Hydro Politics of the Indus River Basin: The Conflict and Cooperation Potential of Trans-Boundary Water in Pakistan-India Relations

By

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Abstract

South Asia, endowed with abundant natural resources and vast river systems originating from its consecutive mountain ranges, faces persistent challenges in transboundary water governance. The unjust boundary demarcation of 1947 and unequal distribution of water resources have created enduring power asymmetries within the Indus River Basin, leading to the securitization of water in the region. Within this context, hydropolitics emerges as a critical field in security studies, offering analytical insights into the complex interplay among states sharing transboundary waters. The Indus water dispute between Pakistan and India reflects a dual pattern of conflict and cooperation, where the Indus Water Treaty (1960) has long served as a framework for water sharing but is increasingly strained by climate change impacts and persistent political tensions. Guided by a comprehensive conceptual framework, this study explores how historical grievances, strategic competition, the Kashmir conflict, cross-border terrorism, and identity-based perceptions shape the hydro-political dynamics between the two nuclear-armed neighbors. Through qualitative analysis, the research identifies the underlying causes and evolving trajectories of both cooperation and confrontation in their hydro-political relationship. The findings suggest that political mistrust, historical divisions, and security rivalries continue to fuel tensions over shared water resources, threatening regional stability. The study concludes that enhanced hydro-diplomacy and cooperative water management are essential for transforming the static and conflict-prone hydro-political relations between Pakistan and India into a foundation for sustainable peace in South Asia.

ABBREVIATIONS

BAR	Basins at Risk
BHEP	Baglihar Hydroelectric Project
CBDC	Central Bari-Doab Canal
CPEC	China Pakistan Economic Corridor
CSCT	Classical Security Complex Theory
ENCOP	Environment and Conflict Project
ICJ	International Court of Justice
ICOLD	International Commission of Large Dams
IHK	Indian Held Kashmir
ILA	International Law Association
IRSA	Indus River System Authority
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
IWT	Indus Water Treaty
KHEP	Kishenganga Hydroelectric Project
LoC	Line of Control
MAF	Million Acre Feet
NE	Neutral Expert
NJHEP	Neelum Jhelum Hydroelectric Project
PIC	Permanent Indus Commission
PPC	Punjab Partition Commission
TFDD	Transboundary Freshwater Dispute Database
UBDC	Upper Bari-Doab Canal
WAPDA	Water and Power Authority of Pakistan

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Introduction

Water is a non-renewable natural resource and its scarcity coupled with other contextual factors make it a contestable commodity giving it a political tinge.[1] In the realm of International Relations, we find two divergent and conflicting perspectives regarding the potential of water, as a facilitator for peace or as a trigger of conflicts. Water scarcity is a matter of concern for the world community and particularly for the developing states. Hydrologists usually assess water scarcity by looking at the population-water equation. According to the United Nations, an area qualifies as being water stressed when annual water supplies drops below 1,700 cubic meters per person and the population faces water scarcity. Absolute scarcity occurs when water availability drops below 500 cubic meters.[2] The environmental resource depletion, ecological degradation, poor management of water have made it a scarcest natural resource in weak economies. Consequently, the insufficiency of water resource sometimes triggers the conflict.

Water security concerns are primarily severe in the regions where various transnational river basins are located, hence these regions become a source of territorial and geopolitical disputes between different countries that share the common water resource. Some of the extensively deliberated main conflicts include the Nile (Sudan, Ethiopia and Egypt), Jordan River Basin along with Yarmouk River (Arab states and Israel), the Euphrates (Syria, Iraq and Turkey), the Han River between North Korea and South Korea, Ganges River among the states of Nepal, Bangladesh and India, the Amu Darya and Syr River among the states of Central Asian Republics, Brahmaputra River between China and India and in South Asia the Indus River Basin primarily between Pakistan and India that might involve Afghanistan and China. Among these, the enduring and noticeable water disputes between riparian nations are those involving Israel and Arab states, and Pakistan-India.

Pakistan and India are two neighboring states that share colonial history, language, culture and water resource. But the two countries differ in ideological foundations, religious dispositions, economic growth and political principles. British colonial rule came to an end in

[1] Deborah Davenport, "Conflict and Cooperation over Natural Resources," in *Introducing Global Issues*, ed. Micheal T. Snarr and D. Neil Snarr, (London: Lynne Rienner Publishers, 2005), 288.
[2] UNDESA, Water scarcity | International Decade for Action 'Water for Life' 2005-2015. Available online at: http://www.un.org/waterforlifedecade/scarcity.shtml, (2015).

subcontinent in 1947 and the boundaries of the two states i.e. Pakistan and India were demarcated in such a way that the head works of a network of canal system built under British rule were physically in Indian control. This demarcation of boundaries consequently imparted India the status of upper riparian while Pakistan turned out to be lower riparian.

The two neighboring riparian countries have started to experience moderate to severe water scarcity in many regions, mainly because of the concurrent specific effects of the agricultural development, economic development, urban expansion, population surge and climatic variations. Owing to the increase in demand of water resources for irrigation purposes, domestic and industrial use, there is probability that major areas of the lower riparian state may face water scarcity, coupled with the varying climatic patterns and rapid changes in socio-economic structures and demography. Therefore, these shrinking and deteriorating resources freshwater might lead to political instability between states in future in the backdrop of already prevalent tense and distrustful regional milieu of South Asia. Moreover, the water sharing issues in South Asia between states, numerous water and energy related matters are unfavorably disturbing the environmental balance, regional food security, and agricultural production in the Indus basin. Therefore, in this context water security has emerged as an increasingly vital and important issue for both Pakistan and India despite signing the Indus Water Treaty as a mechanism for sharing Indus resources between both states.

Hydrology of the Indus River Basin

The Indus is a transboundary river that originates in the Tibetan highlands of western China from the small spring called Sênggê Zangbo or the 'mouth of the Lion'.[3] Having length of approximately 3,200 kilometers, it is one of the longest rivers in Asia, besides Brahmaputra River.[4] The river flows through Jammu and Kashmir after completing its journey from Ladakh, enters Pakistan through the region of Gilgit and Baltistan. Further running through the provinces of Khyber Pakhtunkhwa and Punjab, finally it reaches Arabian Sea in the province of Sindh. Most of the catchment area of Indus River lies in the territory of Pakistan with almost 63 percent while India sharing 29 percent, China and Afghanistan share 5 percent of the Indus catchment area.[5] Water resources from Indus serves around 268 million people of South Asia,

[3] Jean Fairley, *The Lion River*: The Indus (London: John Day Co, 1975), xiii

[4] Arun Bhakta Shrestha, Nand Kishore Agrawal,Bjorn Alfthan, Sagar Ratna Bajracharya, Judith Maréchal, Bob van Oort, *The Himalayan Climate and Water Atlas: Impact of Climate Change on Water Resources in Five of Asia's Major River Basins.* (Nepal: International Centre for Integrated Mountain Development- ICIMOD, 2015), p 58

[5] ibid

therefore, it is one of the most important water resources for both the states.[6] The upper catchments of mountainous Himalaya host enormous reserves of water in the form of glacial ice and permanent snow and sustains one of the world's largest integrated irrigation networks down streams. The Indus Basin supports and maintains a multitude of ecological services indispensable to sustain the economic progress, secure food supplies, alleviate poverty, support prosperity, fuel energy demands and especially it guarantees political stability to the South Asian states that share transboundary water resource in the region.[7]The left and right bank tributaries of Indus are mentioned below in the table.

Figure 1: Table showing left and right tributaries of Indus River

Left Bank Tributaries	Right Bank Tributaries
Jhelum River	Shyok River
Chenab River	Gilgit River
Ravi River	Hunza River
Beas River	Swat River
Sutlej River	Kunar River
Zaskar River	Kurram River
Suru River	Kabul River
Soan River	

Source: Author's compilation

The River Jhelum starts its course in Western Jammu and Kashmir region and is united by the River Neelum in Azad Jammu and Kashmir area in Muzaffarabad. It is called the Kishenganga River in Indian state. The Jhelum River then moves towards south in the Punjab province. The River Chenab begins its journey from the State of Himachal Pradesh in Northern India and flows through the Jammu and Kashmir region and reaches Punjab. The Jhelum River and Chenab River converge at the Head Trimmu in the Jhang District of Punjab province. Continuing the course as the River Chenab, it is primarily joined by the Ravi River and then afterwards meets the Sutlej River near the Bahawalpur. This River after the joining of its

[6] Arun Bhakta Shrestha, "The International Centre for Integrated Mountain Development (ICIMOD). Indus basin initiative". (ICIMOD, Nepal, 2018) available at: https://www.icimod.org/initiative/indus-basin-initiative/
[7] Romshoo Shakil, *Indus River Basin Common Concerns and the Roadmap to Resolution*, (New Delhi: Centre for Dialogue and Reconciliation, 2012), 7.

tributaries is named as Panjnad and meets the Indus River near Mithankot town in Southern Punjab.[8] River Indus now continues to wind and wander through the remaining province of Punjab when finally it reaches its destination and merges with the Arabian Sea in Karachi (Sindh) through the Indus River Delta.[9]

The Indus along with its tributaries receive all waters in the upper hilly parts of their catchment areas. Hence, they have maximum flow in the foothill areas from where these tributaries emerge, besides addition of little surface water flow in the lower plain regions. In plains the water flow is considerably reduced because of evaporation and seepage. The water flow level is at its lowest from mid-December to mid-February. After February, Indus starts rising slowly and then more rapidly at the end of March. The high-water level typically occurs between mid-July and mid-August falling quickly when the level of water flow decreases further steadily near the start of October. Approximately 110 cubic km (26.5 cubic miles) is carried by the Upper Indus Basin that is somewhat less than half of the aggregate water supply in the Indus River system. Chenab and Jhelum River collectively comprises about one-fourth, and the Beas, Sutlej and Ravi River together constitute the remaining of the entire water supply of the Indus Basin System.[10]

Figure 2: Map showing western and eastern rivers demarcated under IWT

Source: http://www.apjmr.com/wp-content/uploads/2015/02/APJMR-2015-3-176-Evaluation-of-Historic-Indo-Pak- Relations-Water-Resource-Issues.pdf

[8] Michel Aloys, *Indus Rivers: a Study of the Effects of Partition*, (USA: Yale University Press, 1967), 29-35
[9] Shafqat Kakakhel, "The Indus River Basin and Climate Change," *Criterion Quarterly* 10, no. 3 (2015), 139.
[10] A.F Lutz., W.W. Immerzeel, P.D.A. Kraaijenbrink , A.B. Shrestha, M.F.P. Bierkens, "Climate Change Impacts on the Upper Indus Hydrology: Sources, Shifts and Extremes," Plos One 11-11 (2016): 02, accessed December 4, 2021, e0165630. https://doi.org/10.1371/journal.pone.0165630

The sharing of transboundary water of Indus River was a main source of confrontation between Pakistan and India since independence. India complicated and exploited the circumstances as being upper riparian after partition by suspending the flow of Indus River in Pakistan, threatening the agricultural and agrarian infrastructure of Pakistan. In April 1948, India blocked the water flow from Central Bari Doab Canals in the sowing period causing crucial impairment to the standing crops in Pakistan that resulted in escalation of tensions between both states.[11] In the absence of any consolidated water management between both newly independent states, India exerted hydro-hegemony being upper riparian and consequently the lack of any water sharing mechanism between neighboring riparian soon morphed into hydro-political conflict, intimidating the stability of South Asia. This state of affairs continued for almost a decade and finally through the intervention of World Bank, both countries signed Indus Water Treaty in 1960 that allocated the three Western Rivers Jhelum, Chenab and Indus to Pakistan and India was given the control of Ravi, Sutlej and Bias, the three Eastern rivers.[12]

The Indus Water Treaty is declared as an accomplishment for sharing of the transboundary waters between riparian states, since it has endured three direct conventional wars, along with the frozen ties between Pakistan and India in addition to the animosity over the ongoing Kashmir issue. Over the last two decades, divergent state opinions have surfaced regarding the interpretations and elucidations of various provisions of the Indus Water Treaty. Moreover, few differences have appeared in recent years over the hydropower generation projects on western rivers in the Upper Indus Basin planned by Indian government that may potentially spoil the bilateral relations between the two nuclear armed neighboring states. The treaty resolves the water issues to a great extent but Pakistan became concerned when India started construction of dams, altering the direction of water flow and reduce water supply to Pakistan.

For an equal and fair distribution of water resource between Pakistan and India, the Indus Water Treaty (IWT) formulated a sharing mechanism. According to Article VIII of IWT, a permanent Indus Water Commission was made, to resolve all issues of conflict by inspection and examination, regular meetings and visits and exchange of statistics and data.[13] If there is

[11] Nawaz Bhatti, Ahmad Farzad, Alvi Asia, Kashi f Ali, Nabeela Akhtar, "Negotiating the Indus Waters Treaty: An Historical Assessment," *Journal of the Research Society of Pakistan* 57, no. 1(2020): 489.
[12] Shaheen Akhtar, "Emerging Challenges to Indus Water Treaty." Issues of Compliance and Transboundary Impacts of Indian Hydro projects on the Western Rivers," *Regional Studies* 28, no. 4 (2010): 16.
[13] Article VIII of Indus Water Treaty

any disagreement, an impartial expert would be consulted for arbitration and mediation. India is under obligation through Indus Water Treaty to let flow the river water without any meddling with the water flow but treaty also permits India to use limited water supply from the three western rivers granted to Pakistan. These consist of non-consumptive domestic use, agrarian use and hydroelectric power generation as regulated in Annexure C, D and E of Indus Water Treaty.[14] India initiated development of its hydropower system in Himalaya region and planned to construct various projects on head works of western rivers especially and Jhelum and Chenab.[15]

Indus Water Treaty has witnessed some strains in recent years, rising reservations about its effectiveness in safeguarding the state interest across both sides of the border. These apprehensions hold the potential to intensify into turmoil by being misinterpreted and misrepresented by aggressive elements in both states. India has started an ambitious program of hydropower generation across the Himalayan region under their control in recent years that involve the construction of around sixty hydropower generation projects of different proportions on the western rivers allocated to Pakistan, especially the Chenab and Jhelum.[16] These developments have caused apprehensions in Pakistan that such projects will enable India to attain manipulative control over the western waters that flow into Pakistan. The Indian government has emphasized that these hydropower generation projects are crucial for Indian developmental needs and have been commenced in accordance with the spirit of the Indus Water Treaty.

The major reservation of Pakistan regarding dam construction on western rivers by India goes beyond the technical limitations of the Indus Treaty and is related to the designs of the dams and lack of data sharing before the commencement of the projects. The apprehensions rather stem from the cumulative capability of these Indian hydropower projects to hinder the natural timing of water flow from these western rivers. The timing of the water flow is a serious concern, as agriculture in the Pakistan is hugely reliant on adequate water flow during the planting period.[17] Therefore, for this purpose the Indian ability to manipulate the timing of water flow was hardwired into Indus Water Treaty by restraining the quantity of live storage in each and every dam structure that India would build on the two western rivers. This limited

[14] Annexure C, D and E of IWT
[15] Interview with Muzzamil Hussain, ex WAPDA Chairman
[16] Interview with Shaheen Akhtar
[17] John Briscoe, "War or peace on the Indus?" *The News International,* April 05, 2010.

live storage of water provided to India under the IWT thus delivered some degree of protection to Pakistan against the upstream manipulation of water flow.[18]

The negotiators and mediators of the IWT could have anticipated the water security danger to Pakistan that could arise from Indian permitted usage of the water from western rivers for agricultural use, domestic use, non-consumptive use, and generation of hydroelectric power. Nonetheless, it is stated that a multiplicity of factors over the time have contributed to aggravating the threat to the brink where the complete framework of treaty lies at the risk of being undermined. Indian political leadership has repeatedly iterated that if India is able to complete all planned hydropower generation projects in Kashmir then India may control the water supply and use it as a political and war weapon against Pakistan in future.[19] India has also threatened to repeal the Indus Water Treaty unilaterally, aggravating Pakistan's reservations over water insecurity.[20]

Indian government has politically decided to commence the construction of major hydropower generation projects across its Himalayan region, predominantly on the headwaters of the Jhelum and Chenab. If this problem is not dealt with technical perspective deprived of the legal mechanism, then it might further aggravate already prevalent tensions between Pakistan and India. Chenab and Jhelum rivers that are awarded to Pakistan according to the treaty, flow through the Indian occupied Kashmir before they enter into Pakistan. This means that any dialogue over water dispute is always linked to the concerns over territorial sovereignty, pointing to the rationale that why tensions in Indian occupied Kashmir very swiftly intensify conflicts over transboundary water sharing mechanism specifically post 2019 after India changed the status of Kashmir. Additionally, a reduced water flow in western rivers might be perceived as Indian approach to put further pressure on Pakistan. Serious projected water shortages in Pakistan, damming and diverting waters by India and expected depletion of water because of global warming in the Indus River Basin are a constant source of mounting tensions between two neighboring states.

[18] ibid
[19] "Blood and water cannot flow together: PM Modi at Indus Water Treaty meeting," *Indian Express*, September 27, 2016, Accessed June 10, 2024, https://indianexpress.com/article/india/india-news-india/indus-water-treaty-blood-and-water-cant-flow-together-pm-modi-pakistan-uri-attack/
[20] Shafqat Kakakhel, "Indus Waters Treaty under threat," *The News International,* March 12, 2023.

Statement of the Problem

Water disputes often get entangled with broader political and diplomatic tensions between the two countries. Pakistan and India have battled three total wars and have been enmeshed in tensed and hostile bilateral relationships since independence in 1947. Although water issue has never been the core causative factor triggering any war between Pakistan and India; nonetheless, circumstances are fluctuating in recent few years. India being an upper riparian country is constructing a number of hydro structures in western rivers that are considered by Pakistan as an endeavor to create its hydro-hegemony and achieve political preeminence vis-à-vis Pakistan in South Asia. The increased demand of water owing to growing population across the border in riparian states and effects of varying climate are causing further competition between Pakistan and India, thereby making water a political commodity. Therefore, hydro-politics has emerged as a major risk in South Asia that may jeopardize the regional stability and peace, besides adversely affecting population of two states in socio-economic sphere.

The hydro-politics in Indus Basin River is a complex issue that stems from scarce natural resource with an immense influence of contextual factors such as surge in population, decreasing water level, construction of dams like Baghlihar and Kishenganga, poor management of water resources, power asymmetry, cross border terrorism, identity related perceptions and Kashmir issue. The increasing demand of water leads to securitization of water resources, unleashing another source of conflict in already longstanding disputes between Pakistan and India. Serious projected water shortages in Pakistan, damming and diverting waters by India and expected depletion of water because of global warming are constant causes of mounting tensions between two neighboring states.

Although IWT was ratified in 1960 by both riparian, the differences between both states have emerged over the interpretation of numerous articles of IWT. Moreover, several issues, that were not dealt with in the scope of Indus Water Treaty or were not predictable at the time of the ratification, have also appeared aggravating water sharing issues between the two neighbors with nuclear capability such as the climate change and reduction in ground water level. Securitization and politicization of Indus water resources in South Asia is aggravating the existing tenuous and fragile bilateral relationship between both riparian states i.e. Pakistan and India. The linkage of national security with the administration of transboundary hydro

resource in South Asian region has additionally complicated the hydro-management discourse between Pakistan and India.

Research Objectives

1. To critically examine the historical evolution of Pakistan-India transboundary water governance.
2. To assess how contemporary factors—geopolitical, climatic, and developmental reshape the patterns of cooperation and conflict in hydro-politics.
3. To evaluate future trajectories of hydro-political relations under new regional and environmental constraints.
4. To analyze the role of domestic water governance as a structural determinant in bilateral hydro-political disputes.

Research Questions

1. How have the post-partition politics and asymmetries shaped the evolution of transboundary water governance between Pakistan and India?
2. Why do challenges in implementing the Indus Water Treaty play a crucial role in shaping conflict and cooperation between Pakistan and India?
3. How are changing geopolitical realities, climate pressures, and hydropower developments reshaping the balance between conflict and cooperation in Pakistan-India hydro-political relations?
4. Why do local governance and subnational water politics determine patterns of conflict and cooperation over shared Indus waters?
5. How will changing transboundary water dynamics influence the future patterns of conflict and cooperation between Pakistan and India?

Literature Review

Water is a considered as strategic and vital natural resource, and the scarce availability of water is a recurrent contributor to the political clashes across the globe. Water is a moveable natural resource that crosses the frontiers and boundaries of various states and has the potential to influence the geopolitics, diplomacy and even conflict in 21st century. Therefore, its effective management is more problematic and challenging because it can fluctuate and change over a period of time. It can even become more perplexing where the riparian states are predominating rivals and already have strained relations between them. The upper riparian might take benefit

of the geographical location and can manipulate the quality and quantity of the available water resource to the lower dependent riparian.

Competing water usage is posing serious challenges in South Asia when combined with environmental degradation, demographic pressure and rising demand for water. As much of the South Asian region is arid or semi-arid, poor watershed management provides fertile ground for conflict in the background of complex, political, historic and security divergence between nuclear armed Pakistan and India. While looking at the trajectory of water sharing mechanisms between both countries, problems arise with the power asymmetry in the geographical position, political and economic spheres that lends India a strategic leverage over Pakistan.

The literature review of this study is based on the thematic analysis that is critically divided in various themes. These themes revolve around the key concepts and variables that play significant role in understanding and analyzing the core argument of this study. The literature reviewed reveals the complex interplay of different patterns of conflict and cooperation entrenched in the hydro-political complex of South Asia. The Indus River Basin dispute between Pakistan and India have been analyzed by applying several investigative lenses that range from realist understandings of water as a cause of tactical conflict to a constructivist and institutional angles that underline the accommodating and collaborative mechanisms like the Indus Water Treaty. The thematic examination combines existing literature across five significant themes:

- Water as an instrument of conflict and cooperation in Pakistan–India relations
- Emergence of hydro-politics as a framework for analyzing transboundary interactions
- Application of the hydro-hegemony framework in understanding power asymmetries
- Performance, resilience, and limitations of the Indus Waters Treaty
- Interlinkages between territorial disputes, identity politics, and basin governance

These themes deliver a holistic foundation for the transitional nature of Indus Basin politics in the changing milieu of climatic variation, geopolitical tensions, and institutional insufficiencies.

Hydropolitics and Securitization of Water in South Asia:

Water plays crucial role in every field of life and became a sign of life and death. It has been involved in all perspectives of life from environment to economy, culture to politics, prosperity to poverty and dispute to war, hence water scarcity affects all areas of life in wide

spectrum.[21] Therefore, water became a source of hydro-politics across boundaries. Serious political instability in some regions makes this even more complicated as poor relations between neighbors can weaponize water governance. There have been two ideas in literature about water sharing; one was 'war for water' and other was 'peace for water'. Those two ideas depict different scenarios; one was about water disputes that can bring states to the brink of wars while on other side of picture shows cooperation by compromises made by two states for peaceful sharing of water. However, this peaceful sharing does not mean absence of conflict.

Hydropolitics refers to the political competition and geopolitics, of the water resources, predominantly in regions where water is scarce or contested. It involves the usage of water resource as a political tool, and the influence of water management on global politics, conflict, and cooperation. The conceptual framework of hydropolitics provided a linkage of power asymmetry, geographical location, and environmental security in transboundary river basins. The securitization of water in South Asia has increased distrust and strengthened the state-centric control over transboundary resources, where riparian countries structure resource access as an issue of national security. This structuring of natural resources as a security agenda limits cooperative governance and often transmutes environmental/ hydrological interdependence into geopolitical competition.[22]

In Pakistan, hydropolitics is a significant issue due to the country's dependence on the Indus River Basin, which is shared with neighboring India. The Indus Waters Treaty that was ratified by both states in 1960, is a key settlement which governs the sharing of water resources between the two countries. Some of the key aspects of hydro-politics in Pakistan include, water sharing mechanism with India on eastern front and Afghanistan on western border, management of the transboundary Indus River Basin, construction of dams and water infrastructure, effect of climatic variation on South Asian water resources and transboundary water governance.

Hydropolitics is a term that needs to be explored when we apply this on Pak-Indian case of water dispute. Hydropolitics is a concept given by Micheal Shulz and is further elaborated by Anthony Turton in his book, "*Hydro politics in the developing world: A South African perspective*."[23] Turton explains the theory of hydropolitics and also the idea of hydro

[21] Michael Renner, "International Conflict and Environmental Degradation," in *New Directions in Conflict Theory, Conflict Resolution and Conflict Transformation*, ed., Raimo Vayrynen (London: Sage, 1991) p. 29-30.
[22] H. Hussein and M. Grandi, *"Dynamic Political Contexts and Power Asymmetries: The Cases of the Blue Nile and the Yarmouk Rivers," International Environmental Agreements* 17 (2017): 799
[23] Anthony Turton, "Hydropolitics and Security Complex Theory: An African Perspective," 4th Pan-European International Relations Conference, University of Kent, Canterbury. Sep, 2001.

hegemon in any hydropolitical complex region. He chooses South Africa. However, it is quite helpful in developing the framework regarding the analysis of the water related issues in developing world, which can be applied to South Asia and especially on Pak-Indian case. Different countries had conflicts and fought for natural resources like oil, gas, minerals etc. but most crucial or threatening issue regarding natural resources would be dispute over water, because water has been a vital source for survival of all living things on earth, economic growth of nations and natural ecological stability. Arun P. Elhance's describes hydro-politics as "the methodical study of conflict and cooperation between different riparian countries over the water resources that surpass international boundaries".[24] Mollinga, splits water politics into four different types, "the routine politics of water resource administration", "the politics of water strategy in the context of independent countries", "inter-state hydropolitics" and "the international politics of water".[25]

Scott M. Moore, in his book "*Subnational Hydro-politics: Conflict, Cooperation, and Institution- Building in Shared River Basins*" discusses the possible reasons of conflict between states. The study suggests one of the inclusive descriptions of the dynamics of conflict and cooperation in the mutual shared subnational river basins that had diminutive scholarly consideration by the water practitioners and academicians studying hydro politics.[26]Traditionally, examples from history of conflict between riparian states over the water as a sole reason have been rare. Far more common, and more economically and socially disturbing, are tenacious political struggles and disputes between water users at the subnational level, particularly those which include political dominions like federations, provinces, and regions with in states. India faces its own water scarcity based on supply and demand projections, providing India an excuse to store or divert water that would otherwise reach Pakistan. Water shortages would pressure the government of Pakistan to get increased share of water under the Indus Water Treaty as Pakistan is greatly reliant on the Indus water sources and has limited alternate water supply sources unlike India. This subnational hydropolitics and its pressure on the national and international level is discussed in chapter five of this thesis.

In case of South Asia, hydropolitics had been initiated with the partition of Pakistan and India in 1947 when India could not digest independence of Pakistan and kept grip of the

[24] Arun P. Elhance, *Hydropolitics in the 3rd World: Conflict and cooperation in International River Basins* (Washington, DC: US Institute of Peace Press, 1999), 3.
[25] Peter P. Mollinga, "Water, politics and development: Framing a political sociology of water resources management," *Water alternatives* 1, no.1 (2008): 7-12.
[26] Scott Moore, *Subnational Hydro-politics: Conflict, Cooperation, and Institution- Building in Shared River Basins* (New York: Oxford university Press, 2018), xi-xii.

headworks of water in hands of Delhi. India put objection on the allocation of Gurdastpur and Ferozpur areas to Pakistan, although Redcliff was of the opinion that these areas with headworks would be allocated to Pakistan based on the principle of partition that decided that the Muslim majority regions would be awarded to Pakistan. But owing to the communication between Mountbatten and Redcliff, Gurdaspur was awarded to India and Pakistan became a downstream region. This awarding of Gurdaspur to India resulted in all water headworks under control of India with solitary land way to Kashmir.[27]

"Hydro-Diplomacy: Preventing Water War Between Nuclear-Armed Pakistan and India" by Ashfaq Mahmood elucidates various ups and downs being encountered in the management of the transboundary water relations between both neighbors since the bloody partition of Indian subcontinent in Pakistan and India in 1947. Although the ratification of Indus Waters Treaty (IWT) took place in 1960, various differences between Pakistan and India began to re-emerge in 1970's over the understanding of several sections of the Treaty coupled with the objections on the design of water infrastructure developments by India on the western rivers allotted to Pakistan. Being a water practitioners approach and lessons received from the real-life experiences and knowledge, the study lays recommendations as how to prevent water problems from escalation in future and hence a full fledge nuclear war between Pakistan and India.[28] The writer suggests that hydro-diplomacy is the key to prevent water war between two neighbors with nuclear capabilities.

Water as a source of conflict or cooperation in Pak- India bilateral relations:

The Pak-India hydropolitical relationship over Indus Basin demonstrates the dual character of water as both an instrument for cooperation and a catalyst for interstate tensions. Literature reviewed suggests that despite tenacious antagonism, the two riparian states have upheld an operational framework through the Indus Waters Treaty, demonstrating that even rival neighbors can cooperate under compulsion. However, episodic disputes over flow disruptions, dam construction, and treaty interpretation continue to inject political distrust and certainty into technical consultations, making the Indus Basin a classic case of "cooperation under constraint." [29]

[27] Sheikh Ghulam Rasool Waleed and Manzor Nazim, "Hydro Politics as Hybrid War: The correlation to Kashmir and Pakistan Survival," *Abasyn Journal of Social Sciences* 10, special issue (2017): 170.
[28] Ashfaq Mehmood, *Hydro-Diplomacy Preventing Water War between Nuclear Armed Pakistan and India* (Islamabad: IPS Press, 2018), 12-14.
[29] S. Akhtar, *"Challenges and Opportunities in the Indus Waters Treaty: A Legal and Political Analysis," International Journal of Water Resources Development* 39, no. 1 (2023): 47

Pakistan and India share a complex, complicated and fundamentally unfriendly relationship that is embedded in a multitude of historic and political events, the most notable is the division of Imperial India in August 1947. Pakistan and India became independent seventy-five years ago out of a bloody separation of the Indian subcontinent by the British, an incident usually referred to as the partition. Since the establishment of both the states in 1947, the bilateral relations of Pakistan and India have been unstable and both the countries have fought four wars. The Kashmir issue has been the main irritant between both the states and is still an unsettled and undecided boundary dispute in South Asia awaiting its resolution as per international norms. Cross border terrorism, is however another key issue which has stalled the relationship. Although many encouraging and progressing initiatives were taken in due course, yet the Pakistan-Indo bilateral relationship in recent era has reached at its lowest ebb after revocation of article 370 by India that altered the Kashmiri status.

While both the nations established full diplomatic and political relations after their formal independence, the bilateral relationship between them was swiftly overshadowed by the mutual impacts of the division as well as by the emergence of inconsistent and conflicting territorial assertions over several princely states, with the utmost noteworthy dispute being that of Jammu and Kashmir region. Pakistan and India have been involved in several military skirmishes and armed standoffs; the Jammu and Kashmir conflict has functioned as the catalyst for almost every military conflict between both states, with the exemption of the Pakistan-Indo War of 1971.

The Pakistan-India bilateral relations has often been suffered by territorial disputes, cross-border terrorism and ceasefire violations etc. The bilateral relationship was rocked in 2019 by numerous tense incidents like the Balakot airstrike and Pulwama terror attack in the backdrop of scrapping special status of Jammu and Kashmir. Regardless of the formation of diplomatic relations after their immediate violent partition and independence, several wars, terrorist attacks and various territorial disputes dominated their relationship. A number of efforts were made to develop the bilateral ties that were effective in de-escalation of tensions in the region. Nonetheless, these efforts for improving relations were hampered by terrorist attacks or ceasefire violations.

Water issue has become conspicuous owing to the increased water scarcity and insecurity in Pakistan. Owing to the massive and over-extraction of groundwater, the underground aquifers of Indus Rivers are critically being depleted and the two major dams, the

Tarbela dam and Mangla dam have seen a deterioration in their storage volume due to the excessive and unnecessary deposits of silt. Per se, any reduction in the water flow will have severe consequences for Pakistan. United Nations in its report in 2006, *"Regional Cooperation between Countries in The Management of Shared Water Resources: Case Studies of Some Countries in The ESCWA Region*," highlighted the mutual benefits of accommodation and collaboration in transboundary water resource between the riparian. These may include biodiversity and quality of water, effective management of ecosystem of river basin, energy generation, improved agricultural yield and particularly the decrease in tensions and confrontation. But the report suggests that the magnitude of political, administrative, economic, cultural and topographical conditions vary from basin to basin.[30] The dawning of 21st century is melancholic for the upcoming generations of South Asia owing to the increased water scarcity that often fabricated the threats of water conflicts as well.

"Contested Waters India's Transboundary River Water Disputes in South Asia" by Amit Ranjan, analyzes the Indian transboundary river water disputes with its South Asian riparian neighbours that include Nepal, Pakistan, Bhutan and Bangladesh. The book discovers the historical traces of disputes and collaboration over the transboundary river water in South Asia as well as deliberates on the existing disputes and future challenges. He indicated that India's transboundary river water differences with its South Asian riparian neighbors are most likely to intensify in the coming years owing to the widening of the demand-supply gap in the respective riparian republics. It additionally shows the influence of the nature of bilateral relations on the resolution of transboundary water sharing disputes, as even the amiable relationships do not might guarantee the absence of river water disputes between riparian states.[31]

Khalid Mehmood Arif in his book, "*Estranged Neighbours,"* has clearly dealt with this issue and he has described the significance of water and its role in achievement of developmental objectives, the attainment of edible and food commodities in agrarian state and its impact on quality of life of human beings. He illustrated that it was unacceptable for Pakistan to keep silent on the formula forwarded by India, assenting the India's privileges on the rivers premised on the fact that India is upper riparian. He also discussed the Kishenganga project

[30] "*United Nations, "Regional Cooperation Between Countries in The Management of Shared Water Resources: Case Studies of Some Countries In The ESCWA Region‖."* (New York, UNO, 2006), accessed on Dec. 5, 2020 http://www.escwa.un.org/information/publications/edit/upload/sdpd05-15.pdf"

[31] Amit Ranjan, *Contested Waters India's Transboundary River Water Disputes in South Asia* (NewYork: Routledge, 2021), 31-33

that was started by India in 1994 in Indian Occupied Kashmir.[32] The author has also argued about the construction of Wullar Barrage that commenced in 1984, which tried to alter the natural flow of Wullar Lake thereby restricting the flow of water to Pakistan. The work on the barrage was halted in 1987 owing to the strong and severe protest of Pakistan.

Manish Vaid & Tridivesh Singh Maini have discussed the water issue between Pakistan and India in their article, *"Indo-Pak Water Disputes: Time for Fresh Approaches*," and concluded that the water scarcity primarily stems from the partition of subcontinent. They further argued that the decrease in availability of the surface and ground water is due to the environmental changes and also from poor water management in both states. They stressed the need for mutual cooperative mechanism under the framework of existing IWT. The challenges posed by water scarcity to both neighboring states should be dealt in moral spirit for future generations and this issue should bring cooperation rather than conflict and hostility between them.[33]

Uttam Kumar Sinha in his book "*Riverine Neighborhood: Hydro-politics in South Asia"* has critically emphasized that the natural/physical characteristics of 'location' and the complicated relationships develop and interrelate by connecting environmental, societal dynamics to the economic and political systems. Sinha revealed the underlying forces of hydro politics in South Asia since it has the largest ratio of Transboundary Rivers in the region and collaboration among the South Asian riparian states is certainly high but this does not indicate the absence of competing privileges and rights for water. Therefore water will remain profoundly a political discourse in this region. Frequently the water treaties and arrangements are not always about water alone. History and hegemony play an imperative role in comprehending the strategic communication among riparian nations and in the contextual structure under what circumstances politics interfere with cooperation or whether sharing of water resource performs as a counterbalancing factor in difficult political circumstances. Equally essential is how the history and competing interest impacts the riparian behaviour.[34] The rivers in South Asian region as they cross the political frontiers, present interdependencies which can either catalyze or reduce differences.

[32] Khalid Mehmood Arif, *Estranged Neighbours* (Islamabad: Dost Publishers Islamabad,2010), 172.
[33] "Manish Vaid and Tridivesh Singh Maini, "Indo-Pak Water Disputes: Time for Fresh Approaches," *Peace Prints: South Asian Journal of Peacebuilding* 4, no. 2 (2012): 24-26
[34] Uttam Kumar Sinha, *Riverine Neighborhood: Hydro-politics in South Asia* (New Delhi: Pentagon Press, 2016), iv-xi.

Fatima Riffat and Anum Iftikhar have analyzed the effect of hydro-politics on the bilateral relations of Pakistan and India in their article, "*Water issues and its implications over India-Pakistan Relations.*" They have discussed the issues of contention between both states like Wullar barrage, Kishenganga project and Baghlihar dam. Despite signing the Indus Water Treaty, the issues started emerging on the designs of these hydro-projects pursued by India on western rivers. They mentioned the stance of John Briscoe that the Indus River can bridge the gulf between two states because it is the issue of mutual survival for both states.[35]

Muhammad Nasrullah Mirza has touched the water issues deeply in his book "*Water, War and Peace linkages and Scenarios in India Pakistan Relations."* The author has given a detailed analysis of water issues between India and Pakistan and the construction of hydropower generation projects like Baghlihar dam on Chenab River, Wullar barrage, Kishenganga over Neelum. He has deliberated on IWT as well where he said that India considers the Pakistani viewpoint as baseless when the latter complains about breach of treaty regarding construction of dams.[36] India views that Pakistan is creating unrelenting obstacles by using treaty against different projects undertaken by India. He is of the opinion that Pakistan greatly depends on water flow from Indus and unrestricted water flow under the auspices of treaty is an issue of life and death for us where India uses water as a political tool for arm twisting of lower riparian.

Brahma Chellenay in his book, "*Water, Peace and War: Confronting the Global water crisis"* debates about the vitality of water and designates it to be more significant that oil. He argues that scarcity of water along with environmental changes and global warming can become a flashpoint in Asia. He is very critical of construction of dams by China in Tibet region where he claims that this move can accentuate a sense of alarm in India where India is a lower riparian as considered to China. He says that being a strong state, China ignores that concerns of lower riparian states and can result in strained relations between them. But in Pak-Indian case he couples water scarcity of Pakistan with terrorism.[37]

Bilal Hussain in his article, "*China, Pakistan and India: Moving beyond Water Wars,"* discussed the importance of cooperation among the countries that share Indus Basin rivers and

[35] Fatima Riffat and Anum Iftikhar, "Water issues and its implications over India-Pakistan Relations," *Journal of the Punjab University Historical Sciences* 28, no. 2 (2016): 11-20.
[36] Muhammad Nasrullah Mirza, *Water, War and Peace Linkages and Scenarios in India Pakistan Relations* (Sarbrucken: Lambert Academic Publishers, 2011), 5.
[37] Brahma Chellenay, *Water, Peace and War: Confronting the Global Water Crisis* (Rowman: Littlefield Publishers, 2013), 13.

emphasized that the reliance on the transboundary water resource should promote cooperation and accommodation rather than conflict and hostility. He opined that there should be a joint endeavor for water sharing mechanism among all the states that share Indus River for a win-win situation both economically and ecologically. Hydro diplomacy and the role of mediators like World Bank, Asian Development Bank and NGO's is crucial to bring all the stakeholders for cooperation on Indus River Basin.[38]

Indus Water Treaty: Institutional Resilience and Emerging Challenges

The Indus Waters Treaty (IWT) is a landmark agreement signed between Pakistan and India on September 19, 1960, in Karachi, Pakistan. The treaty aimed to resolve disputes over the sharing of the Indus River basin's waters, which flow through both countries. The treaty apportioned the river water of the Indus Basin along with its tributaries between Pakistan and India. Pakistan received the Indus, Jhelum, and Chenab rivers, while India received the Ravi, Beas, and Sutlej rivers. India was allowed to build hydroelectric power projects on the rivers allocated to Pakistan, subject to certain conditions. The IWT has survived several conflicts and tensions between Pakistan and India, and its implementation has been largely successful, with some exceptions. However, there have been recent tensions and disputes over Indian hydropower projects on the Chenab River that Pakistan claims violate the treaty's provisions.

Indus water Treaty was ratified between Pakistan and India but later on both signatories felt that this treaty was unable to fulfill all their demands, because both countries still had conflicts over right of Kashmir's geography. India tried to teach Pakistan a lesson that India had more occupation over rivers and Kashmir. Indus Water Treaty was only agreement in which a natural and vital resource like water had been sold out between two nations. The research on the Treaty has amply proven the fact that it benefits India far more than Pakistan.[39] In fact some scholars have asserted that a non-democratic pro-American government in Pakistan at the time deliberated legitimacy to an action of global plunder at an exceptionally high economic cost to the people of Pakistan.[40] According to Indian view, Pakistan wants occupation over Kashmir just to ensure its control over waters of Indus water system. In a modern study it has been mentioned that, Pakistan's foremost purpose behind claim for right on Kashmir was just to secure water resources.

[38] Bilal Hussain, China, India, Pakistan: Moving Beyond Water Wars," *The Diplomat,* October 06, 2016, https://thediplomat.com/2016/10/china-india-pakistan-moving-beyond -water-wars/

[39] Baqai Huma, Water-related Issues in South Asia: Conflicts in the Making, Pakistan Horizon, Vol. 58, No. 3 (July 2005), 81

[40] ibid

Pakistan and India would be at the verge of war over water issue in upcoming years. Pakistan and India have to resolve this hydro-politics in a way that flowing water of Indus river system served as a source of binding them together and not as a source that took them on the brink of water disputes. Water scarcity had become a burning issue in Pakistan. As annual per capita water had drastically reduced from the time of separation, which was 5600 m^3 per capita annually in 1947 and after 2010 it became less than 1000 m^3 per capita annually.[41] These situations further worsened conditions for cash crops like cotton and wheat in Pakistan."

Niranjan Das Gulhati in his historic work, *"Indus Waters Treaty: An Exercise in International Mediation,"* has recorded a detailed analysis of the negotiation protracted process before the ratification of the water agreement between Pakistan and India. The negotiation process is the most important factor and it is very under examined area of study referred by the researchers. Ijaz Hussain in his book, "*Political and legal dimensions of Indus Water Treaty,"* has done an in-depth analysis of the treaty and presents a chronological examination of water issues between Pakistan and India since their independence. He gives a candid explanation of Indus River system, origin of water dispute between both neighboring states, role of World Bank in IWT as a negotiator and also highlights the provisions of IWT and its implementation. He also raised an important issue that the treaty is silent on climatic change and this has become the most significant determinant in Pak-India water dispute in the contemporary era.[42]

Robert Wirsing and Christopher Jasparro opined in their article, *"Spotlight on Indus River Diplomacy: India, Pakistan, and the Baghlihar Dam Dispute*," that the scarcity of water resource have risen tensions between India and Pakistan and the inability to resolve the water dispute between both riparian along with inadequate management of water resource would prove disastrous not only for both of them but for the whole region. India was persistently considering pulling out of the IWT as one of the steps of hitting back at Pakistan for its suspected support of terrorist outfits targeting India from December 2001 to June 2002, and in reciprocation Pakistan has iterated that it would be ready to use nuclear weapons over a water crisis.[43]

[41] Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2008 Revision,* (New York: United Nations, 2009), available at http://esa.un.org/unpp.

[42] Ijaz Hussain, *Legal and Political dimensions of Indus water Treaty* (Oxford University Press July 2018), 47.

[43] Robert Wirsing and Christopher Jasparro, "Spotlight on Indus River Diplomacy: India, Pakistan, and the Baglihar Dam Dispute," *Asia-Pacific Center for Security Studies.* Accessed from http://www.apcss.org/Publications/APSSS/IndusRiverDiplomacy.Wirsing.Jasparro.

Ahmer Bilal Soofi in his paper *"Filling the missing gaps in the Indus Water Treaty,"* has discussed the background of water dispute between Pakistan and India and linked it to the current apprehensions in Pakistan regarding water insecurity in the Indus River Basin. He also differentiated between the perception and reality of the tensions regarding the Indian construction of run of the river projects on western rivers and emphasized on the need to reinterpret the Indus Water Treaty according to the needs of the time. Similarly, he cited the development of International Law since ratification of the treaty and accentuated the importance of cooperation on legal and political level apart from technical collaboration that will help lessen the tensions regarding water insecurity.[44]

Syed Jamait Ali Shah emphasized on the upgrading of Indus Water Treaty and improvement of hydro management concerns in Pakistan. He elaborated in his article, *"Indus Waters Treaty under Stress: Imperatives of Climatic Change or Political Manipulation,"* that India should comply with the treaty by designing the projects according to the parameters of IWT and should share the statistics with Pakistani counterpart of Indus Water Commission. Pakistan should also use maximum water flowing in its territories and the problem of the water scarcity and reduced availability is not only restricted to the water sharing mechanism between Pakistan and India rather the poor management of water resource coupled with environmental stress makes Pakistan a water scarce state.[45]

The Indus Water Treaty remains a keystone of transboundary water management and one of the rare enduring connotations of Pakistan and India collaboration. Despite military combats and geopolitical predicaments, IWT has operated, demonstrating organizational resilience. But, change in climatic patterns, population surge/ urbanization and hydropower generation projects are challenging its adaptability. Various academicians and practitioners significantly call for structural reforms in the structure of treaty that surrounds climate-sensitive operational rules, data transparency, and innovation in dispute resolution processes in order to uphold the applicability of IWT in a hastily altering hydrological context.[46] Renegotiating the Indus Water Treaty may become an imperative diplomatic issue between Pakistan and India. Water issue with India is a far more human security, strategic and political matter than just water sharing. India has started propagating that Tibetan water is for humankind, and not for

[44]Ahmer Bilal Soofi, "Filling the missing gaps in the Indus Water Treaty," *ISSI,* no.31(2016): 15-17
[45] Syed Jamait Ali Shah, "Indus Waters Treaty under Stress: Imperatives of Climatic Change or Political Manipulation," *Margalla Papers* XV, no. 1 (2011): 12-13
[46] *The Indus Water Treaty: Historical Context, Provisions, and Implications in the Contemporary Era," UPPCS Magazine*, accessed October 11, 2025, https://www.uppcsmagazine.com

China alone, but they have forgotten that the Indus-Ganges basins are also for humanity, not for India alone. The third chapter of the thesis provides in-depth analysis of the treaty provisions and the possible modifications in it.

Kashmir issue: Nexus of Geopolitics and Hydro-security

The Kashmir issue is identified as a critical contextual variable in the hydro-political dynamics of the Indus River Basin. The headworks of main western rivers originates in the disputed terrain of Kashmir, thereby, interweaving territorial sovereignty and hydro security**.** Political distrust, high militarization of region, and contending domestic narratives make accommodating basin management enormously difficult. Various scholars contend that de-securitization of Kashmir, water governance at interstate and intrastate level will continue to be a hostage to nationalist politics rather than directed by environmental sagacity or regional interdependence. Kashmir issue is a longstanding territorial conflict between Pakistan and India, where both states claim sovereignty over the disputed region. The dispute started in post partition era, when India and Pakistan gained freedom from British colonial rule in 1947. Two south Asian countries had two wars on Kashmir dispute.

Three main reasons had made both nations always in war conditions on issue of Kashmir. First and most important reason of Kashmir dispute was emotional attachment of both nations. Pakistan came into being with an idea of 'two nation theory', so that Pakistan claimed occupation over Kashmir because Kashmir valley was a princely state with Muslim majority. On other side, India as a secular country had not accepted the concept of Muslim nationalism in subcontinent and likewise the 'two nation theory' that served as the foundation of Pakistan. Therefore, India did not endorsed the idea of separate Muslim state as Pakistan and claimed its right over Kashmir. Second reason behind Kashmir conflict was political and legislative issue. When both countries failed in resolution of conflict with United Nations, population of Kashmir stood for their rights. Pakistan had helped them in their step and India argued that conditions became more complicated because of Pakistan's support to Kashmiris. Last reason behind Kashmir dispute is that Kashmir had catchments of Indus river system and if India gave independence to Kashmir or gave its control to Pakistan, India would no more be an upstream country and would lost its power over Pakistan. And Pakistan being downstream needed control over water of Indus badly, to secure its economy, environment, population and ecological balance.

Pakistan is all also cognizant of its vulnerable position vis-a-vis water entering in its territory from Indian occupied Kashmir. More than 400 dams are under construction, or are scheduled for the coming decades, in South Asian countries like India, Nepal, Bhutan, Pakistan; many more will be built across the Chinese border in Tibet. If these strategic dam construction in Indus Basin is achieved in future, this region will be among the most comprehensively dammed river basins in the world. These arrangements will both intensify international tensions and also have grave ecological and environmental hazards that don not respect ant borders between states. Equally imperative as Indian government fears Chinese ambitious plans to dam the Brahmaputra specifically, Bangladesh has already experienced the repercussions of Indian hydraulic engineering experiments upstream. In case of Pakistan and India water sharing mechanism, India has constantly and emphatically upheld that it has never interfered or manipulated with Pakistan's share of the Indus water supply. India has rarely acknowledged that it has meddled with the water supply from the three western rivers flowing to Pakistan. As there is also an excessive degree of secrecy that surrounds the management of the water of Indus basin and data is not eagerly shared, there is no conclusive means to verify whether India has just got caught up in Pakistani sensationalism or whether the seeds of antipathy and securitization of water resources were sowed and currently being retained by the Indian side.

Water dispute between Pakistan and India is linked to the Kashmir issue because the strategic geographical location of Kashmir compels both the states to control and influence the valley. The Jammu and Kashmir conflict is coincided with the water issue since partition. Both the issues are interlinked and the historic evaluation of bilateral relations between the two states demonstrates that the occupation of Kashmir valley by Indian administration is important primarily because India wants to control and manipulate the flow of transboundary rivers. Muhammad Tayyab Sohail in his article, "Evaluation of Indo-Pak Relations, Water Resource Issues and its impact on Contemporary Bilateral Affairs," has emphasized on the Kashmir issue as the irritant between both states because as the upper riparian India has physical control over Kashmir and Pakistan depends on waters that flow through the Indian occupied areas in Kashmir.[47]

The climatic change and variation is increasing unpredictability in the weather patterns and is leading to more dangerous weather events like droughts, famines and floods. Climatic variation and degradation is expected to aggravate the pressure on water resources in Indus

[47] Muhammad Tayyab Sohail, "Evaluation of Indo-Pak Relations, Water Resource Issues and its impact on Contemporary Bilateral Affairs," Asia Pacific Journal of Multidisciplinary Research 03, no, 1 (2015): 51

Basin along with its tributaries, because the recurrence and intensification of floods and droughts are also increasing in Pakistan in recent years. Therefore, peaceful sharing of transboundary natural resources especially water resources thus turn out to be complex often and henceforth conflicts in many cases come to be obvious phenomena. When power asymmetry exists in states, and relations are not peaceful, tensions do rise on the continuousness of the water arrangement.[48]Since independence in India, the annual per capita availability of water has progressively reduced from 6,008 m3 in 1947 to 2,266 m3 in 1997. Yet it dipped to 1,820 m3 in 2001, and continue decreasing with every coming year. If this situation remains same, India may reach the ambiguous label of being a water scarce country by 2025 (estimated 1,140 m3/year/ capita).[49]

Undala Alam deliberates the significance of Indus Water Treaty and delivers an insight and understanding regarding conflict rationale that both rival states might have fought a war on the transboundary Indus River Basin but instead they negotiated the treaty and distributed the Indus with its five tributaries between them after negotiation. Both the states have maintained the treaty for almost forty years, though they have fought two wars and also conducted nuclear tests. This hints at the cooperation and accommodation potential of transboundary water resource between two neighboring nuclear rivals.[50] The projected literature helped to provide insights into the potential and role of transnational water resource as a source of conflict and certain cooperative steps by the co-riparian states. The literature perused for this case study demonstrates that water is life line for human existence and the unequitable distribution or water supply possess the latent capability to influence geopolitical dynamics, diplomatic ties between riparian states may leading to even protracted conflict. Undoubtedly, the water issue between Pakistan and India stemmed from partition in 1947 that demarcated the boundaries of subcontinent and India became the upper riparian while Pakistan became the lower riparian of Indus River basin. The hydro politics between both the states was resolved by Indus Water Treaty but the situation aggravated by the Indian construction of hydro-projects at western rivers.

[48] Khursheed Ahmad Wani and P. Moorthy, "Indus Waters Treaty: An Emerging Flashpoint between India and Pakistan," *Pakistan Horizon* 67, no. 02, (2014): 45-47.
[49] Roshni Chakraborty, Ismail Serageldin, "Sharing of River Waters among India and its Neighbors in the 21st century: War or Peace?" *International Water Resources Association Water International,* 29, no. 2, (2004) 201–208.
[50] Undala Alam, "Questioning the water war rationale: A case study of Indus Water Treaty," *The Geographical*, 168, no. 4 (2002) 341-353.

Every individual and state depends on water for survival and water also fuels a country's commerce, trade, industry, innovation and economic success. Despite water shortage and scarce availability is a severe issue in numerous states around the globe it has frequently been unnoticed, underfunded, overlooked and underestimated issue within the foreign strategies of states across the world. Water politics between both riparian is generally overshadowed by overall antagonistic bilateral relationships of Pakistan and India. The traditional discourse in academia, political sphere and strategic domain revolves predominantly around Kashmir issue and cross border terrorism. This study focuses upon the water tensions between two rival nuclear neighboring states where hydro-politics is quietly smoldering and emerging as a sleeper risk that has the potential to thwart the existing incompatible relations between them.

The literature reviewed regarding hydropolitics between Pakistan and India shows that there is a considerable difference in the hydro-political discourse where some writers hail IWT as an example of cooperation in the riparian states while others view securitization of water as a trigger and an impetus of conflict between Pakistan and India. We find both discourses in the appraised literature sources. The importance of Kashmir dispute is also imperative and interlinked to the water dispute between Pakistan and India. Likewise there is an urge to revisit the Indus Water Treaty because its scope does not include the environmental and ecological issues. This literature review aided to evaluate the different discourse on the subject matter and further helped to find the research gap and refine my research.

While examining the available scholarly literature on the water dispute between both states and the Indus Water Treaty, I found that a considerable literature is available on the Indus Basin problem that deliberates the Indus Water Treaty in detail but very little is known of the negotiation process regarding the water sharing dynamics in inter-conflict years while the treaty was being formulated. The second chapter serves this purpose and discusses in detail the long and cumbersome negotiation process before ratification of the treaty. The literature lacks an examination of episodes of cooperation amidst the ongoing competitions and their impact on the broader correlation. We generally focus instead on two distinct and extremist views: that "water is the source of conflict" and "water is the facilitator of peace" - an ongoing debate between the water 'war theorists' and 'water peace' theorists. Historical accounts offer numerous cases where rival riparian countries, despite resorting to the use of force, eventually achieved accommodation across Transboundary Rivers. Overall, however, such settlements rarely encouraged collaboration and peace among them and their enmities generally remained

intact. The example of Pakistan-India cooperation over the Indus Basin Rivers that are coupled with prolonged conflict and a series of wars over the territory of Jammu and Kashmir offers a remarkable illustration of this phenomenon.

The conceptual framework of Hydropolitical Complex Theory, Hydro hegemony and Environmental Scarcity Model combined gives this research problem a new dimension of analysis that is generally viewed from other theoretical angles. The conceptual framework helped to examine the under discussion phenomena from the perspectives of securitization and politicization of water resource coupled with the other factors as geography, power asymmetry, ground water depletion, environmental challenges, poor water resource management, resource capture and different demographic features. We find the importance of global environment change in the literature but do not find pragmatic evidence of water dispute only based on ecological reasons. In fact, the nexus between different causative factors and contextual factors aggravate the issue between riparian states and Pak-India water dispute is an example of this. Chapter five provides a holistic and inclusive analysis of causative factors and contextual factors that segregates the actual issues of divergence and the ideological or socio-political factors that either mitigate or escalate the hydro-politics between Pakistan and India.

The literature reviewed found certain areas of agreement and some points for critical debate that include the significance of power asymmetry and institutional inertia like PIC. Certain areas of debate also like the adaptability of the treaty and the magnitude of genuine cooperation between to states under the ambit of treaty's manifesto. There is also a limited exploration in the literature that highlights the climatic patterns as a causative factor in the hydropolitical analysis of the treaty. The most important latent and understudied element is the linkage of subnational hydropolitics with the interstate hydropolitical dynamics. Similarly there is insufficient approach to hydro diplomacy in the face of emerging challenges pertaining to the climatic variation and shifts in geopolitical overtures.

Research Gap

Existing studies have primarily been founded within the contexts of hydrohegemony and realist security models, which highlight India's dominance as an upstream riparian and Pakistan's vulnerability as a downstream state. While these frameworks describe power imbalances, they often simplify hydro-political relations to static representations of

geopolitical hierarchy, overlooking the intricate ecological and institutional interdependencies that currently influence basin politics amid climatic and developmental changes.

A noteworthy conceptual gap persists in the incorporation of climate change and environmental variability into hydro-politics. Much of the literature recognizes climate stress but examines it as an external variable rather than as a structural driver of conflict and cooperation among riparian states. Limited studies employ interdisciplinary frameworks that embraces hydropolitics, environmental governance, and international relations to conceptualize the patterns of conflict and cooperation nexus in transboundary river basin. Various variables identified in the conceptual framework of this study that determine the dynamics of conflict or cooperation between states sharing river basins are power asymmetries, riparian location and geography, subnational water governance, climate variability and population surge. The application of various identified variables according to the conceptual framework on the Nile Basin as a whole, and on the Indus Basin within the South Asian context in particular, endows this study with a unique comparative perspective that elucidates the multifaceted issues confronting both river systems. Although the Indus Basin constitutes the central focus of this research, selective comparison with the Nile Basin is employed to enrich the analytical scope and provide broader contextual insight.

The sub-national political and institutional dynamics of transboundary water governance in Pakistan and India remain largely underexplored. A key element is the neglect of the domestic sphere and the emphasis is placed on a strongly state-centric approach that risks discounting the various national and sub-national dynamics from the analytical lens. Water problems within countries determine water problems between countries. This element is dealt in this research and examines the domestic hydro-management in both Pak and India. The water stress prevalent at the sub-national level in both Pakistan and India is also one of the most significant causative factor affecting the hydro-politics in South Asia. The conceptual analysis is therefore based on the transnational and the subnational level of hydro-politics. The causal link between sub-national hydro-politics and interstate hydro politics as a determinant of hydro-political tension between Pakistan and India is elaborated in the fifth chapter. The literature reviewed also unfolded the missing element in the hydro-political domain that there is very little scope in legal field if any state commits any water aggression against any state. This legal domain needs more clarity an elucidation but this is not the purpose of the thesis, therefore, left for the legal fraternity to fill in the missing gaps.

Finally, the regional and global dimensions of the Indus Basin have received scant attention. The growing influence of China's Himalayan water projects, Afghanistan's Kabul River development, and international climate governance frameworks has yet to be systematically integrated into analyses of Indo-Pak hydro-politics. This study therefore seeks to bridge these gaps by employing multiple theoretical lens, climate-sensitive, and conceptually grounded framework to reassess the evolving contours of Pakistan-India water relations and their implications for regional security and cooperation.

Research Methodology

The research problem of the study intends to unveil the complicated nexus of engagements between states sharing the transboundary water resources and investigates the dynamics of transboundary water issues shaping conflict and cooperation between Pakistan and India having complex bilateral relations. The research questions of this study revolves around the past and present patterns of conflict and cooperation in hydro-political relationship between both nuclear riparian states and examination of the prospective conflict and cooperation between Pakistan and India over current emerging water issues. This is an explanatory and descriptive longitudinal case study that is analyzed with the lens of qualitative research methodology. The hydro-politics between Pakistan and India emerged after partition of subcontinent and after a protracted negotiation process brokered by World, the dispute culminated in the ratification of Indus Water Treaty in 1960 such as a cooperative mechanism. Since then various issues of conflict notably the controversial dam construction by India on the western rivers, surging population, increased urbanization and climate challenges have exacerbated the problem even more. Therefore, the research required an inclusive and holistic evaluation of the hydro-politics in Indus River Basin spanning over seven decades containing factors of continuity or change and asymmetry in power relations between riparian states.

The data regarding examination of the factors of conflict and dynamics of cooperation in hydro-political complex of Indus River Basin is based on the critical examination of official documents like the bilateral agreements between Pakistan and India. The study also contemplated and examined some archival sources such as Indus Water Treaty itself and the proceedings and negotiations of Indus Water Commission during the course of research. Given the complex and shifting dynamics of the Indus Basin's hydro-politics, this study used semi-structured interviews as the main explantory method to gather nuanced insights from experts—perspectives that are often missing from purely secondary sources. The interviews served as a

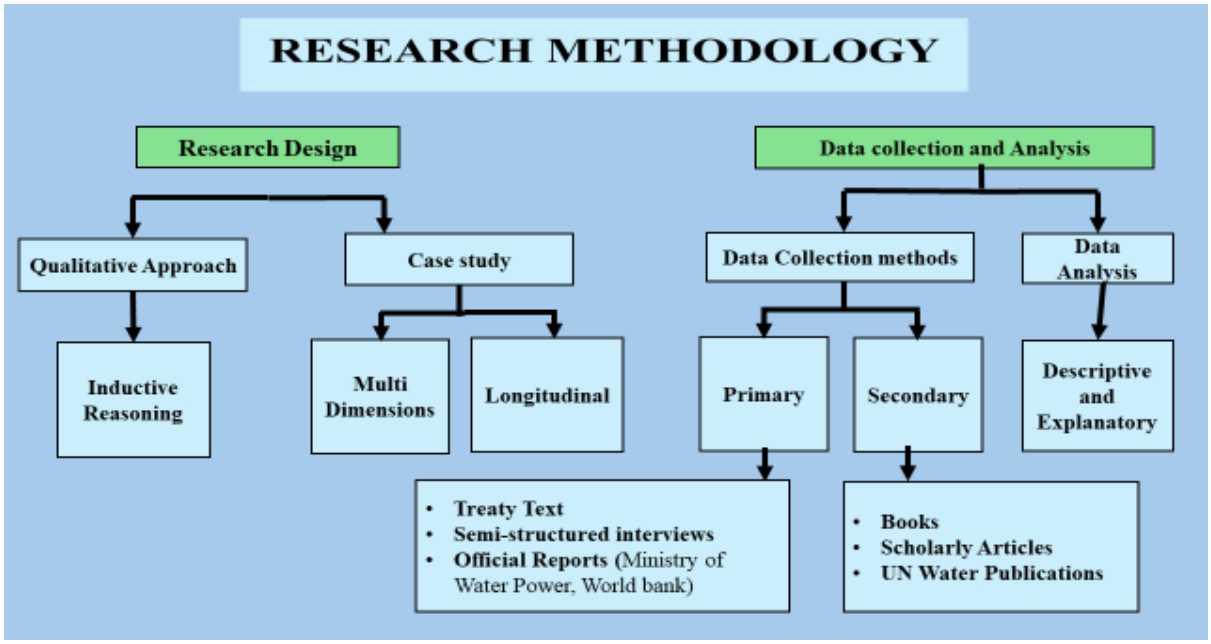
primary qualitative method to gain in-depth insights into the complex dynamics of Indus Basin hydropolitics ensuring both data richness and contextual authenticity, strengthening the analytical depth of the study. This individualized approach facilitated direct interaction with participants, allowing for detailed exploration of sensitive and context-specific issues that are often underrepresented in secondary data. The interviews engaged six Pakistani, three Indian, and two Western scholars, policymakers, and practitioners who possess recognized expertise in these areas. Interviews were conducted both in person and via email, allowing flexibility in reaching participants and giving them time to provide more thoughtful and reflective responses. The semi-structured format encouraged open discussion while maintaining focus on key themes, including governance inefficiencies, institutional fragmentation, hydro-hegemony, and policy misalignments within the broader Indus Basin context. However, the responses had faced limitations as the Indian experts did not respond to email correspondence.

The inquiry of both online and offline available books, relevant documents, journals, periodicals and academic articles, of Pakistani, Indian and western researchers forms the secondary base of the study. The substance of the research and analysis substantiated the objectivity and subjectivity of the methodology to conclude the research. Therefore, the data is chosen from several sources: primary [archival] as well as secondary; general library collections. In terms of secondary data, all possible sources have been explored: books, research journals, and leading international and regional newspapers available both offline and online. The available hydrological data relevant to the research problem is not very new and lacks in the updated statistics regarding the Indus basin.

The main independent variable in this research is the water dispute itself with all its complex nexus of factors like economic, geographic, military and political between Pakistan and India. The two dependent variables are i.e. the resultant conflicting dynamics or cooperative and accommodative mechanism between Pakistan and India. These include patterns of conflict (diplomatic disputes, treaty violations, or securitization of water issues as evident in Kishanganga and Baglihar cases) and patterns of cooperation (Institutionalized communication, technical collaboration, data sharing, and continued treaty compliance.) Therefore, conflict and cooperation are not competing claims but are dependent on variables that emerge from the interplay of the above independent variables. There are a number of factors that interplay between both the variables and can aggravate or mitigate the sharing of transboundary water resource. The external factors in the South Asian Hydropolitical Complex are the other riparian of Indus River that are China and Afghanistan on one hand and the effects

of climate change in the region on other hand. The factors between India and Pakistan include the hydrostrategic importance of Kashmir, diverse political narratives, poor water management, securitization of resources and economic dependence on Indus and its tributaries. Conflict and cooperation rarely happens due to a single causative factor but instead the complex nexus of various factors mentioned above play their role in either outcome i.e. conflict or cooperation. Conflict or cooperation depend upon these multidimensional causative factors and in-depth assessment of these factors have been carried out by employing the descriptive and analytical techniques through discourse analysis. The water issue between Pakistan and India is examined since partition and then the focus of the study relies on the analysis of the causative factors that facilitated in concluding the research. Both secondary and primary forms of data has been collected and analyzed in the due course of conducting the research.

Qualitative approach is employed in this research because it encompasses an in-depth understanding, comprehension and examination of the collected data which helped in concluding the findings, proposing the recommendations and reaching the conclusion.



Significance

Water is the most valuable and precious natural resource for lifecycle on the planet earth and is an essential element for human survival. The use of water will undoubtedly continue to play key role in reaching the vast purposes of development, progress, food attainment, sustenance of human life in the world. It is a mobile natural resource that is shared

by states by crossing the frontiers of various countries. The thesis attempts to investigate the origin of water sharing disagreement between Pakistan and India since their independence and then examines the patterns of conflict and cooperation in hydro-political relationship post-partition of Subcontinent. Water sharing mechanism has remained a bone of contention although both states signed the Indus Water Treaty in 1960. The historical dispute over the apportionment and utilization of the Indus River waters has withstood ever-evolving patterns of hydro-political relationships, multidimensional dynamics of water policy framing and the inconsistent intensity in conflictive and accommodating interactions. The transboundary nature of the Indus water discloses the interconnectedness of the Indus Basin riparian countries that are dependent upon the Indus River Basin not only for the fulfillment of their economic, commercial, socio-cultural necessities, but also for the preservation of peace and security in the region.

Water dispute between Pakistan and India has frequently been given the ideological and political tinge subsequently making the geographical, ecological, environmental and economic dimensions subordinate to them that are integral in hydro-political relationship of co-riparian states. This study aims to highlight the water dispute between Pakistan and India, by applying the conceptual framework of Hydro-political Complex Theory, Hydro-Hegemony and Environmental Scarcity Model by Homer-Dixon to the Indus River. The concept of non-traditional security forwarded by Barry Buzan shifted the focus from military and political domains to other areas like environment. It led to the new interpretation of politics between states so this study aims to view the subject matter from this perspective. The findings of this research will be useful for the national and regional policy makers, Indus Water Commission on both sides of the border, environmental ministry, academia and researchers in the field of hydro-politics.

Delimitation

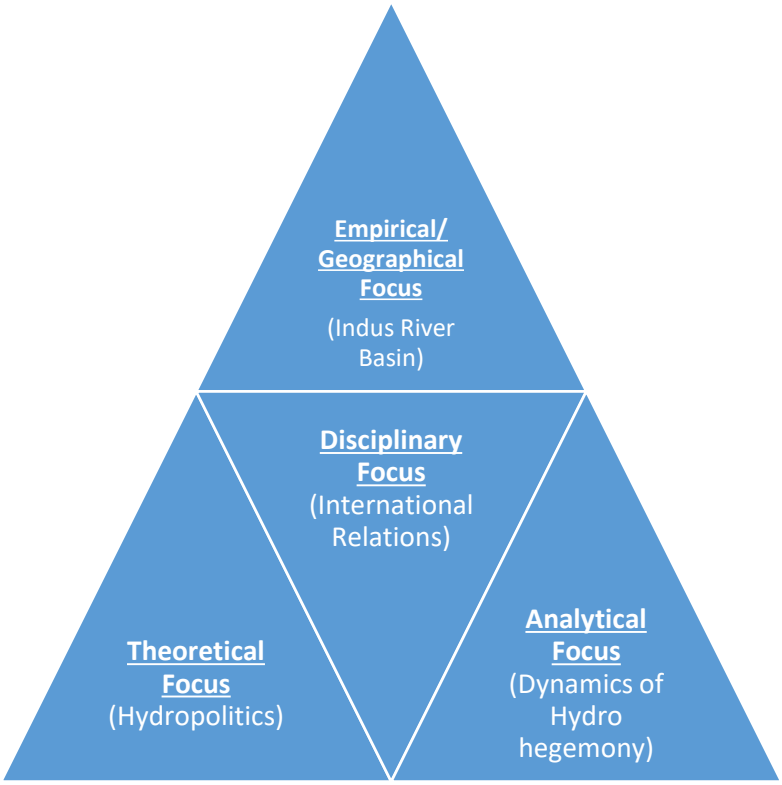
Water scarcity is a serious problem faced by many countries across the globe and especially in the developing states. The changing global environmental conditions and ecological degradation has affected the agrarian economies in the developing countries where water has become one of the scarcest natural resource. Transboundary water resource can be a source of conflict or cooperation between the riparian states depending upon the mechanism and dynamics of a various number of contextual factors.

Pakistan and India are two neighboring countries that share Indus River and after independence the sharing of the water resource triggered tensions between the two states. This was resolved after negotiations facilitated by World Bank in 1960 by signing the Indus Water Treaty between Pakistan and India but despite strained bilateral relations the treaty survived for following four decades. The dispute once again surfaced recently owing to the Indian endeavor to build hydroelectric power generation projects on the western rivers. The Indus Treaty is hailed as one of the successful example that resolved the major transboundary river basin conflict but the grievances and lack of trust between Pakistan and India can lead to a possibility that the cooperation can turn into major conflict in future.

The thematic basis of this study is based on the proposition that the water scarcity and hydro management due to environmental degradation overwhelms the existing global affairs. Water scarcity coupled with environmental and ecological degradation has ensued in the securitization and politicization of the water resource and it has become a flash point between the states that share transboundary water resource. The hydro-political issue between Pakistan and India carries a double-edged significance where we see patterns of conflict and cooperation between two rival nuclear neighboring states that have a history of strained relations, where Indus Waters Treaty has continued to be a mechanism for water sharing and division between them. Yet, its efficacy has become questionable in the contemporary era amid imperatives of global climatic change effecting the water sharing mechanism and enduring political differences between both the states. In this context, it is significant to give attention to various factors in the hydro-political relation between Pakistan and India that can be used for political manipulation in future.

The focus of the research is the hydro political complex of Indus River Basin and the research analyzes the water dispute between two riparian states i.e. Pakistan and India. It discusses the hydrology of Indus encompassing the recent activities of India in constructing dam in Kabul, Afghanistan which according to an estimate will decrease water flow to Pakistan about 16-17 percent thereby triggering a regional security threat. The application of this study is exclusively limited to the concerns of control and the privileges of the riparian countries that share transboundary river basin—the Indus River Basin, as well as more precisely, the hydro-political relations by negotiation and settlement of the water dispute between Pakistan and India through arbitrating the Indus Waters Treaty and the contemporary state of affairs on water issue between two states. This thesis is restricted to the conflict and cooperation dynamics between Pakistan and India and is related entirely to the negotiation process and settlement of the dispute

through mediation of World Bank, ratification of the Indus Waters Treaty, emergence of issues of divergence in post treaty era along with resolution process and the future prospects of conflict or cooperation between the two rival nuclear armed states sharing transboundary resource.



Organizational Structure:

The research content of the thesis are organized as under:

Introduction comprises of the research problem, objectives, literature review, research questions, methodology, significance and delimitation of the study.

Chapter One: Hydro-politics in International Relations: Theorizing Conflict and Cooperation in Indus River Basin

This chapter is very important since it helps in conceptualizing the concept of securitization of water in vulnerable regions in general and particularly the Indus River Basin. It discusses several theories regarding the hydro-political issues and hydro-hegemonic tendencies. This chapter lays the foundation for conceptual clarity of the topic and debates on emerging water paradigms in international politics.

Chapter Two: Hydro-politics in Indus River Basin - A Historical Background

This chapter of the thesis provides an comprehensive analysis of the origin of hydro-politics between Pakistan and India, the hydrological system of Indus River Basin, geographical attributes of the system, past patterns of conflict and cooperation in water issues, emphasizing the differing claims of the two countries, pertaining to their respective relative riparian location and privileges, patterns of conflict and accommodation by both states, endeavors by the upper-riparian (India) to manipulate the weakness and resource-dependency of Pakistan as a lower-riparian, detrimental relative location due to unjust imposed ceasefire borders and supportive geographical characteristics for the upper riparian.

Chapter Three: Hydro-Diplomacy between Pakistan and India – An Appraisal of Indus Water Treaty 1960

This chapter focuses analysis on the Indus Water Treaty and explores the principles of water sharing between riparian, dispute resolution mechanism, strengths and limitations of IWT and lastly calls attention to the proposed modifications in the treaty. It also tries to figure out that why apparently seeming rivals with having baggage of complex issue in backdrop opted for cooperation.

Chapter four: Hydro-hegemony in Indus River Basin: Analysis of the Indian Hydropower Projects on Western Rivers of Indus Basin

Chapter four discusses the post treaty issues of conflict between both riparian and their consequent resolution process in detail. The projects that India is perusing on the western rivers like Wullar Barrage, Baghlihar Dam and Kishenganga Dam and the consequent response of Pakistan.

Chapter five: Hydro-politics Between Pakistan And India: The Causative and Contextual Factors of Pak-India Water Dispute

This chapter investigates the causative factors and determinants that are root cause of the water issue and will try to answer the problems like resource scarcity, environmental degradation, resource capture, population growth, ecological marginalization or power asymmetry in the hydro political relations of co-riparian. The other major factors that aggravate the issue are the divergent religious, diplomatic and political disposition held by both sides. Importance of Kashmir conflict is also a part of this chapter because the occupation of Kashmir valley points out to the tactics maneuvered by hydro hegemon from where the water flow to the lower riparian can be controlled.

Chapter Six*:* Hydro-politics between Pakistan and India: **Future Prospects**

Fifth chapter centers on the future prospects of the hydro-politics between Pakistan and India based on the previous patterns of conflict and cooperation amongst the riparian states. It includes the recapitulation of the major causative and contextual factors that act as independent variables and consequently determine the prospective potential of conflict or cooperation between riparian states sharing transboundary water resource in South Asian Hydro-Political Complex. Further it also analyzes the prospects of hydropolitical relations in future because currently there is neither primarily more cooperation, nor more conflicts. Conflict or cooperation is not a single causal factor instead they are product of multi-dimensional and complex interlinked factors. They are identified as the relative riparian geographical location, environmental and ecological degradation, population growth, power asymmetry and mismanagement of intra state and interstate natural resources. These all together work in complex manner to determine the prospects of conflict or cooperation.

Conclusion

The final chapter comprises of findings and recommendation with concluding remarks.

Chapter One

Hydropolitics in International Relations: Theorizing Conflict and Cooperation in Indus River Basin

The foundation of the global economy lies on the natural resources. Wealth generation is dependent upon the utilization of the resources provided by the nature. Most of the natural resources are present within the territorial borders of sovereign states. Some of the states are self-sufficient, they often are likely to cooperate with other countries. However, owing to the scarcity of natural resources, cooperation can turn into violent conflicts as an alternative strategy. Leadership of the states decides the scope and extent of cooperation and competition without relinquishing the state sovereignty and to meet the need of state.

Natural resources have various kinds which have a wide range of different influences on global politics. Natural resources can be categorized into main four kinds.

1.1: Renewable Resources vs Non-Renewable Resources

Renewable natural resource can regenerate themselves like plants, marine life and terrestrial animals. While nonrenewable natural resource cannot redevelop and regenerate. Most of the natural resources are generally renewable depending upon that whether they can be renewed over a defined and reasonable timeframe according to human terms. Oil is a renewable natural resource and it can regenerate over a time period, though the regeneration time takes centuries rather than months.[51] Therefore, for policy framing reasons, fossil fuels and oil is termed accurately as nonrenewable rather than renewable natural resource.

Natural resources whether renewable or nonrenewable may have different impacts on the global system. Ideally speaking states should not fight on the renewable natural resource and after fulfilling their own needs, they can frequently conclude treaties or agreements for cooperation or regional economic integration. But if there is over consumption and delayed renewal and sustainable growth of the resource, conflict and competition over that renewable resource can be an alternate. Conflicts on whaling and fishing have become critical key issues over the previous several decades (The U.S.-Canada salmon dispute in Pacific Northwest).[52]

Violence and conflict frequently occurs over nonrenewable natural resources across the globe. The quantity, quality and availability of the resource adds to its significance. If a nonrenewable natural resource is available in a limited finite amount, states may get into severe

[51] Deborah S. Davenport and Karrin Scapple, "Conflict and Cooperation over Natural Resources," in Introducing Global Issues, ed. Micheal T. Snarr and D. Neil Snarr (London: Lynne Rienner Publishers, 2005), 278.
[52] ibid

competition to obtain that resource and conflict might be the result. The Gulf War (1990-1991) was a visible and evident clash between states over nonrenewable natural resource. Although cooperation might be possible, but it becomes implausible if the resource like oil is critically required and the disputing parties have a history of other unresolved issues.

1.2: Boundary vs. Transboundary Resources

The natural resource like forests that exists within territorial boundary of any state, the ownership belongs to that particular state but if the natural resource moves around and transcends the territorial bounds of any state it is termed as transboundary natural resource. Conflict is implausible within that state because of the principle of sovereignty however competition can also occur over sharing and management of resource within the state also.[53]

Transboundary natural resource like rivers may be an explicit cause of open conflict between sovereign states. A river might segregate borders between states or it might travel from one state to another state, in any case that river must be shared by two or more than two countries. Here we may find probability of low and high level conflict intensities, though cooperation can also occur. Issue of sovereignty is embedded with the sharing and management of transboundary natural resources. The territorial and geographical location of the riparian states is also very critical since the head of river exists in one state-upstream country and the states dependent on that resource-downstream state.

Generally, the geographic location of the state has a key impact on the decisions taken by the leadership of the upstream state or upper riparian. Cooperation and conflict potential of any transboundary shared natural resource involves various drivers behind each form of interaction. Upper riparian or upstream states strongly bank on the principle of absolute sovereignty and the lower riparian or downstream states endorse the standards of equitable sharing and cooperation. Cooperation might be convenient and easy in some cases but if the resources are very critical and indispensable for the survival and sustainability like water resource, conflicts can occur. Water deviations and construction of dams by one riparian, reducing the availability of supply of water resources to another riparian, might often incite strong sentiments among those adversely affected states by such actions. Tensions and conflict often arise and a prospective eventual outcome might be a war.

Water is a source of life and crucial for survival of living creatures on earth. Water is commonly thought to be renewable natural resource but empirically more than three-fourths of underground available water resource is nonrenewable because a considerable time period

[53] Ibid, 279

covering centuries is required for its replenishment. Water can also have thought to be nonrenewable if chemical spilling makes it polluted permanently. Additionally, fresh water resource availability might be consumed completely if scarce or no rainfall occurs in arid regions for a longer time period. Water scarcity is so severe across the globe that around seven hundred and eighty three million people do not have access to drinking water and are facing acute economic and social devastation as a consequence of critical scarce availability of water.[54] United Nations Organization declared year 2003 as "International Year of Fresh Water".[55]

1.3: Environment in Contemporary Global Studies

In modern global studies, environmental issues are increasingly recognized as significant threats to sustainable development, improved governance, and the peaceful resolution of international conflicts. The integration of environmental concerns into the political agenda reflects a systemic trend that has progressively shaped policy-making processes around the world since the 1992 United Nations Conference on Environment and Development.[56] Policymakers and practitioners have since concentrated not only on the effects of hazardous events like drought, famine, and climatic disasters but also on the pressing need to enhance the efficient management of natural resources.

The growing population, desertification, pollution, global warming, flooding, and soil erosion are significant factors that affect the sustainable management of natural resources on a global scale. Over the past twenty years, both natural and anthropogenic causes of environmental degradation have been examined from a variety of theoretical viewpoints, both within academic circles and beyond. Significant focus has been directed towards the management of freshwater resources, owing to their inherently finite availability, the challenges associated with storing them for future use, and their crucial role in ensuring physical survival, fostering social connections, and promoting economic development.

The necessity of expanding the research framework to illuminate the intricate connection between water and conflict has created opportunities for incorporating political aspects of water-related dynamics. The post-Cold War period has experienced a conceptual transformation in conventional political discourse, paving the way for explorations that the earlier dichotomy of international opposition would have precluded, particularly concerning

[54] Uttam Kumar Sinha, *Riverine neighborhood: Hydropolitics in South Asia*, (Pentagon Press, 2016), 2.
[55] The International Year of Fresh water 2003, UNESCO-IHE Institute for Water Education, available at UNESCO Digital Library
[56] Ken Conca, "Environmental Governance after Johannesburg: From stalled legalization to environmental human rights?" *Journal of International Law & International Relations*, Vol.1 (1/2): 121-138.

natural resources and environmental issues. The early 1990's has observed the broadening of the UN mandates, obligation and international responsibility, the multiplication of international fora and global reports, and the ratification of numerous resolutions: concerning environmental issues. After the preliminary sessions of Brundtland Commission- 1987 and the Earth Summit-1992 at the platform of UNCED United Nations Conference on Environment and Development, held in Rio de Janeiro,[57] the notions of sustainability, human security, and human development have emerged as prominent and pervasive components of a global discourse, significantly influencing the integration of environmental concerns into the political agendas of states as well as the initiatives and campaigns of civil society.

At least three significant conceptual shifts have introduced new dimensions to the field of international relations. Firstly, the broadening of the security concept to encompass areas beyond mere military concerns, along with the integration of previously marginalized issues such as environmental matters into the overarching frameworks of Global Politics and International Relations, signifies a notable advancement from the conventional security paradigm proposed by Buzan.[58] The emergence of environmental movements, particularly in Germany and the United States, played a crucial role in bringing environment-related issues to the forefront of the political agenda. This shift occurred despite the previously dominant focus on military and economic concerns among politicians and government officials. Furthermore, following the conclusion of the Cold War, a new framework of alliances and diplomatic relationships gradually began to redefine the landscape of international relations, leading to the development of innovative policies.

The aforementioned three elements highlight, among various other factors, the reasons behind the gradual emergence of environmental relevance as a distinct yet interconnected focal point for both policymakers and civil society over recent decades. Initially dismissed as a unique concern within the political sphere, environmental issues have now been integrated into political discourse. While for some scholars the environmental issue has constantly being regarded as one influencing factor among many others that shape the domestic as well as the international politics,[59] for others the elements of newness that the sustainable administration of the environment had brought into the political agenda signified an important shift in the

[57] ibid

[58] Jeroen Warner, "Plugging the GAP Working with Buzan: the Ilisu Dam as a security issue" (Occasional Paper presented in SOAS, Kings College London, Water Issues Group, 2004), https://www.academia.edu/12840691/Plugging_the_GAP_Working_with_Buzan_the_Ilisu_Dam_as_a_security_issue

[59] Norman Myers, "Environment and Security," *Foreign Policy*, no. 74, (1989):24-26.

policy design and in the structure of global relations. The evolution from a primary focus on high politics in the political agenda to an appreciation for low politics has led to an expanded understanding of security that incorporates ecological and environmental issues. This transformation is a key feature of the post-Cold War environment. Myers (1996) asserts that environmental security is viewed as the most critical form of security in a globalized world, where various threats and risks, along with environmental degradation and the struggle for natural resources, could disrupt peaceful diplomatic relations among and within countries.[60]

In the initial years of 90's decades, this analysis has been excellently portrayed by the Copenhagen School steered by Ole Waever and Barry Buzan, both leading academicians distanced themselves from the Classical Security Complex Theory (CSCT). They expanded the conceptual parameters of 'Security' beyond the traditional conceptual domain and also prevented the analysts to plunge into the academic difficulties that a very extensive and wide-ranging security agenda may evasively being brought to the analytical framework.[61] They argue that the CSCT embodies a limited perspective on security, wherein a strictly realist, statist, and positivist understanding of military and political security omits certain sectors and actors from consideration. Buzan posits that a security issue should not be viewed merely as an objectively quantifiable threat or problem; rather, it is perceived as an existential threat, shaped by the actions of the involved parties, which consequently extends political dynamics beyond the conventional frameworks.[62] The discussion is further developed through the assumption of causality between threats and conflicts, incorporating more intricate levels of analysis such as linkages, interactions, overlaps, and the interplay of various factors. This conceptualization of security marks a significant transition from the positivist belief in the objectivity of extreme threats to an emphasis on understanding how perceptions of threats are constructed, thereby revealing the underlying causes that render an issue threatening.

Addressing environmental issues broadly, and specifically those related to water, the adoption of a detailed analytical framework is instrumental in critically evaluating the conventional wisdom surrounding water conflicts. This framework's incorporation of perceptions and the potential for securitization enriches the analysis, revealing that the link between scarcity and conflict may be more complex than the existing literature suggests. By moving the focus from the objective measurement of natural resource availability to the

[60] Norman Myers, "Environmental services of biodiversity," *Proc. Natl. Acad. Sci*. 93, (1996): 2764-2765.
[61] Holger Stritzel, "Towards a Theory of Securitization: Copenhagen and Beyond," *European Journal of International Relations* 13, no.3, (2007): 361–363
[62] ibid

subjective construction of perceived threats, this approach highlights the layered complexities inherent in these environmental challenges. Environmental issues are no longer viewed as isolated and independent concerns; rather, they are approached in a comprehensive manner that highlights the interconnections among various sectors and numerous stakeholders. In the context of water, this implies that water-related challenges are not solely assessed in terms of availability, access, or distribution. Instead, they are situated within a broader framework that encompasses the political, economic, and social dimensions relevant to a specific geographical area. This intricate and multifaceted nature of water conflicts, along with the interplay of diverse economic, social, and political elements, aligns with the concept of social ingenuity proposed by Homer-Dixon.

1.4: Hydropolitics as a Discourse in International Relations

"Water resource is the real wealth in any desiccated and dehydrated landscape and any area deprived of water is insignificant or closely to being worthless. Therefore, if someone controls water, it controls the territory that is dependent on that." [63]

The robust discussions on the environmental significance as imperative element of political interactions, and more specifically water as being one of the major concerning point, got impetus during the decade of 80's and 90's. For at least the past two decades, there has been a growing literature that explicitly addresses water-related issues, either as a conceptual subset of broader environmental approaches or as a prominent feature in political economy, security studies, and world politics. From an initial focus on the limited use of water available to humans, the concept of water security has attracted increasing attention through various approaches that include water quality, human health, and ecological concerns. Recognizing the risks associated with a waterless future and the possibility of water shortages is rapidly influencing government officials, international organizations, think tanks, academic institutions, and the mass media, and often prompts analysis of new issues. The issue of water challenges includes catastrophic scenarios and apocalyptic imaginings of the depletion of an essential but limited resource. Water scarcity has emerged as a critical concern that has engaged the analytical capabilities of researchers and policymakers on both global and regional scales. This engagement has spurred investigations into various strategies aimed at mitigating the risks associated with the reduction of water resources worldwide. As awareness of the global water

[63] Peter H. Gleick, *Water in Crisis: A Guide to the World's Fresh Water Resources* (New York: Oxford University Press, 1993), 9.

crisis grows, particularly regarding the escalating competition for scarce resources, there has been a notable increase in attention from policymakers.[64]

To conclude, a diverse array of sectors, nations, and economic stakeholders have asserted claims over a precious and progressively scarce water resource, leading to a reduction in its availability and an increase in the need for governance. With the rising recognition of water scarcity and the escalating competition for this resource, water has been politicized and securitized. Its scarcity is increasingly viewed as a nontraditional security threat, especially in areas where it is jointly managed by several states.

1.5: Definition of Water Insecurity

Water insecurity can be defined as 'shortage of available water resources for fulfillment of basic human needs including agriculture, drinking, domestic use, industries and power generation; which resulted in elevated risk of disasters related to water resources such as floods and droughts'. Thus, in contrast with water insecurity, water security may be defined as 'sufficient quantity of fresh water availability, reduced risk of water related disasters, resolution of transboundary water conflicts and more chances for cooperative use of shared water resources'.[65] Therefore, water security is related to different factors such as; security of food, sustainable environment, economy, poverty and fair, just and impartial social policies. According to a report of UNO, water requirement and utilization has been increased almost two times as it was in beginning of twentieth century due to the continuous increase in global population. It has been reported by UN in 2021 that about 2.3 billion habitants have been settled in water insecure countries, out of which 0.733 billion humans have been settled in areas with critically water insecure resources.[66]

Water insecurity in developing countries has adverse effects on transboundary water resources and caused conflicts between neighboring countries. River Nile and Indus River Basin are examples of such water insecure regions. Water security, whether at the household level or on a global scale, signifies that every individual has access to sufficient safe water at a reasonable cost, enabling them to maintain a clean, healthy, and productive lifestyle, while also safeguarding and improving the natural environment. This perspective offers a more

[64] Gordon J. Young, James C.I. Dooge, and John C. Rodda, *Global Water Resource Issues* (Cambridge: Cambridge University Press, 1994), 20.
[65] Harriet Bigas, "*Water Security & the Global Water Agenda*," UN-Water Analytical Brief (2013), available at https://www.unwater.org/publications/water-security-and-global-water-agenda.
[66] UN Water, *Progress Update 2021: SDG 6 — water and sanitation for all*, (Geneva: UN Water publications,2021), https://www.unwater.org/publications/summary-progress-update-2021-sdg-6-water-and-sanitation-all

comprehensive understanding of water security, incorporating a multidimensional view of the intricate connections between human development and ecosystems. Thus, it is evident that strategies for achieving water security are varied and constantly adapting.

1.6: Water as a Classic Interstate Security Issue

The most important factor in the emerging water paradigms has been the convergence between the expansion of traditional security studies towards new security paradigms and the birth of a globalizing discourse. The most salient features of the post-Cold War world order has been the emphasis on environmental issues.[67] One subset of these environmental issues is the emergence of a powerful global discourse for the management of water resources closely linked to concepts of national and environmental security.

In the 1990's, the notion of water security was primarily associated with the dynamics of war and peace, as well as conflict and cooperation, with water often viewed as a potential catalyst for disputes. Over time, this concept has developed into a more comprehensive understanding of water security, which now includes considerations of access, affordability, human necessities, and ecological well-being. The definition of Water Security was proposed by UN-Water to serve as a preliminary idea for water discourse in the UN system. "Sustainable access to water in sufficient quantities and of acceptable quality to sustain livelihoods, human well-being, socio-economic development, ensure protection against water-borne pollution and water-related disasters, and protect ecosystems." The ability of citizens to protect themselves in an atmosphere of peace and political stability.[68]

This evolution is a consequence of the newly established security paradigm, which has widened and enriched the security agenda by integrating non-military threats, commonly known as low-politics, and involving non-state security participants at all tiers of society.[69] Following that period, a diverse array of literature has rapidly expanded, providing multiple definitions of water security, from those rooted in specific academic disciplines to more integrated, inclusive, and multidisciplinary approaches. The discourse surrounding the use of water for human purposes—encompassing both social and economic aspects—versus its use for environmental needs has become a pivotal topic of debate. At the hydropolitical level, this issue includes contentious matters such as conflicts between states, while also being reflected

[67] Nils Peter Gleditsch, "Armed Conflict and the Environment: A Critique of the Literature," *Journal of Peace Research* 35, no.3, (1998): 384-385.

[68] "What is water security?", (UN Water, May 2013), https://www.unwater.org/publications/what-water-security-infographic

[69] Anthony Richard Turton, "Hydropolitics: The Concept and Its Limitations," in *Hydropolitics in the Developing World: A Southern African Perspective* (Pretoria: University of Pretoria, 2012), 13-19

at the subnational level as a critical concern regarding the appropriation of resources and the ecological marginalization faced by communities.

The International Water Management Institute (IWMI) is a research institute that works on water analysis, both from the perspective of geophysical studies and from the perspective of socio-economic impacts of water scarcity, and has developed methods to measure water scarcity around the world. According to its projections, water scarcity will be a major concern in many parts of the world by 2025, not only in dry regions where water supplies are very limited (physical scarcity), but also economically, thereby increasing the water stress.[70] The repercussions of water scarcity on the perceptions of global audiences are similarly captured by the Global Risks Index formulated by the World Economic Forum in 2015. Data collected in 2014 reveals that water crises represent the greatest risk to the well-being of the global population, outpacing longstanding international concerns such as diseases, weapons of mass destruction, conflicts, and fiscal crises in the hierarchy of risks.[71]

A most important cause among others for the emphasis on water securitization is dependent on the fact that majority of accessible fresh water resources around more than 40% of the world is mutually shared between two or more states.[72] The availability of water, when abundant and manageable, typically facilitates straightforward sharing. Nevertheless, this scenario is frequently not the reality, becoming increasingly uncommon due to rising consumption levels and an escalating sense of competition. In numerous regions globally, rivers, lakes, and aquifers cross national boundaries, leading to disputes and controversies of varying degrees. Notable examples include the Nile River, the Ganges, the Indus River, the Jordan River, as well as the Amu and Syr Darya, which contribute to the diminishing Aral Sea, along with the shared groundwater resources between Israel and Palestine.[73] The aforementioned water systems represent just a few cases among many where disputes have surfaced concerning the equitable allocation and use of shared water resources. As water scarcity intensifies in several basins, alongside the impacts of climate change that result in varying water levels across different regions, it is imperative for states to take proactive

[70] Upali A. Amarasinghe and Vladimir Smakhtin, *Projected global water scarcity, 2025*, (Srilanka, International Water Management Institute, 2014), http://www.iwmi.cgiar.org/

[71] *Global Risks 2015*, (Geneva: World Economic Forum, 2015), https://www.weforum.org/publications/global-risks-2015/

[72] Aron T. Wolf, Shira B. Yoffe, and Mark Giordano, "International waters: Identifying basins at risk," *Water Policy* 5, no.1, (2003): 30–32.

[73] Brahma Chellenay, *Water peace and War: Confronting Global Water crisis*, (Rowman & Littlefield Publishers,2013), xiii-xiv

measures to avert violent conflicts and to pursue cooperative approaches to address these challenges.[74] Still, progress in finding sustainable cooperative solutions is slow.

Around two third of the transboundary rivers lack organized frameworks for collaboration. The difficulty in establishing consensus on cooperative frameworks is, from an international relations viewpoint, quite understandable. States are under growing pressure and are increasingly hesitant to prioritize the welfare of others over that of their own citizens. The probability that disputes over a scarce resource might aggravate and exacerbate into global conflict has transformed water into ―Blue gold of the 21st Century, as defined by Barlow.[75] Consequently creating a common sense that had promptly been formalized by academia, media and policy-formation into a paradigmatic principle as put forward by Ismail Serageldin, former Vice-President of the World Bank that the wars of the next century will be about water. The same was reaffirmed by Kofi Annan- Former Secretary-General of the United Nations that "It is projected that by 2025, approximately two-thirds of the world's inhabitants will be living in countries facing moderate to severe water scarcity. The fierce competition for water resources among nations has sparked apprehensions that such issues could potentially give rise to violent conflicts." [76]

Environmental challenges had been addressed by some authors as the "ultimate security",[77] establishing the credible factual grounds that securing water supplies plays a pivotal role in contemporary politics. The growing body of research and assessments concerning the likelihood of water crises resulting in disputes and violent conflicts is a direct consequence of the belief that water will soon be a central issue in interstate confrontations, as evidenced by the work of Gleick, Homer-Dixon, Elhance, and Wolf. In the latter decades of the 20th century, wars were primarily fought over oil control, while water is expected to become the "Blue oil" of the 21st century.[78] Controversies stemming from conflicts over the governance and use of limited water resources are heightened by the global nature of the largest freshwater reserves. Estimates indicate that 80% of the world's freshwater is derived from 263

[74] ibid
[75] Maude Barlow, *Blue Gold: The Global Water Crisis and the Commodification of the World's Water Supply* (San Francisco: International Forum on Globalization2001)
[76] Barbara Crossette, "Severe Water Crisis Ahead for Poorest Nations in Next 2 Decades," *The New York Times*, Aug.10, 1995.
[77] Norman Myers, "Environment and Security," *Foreign Policy*, no. 74, (1989):24-26.
[78] Maude Barlow, *Blue Gold: The Global Water Crisis and the Commodification of the World's Water Supply* (San Francisco: International Forum on Globalization2001)

transboundary rivers, whose drainage basins encompass nearly 47% of the planet's terrestrial surface.[79]

Given this scenario of increasing worldwide water scarcity and transboundary nature of the major river basins, the likelihood of incumbent international water wars has surged as one of the main focus of scholars and water experts, who have explored whether water could be a driver for future conflicts. While some international relations scholars like Gleik, Schueumann, Elhance and Ohlsson advocate for the thesis that water scarcity is expected to lead to violent interstate conflicts , others contend on the contrary that the significance of water resources will foster global cooperation and diplomatic settlement of potential disputes, as the benefits that could be ensued from the joint administration of a shared resource greatly overcome the risks and costs of open wars as iterated by Salman and Chazournes ,[80] Postel and Wolf.[81] This initiates the exploration and conversation about water politics within the discipline of International Relations. The contrast between the paradigms of "water wars" and "water peace" engenders either a neo-Malthusian or a Cornucopian approach, thereby classifying water as either a factor contributing to conflict or a means of fostering peace and regional unity.

Much of the scholarly work published in the 1990's tends to emphasize the potential for conflict surrounding water resources, as highlighted by Gleick (1993) and Homer-Dixon (1994). This body of evidence aligns with the notable prediction made by former UN Secretary-General Boutros-Ghali, stating that "the next war will be fought over water and not politics."[82] Although major water sources often cross national boundaries, there is a lack of evidence indicating that international wars have been fought specifically for the purpose of controlling or utilizing water resources. Conversely, cooperation is a more common feature in international disputes concerning water. In 2001, Yoffe and Larson created the Transboundary Freshwater Dispute Database (TFDD) as part of the Basins at Risk (BAR) initiative at Oregon State University. This database cataloged over 1,800 water-related events between states from 1948 to 1999. The analysis reveals that the vast majority of these events, specifically 1,228 or 67% of the total, were cooperative in nature. Additionally, among the 507 conflictual events, which

[79] Aron T. Wolf, et.al, "International Rivers Basins of the World", *Water Resources Development* 15, no. 4, (2010): 388

[80] Salman M. A. Salman, Laurence Boisson de Chazournes, "International Watercourses: Enhancing Cooperation and Managing Conflict", (Washington DC: World Bank Seminar Proceedings,1998), 167--170

[81] Sandra Postel, and Aron T. Wolf, "Dehydrating Conflict", *Global Foreign Policy,* Sep. 18, 2001, https://archive.globalpolicy.org/security/natres/water/2001/1001fpol.htm

[82] Boutros Boutros-Ghali, "I Support the Algerian Government," *Middle East Forum Quarterly*, September 2007. https://www.meforum.org/middle-east-quarterly/boutros-boutros-ghali-i-support-the-algerian

account for 28% of the total, two-thirds were verbal disputes rather than instances of armed conflict.[83]

The data appears to reinforce the "water peace" viewpoint, indicating that water could promote cooperation rather than incite warfare. However, it is essential to note that the absence of war does not necessarily indicate a lack of conflict or the existence of peace. Moreover, cooperative efforts do not always culminate in meaningful cooperation.[84] International water disputes exhibit a complex dynamic, where both overt and covert mechanisms obscure the multifaceted interactions among different actors engaged in cooperative agreements between riparian states. The shared transboundary waters are not simply black and white; rather, they often present a grey area. The key factors driving water disputes are found within the dynamic processes that complicate the political landscape of water management. Conflict and cooperation should not be viewed as a straightforward continuum; instead, they should be understood as overlapping interactions that can lead to various outcomes, shaped by particular circumstances, timeframes, and geographical influences.

A comprehensive examination of water politics necessitates an expansion of the analysis to encompass the contextual factors that have contributed to the intricate nature of established hydro-political relationships. This is significant because it is frequently the influences beyond the water domain that are instrumental in heightening tensions.[85] Consequently, for the purpose of analysis, it is imperative to view water management as interconnected with water governance, which includes elements of power and authority. The causes and solutions to water-related challenges are derived from the larger context in which they are situated. Recognizing the interdependence of water governance and management within broader socio-political and economic structures allows for a more nuanced examination of the processes, dynamics, and relationships that influence the hydro-political framework in specific contexts. This approach ultimately contributes to a more effective evaluation of the contentious and cooperative characteristics of water-related interactions.

Since conflict and cooperation results from the dynamic evolution of power relations (asymmetry and symmetry between riparian states) coupled with other contextual factors, the inclusion of a theoretical approach concerning these power relations and contextual factors is

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[83] Lucia De Stefano, Lynette de Silva, Paris Edwards and Aaron T. Wolf, *From Potential Conflict to Cooperation Potential* (France: UNESCO World Water Assessment Programme Paper 6, 2009)

[84] Mark Zeitoun, Naho Mirumachi, "Transboundary water interaction I: Reconsidering conflict and cooperation*," International Environmental Agreements: Politics, Law and Economics* 8, no.4,(2008): 299

[85] *Transboundary Waters: Sharing Benefits, Sharing Responsibilities*, (UN Water, 2008), www.unwater.org/downloads/UNW_TRANSBOUNDARY.pdf.

deemed necessary in order to elaborate the elusive processes that add to the complexity of hydro-political relations. Considerably, the imminent sources of future water war will be more diverse rooted in blends of internal and external elements and of wider circumstances like environmental degradation and climatic diversity. Consequently, the primary aim of this research endeavor is to elucidate the characteristics of power and other influential factors within the Indus basin. This exploration is anticipated to enhance the existing literature by establishing an analytical framework that will further the field of critical hydro-political studies.

1.7: Conflict and Cooperative Potential of Water as a Transboundary Natural Resource

In the last twenty years, the potential for conflict due to escalating competition for water resources has been prominently emphasized. There has been considerable scrutiny of the water sector, especially regarding issues like water stress, water scarcity, and water security, to confront the perceived danger of "water wars." Claiming that sharing a precious resource like water might induce states to recur to violence to secure present and future utilization, twenty years ago Young stated that water wars are, unfortunately, likely to be of more and more common occurrence in the future, apprehending a threat of upcoming water wars.[86]

The assertion that escalating water scarcity could result in conflicts among various users and competing demands, potentially inciting violence over access to and control of this vital resource, has gained significant credibility. This perspective aligns with the theories proposed by Gleick1994, Scheumann and Schiffler in 1998; Elhance and Ohlsson in 1999, regarding a straight or indirect causative relationship between resources of water and conflict. Due to these developments in hydro political discourse in International Relations, water management was given rising priority in the political agenda. Trottier defined it as the diffusion of one of the two main hegemonic concepts in water literature.[87] The framework surrounding water conflicts has achieved formal agreement and established the basis for a theoretical narrative, while simultaneously fostering the development of a comprehensive body of literature that has significantly influenced discussions on water-related conflicts since the early 1990s.

Reassessing the Malthusian proposition of growing pressure over scarce natural resources, and defending the absolute prudence that competition will turn into war as the factors

[86] Oran Young, "The politics of international regime formation: Managing natural resources and the environment," in *International Environmental Governance* (New York: Harper Collins, 2008), 29

[87] Julie Trottier, "Water Wars: The Rise of a Hegemonic Concept. Exploring the Making of the Water War and Water Peace Belief within the Israeli-Palestinian Conflict," *UNESCO's International Hydrological Programme PCCP Series,* no. 6, 2003

of water stress surge, the narrative around the water wars construes the logics of global relations through the Hobbesian lenses of continuous warfare for survival, as water is an indispensable resource necessary for the survival of all species, the growing sense of its scarcity may reasonably substantiate the theory of conflicts over water resources. The causal reasoning inherent in the water war paradigm, along with the deterministic link established between water scarcity and violent conflict, has contributed to an increase in both scholarly focus and governmental recognition of the challenges associated with water resource management. Nevertheless, the tendency to reduce the intricate nature of warfare to a singular deterministic cause—be it rising population, resource depletion, or increased production—has led to a narrowing of the debate. Such an approach tends to obscure the complex variables and multifaceted interconnections that are crucial for a nuanced understanding of the purported (water) wars.[88]

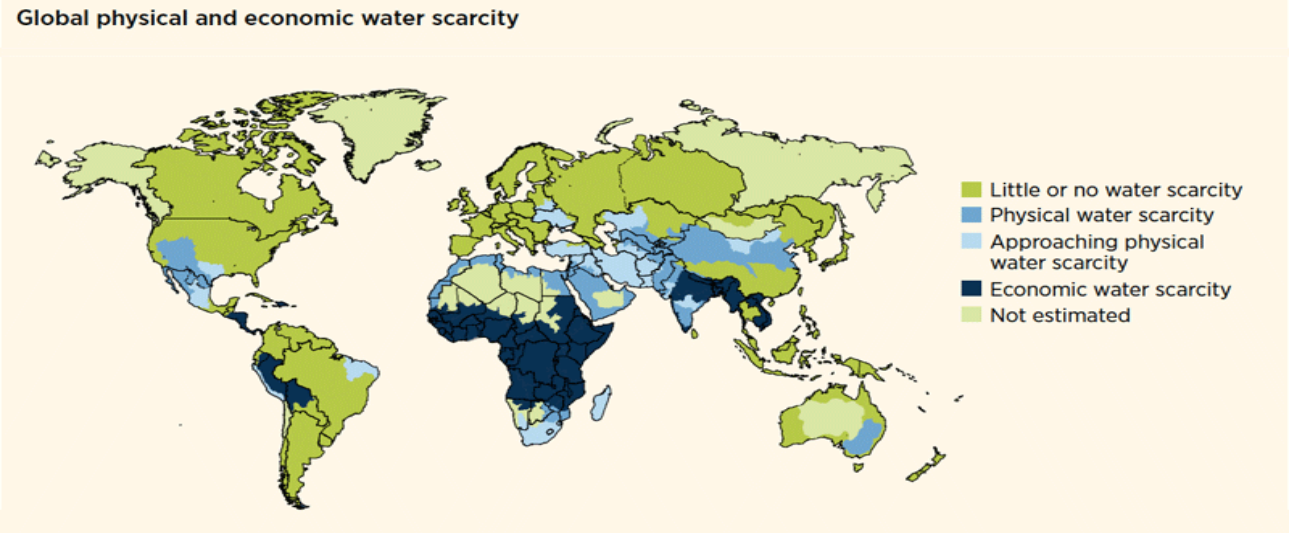
There is another concept in international relations that the resource stress with in the political boundaries compel the governments to expand their struggle to search and compete for resources outside their frontiers. Resultantly the issues of domestic management are expanded and linked with the national security imperatives induces the chances of violent conflicts with other states. This school of thought in International Relations, applied to the study of national and subnational hydro management and transnational conflicts, assume states as the pivotal unit of analysis and the potential asymmetry as motivating factors for resource capture. Water scarceness compels global actors to strive for securitization of available freshwater resources, often recurring to violent behaviour that might lead to war.

A different version that owes attributes to the same logic is exemplified by a sort of Cornucopian view, which identifies abundance of the resource, rather than its scarcity, as the driver for the spark of violence among states.[89] Both interpretations, whether focusing on abundance or scarcity, are based on identical theoretical foundations that establish a causal connection between resource competition and the proliferation of violent conflicts. The terms water shortage, water stress, and water scarcity are commonly used to indicate the extent of access to freshwater. However, these terms are often employed interchangeably, even though they pertain to distinct conceptual matters, including the imbalance between availability and demand, the decline in surface and groundwater quality, and competition between nations.

[88] J. David Singer and Melvin Small, "Correlates of War Project: International and Civil War Data, 1816-1992," *Inter-university Consortium for Political and Social Research* 9905, (2006): available at https://www.icpsr.umich.edu/web/ICPSR/studies/9905

[89] Nils Petter Gleditsch, "Armed Conflict and the Environment: A Critique of the Literature," *Journal of Peace Research* 35, no.3 (1998): 382-384.

Figure 3: Global Physical and Economic Water Scarcity



Source: World Water Development Report 4. World Water Assessment Programme (WWAP) Available at: https://www.un.org/waterforlifedecade/scarcity.shtml

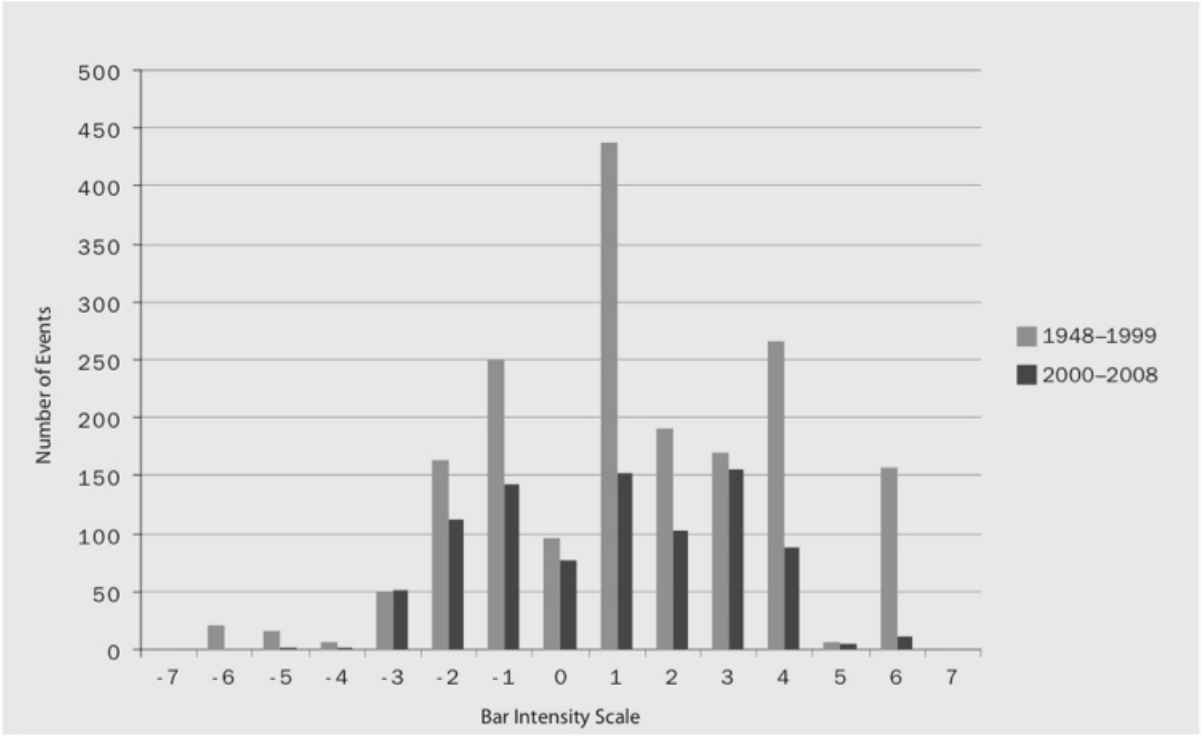
1.8: Dynamics of Interstate Water Conflicts: Resource Scarceness, Ecological Degradation, Environmental Marginalization

As highlighted above, extensive literature in the field of International Relations stresses the role of water as a potential instigator of conflicts. However, the database created by Wolf identifies only seven instances where water-related issues contributed to disputes among a total of 412 crises involving riparian states from 1918 to 1994. This evidence demonstrates that the claim of significant wars being fought over water lacks empirical support.[90] Yoffe created a systematic database to substantiate the link between water and warfare, which compiles and categorizes data on international water-related events. This database utilizes an "intensity scale" that indicates the spectrum of conflictual or cooperative characteristics of each event, from formal declarations of war (7) to neutral or non-significant actions in the global arena (0), and includes instances of voluntary unification into one nation (+7).[91]

[90] Jannik Boesen and Helle Munk Ravnborg, "From water 'wars' to water 'riots'? Lessons from Transboundary water management", (Danish Institute for international Studies, Copenhagen 2004)

[91] Shira Yoffe, Aaron T. Wolf and Mark Giordano, "Conflict and cooperation over international freshwater resources: Indicators of Basins at risk," *Journal of the American Water Resources Association* 39, no. 5(2003): 1112

Figure 4: From Potential Conflict to Cooperation Potential (PC-CP) series. World Water Assessment Programme



Source: De Stefano, L., de Silva, L., Edwards, P., and Wolf, A.T. (2009). Updating the International Water Events Database. From Potential Conflict to Cooperation Potential (PC-CP) series. World Water Assessment Programme.

The theoretical foundation of such compilation exist in the assumption of a progressive scale from very conflictive to very accommodating relationships, and the outcomes clearly show the dominance of mild cooperative arrangements among the actors involved value of 1, thus overturning the assumption of the predisposition of water for being a causal factor of the conflicts. Figure 2 shows how high conflict incidents have not been recorded since 2000 and that many water events were categorized between -3 (diplomatic/economic hostilities) and +3 (working group agreements).Therefore, it is demonstrated that the causality link between scarcity of water resource and violent conflicts might be fragile, and the analysis should incorporate other contextual components that may possibly play an appropriate relevant role in the configuration of water-related disputes.

The two academic groups i.e. the Toronto Group headed by Homer-Dixon and the Environment and Conflict Project (ENCOP) led by Baechler and Spillman, started evolving contending theories about the reasons and features of the ecological conflicts in early years of 1990's, and relevantly contributed expertise in broadening the discussion. The first group focused on scarcity of natural resources and the second group advanced enquiry over the analysis of ecological degradation, in order to classify the environmental conflicts at different levels of analysis in different categories and consequently to investigate the relationships

between natural resources and conflicts. Baechler indicated that environmental degradation prompted ecological conflicts[92], and analogous logic according to Homer-Dixon might be derived from his theoretical assumption that violent and intense conflicts between states are triggered by environmental scarceness.[93] Despite the conceptual difference in the hypothesis of the two authors on the terminology like degradation or resource scarcity, the diversified categories and implied research methodology, the deterministic correlation verifies that conflicts may be a probable consequence of disputes over resources. Competition over the scarcity of water is a crucial assumption in both schools of thought.

Many other researchers have been critical of the deterministic perception and link of resource scarcity and conflicts establish that Homer Dixon's theoretical foundation that scarcities of renewable resources are already contributing to violent conflicts resulted to be academic and subjective. This postulation that mostly influenced the discussion for over a decade, some authors challenged the rationality that decrease in resource quantity might be a trigger of resource conflict, as in many cases the opposite strategy of cooperation proved to be true. In this sense, resource acquisition, social distribution, demand of that resource and probable manipulation result to be more important than ―simple resource scarcity also later recognized by Homer-Dixon and his colleagues.

This paradigm change signified a way out from the drawbacks of theories based on sole deterministic driver of resource conflicts like water scarcity or variation in availability of water flow, consequently opened the field to the assimilation of other variables like past relationships between states, relative geographical riparian position, governance mechanism, military balance (or asymmetry) of power and decision-making structures. However, the chances for escalation in environmental conflicts are enhanced by the analysis of a wider area of encouraging/intervening features that range from political and socio-economic conditions to the existence of cultural heritage and legal engagements,[94] consequently substituting the water scarcity concept with manifold inter-linked sources of potential conflicts across a variety of spatial and chronological scales.

Most of the water resources experts across the globe acknowledge that water conflicts are not triggered solely by the physical scarcity of water but they happen primarily owing to

[92] Günther Baechler, "Why Environmental Transformation Causes Violence: A synthesis," *Environmental Change and Security Project Report* 4, (Spring 1998): 25.
[93] Homer Dixon, "Environmental scarcities and violent conflict: evidence from cases," *International security* 19, no. 1 (1994): 5.
[94] Nils Petter Gleditsch, "Armed Conflict and the Environment: A Critique of the Literature," *Journal of Peace Research* 35, no.3 (1998): 391.

the poor hydro-management issues. This acknowledgment given to the role played by the intervening and contextual elements rather than merely physical and technical perspectives, enabled the convergence of two primarily very distant concepts of literature i.e. the hydro politics and hydro-management theoretical underpinnings.[95] Whereas the water conflict/war works started considering administrative approaches to address the problems originating from the inclusion of the demand-side and the distributional characteristics of water supply, similarly the hydro-management practitioners and professionals opened their inquiry to environmental, ecological, communal and political assessment heading towards the classification of water governance. Hydro governance in a transboundary water sharing context encompasses actors ranging from global/international to provincial, national, subnational and local users.

The determining factors of conflicts relating to water are complex, manifold, multifaceted, and are not reducible to the simple availability and accessibility of the water resource. The basic features of water conflicts are "great diversity of actors, its transnational character, and mismatch between environmental and political-administrative frontiers, power asymmetries and irregularities, ideological and antagonistic legacy and uncertainties."[96] The incorporation of the "political dimension" into the academic discourse on Transboundary Water Management is consequently one of the most pertinent contribution of the social science scholars to the analytical domain of water conflicts, and ascends around the same themes which helped in the emergence of social scarcity concept. They include various causative factors such as power asymmetries, imbalanced access and usage of natural resources, socio-economic dis/advantages, institutional capability, negotiating stratagems and susceptibility to internal and external shocks. These factor in amalgam signifies an accurate methodology to reveal and disclose the unseen or subtle causes that play a more dominant role in determining the dynamics of hydro-politics rather than complete existing and future accessibility of the natural resource specifically water resource.

1.9: Riparian Relationships

The dominant and powerful upper riparian nations in shared transboundary river basins incline to favor the theory of Absolute Territorial Sovereignty (no consultation required with downstream nations), while the powerful lower riparian states tend to invoke the theory of

[95] Maite Martinez Aldaya, Alberto Garrido, M. Llamas, Consuelo Varela Ortega, Paula Novo, and Roberto Rodriguez Casado, "Challenging the conventional paradigm of water scarcity through the water footprint: The Spanish example," in *Water Policy in Spain,* ed. Hoekstra (CRC Press, 2009): 7

[96] Helga Haftendorn, "Water and international conflict," *Third World Quarterly* 21, no.1 (2000): 54-55.

Absolute Territorial Integrity (all water resource must flow downwards).[97] Consider powerful upstream republics like Turkey (Tigris and Euphrates rivers basins), India (Ganges, Brahmaputra and Meghna rivers basins), and China (Brahmaputra and India (Ganges, Brahmaputra and Meghna rivers basins) and powerful lower riparian states such like Egypt and Sudan (Nile river basin). However as these nations usually have a propensity to favor one-sided development of the river inside their territorial bounds, simultaneously, they criticize the unilateral hydro expansion plans by the other riparian states along the same river basin.[98]

- In the Southern Arizona River valleys, the Hohokam tribe who flourished during 300–1,450 AD were considered as nonviolent maize agriculturalists collaborating with each other for building water canals. According to the latest archaeological findings, Hohokam expert Glen Rice contends that, though cooperative mechanism were present within same communities and also sustained during the canal maintenance works, but simultaneously these communities were in a constant preparedness to go to war at any time.[99] Collaboration along with the fear of losing control on shared water and a persistent preparation for war among water sharing groups, was a general practice in the past and still remains a reality in the contemporary world. At this juncture, few contemporary instances are exemplified to comprehend the extent and nature of uncertainties and apprehensions various countries are being subjected to in different transboundary shared rivers basins across the globe.
- In South Asia tensions are imminent between Pakistan and India over sharing of water of Indus Rivers. As per the 1960 Indus Waters Treaty, right to water flowing from three western rivers, i.e. Indus, Jhelum and Chenab, were given to Pakistan amongst the six rivers of the Indus basin, whereas the right of three eastern rivers, i.e. Sutlej, Beas and Ravi, were allocated to Indian state. Around thirty three hydropower generation projects with overall installed capacity of 3,000 megawatts (MW) on the upstream of the western rivers presently are under erection by India lacking proper consultation with Pakistan. Among them one of the most controversial project is 330-MW Kishanganga dam on Kishanganga River, a tributary of Jhelum.[100] Pakistan has objection on the design of this dam and maintains that this project would decrease

[97] Muhammad Mizanur Rahaman, "Water wars in 21st century: speculation or reality?' *International Journal of Sustainable Society* 4, no. 1-2 (2012): 5.
[98] ibid
[99] Heather Pringle, "North America's wars," *Science* 279, no. 5359 (1998): 2038.
[100] Pallava Bagla, "Along the Indus River, saber rattling over water security," *Science* 328, no.5983 (2010): 1226–1227.

water flow to the Jhelum River. Water experts are warily conveying that these projects would provide India the capability to store sufficient water to control or limit the water flow to Pakistan in the critical time of agricultural cultivation. Despite the ratification of the Indus Treaty in 1960, no main conflict had escalated between the two states, these current hydropower projects might become a foundation of intractable water conflict between nuclear neighbors. Pakistan holds reservations that the scheduled dams might potentially lend India 'the capacity to accumulate sufficient water to manipulate the supply to Pakistan at the crucial moments of the growing season.

- In Central Asia, Amu Darya river basin, there is under construction Rogun Dam along with the Vakhsh River in Southern Tajikistan. This has also became a basis of tension between Tajikistan and Uzbekistan. Amu Darya gets 25% water flow from the Vakhsh River and Uzbekistan is apprehensive about losing water due to Rogun Dam in upstream. Additionally there is another mega project, the new Golden Age Lake covering about 3,500 km2 of six billion dollars presently under production by Turkmenistan.[101] Uzbekistan is worried that water might be diverted by Turkmenistan from Amu Darya to improve freshwater in lake consequently reducing the water availability in Uzbekistan. The aforementioned two projects are causing tensions along the Amu Darya river basin.
- Indian and Chinese individual independent strategies to exploit the water resources and hydropower potential of Brahmaputra basin's upstream is raising tension between the two Asian neighbors along their frontier and extend the alarm to downstream Bangladesh for the likelihood severe shortage and scarcity of water owing to the decreased water flow from Brahmaputra River. Remarkably, most of the dam projects along the Brahmaputra river basin as projected by China and India are located on the border zone of Tibet Autonomous Region and Arunachal Pradesh. This area is at present already unstable due to the ongoing conflicting arguments on territorial claims by two states.[102] Apprehensions are present on Indian side that Chinese development projects planned upstream of Brahmaputra basin will jeopardize its own development projects along the mid-stream of the river and lessen water flow in North-Eastern India. Bangladesh as the most downstream state receiving water from the Brahmaputra basin, suspects that any unilateral water development plans upstream, whether by China or

[101] Richard Stone, "A new great lake – or dead sea?' *Science* 320, no. 5879 (2008): 1003.
[102] Muhammad Mizanur Rahaman, "Integrated Ganges basin management: conflicts and hope for regional development," *Water Policy* 11, no. 2 (2009): 170.

India, might reduce the water flow in Bangladesh and could extremely hurt its overall development specially the agricultural sector.

- The hydropolitics between Israel and Palestinian Gaza city is also significant example of water tensions in Middle Eastern region. Israeli National Water Company- Mekorot- used to sell 5 million cubic metres (MCM) piped water into Gaza city per year. Severe water shortages is faced by Gaza (assessed 60 MCM water shortages per year) and also degrading water quality (high salinity and higher nitrate concentration).[103] The increased amount of salinity contributes to kidney ailments and the greater nitrate concentration causes blue baby syndrome that is widespread in Gaza city.
- Ethiopia is sitting with enormous unexploited hydropower potential along the upstream of the Nile basin in Nile river basin, North Africa. Ethiopia is vulnerably waiting to exploit this massive potential owing to the opposition from downstream regional powerful states like Egypt and Sudan. Ethiopia, is constantly under pressure from Egypt not to pursue development projects upstream although it contributes around 86% of the total water flow of Nile. Anwar Sadat, the late President of Egypt stated once that any act that would put in danger the waters of Blue Nile would be tackled with a strong response from Egypt, even if that action necessitated start of war."[104] Ethiopian apprehension is verified already that any hydropower generation development project in Nile basin would not be tolerated inside their own territorial area by the regional downstream key powerful players.

The above mentioned cases draw attention to the professed fears that both in the past and at the present, water is frequently being used for political motivations. The apparent reservations among riparian states in transnational rivers basins, discussed above with some contemporary case studies, are existent and real disputes that calls for global attention. Evading these hydro-political tensions with political tinge might contribute to the continual preparedness to go to war, further contributing to the securitization and politicization of the water sharing related issues. On the other hand, focusing such issues appropriately, will reduce the possibilities of resource wars and offer us with the policies to resolve the hydro-political tensions through peaceful management/administration and integrated basin development strategies in the regions sharing transboundary water resources. If managed accurately with wisdom, water may function as a tool for sustainable environmental development, peace

[103] John Bohannon, "Running out of water – and time," *Science* 313, no. 5790 (2006): 1085–1087.
[104] Daniel, Kendie, "Egypt and hydro-politics of the Blue Nile river," *Northeast African Studies* 6, No. 1–2 (1999): 143.

building and preventive diplomacy. Failing to tackle these issues with sagacity ensue real risks and dangers in future.

The gradual transfer of hydro-management from scientific realm to security domain is a threat that should be tackled prudently and aptly. The global powers should employ and encourage 'soft power' rather 'harsh power' in order to prevent the likelihoods of resource wars. There are impending threats of water wars, disputes or conflicts predominantly in shared rivers basins with diverging contextual factors, therefore the world community should be well equipped to deal with the worst scenario. Serageldin correctly encapsulates that, in order to avoid water wars, "we should manage our aquatic resources in a better way, learning from the past experience, realizing best practices and facing up to the intensifying challenges that are approaching our way, not to lay off 'water wars' issue as a myth". [105]

1.10: Theoretical Foundations

Hydro relations of India and Pakistan are complex, multidimensional and complicated ever since the independence of both states in 1947. The historical disagreement over the utilization and allocation of the waters of Indus River has withstood ever-evolving patterns of hydro-political interactions, multi-level dynamics of making water policies and mutable intensity in cooperative and conflictive interactions. The transboundary nature of the Indus River discloses the interconnectedness of the Indus Basin states that rely upon the Indus river basin not only for the satisfaction of economic, socio-cultural needs, but also for the maintenance of peace and security in the region. For an enriched examination of the said problem I have used the lens of three theories related to hydro-political relations between Pakistan and India. The first theory is the Hydropolitical Complex Theory that forms the analytical backdrop of the whole issue. The second theory is Hydro-Hegemony Theory that enlightens the role played by power symmetry/asymmetry in River basins thereby focusing on the causative factors of water conflict/cooperation among riparian states. The third concept is the Environmental Scarcity Model by Homer-Dixon which elucidates the role of contextual factors that catalyzes the hydro politics among riparian states. Each of the theory is discussed separately below and later woven into conceptual framework for analysis.

[105] Ismail Serageldin, "Water: conflicts set to arise within as well as between states," *Nature* 459, no. 163 (2009): 163.

1.10.1: Hydro-political Complex Theory

Michael Schulz gave the thought of Hydro-political Complex Theory (HCT) and this concept was explained substantially by Anthony Turton.[106] This theory profoundly builds its theoretical edifice on the concept of Regional Security Complexes forwarded by Copenhagen School of security studies. This approach to global security puts emphasis on a much broader conception of the subject matter rather than customary and conventional approaches that consider merely military and political dimensions. Barry Buzan along with his associates expanded the concept of security broadly and comprehensively integrated the societal, economic, and environmental aspects along with political and military factors into their investigative and analytical domain.[107] The environmental fragment of their theory has specific significance and relevance to the theme of this study that encompasses water security and hydro politics in South Asia. The model of a Hydro-political Security Complex is beneficial in examining the conflictive and cooperative dynamics of hydro-politics in Indus River Basin because water availability is decreasing at a rapid pace along with several contextual factors of water disputes between the riparian states having divergent views on water sharing mechanism.

The effectiveness of the hydro-political security complex as a conception lies in the fact that it permits the relationships between diverse actors/players inside a particular basin to be mapped and examined in great detail. South Asia is currently a 'hydro-political security complex' where water has become the central focusing agenda, and is becoming increasingly both a bilateral and a regional issue, in which countries are simultaneously 'owners' and 'users' of Transboundary Rivers. This framework of hydro-political security complex' has revealed different levels of analysis for examination as the behaviour of riparian countries (hydro-behaviour), the upper riparian-lower riparian competition (hydro-competition), issue of preceding water usage, and diverging priorities. Assuming the countries as rational egoists that are interested in preserving their relative competencies, hydro-management has now assimilated a political sharpness and the elements of state power.[108]

In the domain of International Relations' subject matter, a common division is made amid the units/ subunits, international systems/ subsystems and individuals. Buzan and Waever differentiated the regional from the international level and contend that theoretical 'regional

[106] Micheal Schulz, "Turkey, Syria and Iraq: A Hydropolitical Security Complex," in *Hydropolitics: Conflicts over Water as a Development Constraint,* ed. Ohlsson (London: Zed Books, 1995): 92.
[107] Barry Buzan, Ole Weaver and Jaap D. Wilde, "Security: A New Framework for Analysis"(London: Lynne Rienner Publishers, 1998):15-16
[108] Micheal Schulz, "Turkey, Syria and Iraq: A Hydropolitical Security Complex," in *Hydropolitics: Conflicts over Water as a Development Constraint,* ed. Ohlsson (London: Zed Books, 1995): 97.

security complexes' are more decisive and influential in international security in the post-cold war global order. Therefore, regional approach to the international and global security studies is advocated by Buzan in order to analyze the different aspects of five dimensional security prism. Consequently, security complex then is well-defined as "a combination of elements whose process of securitization and de-securitization or both are so intertwined that their security complications cannot rationally be examined or determined separately from one another."[109]

The securitization process is described as captivating a matter outside the jurisdiction of recognized rules and henceforth categorizing it as beyond political affairs, or classifying it as an existential danger that should be counteracted with emergency methods. Therefore, security politics should be considered as different from normal politics. The securitization could also be a deliberate approach by politicians and policymakers in order to make water and other ecological concerns a focal point that else may go overlooked and disregarded, that emphasizes the intrinsically communicative purpose of the process.

Though we may find securitization of ecology and water in certain circumstances, the complete water securitization is rarely found that is an optimistic outcome in so far as asserted by Turton because in case of complete securitization of water resources would be failure of state apparatus to resolve the issues in the customary political structure and framework.[110] Nonetheless security dynamics may perhaps be found at a play in politically charged atmospheres. The usefulness and effectiveness of security complexes for the examination of complex and interweaved transboundary water-relations turns out to be apparent and therefore this conceptual framework can be effectively applied to perspectives of hydro-politics globally. Hence, a "hydro-political security complex" precisely can be defined as the countries which are mechanically users and geologically owners of waterways and rivers.[111] Resultantly, the rivers could be deliberated as a vital national security issue.

A hydro-political complex ensues when a state's dependence on transboundary water systems (both surface and under groundwater aquifer) is of such a tactical nature that this dependency begins to drive inter-state relationships as likely collaboration and/or animosity in an observable manner. These hydro-political complexes are different from traditional security complexes as they have complex hydro-political milieus of politics, securitization,

[109] Barry Buzan, Ole Weaver and Jaap D. Wilde, "Security: A New Framework for Analysis"(London: Lynne Rienner Publishers, 1998): 25

[110] Anthony Turton, "Hydropolitics and Security Complex Theory: An African Perspective" (4th Pan-European International Relations Conference, University of Kent, Canterbury,2001): 8

[111] Ibid 19

consultations, negotiations and social interaction.[112] So we find both the benefits of accommodation and the repercussions of conflict within the hydrological basin and its constituent parts instead of the power balancing of external actors.

It is worth noting that security complexes are fundamentally categorized by the fact that their security issues cannot be examined or solved independently, which undoubtedly also applies to the issue of water security. Regarding conflict analysis, it should be noted that "when a water resource dispute is rooted in a greater prevailing political tensions, the water resource dispute can neither be understood as an independent resource conflict nor resolved as such". The ownership of water resource might not lead to any political conflict in essence, but potent conflict will unavoidably affect interactions with water. Both are therefore inextricably linked to the extent that the dispute over water is perceived as an expression or a miniature of a complex political confrontation.

The resolution of the broader prevailing conflicts must therefore precede any resolution of the potential conflict and the establishment of actual cooperative mechanism. The international subsystem relevant to this thesis is South Asian Regional Security Complex. The transboundary water resource that is focus of this research is Indus River Basin that is mutually shared by China, India, Afghanistan and Pakistan. The units of analysis are the coastal political entities, primarily Pakistan and India. The relevant sub-units are various, such as non-governmental organizations (NGO's), river basin organizations (RBO's), governmental organizations, agrarian lobbies and civil society associations.

1.10.2: Hydro-Hegemony: A Theoretical Framework for the Analysis of Hydro-politics

Hydro-hegemony is an analytical framework that explains the power related hydro-political dynamics in regions where states share water resource from Transboundary Rivers in general and here the rationale to choose this framework is to investigate the hydro-politics between Pakistan and India. According to this theory, the control on the water resources is not accomplished by water wars rather through a set of power-related strategies and policies. The research by, Peter H. Gleick, Lowi, T. Naff and R. C. Matson, Thomas Homer-Dixon and Aaron T. Wolf are indeed pioneering and contributions in this field of hydro-politics. Even with such shifting novel focus on water related studies, still the field of hydro-politics remains inadequate and water conflict examination has suffered from the under-consideration of two distinctive and imperative theoretical subjects. Primarily the presence of the fluctuating

[112] Mark Zeitoun, *Power and Water in the Middle East. The Hidden Politics of the Palestinian-Israeli Water Conflict* (London and New York: I.B. Tauris, 2008), 19

magnitude and dynamics (cooperative and conflictive) of hydropolitical conflict between riparian states succeeding by the presence of the power asymmetry between riparian sharing the same water resource. Both these elements of varying and erratic power relations between contending riparian states and presence of fluctuating magnitude of cooperation and conflict are evident in this case study and also a foremost element in this study. Therefore, neither entirely cooperative nor thoroughly conflictive configurations are the result of hydro-political communications in Transboundary Water Management between riparian states. However, the decisive elements in such case studies are the changing patterns of the political interactions among the concerned players along with other factors outside the domain of technical parameters that are characterized as contextual actors in this research.

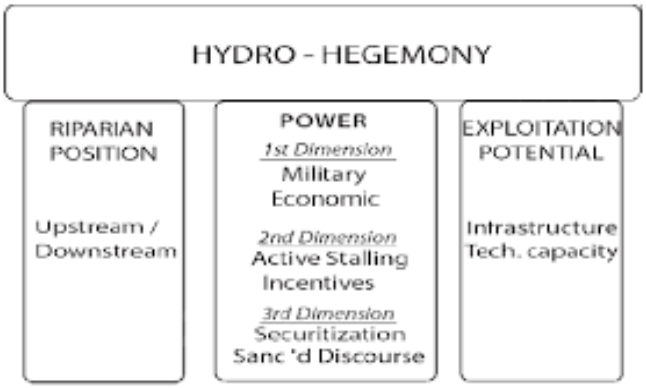
The power relationships between riparian are the principal determining factors (causative factors) of the ability and magnitude of control over shared water resources that individual respective riparian achieves. The relative riparian geographical location and the potential to exploit the water flow through erecting hydraulic structures like dams also have some influence but are not decisive except in so far as they are power associated. By examining the consequences of unpredictable intensities of conflict, contextual factors and of power on water conflicts, this case study relies on combination of factors to form a conceptual framework that provides these elements an organized orderly place in analysis of water related conflict. The conceptual model is stated as the Framework of Hydro-hegemony that studies the underlying forces of domination functioning at the river basin level.

Hydro-hegemony is also theoretically useful tool in studying hydro-politics. This concept has been developed by London Water Research Group and takes the foundations from security studies. The theoretical pillars of hydro-hegemony framework were propounded by Mark Zeitoun and Jeroen Warner in 2006 in research article titled "Hydro-hegemony – a framework for the analysis of transboundary water conflicts". This framework HHF was applied to four case studies of transboundary river basins including Nile, Jordan, Tigris and Euphrates. They held the view that hydro-hegemony refers to the dominion and authority exercised by riparian countries at the shared basin levels. This controlling authority is a desirable national requirement that can be accomplished by embracing water control schemes and policies. Such controlling strategies comprise: "resource capture, assimilation, control and containment" and can be implemented through several strategies like "coercive policies, agreements, treaties and information building, etc. The “weak global institutional structure" and power asymmetry in the prevailing global structure, enables the influential state to exercise hegemony in cross-border water level relationship between riparian states.

By analyzing the role of the hydro-hegemonic state, it remains evident from observation that it either adopts cooperative behaviour or contests for water ownership. The cooperation mechanism is driven by the necessity of gaining advantages, while rivalry is to gain dominance and an unfair water share or a larger share than a less powerful or other weaker state. The level of its water controlling approach in hydro-competition is determined by the national power of a state. In a nutshell, the Hydro-Hegemony Framework demonstrated the fact that there is a constant competition for water between federations around the world. Various nations have an asymmetric power relationship and a (hydro hegemonic) state wants to gain dominance over water resources/flows by implementing several strategies. In order to be a strong hydro-hegemonic state, a hydro-hegemonic country implements three kinds of strategies that include "the capture of water resources, assimilation and containment tactics".[113]

To understand the concept of hegemony we must consider the notion of 'Power' because in social sciences many definitions and phenomena revolve around power. Zeitoun takes various kinds of power as foundation like hard power (military and economic aspects), bargaining power and ideational power (soft power tactics).[114] In fact, it is the skill to group different forms of power that significantly enhance the hegemonic control. In hydro-politics of Indus River Basin, the Indus Water Treaty of 1960 between Pakistan and India is an example of bargaining power.

Figure 5: Three pillars of Hydro-Hegemony Framework (HHF)



Source: (Zeitoun & Warner, 2006)

[113] ibid

[114] Mark Zeitoun, and Naho Mirumachi, "Transboundary Water Interaction I: Reconsidering Conflict and Cooperation,'' *International Environmental Agreements* 8, no.4 (2008): 308-310.

Hydro-hegemony theory is applied to uncover the power tactics and dynamics in bilateral and multilateral interactions between riparian states over transboundary water resource. This presents that conflict and cooperation coexist rather than opposed phenomena in social realm and is immensely relevant to this study of hydro-politics in Indus River Basin. Water resources are decreasing and becoming scarce due to the melting of glaciers owing to climatic change and ecological degradation. The consequent less availability of water resource leads to water competition between states sharing Transboundary Rivers. States do not exist in in a state of power balance, rather they face a power asymmetry in political, economic, strategic and military fields. This prevailing power asymmetry between nations forces them to adopt water control strategies and policies to achieve contested control over the water resources vital for survival of human race. This contested water control benefits the hydro-hegemonic state to sustain their energy needs and also meet its water demand in a water-scarred atmosphere. Through this broad and explanation of Hydro-Hegemony Framework three main elements or criteria of the theory are demonstrated. The first being water competition, second is power asymmetry, and the third is water control plans. Nonetheless, water control itself necessitates adoption of numerous strategies and tactics.

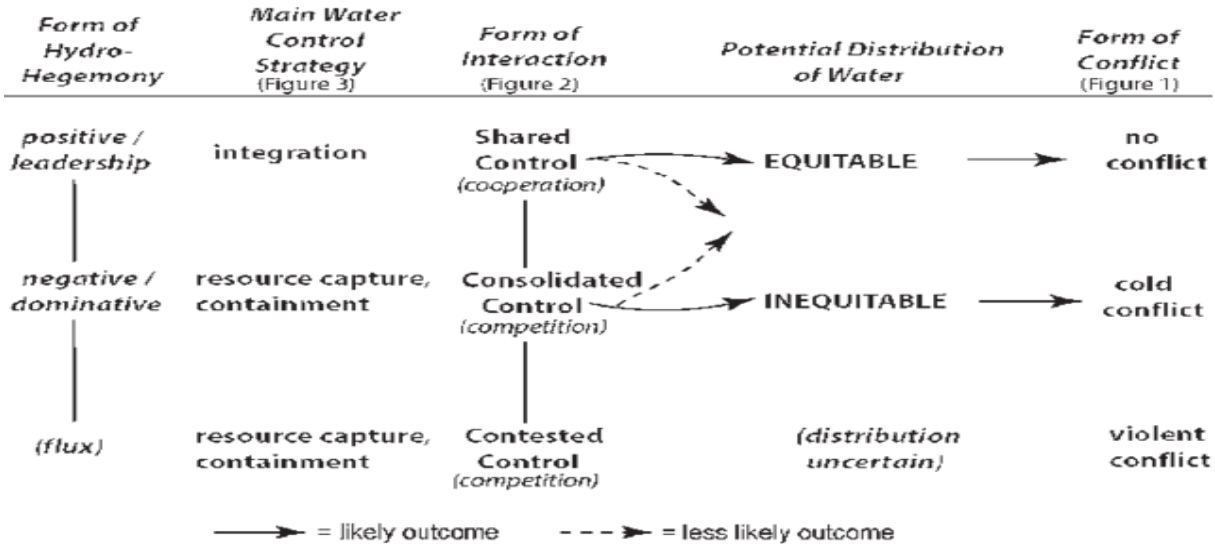
In the context of Pak-India relations it has protracted in low intensity conflict but has the potential to become a full scale war because the question of Kashmir has significantly intertwined to this issue. As Indian Prime Minister in a latest standoff between India and Pakistan, clearly iterated that "blood and water cannot flow together and we will bring back the Indian right to use water of Indus River for Indian people."[115] Consequently, where cooperation is present on the functional level, power asymmetry is between Pakistan and India is embedded in the institutional framework thus facilitating in understanding the hydro-hegemonic relation of Indo-Pak interstate relations and the possibilities for any steps towards conflict or continued cooperation.

India's hostile efforts to build dams and initiate hydro power generation projects across the three western rivers deteriorated relations between Pakistan and India further making them problematic. Pakistan has raised several objections to various Indian dam projects across the western rivers. The disputed projects include Baglihar Hydro Power Project (which is called BHP), Kishenganga Project, Wullar project, and Tulbul Navigation Plan. India is trying to proclaim its hydro-hegemony over these rivers by altering the flow of water. The foremost cause for the Indus water dispute was that the main rivers in the Indus basin flow through the

[115] Vineeta Pandey, "Blood, water can't flow together: PM," *The Pioneer* (New Delhi, India), Sept. 27, 2016.

Indian occupied territory of Jammu and Kashmir that has been a bone of contention between Pakistan and India since partition in 1947. There is a politics of resources and water in Kashmir.

Figure 6: An overview of Hydro hegemony framework



Source: Zeitoun & Warner, 2006

This figure by Zeitoun and Warner systematically demonstrates the hydro-hegemony framework (kind of hydro-hegemony, hydro control tactics, interaction, the water dissemination outcome and conflict). The figure shows the various form of hydro-hegemon. Hydro-hegemon can either have positive leadership with constructive role or can have adverse role in order to retain dominance in river basins. Water control strategies might include assimilation, resource capture or resource control. These policies are based on the character/role/ nature/form of hydro-hegemon. The kind of interaction may be of three various forms that involve shared water control, consolidated water control or contested water control. This relationship would also be determined by the form of hydro-hegemon, however, the interaction defines the distribution of water resources. The nature of hegemon state, its policies, its interaction and its sharing of resources defines the scenario of cooperation/accommodation and conflict/war.

1.10.3: Environmental Scarcity Model

The third theory is the Environmental Scarcity Model of Homer-Dixon. He discoursed that the contextual factors exacerbate the environmental scarcity issues between states that may lead to conflict.[116] Homer-Dixon elucidated the nexus of environment and security and pointed

[116] Thomas Homer Dixon, "Environmental Scarcities and Violent Conflict: Evidence from Cases," *International Security* 19, no. 1 (1994): 7.

out that natural resource is estimated to be rivalrous when its consumption by one actor reduces its availability to others.[117] The hypothesis behind the environmental scarcity model by Homer Dixon is that interstates conflict can occur through the following three causative forms of resource inadequacy i.e.

- demand-induced (increasing population)
- supply-induced (maldistribution and degradation of resources)
- structural-induced (control through hydropower structures)

Homer-Dixon cautiously points out that the impacts of environmental/ecological shortage are indirect and play in combination with various societal, economic and political pressures. In order to discover the characteristics of hydro-politics it is undeniably essential to widen the analysis to the contextual factors that have contributed to forge well-defined configurations of hydro-political relationships, since it is usually influences outside the water domain that are critical in intensifying tensions related to water conflicts. Therefore, for investigative purposes the hydro management cannot be incoherent with water governance, since both causal elements and explanations of water challenges arise from the larger context in which they are embedded. The acknowledgement of the embeddedness of hydro governance in extensive socio-political configurations enables an analysis over procedures, dynamic forces and relationships that explicitly or covertly influences the hydro-political arrangement in a given space and time perimeter, and paths the way towards a more effective assessment of conflictive and accommodating features of hydro-political relations.

In the case study of Pakistan and Indian hydro-political relations an explicit linkage is evident between water security and national security and has become crucial after the lack of cooperation and repeated stern statements from Indian politician. Often the issues between bilateral relations of Pakistan and India are related to the identity politics where religious and political disposition moreover blurs the actual reasons of conflict. Therefore, during negotiations Kashmir and water related issues are kept subordinate to other factors. Water scarcity can lead to conflict according to Homer-Dixon, when this scarcity takes the shape of insecurity that are accentuated by the complementary factors that are definitely evident in case of interstate relations of Pakistan and India.

Pakistan has already being regarded as a water scarce state that is fast approaching to the level of absolute scarcity. The water availability in Pakistan has fallen to 1,017 cubic meters

[117] Thomas Homer-Dixon, *Environment, Scarcity, and Violence* (Princeton, NJ: Princeton University Press).48

per capita, that is a severe drop from 5,000 cubic meters in 1950. Pakistan is by this time the third most water-stressed state in the world according to the International Monetary Fund (IMF). Pakistan has the world's fourth maximum rate of water usage and its economy is the most water-intensive in the world, that consumes the highest volume of water per unit of Gross Domestic Product.[118] Climatic change is the phenomenon that is aggravating the problem further; a concept not effectively comprehended nor addressed within the ambit of Indus Water Treaty. At present, the Himalayan glaciers supply the Indus basin with between 50-70 per cent of its water supply. [119] The speedy recession of these glaciers specifically owing to the global warming has changed river flows and triggered uncertainty in the availability of irrigation water, causing an overall reduction of water availability and the drying of riverbeds.

Climate change is triggering conflict between states as world population is struggling over diminishing resources across the world. The fight over water could quickly escalate between Pakistan and India while both have nuclear arms with historical baggage rife with conflictive relationship. The conflicts over water resources are indistinguishably amalgamated with politics at every level of analysis i.e. from the domestic/subnational to the national/regional. The menace of "water wars" is a blunt tool with which to apprehend the volatility of struggles over water is necessary. The understanding of existential significance of water resource as a basic need for human survival and necessary for human security might resolve conflicts as much as contending attempts to control water will deepen it.

1.10.4: Conceptual Framework

With water receiving centrality, and progressively becoming both a bilateral and regional issue, South Asia is now a 'hydro-political security complex' in which countries are simultaneously part 'owners' and part 'users' of the rivers. This phenomenon has identified various levels of analysis on how riparian states behave (hydro-behaviour), upstream-downstream contestation (hydro-competition), previous use issues, and clashes of priorities. Supposing that countries are rational entities that are interested in preserving relative capabilities, water has now got a political outlook and the aspects of national power of state. Hydro-political relations can never be enduringly settled, the purpose being that river flows in natural course and are not constant. The flow of water is determined by the cyclical variations of seasons and usage, principally those that are non-consumptive in nature. The interferences

[118] Michael Kugelman, "Water scarcity is Pakistan 's worst nightmare", DW online, Available at: http://dw.com/p/1FrdQ

[119] Shafqat Kakakhel, "The Indus River Basin and Climate Change," *Criterion Quarterly* 10, no. 3 (2015): 144

and modifications on rivers by building water infrastructures like dams impact the water flow. The fluctuations in the quantity and quality of nature of the river water will influence the political relations of states sharing transboundary rivers.

From the above discussion of the main aspects of theories, we can infer that self-interest and competitive tendencies arise on the scarce natural resource and following key arguments can be construed to weave them into combined framework for analysis of transboundary water resource and consequently their potential for conflict and cooperation among riparian states.

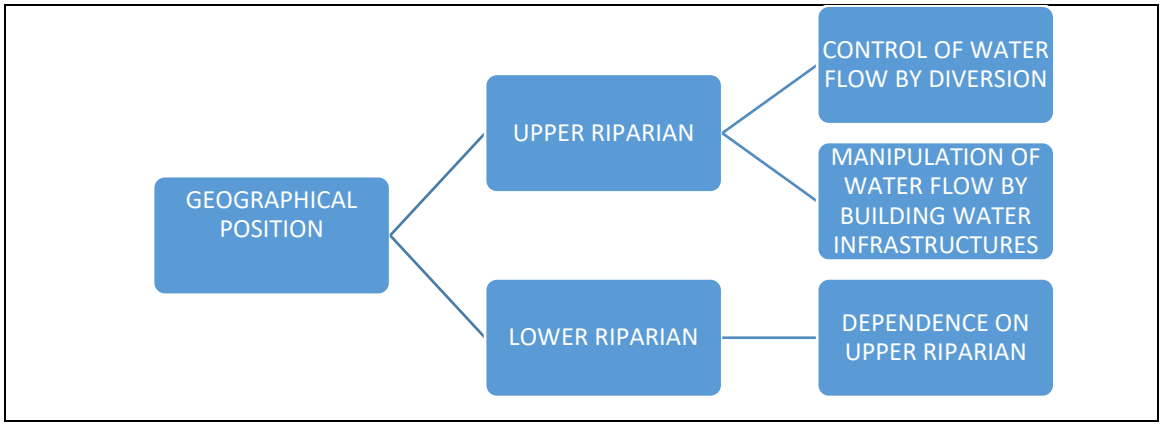
- Securitization of scarce natural resource leads to the politicization of transboundary water resource primarily owing to the following three critical factors:
    - Vitality of the natural resource
    - Availability of the natural resource
    - Management of the natural resource

- Second concept lays emphasis on the patterns of transboundary water sharing between riparian states be it conflictive or cooperative. The riparian position lends advantage to the hydro hegemon to manipulate the basic necessity of human life. Another deterministic factor is the power asymmetry between riparian states that contributes the comparative advantage to the powerful riparian. Summarizing the two decisive factors are
    - Riparian Posture (geographical position)
    - Power asymmetry (material, economic, bargaining, ideational)
- The third crucial perspective in the analysis sheds light on the factual basis that diverse and deteriorating environmental scarcities interact with the structure and other socio-political and contextual factors that exacerbate the linkage between scarcity and violent conflict. Environmental scarcity solely is not responsible for tension but it is a product of various other variables like structure of the state, historical legacies, nature of intrastate and interstate relations, increased demand or degradation of resource. The role of these various contextual factors is crucial because they determine the variability of conflict magnitude and the potential of conflict or cooperation vis-à-vis transboundary water. Therefore, we find two key deterministic points here
    - Environmental Scarcity (scarcity, degradation, uneven distribution and management of natural resource)
    - Significance of contextual factors in riparian relationship

The above debate regarding the theoretical foundation of this study on sharing of transboundary water resource in Indus Basin between Pakistan and India and their consequent effects on interstate relations whether conflictive or cooperative depend on the following elements:

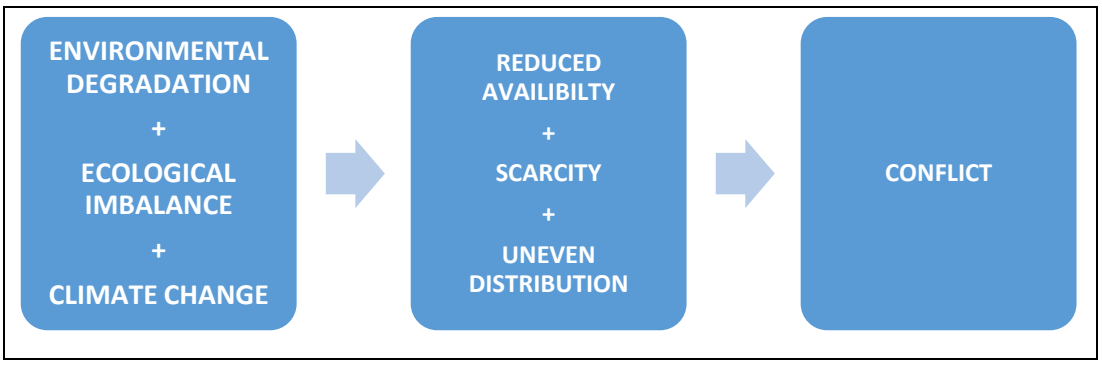
a. Three factors determine potential of conflict and /or cooperation vis-s-vis transboundary sharing i.e. vitality, availability, management of the resource
b. Politicization of water sharing may lead to the course of either conflictive or cooperative pattern in hydro-political correspondence and depends on certain set of factors like geographical posture, power asymmetry and other intervening factors (causative factors).
c. The environmental scarcity couple with other contextual factors (socio-political, historical, and managerial) determine the pattern of conflict and/or cooperation between riparian states.

Figure 7: Relative Location of Riparian



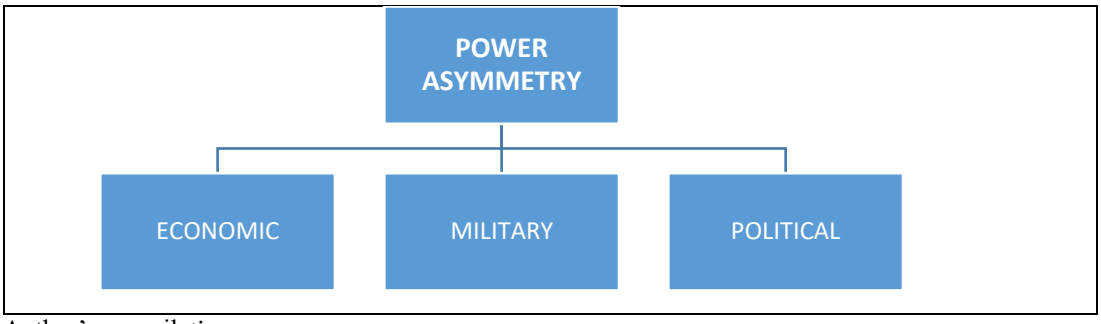
Source: Author's compilation

Figure 8: Environmental Factors



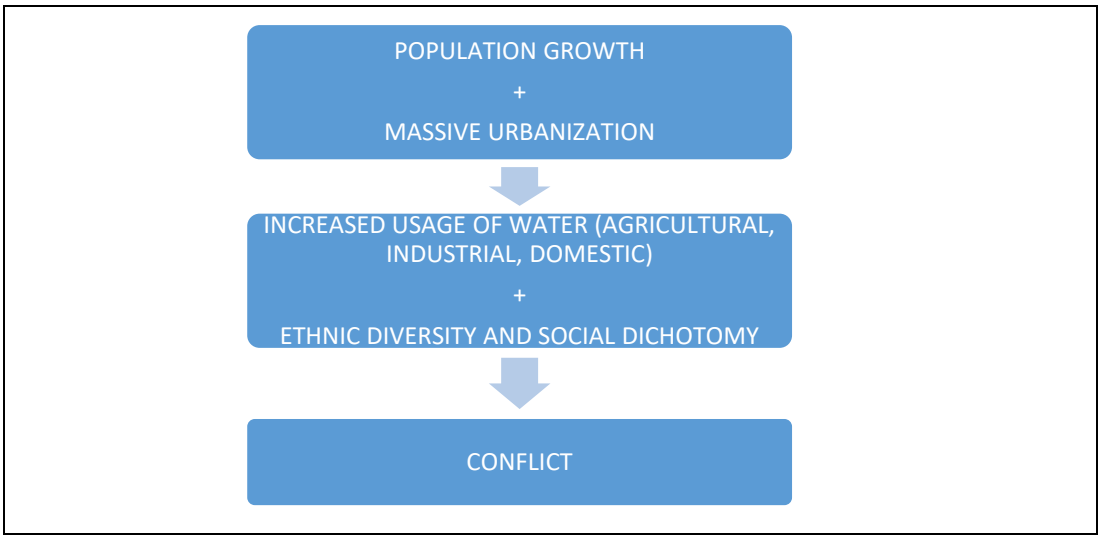
Source: Author's compilation

Figure 9: Power Asymmetry



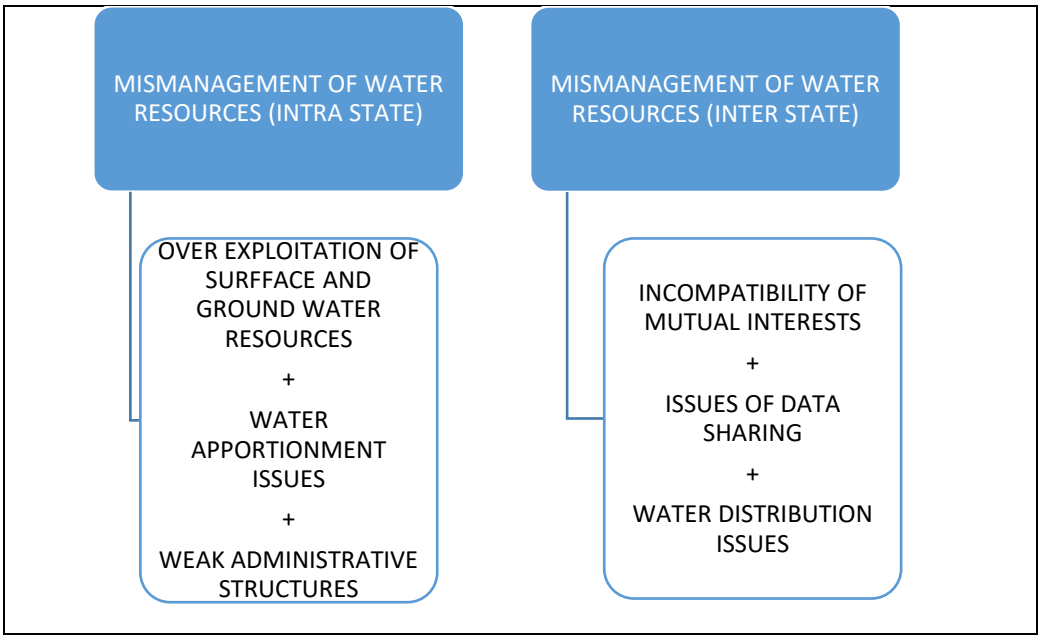
Source: Author's compilation

Figure 10: Population Surge and Urbanization



Source: Author's compilation

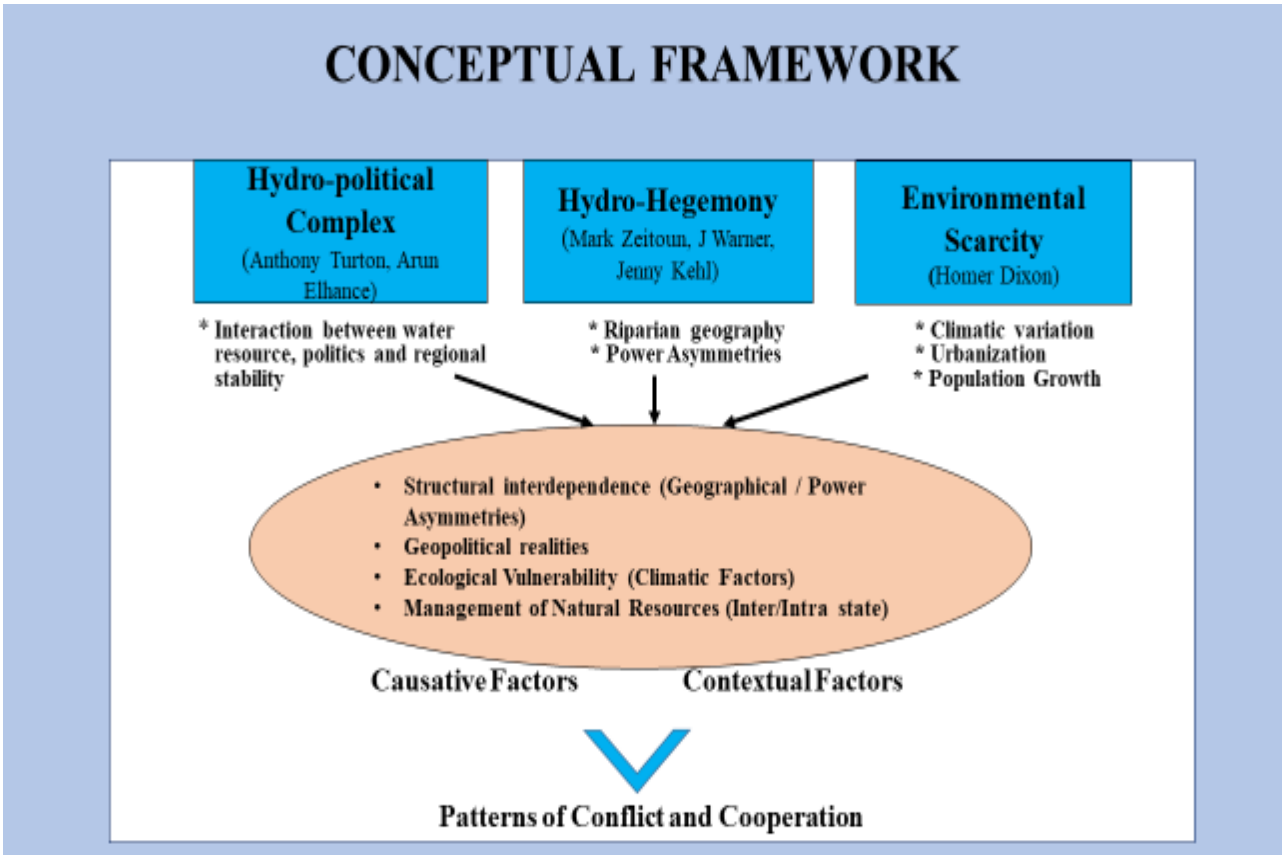
Figure 11: Mismanagement of Natural Resource



Source: Author's compilation

These elements offer us with a new analytical perspective that are applied in this research and they set a stage for a rational and pragmatic approach to investigate the hydro politics in Indus River Basin and the potential of conflict and/or cooperation of transboundary resource between Pakistan and India. Indian supremacy and one-sided redirection of water in the area are disreputable that are detrimental to the interests of its co-riparian and particularly Pakistan's water sharing settlement. India is seeking resource capture strategies and eventually contributing to the distrust and conflict among the riparian countries. The control on shared water resources; usage of water as a political instrument, the relationship of water with socio-economic development and the danger of terrorists/non state actors using it both as an object or a tool are relatively pertinent to Pakistan

. Figure 12: Conceptual Framework



Source: Author's compilation

As conflict or cooperation is outcome of the dynamic development of power relationships, the inclusion of a conceptual method over power analysis is considered indispensable in order to shed light on the understated procedures that forge water policies and impact water negotiations. In hydro-politics, controlling the water supplies renders the control

of the areas reliant on those water supplies. In transnational river basins, the co-riparian countries compete to regulate the administration of water supplies, for attainment of domination and command in regional political arrangement. Therefore, managing and control of water supplies provides political muscle to hostile countries since water is crucial for vigorous economic development. In hydro-politics, water and economics complement one another, signifying their interdependence. [120]

Hydro-hegemony can identified by examining the asymmetrical power configuration in the consumption of water in international river basins. For example, the authoritative water manipulation can be determined through hydro-hegemony by observing three vital and dependent determining factors. “Exploitation potential” is the first factor that is the capability of a potentially powerful state to build water controlling arrangements for management of flow of water resource. The subsequent distinguishing element is labelled as "riparian position," that discusses the relative geographic location of the riparian state in position of water flow. Principally, this element explains whether the country is an upper riparian or a lower riparian state. Lastly the third deterministic factor is the "three dimensions of powers," denoting the structural power, bargaining power, and ideological traits of power of a state.[121]

The structural feature is the "strength" in power terminology that is comprised of economic strength, military power, governmental strength, negotiating/bargaining supremacy, and other determinants of state power.[122] The bargaining characteristic denotes the capability of a powerful government to influence other weaker states into acquiescence with its agendas. The ideological feature is the principal characteristic of power-play by the hegemonic riparian, allowing the authoritative state to stop other countries from resolving their objections by shifting opinions of the population into accommodating the commanding role of the dominant state. Applying these strategic mechanisms, the hegemonic riparian countries achieve consensus in the overall regional political apparatus. This dynamics occasionally embraces potent imposition by the conventional/military strength and sanctions, consequently achieving complete control of the water resources of weaker countries.

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[120] Edward B. Barbier, “Water and Growth in Developing Countries,” in *Handbook Of Water Economics*, ed. Ariel Dinar and Kurt Schwabe (UK: Edward Elgar Publishing Limited, 2015) 501

[121] Farnum Rebecca, Stephanie Hawkins, and Mia Tamarin, “Transboundary Water Interaction IV: The Role of International Law in Hydro-Hegemonic Arrangements” (The Eighth International Workshop on Hydro-Hegemony: Law & Hydro-Hegemony, Kings College London. 2015.

[122] Ahmad Qureshi Waseem, “Indus Waters Treaty: An Impediment to the Indian Hydrohegemony,” *Denver Journal of International Law & Policy* 6, no. 1(2017): 50.

Hydro hegemony refers to the dominance of one country over others in the control and administration of the shared transboundary water resources. The lower riparian states are apprehensive of the activities of the upper riparian, concerning water management, water control, and water pollution, as water flows from the upper riparian to the lower riparian states. Upper riparian countries may tend to decrease water flows, build water management infrastructures, or pollute waters against the interests of lower riparian countries.[123] The developed world has rarely seen any key international water political conflict, as compared to developing countries.

1.11: Analytical Comparison of the Nile and Indus River Basins

The Nile and Indus River Basins both illustrate how power asymmetry, environmental stress, and political rivalry shape transboundary water relations. In the Nile, Egypt's historical dominance is increasingly challenged by Ethiopia's upstream development, prompting a shift toward negotiated cooperation. In contrast, the Indus Basin, governed by the 1960 Indus Water Treaty, maintains institutional stability but remains politically tense due to Pakistan-India rivalry.

- **Two Critical River Systems in Comparative Perspective**

The management of Transboundary Rivers represents one of the most complex challenges in global water governance, particularly in regions experiencing heightened water stress. Among the world's shared river basins, the Nile and Indus basins stand out as critical systems where hydrological interdependence intersects with deep-seated geopolitical tensions, historical legacies, and pressing development needs. A comparative analysis of these basins reveal key factors affecting transboundary water disputes, including power distribution, geographical determinants, and institutional capacity.[124] The Nile River, flowing through eleven riparian states in northeastern Africa, and the Indus River, shared primarily by India, Pakistan, Afghanistan, and China, both support the lives and livelihoods of hundreds of millions of people while serving as crucial engines for agricultural production, energy generation, and economic development. These basins present compelling cases for comparative analysis due to their similar strategic importance, their history of conflict and cooperation, and

[123] Arun P. Elhance, *Hydropolitics In The Third World: Conflict And Cooperation In International River Basins* (Washington D.C: USIP Press, 1999), x

[124] Azizi, Mujib Ahmad, and Jorge Leandro. 2025. "Factors Affecting Transboundary Water Disputes: Nile, Indus, and Euphrates–Tigris River Basins." Water 17, no. 4: 525. https://doi.org/10.3390/w17040525.

the mounting pressures they face from population growth, climate change, and competing demands for scarce water resources.

- **Power Asymmetries in Transboundary Hydro-politics**

Power asymmetries fundamentally shape the hydro-political dynamics of both the Nile and Indus River basins, though they manifest in distinct configurations and have evolved along different trajectories. In the Nile Basin, power relations have historically been dominated by Egyptian hydro-hegemony, rooted in colonial-era agreements that allocated the vast majority of the river's flow to Egypt and Sudan while ignoring the rights and needs of upstream states. This hegemony was maintained through Egypt's greater economic and military strength, diplomatic influence, and the strategic use of discursive frameworks that framed the Nile as essential to Egyptian national survival. The dynamic political contexts of the region have perpetuated these power asymmetries, creating enduring structures of hydro-political control.[125] However, the early 21st century has witnessed a significant reconfiguration of power dynamics in the Nile Basin, challenging Egypt's historical dominance. Ethiopia's rapid economic growth and increased financial capacity to fund major infrastructure projects has enabled it to assert its claims to the Nile's waters more forcefully.

In the Indus Basin, power asymmetries reflect the broader geopolitical tensions between Pakistan and India, the basin's two primary riparian states. The Indus Water Treaty (IWT) of 1960 institutionalized a geographical division of the river system that allocated the three eastern tributaries to India and the three western rivers to Pakistan. While ostensibly creating a balanced framework for sharing the basin's waters, the treaty's implementation has been shaped by India's position as the upstream power and its larger economic and military stature. These structural power imbalances are critical factors in understanding the persistence of transboundary water disputes in the region.[126] Pakistan's position as the lower riparian has created a pervasive sense of vulnerability, with many in Pakistan viewing Indian control over upstream waters as an existential threat. This dynamic factor is particularly acute in the context of the disputed Kashmir region, where several important Indus tributaries originate.

- **Riparian Location and Geographical Determinants**

The geographical contexts of the Nile and Indus River basins create distinct hydro-political configurations that significantly influence conflict and cooperation dynamics. The

[125] Hussein, H., and M. Grandi. 2017. "Dynamic political contexts and power asymmetries: the cases of the Blue Nile and the Yarmouk Rivers." International Environmental Agreements: Politics, Law and Economics 17: 795–814. https://doi.org/10.1007/s10784-017-9364-y.

[126] Azizi, Mujib Ahmad, and Jorge Leandro. 2025. "Factors Affecting Transboundary Water Disputes: Nile, Indus, and Euphrates–Tigris River Basins." Water 17, no. 4: 525. https://doi.org/10.3390/w17040525.

Nile River exemplifies a sequential river system where water flows from upstream sources through middle riparian states before reaching downstream beneficiaries. The Blue Nile, which contributes approximately 60-70% of the Nile's total flow, originates in the Ethiopian highlands before joining the White Nile in Sudan and continuing north to Egypt.[127] This geographical reality creates a fundamental asymmetry of dependency, with downstream Egypt relying almost entirely on upstream sources for its water supply while upstream states have alternative water resources and rainfall. Egypt's extreme dependency on the Nile has shaped its historical approach to Nile governance, characterized by assertive claims to water rights and resistance to upstream development.

The physical impacts of water infrastructure development are visibly manifested in the changing geomorphology of these river systems. Research on shoreline dynamics reveals that "the construction of major dams and barrages has significantly altered sediment transport and deltaic formation in both the Nile and Indus deltas".[128] For Ethiopia, the steep topography of the Ethiopian highlands provides ideal conditions for hydropower development, exemplified by the GERD project. For Egypt, the concentration of its population and agricultural land along the Nile Valley makes it exceptionally vulnerable to any reduction in river flow, a vulnerability compounded by ongoing shoreline changes in the Nile Delta.

The Indus Basin presents a different geographical paradigm, characterized by a more complex tributary system with multiple rivers flowing from distinct mountainous source regions before converging in the plains of Punjab. The Indus and its major tributaries originate in the Himalayas and flow through India before reaching Pakistan. This geography creates multiple potential flashpoints for conflict, as developments on any single tributary can affect water availability downstream. The system's heavy reliance on glacial melt and snowmelt from the Himalayas adds another layer of hydrological vulnerability, particularly in the context of climate change. The partition of the Indus Basin between India and Pakistan during the 1947 division of the subcontinent created an artificial fragmentation of a naturally integrated hydrological system, transforming domestic water management into an international governance challenge.

[127] John Waterbury, Hydropolitics of the Nile Valley (Syracuse, NY: Syracuse University Press, 1979), 15.
[128] Risha, Muhammad, and Paul Liu. 2025. "Event-Driven Shoreline Dynamics of the Nile, Indus, and Yellow River Deltas: A 50-Year Analysis of Trends and Responses." Earth 6, no. 4: 120. https://doi.org/10.3390/earth6040120.

- **Sub-national Water Management and Governance Structures**

Sub-national water management in both the Nile and Indus basins reflects complex interactions between central state authority and local water governance practices, though with distinct institutional arrangements and challenges. In the Nile Basin, water management is primarily characterized by strong central state control, with limited devolution of authority to subnational units. Recent assessments of transboundary water management practices highlight that "institutional fragmentation and weak coordination mechanisms at subnational levels continue to impede effective water governance in the Nile Basin". [129]In Egypt, a highly centralized system operates through a hierarchical structure with the Ministry of Water Resources and Irrigation at the apex, directing water allocation and infrastructure development throughout the Nile Valley and Delta. This centralized approach reflects the strategic importance of the Nile to Egypt's national security and the historical state-building project around water control.

In the Indus Basin, subnational water management is defined by the Indus Basin Irrigation System (IBIS), the largest contiguous irrigation system in the world, which serves as the backbone of agricultural production in both India and Pakistan. The IBIS represents a colossal engineering achievement but also creates path dependencies that are difficult to reform. In Pakistan, water allocation between provinces is governed by the Water Apportionment Accord of 1991, which distributes flows from the Indus and its tributaries among Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan. This interprovincial allocation framework has reduced conflict but has proven inflexible in responding to changing water availability patterns and shifting demand. Subnational water governance in the Indus Basin faces severe challenges related to water quality degradation and infrastructure maintenance, with significant impacts on riparian health indicators throughout the basin.[130]

- **Population Surge and Escalating Water Demand**

Demographic pressures and escalating water demands represent critical drivers of hydro-political tension in both the Nile and Indus basins, though with distinct implications for future water security scenarios. The Nile Basin is experiencing rapid population growth, with the current population of approximately 300 million people within the basin expected to double

[129] Deribe, Mekdelawit M., Assefa M. Melesse, Belete B. Kidanewold, Shlomi Dinar, and Elizabeth P. Anderson. 2024. "Assessing International Transboundary Water Management Practices to Extract Contextual Lessons for the Nile River Basin." Water 16, no. 14: 1960. https://doi.org/10.3390/w16141960.

[130] Hira, A., M. Arif, N. Zarif, Z. Gul, X. Liu, and Y. Cao. 2022. "Impacts of Stressors on Riparian Health Indicators in the Upper and Lower Indus River Basins in Pakistan." International Journal of Environmental Research and Public Health 19, no. 20: 13239. https://doi.org/10.3390/ijerph192013239.

by 2050.[131] This demographic expansion will exponentially increase water demand for domestic, agricultural, and industrial uses, placing additional strain on already stressed water resources. The basin is already classified as critically water-stressed, with total freshwater withdrawals exceeding total renewable freshwater resources in some regions. This imbalance between population-driven demand and available supply creates a potentially volatile scenario that existing institutional arrangements are ill-equipped to manage.

For upstream states like Ethiopia, Sudan, and Uganda, high population growth rates combine with development aspirations and energy poverty to create compelling motivations for increasing water utilization from the Nile and its tributaries. The Indus Basin faces similarly intense demographic pressures, with over 300 million people currently dependent on the basin's water resources. Future projections indicate that "upstream water consumption in the Indus Basin is expected to increase significantly, which will substantially impact downstream water availability".[132] Population growth, particularly in urban centers, is driving increased water demand for domestic and industrial uses, in addition to the already massive agricultural withdrawals. The basin is already among the most water-stressed in the world, with some regions experiencing severe water scarcity during dry periods. Current water demands for irrigation significantly exceed dry season supplies, leading to groundwater overexploitation that is unsustainable in the long term.

- **Patterns of Conflict and Cooperation**

The historical and contemporary patterns of conflict and cooperation in the Nile and Indus basins reveal contrasting approaches to transboundary water governance, with important implications for their future management. The Nile Basin has been characterized by persistent hydropolitical tensions rooted in the exclusionary allocation principles established during the colonial period. The 1929 and 1959 agreements between Egypt and Sudan allocated nearly the entire flow of the Nile between these two downstream states, ignoring the rights and needs of upstream riparian countries. This inequitable distribution created a governance framework that privileged existing uses over equitable allocation, establishing structural conditions for conflict as upstream states developed the capacity to challenge the status quo. The dynamic political

[131] United Nations Environment Programme (UNEP), *Nile River Basin: Environmental Outlook—Summary for Decision Makers* (Nairobi: UNEP, 2013), 4.

[132] Smolenaars, W. J., S. Dhaubanjar, M. K. Jamil, A. Lutz, W. Immerzeel, F. Ludwig, and H. Biemans. 2022. "Future upstream water consumption and its impact on downstream water availability in the transboundary Indus Basin." Hydrology and Earth System Sciences 26: 861–883. https://doi.org/10.5194/hess-26-861-2022.

context of the Blue Nile basin exemplifies how power asymmetries can simultaneously drive conflict while creating opportunities for negotiation and cooperation.[133]

Efforts to establish more inclusive cooperative frameworks in the Nile Basin have achieved limited success. The Nile Basin Initiative (NBI), established in 1999, was intended to foster cooperation among all riparian states and develop a comprehensive legal framework for water sharing. However, the NBI failed to resolve fundamental disagreements over water rights and allocation principles. The ongoing dispute over Ethiopia's construction of the GERD represents the most serious test of these competing claims, with negotiations repeatedly stalling over technical details regarding the filling and operation of the dam.

The Indus Basin presents a more institutionalized approach to conflict management through the Indus Water Treaty (IWT) of 1960, which has proven remarkably resilient despite periods of intense political conflict between Pakistan and India. The IWT has been credited with preventing water disputes from escalating into broader conflicts, surviving three wars and numerous military standoffs between the two nuclear-armed neighbors. The treaty establishes detailed procedures for conflict resolution, beginning with the Permanent Indus Commission—a bilateral body of water officials—and escalating to neutral expert determinations and court of arbitration when bilateral negotiations fail. However, the IWT faces growing challenges that test its continued effectiveness. Scholars have identified several pitfalls in the treaty, noting that its "rigid structure fails to address contemporary challenges like climate change, groundwater management, and environmental sustainability".[134] Additionally, the treaty's focus on surface water allocation ignores the critical connections between surface and groundwater systems, creating regulatory gaps that parties can exploit.

[133] Hussein, H., and M. Grandi, "Dynamic Political Contexts and Power Asymmetries: The Cases of the Blue Nile and the Yarmouk Rivers," *International Environmental Agreements: Politics, Law and Economics* 17 (2017): 795–814.

[134] M. U. Qamar, M. Azmat, and P. Claps, "Pitfalls in Transboundary Indus Water Treaty: A Perspective to Prevent Unattended Threats to the Global Security," *npj Clean Water* 2 (2019): 22, https://doi.org/10.1038/s41545-019-0046-x

Figure13: Comparative Analysis of major variables in Nile River Basin and Indus River Basin

Analytical Variable	Nile River Basin	Indus River Basin	Comparative Insight
Hydro-hegemony	Historically dominated by **Egypt (downstream)** through colonial-era treaties (1929, 1959), reinforcing control over water allocation. Recent **upstream challenge** from Ethiopia (GERD) represents a shift toward *contested hydro-hegemony* (Zeitoun & Warner, 2006).	**India (upstream)** exercises structural hydro-hegemony through control of headwaters and hydropower development, while **Pakistan (downstream)** relies on legal safeguards under the Indus Water Treaty (IWT).	Both basins reflect **asymmetric hydro-political structures**, but hegemony flows **downstream in the Nile** and **upstream in the Indus**—reversing the direction of control.
Power Asymmetries	Rooted in colonial agreements and Egypt's geopolitical dominance; upstream states historically marginalized in negotiations.	Asymmetry stems from India's larger economic, military, and diplomatic power relative to Pakistan.	Both systems exhibit entrenched asymmetries, but **the Nile's are historically institutionalized**, while **the Indus's are strategically reinforced**.
Riparian Location and Geography	Multi-riparian basin (11 states); complex hydrology with competing upstream–downstream claims.	Bi-riparian system mainly between India and Pakistan (with minor shares by China and Afghanistan); geographically linear and glacial-fed.	Nile's multi-state configuration complicates cooperation; Indus's bilateral nature simplifies negotiation but heightens rivalry intensity.
Subnational Water Management	Weak domestic integration; upstream states (e.g., Ethiopia, Sudan) have limited coordination mechanisms; internal governance fragmented.	Significant subnational disputes exist within both India (interstate river disputes) and Pakistan (provincial allocations under the 1991 Water Accord).	Both basins face **internal governance fragmentation**, but **Indus subnational tensions are institutionalized**, while **Nile subnational coordination remains weak**.
Population Surge and Water Demand	Rapid population growth across basin states increases agricultural and domestic water demand, especially in Egypt and Ethiopia.	Population pressure in Pakistan and India heightens irrigation dependency and groundwater overuse.	Both basins experience **demographic stress**, amplifying water scarcity and governance strain.
Patterns of Conflict and Cooperation	Long-standing **downstream dominance** now giving way to **upstream assertiveness** (e.g., GERD crisis). Cooperation attempts through **Nile Basin Initiative (NBI)** remain limited and politically fragmented.	**IWT (1960)** institutionalized cooperation with defined allocations and dispute mechanisms; cooperation persists despite wars and diplomatic breakdowns.	Both basins exhibit **conflict–cooperation duality**: the Indus shows *functional cooperation amid conflict*, while the Nile reflects *emerging contestation amid fragile cooperation*.

Source: Author's compilation

1.12: Hydro-political Complex of South Asia

The hydro-political complex of South Asia involves the activities and tactics employed by India in order to establish and monopolize its hegemony. Apart from Kashmir issue and terrorism between the two states, water insecurity has emerged as another flash point. India behaves like a hydro hegemon that is evident in post treaty construction of hydropower generation projects on western rivers posing serious threats to the water sharing equation between both states. The Indus Water Treaty of 1960 resolved the water issue to a considerable length, however India's behaviour is revoking and intimidating. The problem arises from India's interpretation of the IWT in accordance with the primacy of its interest.

The water conflicts in South Asia between Pakistan and India have intensified, both quantitatively and qualitatively, because India has built several water management infrastructures over its western rivers. In the context of the Indus Basin, India is often accused of exercising hydro-hegemony over Pakistan due to its geographical position and control over the upstream waters of the Indus River. The concept of hydro-hegemony highlights the power dynamics at play in the management of shared water resources, where the upstream country (India) has significant control over the downstream country (Pakistan). India has managed to gain hydro-hegemony in the Indus water basins against Pakistan through her diplomatic associations, positive image in the international community, geographical location as an upper riparian, and political, economic, and ideological strengths.

Figure 14: Analysis of key variables identified in conceptual framework

Analytical Variable	India: Upper Riparian	Pakistan: Lower Riparian	Analytical Insight
Hydro-hegemony	India exercises *upstream hydro-hegemony* through control of headwaters (e.g., Chenab, Jhelum, Ravi). Uses structural and bargaining power to influence water flows and dam construction (Baglihar, Kishanganga).	Pakistan remains *hydrologically dependent* on upstream flows; experiences *vulnerability hydro-hegemony*, relying on treaty mechanisms for protection.	Reflects **asymmetrical control** where India's positional and material advantage shapes water politics despite legal parity under the Indus Water Treaty (IWT).
Power Asymmetries	Regional hegemon with greater economic, military, and technological capacity. Uses water issues as a *soft coercive tool* within broader strategic rivalry.	Weaker state in relative power terms, seeking international mediation and legal instruments (e.g., World Bank arbitration).	The IWT reduces overt coercion but **power asymmetries persist** through India's project leverage and bureaucratic control of data-sharing mechanisms.
Riparian Location	Upper riparian; source of all six major tributaries; holds natural geographical advantage.	Lower riparian; entirely dependent on inflows from Indian-controlled headwaters.	The **geographic asymmetry** structurally defines the conflict—India controls supply, Pakistan depends on release.
Subnational Water Management	Internal disputes over inter-state water allocation (e.g., Punjab–Jammu & Kashmir tensions) complicate national coherence on transboundary management.	Severe *intra-provincial conflicts* (Punjab–Sindh) weaken unified water diplomacy and implementation capacity.	Both countries exhibit **internal fragmentation**, undermining basin-wide adaptive governance and treaty effectiveness.
Population Surge & Water Stress	Rapid urbanization and industrial growth intensify demand; expanding hydropower projects under domestic energy strategy.	Population surge and agricultural dependence (90% water used for irrigation) heighten scarcity; groundwater overexploitation.	Both face **environmental scarcity**, yet India's diversification cushions stress while Pakistan faces existential water security challenges.
Patterns of Conflict and Cooperation	Engages in strategic dam-building, often triggering political disputes but maintains formal treaty adherence.	Challenges Indian projects through legal forums (Neutral Expert, PCA), while advocating third-party involvement.	Despite recurrent disputes, the **IWT sustains functional cooperation**—a unique model of "managed rivalry" under hydro-hegemony.

Source: Author's compilation

The water dispute between Pakistan and India is closely tied to environmental factors, particularly in the context of the Indus River Basin, which is shared by both countries. The Indus River Basin is water-stressed, with increasing demands from agriculture, industry, and urbanization. Changes in precipitation patterns, melting of glaciers, and altered river flows affect water availability and quality. Agriculture is the primary user of water resources, with Pakistan and India having different crop patterns and irrigation systems. India's construction of dams on the Chenab and Jhelum rivers, tributaries of the Indus, has raised concerns in Pakistan about reduced water flows. Industrial, agricultural, and domestic waste contaminates water sources, affecting human health and ecosystems. Alterations to natural river flows and habitats harm biodiversity and ecosystem services. Effective cooperation and data sharing between Pakistan and India are essential for sustainable water management. All of these factors have been applied and discussed in detail in fifth chapter.

Hydro-hegemony provides ground for regional water conflicts. Usually, countries depend on instituting water distribution arrangements through cooperative mechanism in order to defend their interests and to evade violent behaviors for the resolution of hydro-political disputes.[135] Mutual cooperation supports to achieve an enhanced hydro management/governance system, better environmental safeguard, and reinforced peace in the area and therefore, reduced regional tensions and conflicts. The noticeable instances of cooperative mechanism among riparian countries to reduce conflicts and resolve hydro-political issues by joint settlement include the Great Lakes Water Quality Agreement 1978, between America and Canada, the Agreement for the Cooperation for the Sustainable Development of the Mekong River Basin- 1995, among Thailand, Laos, Cambodia, and Vietnam, the Niles Waters Agreement- 1959, between Sudan and Egypt and IWT-1960 between Pakistan and India.[136]

But, achieving consensus in establishing an agreement or a treaty for sharing transboundary water resource is admissibly is a complicated task, the trail to which is protracted ,problematic and challenging one. The example is the long and hefty negotiation process before formal ratification of the Indus water Treaty between Pakistan and India. The Indus Waters Treaty (1960) aimed to resolve water disputes, allocating the Indus Basin's waters between Pakistan and India. However, tensions persist, and environmental factors have become

[135] Ahmad Qureshi Waseem, "Indus Waters Treaty: An Impediment to the Indian Hydrohegemony," *Denver Journal of International Law & Policy* 6, no. 1(2017): 51
[136] Ibid

increasingly important in the dispute. Addressing environmental factors is crucial for resolving the water dispute and ensuring the long-term sustainability of the Indus River Basin's resources.

The mismanagement of Indus water resources has significant consequences for Pakistan and India consequently resulting in frictions between both states. These include the inefficient use and allocation of water leading to shortages, affecting agriculture, industry, and domestic, inadequate infrastructure and poor maintenance result in significant water losses during transmission and distribution, water scarcity and reduced agricultural productivity threaten food security in the region. Water mismanagement affects economic growth, livelihoods, and poverty alleviation efforts. Mismanagement exacerbates tensions between Pakistan and India, hindering cooperation and conflict resolution.

Hydro-politics will continue to be indisputably the top agenda and security concern of South Asia in the years to come and the future course will be established by the political priorities and determination of both states to resolve this issue. Effective management of Indus water resources requires a collaborative approach, considering both countries' needs and environmental sustainability. The application of this framework covers all the dimensions of time with respect to the hydro-political relations between Pakistan and India like digging in past for analysis of the origin of the conflict, connecting to the present status of the hydro-politics and linking to the future prospects of sharing this vital resource between Pakistan and India.

Chapter Two

Hydropolitics in Indus River Basin- A Historical Background

This chapter of the thesis provides an in-depth analysis of the origin of the hydrological system of Indus River Basin, water dispute between Pakistan and India, the geographical attributes of the system, past patterns of conflict and cooperation in water issues (pre Indus Water Treaty hydro politics between both states). This chapter delivers a short but inclusive explanation of the origin of hydro-politics between Pakistan and India after partition in 1947. It explores the root cause of the hydro-politics between Pakistan and India embedded in the division of the Indian Punjab and the beginning of the bilateral dialogues that reached impasse in 1951. This deadlock highlighted the urgent need for including a third party to break the stalemate.

South Asia offers accommodation to approximately 25.29% of the total global population and the states here are fundamentally agricultural economies. Unluckily, the South Asian nations, especially Pakistan and India, have both faced problems in management of water resources and appropriate watershed management leading to the hydro-politics in the Indus basin that affected both groundwater and surface water. Data on freshwater accessibility per person per annum discloses this vulnerability. The renewable resources of freshwater in South Asia are about 1,200 cubic meters per capita. As compared to Pakistan a large number of states have 2,500-15,000 cubic meters per capita availability of water for their population. Some states like Canada and Norway have over 70,000 cubic meters per capita water availability.[137] The surface water management is very difficult, complex and challenging especially complex in South Asia.

Watershed is the crucial source of all water used in domestic, agricultural and industrial use (such as hydroelectric power), as well as the receptors for most wastewater. The Indus River Basin includes the Indus River beside with its five eastern tributaries—the Jhelum, Chenab, Ravi, Beas and Sutlej with a total length of 2,748 km, crossing international borders.[138] The tactics of upper riparian like interference in the natural water flow of rivers towards lower riparian, deviation of waters course or even the threat of blocking the flow of water can frequently lead to hydro-politics and hostilities, as happened in the case of Pakistan and India

[137] "Water scarcity | International Decade for Action 'Water for Life' 2005-2015," (UNDESA, 2015), Available online at: http://www.un.org/waterforlifedecade/scarcity.shtml, (2015).
[138] Hussain Muzzamil, "Diminishing Waters in Pakistan" Hilal, May 2018. available at https://www.hilal.gov.pk/view-article.php?i=43

in 1948. Downstream countries become vulnerable in Transboundary Rivers especially when power asymmetry exists between the riparian. Therefore, effective watershed management requires water users to consider the relationships, interactions and the impact of any actions especially on downstream riparian.

The most consumed transboundary hydrological resources in the world are located in Asia. These rivers serve countries with huge populations that face major economic and .development challenges, such as China, India and Pakistan. The Brahmaputra, Ganges, Mekong, Indus and Salween basins are Transboundary Rivers in Asia. Among these rivers, the Indus River, which is home to ancient Hindu civilizations, is a transboundary river whose watershed falls mainly in Afghanistan, Pakistan, China and India.[139] Inflow to the Indus River system is derived from snow, glacier melt and rainfall upstream of the Indus Plain. The mountains with unbroken snow cover is the primary source of water for Indus**.**

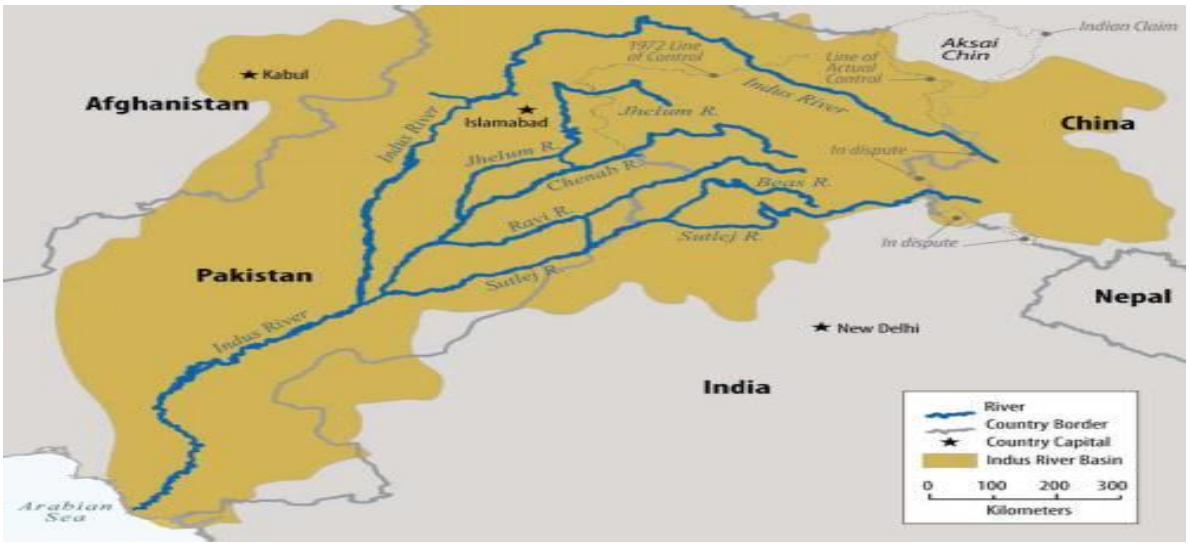
Transboundary Rivers in South Asia cascade down from the high altitudes of the Himalayas, leading to enormous hydro-potential regions such as Jammu and Kashmir, Bhutan and Nepal. Several analysis of climate change on glaciers propose that snow melt will increase in the short to medium term, consequential in amplified flow and flooding. The construction of water infrastructures to accumulate this surplus water and its discharge during the dry season has troubled planners because it has benefits on one hand but lead to supplementary hazardous by-products on the other. This is particularly important for the Indus basin, as glaciers account for roughly half of the water flow.[140] The hydrology of the region is not only linked to economic development, but also to security and stability of South Asia particularly the two nuclear states.

The impulse for water utilization from Asia's transnational rivers for local, agrarian, industrial and environmental/ecological purposes is increasing rapidly by every passing day. Consequently, the states sharing transboundary river systems, lakes and aquifers are susceptible to tensions and hydro political conflicts that frequently are aggravated by climate change. A major river in Asia, the Indus River is a source of both cooperation and conflict between riparian states. Such cooperation, especially between Pakistan and India regarding the water rights of the Indus basin system are clearly defined in the Indus Waters Treaty. The Indus Waters Treaty, which is around 60 years old and governs the consumption of the Indus River between Pakistan and India, is addressed as one of the most sophisticated global water treaties

[139] Uttam Kumar Sinha, *Riverine Neighbourhood: Hydro-politics in South Asia* (Pentagon Press, 2016) 18-19
[140] David E. Shean, Shashank Bhushan, Paul Montesano, David Rounce, Anthony Arendt, and Batuhan Osmanoglu, "A Systematic, Regional Assessment of High Mountain Asia Glacier Mass Balance" *Front. Earth Sci.* 7, (2019):363. doi:10.3389/feart.2019.00363

in the region, in spite of several impediments encountered during its negotiation and employment.

Figure 15: Map of the Indus Basin Source



Source: https://ecopeaceme.wordpress.com/2012/12/30/cooperating-over-water/map-of-the-indus-basin-source-us-senate-report/

2.1: Hydrological system of Indus River Basin

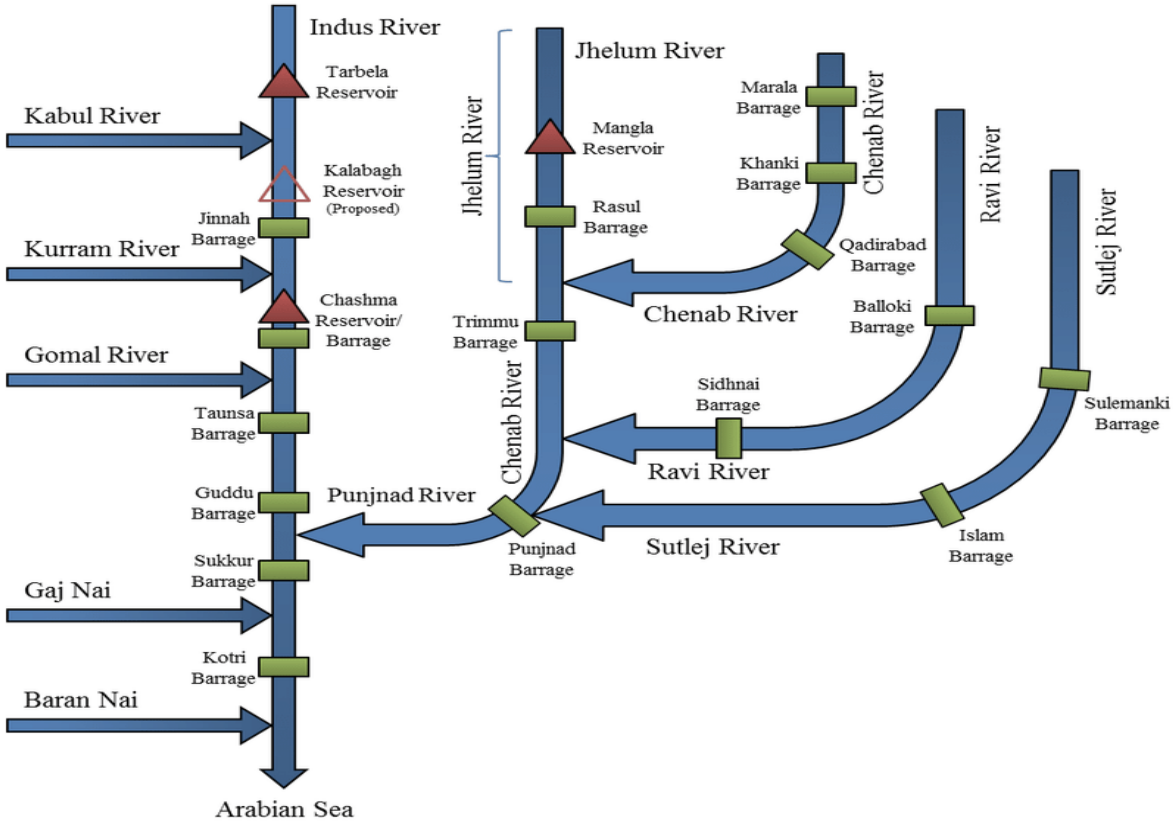
The Indus River Basin covers an approximately 1,165,000 km2 and is one of the largest basins in Asia.[141] Four states share the water course of Indus namely China in northeast, India in east, Afghanistan and KPK in north-west, mainstream plains of the province of Punjab and Sindh in Pakistan. The Indus Basin encases the three largest mountain ranges of the world i.e. Karakoram Range, Himalayan Mountains and Hindukush ranges. It originates at 17,000 feet above sea level in Tibetan plateau. The river passes through Indian occupied Jammu and Kashmir, enters into northern area of Pakistan and finally merges into Arabian Sea. The drainage area of Indus is around 450,000 square miles and contribute to an average annual inflow (including all rivers) of 175 million acre feet and provides water to around 240 million people and the population is projected to increase to 319 million by 2025.[142] The snow melting in the Himalayan- Hindukush regions and precipitations in mountains are the major components of the annual flow of these rivers.

[141] Arun Bhakta Shrestha, Nand Kishor Agrawal, Björn Alfthan, Sagar Ratna Bajracharya, Judith Maréchal, Bob van Oort, *The Himalayan Climate and Water Atlas: Impact of Climate Change on Water Resources in Five of Asia's Major River Basins* (Norway: ICIMOD, GRID-Arendal and CICERO, 2015), https://lib.icimod.org/record/31180.

[142] Abdul Nasir Laghari, D. Vanham, W. Rauch, "The Indus basin in the framework of current and future water resources management," *Hydrology and Earth System Sciences* 16, no.4 (2012): 1064.

The Indus River Basin is comprised of Indus River, along with the Kabul and Kurram rivers as its two western tributaries and the Jhelum, Ravi, Beas, Sutlej and Chenab rivers as its five eastern tributaries. Indus River and Sutlej River rise from Lake Manasarovarin in Tibet.[143] The Chenab River comes from Himachal Pradesh in India, flowing through the Indian occupied Kashmir valley into Pakistan's territory. Ravi River also stems from Himachal Pradesh (India) but flowing through Indian Punjab enters Pakistan. Beas River originates and entirely follows its course in Indian state. The Jhelum River originates in the Indian occupied Kashmir Valley and then enters into Pakistan. Kabul River surges from Afghanistan and follows its course through Peshawar finally joining the Indus River at Attock region. The five main tributaries of Indus comprises an aggregate length of approximately 2,800 miles. The combined length of Kabul River and Kurram River together cover more than 700 miles.[144]

Figure 16: Indus Rivers Basin with its Tributaries



Source: https://www.researchgate.net/figure/Schematic-diagram-of-the-Indus-River-Basin-IRB-showing-its-major-rivers-and-tributaries_fig1_325475800

[143] Ashfaq Mehmood, *Hydro-Diplomacy Preventing Water War between Nuclear Armed Pakistan and India* (Islamabad: IPS Press, 2018), 12-14.
[144] *Imperial Gazetteer of India* Vol. 13 (Oxford: Clarendon Press, 1909), 357-360.

2.2: Climatic Conditions of Indus Basin Region

The climatic conditions are not uniform across the catchment area of Indus basin. The conditions vary from dry to semi-arid to slightly sub-humid in the plains of Punjab and Sind provinces. The annual precipitation ranges from a maximum of 2000 mm on the mountainous areas and 100 to 500 mm in the lowland regions. The water flow is ample during the monsoon season from July to September that contributes 51% of the annual flow.[145] Precipitation is considerably greater in the mountains, reaching almost 2000 mm in the frontal Himalayas. Approximately 60% of the rainfall takes place during the southwest monsoon from July to September. The summer temperature everywhere in the plains is high, rising above 40°C, resulting in a high rate of evaporation. The average annual evaporation in the upper Indus plain is more than 1500 mm, a figure that rises to more than 2000 mm in the lower plains.[146]

The flow of surface water in the Indus basin is irregular and is influenced by different variables like rainfall from June to September and melting glaciers. The changeability of the flow and its composition brings significant challenges for, but ultimately demonstrates the need and importance of integrated water management of the basin. The Indus basin also constitutes a vast aquifer of groundwater covering a gross command area of 16.2 million hectares.[147] Before the introduction of the canal irrigation system in the 19th and 20th centuries, the aquifer was in a state of hydrological balance, with recharge from rivers and rainfall balanced by runoff and crop evapotranspiration.[148] The irrigation system, the world's largest continuous gravity irrigation system, has led to increased seepage into the aquifer in irrigated areas, causing salinity and waterlogging problems. While higher groundwater levels in freshwater zones were exploited by wells and tube wells, today groundwater extraction exceeds recharge and these aquifers are under increasing pressure.

While fast glacial melt is a factual and existing threat, one of the most noticeable aspects of environmental degradation and climate change in South Asia has been the variation in the timing and intensity of the Monsoon and consequent floods in the Indus Basin. Both countries, Pakistan and India sharing Indus Basin have experienced flooding every Monsoon since 2010, with Pakistan suffering a devastating "1000-year" flood in 2010 that inundated nearly twenty

[145] Encyclopedia Britannica Online, "Hydrology of the Indus River," accessed on May 2, 2022, https://www.britannica.com/place/Indus-River/Hydrology

[146] Asif Inam, Peter D. Clift, Liviu Giosan, Ali Rashid Tabrez, Muhammad Tahir, Muhammad Moazam Rabbani and Muhammad Danish, "The geographic, geological and oceanographic setting of the Indus River," in *Large Rivers: Geomorphology and Management,* ed. Avijit Gupta (USA: John Wiley & Sons, 2007), 334.

[147] Ahmad Rafay Alam, "India, Pakistan, Water And the Indus basin: old Problems, new Complexities," *Jinnah Institute* (2017), 2

[148] ibid

percent of its landmass.[149] The transboundary nature of climate and basin hydrology challenges the existing legal and institutional frameworks in the riparian states.

Figure 17: Co-riparian states in Indus Basin Area

Name	Area of basin (sq. km)	Country	Area of the country in basin (sq. km)	Per cent area of country in basin (%)
Indus	1,138,800	Pakistan	597,700	52.48
		India	381,600	33.51
		China	76,200	6.69
		Afghanistan	72,100	6.33
		Chinese control, claimed by India	9,600	0.84
		Indian control, claimed by China	1,600	0.14
		Nepal	10	0.00

Source: ASIA: International River Basin register: The Transboundary Freshwater Dispute Database (updated August 2002) <http://www.transboundarywaters.orst.edu/ publications/register/tables/IRB_asia.html>.

The origin of the flows of these rivers was divided among four states, with the major share rising from India and Jammu and Kashmir, which was about 70%, Pakistan contributed about 20% of these flows, and the remaining 10 to 12% came from China and Afghanistan combined. The major contributors to the Indus basin were Pakistan and India, with Pakistan's dependence on Indus waters being approximately 60–65% and India's dependence 35–40%.[150] The Indus basin is a major source of employment and the state's food needs also serve as a source of livelihood for the 300 million people in it. Both countries, Pakistan and India, depend on water originating from the Indus for their agriculture, including food crops and cash crops, which account for more than 90% of pumped water.

Agriculture is the main sector contributing to the economy of both countries. About 20 to 22% of Pakistan's gross domestic product and about 40% of the employed workforce depend on agriculture, and one-fourth of India's economy depends on agriculture.[151] The main difference or cause of threat to Pakistan was that unlike other Indian sources of water, Pakistan

[149] "Annual Flood Report 2010," Ministry of Water and Power, Government of Pakistan, available at chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://mowr.gov.pk/SiteImage/Misc/files/2010%20Annual%20Flood%20Report%20of%20FFC.pdf

[150] Abdul Nasir Laghari, D. Vanham, W. Rauch, "The Indus basin in the framework of current and future water resources management," *Hydrology and Earth System Sciences* 16, no.4 (2012): 1064.

[151] Asad Sarwar Qureshi, "Water management in the Indus basin in Pakistan: challenges and opportunities," *Mountain Research and Development* 31, no.3 (2012): 253-254.

is completely dependent on the Indus basin.[152] However, the Indus Basin did not have a regular inflow of water as it depends on some environmental factors such as summer rainfall from the month of June to the month of September and the temperature that causes the glaciers to melt. The irregularities in the flow of water and construction of river infrastructures led to many problems that could only be solved by integrated water resources management. It has been argued that there is nothing wrong with this as long as the storage dams can use the regular flow of water to ensure water and food security throughout the year.

Climate change-induced melting of glaciers in the Himalayas is impacting water supply and water demand in the Indus Basin, which is shared primarily by Pakistan and India. Pakistan and India will have to overcome a number of overlapping pressures as they seek to meet their future water needs and manage the shared and threatened water in the Indus River. With increasing demand, unsustainable use, and little or no spare capacity, decision makers will soon be forced to better understand the many mutual risks of water resource problems in both riparian countries.

2.3: Origin of Hydro-politics in Indus River Basin

The four riparian countries, Pakistan, India, Afghanistan and China of South Asia are drained by the highlands of Indus River Basin. China and Afghanistan could not fully develop their hydro infrastructures along the river because of the rough topography surrounding and has so far reduced the ability of these states to fully tap the water resource of Indus develop within their borders. Nonetheless both countries are proclaiming their rights now for an equitable and judicious share of the Indus tributaries flowing through their land. Afghanistan is planning the construction of Shahtoot dam on Kabul River as a part of ambitious strategy of building twelve dams on Kabul River. India has other water resources like Brahmaputra, Ganges and Kaveri River along with Indus but Pakistan primarily dependent on the water of Indus River.[153]

Hydro-politics in Indus Basin River has brought great attention in South Asian region mainly owing to the tense and hostile relationship between Pakistan and India. After the Mumbai attacks in 2008, the bilateral relations became more unfriendly in the following years sparking the fears of a nuclear war between both states.[154] Political analysts started exploring the causative factors of the tensions between both nuclear states and also tried to identify the

[152] Ahmad Rafay Alam, "India, Pakistan, Water And the Indus basin: old Problems, new Complexities," *Jinnah Institute* (2017), 2

[153] Sudha Ramachandran, "India's Controversial Afghanistan Dams," *The Diplomat*, August 20, 2018.

[154] "26/11 Ended a Chapter in India-Pak Ties. Ten Years On, Communication is Still Broken," available at https://thewire.in/diplomacy/26-11-end-of-a-chapter-india-pakistan-diplomacy

avenues possessing the potential for mutual cooperation and thus decreasing the likelihood of a war in the future. Sharing of transboundary water resource is one such area where we witness the fluctuating patterns of conflict and cooperation between the two neighboring states that especially the Indus basin water resources.

The post-colonial division of boundaries of this region created the hydro-political complex of Indus River Basin that forms the basis of this research where India became the upper riparian and Pakistan, the lower riparian state. From a conflict analytical perspective, the crucial point to be considered is that if a dispute over water resources is rooted in a greater political engagement, then water issue can neither be regarded of as an isolated conflict over a natural resource, and nor it can be resolved as such. Primarily, the water ownership might not result in political conflict, yet an intense conflict might certainly influence the hydropolitical relations. These two factors are therefore persistently entwined, to such an extent that a water dispute may be apparent as a demonstration of a complex political hostility. Thus, the resolution of the extensive conflict must pave the way for any resolution to the contingent conflict and the commencement of unpretentious cooperation. For a better understanding of this issue, we need to turn the pages of history to have a look at the origin of dispute from analytical point of view after the partition.

2.3.1: Pre Partition Irrigation System of India

The origin of this hydro-political complex in South Asian region is deep-rooted in the time before the division of the subcontinent. In 1859 and following era, the British Imperial Government planned the dams and canals construction for storing and diversion of water of the Indus River System.[155] The Britain Government in the midst of 19th century initiated expansion of irrigation system in India through building barrages across the rivers in several parts of Subcontinent in order to protect the people of Punjab from the impacts of recurring famines and food scarcity. Upper Bari Doab Canal (UBDC) from Ravi River, Indian first permanent canal was completed in 1859. The Lower Chenab Canal was taken from River Chenab in 1892, Sirhind Canal was extracted from the River Sutlej in 1882, and in 1901 the lower Jhelum was taken from the River Jhelum in 1901.[156] The Bahawalpur Canals and Upper Swat Canal were finalized in 1908 and 1914 respectively. The Triple Canals development was finished in 1915.

[155] Muhammad Nawaz Bhatti, Farzad Ahmad, Asia Saif Alvi, Muhammad Kashif Ali, Nabila Akhtar, "Negotiating the Indus Waters Treaty: An Historical Assessment," *Journal of the Research Society of Pakistan* 57, no. 1 (2020): 487.

[156] Bashir A. Malik, *Indus Water Treaty in Retrospect* (Lahore: Brite Books, 2005), 71.

The biggest irrigation project in the world i.e. the Sukkar Barrage was accomplished in 1932 in Subcontinent to get water from the main Indus post World War I.[157]

In 1932, the Sutlej Valley Project was completed that incorporated four main plants at Punjnad, Islam, Sullemanki and Ferozpur. Haveli Canal plan together with the Trimmu Barrage was completed in 1939 for optimum utilization of the surplus water resources of the River Chenab. The Kalabagh Barrage started working in 1947.[158] The state of Bahawalpur criticized that the waters allocation to the Bikaner state, appealing that the existing water availability was insufficient even to satisfy the requirements of the Punjab province and Bahawalpur State. Meanwhile, province of Punjab also opposed the sanction of the Sukkar Canal Scheme on the grounds that there would be inadequate water supply for Sukkar and Thal barrages. Sindh along with Bombay province also criticized the approval of Sutlej Valley development plan as it might affect adversely Sakkar Barrage canals.[159]

Disagreements emerged after 1918 (Post WWI) on the sharing of waters owing to the increase in the water withdrawals of Indus Rivers, as several development schemes were planned in the numerous places across the Indus. This plan demanded the apportionment of water among relevant respective riparian states by the British government. Several endeavors were made by the British government to get consensus among the provinces regarding sharing of water resources, but all went ineffective. Indus basin was developed by the British administration in subcontinent as an integrated and assimilated region under the concept of a single management.[160] The Indian Government selected a commission before the partition of Subcontinent in 1941, with Sir Benegal Narsing Rau as chairman of the commission.[161] The Rao Commission identified the riparian rights of different provinces and princely states in respect of the Indus river system along with its tributaries, based on the accepted principle of "equitable distribution". According to this principle, the upstream coastal areas were prohibited from taking any action that might interfere with the irrigation available in the Indus basin or disrupt the water supply to the downstream provinces.

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[157] Niranjan Das Gulhati, *Indus Water Treaty- An Exercise in International Mediation* (Bombay: Allied Publishers, 1973), 36-37.

[158] Muhammad Nawaz Bhatti, Farzad Ahmad, Asia Saif Alvi, Muhammad Kashif Ali, Nabila Akhtar, "Negotiating the Indus Waters Treaty: An Historical Assessment," *Journal of the Research Society of Pakistan* 57, no. 1 (2020): 488

[159] Gulhati, 38

[160] *Canal Waters Dispute*, Correspondence between the Government of Pakistan and the Government of India and Partition Documents, No. 65 (May 1958), 65-67.

[161] ibid

In July 1942, the Rau commission presented its report, and identified that water withdrawals in the province of Punjab would inflict harm to the flood canals in province of Sind particularly. Some recommendations were also presented by the commission associated with distribution of water resources during the winter season. The recommendations by the Commission were rejected by both sides. Consequently, for final decision on apportionment and distribution of water resources of Indus, the case was sent to the British government for a final decision. But the time of the referring the issue of water distribution to the British administration in London proved unsuitable as before reaching an agreement, India was partitioned on August 14, 1947.

The integrated nature of the Indus Basin system in Punjab (pre partition) that was divided between West Punjab (Pakistan) and East Punjab (India), during the partition of the subcontinent, created many problems. The dividing line demarcated by Radcliffe covered both the headwaters i.e. Madpur and Ferozepur in the East Punjab (in India) and the watersheds of the West Punjab (in Pakistan) as well as the water discharged by these headwaters. As a result, the Upper Bari-Doab Canal (UBDC) came under Indian control, on which the Central Bari-Doab Canal (CBDC) in western Punjab (Pakistan) was reliant on. "The only source of transportation is the Sutlej, Beas and Ravi (East) rivers that flow into these canals, was originating in Indian Territory and reached Pakistan after flowing through large distance.[162]

India claimed the autonomous right to use the water resources of the Indus system with all its tributary rivers that are upstream of the coast and flow through their territory.[163]According to the Indian perspective, most of the upgradation and expansion of irrigation systems in the Indus Valley took place during the British rule in the West Punjab regions, while the territories that in future formed East Punjab were neglected. India claimed that development of water resources was uneven and unfair, while Pakistan saw Indian water aggression as an existential threat to its survival.[164]

The Punjab Partition Commission (PPC) designated a sub-committee comprising of two members to look into the issue of partition and decide regarding the water supply of each canal in the western and eastern Punjab. On 28th July 1947, the committee submitted report providing for pre-partition water supply in the Punjab. PPC supported the commission's decision. Even though the Radcliffe Award took the lead in major projects with India, the

[162] Mohammad Ayub Khan, *Friends Not Masters: A Political Autobiography* (Lahore, Karachi, Dacca: Oxford University Press, 1967), 108.
[163] Nasrullah Mirza, "Wullar Barrage," *Pakistan Horizon* 47, no. 1 (1994): 60.
[164] Niranjan Das Gulhati, *Indus Water Treaty- An Exercise in International Mediation* (Bombay: Allied Publishers, 1973), 59

Pakistani government was complacent. The obvious reason can be that the commission and the people's committee assured that the water will continue as was before the partition. No document has been signed to share the cost between East and West Punjab.[165] Disagreements arose about the canal system and the value of the barren lands in other parts of the Punjab. Therefore, it was agreed to refer the additional problems arising after partition of Subcontinent to an arbitral tribunal established as per the Indian Independence Act of India.[166]

A Tribunal was established on 12th August 1947 and it commenced working on 14th August 1947. Five defined issues were chalked out and referred to the Arbitral Tribunal on 30th November 1947. All of the five matters were associated with financial adjustments required for:

(i) Formulation of a fiscal adjustment procedure
(ii) The crown waste lands
(iii) Matters related to irrigation system
(iv) Plantations of irrigated forest
(v) Budget for seigniorage (canals maintenance contribution) for transportation of water resource within the Indus Basin.[167]

Any matter regarding the sharing or apportionment of Indus waters between Pakistan and India was not submitted to the Tribunal.[168] The Engineers-in-Chief of East and West Punjab ratified a cease-and-desist settlement to maintain the status quo on the Central and Upper Bari Doab Canals (CBDC/UBDC) on 20 December 1947. Punjab Partition Commission (PPC) unanimously approved it the same day. All matters were decided the arbitral tribunal on 17th March 1948 and its working tenure expired at midnight on 31st March 1948.[169]

2.4: Post-Partition Indian Water Aggression

On the expiry of term of both Arbitral Tribunal and Standstill Agreement, India stopped the water flow passing through Ferozepur headquarters to the Dipalpur Canal and Bahawalpur State Distribution and through Madhopur headquarters to the Pakistani parts of the Lahore and main branches of the Central Bari Doab Canals in the early hours of 1st April 1948. Indian

[165] "Back Matter," India Quarterly 15, no. 4 (1959). http://www.jstor.org/stable/45068956.
[166] Chaudhri Muhammad Ali, *The Emergence of Pakistan* (New York and London: Columbia University Press, 1967), 318
[167] Niranjan Das Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay: Allied Publishers, 1973), p. 49
[168] Report of the Chairman, Punjab Boundary Commission (August 17, 1947), in *Select Documents on Asian Affairs*-1, India 1947-50, 66-67
[169] Niranjan Das Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay: Allied Publishers, 1973), 61-62

action of stopping the canal's waters to Pakistan at the utmost critical period for the wheat crop further heightened the prevalent tense political bilateral relations between the two newly independent riparian countries. The closure of the water canal to the Western Punjab (Pakistan) was considered as water aggression by India as an upper riparian against the lower riparian Pakistan. As iterated by Chaudhry Muhammad Ali, that the ministers and officials of East Punjab intended a coup de grace to Pakistan and reassured the government of West Punjab to embrace sleep with sweet words. According to him there was Machiavellian deception on the East Punjab side. There has been negligence of responsibility, complacency and dearth of general caution in parts of West Punjab - with disastrous consequences for Pakistan.[170]

For Pakistan, the paramount concern was that the Indus waters flowing throughout the canals infrastructure was a source of sustenance for the fertile parts of West Punjab (Pakistan), whereas India had several other rivers to support its agricultural production, along with significant precipitation ratio, so India is less dependent on irrigation water from the Indus Rivers. Pakistan realized its vulnerability and weakness because the headwaters of all Indus Rivers were located in areas under Indian control, therefore the repercussions of probable intentions of Indian hydro aggression soon appeared before Pakistan. Pakistan instantly asked for negotiations on water sharing mechanism. Consequently, Ghulam Muhammad led the delegation to Delhi in May 1948 for talks on the water issue between both states. The federal finance minister with Mumtaz Doltana and Shoukat Hayat Khan also accompanied him.[171]

India asserted that Pakistan should acknowledge the exclusive ownership rights of the waters of the Indus Rivers in eastern Punjab and they fully belonged to Indian government. They also insisted that western Punjab (Pakistan) could not claim any share in these waters of Indus Rivers as a matter of right.[172] However, Pakistan held the view that water sharing was based on the recognized formula that existing uses were sanctified and surplus water not previously committed could be distributed among coastal areas according to area and population, etc. Pakistan and its people understood the implications of being on the lower coast. Pakistan became cognizant of the fact during negotiations that India could potentially create water scarcity in Pakistan. At this critical stage that Pakistan moved quickly to safeguard its water rights and hydro security by negotiations with Indian government. Indian government

[170] Nasrullah Mirza, "Wullar Barrage," *Pakistan Horizon* 47, no. 1 (1994): 62.
[171] Chaudry Muhammad Ali, *The Emergence of Pakistan* (Lahore: Research Society of Pakistan, University of the Punjab,1973)
[172] Engineer Jamait Ali Shah, "Indus Waters Treaty under Stress: Imperatives of Climatic Change or Political Manipulation," *Margalla Papers* (2011): 3

presented the principle that the upper riparian state has an exclusive right to the water resources and the lower riparian state could obtain it only by agreement or treaty between the riparian.

2.5: A Step Towards Cooperation: The Delhi Agreement, 1948

An 'interim' agreement known as the Inter-Dominion Agreement or the Delhi Agreement was concluded between both states on 4th May 1948, which restored water supply to the Central Bari Doab Canal and the Dipalpur canals temporarily, allowing the government of East Punjab to reduce gradually water supply to them.[173] But it was acknowledged generally that Pakistan could not survive without the resumption of full water supply, and there should not be any compromise on the critical issue of water sharing. International community was also conscious of the fact that the matter of water distribution was very critical between Pakistan and India it might engage both states in war. Eastern Punjab (India) also demanded seignior fees that the West Punjab government (Pakistan) agreed to in principle, however the disagreement over the calculation of these fees remained unsettled and Pakistan requested to refer the case to the International Court of Justice (ICJ) for adjudication.[174] Pakistan held that the Inter Dominion Agreement was interim in nature and was subject to additional negotiations.

An impasse resulted as Indian government denied to submit any response to the International Court of Justice. Governor General of India Lord Mountbatten was approached by Ghulam Mohammad, the Finance Minister of Pakistan, who consulted Indian Prime Minister Pandit Jawaharlal Nehru.[175] Subsequently, a declaration was then presented to Ghulam Mohammad, asking him to sign it without any change or amendment- a condition necessary for the restoration of water flow.[176] Hence, Ghulam Muhammad and two ministers from Western Punjab of Pakistan and Indian Prime minister Pandit Jawaharlal Nehru along with two ministers of Eastern Punjab signed the declaration.

The settlement did not include an expiration date, rather it called for additional bilateral discussions and talks to finally resolve the matter. Second, India viewed it as an "international agreement" and negated claims by Pakistan that it was interim, temporary and was contracted "under duress" or obligation. Thirdly, the settlement mentioning only some canals as assumed by Pakistan established Indian right to the waters of three eastern rivers and deprived Pakistan

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[173] Samuel Martin Burke and Lawrence Ziring, *Pakistan's Foreign Policy: An Historical Analysis* (Karachi: Oxford University Press, 1990), 498.

[174] Rasul Baksh Palijo, "Sindh-Punjab Water Dispute 1859-2003," *Centre for Peace and Civil Society* (2011): 31-32

[175] Nasrullah Mirza, "Wullar Barrage" *Pakistan Horizon* 47, no. 1 (1994): 64.

[176] Note by the Pakistani Delegation (21 July 1948), Government of Pakistan, Canal Waters Dispute: Correspondence between the Government of Pakistan and the Government of India and Partition Documents, No. 65 (May 1958), 129.

of its rights to these rivers. Noticeably, the situation generated confusion in the minds of delegates from Pakistan. The negotiators misconstrued the term "canals" and believed that India was only asking for transportation fees and sharing the cost of maintaining these canals until Pakistan looked for alternative sources (build new main and connecting canals) to meet the shortage in the Ravi River and River Sutlej. The Delhi Agreement or Inter Dominion Agreement produced precarious situation bearing long standing implications for Pakistan. The hydropolitical issue between Pakistan and India is double-edged as we see the patterns of conflict and cooperation between the two rival nuclear-armed neighbors who have historically had strained relations, but despite tense bilateral relations, the two nations have been negotiating for nearly a decade to establish a mechanism for sharing and apportioning water between them. Both states offered their own plans and engaged in the securitization and politicization of water through various agreements.

Pakistan and India began new development plans in the entire Indus Basin after ratification of the Joint Statement. Pakistan started digging work of a canal from the right bank of the River Sutlej to bypass the main structures of Ferozepur. This plan ensured the water supply to the Dipalpur canals due to the closure of Indian land, which India immediately protested. Some irrigation schemes ere also initiated by India on the River Beas and River Sutlej. Bhakra Dam was the most significant project among them that had a potential to store the complete water flow of Sutlej. Pakistan responded to address the issue at the state level and thus wanted to reopen the Delhi Agreement. Pakistan recorded a complaint in June 1948, that water from the eastern canals of India was not being supplied to Pakistan. India responded that the Indian government did not make any such commitment to Pakistan. However, on 15th June 1948, Indian government agreed to restore the water supply, subject to the compensation of conveyance charges by Pakistan as per the Delhi Agreement and the closure of canal development work upstream of the Ferozepur headworks.[177]

Pakistan notified on 6th July 1948 to Indian authorities that it had halted the canal development work. As Pakistan desired the continuous water supply for the 1948-49 Rabi crops, it asked India to provide validation of the interpretation of the Inter Dominion Accord. Since the Delhi Agreement did not specify any termination date, Pakistan rightly considered it to be transitory and interim. Indian government did not remark on the interpretation of the agreement, but guaranteed Pakistan that India as upper riparian would continue to supply water

[177] Government of Pakistan, Canal Waters Dispute: Correspondence between the Government of Pakistan and the Government of India and Partition Documents, No. 65 (May 1958), 127

on demand from Pakistan on 26th September 1948.[178] Jawaharlal Nehru in a telegram sent on 18th October 1948, claimed that the arrangements of 4th May should be understood as a recognition of the rights of the Government of Eastern Punjab to gradually reduce the water supply to the Western Punjab and further said that "any subsequent meetings between the negotiators of both the governments should be at on the base of this acknowledgement on the part of the Western Punjab (Pakistan)." He warned, "If there has been undue delay on the one hand, it is incumbent on the other to terminate the agreement with reasonable notice.[179] This was an open threat by Indian Prime minister Jawaharlal Nehru's to Pakistan and in response Chaudhry said that if Pakistan recognized the Indian contention swiftly, Indian government would terminate the agreement and once again cut-off Indus water supplies to Pakistan. On the other hand the acceptance of the Indian interpretation of the agreement would result in a perpetual renunciation of legal right of Pakistan. India also refused the Pakistani offer of referring the legitimate issues of the dispute to International Court of Justice.[180]

The Indian Government associated the continuation of supply of Indus water rigorously to the conditions penned down in the Delhi Agreement in April 1949. Pakistan suggested later in June 1949 to widen the ambit of the dispute further and to include the waters of all tributaries of Indus River for partition. In next meeting in August 1949, Pakistan proposed further that in case of disagreement between both states, the problem should be referred to the International Court of Justice. Once again Indian representatives rejected the likelihood of referring the water dispute to the ICJ.[181] In the meantime, Indian government established an organization to deal with the issues pertaining to Indus basin water sharing, aiming to collect statistics for further planning in future. The organization's first task was to draw up homework for the upcoming Inter-Dominion meeting to be held in New Delhi in August 1949. At the next meeting (4-6 August) no progress was made, the only "agreement reached" was to meet again for further correspondence. The two sides finally decided to meet for next session in Karachi on 27th–29th March 1950. Pakistan desired a neutral tribunal to be involved for the resolution of the dispute whereas India declined to accept any modification in the terms of the Delhi Agreement, and

[178]Niranjan Das Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay: Allied Publishers, 1973), 73.
[179] India, Telegram No. 1681, 18 October 1948, Government of Pakistan, Canal Waters Dispute: Correspondence between the Government of Pakistan and the Government of India and Partition Documents, No. 65 (May 1958), 141.
[180] Chaudhri Muhammad Ali, *The Emergence of Pakistan* (New York: Columbia University Press, 1967), 322
[181] ibid

asserted that a bilateral commission of examination may perhaps be the first step towards resolution of the issue. [182]

The next meeting took place in Karachi as was planned on the 27th – 29th March 1950. The aim was exploration of the possibilities of mutual management, administration and development of the Indus basin. During the negotiations, both sides were somehow seriously exploring the possibilities on a technical cum procedural level. Pakistani representatives suggested that:

(i) the prevailing uses would be covered by existing resources

(ii) new water supplies would be encountered by constructing storage facilities on the River Ravi, River Sutlej, River Beas and Chenab rivers

(iii) the expenditure on construction shall be distributed in proportion to the advantage obtained and the water resources shall be distributed equitably.

Indian representatives suggested:

(i) River Sutlej should be exclusively owned by India on which Bhakra dam was built

(ii) The water of River Ravi, River Beas, and Chenab river shall be accessible to Pakistan for the purpose of upholding existing water usage subject to certain modifications in favor of India

(iii) to fulfill any shortage in water supply to Pakistan, a connecting canal was built from the river Chenab [183]

Indian and Pakistani engineers agreed in the meeting that they would study the suggestions, collect appropriate statistics and submit them before the commencement of next meeting. Unfortunately, the atmosphere of cooperation between two sides altered completely in May 1950. Indian government not only digressed from its agreed principles, rather demanded exclusive rights on the water resources of the three eastern rivers along with water diversion of 10,000 cusecs from River Chenab at Marhu through a tunnel.[184] These Indian demand was completely appalling and unacceptable to Pakistan since millions of acres of land in Western Punjab were dependent on the water supply of the three rivers watered. As previously in November 1949, Pakistan informed India that though it considered the Delhi Agreement invalid, still Pakistan would deposit money as a goodwill sign, reserving the right

[182] Niranjan Das Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay:Allied Publishers 1973), 76-77.
[183] Chaudhri Muhammad Ali, *The Emergence of Pakistan* (New York: Columbia University Press, 1967), 322-323
[184] ibid

to withhold these deposits. India gave instant and uncompromising reply that the Delhi Agreement was still obligatory for all its signatories, and the minting charges were also an essential part of the agreement.

Till July 1950, Pakistan continuously deposited the financial charges but stopped giving the disputed amount later. A stalemate appeared owing to the contradictory interpretations and conflicting views of the Joint Statement's provision resulting in cessation of further deliberations or talks on the issue of water sharing mechanism between both states. The impasse continued till the World Bank offered good offices in 1951 to break the stalemate.[185] The World Bank was informed by Pakistan regarding the disputed and unpaid money was held in "escrow" (Escrow means a total sum of money or material goods like property that has been given to some party or individual but may be held by a third party and is released only after the specified conditions are met). This issue continued during the entire mediation time period and finally was decided in 1960 in the concluding stages of the Indus Waters Treaty. Meanwhile, remarkably, both the states continued to develop their respective water infrastructures that might secure either their existing or planned water supplies. India continuously enlarged and expanded its forceful appropriation of water supplies of Indus at the expense of Pakistan during the vital times of sowing crops. In particular, the storage capacity and height of the Bhakara Dam was significantly increased over the pre-division design, which doubled its storage capability from 4 to 8 million acre.

2.6: River Diversion by India

Indian engineers started the development of irrigation system immediately after the partition of Subcontinent. India devised a plan to secure its supplies from the Ferozepur headquarters to the Eastern and Bikaner Canals. Indian government decided the completion of the Harike scheme in December 1949 for dual purposes, firstly to ensure any Pakistani diversion of water upstream; and to use the water that would be freed up for Pakistani supplies by "phase-down".[186] India claimed that this latter arrangement was written into the Delhi Agreement of May 1948. India intended to construct a tunnel at Marhu on the Chenab River for diversion of water and ultimately sought to control the entire flow of the Chenab River. The Harike Plan envisioned to build infrastructure in order to control and regulate water flow from the Ferozepur and Sirhind feeders with a capacity of 11,000 cubic feet per second (cusec/cfs) and 15,000 cusecs for the planned Rajasthan Canal. Other schemes were planned in substitution

[185] Hassan Abbas, "Indus Water Treaty: Past, Present and Future," *The Black Hole*, March 2023.
[186] Niranjan Das Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay: Allied Publishers 1973), 85.

of the old canal, leaving the Sutlej River, with effective new canal. Eastern Punjab was also requested to formulate details for the planned canal between Madhopur on the River Ravi and the Beas River with an opening capability of 6,000 cusecs, which was later increased to 13,000 cusecs after the construction of the Marhu Tunnel on the Chenab River.[187]

The Rajasthan government in April 1950, was requested to carry out surveys of areas that might be irrigated under the canals from Harike. India constructed several new distributaries in Eastern Punjab, from the Upper Bari Doab Canal and opened these first canals for the kharif crop in summers of 1950. These canals used to receive water after meeting the needs of Pakistan from the Central Bari Doab Canal, so there was not enough available water to fulfill needs of kharif crops. Under these circumstances, the Eastern Punjab administration speeded efforts for the construction of the Bhakra Dam.[188] In 1946, development on the Nangal Barrage and Canal plan was also underway and was anticipated to be finished in 1952. The Bhakra-Nangal project was therefore reoriented to favor the Bhakra Canal, with the hope of starting operations in Kharif 1954. Pakistan supposed Indian plan as an endeavor to protract the water negotiations aiming at construction of the Bhakra Dam and the Rajasthan Canal among other engineering works and deprive Pakistan of their vital water resources. This change is expected to increase the capability of the dam to hold the complete water flow from the Sutlej River.[189]

2.7: Pakistan's Efforts for Hydro-securitization

The flaws and limitations of the Delhi agreement prompted Pakistani government to safeguard its use on the Sutlej River upstream from the Ferozepur headworks. Various analysts have reiterated that the deal was a critical mistake by the then Pakistani government as it set an example for India to infringe global norms regarding the discharge of water into international rivers,[190] because it provided India the proficiency to dictate the conditions as hydro-hegemon regarding the quantities of water and payments demanded for releasing water into Pakistan.[191] Various construction works were being carried out by Pakistan to ensure the water supply of the Central Bari Doab Canal and Dipalpur canals from the Chenab River and to prevent any

[187] Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay: Allied Publishers 1973), 85
[188] Ibid 86.
[189] Ibid 84.
[190] Huma Baqai, "New Trends and Paradigm Shifts in Pakistan and Pakistan- India Relations: Pakistan and India"s Perspective," *Journal of International Relations and Foreign Policy*, 1:1 (June 2013): 55-68.
[191] Samuel M. Burke and Lawrence Ziring, *Pakistan's Foreign Policy: An Historical Analysis* (Karachi: Oxford University Press, 1990), 498.

threats in future to its water supply from Indian territory. The plans finalized by Pakistani authorities included:

(i) the building of the Bambanwala-Ravi-Bedian link (BRB) to supply water to the Central Bari Doab Canal from the River Chenab

(ii) exploring the prospect of a link between Balloki, (River Ravi), and Suleimanke (River Sutlej)

(iii) development of the Kotri barrage that might be feeding canals located in Lower Sindh

(iv) preparation of viability for building two barrages, at Gudu and Taunsa on the River Indus intended to improve water supplies to inundate canals off-taking from the Indus rivers in Western Punjab and Upper Sindh

(v) extension of the Western Punjab's tube-well system with power supply from the Rasul hydroelectric project operative since 1946.[192]

All of Pakistan's supplementary irrigation plans mentioned above envisaged storage facilities in the Indus basin. Survey were conducted by engineers for suitable locations for construction of dams on the River Jhelum and Indus rivers. A site at Mangla was demarcated on the Jhelum River and construction work was started without any foreign aid that was denied initially owing to a dispute with India. Another site was found at initially at Darband but was later substituted by Tarbela on the Indus River.[193]

In January 1950 the Indian Prime minister Jawaharlal Nehru, conveyed to his Pakistani counterpart Liaquat Ali Khan suggesting a mutual declaration not to wage war on any bilateral disagreement and to strive for peaceful means for resolution of conflicts. The proposal also incorporated a statement for intervention of third-party as mediation by any global organization formally recognized by both states. Liaquat Ali Khan agreed to the offer in February 1950 but also wanted a clear method for a peaceful resolution of the disputes between both states. [194] A meeting was convened in Karachi in February 1950, in which both Pakistan and India communicated their inclination to distribute the Indus Rivers where Pakistan was willing to permit India use all the water resources of the River Ravi and Beas River. This plan was accepted by Indian representatives, but also wanted the right of diversion of Chenab River through the Marhu Tunnel. India interestingly suggested to construct a storage dam at Dhiangarh for regulation of water supplies to Pakistan. Conversely, Pakistan did not accept any

[192] Ibid 86-87
[193] Chaudhri Muhammad Ali, *The Emergence of Pakistan* (New York: Columbia University Press (1967), 325.
[194] Muhammad Nasrullah, "Wullar Barrage Issue," *Horizon* 47, no. 1 (1991): 75.

right of India to construct a dam on the River Chenab and rejected the proposal. Subsequent bilateral negotiations were unsuccessful and India submitted the agreement to the UN as Treaty No. 794 in May 1950 in Delhi.[195]

Pakistan immediately recorded a "disclaimer" with the United Nations in December 1950 and "described the factual nature of the statement to the UNO and confirmed its termination". India disputed Pakistani claim and recorded another disclaimer in November 1951 with the UN Secretariat.[196] While the Charter of United Nations allows for the adjudication of any global legal dispute between members to be brought before the International Court of Justice, the members Commonwealth were denied such incentive and were required to resolve their disputes with each other at the forum of British Commonwealth.

The Sutlej dispute did not get any attention from the Commonwealth forum and subsequently India refused to refer the matter to the International Court of Justice. However, later in September 1950, India suggested to refer the case to a court comprising of four judges, two from each state. The proposal was rejected by Pakistan, on the basis that since the tribunal did not have a neutral and independent chairman, the forum could be used by India to extend the resolution. It became evident that Indian objective was the delay in negotiations till the construction and engineering works at the Bhakra Dam and Rajasthan Canal were completed that would result in depriving Pakistan of vital water supplies and the Kashmir dispute had also further damaged bilateral relations between Pakistan and India relationships.[197] India has been indicted of abusing its position as an upper riparian and trying to impair the economy of Pakistan by manipulating the flow of water. The construction of the Bhakra Dam on the Sutlej River by Indian government was unquestionably detrimental to the interests of Pakistan.

The bilateral relations of Pakistan and India declined further and the military of both states were put on red alert. However, other irritants like non-payment of monetary assets and non-transfer of pre-partition agreed armed and industrial shares to Pakistan by India, cross-border migration, disposal of evacuees' property and frequent border skirmishes along with the Kashmir dispute deepened the differences, but above all the water dispute became acute and took on extreme urgency. India asserted that water was not different from any other natural resource in India, where as Pakistan stressed that the natural flow of rivers across borders makes shared sovereignty. The divergent narratives of Pakistan and India caused failure of the

[195] Government of Pakistan, *Pakistan: The Struggle for Irrigation Water and Existence* (Embassy of Pakistan, US, 1953), 12.
[196] Muhammad Nasrullah, "Wullar Barrage Issue," *Horizon* 47, no. 1 (1991): 76.
[197] ibid

bilateral discussions and created an opportunity for the international community to mediate and broker a deal for the resolution of water conflict. Meanwhile, David E. Lilienthal's article brought the IBRD [renamed as World Bank in the early 1950's] and this situation internationalized the matter. Lilienthal was the former chairman of the Tennessee Valley Authority. Lilienthal highlighted aptly in his article "Another 'Korea' in the Process?[198] the dependence of Pakistan on Indus water, two-thirds of which flows in Pakistan from Indian occupied Kashmir Valley. He termed the Indus water dispute between Pakistan and India as "pure dynamite, Punjab's powder keg" and cautioned that "peace in the Indo-Pakistani subcontinent is not an understanding of these combustibles around". He explained the dependence of Pakistan on Indus water as without irrigation water, West Pakistan would become a desert, where 20,000,000 acres of Pakistani land would dry up in a week and tens of millions would become malnourished and face starvation. No army with bombs and gunfire could shatter the nation as systematically as Pakistan could be damaged by the simple means India permanently shuts off the water sources that are crucial for the survival of the people of Pakistan.[199]

Lilienthal contended that the problem of water sharing is more of a technical and procedural nature and a technical solution is possible for its resolution. Further he proposed that the water sharing should not be politicized and should be deliberated as a developmental issue. Both riparian states would benefit richly from the Indus waters, specifically as more than 80 percent of the Indus river water is drained unexploited into the Arabian Sea. For optimal utilization of unused water, he recommended that some appropriate irrigation developmental projects could be implemented with the aid of World Bank, as the bank was a global financial organization and also possess the expertise to resolve technical and engineering complications in water dispute.[200]

2.8: Mediatory Role of the World Bank

A positive facilitation and a starring role was manifested by the World Bank. The bank was concerned about the probability of escalation, severe effects on the economic security and welfare of both states, and with regard to its own organizational interests. Indeed the ratification of the Indus Water Treaty between both states was made possible by the timely prompt mediation of the World Bank and also the gentle pressure from America in background of cold

[198] David E. Lilienthal, "Another 'Korea' in the Making?" *Collier's* 128, (August 4, 1951): 21-22.
[199] ibid
[200] Government of Pakistan, Canal Waters Dispute: Documents relating to the Negotiation under the Good Offices of the IBRD [World Bank], June 1958.

war. Both Pakistan and India were in desperate need of financial assistance for development projects whereas the World Bank also found itself in a position of influence. Even before the commencement of the discussions, the World Bank clarified Indian government to resolve canal water disagreement with Pakistan for lending financial assistance for the Bhakra Nangal development plan.[201]

The President of the World Bank, Mr. Eugene Black, reinforced the proposal by Lilienthal and communicated his stance to "recommend the Bank to offer its good offices" for amicable solution of the Indus water dispute. The interest of Eugene Black in resolving the water conflict between Pakistan and India, stemmed from his concern that it could pose a serious threat to the economic growth of the newly established sovereign states.[202] Both sides accepted the bank's mediation gradually. However, India broke off the Kashmir dispute and Indus dispute but agreed to supply Pakistan with then current water usage practices as long as the talks continued. This turned out to bode well for both Pakistan and India as both were approached separately by the bank for their respective water development projects. The bank was looking for economic enterprises that could construct and later improve the reputation to ensure that it might increase investment in the global financial markets.

Lilienthal's proposal and the nature of bilateral relations between Pakistan and India appealed American involvement in the water dispute. America's interest in mediating the water dispute was driven by its urge to pursue international cooperation in carrying out its strategy of containing communism and seeking supporters. David Lilienthal, visited South Asia in February 1951[203] and noted that the resolution of the water dispute is primarily important to calm down the tensions and begin deliberations on the Kashmir dispute. He iterated that Pakistan might win the legal fight against Indian government, but such a ruling would not facilitate the solution of the subcontinent's food issues, nor would it stop the Indus waters from being drained unutilized into the Arabian Sea.[204] However he also cautioned that the disputants were then near waging war. He insisted that the entire Indus river system needs to be developed as a single integrated unit, just like the seven-state system of the Tennessee Valley Authority as in the US, and deliberated three principles essential for resolution of the Indus dispute:

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[201] Uttam Kumar Sinha, *Riverine Neighbourhood: Hydro-Politics in South Asia* (Pentagon Press, 2016), 97

[202] Robert E. Asher and Edward S. Mason, *The World Bank since Bretton Woods* (Washington DC: Brookings Institution Press, 1973), 915.

[203] Bashir Asad Malik, *Indus Water Treaty in Retrospect (*Lahore: Brite Books,2005), 161.

[204] Saista Tabassum, *River Water Sharing problem between India and Pakistan: Case Study of Indus Water Treaty* (Colombo: Regional Centre for Strategic Studies,2009), 14

(i) the disputants should acknowledge presence of enough water in the Indus rivers for their existing and future usage

(ii) the water flow from the River Sutlej only would not be adequate to solve the conflict, consequently the waters of all the six tributaries of the Indus basin must be taken in consideration

(iii) a functional perception should be the paramount approach for settlement of the water dispute.[205]

Pakistan's Prime Minister Liaquat Ali Khan accepted the mediation offer of World Bank on 25 September 1951. Indian government also followed suit, however Jawaharlal Nehru made clear the nature of the involvement and immediately separated the water conflict from Kashmir dispute. He elucidated that the water conflict between both neighbors had no connection with the Jammu and Kashmir issue. The negotiations began and were confined to the irrigation systems of East and West Punjab. Although the dispute over Kashmir was of primary importance, it remained secondary to the dispute over the waters of the Indus. Pakistan's prime minister also agreed that the parties should "refrain from negotiating one dispute to delay progress in resolving any other".

The two main issues of coastal rights and water scarcity were raised. India declared that it would invoke the “Principle of absolute territorial sovereignty”, envisioning complete renunciation of the waters of the three eastern rivers of Indus Basin to Pakistan, whereas Pakistan forwarded the “Principle of Historical Use”. Both states invoked international water law to validate their respective demands and actions.[206] World Bank acknowledged the inadequate water supply that is established on the existing storage options for irrigation requirements in the Indus basin. The most considered serious problem was the assimilation of the conflicting claims of Pakistan and India. Each party proclaimed their right to the available water supply. Both parties were urged by the World Bank to address the crucial basic need for water as human security rather than restating their respective legal claims and entitlements. He delineated his position with three arguments. Firstly, the methodology of the dispute resolution should be technical in nature, without any reference to political issues. Secondly, the World Bank would only assist the negotiation process, and not arbitrate. Thirdly, neither party would act to damage the prevailing water supplies during the involvement of World Bank. The approach of Bank created the status quo and prohibited further intensification of the conflict

[205] Aloys Arther Michel, *The Indus River: A Study of the Effects of Partition* (New Haven and London: Yale University Press, 1967), 222.
[206] Muhammad Nasrullah, “Wullar Barrage Issue,” *Horizon* 47, no. 1 (1991): 79.

between Pakistan and India. The only optimistic feature for Pakistan was that the intervention of Bank brought Indian authorities to the negotiating table to which it was before reluctant to do.

The World Bank encouraged the two disputing parties to work out a joint solution that would meet their needs, but the resulting differences forced it to ask Pakistani and Indian delegates to draw up separate plans. However, when even these separate plans failed to bridge the gap, the bank submitted its own plan in 1954. The India Plan allocated all three eastern rivers (Ravi, Beas, and Sutlej) plus seven percent of the three western rivers (Indus, Jhelum, Chenab) to India. The Pakistan Plan allocated all three western rivers plus seventy percent of the eastern rivers to Pakistan.[207] The bank recognized that the issue alone cannot be solved only by technicians. The Bank's representative felt that it is his responsibility to acquiesce a proposal for the consideration of both parties which would serve as the basis of a comprehensive plan for water apportionment between both states. Therefore, on 5 February 1954 the World Bank decided to give in its own plan based on the common principle that the three western rivers were reserved exclusively for the use and benefit of Pakistan, except for local utilization in Kashmir and the three eastern rivers to be absolutely reserved for India. [208]

The World Bank proposed the division of the Indus rivers system. India accepted the water sharing plan in March 1954 after a month.[209] Pakistan did not replied instantly for the reason that it sought safe and permanent alternative measures to replace the water lost to India from the three eastern Indus basin rivers. Pakistan asked the American Irrigation Adviser, Mr. Royce J. Tipton, to conduct an autonomous assessment of the proposal by World Bank to see if it had achieved the results it claimed it had. On the basis of Tipton's report, a statement was submitted to the Bank that the waters of the western rivers were insufficient to meet the irrigation requirements of the cultivated lands in Pakistan without creating storage dams.[210] The representatives of World Bank persuaded and prompted the Pakistani representatives of the benefits contained in the proposal. Firstly, that there will not be any interference by India with the waters of the Chenab River; secondly, that the cost needed in construction of the

[207] Aloys Arthur Michel, *The Indus Rivers: A Study of the Effects of Partition* (New Haven and London: Yale University Press, 1967), 230.
[208] Arshad H. Abbasi, "Indus Water Treaty between India and Pakistan," *PILDAT* (2012), available at http://www.pildat.org/publications/publication/FP/IndusWaterTreatybetweenPakistanAndIndia_PakIndiaDialogueIII.pdf
[209] Muhammad Nasrullah, "Wullar Barrage Issue," *Horizon* 47, no. 1 (1991): 82.
[210] Government of Pakistan, Case No. 467/54, Clarification/explanation of Bank Plan and other Studies, Vol. II.

replacement works in Pakistan would be paid by India; and thirdly, the existing usage of water supplies by Pakistan would be secured during the intervening time period.

During 1955 and 1956, Pakistan informed World Bank about the water shortages relative to its irrigation needs in the critical late kharif i.e. summer crop and early rabi i.e. winter crop times and without the water storage facilities. After a study conducted in more than eighteen months by the experts of World Bank, the Bank issued an "Aide Memoire on 21 May 1956, acknowledging that the "surplus flow" in the western rivers would not even be adequate enough to cover exchange needs at the beginning of the year and late Kharif, unless storage has been secured. It therefore called for a modification of its plan of February 1954 to ensure timely supply of water supply to Pakistani territory. The adjustment could be accomplished in two possible means: first, by the continuous supply of water from the eastern rivers to Pakistan; second, the erection of storage facilities infrastructures on the western rivers with Indian support. World Bank favored the later course of modification. India, though accepted the principle of partition in 1954, demanded the same from the very start, was hesitant to accept the specific works proposed by the Aide Memoire on the basis of principle of "cost paid by the recipient".[211]

In chalking out the critical division of water to be provided to both states under the comprehensive scheme, there were some main problems to be resolved. Concerns were expressed by Pakistan regarding new engineering works, projects and progress over western rivers and insufficient water supplies from western rivers. [212]After consideration of all factors and explanations, Black proposed the construction of dam infrastructures on the Indus River and Jhelum River and ten link canals instead of the Upper Indus Link canal that would have been reasonably expensive to construct. On the Indus River, the Tarbela Dam was planned to provide a water reservoir structure for development in Sindh and its replacement in Punjab and Bahawalpur through two trans-Thala link canals that transferred water from Kalabagh to Jhelum and Taunsa to Panjnad. The Mangla Dam on the River Jhelum in Azad Jammu and Kashmir administered by Pakistan was intended to supply Punjab with extra water supplies. Three other side dams were also proposed on the tributaries of the Indus and Jhelum rivers, which would be used to transfer the excess water storage to the upper stretches of Punjab and Bahawalpur State through a series of connecting canals.[213]

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[211] Muhammad Nasrullah, "Wullar Barrage Issue," *Pakistan Horizon* 47, no. 1(1991): 85.
[212] Government of Pakistan, Case No. 467/54, Clarification/explanation of Bank Plan and other Studies, Vol. II.
[213] Aloys Arthur Michel, *The Indus Rivers: A Study of the Effects of Partition* (New Haven and London: Yale University Press, 1967), 246

Indian delegation suggested construction on a number of places on the River Chenab in Indian occupied Jammu-Kashmir and Himachal Pradesh.[214] They planned to construct two diversion tunnels used to divert water from the River Chenab to other tributaries of Indus Basin, thence to the command areas of the canal. India recommended that if a dam reservoir was still required, then it would be constructed at Dhiangarh on the Chenab River, where during 1970's India built the Salal Dam. India had promised that if Pakistan allowed the site to be used, it can guarantee the supply of half of its exchange requirements. As per Indian assessments, Pakistan would require 10 MAF, so 5 MAF should be supplied from Pakistan from the connecting channels.[215] The plan by Pakistan convinced the Bank to look into its genuine concerns. Since without any water storage facilities available to Pakistan, the supply of water of western rivers was entirely insufficient to replace Pakistan's prevailing uses of the waters from the eastern rivers; and with limited water resources Pakistan could not build any dam infrastructure.

Eugene Black himself pointed out that "the Bank's plan would have left much of Pakistan's irrigation system without water." [216] To solve this problem, a consulting engineer R. J. Tipton, conducted an independent engineering assessment of the bank's plan for Pakistan. It found that the bank's proposal did not meet the standards of justice under international law, that it failed to fairly distribute water from the Indus river system, and that it would be a violation of the principle of using water resources in a way that most effectively supports development. Subsequently further discussion, the Bank reached the inferences enclosed in its Adjutant's Memoir dated 21 May 1956. The Adjutant's Memoir decided that: there would be a perpetual shortage of rabi, occasionally beginning in late September or extending into early April... in extent, duration and frequency that the World Bank might not reflect permissible.[217]

The Bank consequently believed that an amendment (was) required in its plan of February 1954. According to the bank, this arrangement should ensure timely supply of water to Pakistan sufficient to reduce the shortage. Adjustment could take the practice of constant distributions of "timely" water from the eastern rivers or the building of storage dam infrastructures on the western rivers. The Bank favored the later flow and to this end proposed that the flows of the western rivers should be used as much as possible.[218] The fundamental

[214] Muhammad Nasrullah, "Wullar Barrage Issue," *Pakistan Horizon* 47, no.1 (1991): 86.
[215] ibid
[216] Ghulam Waheed Chaudhri, *Pakistan's Relations with India: 1947-1966* (London: Pall Mall Publishers, 1973), 162.
[217] Government of Pakistan, *Canal Waters Dispute: Documents relating to Negotiations under the Good Offices of the International Bank for Reconstruction and Development* 1 (June 1958), IBRD Press Release No. 380, Appendix 3, 1.
[218] ibid

problematic issue was solved, but took long negotiations of four years of conscientious discussions to arrive at a tangible solution acceptable to both parties.

The complications did not only just stemmed from the difference in conflict solving approach between Pakistan and India but there were immense financial problems as well. It was acknowledged that the budget required for the construction works as settlement in accordance with the proposal of World Bank was beyond the fiscal capability of Pakistan and India. The concluding settlement between both states was made possible by the committed determination and "economic diplomacy," to use the phrase of President Black of the World Bank, and friendly assistance from the United States, Britain, Australia, Canada, New Zealand and the Western Germany.[219] Eventually the Indus Waters Treaty, was signed on September 19, 1960 at Karachi.[220] According to Aloys Michel, a prominent writer on the Indus Basin, most of the negotiations were focused on the ratio and scope of the assistance package assigned to Pakistan for the building of these water infrastructural developments and less on the water rights. He further added that the final treaty was suitably "an annex to the development fund agreement rather than the other way around" and that "the World Bank and friendly states, particularly the America, really bought into the agreement".[221]

2.9: Patterns of Conflict and Cooperation (1948-1960):

Four interlinked dynamic drivers shaped the patterns of conflict and cooperation in the Indus River Basin. As per the conceptual framework these drivers were:

- **Power asymmetry and geography**

  The geographical position of India as an upstream riparian awarded India with the structural power, demonstrated by the suspension of water flows in 1948. However, this dominance was jeopardized by the fear of regional instability. Therefore, this power asymmetry owing to geographical position served as a dual edged sword both as source of conflict and a catalyst for formalizing reciprocated obligations through treaty mechanisms.

- **Demographic–economic pressures**

  The urbanization, population surge and agricultural dependency in both riparian states intensified the developmental stakes of hydro securitization. With Pakistan's reliance

[219] Fruchard, Benoit Camenen, "Reservoir Sedimentation: Different Type of Flushing – Friendly Flushing Example of Genissiat Dam Flushing." *ICOLD International Symposium on Dams for a Changing World* (Kyoto, Japan: 2012): 6.
[220] "How the Indus Treaty was signed," *The Hindu*, September 28, 2016.
[221] Aloys Arthur Michel, The *Indus rivers: a study of the effects of Partition* (New Haven and London, Yale University Press, 1967), 254.

on irrigated agriculture for economic growth and India following hydropower generation development programs, both Pakistan and India acknowledged the necessity for a foreseeable, negotiated water framework to sustain national development.

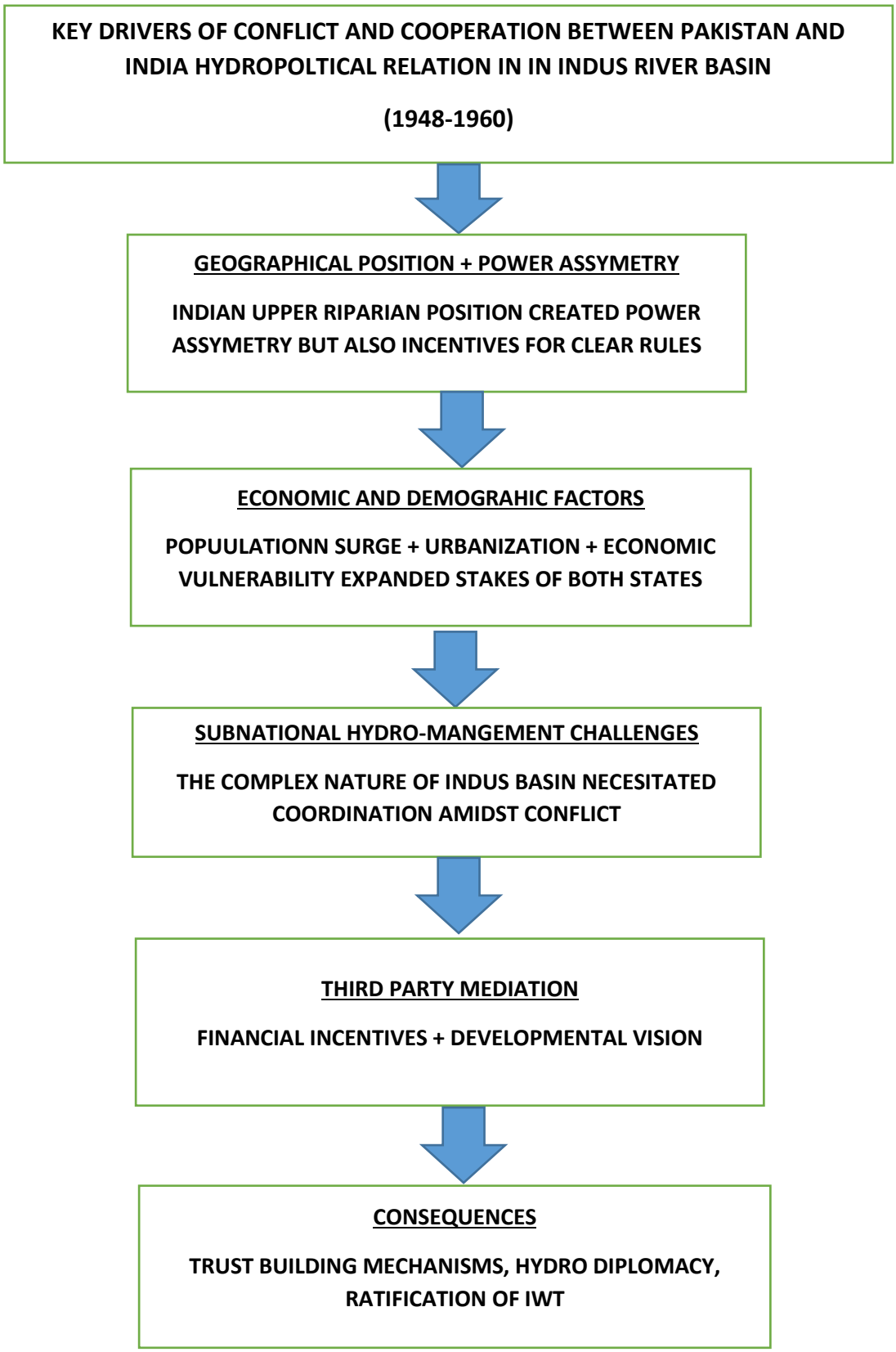
- **Internal management complexity**

  The technical and mechanical intricacies of the Indus River system compelled collaboration at the engineering level also. Mutual challenges in storing water, water diversion, and basin management facilitated a technocratic pragmatism and rationality, letting experts to cooperate even in a milieu of deep political distrust.

- **External institutional incentives**

  The third party mediation and financial incentives from the World Bank, completely changed hydropolitical hostility into a developmental partnership. This transformation from confrontation to cooperation was backed by Cold War geopolitical motivations. This circumstantial background of international Cold War compelled both Pakistan and India to transform their conflicting tone to conciliatory tenor and finally institutionalizing cooperation through the ratification of Indus Waters Treaty in 1960.

Figure 18: Key drivers for patterns of conflict and cooperation in Pak-India hydropolitical relationship (1948-1960)



Source: Author's compilation

The clash over the Indus Basin post partition of Imperial India offers a remarkable illustration of how mutual dependence on natural resources, inherit colonial structures, and third party mediation converted a potentially endless hydro--political clash into one of the world's most enduring water-sharing arrangements. Despite deep-rooted distrust following the division of Imperial India, both Pakistan and India ultimately found cooperation not out of benevolence, but because the structural realities of geography and survival left them little choice. This bitter reality created structural conflict, setting the stage for a twelve-year period of intense hydro-political negotiation that would oscillate between crisis and cooperation, driven by a complex interplay of geopolitical insecurity, institutional weakness, and economic necessity. The eventual signing of the Indus Water Treaty (IWT) in 1960 was not an inevitable outcome but the result of a fraught process whose drivers find instructive parallels and contrasts in the concurrent hydro-politics of the Nile River Basin.

The initial phase of the conflict (1948-1951) was characterized by unilateral action and a stark demonstration of power asymmetry, underscoring the primacy of geopolitical drivers. In April 1948, the Indian government, upon the expiration of a temporary "Standstill Agreement," cut off water flows from the Upper Bari Doab and Dipalpur canals to West Punjab (Pakistan). This act was a strategic shock to the nascent Pakistani state, revealing its profound hydraulic vulnerability. As historian Daniel Haines argues, this was not merely a technical dispute but a moment where "water became a key symbol of national sovereignty" in the bitter aftermath of partition.[222] Pakistan, perceiving this as an act of coercion, was forced into the May 1948 Inter-Dominion Accord. However, this agreement was a classic example of a "fragile cooperation." Pakistan signed under duress, viewing the requirement to pay for water it felt was its right as an insult to its sovereignty, and soon ceased payments, breaking the accord. This period highlights how, in the absence of a robust institutional framework, cooperation is unsustainable when overshadowed by existential geopolitical fears and a fundamental lack of trust, a dynamic factor also evident in the Nile, where Egypt's historical hydro hegemony, rooted in the 1929 Anglo-Egyptian treaty, created a similar legacy of resentment among upstream states who were not party to the agreement.[223]

The failure of bilateral institutions to manage the crisis from 1951 onwards necessitated a critical shift in strategy, leading to the involvement of a third party, which became the primary

[222] Daniel Haines, "Disputed Rivers: Sovereignty, Territory and State-Making in South Asia, 1948–1951," *Geopolitics* 19, no. 3 (2014): 632–655

[223] Sheferawu Abebe Ferede, Wuhibegezer "The Efficacy of Water Treaties in the Eastern Nile Basin," *The Journal of Environment & Development* 23, no. 3 (2014): 278-280.

driver of the eventual cooperative outcome. Direct negotiations between India and Pakistan were perpetually stalled, poisoned by the overarching dispute over Kashmir and the general climate of hostility. Recognizing the deadlock, the World Bank, under the leadership of its president, Eugene Black, intervened in 1952. The Bank's strategy was pivotal: it deliberately separated the technical problem of water distribution from the intractable political conflicts between the two nations. As William H. Thompson notes, the Bank acted as a "neutral broker," reframing the issue from a zero-sum conflict over a finite resource to a joint problem of river-basin development that could be expanded through engineering and international financing. This institutional intervention was crucial because it provided a face-saving mechanism for both sides to engage in technical discussions without appearing to make political concessions.

This contrasts sharply with the Nile Basin during the same period, where no comparable neutral third party emerged to mediate between Egypt, Sudan, and Ethiopia. Consequently, Egypt and Sudan solidified their bilateral control through the 1959 agreement, entirely excluding Ethiopia and other upstream states, thereby institutionalizing a conflictual structure rather than a basin-wide cooperative one.[224] The final pathway to the Indus Water Treaty (IWT) was paved by a confluence of economic and institutional drivers that made a negotiated solution materially attractive. The World Bank's proposal, which evolved into the treaty's core, was ingeniously simple in principle but massive in scale: rather than continuing to share the contested rivers, the basin would be partitioned. The three eastern rivers (Sutlej, Beas, Ravi) were allocated to India, and the three western rivers (Indus, Jhelum, Chenab) to Pakistan. To make this partition viable for Pakistan, which would lose its historical water sources from the eastern rivers, the solution involved the world's largest irrigation infrastructure project—the construction of a system of link canals and storage dams to transfer water from the western rivers to eastern Pakistan.

The World Bank orchestrated and guaranteed the massive international funding required for this "Indus Basin Project", and it was this financial underpinning that made the treaty palatable for Pakistan; it transformed a perceived loss into a development opportunity.[225] This economic driver had no parallel in the Nile at the time. While the Aswan High Dam was built with international support, it was a unilateral Egyptian project that further cemented its downstream control, rather than a basin-wide development package designed to buy the

[224] Ana Elisa Cascão, "Changing Power Relations in the Nile River Basin: Unilateralism vs. Cooperation?" *Water Alternatives* 2, no. 2 (2009): 245–268.
[225] John Briscoe and Usman Qamar, *Pakistan's Water Economy: Running Dry* (Washington, DC: World Bank, 2008), https://www.sidalc.net/search/Record/dig-okr-1098611746/Description

consent of all riparian states. The signing of the IWT in 1960 represented the institutionalization of cooperation, but it was a cooperation born of necessity and engineered by external intervention. The treaty created the Permanent Indus Commission (PIC), a standing bilateral body of engineers from both countries, which provided a permanent channel for communication and a first step for dispute resolution. The brilliance of this institutional design was its technocratic nature; it insulated day-to-day water management from the volatile political relationship. However, the treaty's very structure also reveals the limits of the cooperation achieved. It is a treaty of division, not integration. It manages conflict by separating the hydrological systems of the two rivals, reflecting the deep-seated distrust that made joint management politically impossible. In this sense, it differs profoundly from the cooperative aspirations of the later Nile Basin Initiative (1999), which aimed at integrated, joint management.[226] The IWT was a pragmatic solution to an immediate and dangerous conflict, not a visionary model of shared river basin development.

In a passing comparative analysis, the patterns of conflict and cooperation in the Nile Basin during the same period (1948-1960) reveal a different trajectory shaped by a distinct colonial legacy and power structure. While the Indus conflict was bilateral and immediate, the Nile conflict was multilateral and simmering. Egypt, as the powerful downstream state, successfully maintained its hydro-hegemony through the 1959 agreement with Sudan, which allocated the entire average flow of the Nile between them. Upstream states, particularly Ethiopia the source of the majority of the Nile's waters were completely marginalized. There was no "Ethiopian crisis" equivalent to the 1948 Indian water shut-off because Ethiopia lacked the political will and technical capacity at the time to challenge Egypt's dominance. Thus, while the Indus dispute saw a dramatic escalation followed by third-party-mediated cooperation, the Nile was characterized by a stable but inequitable hegemony that suppressed overt conflict but sowed the seeds for future disputes, such as those surrounding the Grand Ethiopian Renaissance Dam in the 21st century.[227] The primary driver in the Nile was the persistence of colonial era institutional arrangements that favored the downstream power, whereas in the Indus, the postcolonial rupture created a crisis that necessitated a novel institutional solution.

[226] Aaron T. Wolf, "Conflict and Cooperation Along International Waterways," *Water Policy* 1, no. 2 (1998): 251–265, https://doi.org/10.1016/S1366-7017(98)00019-1

[227] Ana Elisa Cascão and Mark Zeitoun, "Power, Hegemony and Hydro-Hegemony: The Role of Power in the Shaping of Transboundary Water Interaction," *Water Policy* 12, no. S1 (2010): 1–19.

Finally, the journey from the 1948 water crisis to the 1960 Indus Waters Treaty demonstrates that cooperation on transboundary waters is not a spontaneous occurrence but a constructed achievement. For Pakistan and India, cooperation failed when it was attempted bilaterally in a context of profound geopolitical hostility and institutional infancy. It only became possible when a powerful third-party institution, the World Bank, reframed the conflict in technical terms and provided the economic resources to make a solution viable for both parties. The resulting treaty was a masterpiece of pragmatic conflict containment rather than integrative cooperation. When contrasted with the Nile, it becomes clear that the presence of an accepted mediator and the availability of financial incentives were the critical differentiators that allowed the Indus dispute to move toward a formal resolution, while the Nile Basin remained locked in a hegemonic, and ultimately unstable, arrangement. The patterns from this formative decade illustrate that the drivers of hydro-political outcomes are never purely about water; they are inextricably linked to the broader political landscape, the strength of mediating institutions, and the economic cost-benefit calculus of peace versus conflict.

Chapter Three

Hydro-Diplomacy between Pakistan and India – An Appraisal of the Indus Water Treaty 1960

Chapter three focuses its analysis on the Indus Water Treaty and explores the principles of water sharing between riparian, dispute resolution mechanism, strengths and limitations of IWT and lastly calls attention to the proposed modifications in the treaty. It also tries to figure out that why apparently seeming rivals with having baggage of complex issue in backdrop opted for cooperation.

Stanley Wolpert, a renowned Indologist penned that Pakistan and India were born to conflict in 1947.[228] The geographical split of Subcontinent in August 1947 made Pakistan lower riparian and the flow of water from Indus River along with its tributaries was dependent on the will of India. In order to protect the uninterrupted flow of water, the Chief Engineers of Eastern and Western Punjab signed a Standstill Agreement on 20 December 1947. India was bound as per agreement to permit the pre-partition distribution of water in the Indus basin up to 31st March, 1948.[229] India emphasized that Pakistani government could not claim any water share "as a matter of right" and Pakistan reinforced this stance by paying cost for water as per the Standstill Agreement. India reiterated that since Pakistan has decided to pay remuneration for the supply of water, they are recognizing the exclusive Indian right on water. Pakistan responded by saying that they had rights of prior appropriation. These conflicting claims resulted in increased geopolitical antagonism and resentment between the two states sharing transboundary water resource. On the expiry time of the Standstill agreement, India shut off the water flow of East Punjab, depriving Lahore of municipal water as well as electrical supply from Mandi hydroelectric. This Indian move along with the unjust partition tensions triggered the decade long water dispute between both neighbors until the mediation of World Bank which resulted in ratification of Indus Water Treaty between Pakistan and India.

World Bank declared that there has been an excessive pressure on global river basins as a result of growing needs of water for domestic usage, irrigation, urbanization, increased power generation, industrialization and global warming specifically on four fast growing states of South Asia and China. [230] This situation has become more worsen due to lack of trust and

[228] Stanley Wolpert, *India and Pakistan: Continued Conflict or Cooperation? (*University of California Press, Berkeley, 2011), 126.
[229] Azhar Ahmad, "Indus Waters Treaty: A Dispassionate Analysis," *Policy Perspectives* 8, no. 2, (2011): 74-75.
[230] ibid.

flexibility among countries that share transboundary rivers as natural resource among them, especially in South Asia where India is the largest territory and upper riparian sharing rivers with neighbors. Indus Basin consists of six rivers actually these were nine rivers namely 'Indus River, Sutlej River, Bias River, Ravi River, Chenab River and Jhelum River.

The increasing scarcity of water resources in Pakistan and India has initiated an extreme antagonism over transboundary water resources of the Indus basin. It also stimulated a deliberation on the possible resource war in South Asia over the Indus waters between Pakistan and India. Water wars rationale predicts possibility of violent conflict between states dependent upon a shared transboundary water resource. The main drivers of conflict can be scarce availability of the resource coupled with competitive use and predominant animosity between riparian. In contrast to Water wars concept, Water rationality proposes actions under taken by any state for future securitization of its water supplies, both quantitatively and qualitatively implying that a state manages its water resources carefully on national scale, and upholds favorable relations with its co-riparian to ensure enduring access to the transboundary shared water.[231] In 1960, the two nations negotiated Indus Water Treaty through talks instead of engaging aggressively and fighting a war over Indus waters, thereby ensuring their long-term water supplies. Consequently, cooperative rationale prevailed over conflictive rationale implying the cooperative potential of transboundary water resource.

The explicit purpose of the Indus Water Treaty was to distribute and allocate the ownership of the watercourses of the Indus Basin between Pakistan and India and regulation of the construction/development of the storage infrastructures and catchment areas of Indus basin. IWT allocated the water from the three eastern rivers i.e. Sutlej, Ravi and Beas to India and Pakistan was allocated the water from the three western rivers i.e. Chenab, Jhelum, and Indus to Pakistan establishing regulations for each state.[232] The Preamble of the IWT identifies the need for fixing and delineating the obligations and rights of each state in relation to the other regarding the use of the waters in a spirit of friendship and goodwill.[233] Both states acknowledged their shared interest in optimal river infrastructure development and affirmed their intent to cooperate through collaborative endeavors.[234]

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[231] Uttam Kumar Sinha, *Riverine Neighborhood: Hydro-Politics in South Asia* (Pentagon Press 2016), 14-15

[232] Ramaswamy R Iyer, "Indus Treaty: A Different View," *Economic and Political Week* 40, no. 29, (2005): 3140-3144.

[233] Tufail Jawed, "The World Bank and the Indus Basin Dispute: Indus Waters Treaty—III," *Pakistan Horizon* 19, no. 2, (1996): 133-142.

[234] Kulbhusan Warikoo, "Indus Waters Treaty: View from Kashmir," *Himalayan and Central Asian Studies* 9, no. 3, (2005): 11-13.

World Bank as a third party tried to resolve water dispute between both countries and introduced an agreement named Indus Water Treaty. After long negotiations for about nine years both countries agreed to treaty and this treaty served transboundary countries for about 50 years. For a just and equal dissemination of Indus Rivers between Pakistan and India and for the resolution of hydro-politics between both countries, Indus Water Treaty developed a procedure. According to Article VIII of Indus Water Treaty, a commission was developed which was a permanent commission for resolution of conflicts on hydro-politics between two states, for sharing of statistical data, discussions and visits.[235] If permanent commission would not be able to resolve any issue then a neutral expert would be consulted for agreements. And according to some annexure of Indus Water Treaty, India was obliged to permit normal flow of Westerns Rivers to Pakistan and only a limited amount of water can be permitted to India for domestic use, agricultural use and for some hydroelectric power projects.

Formulation of Indus Water Treaty was a complicated task and has been thoroughly deliberated because each of them wanted to assure its right for future but at cost of other country. Most prior concern of both Pakistan and India was that with this agreement their right on Kashmir territory would not be changed. In the whole negotiations, both countries talked about their rights and duties so that each of them could not misconceive the treaty. Thus, final draft became ten times larger than its original text. At the occasion of signing of treaty members from United States, New Zealand, United Kingdom, Australia and Germany was present for representation of their countries and treaty was signed between Mr. Nehru (Prime Minister of India), Mr. Ayub Khan (Pakistan's President) and Mr. Illif (Vice President of World bank).[236]

It was an international event that was held in Karachi in which serious water conflict between upper riparian and a lower riparian region was settled down in a harmonious environment on 19 September 1960.[237] World Bank had issued a press release in which importance of IWT was highlighted that it resolved a severe water issue between two countries with peace and harmony which was remained unresolved since many years. President of Pakistan Mr. Ayub Khan said that "for both of us and also for whole world it would be a great occasion" and Mr. J. Nehru (Prime Minister of India) expressed that "this treaty would be a

[235] Article VIII of Indus Treaty

[236] Amit Ranjan, *Contested Waters: India's Transboundary River Water Disputes in South Asia* (New York: Routledge, 2021), 90.

[237] Announcement of Indus Water Treaty Signed on September 19, 1960 (English). Press Release, no. 1960-650 Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/127721589378651773/Announcement-of-Indus-Water-Treaty-Signed-on-September-19-1960.

way towards many advantages for both of us, however beyond all that advantages main and major benefits are related to spiritual and intellectual advantages".[238] In this way ministers of both territories expressed their gratification and pleasure on resolution of water dispute between them.

Along with government heads of both countries, majority of their public also showed satisfaction and accepted treaty for mutual future benefits, although some of opponents from both sides of border were also present who opposed this Indus Basin Water Treaty. Opponents from Indian region criticized that Indian government had handed over its water to Pakistan for no reason and it would affect projects of New Delhi. On the other side, opponents of Pakistan showed bitterness on the loss of three eastern rivers i.e. Sutlej, Bias and Ravi.[239] As per Indus Water Treaty three rivers of Western side was allocated to Pakistan namely; Indus River, Chenab River and River Jhelum. While India was allocated with three eastern rivers namely; River Ravi, River Sutlej and River Bias.[240] Pakistan objected for lands that were traditionally irrigated by eastern rivers on which World Bank allowed Pakistan to build structures that could bring water from western rivers to those areas for irrigation. For construction of substitution structures, World Bank had arranged funds from different states including; United Kingdom, United States, New Zealand, Germany, Australia and India also gave its contribution of about 62 million pounds.[241] In addition to these funding World Bank also gave Pakistan a favor that India should allow same flow of Eastern Rivers for ten years until substitution work has been completed.

3.1: Analysis of the Indus Water Treaty

The Indus Water Treaty is a water sharing settlement between Pakistan and India, facilitated and negotiated by the World Bank for optimum utilization of available water in the Indus River along with all its tributaries. The Indus Waters Treaty comprises a preamble, twelve articles and eight annexures A-H (containing appendices dealing with the technical issues). IWT endeavors to deal systematically and methodically with the matters of water

[238] Azhar Ahmad, "Indus Waters Treaty A Dispassionate Analysis," *Policy Perspectives* 8, no. 2, (2011): 73-83.
[239] Uttam Sinha, *Riverine Neighbourhood: Hydro-politics in South Asia* Pentagon Press 2016), 99.
[240] Mehsud, Muhammad Imran, Azam Jan, and Tariq Anwar Khan, "War or Peace on the Rivers of South Asia?" *Liberal Arts and Social Sciences International Journal)* 4, no. 1 (2020): 242-254.
[241] Jamait Ali Shah, "Indus Waters Treaty under Stress: Imperatives of Climatic Change or Political Manipulation," *Margala Papers* XV, no. 1 (2011): 6

distribution, flow of water in the Indus Basin Rivers and mechanisms to tackle disputes. The Treaty laid out the regulations as such:

- "All Eastern Rivers, except for domestic and non-consumptive use, "shall be unrestrictedly available to India" after the transition period. Once the rivers have crossed into Pakistan, then Pakistan has unrestricted use.
- India shall not "store any water or construct any storage works on the Western Rivers" and shall not interfere with the Western Rivers.
- "Pakistan, should it want to increase the catchment area, shall increase the capacity of that drainage to the extant necessary so as not to impart its efficacy for dealing with drainage waters received from India"
- If "India finds drainages should be deepened or widened in Pakistan, Pakistan agrees to undertake to do so as long as India agrees to pay the cost of deepening or widening" (Indus Waters Treaty 1960)."

Non-consumptive use and local use shall be allowed "in both rivers by both countries, but such use should not in any way affect the flow of rivers or channels, to be used by the other party".[242] The Treaty distributed the water resource from the eastern and western rivers in a bid to preserve Pakistan and Indian individuality from each other, the consequences of this condition intended that every state had the prospects of water infrastructure development exclusively and not reliant on other party. Long-term development and the regulation of storage and catchment areas support an increase in the water flow for agriculture and irrigation.

3.1.1: Water Sharing Principles in IWT

Before signing the treaty, Pakistan emphasized on the principle of "historical usage" whereas India claimed "absolute rights" on the river resources of Indus Basin system as an upper riparian state. IWT solved this issue that was not compelled by the legal principles, rather resolved it according to the perspective of hydro-economics and engineering. Different conflicting principles were brought forward by the concerned parties, Pakistan highlighted the principle of "no appreciable harm" - the favourite of International Law Commission (ILC) whereas principle of "equitable utilization"— the favourite of International Law Association

[242] Kulbhusan Warikoo, "Indus Waters Treaty: View from Kashmir," *Himalayan and Central Asian Studies* 9, no. 3,(2005):11-13.

(ILA) was emphasized by the Indian counterparts.[243] Instead of division of the waters resources of the Indus Rivers, Indus Water Treaty distributed the six rivers of the Indus basin between the two riparian. Nonetheless, the treaty allowed each country defined water usage from the rivers apportioned to the other state, bound by specific conditionality mentioned in the annexures of the treaty. Under the Treaty:

- Article II of the treaty explained that all the hydro-resources of the Eastern tributaries of Indus will be accessible to Indian utilization unhindered. Pakistan while on the other hand was allowed to utilize the resources from these eastern tributaries for the restricted agrarian purposes, local and non-consumptive usage. [244] A detailed description is also provided in Annexure B of IWT for the irrigational usage of forty five thousand acres from the offshoot of Ravi.
- As per Article III -1, Pakistan will get the "unhampered water usage of the Western Rivers" which India is "under commitment to let flow" and shall not authorize any interference with these western waters, except for the water usage, as mentioned in para five of Annexure C. These include the water use for domestic purpose, non-consumptive use, agrarian use (limited and set out in Annexure C), hydroelectric power generation highlighted in Annexure D and the storage works.[245]

Indian water utilization from the Western Rivers allotted to Pakistan was comprehensively deliberated in the complex and lengthy discussions during the negotiation process. The settlement identified and stipulated some qualified usage of water for storage, agriculture and hydroelectric power generation.[246] The details of water usage by India for agricultural purposes is enumerated in Annexure C i.e. 1.3 MAF water can be used by India for irrigation purposes. This points out that India can irrigate 13, 43,477 acres with the waters from western rivers. Until now India has been irrigating only 7, 92,426 acres of land for watering its crops from the water resources of western rivers.[247]

[243] Tariq Muhammad, "The Indus Waters Treaty and Emerging Water Management Issues in Pakistan", in Problems and Politics of Water Sharing and Management in Pakistan, Islamabad Policy Research Institute (IPRI), op.cit., p.88.
[244] Akhtar Shaheen, "Emerging Challenges To Indus Waters Treaty Issues of compliance & transboundary impacts of Indian Hydro Projects on the Western Rivers," *Institute of Regional Studies* 28, no. 4 (2010): 22
[245] Article III (2) of IWT
[246] Salman M. A. Salman and Kishor Uprety, *Conflict and Cooperation in South Asia's International Rivers: A Legal Perspective* (World Bank Publications, 2002), 4.
[247] Iftikhar Gilani, "Water not an issue at all: India," *The Kashmir Times, Jammu*, March10, 2010.

Figure 19: Land irrigated by India from the waters of Western Rivers (figures in acres)

River	Eff. Date	Add Area	Total	From Flow	2008-09
Indus	42,179	70,000	112,179	112,179	51,175
Jhelum	517,909	400,000	917,909	667,909	631,604
Chenab	82,389	231,000	313,389	157,389	109,647
Total	642,477	701,000	1,343,477	937,477	792,426

Source: Indus Water Commission

India is permitted to build run-of-river hydroelectric power generation projects on the Western Rivers. The engineering and technical limitations and restrictions on design and structure of these plants are specified in the Annexure D of the treaty. The Annexure E of the treaty mentions the limits of several storages structures of water constructed by India on the Western Rivers allocated to Pakistan.

Figure 20: Indian right of storage on the Western Rivers allocated to Pakistan (MAF)

River system	General Storage	Power Storage	Flood Storage
Indus	0.25	0.15	Nil
Jhelum (Excluding Jhelum Main)	0.50	0.25	0.75
Jhelum Main	Nil	Nil	As in Paragraph 9, Annexure E
Chenab (Excluding Chenab Main)	0.50	0.60	Nil
Chenab Main	Nil	0.60	Nil

Source: Indus Water Commission

Furthermore, Article IV (2) of the treaty noticeably stated that any non-consumptive use made by either riparian state would not "substantially alter… the water flow in any channel to the prejudice of the water usage on that waterway by the other riparian." The plans or projects for the control and protection of flood by either riparian was "to evade, as much as feasible, any substantial loss to the other party, and any such arrangement carried out by Indian on the water resources of western rivers shall not include any use of water or any storage besides conditions provided under Article III of the treaty."[248] Article IV (6) of IWT reiterated that both riparian states will "preserve the natural waterways of the all the rivers… and would

[248] Article III of IWT

evade, any hindrance to the flow in these channels expected to inflict any material damage to the other party, as far as practicable,"

During an intermediate period of 10 to 13 years, a system of replacement works was developed by Pakistan that involved two dams, six barrages, and nine link canals for the water transfer around 14 MAF from the Western Rivers. [249] An Indus Development Fund was set by the World Bank with a billion dollars where 174 million dollars were contributed by India. Subsequently the completion of replacement works, Pakistan and India attained autonomous control in the process of its water supplies.

3.1.2: Cooperative Principles in IWT

IWT articulates the principles of collaboration related to the "exchange of data" in Article VI and "future cooperation mechanism," in Article VII. This is proposed to ensure optimal usage of the rivers, cooperation and accommodation between both the rivals riparian. The statistics regarding the regular flow every day and water utilization of the rivers is to be informed and exchanged on regular basis. The data includes,

a) daily gauge and water discharge records at all observation sites regarding flow of the rivers

b) daily water withdrawals or water discharges from the reservoirs

c) daily water discharge at the canal heads managed by government or any other organization, with data from link canals

d) daily water withdrawls from all canals

e) daily distributions from the link canals.[250]

The above mentioned all statistics is to be communicated by each party on regular monthly basis, however if this data is "essential for operational objectives", data shall be "provided daily basis or at less recurrent intervals, as requested by the other riparian."[251] Moreover, any riparian can "demand the provision of any kind of data concerning the hydrology of the Indus rivers, or pertaining to the canal/reservoir operation associated with the rivers, or related to any provision of IWT."[252] This provision has faced numerous problems in

[249] The Indus Waters Treaty, <http://www.waterinfo.net.pk/pdf/iwt.pdf>.
[250] Article VI, (1) a, b, c, d, and e of IWT
[251] Article VI, (1) of IWT
[252] Article VI, (2) of IWT

its understanding and employment. The article VII of IWT openly says that both Pakistan and India did "acknowledged their shared and mutual interest in the optimal development of the Indus rivers" on future cooperation and both had affirmed their committed "to collaborate by joint agreement, to the fullest probable degree."[253] This included:

- Setting up of the hydrologic observation posts or meteorological observation facilities
- Running drainage works as per requirement by either riparian, subject to the imbursement of financial costs.
- Collaboration in undertaking engineering mechanisms by mutual agreement.[254]

Worthwhile cooperation in the areas identified in this clause of the Treaty is missing that causes tensions in both states.

Article VII (2) of IWT additionally indicated cooperation and exchange of data concerning planned engineering works on any of the rivers off the basin. The engagements in each case were left to each party. It proposed:

"If any riparian state plans the construction of some engineering work that might result in intervention in allocated waters of any of the rivers and which, in its belief, would disturb the water resources allocated to other party substantially, it will inform the other riparian of their plans and will provide data related to the work as may be available and as would facilitate the other party to apprise itself of the nature, scale and consequences of that planned work."

"If any development plan would result in meddling with the waters of any allocated rivers but might not, in the view of the planning party, disturb the other party substantially, nonetheless the party planning the development shall, on demand, provide the other party with data concerning the nature of plan, scale and outcome, of the designated planned work as much as available."[255]

In terms of the interpretation and implementation of this clause has faced problems. Article VII also faces problems as lack of data by India is another irritant and challenge for Pakistan. Many projects are started by India without informing and sharing details with Pakistan whereas a time period of six months is required before commencement of the project by either party to share the details of the project for avoiding any further conflict of interest.

[253] Article VII, (1) of IWT
[254] Article VII, (1) (a), (b), (c) of IWT
[255] Article VII, (2) of IWT

Further, there is also a provision in the IWT that the riparian would avoid contaminating and polluting the waters of rivers.[256]

3.1.3: Dispute Resolution Mechanism in IWT

Indus Water Treaty offers a complete and multidimensional structure of conflict resolution both bilaterally and also through the arbitration by international institutions. Different dispute resolution mechanisms are mentioned in the article IX of Indus Water Treaty including

a) Article IX (1): Pak-India Permanent Indus Water Commission

b) Article IX (3) & (4): Governments of both states

c) Article IX (2) (a): Neutral Expert

d) Article IX (5): International Court of Arbitration

Under Article VIII of the Treaty, Permanent Indus Commission (PIC) was established having two Commissioners appointed by the governments of Pakistan and India and they serve as the regular communication channel on all matters relating to the implementation of the Treaty. The core task of the Permanent Indus Commission is "establishment and maintenance of cooperative engagements for the effective implementation of the Treaty in true letter and spirit", to endorse collaboration between riparian in the development of the waters of the rivers", resolution of questions concerning the explanation and implementation of the IWT and to conduct the visits for site inspection. [257]

Resolution of disputes between both riparian states is one of the numerous responsibilities of Permanent Indus Commission (PIC) defined in Article IX of IWT that deals clearly with the settlement of disagreements and disputes. The disagreement on comprehension and interpretation of the clauses of IWT between the two riparian states are categorized into three kinds: "questions" to be scrutinized by the Permanent Indus Commission (PIC); Neutral Experts will deal with the differences; and the "disputes" will be tackled by International Court of Arbitration.[258] If the 'questions' develop into the 'differences' fundamentally of any technical/mechanical nature, such issues will be referred to a Neutral Expert. The findings and recommendations of Neutral expert will be final and obligatory for both riparian. Subsequently

[256] Article 1V, (10) of IWT
[257] Article VIII (4) o IWT
[258] Indus Waters Treaty, World Bank, <http://web.worldbank.org/>.

Court of Arbitration is another forum available for resolution of disputes between Pakistan and India concerning water issues.[259] World Bank's role is more technical in the nomination of any Neutral Expert and establishing the Court of Arbitration for dispute resolution.

The dispute resolution mechanism as envisaged in the treaty and discussed above itself is a sensitive point between both Pakistan and India in terms of their hydro political relation. The past issues of contention clearly indicated that stark differences are present in the interpretation of treaty between both states. Various conflicts emerged related to the interpretation of treaty associated with the design and storage capacity of hydro structures built by India as discussed in the next chapter in detail. These differing perspective in comprehension of the provisions of treaty by Pakistan and India needs mutual understanding for clarification and avoidance of additional conflicts in future. As in the case of Kishenganga and Rattle projects there is an impasses on the dispute resolution process where India boycotted and questions the mandate of International court of arbitration. The two sides could not find any amicable resolution for these projects bilaterally on the platform of Indus Commission for ten years and ultimately referred to third party for settlement. The dispute resolution mechanism itself came under ambiguity in these cases further adding to the stalemate between hydro-political relationship and communication in both riparian states.

Figure 21: Dispute resolution process envisaged in IWT

S.No	Classification of problems	Method for resolution	Composition of forum	Dispute Cases
1	Questions	Permanent Indus Commission	Two members from Indus Commission.	Salal Dam
2	Differences	Referring Neutral Expert	Appointment of NE is done with agreement of both parties and failing to do so, World Bank is assigned then to appoint expert. 23 questions are listed in annexure F that falls within the preview of the Neutral Expert.	Baglihar Dam
3	Disputes	Court of Arbitration	Article IX (5) and Annexure G of the treaty deals with the Court of Arbitration.	Kishenganga Dam

Source: Author's compilation

[259] Annexure F of the Treaty.

3.2: Criticism of the Treaty

Indus Water Treaty faced considerable resentment from both sides i.e. Pakistan and India. IWT however did not pacify critics across the borders. People from Pakistan argued that they have 90 % of the arable and irrigated land but were only allocated with 75 % of waters from Indus Basin Rivers while Indians grudged on this allocation. India contends that the treaty limits its ability to fully exploit hydropower potential on the Western Rivers and constrains development in Jammu & Kashmir, especially for storage-based projects Indian press and politicians criticized IWT and termed it as diplomatic defeat, surrender and undue concession to Pakistan.[260] Congress MP Ashok Guha, grieved that the "interests of India had been sacrificed to placate Pakistan". Another leader of the PSP (Praja Socialist Party) in the Lok Sabha, Ashok Mehta labelled the treaty as a strange agreement under which Pakistan would be unable to fully utilize its share of the Indus Water resources and would have to allow it to flow into the Arabian Sea."[261] H.C. Mathur and Iqbal Singh, the Congress MPs from Rajasthan and Punjab, called the IWT detrimental to India by stating that both Rajasthan and Punjab states "had been severely let down".[262]

Indian perspective regarding the dispute resolution mechanism of IWT is that the proposed mechanism for solving water disputes have posed obstructions to Indian construction plans because all available forums are exploited fully by Pakistan under the framework of Indus Water Treaty. Therefore, the construction of hydro-power generation projects in India is often delayed and this interruption incurs huge economic expenditures. Indian researchers have consistently expressed their resentment that the treaty prevents India from obtaining full benefits of its potential to produce hydro-energy that also cause trouble for India as an "opportunity cost."[263] Additionally, Indian perception reveals their belief that the IWT is too generous to Pakistan. Indian government faces great domestic pressure from its various states for scrapping or modification of the treaty. For example, three resolutions were initiated in Indian national assembly for reviewing the Indus Water Treaty.[264]

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[260] Mehmood Ashfaq, *Hydro-Diplomacy Preventing Water War between Nuclear Armed Pakistan and India* (IPS Press, 2018), 12.
[261] Uttam Sinha, *Riverine Neighborhood, Hydro-politics in South Asia* (Pentagon Press, 2016), 97.
[262] Kulbhusan Warikoo, "Indus Water Treaty: View from Kashmir," *Himalayan and Central Asian Studies* 9,no.3, (2005): 15.
[263] Brahma Chellaney, *Water: Asia's new Battleground* (Georgetown University Press, Washington 2011), 13.
[264] Waseem Ahmad Qureshi, "Indus Waters Treaty: An Impediment to the Indian Hydrohegemony," *Denver Journal of International Law & Policy* 46, no. 1 (2017): 45-71

Pakistan argues that India's construction of run-of-the-river projects on the Western Rivers, with specific designs affecting pondage and flow regulation, grants India excessive control, undermining downstream water security and agricultural stability. Pakistani farmers also showed their resentment because they occupied and command the control area of three eastern rivers. The farmers had to pay the sudden price of Indus Water Treaty in the form of engineering works under taken in West Pakistan under the aegis of treaty ensuing serious environmental hazards, water logging and salinity and depletion of ground water. Syed Salahuddin, the Chairman of the United Jihad Council was cited as saying that Indian occupied Kashmir is the source from where all water resources of Pakistan originate. In case Pakistan faces any defeat in war against India, it might become a desert.[265] The economy of Pakistan is dependent upon agriculture and therefore on water resources, hence increasing the significance of Kashmir.[266]

3.3: Strengths of the Treaty

The covenant between Pakistan and India known as Indus Water Treaty solved the hydro-political tensions and hailed as a great case of successful hydro-diplomacy. The main advantage of Treaty was that after substitution work had been completed in Pakistan both countries would be able to enjoy independent right on their allocated rivers without any interference of other party. Second facility is that under climate changes, run of river system has been considered to be more liable system and luckily Indus Basin irrigation system was a run of river system. Another benefit of treaty to Pakistan and India was that both ministries were free in planning, building and management of new projects on their own rivers without seeking permission from other party on their allocated water resources. WAPDA -Water and Power Authority of Pakistan, which was in infancy at the time of ratification of treaty, developed in a large and successful engineering institution later on.[267] The treaty unleashed tremendous engineering works in Pakistan by building several canals, barrages, dams and infrastructure.

In addition to this, IWT provided each country with benefit of utilization of water of their rivers efficiently and effectively, as storage of water by them will provide advantage to that country at the time of water shortage and also independence over waters. Two large dams i.e.

[265] ibid
[266] Sundeep Waselkar, "The Final Settlement: Restructuring India-Pakistan Relations," *Strategic Foresight Group,* available at http:// www.strategicforesight.com/finalsettlement/thesecret.pdf
[267] Yousafzai Fawad. "Wapda endeavouring to add 9000MW to national grid by 2028," *The Nation*, May 12 2021.

Mangla and Tarbela transformed the landscape and economy. Due to Indus Water Treaty for each of signatories there will be no interference of other party that would reduce chances for any kind of water related conflict or strain between them. Moreover, thanked to the treaty that it increased storage capacity of canal system due to deflection about a double of its previous storage. Furthermore, in hydrological perspective of IWT another major advantage was water storage in dry season and availability of more that 80 percent of water during wet season. Finally a commission on Indus water treaty was developed so that any conflicts related to water in future period can be resolved between two countries. The permanent commission consisted of commissioner from both Pakistan and India and provided with consultation machinery for resolution of conflicts through inspection, examination, visit of sites and sharing data. Enormous participation of local contractors in massive engineering works benefitted them.

Figure 22: Replacement Works on Indus Basin

LINK CANALS (9)	**BARRAGES (6)**	**STORAGE (3)**
TRIMMU-SIDHNAI	SIDHNAI ON RAVI	MANGLA
SIDHNAI—MAILSI	MAILSI SIPHON ON SUTLEJ	CHASHMA
MAILSI-BAHAWAL	QADIRABAD ON CHENAB	TARBELA
RASUL-QADIRABAD	RASUL ON JHELUM	
QADIRABAD-BALLOKI	CHASHMA ON INDUS	
L.C.C. FEEDER	MARALA ON CHENAB	
BALLOKI-SULEMANKI-II		
CHASHMA-JHELUM		
TAUNSA-PANJNAD		

Source: Ashfaq Mehmood

Recent Developments

The IWT has resolved transboundary water issues. Recurring problems over the Indian hydropower projects do cause tension but the elaborate procedure of dispute settlement contained in Article 9 of the Indus Water Treaty is fully capable of addressing the difficulties.[268] The Treaty has endured three wars between both states in 1965, 1971, and 1998 and also sustained the volatilities in the troubled bilateral relations between the two rival riparian. Nonetheless, apprehensions over the decline in availability and worsening quality of fresh water produced by the urbanization, population surge, agricultural and industrial

[268] Interview with Ex Ambassador Shafqat Kakakhel

developments, coupled with the institutional flaws have exponentially increased in both states. Due to the environmental degradation and climatic variation, these issues are anticipated to be aggravated in future. Throughout the sporadic high-level meetings between both riparian, the dialogues on water problems have focused on the ongoing disputes, devoid of much success.

On 25th January 2023, through a communication from the Indian Indus commissioner to the Indus Commissioner of Pakistan, the Indian government proposed to start bilateral talks for modification of the Indus Waters Treaty with in ninety days. The official text of the Indian message is not disclosed in the public sphere. Nonetheless, Indian spokespersons have informed their media whose wide-ranging coverage unveiled the rationale behind Indian move, in line with the past practice. Indian officials stated that the negotiation notice had been communicated by India two days prior a Court of Arbitration was established at the appeal of Pakistan under the Indus Water Treaty.[269] Indian officials iterated that whereas India has always been a dedicated and responsible state in implementation of the Indus Water Treaty in its true letter and spirit, the intransigence from Pakistan had compelled Indian government to deliver a notice for modification of the treaty. This notice was intended to provide an opportunity to Pakistan "to enter into negotiations within ninety (90) days" in order to "rectify the material breach of the IWT". They emphasized that the process of discussions and negotiations will also facilitate to revise the treaty in order to integrate the experiences from last sixty-two years of its implementation in Indus Basin.[270]

In 2016 disagreements arose on the designs of the Rattle and Kishenganga hydropower projects, where Pakistan and India both asked for two different methods to the World Bank. Under Annexure G of the treaty, Pakistan requested for empanelment of the CoA. But under the Annexure F of the Indus Water Treaty, India requested for the nomination of a Neutral Expert. Though Pakistan requested before India, the World Bank decided to start both procedures at the same time. Nonetheless, in December 2016, owing to the problems linked to continuing with the two processes simultaneously, the World Bank paused the mechanism of conflict resolution of IWT. Nonetheless, due to lack of settlement between the two riparian, predominantly due to intransigent Indian behaviour, World Bank decided to continue with both process i.e. process of the Court of Arbitration and appointment of the Neutral Expert in April 2022.

[269] Shafqat Kakakhel, "Indus Waters Treaty under threat," *Dawn*, March 12, 2023.
[270] ibid

The Permanent Court of Arbitration's "unanimous decision" that rejected respective Indian objections also started the next stage of the dispute resolution mechanism, that will comprise addressing the questions regarding the general understanding and implementation of the provisions of the treaty on the design and operation of hydroelectric power project. The court will also deliberate on the legal effects of the decisions taken previously by the dispute resolution institutions. On 6th July 2023 PCA passed a ruling declaring the jurisdiction of the court to be "competent" for determination of disputes upraised by Pakistan against the two hydroelectric power projects by India in Jammu and Kashmir.[271] However, India rejected this ruling of PCA. India's pronouncement to boycott the Court of Arbitration is a dominant example of its haughtiness in managing the issues regarding Transboundary Rivers shared with her neighbors. However, there is a need to renegotiate the IWT but the conflictive matters related to the effects of climate change can be discussed under the scope of Article 7 dealing with Future Cooperation at the platform of Indus Water Commission.[272]

Recently another formal notice was sent by India to Pakistan on 30 August 2024. In this second letter India seeks renegotiation regarding the Indus Water Treaty and cited that the changes circumstances needs a review of the treaty. This second letter is different from the first one as the former hinted at the intransigence of Pakistan but the later talks about the changed demographic, environmental and climatic patterns. The primary rationale behind the letter sent in August 2024 revolves around the evolving realities in the Indus Basin. This reflect a paradigm shift in the Indian attitude that changed from blaming Pakistan as being obstinate and inflexible in Hydro political relations to mainly acknowledging and recognizing the change in the region's geographical realities. The key factors behind this change is demographic pressure from the increased population in the region especially the population of Jammu and Kashmir that is the main geographical territory of Indus Basin, the scarcity of water resources, harnessing full potential of hydropower generation and unprecedented environmental and climatic variations.

The treaty is suspended by India now after a terrorist attack in Pahalgam Jammu and Kashmir. Making water as a political tool and weoponizing it is starkly demonstrated in the aftermath of the 2025 terrorist attack in Pahalgam, when India took the unprecedented step of unilaterally placing the treaty "in abeyance". This move marked a dangerous escalation, transforming the treaty from a technical channel for cooperation into a lever of strategic

[271] "India Rejects Hague Court Order on Indus Water Treaty," *The Diplomat,* July 11, 2023.
[272] Interview with Ex Ambassador Shafqat Kakakhel

coercion. It highlighted a critical vulnerability: the treaty's operational continuity is contingent on a baseline of political goodwill that has consistently eroded over time, making the framework a hostage to broader bilateral disputes rather than a buffer against them.

3.4: Indus Water Treaty as Hallmark of Hydro-Diplomacy

The Indus Waters Treaty (IWT) of 1960 stands as a monumental achievement in hydraulic diplomacy, representing a sophisticated and enduring mechanism for managing one of the world's most politically charged transboundary water systems. Far more than a simple water-sharing agreement, the IWT functions as a continuous, structured form of state-to-state engagement between India and Pakistan, a diplomatic channel that has remained open even when all others have closed. Examining the Treaty through the lenses of hydropolitical theory, the dynamics of its negotiation, and its unique institutional design reveals how a technical agreement on water allocation has been leveraged as a critical instrument of conflict management and precarious cooperation in South Asia. This complex interplay demonstrates that the IWT is not merely about dividing a resource but about governing a relationship, making it a seminal case study in the use of shared natural resources as a medium for international diplomacy.

From a theoretical perspective, the IWT's creation and endurance can be understood through the concept of hydro-hegemony, albeit one that was strategically negotiated rather than imposed by pure force. The Treaty did not eliminate the underlying asymmetry India remains upstream but it institutionalized it within a legal and technical framework that legitimized Pakistan's water rights and provided it with a guaranteed allocation. As per hydropolitical theory a stable hegemony often requires a degree of consent from the weaker state, achieved by providing it with some benefits and a sense of security.[273] The IWT accomplished this by dividing the rivers themselves, granting Pakistan the vast majority of the Indus system's flows and financing the massive infrastructure needed to make this division viable, thereby moving the relationship from one of coercive hegemony towards a more contractual, rules based interaction.

The IWT's functionality as a tool of hydraulic diplomacy is encoded in its institutional architecture, primarily the Permanent Indus Commission (PIC). The PIC is a remarkable diplomatic innovation: a standing bilateral body of engineers that provides a permanent, mandated channel for communication. Its design is deliberately technocratic, insulating day-

[273] Mark Zeitoun and Jeroen Warner, "Hydro-Hegemony – A Framework for Analysis of Transboundary Water Conflicts," *Water Policy* 8, no. 5 (2006): 435, https://doi.org/10.2166/wp.2006.054

to-day water management from the volatile swings in the political relationship. The Commission's primary role in facilitating the exchange of data and conducting tours of inspection creates a rhythm of obligatory interaction, ensuring that dialogue never completely ceases. Furthermore, the Treaty establishes a sophisticated, graduated dispute resolution mechanism, beginning with negotiations within the PIC and escalating, if necessary, to a Neutral Expert and finally to a Court of Arbitration. [274]This tiered system prevents minor technical disagreements from immediately exploding into major political crises by providing a clear, legalistic pathway for resolution. This institutional machinery has been tested repeatedly, from the Salal Dam in the 1970s to the Baglihar and Kishenganga arbitrations in the 2000s, and has consistently succeeded in containing disputes within its legal-technical framework, thereby preventing hydraulic conflicts from triggering broader military confrontations.

However, the limits of this hydraulic diplomacy are being severely tested by contemporary challenges that the treaty's 20th-century designers could not foresee. The IWT's rigid structure, while a source of stability, lacks the flexibility to address climate change, groundwater management, and environmental flows. Moreover, the diplomatic function of the treaty is increasingly strained by its politicization. The period following the 2025 terrorist attack in Pahalgam, which led India to declare the treaty "in abeyance," represents a critical juncture.[275] This move signaled a shift from using the treaty's channels for conflict resolution to weaponizing the treaty itself as an instrument of coercive diplomacy, directly challenging its foundational principle of functional neutrality. When the technical realm is subsumed by high politics, the entire edifice of hydraulic diplomacy risks collapse. The path forward requires courageous diplomacy to negotiate a more flexible, adaptive, and comprehensive agreement that addresses the realities of the 21st century, transforming the Indus from a river of discord into a river of shared opportunity.

Hydro-diplomacy offers an apolitical platform for discourse and communication even when broader political relations are tense. Such functional cooperation can act as an opportunity for wider trust-building between riparian states. In the context of Pakistan and India, it can create environment of positive mutual interdependence that may be extended from issues of low politics like agendas regarding climate adaptability and hydraulic cooperation to issues of high politics. Hydro-diplomacy can enable joint hydrological monitoring, timely

[274] World Bank, "Fact Sheet: The Indus Waters Treaty 1960 and the Role of the World Bank," last updated June 21, 2023, https://www.worldbank.org/en/region/sar/brief/fact-sheet-the-induswaters-treaty-1960-and-the-world-bank

[275] "Strategic Waters: The Indus Treaty Abeyance and Its Geopolitical Implications," *South Asian Voices*, July 13, 2025, https://www.southasianvoices.org/

warning systems for flooding, and climate adaptation projects. These collaborations can depoliticize the water issue and focus on shared technical solutions, reducing misperception and escalation risks. Water diplomacy will help both state to align with international norms, attract funding, and improve diplomatic standing without surrendering their respective sovereignty.

At the subnational level of analysis, hydro-diplomacy within both Pakistan and India is molded by internal governance tensions, competing interests, and the growing involvement of non-state actors. In Pakistan, federal–provincial disputes over water allocation—particularly between Sindh and Punjab—challenge a unified national position on Indus basin management and weaken the state's capacity to involve cohesively at the international level. Likewise, in India**,** the upstream regions such as Jammu and Kashmir and Himachal Pradesh often feel marginalized in decision-making, as New Delhi controls negotiations at transnational level and hydropower project planning. These subnational divisions echo an extensive problem of institutional fragmentation, where overlapping bureaucratic jurisdictions, political rivalries, and weak coordination among ministries obstruct coherent water governance.

Beyond the formal institutions, non-state actors—including media, civil society, agriculture associations, and nationalist political groups—play a substantial role in framing the Indus Water Treaty through a security or sovereignty lens. In Pakistan, criticizers depict the treaty as a structural restriction that legitimizes Indian control on water resources, while in India, nationalist segments recurrently condemn it as excessively concessional to Pakistan. Such lobbying has securitized water discourse, converting technical collaboration into a matter of national identity and political leverage. Therefore, domestic contestation not only limits adaptive governance but also constrains the space for meaningful transboundary diplomacy, as governments become captive to domestic narratives of distrust and zero-sum politics.

3.5: Limitations of Indus Water Treaty

Besides a successful treaty between Pakistan and India for long period of time, there were limitations in treaty which both countries wanted to review with the passage of time. World Bank suggested a quantitative distribution of waters of the Indus Basin Rivers rather than a cooperative management and sharing between two riparian. Some short comings of IWT included; firstly, both countries did not consider sharing of water was just between both parties. Pakistan's view point was that the partition of rivers of Indus Basin was a distinctive deviation from the principles of rights of upper and lower riparian states (safeguard of prevailing water usage from the same source of water) under international law. In this manner Pakistan had to sacrifice the complete continuous flow of the fresh water resources (24.00 MAF) of the three

eastern rivers of Indus Basin that was utilized historically for irrigation purposes. [276] While on other side, India's perspective was that Pakistan had been given 75% of water share instead of equal sharing which violated principle of equity. Similarly, Pakistan also had to neglect all water inflow of three rivers that were awarded to India which were traditionally used for major irrigation land portion of Punjab.[277]

The changing climate and stoppage of water flow in eastern rivers cause sedimentation and siltation of watercourses and with flood a great destruction of both infrastructures and crops might be the result. Maintenance cost would be increased as new channels have been developed in accordance of IWT and more capital would be needed for their proper working and administration. Moreover, storages lasted for limited periods of time and could not be replaced by perennial canal systems and also siltation of watercourses might became cause of destruction is Pakistan.

Unlike international agreements on water issues, water sharing in Indus Water Treaty is based on location of distributaries; neither any rule of operation has applied nor was any quantitative basis there. According to Indus Water Treaty only share of distributaries was discussed that which one will be used by each of signatories but conflicts related to changing climate, changed precipitation pattern, use of groundwater and increased utilization for domestic sector with increasing population had not been discussed.[278] No provision is present in the Indus Water Treaty that explains the procedure on how the parties should respond to the existing or forthcoming reduction in the flow of water which might be triggered by the climatic change, accumulation of sedimentation, or any other factors imminent in future. The appropriate hydrological management of the ground waters is another significant matter ignored by the treaty since water level is decreasing day by day thereby increasing the water scarcity in the basin. This water scarcity of surface water and ground water aquifers is intensifying hydro-politics in the region. The permission granted to India for optimum utilization waters of the western rivers for hydroelectric power generation and irrigation, it omits any analysis of the aggregate effects of a cascade of these planned projects.

Any provision pertaining to making flood control infrastructure or mutual flooding warning systems is not discussed in the treaty. Such mechanisms would be of enormous advantage to both states as they would contribute in curtailing the perils related with extreme and life

[276] Azhar Ahmad, "Indus Waters Treaty A Dispassionate Analysis." *Policy Perspectives* (2011): 73-83.
[277] ibid.
[278] Kokab, Rizwan Ullah, and Adnan Nawaz, "Indus water treaty: need for review," *Asian Journal of Social Sciences* 2, (2013): 210-218.

threatening weather hazards and minimize the expenses of humanitarian aid as consequence of any natural catastrophe. Disaster-risk management techniques and mechanism needs to be fully and comprehensively developed and, possibly, added in an updated and modified document of IWT. Absence of cooperation between both governments in water sharing had negative impacts on social and ecological relations across border line of Indus Basin. The discussed problems in the treaty deliberated by both sides are only technical in nature, and the technical and engineering problems should be solved with engineering solutions.[279] The treaty does not arrange for any watershed management in respect of rivers whose catchment areas are situated across the borders of Pakistan and India. IWT does not consider environmental flows in the eastern rivers 'allocated' wholly to India.

The challenges to the treaty lies in the areas of emerging issues-climate change, environmental flows and ecological imbalances, non-inclusion of surface water, reluctance to share vital water data. The broker of this treaty- the World Bank now plays a dormant rule. The Indus Basin Commission's meeting and forums provide a rather sterile forum without any imagination or innovation given the rapidly developing complex water scenarios for South Asia. All these elements are new and not part of the Indus Basin Treaty. The prospective water relations between Pakistan and India profoundly depends on the sanctity of the Indus Water Treaty. Within the confines of the treaty, little space is present for maneuvering. The nuisances like climate change, quality and quantity of surface water, changed environmental flows, glacier melt etc. are become glaring spots between both states hydro-political arrangement. Therefore, these issues need to be faced upfront with or without the treaty-inclusively or exclusively.

3.6: Modifications in Indus Water Treaty

Though none of the riparian unilaterally can withdraw from Indus Water Treaty, provisions are stipulated in IWT for its modification periodically by an appropriately ratified updated treaty concluded between the administrations of Pakistan and India as per the Article XII of Indus Water Treaty.[280] Keeping in mind the emerging challenges, Pakistan and India should first state the new issues, quantify the likely impacts, pin point the hotspots and open a dialogue for a fixed period to clearly delineate positions, concerns, emerging challenges and problem addressment.

[279] Planning Commission of Pakistan. Canal Water Pricing for Irrigation in Pakistan: Assessment, Issues, and Options.https://www.waterinfo.net.pk/sites/default/files/knowledge/Canal%20Water%20Pricing%20for%20Irrigation%20in%20Pakistan%20-%20Assessment%20Issues%20and%20Options.pdf 2012

[280] Article 12 of IWT

Indus Water Treaty had been considered a best example in field of hydropolitics as it showed a good cooperation between Pakistan and India as upper and lower riparian for transboundary water sharing. More than six decades has been passed when Indus Water Treaty served as a signature agreement between the two countries about equal share of waters but it did not give any guide about changing climatic scenario, water scarcity, increasing demand of water, pollution control, water quality, ecological protection and impacts of environmental degradations. Therefore criticism has been charged on Treaty for modification and revision. During first phase of analysis, it has been analyzed that there has been no considerations for utilization of groundwater for both Pakistan and India.

In addition to this, IWT overlooked another aspect that it only considered two countries Pakistan and India whereas China and Afghanistan also being riparian countries were ignored in IWT which now cause problematic situations regarding transboundary waters. It is advisable for the best interest of the vitality of the watercourses to include all riparian states of the Indus Basin in mutual management of water resources as they are also part and parcel of the interrelated network of the Indus Basin. All the stakeholders of Indus Rivers System should share the responsibility of effective management, not just disjointedly partial obligation. In view of all these problems analysts supportive of water war rationale had given a prediction of war in future between Pakistan and India on hydro-politics.[281]

Pakistan being downstream country faced water quality issues by receiving agricultural and industrial water pollution from India. These chemically polluted water adversely affected fertility of soil and also health issues in region of Indus Basin in Pakistan as lower riparian. It has been evident from analysis that in Indus Water Treaty major concern was physical sharing of rivers quantitatively and hydro-power generation projects but environmental degradation had been seriously ignored. There has been a need for both countries to have bilateral negotiations for resolution of these issues regarding quality of water and pollution related matters as involvement of Third Party (Neutral Expert or Court of Arbitration) would not be a good idea. Agriculture, domestic and industrial dump in Indus every year has been estimated as 55 cubic kilometers and only a little out of it was treated before dumping.[282] Indus had double amount of nitrogen and phosphorus pollution then its assimilation power. Poor quality waters for irrigation resulted in water logging and salt affected land with loss of yields. Consequently, major parts of land gone out of cultivation every year due to salinity and water

[281] Zawahri, Neda and David Michel, "Assessing the Indus Waters Treaty from a comparative perspective," *Water international* 43, no. 5 (2018): 696-712.
[282] ibid

logging. In a report of World Bank 2004, it was declared that about 20 million hectares of cultivated land in Pakistan had gone out of cultivation due to the problem of water logging and salinity produced by irrigation with poor quality water.

Groundwater resources receiving that poor quality water would also place a question mark on quality of groundwater. Due to those salt intrusions groundwater quality also had been deteriorated. Farmers had misconception that groundwater had good quality then freshwater but it's totally opposite scenario. Only solution for this threat is better storage capacities. This phenomenon caused siltation of storage pools of Indus canal system and has reduced power generation capacity of Tarbela Dam. Seriousness of this threat had not taken under consideration at any political level neither by Pakistan nor by India realized the importance of this matter for shared waters between both countries.

The mounting stress caused by scarcity of water in both the riparian states is prospectively deepening with evolving climatic pressures to the water resources of Indus Basin Rivers. Resultantly, the Indus water management formed in 1960 is facing massive stress from changes in hydrological, demographic, geo-economic, political ecology and melting of Himalayan glaciers. Therefore, this changing patterns in climate and environment is causing strains on the administrative, normative and practical sustainability of the Indus Waters Treaty. The population of Pakistan and India collectively has tripled now from 485 million in 1961.[283] The demand for water consumption for irrigation complexes and hydro power electricity generation is augmented than it was required in 1960 and compels more attention. In the decades of 60's when Indus Water Treaty was originally ratified, the water resources were considered ample for consumption of both states by the negotiators. Nowadays due to augmented demand of water share, water security in both riparian is at great danger as the rate of water extraction surpasses recharge rates, leading to the decrease in water tables and increased withdrawals from the surface water resources of Indus Basin.

Any successful and efficient treaty should respond to the prospective complications faced during its course of implementation. In the case of the Indus Waters Treaty, any modifications renegotiated should tackle the issues related to water availability (surface and ground water aquifers), flooding along with its corresponding adverse consequences. There has been a threat due to changing climate that it could cause adverse impacts on monsoon regimes. Major dependence of Indus Basin Rivers was on melting of glaciers which was estimated as

[283] Hamid Sarfraz, "Revisiting the 1960 Indus Waters Treaty," *Water International* 38, no.2 (2013): 205.

about 60 % of its total flowing capacity.[284] These glaciers had been declined due to impact of changing climate and global warming with elevated temperatures and low precipitation rates. In a report of 2008 it was declared that each year Himalayan glaciers shed off its ice in Indus Basin about 7 billion metric tons. Initially, deglaciation of Himalayan glaciers caused increased flow in river and an increased threat for floods. But with passage of time as a significant amount of snow at glaciers melted off it would cause water scarcity and water shortage for agriculture, domestic, industrial and hydro power generation uses. Similar to many other treaties of water issues, Indus water treaty also had no consideration for climate change and global warming. At the time when Indus treaty was signed between two countries climate change was not given scientific considerations, so this perspective of climate change was ignored in 1960. Therefore there has be a need for modification of treaty under analysis and advanced database compiled by experts, new things would be added to treaty. In this way both signatories of treaty could manage this climate related issue for water peacefully.

Indus Water Treaty is one of successful treaties in field of hydropolitics across the world.[285] Despite of all negative comments of public of countries, some flaws and ignorance of treaty it had been proved to be a peaceful agreement even during two wars between Pakistan and India. However, Indus Water Treaty could not be fully adaptable because of its weaknesses. Unlike other water treaties where there have been time given in treaties for renegotiations and amendments, Indus Water Treaty had not given any time or expiry date it was a permanent treaty because there has been no clause in the treaty regarding renegotiations and amendments with changing scenarios of climate, environment degradation and other related factors. For successful accommodation of climate change, IWT needs to be flexible and resilient.

Here after this analysis it has been proposed that instead of formal renegotiations for Indus Water Treaty's revising of modification, both governments might adopt strategies like communications or transfer of ideas for understanding between both countries without involvement of any third party like Neutral Expert. It would be beneficial for both countries in a way that issues related to climate change would be discussed without reopening of issues of entitlements and duties of each other. Sources for sustainability of Indus Basin like, precipitation and snow melting had been adversely changed due to global warming, shift in seasons, low precipitation rates, high temperatures and rapid melting of glaciers. Greenhouse

[284] ibid

[285] Hamid Sarfraz, "Revisiting the 1960 Indus waters treaty." Water International 38, no. 2 (2013): 204-216.

gas effects caused large difference in ocean and land temperatures, changed moisture contents of atmosphere and changed monsoon patterns.

A revised modified treaty should deliberate on climatic, environmental and population surge elements into consideration. However, for revising or modifying the treaty, there should exist a genuine spirit of goodwill and shared determination between Pakistan and India for welfare of population of both states. Without realizing the access to water as a basic human right and a fundamental element of human security, modifying the current treaty will prove challenging task, if not an impossible one. The examination of other treaties especially in field of hydro-politics would prove to be successful for betterment of relations of two countries. Therefore, by making rules, regulation, management of conflicts and procedures for decision making would help in improvement of overall bilateral relations of Pakistan and India.[286]

Another matter that should be taken under consideration in Indus Water Treaty for revision was control of pollution. Industrial waste water and chemically polluted waters have been continuously added in to Indus basin which ultimately deteriorate quality of river waters and as it has not been mentioned in Indus Water Treaty so no considerable attention had been given to this serious issue. Indus water treaty should focus on the control of pollution and forbidden of addition of hazardous water into rivers without treatment. Hence Indus Water Treaty was a fair draft at that time but under changed conditions treaty's articles should be revised and re-uttered between both countries for dissolution of emerging water disputes due to global warming, pollution or increased demand. Modification in Indus water treaty will reduce levels of disputes among countries of South Asia and help them in regaining of their better reputation. Furthermore, experts of India had also been fed up on delayed hydroelectric projects of India due to opposition of Pakistan and this issue has only been arisen just because of limited annexure of Indus Water Treaty. Indians claimed that limitations of treaty caused hindrances in way of expression of India's hydropower capabilities and representation of cost benefits.

Water disputes among Pakistan and India had direct impact of issue of Kashmir as these rivers have their opening in Kashmir and hence Kashmiris have to face consequences due to bilateral conflicts of both states.[10] Kashmiris has also highlighted that those water issues cause exploitation of their rights by both Pakistanis and Indians. Thus modification of Indus Water Treaty in consideration with rights of Kashmiris might prove to be useful is resolution of many conflicts between both countries. Like India, modifications in Indus water treaty provide Pakistan with some advantages also. Since 1990's Pakistani government allowed pumping of

[286] Ibid

groundwater and installation of private wells along with subsidized electricity and diesel driven pumps, which cause continuously lowering down of water table and it threatened Pakistan's groundwater resources of water.[287]. With growing need for power generation and lessen opportunities Pakistan claimed that Indus Water treaty has no rules on power generation. It has been proved that Indus Water Treaty is just based on sharing of rivers between two countries and no consideration of power generation was accommodated in the treaty. As per IWT, India can built any power generation project over western rivers, along with this it has been allowed for divergence of eastern rivers for power generation so India can took benefit from all six rivers but Pakistan has option of utilization of only three rivers for power generation.

Currently Pakistan's need for power and also water storage has been increased which could not be fulfilled under instructions of Indus Basin Water Treaty. So if like India, Pakistan also had given rights for utilization all six river's water then issue of less power generation among its provinces would be resolved. Pakistan wanted a modification in Indus water treaty so that gap of power generation can be fulfilled in Pakistan. Pakistan has been facing serious water crisis with continuous reduction in per capita availability of water and also water for agriculture sector has been reduced to a remarkable percentage. In IWT no consideration was given to quantity of water flow in eastern rivers. And India was not stopped from total drying up of these rivers or very little inflow of water in these rivers. Pakistan was a view point of that these drawbacks should be reconsidered in its revised edition and Pakistan will be given due consideration in order to resolution of its water crisis.

3.7: Critical Appraisal of IWT under Emerging Challenges

For over six decades, the Indus Water Treaty (IWT) has stood as a remarkable, if imperfect, example of cooperation, surviving multiple wars and enduring periods of intense political hostility between Pakistan and India. Its resilience has historically been anchored in its technical and legalistic framework, which includes the Permanent Indus Commission (PIC) for bilateral negotiations and a multi-tiered dispute resolution mechanism.[288] However, the treaty's rigid mid-20th-century architecture is now being severely tested by 21st-century pressures: shifting political dynamics that weaponized its provisions, the existential threat of climate change, and technological advances that create new frontiers for dispute. A critical examination reveals that while the IWT has been administratively durable, its fundamental

[287] Kokab, Rizwan Ullah, and Adnan Nawaz, "Indus water treaty: need for review," *Asian Journal of Social Science* 2 (2013): 210-218.

[288] "The Indus Water Treaty: Historical Context, Provisions, and Implications in the Contemporary Era," *UPPCS Magazine*, n.d., accessed October 11, 2025, https://www.uppcsmagazine.com/

assumptions are increasingly misaligned with contemporary geopolitical and environmental realities, pushing it toward a potential breaking point.

Shifting Geopolitical Dynamics

The political context in which the IWT operates has dramatically shifted, transforming the treaty from a technical channel for cooperation into a lever of strategic coercion. The treaty's institutional machinery, particularly its dispute resolution mechanisms, has historically functioned effectively, navigating technical disagreements over projects like the Baglihar and Kishenganga dams through neutral expert determinations and Court of Arbitration rulings.[289] Yet, this functional resilience is contingent on a baseline level of political goodwill, which has evaporated in recent years. The period following the terrorist attack in Pahalgam in April 2025 marked a critical juncture, as the Indian government took the unprecedented step of unilaterally placing the IWT "in abeyance".[290] This move, justified by India on national security grounds with the declaration that "blood and water cannot flow together," represents a fundamental politicization of the treaty. [291] The development marked a dangerous escalation, transforming the treaty from a technical channel for cooperation into a lever of strategic coercion. It highlighted a critical vulnerability: the treaty's operational continuity is contingent on a baseline of political goodwill that has consistently eroded over time, making the framework a hostage to broader bilateral disputes rather than a buffer against them

The suspension has crippled core cooperative functions, halting the sharing of critical hydrological data and preventing commissioner inspections, thereby undermining Pakistan's capacity for flood forecasting and drought management. This action has not only escalated bilateral tensions but has also triggered regional realignments, with Pakistan seeking deeper water infrastructure collaboration with China, thereby internationalizing the basin's hydropolitics further.[292]

Climate Change and Demographics

The twin pressures of climate change and demographic surge are testing the treaty's rigid allocation framework in ways its drafters never envisioned. The IWT's core principle

[289] Ishaal Zehra, "Weaponizing Rivers? The Indus Water Treaty Verdict and the Limits of Power," *Global Water Forum*, September 11, 2025, https://www.globalwaterforum.org/

[290] "Strategic Waters: The Indus Treaty Abeyance and …," *South Asian Voices*, July 13, 2025

[291] Tadesse Kebebew, Caroline Pellaton, and Mara Tignino, "A Treaty on the Brink? India's Suspension of the IWT and the Case for Cooperative Transboundary Water Governance," *International Water Law*, June 16, 2025, https://www.internationalwaterlaw.org/

[292] Farwa Aamer, "The Indus Waters Treaty: South Asia's Most Durable Accord Faces a Tough Test," *9DASHLINE*, n.d., accessed October 11, 2025, https://www.9dashline.com/article/the-indus-waters-treaty-south-asias-most-durable-accord-faces-a-tough-test

allocating the three eastern rivers to India and the three western rivers to Pakistan operates on a fixed-volume logic that is ill-suited to a climate-altered world. The Indus Basin is acutely vulnerable to climate-induced hydrological volatility, including accelerated glacial melt and increasingly erratic monsoon patterns, which lead to more frequent and intense floods and droughts. [293]This variability creates a shared vulnerability that, in the current climate of mistrust, fuels suspicion rather than fostering cooperation. For instance, Pakistan fears that India's upstream infrastructure could be used to manipulate flows during critical periods, exacerbating climate-induced disasters. Compounding this ecological crisis is soaring water demand from rapidly growing populations, which projects severe water shortages in both nations by 2030. The treaty contains no provisions for collaborative climate adaptation, shared data on glacial retreat, or managing water quality, leading to an environmental crisis exemplified by the collapse of the Indus Delta into a saline wasteland. The IWT, in its current form, offers no framework for addressing these systemic, basin-wide threats, rendering it an increasingly outdated instrument for ensuring long-term water security.

Technological Disputes

Technological advances in water infrastructure have become a primary source of friction, testing the treaty's specific technical provisions and fueling a cycle of suspicion. The IWT permits India to build "run-of-the-river" hydroelectric projects on the western rivers allocated to Pakistan, provided they involve minimal storage. However, the sophisticated designs of modern dams particularly their gated spillways and pondage capacities have been a persistent point of legal and technical contention.[294] While each individual project may comply with the treaty's letter, Pakistan worries that the cumulative storage capacity of multiple projects could grant India the ability to subtly regulate the timing and volume of water flows, a capability that could be weaponized during times of tension. In the wake of the treaty's suspension, reports indicate that India has moved to maximize its control by modifying water flows from existing dams without prior notification and accelerating the construction of new projects.[295] These actions, while offering limited short-term strategic leverage, demonstrate how infrastructure development is intensifying the dispute.

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[293] Neda Zawahri and Melissa McCracken, "The India-Pakistan Water Dispute: Unpacking the Health Consequences," Think Global Health, 2025, accessed October 11, 2025, https://www.thinkglobalhealth.org/
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[294] Tadesse Kebebew, Caroline Pellaton, and Mara Tignino, "A Treaty on the Brink? India's Suspension of the IWT and the Case for Cooperative Transboundary Water Governance," *International Water Law*, June 16, 2025, https://www.internationalwaterlaw.org/

[295] "Strategic Waters: The Indus Treaty Abeyance and …," South Asian Voices, July 13, 2025, https://www.southasianvoices.org/

The ensuing trust deficit makes it exceedingly difficult to separate technical disagreements from political conflicts, thereby paralyzing the very cooperative oversight the treaty was designed to ensure. The Indus Water Treaty finds itself at a critical crossroads. Its historical success in preventing armed conflict over water is undeniable, yet its capacity to manage the complex, interlinked challenges of the 21st century is rapidly diminishing. The convergence of its politicization as a strategic tool, its inadequacy in the face of climate change, and the perpetual friction caused by new technologies has created a perfect storm. The treaty's suspension and the ensuing actions by both nations highlight a governance gap that the original IWT cannot fill. Moving forward, the survival of cooperative water management in the Indus Basin will depend on whether Pakistan and India can transcend the treaty's rigid, century-old framework to negotiate a more flexible, adaptive, and comprehensive agreement that addresses the realities of climate vulnerability, technological advancement, and the imperative of shared ecological security. The path forward requires courageous diplomacy to negotiate a more flexible, adaptive, and comprehensive agreement that addresses the realities of the 21st century, transforming the Indus from a river of discord into a river of shared opportunity.

Chapter 4

Hydro--Hegemony in Indus River Basin: Analysis of the Indian Hydropower Projects on the Western Rivers of Indus Basin

The protracted negotiations approximately for nine years culminated in signing an agreement between the two counties known as Indus Water Treaty, facilitated by the World Bank. This chapter highlights the post treaty conflicts between Pakistan and India after Indian plans for construction of various dams like Wullar Barrage, Kishenganga Dam and Baghlihar Dam. The treaty chalked out a mechanism for equitable division of water resources of Indus Basin between Pakistan and India. However, as an upper riparian, India is actively pursuing building a considerable number of various dams as run-of-the-river hydroelectric power generation projects, obtaining the ability to control the flow of water. The unnoticed objections by Pakistan have been transformed into a serious source of conflict between Pakistan and India.

Indus Water Treaty is the most effective transboundary water-sharing treaty and a durable bilateral confidence-building measure between two nuclear armed neighbors that has survived various wars. Indus water Treaty proved to be successful for both countries as it had resolved various water related problems between both riparian but the two states continued their conflicts related to the usage of water of six rivers of Indus Basin as both of them acknowledged the vitality of water for their national security. Pakistan being lower riparian considered themselves disadvantaged by the Treaty's provisions as compared to India being upper riparian especially after construction of dams on the Western Rivers. Vice President of ICOLD (International Commission of Large Dams) said that, under Indus Water Treaty's provisions, Pakistan was permitted to unrestricted use of only Western rivers; Indus, Jehlum and Chenab and was restrained to use waters from Eastern Rivers; Ravi, Sutlej and Bias. India was given favor that it could develop and use specified amount of water from Western Rivers too.[296]

The construction of an array of hydroelectric power generation projects on Chenab resulted in increased hydro-politics between Pakistan and India. The geographical power asymmetry of Indian location as an upper riparian country is exploited comprehensively by India against Pakistan. Knowing this fact, Pakistan has challenged construction of several Indian controversial dam projects that is proving as an irritant between hydro political relations of the two nuclear neighbors. Pakistan has only objected against the projects with greater impact on

[296] Muhammad Rashid. "Crucial Water Issues between Pakistan and India, CBMs, and the Role of Media." *South Asian Studies* 28, no. 1 (2013): 214-216.

the supply of water from the western rivers that are allocated to Pakistan in the Indus Water Treaty. The conflict resolution mechanism of the treaty is slightly slow and takes considerable time to process disputes timely, defeating its aim of settlement of differences.[297] The time taken by any issue to reach the highest accessible forum for resolution of the disputes is so long, that either the construction works are completed or have incurred much financial cost that the forums are incapable to provide justice to Pakistan.

River Chenab and the Jhelum River are turning into a source of grave political strains between the two riparian. Indian Prime Minister, A. B. Vajpayee in 2003 inaugurated Indian plan labelled as "50,000 MW initiative." This proposal prepared the Preliminary Feasibility Reports (PFRs) of 162 new hydroelectric power generation arrangements cumulatively around 50,000 Mega Watt.[298] As per Chief Minister of Indian Held Kashmir, Omer Abdullah, the proposed hydel potential of Indian occupied Kashmir is approximately 20,000 MW out of which tapped potential stands around 10 % so far.[299] Indian government is planning further development around 8,000 MW in Indian Held Kashmir.

The protracted disagreement over the dam construction on the River Chenab such as Baglihar, Salal and Dul Hasti hydro power generation projects has resulted in increased animosity and reservations. Eight small and three big dams had been built by India on River Chenab, along with 24 other ventures that are in the pipeline.[300]A summary of the main hydropower generation projects constructed by Indian authorities on Chenab River is compiled in the table below.

Figure 23: Major hydropower projects on Chenab River by India

Name of the Project	**Location**	**Installed capacity**	**Status**
Salal I&II	45 miles u/s Marala Barrage in Riasi in Udhampur (Jammu)	690 MW	In operation
Baglihar-I	On the Chenab main, 147 km u/s Marala headworks	450 MW	In operation
Dul Hasti I & II	Near Kishtwar (Jammu) on the Chenab	780 MW	In operation
Sawalkot I&II	Upstream Salal	1,200 MW	Under investigation
Bursar I &II	Hanzal, Doda district (Jammu)	1,020 MW	Under investigation
Pakwal Dul I&II	Doda district (Jammu)	1,000 MW	Under investigation
Seli	Chenab river	715 MW	Under investigation
Raltle I&II	Drabshalla, Kishtwar (Jammu) on the Chenab	560 MW	Under investigation

[297] Muhammad Adeel, "Indus Waters Treaty and the Case for Hydro-Hegemony," *Center for Strategic and Contemporary Research* 4 (2016), http://cscr.pk/pdf/rb/IndusTreaty.pdf.
[298] <http://www.nhpcindia.com/english/50000MW_initiative.htm>.
[299] "Indus Water Treaty: J&K asks Centre for compensation", *The Kashmir Times*, June 24, 2009.
[300] "Hydro Electric Potential in the District", <http://doda.nic.in/others/ hydro.htm>.

Karwar	Kishtwar tehsil, Doda district (Jammu)	520 MW	Under investigation
Kiru	Upstream Dul Hasti, Doda district (Jammu)	600 MW	proposed
Kirthi I&II	The Chenab river	600 MW	Under investigation
Gypsa I&II	On Bhaga river, a tributary of the Chenab	395 MW	Under investigation
Naunat	Chenab river	400 MW	Under investigation
Shamnot	On Bhut Nala, the Chenab	370 MW	Under investigation
Barinium	Chenab river	240 MW	Under investigation
Ans	Ans river, a tributary of the Chenab	200 MW	Under investigation
Raoli	Chenab river	150 MW	Under investigation
Bichari	On Mohu Mangat Nala, Chenab river	104 MW	Under investigation

Source: Based on data provided by Indus Water Commission.

The Transboundary Rivers necessitated the attention of the Permanent Indus Commission comprising the representatives of both countries designated as Indus Commissioners for the run-of the river hydropower plants built by India using the water of the western rivers, especially Chenab and Jhelum. Pakistan has been objecting to the designs of the plants, especially the storage capacity, alleging that they are in violation of the specifications noted in the relevant annex of the IWT.[301] India has constructed 13 hydel projects on River Jhelum, having Uri I &II with complete installed capability of 480 MW, 105 MW at lower Jhelum, and Upper Sind-phase II, 105 MW. Indian Ministry of Water has recognized additional 74 construction sites that consist of three chief and 12 medium to small hydel power generation schemes, comprising multiuse Ujh storage installation with 280 MW power producing potential, Sonamarg storage 165 MW, Gangabal storage 100 MW, and 330 MW Kishanganga hydropower generation project. 12 other such development plans range in power generation potential between 15 MW to 84 MW.[302]

So far, India has designated nine hydro projects on the River Indus. The Chutak project with 44-MW and the Nimoo Bazgo projects with capacity of 45-MW are the major projects that are being constructed, whereas a plant at Dumkhar with projected potential of 130-MW is in the pipeline. The Indus Water Commissioner of Pakistan objected on the projects that they would stop 43 mcm of water flow to Pakistan in the Indus River.[303] He continued to add that Pakistan wanted true, rational and judicious employment of the Indus Waters Treaty by India.

[301] Interview with Ex Ambassador Shafqat Kakakhel

[302] Shaheen Akhtar, "Emerging Challenges to Indus Water Treaty: Issues of Compliance & Transboundary Impacts of Indian Hydroprojects on the Western Rivers," *Regional Studies* 28, no. 4 (2010)

[303] Waqar Gillani, "Troubled waters," *The News*, April 4, 2010.

The mechanisms and design parameters are already well-defined in the treaty, but its abandonment will negatively affect the water flow to Pakistan.

4.1: Post IWT Key Pak-Indo Disputes Regarding Dams Construction

Despite the consensus on the water sharing principle, the Indus Water Treaty has witnessed various challenges in the last 60 years. Under the provisions of the treaty, 118 meetings of the Permanent Indus Commission has been convened since its creations and several bilateral visits been undertaken by March 2022 for settlement of many unresolved hydro political matters.[304] The archives show a gradual interesting progression of emergence and settlement of issues after ratification of IWT between Pakistan and India. They may be summed up as following:

Figure 24: Post Treaty issues of conflict:

Year	Name of Project	Settlement
1970	Salal Hydroelectric Plant	Bilateral settlement in 1978
1984-1985	Wullar Barrage/Tulbul Navigation Project	Infinite entanglement of bilateral negotiations till date
1992	Baglihar Hydroelectric Plant BHEP	Settled through decisions of third party i.e. Neutral Expert in 2007
1987	Kishanganga Hydroelectric Project KHEP	Design issues of KHEP yet not settled

Source: Author's compilation

4.1.1: Salal Hydroelectric plant

Salal Hydroelectric project was a run of the river project on the River Chenab. The project is situated in Tehsil Riasi of Udhampur district of the Indian Held Kashmir around 40 miles upstream of Marala Headworks that is located in Pakistan on the Chenab River. This was the first controversial hydroelectric project planned by India causing hydro political tensions between Pakistan and India in the 1970's but was decided amicably through diplomatic maneuvers by the foreign secretaries of both states. The project was comprised of two stages. The first stage (345MW) was commissioned in 1987 and the second (345 MW) as commissioned in 1996. The hydro power from the Northern Grid was transmitted IHK, Punjab,

[304] 118th Meeting of the Pakistan-India Permanent Indus Commission, New Delhi India, available at https://mofa.gov.pk/118th-meeting-of-the-pakistan-india-permanent-indus-commission-new-delhi-india

Delhi, Haryana, Himachal Pradesh, Uttar Pradesh, Chandigarh and Rajasthan.[305] India provided the information to Pakistan regarding the Salal project in 1974.

Pakistan's Objection

Pakistan had objected to the design of Salal dam and raised concerns regarding the storage capacity of the project. Pakistan maintained that the large sizes of the project gates and the six bottom level openings provided in the dam were not in the harmony of the provisions of IWT. Pakistan maintained that projected design of Salal dam will provide significant control and manipulation the flow of water of the River Chenab to India. Predominantly the low level outlet afforded a significant authority to India on the water volume in the reservoir.

Resolution of the Issue

Pakistan and India engaged into a series of bilateral negotiations for resolution of the disagreement on various aspects of the project. According to Pakistani perspective, the design of the dam rendered India the power either to flood downstream riparian with releasing surplus water or would permit India to control the water flow of River Chenab. However India rejected Pakistani stance and contended that it would not be possible to cause flood in Western Punjab downstream without causing damage to their own terrain.[306] In 1976, two sessions of rigorous negotiations were conducted. Consequently, in order to remove the objections by Pakistan, Indian government agreed to modify and revise the design of Salal project.[307] Finally in April 1978, a settlement related to the design of the Salal project was mutually agreed and signed by both the states after talks. The elevation of the spillway gates of the project were slightly decreased from 50 feet to 30 feet and the six low-level outlet in the dam were plugged.[308] Nonetheless, in case of emergency imperiling the safety of the dam, India was permitted to open the low-level outlets in consultation with Pakistan. The settlement on Salal dam was expedited by an environment of confidence and trust that was produced by the Simla Agreement of 1972 between both states. Both the states resolved the dispute amicably of without any external pressure or mediation.

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[305] Ashfaq Mehmood, *Hydro-Diplomacy: Preventing water war between nuclear armed Pakistan and India* (IPS Press, 2018), 121.

[306] Keesing's Contemporary Archives, 1978, p.29019.

[307] Shaista Tabassum, "The Role of CBMs in Resolving Non-military Issues between India and Pakistan: A Case Study of the Indus Water Treaty," in *The challenge of confidence-building measures in South Asia* ed. Moonis Ahmar, (New Delhi: Haranand Publications, 2001), 396.

[308] Ashfaq Mehmood, *Hydro-Diplomacy: Preventing water war between nuclear armed Pakistan and India* (IPS Press, 2018), 122

4.1.2: Wullar Barrage

Water scarcity in South Asia is the main reason to give rise to conflicts between the two countries. Increasing dam building projects in India, leads to water scarcity in Pakistan and restricting Pakistan from building dams for water storage. Wullar Barrage, built on the River Jehlum is one of the several water disputes between Pakistan and India. Wullar is derived from Sanskrit word 'woll' meaning hindrance. In this rivalry, both countries have even not agreed on name of this project.[309] Pakistan refers this project as Wullar Barrage Project, while Indian government termed it as Tulbul Navigation Project.[310] Wullar Lake is amongst the biggest lake in Asia. In 1984 India started construction of a barrage that was 0.083 miles long and 0.0075 miles wide on the mouth of Jhelum River named as Wullar Lake (5180 feet above sea level and almost 25km from Srinagar in north) but Pakistan had stopped that project in 1987.[311] On the completion of the project, Wullar Barrage would have storage capacity of water of up to 0.5 MAF along with discharge capability of 50 thousand cusecs. Pondage level could be raised and sustained up to sea level of 5178 Ft.[312]

As per Article I (II) of Indus Water Treaty, both the riparian were not allowed to construct any obstacle like barrage or dam on the six rivers which can hinder normal daily flow of river unless water over flows.[13] Additionally, India was required to inform six months prior to Pakistan about the developmental works of any plan according to the true spirit of IWT. However Tulbul Navigation project was a violation of this clause. Pakistan put an objection on this project that this would stop the normal regular flow of water in river Jhelum which effects canal system's storage capacity in Pakistan. However, India opposes this objection by saying that this project will only regulate normal water flow of river. India claimed that this barrage will result in short-term storage and allow availability of water in need in long-term basis. Another objection of Pakistan was a threat of flood from India that anytime India will be able to open spillways gates and Pakistan would face floods and huge destruction of agricultural lands and infrastructures. Thus it could cause economic losses to Pakistan anytime and Pakistan will have to face consequences.[313]

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[309] Ashutosh Misra, "The Tulbul Navigation Project/ Wular Barrage and Storage Project Dispute: A Casualty of Linkage Politics? "in *India-Pakistan* (New York, Palgrave Macmillan, 2010),157-179.

[310] Sajad Padder, "The composite dialogue between India and Pakistan: Structure, process and agency," *Heidelberg Papers in South Asian and Comparative Politics* 65 (2012): 8.

[311] Ashfaq Mehmood, *Hydro-Diplomacy: Preventing water war between nuclear armed Pakistan and India* (IPS Press, 2018), 107

[312] Tahir Ashraf, "The Antecedents of Pakistan-India Conflict: Challenges and Prospects for Solution," *Journal of Pakistan Vision* 19, no. 2 (2018): 30.

[313] Abdul Majid, "Pakistan-India Rivalry Hampering the SAARC to become a Worthwhile Forum," *Journal of the Research Society of Pakistan* 54, no. 2 (2017): 9

Pakistan's stance

Pakistan stated that the control structure made by India was a barrage that would create a water storing capability of 0.42 MAF out of which 0.304MAF would be live storage. But as per specific provisions of the treaty related to this issue, any storage capacity related to a barrage on the Main Jhelum and River Chenab should not be surpassing 10,000 acre feet.[314] The volume of this storage constructed by India was approximately 30 times more that the upper limit specified by the IWT. Hence, this would result in interference of water flow in Jhelum River and would prejudice Pakistan's uses. Therefore, Pakistan took firm stand that it cannot subordinate the usage pattern on the western rivers of Indus Basin to the requirements of the upper riparian. From Pakistan's perspective, the construction of Wullar barrage on Jhelum for control of flowing water would be an incapacitate dissipation for economy of Azad Kashmir and Pakistan. Apart from threatening to millions hectares of agricultural land it will become one button game for India to release a flood or create scarcity conditions in Pakistan. Pakistan also questioned the Indian argument that it was being built to ensure supportable navigation. The highway infrastructures between Baramulla and Sopore were in good condition and convenient for transport purpose through land rather than transportation through water channel that was not feasible. Another threat is affected water supply to Mangla Dam that is constructed on Jhelum in Pakistan.

India's Position

Indian maintained that the project was started for a construction of controlled structure basically meant for improved navigation on River Jhelum. Natural storage was available in Wullar Lake and the construction of this structure would neither involve any consumptive usage of water nor would cause any raise in the water level of the lake. The water would be returned to Pakistan for storage in Mangla Dam on River Jhelum in Pakistan. Hence, the structure as per Indian perspective did not qualify to be termed as barrage. India wanted to preserve the minimum draught of 4.5 ft in the river up to Baramulla region in the emaciated winter season. It would also facilitate at maintaining a minimum of 4000 cusecs of water and this water depth would be sustainable for transport of various products and population movement of Jammu and Kashmir region during the winter season.

Negotiation Process

Permanent Indus Commission had taken complaint of Pakistan against Indian Project under Article IX (1) of IWT in 1987. Two ministries from both countries sat together for negotiation

[314] Article E, clause 8 (h) of IWT

and India agreed on stopping construction of Wullar Barrage in 1987. The two commissioners had opposing stances and were failed to frame the questions jointly for consideration by the Indus commission or for referring the matter to the CoA or Neutral Expert. Indian ambassador communicated that they want a bilateral settlement of this hydro political issue without any participation of the external third party and also agreed to stop the construction work. Both states exchanged various draft agreement in several rounds of talks in 1987, 1989, 1991 but in vain and did not yield any results. 14 rounds of talks had been conducted between both riparian from October 1987- March 2012 but no decisions could be made on the resolution of the issue and the developmental progress on the project remains postponed till date. However, this dispute has not been resolved after so many negotiations between both governments.

One of reason behind failure of settlement of that dispute is Kashmir issue. India is constructing different water storage and power generation plants in Kashmir on western rivers. Pakistan had put on objections on these projects by arguing that these projects of India cause stoppage of water of three western rivers. And above all Pakistan argued that these development plans are violating the rules of the Treaty. Most burning dispute among both governments is Construction of Wullar barrage since 1985 and is still unresolved.[315]

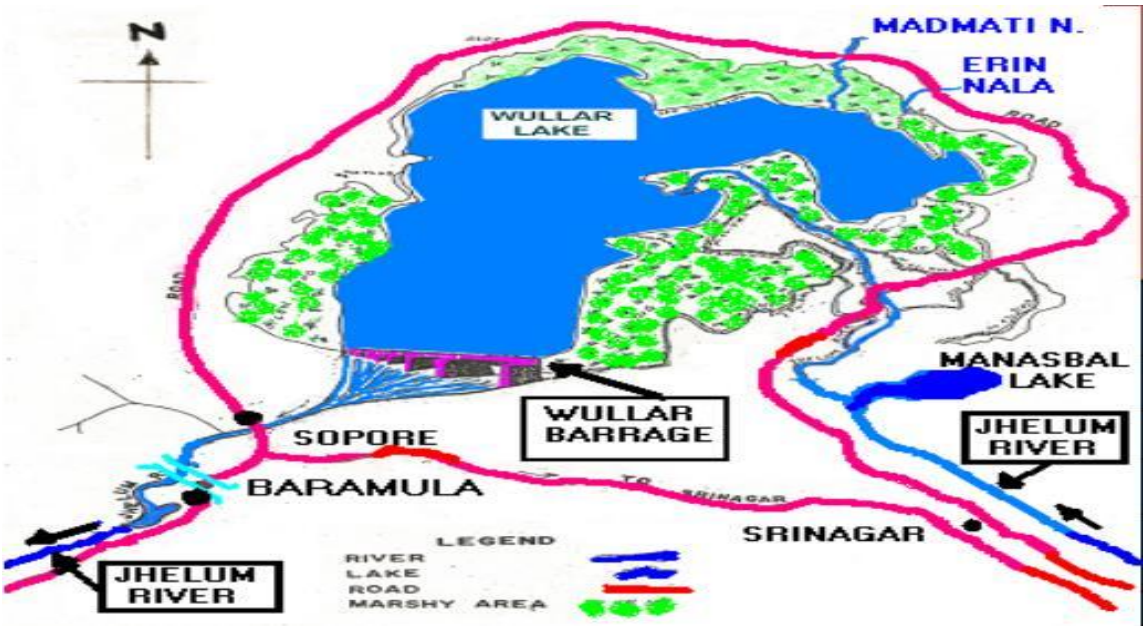
India is working on restoration of the construction plan of the project but Pakistani authorities has requested India to abandon the construction work. In February 1994, Pakistan presented a dossier to Indian government and categorically informed that there would not be any agreement with India that authorizes it to commence the developmental work on the said project. India made this project a political instrument in order to intimidate Pakistan. It is acknowledged by the experts of hydro management and water governance that the main objective of Wullar Barrage plan is not navigational, rather a geostrategic instrument in Indian hands for achievement of geopolitical goals in the bilateral ties.[316]Moreover, the impression of hydel transportation might create an opportunity for Indian policymakers to advocate arguments for navigational enhancement on the river and therefore demand formation of additional barrages on Indus Rivers. This stance would neither facilitate the people of Kashmir Valley nor will benefit any confidence building initiative and enduring peace between Pakistan and India."[317] Wullar barrage would also be helpful in aggregate increase of the water accumulation for the Uri hydel power generation projects.

[315] Abdul Majid, "Pakistan-India Rivalry hampering The SAARC to become a Worthwhile Forum." *Journal of the Research Society of Pakistan* 54, no. 2 (2017): 1-14

[316] Arjimand Hussain Talib, "Soz's Jhelum fantasy", *The Kashmir Times, Srinagar*, September 25, 2007.

[317] ibid

Figure 24: Map of Wullar Barrage



Source: Ashfaq Mehmood: Preventing water war between nuclear armed Pakistan and India

4.1.3: Baghliar Dam:

Baghliar Dam dispute is another issue impacting adversely on the hydro-political relationship of the two South Asian states. Baghliar was the third project by India which became contentious and the first disputed project that was referred to Neutral Expert for identification of technical "questions" expressed by Pakistan. This is a hydropower generation project that is constructed on a western river named Chenab in 1999.[318] This project has power generation capacity of 450MW that can be extended to about 900MW. This dam was constructed in Occupied Kashmir in the Doda district around 80 km upstream of Salal dam.[319] Baghliar hydropower project was first proposed in 1992, got approval in 1996 and India started building this in 1999. This project had an elevation of approximately 144.5 meters with a net storage capacity of 396 million cubic meters of water. Baghlihar was a concrete gravity type dam with a live pondage of 37.5 m cu m (46,570 acre feet).[320] It became a conflict among both

[318] Fatima Riffat, and Anam Iftikhar, "Water issues and its implications over India-Pakistan relations," *Journal of the Punjab University Historical Society* 28, no. 2 (2015): 11-20.
[319] Salman M. A. Salman, "The Baglihar difference and its resolution process-a triumph for the Indus Waters Treaty?" *Water Policy* 10, no. 2 (2008): 105-117.
[320] B. G. Verghese, "Fuss over Indus -1: India's Rights are set out in the Treaty", The Tribune, Chandigarh, May 25, 2005.

ministries due to divergence of both riparian. India claimed that Baghliar dam would generate power from flowing water without any water storage that is known as run of the river dam. Substantiating the construction of twenty such dams which fulfill requirements of IWT. Therefore, there should be no objection on height and storage capacity of Baghliar Dam by Pakistani authorities.

Objections of Pakistan

Six objections were raise by Pakistan related to the design of the dam and maintained that the proposed Baghlihar dam was not in harmony with the provisions of Indus Water Treaty. The issues raised by Pakistan were related to the

- pondage level,
- under-sluices,
- gated spillways,
- level of the intake tunnels,
- elevation of tunnels and
- the height of gates.

The principal objections in the proposed design of the dam were related to the submerged gated spillways as it was a clear violation of the IWT. The planned structure will facilitate India to manipulate the water flow to lower riparian Pakistan proving detrimental to its water security. India was not allowed according to the treaty, to construct any water structure over any western river such as River Chenab unless Pakistan gave them approval for doing so. It violated storage capacity that was assigned in IWT 1960 and caused divergence of water channel. The water diversion caused by the project would affect the growth of wheat in Pakistan in the critical growing season during December to February. The reservoir limit of dam is 3.7722cm which exceeds limit that was assigned in IWT 1960.[321]Pakistan also complained about the proposed height of Baglihar dam that it exceeded the limit mentioned in Indus Water Treaty.

Baglihar project could also result in potential flooding in the areas upstream Marala Headworks owing to the abrupt coordinated water releases from the Dul Hasti dam and the Salal reservoir.[322] Analysts from Pakistan also apprehended that India could also deteriorate water security of Pakistan through controlling the flow of Chenab through the spillways because two canals originate from Head Marala that mainly irrigate the Central Punjab areas.

[321] Tahir Ashraf, "The Antecedents of Pakistan-India Conflict: Challenges and Prospects for Solution." *Journal of Pakistan Vision* 19, no. 2 (2018): 16-31.

[322] Syed Shahid Husain, "Pakistan's Perspective: The Baglihar Project", *South Asian Journal* (April-June 2005), <http://www.southasianmedia.net/Magazine/ Journal/8_baglihar_project.htm>.

Defence related apprehensions are also generated as these canals could be dried when India desires to tilt the balance of power in their favor. Therefore, for water securitization, Pakistan decided to construct Mangla-Head Marala Link Canal to protect their water resources in these two canals originating from Head Marala located near Sialkot on Chenab River. This link canal would secure the availability of water in the two canals i.e. Upper Chenab Canal and the Lower Chenab Canal, and would deliver water for irrigating the Central Punjab areas.[323]Experts in Pakistan indicated that the Baghliar dam would deprive 321,000 acre feet of water availability to Pakistan during the critical months of Rabi season and would have grave repercussions for agricultural development. Pakistan was convinced that these water infrastructures was not required for purpose of power generation rather acquiring excessive capability to accelerate, delay or even stop the water flow, thus offering India a strategic power in political crisis, tension or even war.

Indian Stance

India argued for the approval of Baghliar hydropower project so that energy generation can be done at Baghliar Dam at flexible level. Indus Water Treaty Commissioners of both states tried to settle the dispute through bilateral discussions and talks but no results were found. In accordance with Indus water Treaty Article (I-a) saying that a neutral expert can resolve issue that is unable to be resolved by the commissioners of two riparian.[324] Indian experts upheld that Indus Water Treaty is a flexible agreement which allows changes with modern engineering technologies. Indians also claimed that Pakistan's apprehension about filling of dam in 26 days during dry season is wrong as dam will take no more than 19 days. India also opposed the concern of Pakistan regarding the Indian ability to block the flow of water downstream affecting the water availability to lower riparian and posing a threat to the economically vital farms of Punjab.[325]India contended that the Baglihar met the design standards of the Indus Water Treaty as it was a run-of-the-river project. The spillway gates of the dam were meant for the purpose of smooth water supply and for preserving the protection of the dam. Indian authorities rejected the objections on the removal of the gates as it is equal to termination of the project.[326]

[323] Khalid Mustafa, "Plan to offset impact on defence," *The News*, February 13, 2008.
[324] Abdul Majid, "Pakistan-India Rivalry Hampering the SAARC to become a Worthwhile Forum," *Journal of the Research Society of Pakistan* 54, no. 2 (2017): 1-14.
[325] Robert G. Wirsing, and Christopher Jasparro, "Spotlight on Indus Water Diplomacy: India, Pakistan, and the Baglihar Dam", *Asia-Pacific Center for Security Studies*, (May 2006): 5.
[326] "Indus Water Treaty and Baglihar project: Relevance of International Watercourses Law", *Economic and Political Weekly, Mumbai*, July 16, 2005.

Resolution Process

The discussion regarding Baglihar dam began when India delivered some data to Pakistan about the planned project in 1992. As the complete information was not provided by India, considerable time was wasted in the official correspondence at level of Indus water commissioners. In 2000, the issue got public attention followed by intense debate on both sides. From 2001 to 2004 a series of talks has been held between both countries but commissioners were unable to resolve this dispute. Pakistan highlighted critical concerns on the design of the proposed hydropower plant and resultantly there was an exchange of intense arguments. India was asked by Pakistan to stop construction on the project that has not been resolved. Indian authorities said that they were not under compulsion to halt the developmental work under the Indus Water Treaty. Therefore, under Article IX (1), Pakistan communicated its "questions" to Indian authorities on 4th April 2002.

The contentious features of the dam design were debated in numerous consultations and meetings of the Permanent Indus Water Commission. Yet, all the correspondence between the two riparian states at the commission level could not settle the disagreements on the design of the project. The chronology of the efforts for resolution of the conflict points out that after the objections were raised by Pakistan regarding the design, any meaningful and substantive negotiations could not be held for next ten years. Most of the time was wasted in useless correspondence and discussions until in 2000 Pakistan discovered that construction work had already been started by India on the site. Therefore, Pakistan had only option to invoke the Article IX of IWT that provided mechanism for Settlement of Differences and Disputes between both states. India insisted for bilateral resolution but analyzing the past record, bilateral negotiations were miserably failed. India had taken this stance only for procrastination and to gain time for construction of the dam.

In June 2004, both sides held new rounds of talks at the Secretary Level and agreed on sharing data, technical reports, engineering details, calculations and witnessing tests on the Indian physical model at the Irrigation Research Institute at Roorkee, India.[327] Nonetheless, the Indian secretary declined to prepare any written record of the correspondence and signing minutes of the meetings thereby failing to provide the required set of data in accordance with the agreed schedule of negotiations at secretary level. One more round of talks were conducted at the request of Indian Prime Minister Manmohan Singh to Pakistan's Prime Minister Shaukat

[327] Ashfaq Mahmood, Hydro-diplomacy: Preventing Water War between Nuclear Armed Pakistan and India, (IPS Press 2018), 62.

Aziz in 2005 without yielding any result.[328] Hence, Pakistan was convinced that India was only dilly dallying and was tactfully not willing to address the objections by Pakistan so as to gain time for completion of the project. So, Pakistan finally requested World Bank for appointment of a Neutral Expert according to the parameters of IWT.

World Bank has assigned a Neutral Expert, Mr. Raymond, a Swedish national, an engineer and professor to resolve this dispute in 2005. In 2007, Neutral Expert resolved Baghliar issue in which he supported few objections by Pakistan that demanded the pondage capacity to be decreased by 13.5%, the elevation of dam to be decreased by 1.5 meters, and raising of power intake tunnels by 3 meters, thus restricting some flow control abilities of the previous design of the dam. Nonetheless, he overruled objections by Pakistan on the elevation and gated control of the spillway, asserting that these features followed the contemporary engineering standards. Pakistan government communicated its displeasure at the outcome.[329] Both countries India and Pakistan had accepted this decision. With this decision, India started working on construction of Baghliar dam and in 2009 its first phase has been completed.[330]

The verdict issued by Neutral Expert overruled Pakistan's complaints in 2007 and maintained the inevitability of the gated spillways and the location of the spillways below the dead storage level, stating that such arrangement was a best international practice to control the sedimentation. The judgement permitted India to withdraw water out of the dam at the levels lesser than those enumerated in the Indus Water Treaty and overlooked Pakistan's stance concerning India obtaining the capability to influence the timings and flow of water flowing in Pakistan. This judgement produced 'a great deal of dissatisfaction in Pakistan'[331] because it 'reinterpreted' the IWT.[332] The judgement by the Neutral Expert proclaimed that the Indus Water Treaty 'did not bind India to 1960 technology and that India could use state-of-the-art technology.'

The verdict of neutral expert was a political setback for Pakistan. According to Pakistan, the ruling appears to deteriorate the safeguard against probable potential floods. The media and specialists in Pakistan applauded the remarks of eminent expert Professor John Briscoe that the neutral expert had certainly claimed that inland watercourses had provisions to update the

[328] Ibid 40

[329] Salman M.A. Salman, "The Baglihar difference and its resolution process-a triumph for the Indus Waters Treaty?" *Water Policy* 10, no. 2 (2008): 105-117.

[330] Vyas, Sameer, Sn Sharma, and Beena Anand. "Influence of Aggressivity of Water on The Long Term Sustainability Of Hydro Power Structures–A Case Study," International Dam Safety Conference, India (2019)

[331] Iyer R. Ramaswamy, "India, Pakistan and Water" (Institute of Development Studies, Madras, Jan. 2, 2012).

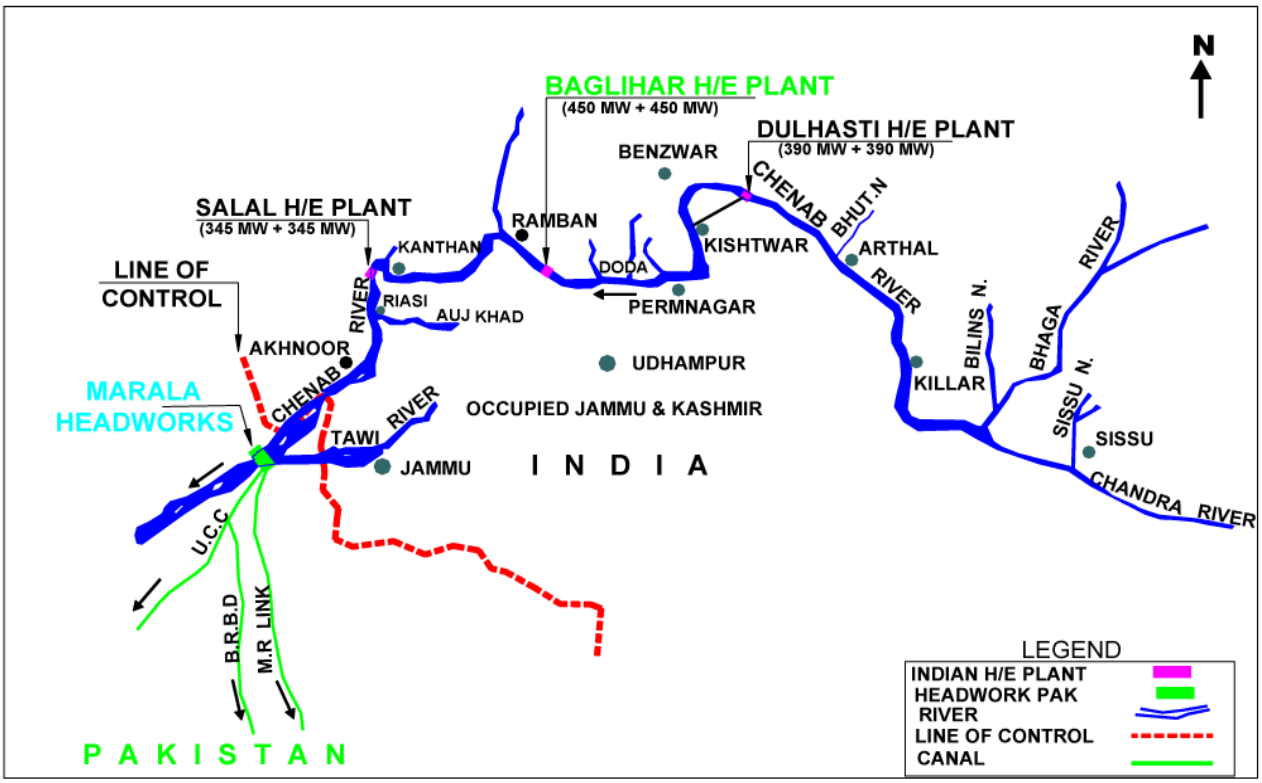
[332] "Troubled Waters: Can a Bridge Be Built Over the Indus?" *Economic and. Political Weekly Mumbai*, Vol. XLV, No. 50, December 2010.

execution procedure of IWT as new information accumulated..." and permitted India to "extract water from the dam at lower levels, rather than the specified levels in the Indus Water Treaty." Briscoe also mentioned the new connotations of the terms given by the Neutral Expert to "live storage" and "dead storage" that were significant to Pakistan's historical and ongoing apprehensions about India's ability to influence and control water flow into Pakistan from Indus resources. The project was formally commissioned on 10th October 2008 after India executed modifications recommended by a neutral expert in the project design.

The resolution process of the Baglihar dispute encompasses few significant lessons for Pakistan and India and also holds importance for future deliberations of the Indus Water Treaty. It is imperative to consider that Pakistan appeared to regard the disagreement primarily a legal issue, whereas India appeared to interpret it purely from an engineering standpoint, concerning hydropower generation plants.[333] The Neutral Expert elucidated the obligation and rights of the riparian states according to IWT "in the context of new technical models and new norms". The verdict decided the Baglihar dispute as per the technical principles for hydel power generation projects as they were established in 21st century, and not as thought of in the 1950's when IWT was concluded. The reference to the modern technical standards is predominantly clear in the discussions and analysis of the Neutral Expert. Second essential element deliberated profoundly in the verdict was related to "climatic variation and its probable effects" that were not predominant at the time of ratification of IWT. The interpretation of the IWT in Baglihar case might possibly influence any interpretation of the Indus Water Treaty in future issues of disagreements between both riparian states as a precedence.[334]

[333] Salman M. A. Salman, "The Baglihar difference and its resolution process- a triumph for the Indus Water Treaty? *Water Policy*, no. 10, (2008): 115.
[334] ibid

Figure 25: Location of Baglihar Hydrelectric Plants



Source: https://aquapedia.waterdiplomacy.org/wiki/images/3/39/Baglihar_Dam_on_Chenab_river.png

4.1.4: Kishenganga Dam

India had started a project named Kishenganga project in Jammu and Kashmir in 1988 but proper requisite information was provided to Pakistan in March 1994.[335] Kishenganga dam is a hydroelectric power project that has capacity of power generation of 330 megawatts and has been constructed on Western River. [336] This dam has been constructed near Bandipora, in Gurez valley on a river that is known as River Neelam in Pakistan while Kishenganga River in India. For power generation at Kishenganga hydropower dam, water is diverted from 24000m lengthy channel to run turbine and then throw it back to river. There are two southern and northern tributaries of River Jehlum that is a western river. One tributary that is flowing from north from foot hills of Himalayas, having higher elevation called as River Neelam. Second tributary is coming from south with suppress elevation itself called as river Jehlum. When these two tributaries enter in Pakistan, both join together.[26] This strange inclination of two tributaries provides a distinctive opportunity of producing remarkable amount or power by constructing a

[335] Fatima Riffat, and Anam Iftikhar, "Water issues and its implications over India-Pakistan relations." *Journal of the Punjab University Historical Society* 28, no. 2 (2015): 11-20.
[336] Mehsud, Muhammad Imran, Azam Jan, and Tariq Anwar Khan, "War or Peace on the Rivers of South Asia?" *Liberal Arts and Social Sciences International Journal* 4, no. 1 (2020): 242-254.

power station through construction of barrage over Neelum River and a tunnel below river Jhelum. This construction can be done both in Pakistan and India; at high altitude in India and at low altitude in Pakistan.

Pakistan's Objections

Pakistani commissioner conveyed the concerns on the project within three months stipulated in the Indus Water Treaty. This was followed by a long history of unproductive mutual correspondence on data sharing, field visits, rights of water diversion and several meetings of the commissioners. During Indus Water Treaty development, it was drafted in the treaty that India can only construct any structure at upstream of river if Pakistan is not running any project downstream or Pakistan's project would not be affected. The KHEP as designed in 1994 by India as a water storage project. Nonetheless, India persistently continued to insist on the legality of the project till 2006, once Pakistan finally decided to refer the problem to the Court of Arbitration. Indian authorities altered the project design of the run of the river project at this time to justify the project as per the provisions of the IWT. The revised design had two things, one is that they turn Kishenganga project to run of river project from storage. Another is reduction in height to 37 meters from 97 meters.[337] However, government of Pakistan was not be satisfied with these changes.

Pakistan had still objections on the revised design on the plea that the diversion of water would have repercussions for the output of already planned Neelum Jhelum Hydroelectric Project (NJHEP). As per Pakistan the diversion of 58.4 cusecs of water would resultantly divert the entire flow of water from Neelum River for more than six months amounting to a loss of 141.3 million dollars along with further loss of 74.1 million dollars from other such future project sites and also would bear environmental impacts. [338] Pakistan opposed this project because it would decrease power generation capacity of Neelam-Jehlum project by 969 megawatts. Hence Pakistan arose six more objectionable issues, of which three issues were connected with the dam design, two were regarding the water diversion by the proposed project and one concerning to the scheme of power generation. Moreover, the objections include the issues related to the design and the engineering features of the project like pondage, free board, level of power intake and location of orifice spillway. The location of the proposed tunnel would allow India to control more volume of water as was permissible by treaty. But India was

[337] Amit Ranjan, "India-Pakistan hydroelectricity issues:"questions""differences" and "disputes," *India Review* 19, no. 5 (2020): 427-447.

[338] Muhammad Rashid Khan, "Crucial Water Issues between Pakistan and India, CBMs, and the Role of Media." *South Asian Studies* 28, no. 1 (2013): 214—215.

not ready to fulfill those requirements. In addition to this, construction of this dam will cause migration of residents of Gores valley due to coverage of vast area. Power generation capacity of Indian Project Kishenganga Dam is 330 megawatts, while that of Pakistani Neelam-Jehlum project is 1000 megawatts.[339]

With sanction of Kishenganga project, its completion will add up threats to Pakistan's economy as agriculture based country and also threatened safety of Pakistan. Armed forces knew very well about contribution of rivers/ water bodies during war times. Tunnels made on eastern side of borders help is irrigation areas which were previously irrigated by other rivers by divergence of flow of western rivers and also help in the days of war against India. It was witnessed that in 1965's war due to these trenches India was unable to cross border. These are major threats to Pakistan with completion of Kishenganga project. One is that India can open water in the trenches to make flood conditions in Pakistan which will adversely affect armed forces of Pakistan. Another issue for Pakistan is that India can stop flow of rivers due to which not enough water supplied to canals irrigating those eastern areas and crops will badly affected and ultimately Pakistan's economy goes down.

Indian Response

India relied mainly on the provisions of IWT that are based on inter-tributary diversions. India was not willing to accept Neelum Jhelum Hydroelectric Project on the contention that it as a proposed project and not existing. B. G. Verghese quoted the Annexure D, Paragraph 15 (iii) of the treaty. It states: "Where any project is situated on a tributary of the Jhelum River that is used by Pakistan for agricultural needs or hydroelectric power generation purpose, the water released below the plant may be diverted to another tributary if deemed necessary but only on a condition that the prevailing agricultural usage or hydro-electric generation by Pakistan on the said tributary would not unfavorably affect the water flow."[340] Therefore, Verghese claims that "inter-tributary deviations in water flow of the Jhelum basin is allowed and that only 'the then existing' agrarian and hydro-electric usage shall be safeguarded." The Indian authorities also maintained that the location of the sluice spillway can be justified on the basis that it would also empower sediment flushing besides channeling the flood waters. In response to Pakistan's objection on the engineering designs issues, India maintained that it was according to the provisions of IWT.

[339] Fatima Riffat, and Anam Iftikhar, "Water issues and its implications over India-Pakistan relations." *Journal of the Punjab University Historical Society* 28, no. 2 (2015): 11-20.

[340] B. G. Verghese, "Fuss over Indus -1: India's Rights are set out in the Treaty," *The Tribune, Chandigarh*, May 25, 2005.

Resolution Process

The Kishenganga Hydroelectric power generation project is the most contentious and complicated project constructed by India on the western river Jhelum of Indus Basin that was challenged by Pakistan for its alleged violation of the provisions of IWT, and consequently was resolved on 20 December 2013 through the decision of a Court of Arbitration. Overall six points of objection remained unresolved between both the governments. In 2007, India started construction of Kishenganga Dam which was restricted by Arbitration court due to objection raised by Pakistan in 2011. Article III (2) of the treaty was invoked by Pakistan that necessitates India "to let flow all the Western rivers to Pakistan and not authorize any intervention with those waters" and also the Article IV (6) of IWT that "demands for the preservation of the natural water channels."[341] This made the interpretation of the provisions by Indian authorities as disputed and invalid. The Annexure D of the treaty, also necessitates the protection of water security for Pakistan on the prevailing agricultural usage or hydroelectric generation uses. Bilateral talks were held in five meetings on the Indus Commission level from November 2004 to November 2005 that could not overcome the differences. Additionally, the required data regarding the project was not provided by Indian representatives, and postponed the sharing of data on the ground that it was under the process of revision.

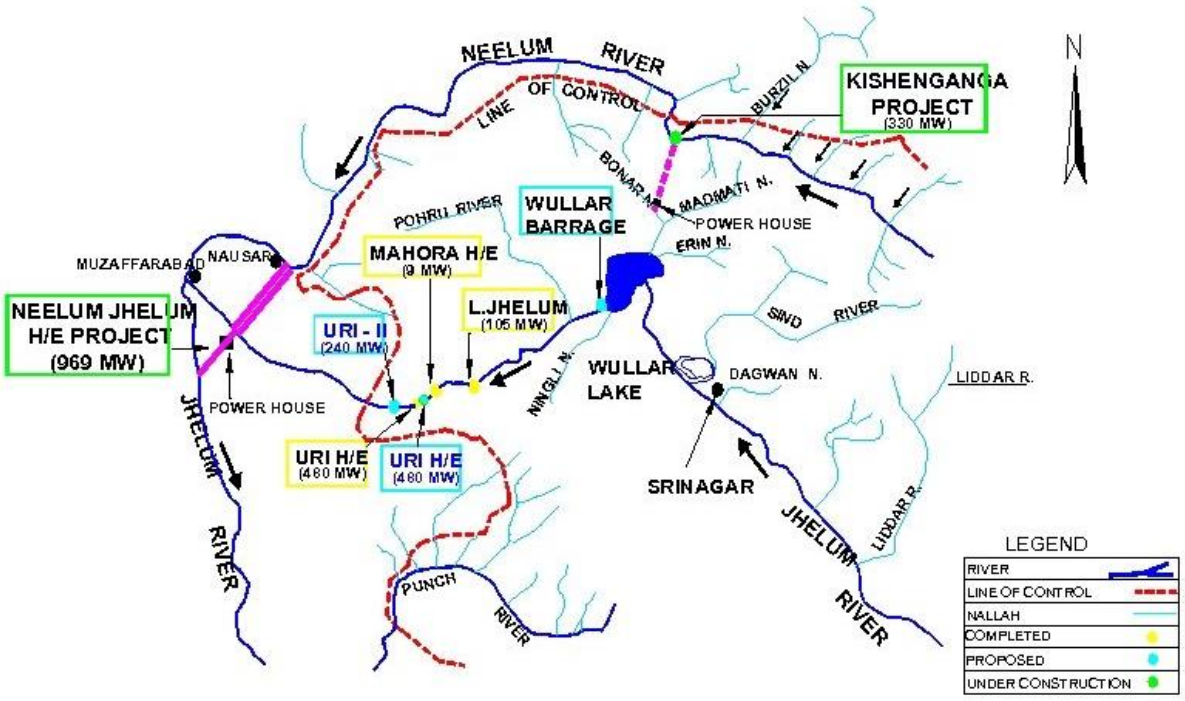
India showed willingness to amend the plan in April 2006 and offered a modified design in June 2006.[342] India revised the scheme from 'storage work' to the 'run-of-the-river' plant and also decreased the storing capacity by decreasing the elevation of the dam from 75.48 meters to 35.48 meters, but retained the diversion of the River Neelum in the project. In reality, India modified the design basically to minimize the cost of the project and accommodate the concerns of local population regarding environmental issues. Three indecisive sessions of the Indus Commission were convened between May 2007 and July 2008, and therefore according to the Annexure G of IWT, the dispute was referred in May 2010 to the Permanent Court of Arbitration.[343]

With disappointment from Mr. Raymond the Neutral expert Pakistan decided to go to Arbitration Court. COA had one Justice Stephen and seven members from United States of America.[344]In 2013, Arbitration court has sanction Kishenganga project to India which is an addition to a series of Indian running hydropower and water storage projects on three western

[341] Ashfaq Mahmood, *Hydro-diplomacy between nuclear armed Pakistan and India* (IPS Press, 2018), 86-89
[342] ibid, 89
[343] Ibid 100
[344] Bharat H.Desai, and Balraj K. Sidhu, "The Kishenganga Final Award: Is the Indus Waters Treaty at the Crossroads?" *Economic and Political Weekly,* (2014): 10-12.

rivers assigned to Pakistan in Indus Water treaty. Court has declared that for power generation India has right of water divergence from Neelam-Jehlum river or Kishenganga river known in India. However, India is restricted for slow down water flow at lower elevation towards Pakistan and India is not allowed to apply drawdown strategy at any time except in severe conditions.[345]

Figure 26: Location of Kishenganga Hydroelectric Project and Neelum Jhelum Hydroelectric Projects



Source: Ashfaq Mehmood: Hydro-Diplomacy: Preventing water war between nuclear armed Pakistan and India

Latest development:

Currently the designs of two Indian projects are disputed, namely Kishanganga which was decided by a Court of Arbitration in 2013.The verdict enabled India to complete the construction of the project and it started producing electricity. Pakistan claims that the plant's design is not in conformity with the verdict of the Court of Arbitration. The design of a power project called Rattle power plant is also contested by Pakistan. The two countries had agreed in 2015 to refer the two disputes to a Neutral Expert. In 2016 Pakistan demanded that a Court of Arbitration should address the dispute. India insisted on a Neutral Expert. After a 6 year pause, the World Bank decided to appoint a Neutral Expert as well as set up a Court of

[345] Mehsud, Muhammad Imran, Azam Jan, and Tariq Anwar Khan, "War or Peace on the Rivers of South Asia?" *Liberal Arts and Social Sciences International Journal* 4, no. 1 (2020): 242-254.

Arbitration. The two processes have been functioning but India has boycotted the Court of Arbitration.

On 25 January, India proposed bilateral negotiations under Article 12 to modify the IWT. Pakistan has informed India that it is willing to listen to the latter's concerns through the Indus Commission. A high level officials meeting in New Delhi has discussed Pakistan's offer but until today a formal response has not been received in Islamabad.[346]

4.1.5: Kiru Hydropower Project

India is gradually achieving the manipulative potential to control the flow of water to Pakistan through construction of various projects at rivers of the Indus Basin. It has not only completed the civil works but almost finished the construction of diversion tunnel for the Kiru hydropower generation project of 624 MW, being erected on the River Chenab. Kiru project is a run-of-river scheme that is planned on the Chenab River in Kishtwar district in Indian occupied Jammu and Kashmir. The plan envisions constructing a dam at an elevation of 135m along with underground Power House comprised of 4 units, each having potential of 156 MW. India has constructed various hydropower generation projects on the rivers allocated to Pakistani under IWT and several other projects are under planning enabling India to manipulate the water flows meant to reach plains of Punjab.

India has completed the excavation work for the main power house and the transformer hall of Kiru project has been finished. All the approaching roads from the site of the dam has also been completed. The work on the tunnel diversion, excavation of the central access tunnel and inspection of the pressure shaft top & bottom is in progress. The construction of the first diversion tunnel with a length of approximately 650 m have nearly been completed by the Indian engineers. As per the Standard Operating Procedures between the two states, it is critical to conduct visits on the site of the project before starting the construction work, however in the case of the Kiru project, Pakistan has been kept in dark while India made substantial progress on the project. A representative of the Ministry of Water Resources acknowledged that the Pakistan Commission of Indus Water has not so far visited the site of the Kiru project. Nonetheless, he stated that in June 2020 India had shared the design of the plan and Pakistan raised some objections to proposed design of the Kiru project. Arshad H Abbasi, a distinguished trans-boundary water expert on water issues between Pakistan and India, stated

[346] Interview with Ex Ambassador Kakakhel

that there are some serious emerging violations of Indus Water Treaty as India has planned to construct 155 hydropower projects in Jammu and Kashmir and that "India isn't sharing any information pertaining to the detail design, structural drawings, and design calculations of the upcoming projects."[347]

4.2: Impending Indian Projects

The proposed dams planned by India to build on the three Western rivers is enormous, instigation apprehensions in Pakistan about their adversarial repercussions for flow of water to Pakistan. India has intended to construct 135 big or small dams, twenty four dams on the Indus River, seventy seven on the Jhelum River and thirty four on the River Chenab. Pakistan is concerned that besides firm obedience to the parameters of IWT, India may obtain a considerable degree of control on the waters of the Western rivers and the cumulative effect of all projects might possibly be able to cause harm to Pakistan. India has planned another mega run of the river project, Rattle Hydroelectric Power Project (850-MW) and is being erected on the Chenab River, after its merger with Marusudar River in the Drabshalla area of district Kishtwar of Jammu & Kashmir region. The construction was started in January 2022 and is scheduled to start generating power in 2026.[348]

Bursar dam is a new megaproject on the River Chenab, with electricity generation capability of 1020 Mega Watt.[349] It is the biggest ever dam in Indian Occupied Jammu & Kashmir and is a storage plan where the regulation of water flow can be advantageous for this project but also for all the downstream water schemes, i.e. Dul Hasti, Pakal Dul, Ratle, Sawalkot, Baglihar and Salal projects.[350] Therefore, the probable potential of all downstream arrangements in Indian Occupied Jammu & Kashmir will be enhanced significantly. The storage capacity of the Bursar Dam is planned to be utilized for supplementary power generation throughout the water flow in winter lean months.

Sawalkot is another large hydro project with an emphasis on significant factors like dam and the location of tunnel. It is a proposed a run-of-the-river plant on the Chenab River, located upstream of the Salal Hydroelectric Power generation project and downstream of the

[347] https://thediplomat.com/2016/06/kashmir-a-water-war-in-the-making/
[348] Shaheen Akhtar, "Emerging Challenges to Indus Waters Treaty: Issues of compliance & transboundary impacts of Indian hydro projects on the Western Rivers," *Regional Studies* 28, no. 4 (2010): 57
[349] Ibid
[350] Pakal Dul Project, <http://www.nhpcindia.com/Projects/English/Scripts/ Prj_Introduction.aspx?vid=32>.

Baglihar dam project.[351]India is also planning two major hydropower generation projects on the Chenab River in Doda district i.e. PakDul, 1000 MW, and Kwar 520 MW.[352]

If India completes all the proposed projects in the pipeline, then it might undeniably and categorically manipulate the water flow of the Western Rivers of Indus Basin, specifically the River Chenab and the River Jhelum, seriously hitting the agricultural economy of Pakistan.

4.3: Implications of Indian Hydro-hegemony on Pakistan

The agricultural economy of Pakistan is effectively a bet on the waters of Indus Basin. In an agrarian country like Pakistan food security and economic security depends upon water security. Indus River always has been only source of irrigation for plain areas of Pakistan from Peshawar to Sindh. Keeping in mind the antagonistic relation between the two nations, Pakistan has always viewed the water resources of Indus River through the national security lens and therefore views Indian projects on western rivers as a potential threat to the security of the country. Pakistan has world's largest irrigation system with Indus and its tributaries which irrigate vast areas of land in Pakistan which is about 36 M acre cultivated land. Therefore, crisis related to water will cause instability of food in an agricultural country like Pakistan. This has been declared in a report of United Nations in the year of 2010 that soon Pakistan will be a water-insecure country. Pakistani government tried to maintain water availability to ensure food security and better economic conditions from period of separation but water availability have gone down of threshold levels of water scarcity with availability of water one thousand cubic meter. This reduction in water availability has not only taken account because of stoppage in flow of water but also mismanagement in agriculture and domestic sectors cause major losses of water.

India is running many projects on Western rivers that were assigned to Pakistan. Only on Chenab they are running about 9 hydropower generation and water storage projects with 40 days water storage capacity enabling India to block the whole water flow of Chenab for 20 to 25 days. This is an alarming situation for Pakistan as Pakistan has both security and economy threats. As Pakistan is an agriculture country and major part of its economy depends upon agriculture sector. These hydro infrastructures build by India have also empowered it to discharge enormous amount of water towards the lower riparian, consequently causing damage to the standing crops but also to the network of canal systems. The Chenab River provides water to 21 canals and irrigates approximately 7 million acres of land in Punjab. Under normal

[351] Munawar Hasan, "India gives go-ahead to another dam on Chenab in IHK," *The News*, March 14, 2010.
[352] ibid

relation conditions between Pakistan and India, all other water conflicts can be resolved through different strategies such as, water storage at flood times, normal river flow and power sharing. In worst case scenario, Indian obstruction of Pakistani water will destroy social fabric of Pakistan as there would be a grave decline in agricultural and electricity productivity and millions of people might be deprived of basic access to food and water. India has already constructed 50-60, medium-sized projects and it plans more than a hundred further. Many trees will be cut, resulting in deforestation. The consequential environmental and ecological impact will also have harmful effects for Pakistan's water availability, owing to the ecological degradation and increase in accumulation of sediment. The reduction in water flows might result in huge loss to the irrigated areas of Punjab, in addition early depletion of Mangla Dam.

Nearly all Indian hydel plans on the western rivers are considered as run-of-the-river projects but these can cause severe repercussions for the lower riparian state both individually and cumulatively. Bangladesh is at present facing similar state of affairs with India particularly in case of sharing water resources of the River Ganges, the mighty Brahmaputra river, the Barak and the River Teesta. India has completed the construction of Farrakha Barrage, the Tipaimukh Dam and Gazoldoba Barrage on the Teesta River that cause floods in the monsoon season and drought in the dry periods.

The Indus Water Treaty has hardwired restrictions on the Indian capability to control the time of water flow in order to protect the concerns of Pakistan. The magnitude and amount of "live storage" was limited as per the provisions of the treaty in each and every hydropower generation dam projects constructed by India on the two western rivers, [353]the Jhelum River and Chenab River that were allocated to Pakistan. The restricted live storage stipulated in the treaty is the sole safeguard against the manipulation in water flow by upper riparian India. The analysis of Baghlihar project as an example, simple assessments suggests that once India is successful in completing the construction of all of proposed hydropower plants on the Chenab River, it would attain the ability to impose major impairment on Pakistan as lower riparian.[354]. The Indian haste for hydropower projects on the Jhelum, the Chenab and the Indus Basin is expected to disrupt the natural environmental system of Indus Basin. The Baglihar hydropower electric project is becoming a cause of concern in the Doda region, as mounting water in Chenab River is seeping under the mountains and turning the soil into loose ground. The local

[353] John Briscoe, "War or peace on the Indus?" *The News*, April 3, 2010.
[354] ibid

population fear the policy to magnify the project to 900 MW and it might be disastrous for the region also it may increase soil erosion. [355]

The environmental and ecological effect of Kishanganga dam on both sides of the border is being discussed a lot. The project would have adversative ecological influence on the Gurez Valley of Indian Occupied Kashmir and the Neelum Valley in Azad Jammu and Kashmir. The Kishanganga project after completion would submerge various areas of the lovely Gurez Valley and may dislocate more than 25,000 Dard Shin natives, from their ancestral homeland.[356] Likewise, the river diversion would not only disturb the agricultural requirements, but also might cause an environmental calamity in the Neelum Valley of AJK. Pakistan has requested to share the environmental impact assessment (EIA) reports conducted by India regarding the Kishanganga dam.

Pakistan has built around single freshwater system likewise in Egypt. There are so many threats related to water security in Pakistan. First and most important one is continuously increasing population and deficient in per capita amount of water since time of separation. Per capita water availability has been decreased to 5 times in about 75years from $5000m^3$/Capita to $1000m^3$/Capita and with this deficit Pakistan enters in water scarcity zone.[357] Many experts predicted that, present situations of water conflicts between Pakistan and India, will be foundation of future war between both countries and that would be unstoppable".

Water scarcity in Pakistan not only became a threat for flooding but also a political threat in Pakistan such that it has been highlighted differences and inequalities between the two nations. Water dispute between Pakistan and India has not been resolved yet just because of Kashmir conflict between them. Indian government had owned waters of rivers that were equally distributed between Indo-Pak in 1960. Indian PM in 2016 declared that "waters that have been owned by India would not be allowed to flow towards Pakistan".[358] Moreover, he claimed that Indus Rivers that were assigned to India such that Rivers of Sutlej, Bias and Ravi would not be wasted by flowing to Pakistan, hence their flow should be stopped to Pakistan. In regard of this declaration main reason of water disputes was the construction of dams and barrages on these rivers.

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[355] ibid

[356] Pia Malhotra, "Kashmir: A Case for Watershed Management?" *IPCS,* Article # 3194, July 19 2010. available at <http://www.ipcs.org/article/jammu-kashmir/kashmir-a-case-for-watershed-management-3194.html>

[357] Rigi, Hanifeh, and Jeroen F. Warner, "Pakistan's representation of transboundary water as a security issue," *International Journal of Water Resources Development* (2021): 1-24.

[358] ibid

Pakistan was concerned about construction of hydro projects that were built on western rivers by India, calling these projects a clear contravention of Indus Water Treaty. Pakistan accused India that it has stolen Pakistan's waters. Pakistan claimed that building of those hydropower projects by India will enhance productivity, power generation capacity and storage of India while it will cause decline in Pakistani production, economy, power generation and water storage. Furthermore, Pakistani commissioners of treaty also accused India by saying that these power generation projects of India will strengthen India's political support for occupying Kashmir and enhance gaps between Pakistan and Kashmir. Moreover, through building of those dams India will tie up stable and strong relations with Kashmir by providing them with more hydroelectric power. Islamabad maintained that it was clear that India wanted to prove itself dominant in Kashmir issue and tried to prove Pakistan against benefits of Kashmir thus diverting attention of Kashmiris from Pakistan.

There is also security dimension of these projects for Pakistan. The Chenab network of canals in Pakistan is the first-line of security against Indian conventional assault. In case these canals are dried out, they might provide easier passage for any infantry armor attack, resultantly posing adverse effects on the defense of Pakistan. The ex-chairman of WAPDA expressed his thoughts that by construction of dams on rivers in Kashmir under Indian control, India has attained military, economic and political supremacy vis-a vis Pakistan.[359] Crux of whole story is that any construction of structures over western rivers in Kashmir by India will threaten water security in Pakistan, cause instability of Pakistan's economy and cause political threats to relationship of Pakistan with Kashmir.

Flooding is another threat for Pakistan along with water scarcity and Pakistan termed it as 'water bombardment' by Indian projects. A real time example of this threat was flood of 2010 and 2022 that came in Pakistan and caused major losses both to public and government. Flood caused destruction of millions of acres of land and crops, destruction of infrastructures and ultimately resulted in loss of billions of dollars to Pakistani economy and put Pakistan in debt condition. Pakistan claimed that unpredictable over flow of water to Pakistan was done in order to pressurize Pakistan and tried to target Pakistan's economy by damaging Pakistan's agriculture sector. It is evident from the above mentioned statements from Indian politicians that India has not yet accepted separation of subcontinent in two parts and even now it uses its potential to weaken the country's strength to rejoin it with India and tried to regain its rule over whole Indo-Pak region.

[359] "Pakistan's Water Concerns," *IPRI Factfile,* Oct 2010: 7.

Pakistan being the lower riparian state views treaty as vital for its agricultural productivity, national security and human security because it depends profoundly on the waters of Indus Basin, whereas India trusts the treaty to guarantee its irrigation requirements and hydropower generation. As the tendency for resource-based conflicts in South Asia surges owing to the mounting impacts of climatic variations, Pakistan and India should concentrate on isolating Indus Water Treaty from domestic stresses that intimidate to politicize IWT. As an alternative, both states should utilize the conflict resolution mechanisms of IWT to solve their hydro-political disputes and engage in technical negotiation to solve the ongoing tensions falling within the bounds of the Indus Water Treaty.

4.4: Indian exercise of Hydro-hegemony in the Indus Basin: Strategic Options for Pakistan

Hydro-hegemony is not maintained through sheer force but through a combination of power asymmetries, which can be geographic, material, or political, and the execution of strategies via tactics like coercion, treaties, and knowledge construction. Within this framework, India is considered the hydro-hegemon, wielding significant power as the upper riparian state, while Pakistan is the "hegemonised" state, forced to employ counter-strategies to protect its water security.[360] This power dynamic allows India to shape the operational norms of the Indus Water Treaty (IWT) and influence the distribution of the basin's resources in its favor, often without resorting to overt violation of the agreement.

India exercises institutional hegemony by operating within the technical boundaries of the IWT while simultaneously testing its limits and challenging its dispute-resolution mechanisms. The treaty itself, by dividing the rivers rather than creating an integrated sharing mechanism, provides India with the institutional tools to assert its upstream position. A key tactic is the construction of run-of-the-river hydroelectric projects on the Western rivers allocated to Pakistan. While permitted under the treaty, the specific designs of these dams become a primary site of conflict. Pakistan has consistently raised technical objections to projects like the Baglihar, Kishenganga, and Ratle dams, arguing that their designs, particularly concerning spillway gates and pondage capacity, exceed what is permissible and grant India the ability to control water flow. A pivotal moment of institutional leverage was India's reaction to a 2025 terrorist attack; rather than violating the treaty, New Delhi suspended its participation, placing

[360] S. Akhtar, “Challenges and Opportunities in the Indus Waters Treaty: A Legal and Political Analysis,” *International Journal of Water Resources Development* 39, no. 1 (2023): 48

the IWT "in abeyance".[361] This move weaponized the treaty's institutional framework itself, using the threat of its collapse as a tool of coercive diplomacy while stopping short of formal abrogation.

India's technical hegemony is manifested through its strategic infrastructure development on the Western rivers, which allows for a form of resource capture within the treaty's legal confines. The ongoing construction of dams like the 850-megawatt Ratle Project on the Chenab River and the completion of the Kishenganga Project on the Jhelum River are physical assertions of India's upstream dominance.[362] From India's perspective, these projects are essential for its energy security and economic development. However, for Pakistan, these structures represent an existential threat. This capability could be used to exacerbate water stress during critical agricultural seasons, thereby wielding water as a strategic tool without turning off the tap completely. This technical leverage is compounded by India's significant untapped potential on the Western rivers, highlighting a latent capacity for further infrastructural development that looms over bilateral relations. Due to climatic variations, the region is witnessing massive flooding since 2022 and along with water surge and floods in Indus River, India very cleverly release massive amounts of water in eastern rivers without sharing data effectively on time thereby using water as a tool to manipulate the struggling governments with natural disasters like unprecedented floods.

Politically, India has increasingly linked the IWT to broader national security issues, transforming a technical water-sharing agreement into an instrument of coercive diplomacy. This trend became pronounced after the 2016 Uri attack, with Prime Minister Narendra Modi's declaration that "blood and water cannot flow together".[363] This rhetoric explicitly connected continued water cooperation to Pakistan's actions on cross-border terrorism. The suspension of the treaty in 2025 following a terrorist attack was the ultimate expression of this linkage. This action represents a fundamental shift in strategic thinking, moving from a posture of strategic patience to one of strategic escalation. This political instrumentalization is a classic hegemonic tactic, using a vital resource to pressure a rival on an unrelated issue. The IWT, once a buffer

[361] Tadesse Kebebew, Caroline Pellaton, and Mara Tignino, "A Treaty on the Brink? India's Suspension of the IWT and the Case for Cooperative Transboundary Water Governance," *International Water Law*, June 16, 2025, https://www.internationalwaterlaw.org/

[362] John Vater, "The Indus Waters Treaty: Prospects for India-Pakistan Peace," *ISAS Working Paper* no. 345 (2021), 5

[363] Brahma Chellaney, *Water, Peace, and War: Confronting the Global Water Crisis* (Lanham: Rowman & Littlefield, 2017), 212

against conflict, has itself become a political weapon, with India demonstrating a willingness to suspend its mechanisms to signal discontent and compel a change in Pakistan's behavior.

India's exercise of hydro-hegemony in the Indus Basin is not monolithic but a multifaceted strategy that operates simultaneously across institutional, technical, and political fronts. Through the calculated design and construction of dams on the Western rivers, India solidifies its technical control and resource capture. By testing the limits of the Indus Water Treaty and challenging its governance mechanisms, it reinforces its institutional dominance. Finally, by explicitly linking the treaty to broader geopolitical issues like terrorism, India wields it as a potent instrument of political coercion. This tripartite application of power demonstrates a sophisticated understanding of hegemony, where control is exercised not necessarily through outright conflict, but through the shaping of rules, the building of facts on the ground, and the strategic connection of water to national security. The enduring power asymmetry between the two nations ensures that this hegemonic structure remains the defining feature of the Indus Basin's hydro politics.

India’s Dominance and Pakistan’s Strategic Options

Indian hydro-hegemony is not absolute; it is bounded by the treaty's international legal standing, the mutual, existential dependence on the basin's waters, and the significant reputational costs of being perceived as an irresponsible hydro-hegemon. Pakistan’s historical position has been one of defensive resistance, challenging each Indian project through the treaty's dispute mechanisms. Yet, this reactive stance has yielded limited success and has failed to address systemic challenges like climate change, which transcends the treaty's 20th-century design. The central challenge for Pakistan is to strategically pivot from this defensive posture to one of proactive and creative engagement, seeking not to dismantle Indian hegemony—an impractical goal—but to redefine the terms of interaction under it.

The major factor behind success of IWT is the integrated conflict resolution mechanism in treaty that permits a neutral expert or an international court of arbitration to resolve disagreements rising from annual meetings between the representatives of Permanent Indus Commissioners of Pakistan and India. Especially, the treaty does not have any exit article in it, averting any of the signatories i.e. Pakistan, India, or World Bank from one-sidedly renouncing it. Amendments in the treaty also requires a unanimous approach between both nations. Hence, any one-sided unilateral action could create economic, legal and diplomatic complexities. Indus Water Treaty is a crucial tool for water conflict resolution between the two rival nuclear states of South Asia.

India's institutional and technical leverage is exercised through a masterful, albeit contentious, interpretation of the IWT's provisions. The treaty permits India to build run-of-the-river hydroelectric projects on the Western Rivers allocated to Pakistan, and New Delhi has pursued this right with vigor, constructing projects like Baglihar, Kishenganga, and the ongoing Ratle dam. While technically legal, the specific designs of these dams concerning pondage capacity and spillway gates have been persistent points of conflict, with Pakistan arguing they grant India an unacceptable ability to control flows.[364] This constitutes a form of "resource capture" within the treaty's legal confines, allowing India to solidify its upstream control without overtly violating the agreement.

Faced with this multi-faceted hegemony, Pakistan's traditional strategy of legal contestation through the IWT's dispute resolution mechanisms has proven to be a necessary but insufficient defense. While this approach has led to some design modifications of Indian projects, it is inherently reactive, costly, and fails to generate a positive vision for shared basin management. A more effective strategy would involve Pakistan shifting from resisting Indian hegemony to actively working to reshape its expression. This requires moving beyond a purely rights-based discourse under the existing IWT and championing a modernization of the treaty framework itself. Pakistan should proactively table proposals to formally incorporate provisions for climate change adaptation, data-sharing on glacial retreat, and joint management of groundwater aquifers, which the current treaty completely ignores.[365] By framing these issues as matters of mutual survival rather than zero-sum competition, Pakistan could seize the diplomatic initiative and cast India's refusal to engage on these critical topics as a failure of regional leadership and a violation of emerging international water law norms.

The ultimate objective for Pakistan should be to transform the IWT from a static, allocation-based treaty into a dynamic instrument for adaptive, cooperative hydro-diplomacy. This would involve fostering "managed interdependence," where India' undeniable upstream power is channeled through a more robust, transparent, and collaborative institutional framework. Pakistan could, for instance, propose elevating the Permanent Indus Commission from a technical body for dispute mitigation into a joint river basin organization with a mandate for water quality protection, ecosystem conservation, and collaborative research on sedimentation

[364] M. U. Qamar, M. Azmat, and P. Claps, "Pitfalls in Transboundary Indus Water Treaty: A Perspective to Prevent Unattended Threats to the Global Security," *npj Clean Water* 2 (2019): 22, https://doi.org/10.1038/s41545-019-0046-x

[365] "Exploring the Pakistan Water Rights under Indus Water Treaty and International Law: Renegotiation as Challenge or Opportunity for Pakistan and India," *Pakistan Journal of Law, Analysis and Wisdom* 3, no. 10 (2024), 210

and climate impacts. Pursuing scientific and technical parity is also crucial; by investing in its own advanced hydrological modeling and remote sensing capabilities, Pakistan can engage with India from a position of greater knowledge, reducing the current information asymmetry that favors the hegemon. This approach would not eliminate power disparities but would embed them within a denser network of joint institutions, shared data, and mutually recognized environmental challenges, making the exercise of raw hegemony more difficult and costly for India.

In conclusion, India's hydro-hegemony in the Indus Basin is sustained by a sophisticated combination of institutional, technical, and political power, yet it is constrained by the very treaty that legitimizes it and by the shared vulnerability of climate change. Pakistan's path forward lies not in a quixotic quest to overturn this reality but in a strategic, forward looking campaign to redefine it. By championing the modernization of the IWT, investing in scientific and diplomatic capacity, and reframing the discourse from water rights to water sustainability, Pakistan can transition from a beleaguered, defensive state to a proactive agent of cooperative management. The goal is to steer the relationship away from the recent brinkmanship and toward a system of managed interdependence, where India's dominance is tempered by its accountability to a shared framework designed to ensure the long-term security and health of the Indus Basin for all its dependents.

Figure 28: Various forms of Indian hydro hegemony in Indus Basin

Leverage Type	Key Tactic	Example	Outcome/Hegemonic Effect
Institutional	Pushing technical boundaries of the IWT; challenging dispute mechanisms.	**Baglihar & Kishenganga Dams:** Objections over design (spillway gates, pondage).	Shapes treaty interpretation; creates legal & financial delays for Pakistan
Technical	Building infrastructure on Western rivers for "resource capture".	**Ratle Hydroelectric Project:** Construction on the Chenab River.	Asserts control & creates potential for flow manipulation; instills long-term vulnerability
Political	Linking water issues to unrelated political/security demands.	Treaty Suspension (2025): Following a terrorist attack.	Weaponizes the treaty itself; uses water as non-military coercive tool

Source: Authors' compilation

4.5: Comparative analysis of Hydro-hegemony in Nile Basin and Indus Basin

A comparative glance at other major river basins, such as the Nile, further illuminates the IWT's unique diplomatic role. Unlike the Nile, where Egyptian hydro-hegemony was long sustained by colonial-era treaties and a lack of effective challenge from upstream states, the Indus conflict was bilateral and immediate, forcing a negotiated settlement (Waterbury 1979).

The Nile Basin Initiative (NBI), formed in 1999, promotes a model of cooperative, integrated water resources management, but it has struggled to achieve a binding, basin-wide allocation agreement. The IWT, by contrast, is a definitive legal instrument that precisely defines rights and responsibilities. This very definitiveness, while creating rigidity, has provided a level of certainty that has allowed for a unique form of diplomacy one focused on implementation and dispute resolution rather than perpetual negotiation over fundamental principles. The diplomatic challenge in the Indus is to manage a settled framework, whereas in the Nile, the primary diplomatic effort remains focused on creating one.

Figure 29: Comparative analysis of Hydro hegemony in Nile Basin and Indus Basin

Dimension	Nile Basin	Indus Basin	Analytical Insight
Political Hydro-hegemony	Egypt historically exercised political dominance through colonial-era treaties (1929, 1959) and securitization of the Nile as an existential resource. Its alliances with Western powers reinforced its upper hand over upstream riparians.	India emerged as the political hegemon post-partition due to its upstream control and stronger international standing. It leveraged its power to shape the 1960 Indus Water Treaty on terms favorable to its long-term strategic and developmental interests.	Both basins illustrate how upstream political power translates into control over basin narratives and agenda-setting, though India's dominance is moderated by treaty constraints while Egypt's was historically absolute.
Institutional Hydro-hegemony	Institutional dominance was formalized through exclusive bilateral treaties that marginalized upstream states like Ethiopia. The Nile Basin Initiative (NBI) later attempted to correct this imbalance but remains politically weak and non-binding.	The Indus Water Treaty (1960) institutionalized asymmetry through World Bank mediation, assigning the three western rivers to Pakistan and the eastern to India. Despite this, the Permanent Indus Commission provides a stable institutional channel for dispute resolution.	The Indus system demonstrates *managed asymmetry* through formalized legal mechanisms, whereas the Nile remains *institutionally fragmented* with competing governance regimes.
Technical Hydro-hegemony	Egypt's early mastery of hydraulic engineering (Aswan High Dam) and control over hydrological data ensured decades of technical dominance. Ethiopia's GERD now challenges this monopoly, signaling a shift toward contested hydro-hegemony.	India's superior technical capacity in dam construction, data management, and hydropower planning reinforces its upstream advantage. Pakistan's dependency on older irrigation systems limits its technological bargaining power.	Both basins show that control over knowledge, data, and infrastructure translates into enduring leverage, though emerging upstream actors (Ethiopia, China's role in Pakistan's hydropower) are altering this balance.
Overall Trajectory	Moving from *status-quo hydro-hegemony* (Egyptian control) to *contested hydro-hegemony* (Ethiopian assertion via GERD).	Evolving from *structured hydro-hegemony* under treaty constraints toward *functional hydro-diplomacy* with potential for adaptive cooperation under climate stress.	The Nile's contestation is driven by upstream empowerment, while the Indus's evolution depends on treaty flexibility and cooperative adaptation to shared vulnerabilities.

Source: Author's compilation

In present political world, control and acquiring water has become a vital issue. Like other regions of world, countries of South Asia also have been sharing river water, some as upper riparian and other as lower riparian. Although water sharing mechanism in some states have controversies in their relationship but both parties respect and obey signed drafts about water. Since partition in 1947, Pakistan and India have been facing water related issues. Before IWT two instances were worth noting; one was that they realized that any dispute between both countries would not be solved by negotiations among both parties and any third party would be required in order to make settlements although it might be short termed settlements. Other instance was that World Bank would be involved in settlement of water disputes as done in case of Indus Water Treaty.

As far as Indian policy has been concerned, they did not allow any third party in resolution of any dispute or conflict between its allies. It means that Indian government did not believe in mutual settlements and always preferred bilateralism for resolutions. Hence Indian government forces other states for bilateral negotiation for the settlement of issues either they are minor issues or major issues like water disputes. In contrast with Indian policy, Pakistani government tried to resolve issues by mutual accommodation and negotiations at various institutional levels but faced Indian intransigence in official correspondence. Therefore, then Pakistan insisted to involve third party for resolution of any dispute among its neighbors, which means that Pakistani government gave preference to mutual dialogues for settlement of disputes between any of its neighboring country but if failed then invited third party. Moreover, it has been a strong belief of Pakistan that involvement of third party in resolution of any dispute would be more appropriate and gave better results.

Indian hydro hegemony and unilateral redirection of water in South Asia is inacceptable, that damages the wellbeing of its co-riparian. Besides, India is blamed by for not communicating its projects with co-riparian states or hides the hydro statistics on the transboundary rivers schemes. Indian behaves like a regional hegemon; though, declines to manifest any responsibility and obligation for effective engagement or collaboration on the regional waterfront. Instead, India pursues resource capture maneuvers and eventually builds up mistrust and conflict on natural resources between co-riparian states sharing transboundary water resource.

India has tried to intimidate Pakistan through water infrastructures and the Indus Water Treaty, whereas Pakistan has followed the suit of talks on equitable terms and rightful division of Indus resources. To manage the collective impending challenges arising in the future,

Pakistan should practically use all legal justifications and must actively employ diplomatic possibilities to present its case vis-a-vis sharing transboundary water resources with India as upper riparian. It is significant that Pakistan should implement proactive strategy to appease its water demands, particularly through the lens of the Indus Water Treaty, and devise a water policy that encompasses new and emergent challenges regarding water resources and their effective management, like flooding, droughts, scarcity of water, hydro management, and climate change.

Chapter 5

Hydro-politics between Pakistan and India: The Causative and Contextual Factors of Pak-India Water Dispute

This chapter investigates the causative factors and determinants that are root cause of the hydro-politics between two neighboring states i.e. Pakistan and India. The core concepts such as the problems of resource scarcity, environmental degradation, resource capture, population growth, ecological marginalization or power asymmetry in the hydro-political relations of co-riparian are described as per identified factors in the conceptual framework. The other major issues that aggravate and intensify the water conflict are the divergent religious, diplomatic and political disposition held by both riparian, sharing transboundary river in South Asia. Importance of Kashmir conflict is also a part of this chapter because the occupation of Kashmir valley points out to the tactics maneuvered by hydro- hegemon from where the water flows can be controlled, impacting the lower riparian.

Disputes are reality of international relations because it ranges from undefined territories or conflicted boundaries associated for critical resources to political, cultural or religious disagreements. Interconnected issues of Indus River Basin and Kashmir conflict between Pakistan and India emerged at time of division of Subcontinent in 1947 when India as acquired physical control over catchments of all five rivers of Indus Basin an upper riparian. Kashmir was always been source of dispute between both the countries since partition of subcontinent. This conflict never let both nations to stand on the same stage and aggravated the tense political relations between them. Geopolitical element of Kashmir appeared in 1948 after the partition when India stopped the water flowing to Pakistan and Pakistan felt threat to its survival. India claimed its right over all rivers as those was emerging from its boundaries. Water dispute was resolved between the two South Asian countries in 1960 with ratification of Indus Water Treaty facilitated by World Bank.

It was beautifully written by Peter H. Gleick "Land can be controlled by water on which that dry land would be dependent, as water has been a real time asset of arid regions and its depletion of absence made that land priceless or near to unworthy."[366]Indus Water Treaty distributed waters of the Indus Rivers between Pakistan and India but Kashmir conflict with geographical divisions remain unresolved. The feeding source of Indus Basin is snow melting

[366] Peter H. Gleick, *Water in Crisis: A Guide to the World's Fresh Water Resources* (New York: Oxford University Press, 1993a), 9.

and precipitations at foothills of Himalayas which are all situated in Kashmir.[367] Pakistan as a lower riparian relies on the largest contiguous irrigation system known as the Indus Basin Irrigation System for survival, food security and water supply for all segments of the economy. For India being upper riparian, receives water from Brahmaputra river as well.

A competition by states to control various water resources has started globally, and various influential states like India and china are involved in controlling and managing the water resources of their areas in order to establish hydro-hegemony. Resource conflicts rarely or never surface as a consequence of any one and particular easily distinguishable causative factor. Rather, there exists generally a complicated web of reasons that are accountable for the incident of conflict. The conceptual framework applied in this study helps to identify various factors at play in the prospective conflictive and cooperative patterns among riparian countries that share transboundary water resource. The conceptual structure supports in the pursuit to accomplish some level of comprehension of the connection between several multilayered dynamic factors thought to be responsible for water conflict or cooperation. There have been numerous causative factors behind conflicts on waters of Transboundary Rivers.

Major causative factors out of all other factors that served as source of conflicts over waters of rivers of transboundary are pointed out as; geographic location of riparian, kind of physical borders, infrastructures made to control flow of water, need of lower riparian regions, climatic variations, use of land and water patterns for development, population and their accommodation patterns, local restrictions and external relations. From these recognized causative factors, the primary factor was location of resource, as situation of resources would be a clear fundamental territorial element and also a radical diplomatic feature.[368]

All causative factors are linked to the key feature i.e. the geographic location of the source of Transboundary River and the relative position of riparian states sharing the transboundary waters. Therefore, floodplains or riverine states had three locations that are upper, middle and lower riparian. A state with upper riverine status could enjoy entire independence, sovereignty and self-governing over its boundaries and flow of water in rivers even to associate lower riparian.[369] For example in case of Pakistan and India, India has a

[367] Andre Savitsky, Donald L Alford, Casey Brown, Dario Julian Debowicz, Sherman Robinson, James L Wescoat, Yi-Chen Ethan Yang, Winston Yu, *The Indus Basin of Pakistan The Impacts of Climate Risks on Water and Agriculture* (Washington D.C: World Bank Report, 2013) http://documents.worldbank.org/curated/en/650851468288636753/Indus-basin-of-Pakistan-impacts-of-climate-risks-on-water-and-agriculture

[368] Basheer Khalil Nijim, "The Indus, Nile and Jordan: International Rivers and Factors in Conflict Potential" (Ph.D. thesis, Indiana University, 1969), 18-19.

[369] Muhammad Nasrullah Mirza, "Indus water disputes and India-Pakistan relations" (PhD thesis, 2016),

leverage of geography as being upper riparian state because all five tributaries of Indus basin originates from Jammu and Kashmir under Indian occupation. On other hand, the lower riverine states were those which do not have independence, sovereignty and self-governing on flow of rivers as they receive flow from upper riverine states and could not divert river flow if it was restricted by upper riparian. As in case of Pakistan and India, Pakistan being lower riparian is dependent on India for water flow in Indus, demonstrating its vulnerability.

Under the IWT, India was permitted to use the water resources of the western rivers for restricted domestic requirements, irrigation and hydropower generation projects under strict parameters specified in the agreement. Pakistan paid for the construction of two large dams and several spillways to collect water from rivers in the west and eight communication canals to transport water to areas irrigated by river canals in the east. Eastern rivers. Indus River Basin potentially can generate 34,000 MW of electricity and India has already constructed hydropower generation projects that can generate 11,113 MW, which is around 33% of its potential.[370] India is determined to build more hydropower generation projects on Indus Rivers as part of its ambitious energy plans. Pakistan has expressed concern over almost all the projects announced by India. The main concern by Pakistan is that while Indian hydropower projects may be allowed as per Indus Water Treaty, Pakistan has reservations on the design and storage capacity of these dams where they could allow India to control river flows to Pakistan.

Population density has also played an essential role in water conflicts because river basins with scarce inhabitants have to face less degree of conflicts as compared to highly populated river basins. Likewise countries whose economy are based on agriculture and irrigation from river flows have more pressure of conflicts as compared to countries whose economy is based on industry. Hence, basins with more populated areas have to face more conflicts due to transportation and disposing of sewage and waste water which cause more pollution of water and environmental degradation.[371] Along with population density if a country has been under external pressures such that exponent claims by co-riparian, it faces more complications and extent of these problems are multiplied in water issues. Politically instable countries with transboundary water resources have more conflicts. So if there are both internal and external pressures on a country along with exponential claims adjoining with matters without satisfaction have higher levels of conflicts beyond limits.

[370] Interview with Ambassador Kakakhel

[371] Basheer Khalil Nijim, "The Indus, Nile and Jordan: International Rivers and Factors in Conflict Potential" (Ph.D. thesis, Indiana University, 1969), 21-22

5.1: Causative Factors of Hydropolitics between Pakistan and India:

Causative factors of hydro politics between Pakistan and India includes; geographic/ topographic location, characteristics of surface, nature of legislative borders, increased growth rate of population and their patterns of residence and environmental degradation. Depletion of water resources negatively affects food productivity and capacity of hydropower generation, and undermines efforts by Pakistan and India to attain food security, energy security, socio-economic development, and poverty alleviation.

5.1.1: Geographical Location of Riparian States Sharing Transboundary Resource

The transboundary sharing of international rivers includes the doctrines of international law, sovereignty and politics, augmented with the characteristics of geographical features and embedded political domination. Indus River Basin has been distributed among four nations; India, Pakistan, China and Afghanistan. It has been observed in overall sphere of Indus Basin that India is the middle riparian country with China as upper most riparian and Pakistan as lower riparian. Afghanistan constitutes a branch of Indus River named as River Kabul. Five other tributaries of Indus River Basin arise from Kashmir i.e. River Chenab, River Jhelum, River Sutlej, River Bias, River Ravi.[372] Therefore major distributors of Indus River Basin are Pakistan and India and both have been involved in many hydropower projects, consumptive and non-consumptive use of water of rivers, consequently these two countries have more apprehensions of hydropolitical conflicts.

In hydropolitics, the powerful nation's muscle their way to advantageous positions. India being an upper riparian with physical control over Jammu and Kashmir has controlled all headworks and catchments of Indus River system. As all these rivers pass through Indian and Pakistani Punjab and Kashmir, therefore center of all agreements and conflicts related to water of all six rivers have been observed in these two areas i.e. Punjab and Kashmir. Pakistan is in fragile position because India, as an upstream riparian, exercise significant control over rivers through building various hydropower projects and water infrastructures on western rivers, and use water as a political tool against Pakistan.[373] Storing or releasing the water in critical time could cause flooding downstream. Pakistan always complains and accuses India of cutting off

[372] Vikramjit Singh, *Indus River System with Map & Tributaries*, Rivers Insight, Aug 25, 2024. https://riversinsight.com/indus-river-system/

[373] Shah Manal, "Hydro-Politics in South Asia: Pakistan India Case Study," *Stratheia Margalla Policy Digest* (2023), https://stratheia.com/hydro-politics-in-south-asia-pakistan-india-case-study/#_ftn2

and stealing Pakistan's water. India's intention, which Pakistan refers to as the "evacuation of Pakistan", can be classified under the category of "man-made technological destruction".[374]

Since Pakistan is located in the downstream region, it depends only on the water flow from India and any exercise by India to exert its hegemony over the waters of the Indus might convert the arable land into barren one. Such a disorder might lead to serious complications of conflict dynamics. India have always took advantage of its position and tried to construct dams, barrages and other hydropower projects to get full benefit from waters of Indus river system and desired to get union of Kashmir by providing them with some benefits. The dam construction on the waters resources of western rivers that are allocated to Pakistan, poises India with the capacity of contested control of water supplies to Pakistan and enjoy political hegemony. Pakistan has always shown concern on hydropower projects of India due to threat for water scarcity in Pakistan as major part of Pakistan's economy and agriculture is dependent upon Indus river system.

5.1.2: Characteristics of Surface

The nature of terrain of Indus river system is suitable for construction of dams and hydropower projects. These hydropower projects are a major cause hydro-political conflicts between both riparian.[375] Water source of that immense flow in Indus River system is a result of snow melt in summer season from snow covered peaks of Kashmir and heavy precipitation water in rainy season. The normal precipitation rate in the Indus Basin is approximately 230 mm/year, which is very low.[376] Arid agriculture land of Pakistan relies heavily on this immense river system. Along with Pakistan a part of Indian Punjab is also dependent upon Indus river system for its agriculture. Geographical nature of charming valley of Kashmir consists of different ranges that include Karakorum, Ladakh and great Himalayas which are surrounded with different rivers, lakes and valleys. The origin of three out of five tributary rivers of Indus basin included Jhelum, Chenab and Ravi lies in Jammu and Kashmir, while other two rivers i.e. Sutlej and Bias emerge from Himanchal Pradesh, a northern region of India. Various dam sites on Indus river system has been planned by India in Jammu and Kashmir at River Jhelum and River Chenab apart from completed and operational water structures like Baghliar Dam, Kishenganga hydropower project.

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[374] Robert Mandel, "Sources of international river basin disputes," *The Journal of Conflict Studies* 12 (1992): 39. http://www.lib.unb.ca/Texts/JCS/CQ/vol012_4fall1992/mandel.pdf

[375] Basheer Khalil Nijim, The Indus, Nile and Jordan: International Rivers and Factors in Conflict Potential (Thesis submitted to Indiana University, 1969), 25.

[376] Shahmir Janjua; Ishtiaq Hassan; Shoaib Muhammad; Saira Ahmed; Afzal Ahmed, "Water management in Pakistan's Indus Basin: Challenges and opportunities," *Water Policy* 23, Issue 6, (2021). 1330–1331.

The topographic features of Indus river system have highlighted the importance of territory of Kashmir for both riparian i.e. Pakistan and India. Indus rivers The elevation and fall of Indus River in entire Jammu and Kashmir is about 240 inches per mile, however when these tributaries of Indus River system leave territory of Jammu and Kashmir and enter in boundaries of Indus Basin, their elevation is reduced to 6-12 inches per mile throughout its way. These two astonishing features of Indus River system associated with Jammu and Kashmir signified hydro political importance of Kashmir valley for both upstream and downstream nations in their interests of conflicts and compromises.

5.1.3: Increased Population and Water Scarcity

World population is increasing at a fast pace and therefore people are facing water insecurity today. According to United Nations Report, around one sixth of the total global population have not sufficient access to clean drinkable water and by 2025, half of the states universally will be facing reduced availability of water or even absolute scarcities.[377] The limited availability of the fresh and safe water has far reaching implications like decreased production of food products and crops, negative impacts on livelihood, and escalation in geopolitical and economic tensions, specifically in the unstable regions like South Asia. South Asia is home to about 1.7 billion people. The increasing population, combined with inefficient water consumption patterns has resulted in steady decline in per-capita availability of water in the region.[378]

Pakistan is experiencing major economic and demographic changes and is currently facing phenomenal transition. Pakistan is densely inhabited state and is fifth most populated state with 2.8% of population growth rate. The current population of Pakistan stands around 220 million that is expected to increase to 250 million by 2025.[379] Simultaneously the population residing in cities has doubled in the two decades due to urbanization, triggering supplementary stress on water demand and consumption besides repercussions for other areas. Substantial urbanization in major cities wields burden on the aquifer to fulfill the water requirements of the population. Water management in Pakistan today has become a multi-

[377] Harriet Bigas, *Water Security & the Global Water Agenda* (Canada: UN-Water Analytical Brief, 2013) https://www.unwater.org/publications/water-security-and-global-water-agenda

[378] Susana Neto, Jeff Camkin, "Water Security in the South Asia Region: Challenges, Experiences, and Lessons Learned." *World Water Policy 9*, no. 3 (2023): 289-292. https://doi.org/10.1002/wwp2.12126.

[379] Shahmir Janjua; Ishtiaq Hassan; Shoaib Muhammad; Saira Ahmed; Afzal Ahmed, "Water management in Pakistan's Indus Basin: Challenges and opportunities," *Water Policy* 23, Issue 6, (2021). 1330–1331.

sectoral concern crossing demographic, economic, agricultural, metro political, ecological and environmental fields.[380]

Population growth is the key problematic issue that becomes the root cause for the overconsumption of natural resources and in turn pressurizes these assets. Increasing global water scarcity has led to intense conflicts over the physical control and access to water resources, significantly not solely between countries but also within countries. This action by governments, especially economically and militarily powerful countries, has sparked discussions about transboundary water sharing and the possibility of conflicts over water. Transboundary Rivers can become flashpoints, causing conflict between countries and disrupting infrastructure. The current global population of 7.6 billion (2023) is estimated to increase to 8.6 billion in 2030 and 9.8 billion by 2050.[381] Whereas the population is growing at a fast pace, the availability of water remains the same to satiate the needs of an increasing population globally. This surge in population and cumulative increase in urbanization plus industrialization aggravate the tensions at various levels. This increase in population in South Asia coupled with robust water usage by India and Afghanistan of 3.5 MAF will necessitate additional 76 MAF water by 2050 that is only possible by managing the supply and demand. Moreover, availability of cultivated land per head had also been reduced due to continuous increased population rate and hence annual agriculture production also had been decreased.

All these factors along with increased rate of population and reduced crop production, would drastically impact availability of food, severe food shortage, dramatic fall in earnings of millions of people and thus a serious threat to economic conditions. The increasing population is impacting the availability of water resource that is already under stress due to the changes in climatic patterns and variation. Therefore increase in demand of water resources for multipurpose by the inhabitants of this region particularly in Pakistan and India would necessitate the rightful claim on water by each riparian, consequently emerging as an irritant between the tense relations between them. [382]

5.1.4: Dams Construction / Hydropower Generation Projects

Various water infrastructures are being developed by India to thwart the exclusive access of Pakistan to the waters of western rivers, consequently claiming political domination and control in the form of Indian hydro-hegemony. Indian Government being upper riparian is

[380] Interview with Muzammil Hussain

[381] "*World population prospects 2017*" (Feb. 13, 2017) https://www.un.org/en/desa/world-population-prospects-2017-revision.

[382] Ahmad Bashir, "Water Management: A Solution to Water Scarcity in Pakistan," *Journal of Independent Studies and Research* 9, no. 2 (July 2011): 111-125.

rigorously constructing different hydropower projects, like barrages, storage dams and hydropower generation dams on Indus and its tributaries, controlling natural inflow of water towards Pakistan. The Indian hydroelectric power generation projects constructed on the western rivers has set off alarm bells in the hydro-insecure lower riparian Pakistan that intensely claims that these Indian projects do not adhere to the specified criteria stipulated in the Indus Water Treaty. India is permitted to construct dams on western rivers allotted to Pakistan but it is not allowed to construct spillway gates that enables live storage and ultimately affects the flow of the river.[383] The unrestrained limitless proliferation of dams and alteration of water channels would severely disturb the flow of the western rivers allocated to Pakistan.

India has constructed and planned 67 large and small hydrogenation projects and reservoirs on the major rivers of Indus basin i.e. Chenab, Indus and Jhelum, allocated to Pakistan under the Indus Water Treaty. Irrespective of IWT, India is developing water management/control infrastructures over the western rivers.[384] The Pakistani authorities have challenged various hydro construction projects currently under construction by India including the Uri Nimo Bazgo project, Uri-II Hydroelectric Power Station, the Baglihar hydropower project, the Rattle project, and the Kishenganga project, Tulbul Dam (Wullar Dam), the Nimmo Bazgo Hydroelectric Power Project on the Indus River and the Chutak Hydroelectric Project on Suru River, a tributary of Indus river in Kargil district of Jammu an Kashmir.[385] These projects have the capacity to hold water resources in periods of water scarcity or to flood the lower riparian land during excessive water flows in times unprecedented precipitation. Both cases have dire consequences for the downstream Pakistan as water is crucial for the agricultural economy of Pakistan while the release of extra water can devastate the land in the form of flooding. Indian inland waterways do not permit India to obstruct the flow of a river through storage or diversion of water. As per an estimated, in case of any political or military conflict between Pakistan and India, the upper riparian can discontinue all the water supplies to Pakistan for about 26 consecutive days.[386] Hence, Indian ability to stop water supplies

[383] Qadir, Brig Shaukat. "India's New Dams Threaten Pakistan's Farming Sector." *The National News*, July 7, 2021. https://www.thenationalnews.com/india-s-new-dams-threaten-pakistan-s-farming-sector-1.591564.
[384] Raja Nazakat Ali, Faiz ur Rehman, mehmood ur Rehman Wani, "Indus Waters Treaty between Pakistan and India: From Conciliation to Confrontation," Dialogue 10, no.2 (2015): 174—175.
[385] I.A. Pansohta, "Threat of Water Wars", *The Nation* (Islamabad), April 6, 2010.
[386] Khalid Chandio, "India Re-Thinking Indus Waters Treaty," IPRI REVIEW (Aug. 27, 2014), http://www.ipripak.org/india-re-thinking-indus-water-treaty/.

flowing to Pakistan is synonymous to a political maneuver for ensuring Indian political superiority in times of war or conflict.[387]

Nowadays, India tried to make more worsening conditions by having project plans with Afghanistan on River Kabul. India had planned for construction of 12 different hydro projects on River Kabul with help of Afghanistan, for power generation of approximately 2406.3 MW and water storage of about 2.650 MAF[388]. River Kabul has its origin in Afghanistan and Jalalabad and it joined with River Kunar which originated in Pakistan and thus River Kabul flows through Pakistan. Therefore, this transboundary river has made Afghanistan and Pakistan co-riparian. If those hydrological projects would be completed by Afghan Government then they would store about 4 MAF of water flowing in River Kabul and will affect a vast agricultural land along with about 3 million inhabitants in Pakistan. Ultimately, it could threaten interstate relations of Afghanistan and Pakistan also[389].

5.1.5: Undeveloped Irrigation Network and Reduced Storage Capacity

Arid countries had high storage capacities for flowing waters in rivers because their major dependence would be on the river water because of low annual precipitation. But unlike other countries Pakistan had very less number of reservoirs with lowest storage capacities as compared to other arid countries that were as low as 15 % of total for annual storage of river waters. As far as annual per capita storage capacity of water in Pakistan had concerned, it was as lower at critical level of only 150 cubic meters, and if annual per capita storage capacity of United States and Australia would be compared it was 5000 cubic meters and which of China was about 2200 cubic meters.[390] Hence, United States could store about 900 days of river flow, which of which for South Africa was 500 days. Even India had capacity for storage of 120 to 220 days river flows which was four to eight times more than that of Pakistan (with only storage of 30 days river flow of Indus River System). A huge gap between water supply and requirement is to be filled by construction of new dams, reservoirs and other water storage works.

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[387] Waseem Ahmed Qureshi, "Indus Waters Treaty: An Impediment to the Indian Hydrohegemony," *Denver Journal of International Law & Policy* 46, no 1, (2017): 56

[388] Hussain, Sajjad, Farrukh Faheem, and Saif Ul Islam. "Impact of Hydro-Politics and Kashmir issue on bilateral relations of India and Pakistan," *Journal of Humanities, Social and Management Sciences* 2, no. 1 (2021): 200-213.

[389] Hussain, Sajjad, Farrukh Faheem, and Saif Ul Islam. "Impact of Hydro-Politics and Kashmir issue on bilateral relations of India and Pakistan." Journal of Humanities, Social and Management Sciences (JHSMS) 2, no. 1 (2021): 200-213.

[390] Interview with Muzzamil Hussain

The hydraulic infrastructure of Pakistan has not been maintained optimally due to constraints of resources and management deficits. The capacity of the transportation infrastructure has also suffered due to sedimentation, resulting in huge losses of irrigation water. It had been estimated by the water sector of Pakistan that there has been a great need to increase storage capacity by 2025 of Pakistan up to 22 billion cubic meters to fulfill water demand.[391] But unfortunately, three decades had been passed away when Tarbela dam was made, last construction work was done by Pakistani government in regard of any storage work for storing water and since then there had been no serious steps were taken to mitigate water shortage issue.[392] Pakistan needs to upgrade its storage capacity by building dams.

5.1.6: Water Scarcity in Indus Basin

The Hindu Kush–Karakoram–Himalayan system is entitled as the Third Pole because after the Polar Regions it has the largest worldwide storage of frozen fresh water resources and the South Asian population of around two billion depends on the vital water supplies from this water system.[393] Discernable global warming and changed climatic patterns has altered the environmental equilibrium of this Asian water tower and consequently affected great the availability of water resources in downstream states. Due to these causative factors, Indus Basin has become the second most over-stressed aquifer in the world where surface and ground water levels have significantly dropped. Due to the mounting water scarcity issues, the predominant 'water war paradigm' anticipated that the battles of the 21st century would be fought over the sharing of water resources. The former UN Secretary-General, Boutros Boutros-Ghali, vied in 1991 that the "next war will be fought over water, not politics."[394]

The impact of climatic variation, water scarcity, population growth, and unequitable dissemination of water resources has made water the scariest natural resource in numerous developing countries. Occasionally, the unequal water distribution becomes the reason for conflict. South Asia has only 4% of the world's annual renewable water that creates a wide gap between demand and supply.[395] The water dispute between Pakistan and India is a glaring illustration of this rising tensions in hydropolitics, where water shortages are increasing the

[391] Interview with Ex Ambassador Shafqat Kakakhel

[392] Bashir Ahmad, "Water Management: A Solution to Water Scarcity in Pakistan," Journal of Independent Studies and Research 9, no. 2 (July 2011): 111-125.

[393] Tandong Yao, Tobias Bolch, Deliang Chen, Jing Gao, Walter Immerzeel, Shilong Piao, Fengge Su et al. "The Imbalance of the Asian Water Tower," *Nature Reviews Earth & Environment* 3, no. 10 (2022): 618. Accessed December 2, 2024. https://doi.org/10.1038/s43017-022-00299-4.

[394] Mustafa Ghulam, Muhammad Ramzan Shahid, ""Water Scarcity in Pakistan: Hydro-Politics in Indus Basin," *Pakistan Languages and Humanities Review* 5, no.2 (2021): 247.

[395] Uttam Kumar Sinha, *Riverine Neighbourhood: Hydro-Politics in South Asia* (New Delhi: Pentagon press, 2016), 17.

timeline leading to securitization of water resources from both sides. Pakistan and India are agricultural states that rely on water availability for economic strength. As a comparison with India, Pakistan depend on almost completely on the Indus Rivers, and the downstream areas of Pakistan like Punjab and Sindh are especially vulnerable to strains on the basin's water supply.

Poor sanitation and maintenance systems is another causative factor responsible for water scarcity conditions. If water would be used under integrated approach and people minimized wastage of water, water shortage issue could be mitigated. Other factor of water scarcity was excessive pumping of groundwater without taking any care about consumption amount, unlimited groundwater had been drawn out which caused remarkable reduction in level of water table. Thus water had gone very deeper that even modern technologies of water pumping would also failed to take out water and water that was available at surface catchments from precipitation was unfit for use and needed filtration of water before use.[396]

The per capita water availability in Pakistan has already declined in 2017 and has gone below the critical line of 1000 m^3 as Pakistan has the fourth highest rate of water use across the globe.[397] The total projected increase in Pakistan's water demand is estimated to rise from 163 km3 in 2015 to 225 km3 in 2050.[398] As water scarcity increases and freshwater supplies decline, the competition/politics over shared transboundary water resources is likely to surge as well as subsequently impact cross-border politics and weaken relations between riparian countries. According to an estimate, the countries of Indus Basin need to investment increasingly up to 10 billion dollars per annum to mitigate the issues of scarce water availability and to ensure enhanced access of the population to water resources by 2050. This huge cost of water investment can be reduced to 2 billion dollars, if South Asian countries cooperate and pursue more collective collaborative policies in water sector for the welfare of the people across the region.[399] Though, cooperation in South Asian states both on issues of transboundary hydro-management and governance, has enormous potential to not only support quest of development goals but also mitigate water related conflicts thereby lessening the political strains in the region also.

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[396] Bashir Ahmad, "Water Management: A Solution to Water Scarcity in Pakistan," Journal of Independent Studies and Research 9, no. 2 (July 2011): 111-125.

[397] Mustafa Ghulam, Muhammad Ramzan Shahid, ""Water Scarcity in Pakistan: Hydro-Politics in Indus Basin," Pakistan Languages and Humanities Review 5, no.2 (2021): 260

[398] "Water conflict and cooperation between India and Pakistan," *Climate Diplomacy*, available at https://climate-diplomacy.org/case-studies/water-conflict-and-cooperation-between-india-and-pakistan

[399] A. Vinca, S. Parkinson, N. Djilali, K. Riahi, et al. "Transboundary cooperation a potential route to sustainable development in the Indus basin," Nature Sustainability 4, (2021): 331–339. https://doi.org/10.1038/s41893-020-00654-7

5.1.7: Vulnerability Due to Climatic Variations

The Indus basin relies heavily on waters from snow melt and glaciers in the upper areas of basin. The effect of global warming on access to water has sparked intense debates about 'rights and needs'. The water availability in the Indus River Basin has been reduced due to the climatic variation and ecological degradation. It is anticipated that the rivers of the Indus basin may change into seasonal rivers by 2040.[400] The mud has reduced the storage capacity of the reservoirs on both sides. Rivers of Indus system had been derived from water coming from mountains of Himalayas. Rivers flowing in Punjab got their maximum flow from melting of ice in seasons of spring and summer, while rest of their flow came from precipitation water coming at end of summer in monsoon season.

The projected global warming will possibly increase glacial melt that means an enlarged water flow for Pakistan which would be wasted as unused as we do not constructed sufficient reservoirs for flood control and the consequent floods will be uncontrollable and devastating. Additionally, the depletion of glacial and Himalayan ice store will ultimately lessen the availability of annual water flow to the agricultural based economy. Consequences related to environmental degradation and climatic variations are still under study and research. Thus any variation in water resources either due to climatic variations or due to any human resistance led to crucial circumstances which ultimately left severe impacts on economic conditions of Pakistan and its nationals. This change in climatic patterns and the melting of the Himalayan glaciers as compared to the world average have augmented the gravity of water sharing issue between both sides of the border and both Pakistan and India want to ensure their water security at any cost.

The impact of climate change is evident with increased melting of glaciers, unprecedented flooding events, famines, and recurrent heat waves. Waning glaciers, reduced water flows, and fluctuating patterns of rain have further contributed to water shortages in Indus Basin. It has been predicted that global warming and rising temperatures would adversely affect production of crops in South Asia and this rising temperature would cause rapid melting of snow at glaciers of Karakorum. The increased river flow which may exceed to approx. 50 % and a significant decrease of about 40 % in water flow would be caused due to snow melt.[401]

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[400] Interview with Pervaiz Ameer

[401] Winston Yu, Yi-Chen Yang, Andre Savitsky, Donald Alford, Casey Brown, James Wescoat, Dario Debowicz, and Sherman Robinson, "The Indus Basin of Pakistan The Impacts of Climate Risks on Water and Agriculture," *World Bank Report* (Washington D.C, The WorldBank,2013). https://documents1.worldbank.org/curated/en/650851468288636753/pdf/Indus-basin-of-Pakistan-impacts-of-climate-risks-on-water-and-agriculture.pdf

The glaciers in the mountain ranges of Pamir and Hindu Kush have reduced by 30 % in the last half of 21st century. The rising in temperature or global warming will approximately result in at least 10% decrease in precipitation volume over the next fifty years. The increase in summer flows due to glacial melt and more rainfall in shorter time period will accentuates frequent floods in the coming years, followed by shortages in the long run.[402] Climatic variations pose quiet serious threats to river basins. As glaciers melt and global warming sets in countries in the region including Pakistan, India and China, all need to contemplate about medium to long term sustainability of human populations, agriculture and economic slowdown. Saving water should become a preoccupation in minds of water managers.[403]

5.1.8: Drainage System

Indus Basin River system passes through plains and flat lands, due to which there had been no natural drainage system throughout Indus river system till it reach Arabian Sea. Also this flat nature of Indus Basin caused restriction in movement of underground water. This was a major reason behind flooding and deterioration of crop lands after excess precipitation. Artificial drainage systems were developed in Pakistan but these drainage systems were also unable to reduce crop losses due to flooding especially in provinces of Punjab and Sindh.[404] Proper drainage systems for draining out of saline water discharges to sea would be proved successful to reduce salinity issues and also reduction of water losses. Thus there is a great need for proper drainage channels likewise canal system to improve agricultural thus economic conditions of Pakistan.[405] A study by the World Commission on Dams found that intensive irrigation combined with poor drainage increases waterlogging and soil salinity problems, causing "serious environmental and poverty impacts."[406] In the past 60 years, Pakistan has experienced 22 severe to extreme floods, and global warming due to climate change will exacerbate the scale and frequency of these disasters.[407]

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[402] Mahmood Ashfaq, *Hydro-diplomacy: Preventing Water War between Nuclear armed Pakistan and India*, (Islamabad: IPS Press 2018), 199-200.

[403] Interview with Dr. Pervaiz Amir: Senior environmental economist, director of the Pakistan Water Partnership and a former member of the Prime Minister's Task Force for Climate Change.

[404] Daanish Mustafa and James L. Wescoat Jr., "Development of Flood Hazards Policy in the Indus River Basin of Pakistan, 1947–1996," *Water International* 22, no. 4 (1997): 238–44.

[405] Bashir Ahmad, "Water Management: A Solution to Water Scarcity in Pakistan," Journal of Independent Studies and Research 9, no. 2 (July 2011): 117.

[406] World Commission on Dams Case Study, "Tarbela Dam and Related Aspects of the Indus River Basin, Pakistan," *Asianics Agro Development International*, (Islamabad: 2000).

[407] Interview with Muzammil Hussain, ex WAPDA Chairman

5.1.9: Management of Ground Water Resources:

The management of the groundwater resources of Indus Basin remains a main challenge in South Asia. Following the expansion of canal irrigation, in British colonial era, waterlogging and salinity have also emerged as a critical issue in the water infrastructures. The availability of the surface water has always been the major irritant that is associated with subnational hydropolitics, but the groundwater availability in the Indus Basin and the complications connected to it, like groundwater overdraft, waterlogging and salinity, are projected to have more severe effects on the productivity of agriculture, usage of water and therefore, the hydropolitics in the long run.[408] The availability of levels of groundwater and water quality fluctuate across the Indus plains during the irrigation seasons and monsoon periods. When tube wells tap into salty groundwater, they increase the secondary salinization of irrigated soils that injures crops and reduces yields.

Ground water issue is cropping up severely and have not been dealt in Indus Water Treaty. Likewise, there is no agreed framework for the regulation of transboundary aquifers between Pakistan and India. Similarly proper mapping of transboundary ground water aquifers have also not been conducted. Water pumping in India is being encouraged because of low electric tariffs whereas in Pakistan, the ground water is shrinking with testimonials available through satellite sensing.[409] The national water experts in Pakistan forecast that by 2025, the probabilities of drying up of rivers in Pakistan are very high. Similarly poor hydro-management and access are significant root cause of water issue rather than physical scarcity of water resources.[410]

5.1.10: Subnational Hydro-politics: A Causative Factor of Interstate Hydro-political Relationship between Pakistan and India

Hydro-politics in its all levels of analysis i.e. subnational/domestic, interstates, regional or global is not merely the product of geographic position up or downstream riparian states. These upstream and downstream riparian relationships, whether conflictual or cooperative, primarily are formed by a complex constellation of subnational political and socio-economic factors. The political elites with their own notion of national interests in a transboundary shared river basin manipulate all existing elements of power. Conflictive dynamics surface when

[408] A. S. Qureshi, P. G. McCornick, M Qadir, Z. Aslam, "Managing salinity and waterlogging in the Indus Basin of Pakistan," *Agricultural Water Management* 95, no.1 (2008): 1–10.
[409] Mahmood Ashfaq, Hydro-diplomacy: Preventing Water War between Nuclear armed Pakistan and India,, IPS Press 2018, 199
[410] Abdul Aijaz and Majed Akhter, "From Building Dams to Fetching Water: Scales of Politicization in the Indus Basin," *Water 12*, no. 5 (May 10, 2020): 2-16. https://www.mdpi.com/2073-4441/12/5/1351

subnational political elements in a decentralized political structures link water resource to predominant prevalent and foregoing tense relationships, particularly those regarding language, ethnic diversity, and geographical identity that in turn can afflict the hydro political relationship between states that share international transboundary river.[411]

Subnational hydro-politics reflects the phenomenon that the use of shared water resources is inherently shaped by politics at the subnational level that has profound impact on hydro-political relationship between riparian states. The sharing of transboundary river resource in turn can be manipulated by the subnational elements just like in case of Pakistan and India. Also, the research of subnational hydro politics tries to enlighten how political competitions construct not only competition but also facilitate collaboration.[412]. According to an estimate, 319 rivers around the globe, comprising half of the world's international rivers, are located within jurisdiction of single state. These river basins are confronted with the subnational, regional as well as international conflictive and cooperative dynamics.

Scott Barrett encapsulates his views as: "Water Resources that are located completely within a territorial borders of one nation can be effectively managed; whereas the shared water resources are prone to overuse".[413] But on the contrary, we see that the presence of a single sovereignty is no assurance of cooperation over shared natural resources. Subnational hydro-politics is a factor not too dominant between the hydro-political relationship between Pakistan and India but is very dynamic at national level. Both in Pakistan and India, the central governments have pressure from the provinces in framing water policies. In turn the subnational hydro-politics defines the hydro-politics at state level between the states sharing transboundary water resource. Both in Pakistan and India, there are various subnational conflicting hydro-political issues present at domestic level. For example, a recent statement by the Goa chief minister in response to a dispute with Karnataka, being its upstream neighbor on the Mahadayi River, exemplifies the magnitude to which subnational hydro rivalry that happens between nation- states: "In this age of globalization, even two states cannot be hostile to each other. It is not right . . . Karnataka and Goa are two states in the same country."

[411] Scott Moore, *Subnational Hydro-politics: Conflict, Cooperation, and Institution- Building in Shared River Basins* (New York: Oxford University Press, 2018), 4.
[412] Andrea K. Gerlak, Tanya Heikkila, Mark Lubell, "The Promise and Performance of Collaborative Governance." in *The Oxford Handbook of U.S. Environmental Policy*, ed. Sheldon Kamieniecki and Michael Kraft, (New York: Oxford University Press, 2008), 413– 36.
[413] Scott Barrett, *Environment and Statecraft: The Strategy of Environmental Treaty- Making* (New York: Oxford University Press, 2005), 33.

However, with this statement, the Goa's chief minister ensued to terminate the bus service to its neighbor in order to protest Karnataka's effort to divert water from the Mahadayi River. [414]

Pakistan also faces subnational hydro-politics prevalent between water sharing issues in provinces. For resolution of water rights, a water sharing accord was signed among provinces in 1991. Issue of divergence exists over the construction of various dams and water infrastructures with in Pakistan like the issue of Kalabagh dam. These internal dynamic elements of subnational hydro-politics finds its place in the already genuine irritants in water dispute between both states. Owing to the mistrust and security perceptions the bordering regions of Pakistan and India shows that these areas fall short of performing well in the social development owing to the security sensitivities and governmental priorities. The figures of HDI (Human Development Index) for example in Pakistan's border areas like Bahawalpur, Bahawalnagar, Hyderabad, and Pakpattan, and in the Indian states like Rajasthan, are not encouraging. Because of negative security perceptions on both sides, these bordering areas remained underdeveloped and face managerial issues in water sector. Therefore the hydro-management in both Pakistan and India needs to be analyzed as a causative factor of hydro politics between both states.

5.1.11: Hydro management issues in Pakistan

Like other complex river basins in the world, Indus Basin of Pakistan also faces a set of institutional, organizational and policy framing issues in hydro-management. The multi-dimensional features of water management in Pakistan are international treaty tensions over upstream development by India, sectoral assimilation across water, agronomy, atmosphere, and energy agencies. These interact at the domestic, national or provincial level and their synchronization in a federal system of government and interprovincial mechanism of water conflict resolution. The water scarcity in Pakistan is projected to intensify in future owing to increase in population growth, ecological degradation and mounting water consumption patterns. Above all the hydro-management in water scarce states like Pakistan has emerged as a very daunting task. Two-pronged issues on disputes surface over the water apportionment on national and subnational level are based on accusations of water theft from the downstream lower riparian on the upper riparian regions. Other factor is the element of distrust on state institutions that is responsible for the additional aggravation of hydro-politics.

[414] IANS-Panaji, "Goa CM Urges 'Big Brother' Karnataka to Check Violence over Water Dispute." *Business Standard*, July 30, 2016.

The water resources of Pakistan are under enormous pressure owing to the rapid urbanization, increasing population, and agricultural activities. Climatic variation and ecological degradation has further aggravated the situation resulting in recurrent periodic droughts and floods. Urban flooding has been a common phenomenon in the last few years since the damaging floods of 2010.[415] The main reason is the reduction in vegetative cover in the Indus catchment areas, unprecedented water flow, the conversion of green lands into metaled and concrete roads thus increasing the excess runoff volume and intensity of water. Besides, the encroachments in the drainage waterways have also magnified the issue.

Hydro management is known as the management of water resource under the prevailing water policies, strategies and regulations. Water, once an ample natural resource, is gradually becoming a scarcer product due to the droughts and overutilization. It also includes supply and demand side management that require a countrywide awareness campaigns for water conservation in all forms and fields. Urbanization rate in Pakistan had been increasing continuously. This overcrowded population of major cities of Pakistan like Karachi, Lahore and Rawalpindi caused shortage of services especially freshwater supply for public. Furthermore, because of over population, heavy transport system and large territories of cosmopolitan cities, it had been a challenging and difficult task to develop, maintain and manage such a huge water supply network.

Water disputes among the provinces of Pakistan preexist the division of India in 1947 and are a glaring example of upstream-downstream water conflict.[416] Water for irrigation was distributed between the provinces through informal and ad hoc schedules after partition in 1947. Deliberation by various committees and commissions eventually led to the distribution of waters of the Indus River System in 1991 between the provinces of Pakistan, referred to as the Water Apportionment Accord 1991.[417] According to Water Apportionment Accord of Pakistan 1991 (WAA), four provinces of Pakistan were sanctioned with volume of water of canals of about 114.3 million acre feet but canals potential was only 99 million acre feet which

[415] Dr. Muhammad Ashraf, "Pakistan Council of Research in Water Resource Annual Report 2020-21," (Islamabad: PCRWR, 2021) chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://pcrwr.gov.pk/wp-content/uploads/2021/09/Annual-Report-2020-21.pdf

[416] Dr. Shahid Ahmad, "Pakistan water apportionment accord for resolving inter-provincial water conflicts: Policy issues and options." *International Union for Conservation of Nature,* (Karachi: IUCN, 2017). 2017 https://cmsdata.iucn.org/downloads/pk_ulr_d4.pdf

[417] Yi-Chen E. Yang, Casey Brown, Winston Yu, James Wescoat, Claudia Ringler, "Water governance and adaptation to climate change in the Indus River Basin*" Journal of Hydrology* 519 (2014): 2527–2537. https://doi.org/10.1016/j.jhydrol.2014.08.055

was about 13.4% less volume of water than that was sanctioned.[418] In Pakistan, disagreements constantly surface over fair and just water sharing between the federating provinces of Punjab and Sindh.[419] On January 2010, the Sindh Assembly approved a joint resolution opposing the construction of a projected power plant at the Chashma-Jhelum Link canal. Several other canal projects like the Chubara Canal Project (Greater Thal Canal) and Cholistan Flood Feeder Canal are constantly being objected by Sind. Sind claims that these projects would likely aggravate the water stress in the province and would only increase the prevailing incessant mistrust between the two provinces. [420]Again in 2024, Sindh has opposed the construction of new canals on Indus.[421]

In contrast with water scarcity, excessive water flow in Indus water channels until its drainage to sea, beyond storage capacity of Pakistan cause disaster for land, infrastructure, crops and human beings like floods in Pakistan. Pakistan has inadequate storage capacity and therefore losses about 120bcm of water during the flooding season. This was experienced in the floods of 2010, 2012 and 2014 besides the devastating effects on population, livestock, crops and infrastructure.[422] The current water storage capacity of Pakistan is 9% as compared to the world storage capacity around 40 % against the annual inflow. During the last four decades no substantial additional water has been injected to the system. Most financing and multilateral assistance for Pakistan's water infrastructure in 1960's came under the treaty. Many of which lack repair and maintenance. The investment in storage and water saving technologies in Pakistan is extremely low.

Most of the internal water problems in Pakistan arise from lack of knowledge regarding water conservation practices and illiteracy. The United Nations World Water development report (2006), declared that "fresh water on earth is available in rough amount for every living entity, but water scarcity and water shortage has resulted from poor management of water, corrupt higher authorities, lack of capital for development of infrastructures and lack of awareness".[423] Pakistan should apply the doctrines of the Integrated Water Resource Management for all water resources and their use of water in all sectors. IWRM include all catchment area, expertise, water efficient irrigation practices, productivity increase by

[418] "Apportionment of The Waters Of The Indus River System Between The Provinces Of Pakistan," *Indus River System Authority IRSA*, Government of Pakistan.
[419] Stephen Cohen, *The Idea of Pakistan* (Washington D. C: Brookings Institution Press, 2004) , 212
[420] "Sindh Assembly Rejects Punjab Canal Project," The News, January 29, 2010.
[421] "Khuhro opposes new canals on Indus," *The News*, Nov 14, 2024.
[422] Federal Flood Commission, "Annual Flood Report 2017," (Islamabad: Ministry of Water Resources)
[423] Dr. Muhammad Ashraf, "Water Scarcity in Pakistan, Issues and Options," *Hilal* (2018): 34-38.

innovative harvesting technologies, reuse of wastewater, aquifer revitalizing expertise, sanitization of water for rural community. These IWRM techniques should be adopted for future water resources sustainability. Pakistan's internal political quagmire plays to the benefit of India in all fields including hydro-politics which has much vocal presence at the International stage about to become a leading player in the international economic arena.[424] Incoming president of World Bank is an Indian citizen.

Figure 30: Available Water in Indus Basin in comparison with per Capita available water

Indus Basin	Total Renewable Water Resources MAF (km^3)	Per Capita Water Availability (m^3/person)			
		1990	2000	2025	2050
Indus-India	78.6 (97.0)	2,487	2,109	1,590	1,132
Indus-Pakistan	154 (190.0)	1,713	1,332	761	545

Source: IUCN, 2011. Indus Water Treaty and Managing Apportioned Rivers for the Benefit of Basin States—Policy Issues and Options. IUCN Pakistan, Karachi, p. 8.

5.1.12: Indian Water Resources Management

India is a semi-arid state, located close to the water sources of Tibet, Kashmir and the Himalayas, and is practically situated in the Indus, Ganges-Brahmaputra River and Meghna river basins, and all of these form part of the major Himalayan river systems. It is also in a relatively favorable position away from Pakistan. In addition, India possess the water resources of the Godavari, Deccan, Krishna, Mahanadi and Cauvery rivers along with several coastal rivers and rivers in inland basins. Water resources Management has been a great challenge in India whose magnitude and scale has mounted manifolds over the last five decades owing to diverse reasons, particularly the growing demands and mounting environmental degradation. Most of the issues in hydro management in India have their roots in water availability, increasing withdrawals and variability, quality and environment, ground water depletion, mismanagement and corruption , hydro-electric project construction, water sharing disputes, hydro governance and related institutions, and various challenges emerged due to the climate changing patterns. According to assessments, India owns 16 percent of the world's population but possess only 4 percent of global freshwater resources. Even with substantial investment

[424] Interview with Dr. Pervez Amir

and development in the water resource sector, the management of increasing demand of water in India has become a cumbersome problem.[425].

India also lags in subnational hydro management for a diversity of causes like the inefficient capacity and capability of Indian states, intricacy of the Indian decision-making system and water conflicts at subnational level over water rights. India also needs improvement and development with respect to the equitable and sustainable provision of drinking water to its population that eventually depends on the sustainable hydro management. Hydro governance definitely plays a vital role in the sustainable administration of water resources. The water problems of India will be further intensified, if the status quo is maintained because it is at present already a water-stressed state.[426]

Water is not uniformly distributed geographically in India. About two-third of available water resources are restricted to about one-third of the land area. In the eastern region of India, the Ganges–Meghna–Brahmaputra river basin comprises around 60 percent of the available freshwater.[427] Absence of regulations, excessive privatization, governmental corrupt practices have led to several generations of people that are feeling thirst for more than just a few drops of risk free water. [428] This tense situation internally in India has grown to an extent that the regional conflicts have ascended over the access to rivers in the interior state. These water disputes undertake a global scale in hydro-politics with Pakistan over the River Indus and River Sutlej in the western India, with China in the northern India and to the east with the River Brahmaputra.[429]

Hydro services are underperforming in India in spite of various investments for water infrastructure and water capacity improvement. Majority of municipal areas have few hours access to water in a day, and continuous water supply for whole day is still a far cry. The lack of sufficient access to water compels mostly women to fetch water from far places and consequently have negative effects on overall environment. It consumes a considerable time and energy, rigorously damaging their efficiency.[430] Water supply through pipes is mainly

[425] A. A. Cronin, A. Prakash, S. Priya, S. Coates, "Water in India: Situation and prospects," *Water Policy* (2014): 16.
425–441.
[426] How is India addressing its water needs?, World Bank Group Brief, Feb. 14, 2023.
[427] Shilip Verma, Sanjeev J. Phansalkar, "India's Water Future 2050: Potential Deviations from 'Business-as-Usual'," *International Journal of Rural Manag*ement 3, (2007): 149–179.
[428] The Water Crisis In India: Everything You Need To Know, Stockholm International Water Institute (2021) https://siwi.org/latest/water-crisis-india-everything-need-know/
[429] ibid
[430] W. Seaforth, "Why water is a women's issue," *Habitat debate* UNCHS Habitat (2001).

skewed in the favor of rich. 20 percent of the population gets 92 percent of the water in Delhi, whereas the remaining 80 percent gets only 8 percent of water supply.[431] Poor water facilities and sanitation are also responsible for the undernutrition of 40 percent of underweight children in India.[432]

The rivers in Indian are also greatly polluted and contaminated. According to research, 70 percent of Indian surface water is unhealthy for drinking due to pollution.[433] More than half of India's rivers, along with many others, are highly polluted at levels that are deliberated as dangerous by modern standards. The waters of the Ganga, Yamuna, and Sabarmati rivers have become dirty because of deadly mixture of pollutants, both toxic and organic. Apart from industrialized pollution and common waste, Indian rivers are open for use in large parts of the state. From the aforementioned human waste disposal to bathing and laundry, the human element contributes to the prevalence of health-related concerns. Ganges is the most significant and symbolic river of India that is worshiped by the population as a living goddess. Nevertheless, the Ganga is currently facing enormous pressure from fast urbanization along river banks, with more than hundred towns and cities clearing their domestic sewage into the river directly.[434]

The steady decline in water availability shows that 71% of the available water resources and 36% of the country's land area are concentrated in rivers that flow westward from the Ganges, Brahmaputra and Meghna basins and the Western Ghats. The remaining 64% of the country's geographical area has only 29% of its water available to meet its needs. This caused massive droughts and floods that divided the country. Droughts caused by climate change are exacerbating India's water scarcity situation. In India, it is essential to recognize that scarcity of water resources is not only associated to water supply, rather also to unequal access to resources, which is increasing due to increase in population growth.[435]

India is an agricultural economy with a high demand for water for agricultural purposes, as well as increasing demand due to rapid urbanization and industry. As a result, India faces serious challenges such as water scarcity and deteriorating water quality due to population

[431] Aidan Cronin, Anjal Prakash, Satya Priya, Sue Coates, "Water in India: Situation and prospects," *Water Policy* 16, (2014): 425-441.
425–441.
[432] Sunita Kishor, Kampala Gupta, "Gender Equality and Women Empowerment in India," *National Family Health Survey (NFHS-3) India 2005-06*; (Maharashtra, India, 2009).
[433] Surrendar Kumar, Maddipati Murty, "Water pollution in India: An economic appraisal," India Infrastructure Rep. 1 (2011): 285–298.
[434] "World Water Day 2022: How India is addressing its water needs" World Bank Brief, March 14, 2022.
[435] Peter H. Gleick, *The World's Water 2000-2001: The Biennial Report on Freshwater Resources* (Washington DC: Island Press,2000), 160-161

growth. Given this situation, a significant question to ponder is how India manages its transboundary water resources with neighboring countries. Indian transboundary water sharing mechanism has been peaceful in some rivers, but in others there have often been differences.

5.2: Contextual Factors

For better exploration and understanding of various dynamic features of hydropolitics at all levels, it is certainly essential to broaden the analytical focus to the role of the contextual factors that contribute to forge the well-defined patterns of hydro political relationships, as it is generally elements outside the hydropolitical domain that are decisively influential in intensifying tensions. Therefore, for analytical drives the hydro-management cannot be disjointed from hydro-governance, since both the causative factors and solutions of water challenges surface from the broader context in which they are rooted. This acknowledgement of the embeddedness of hydro-governance in wider socio-political configurations enables an analysis over the processes, dynamic forces and interactions that overtly or covertly influence the hydro-political structure in a given space and time limit, and directs towards a more effective evaluation of cooperative and conflictive features of hydropolitical relations between riparian states. Therefore, an assessment of contextual factors that determine the cooperation or conflict in hydropolitical relationship of two rival riparian in South Asia i.e. Pakistan and India needs consideration. A critical analysis of these factors is discussed below.

These contextual factors includes diverse economic interests of the riparian, national and local political apprehensions, ethnic diversity, social dichotomy, socio-psychological makeup of community and political leadership, ever increasing polarization over strategic securities. Similarly ideological and identity-related dissimilarities existing in both Pakistan and India. The conflicting perceptions of Pakistan and India related to each other centered upon the perceived corresponding economical and territorial security concerns are deep-rooted in the geo-political realities of the Indus Basin. The full spectrum perpetually increasing intimidation by India and the belligerent pretense has also affected the water resources of Indus and is posing a big challenge to the sustainable regional peace.

5.2.1: Historic Legacy of Unjust Border Demarcation of Punjab

The partition of the Sub-Continent in 1947 divided the territory, population, emotions, assets, and water from rivers as well. The partition of the Imperial India in to two states also affected the route of water channels, irrigation infrastructure and canal system build by British. The nature of Indus Basin dispute is deeply linked to the partition plan announced by the

Radcliffe in 1947. The partition of Subcontinent was a bloody painful event that led to the largest movement of population across the newly demarcated frontiers ever seen.[436] Moreover, according to John Briscoe, the former World Bank Senior Water Advisor, division of Imperial India took place on the religious basis and no attention was given to hydrology of Indus Basin.[437] After partition, India became an upper riparian with control over the canal headworks which provided water to Pakistani Punjab, once the breadbasket of Imperial India, and now became a lower riparian that is totally dependent on the upper riparian for water supplies.

India acquired the control of the headworks of two rivers that provided water for irrigation in Western Punjab and the sole land connection to Kashmir region, through a road over the Madhopur headworks. Subsequently, by grabbing the princely state of Kashmir, access to the catchment areas of the whole of the Indus river system was also gained by India. Therefore, Pakistan was deliberately left water insecure right after partition. These fears of Pakistan became true in 1948 when India obstructed the water flow from the Sutlej River into Pakistan, initiating severe damage to Pakistan's agriculture.

During administration of British rule in Subcontinent, there were different water systems such as irrigation canals, which later on at the time of division of Imperial India caused water conflict between Pakistan and India. The province of Punjab was situated at banks of River Sutlej and Bias. Biased decision of Radcliffe in division of Punjab had created many problems for Pakistan. Most critical problem with division was distribution of river waters. Along with this unjust division, another critical decision was full control of headworks in Kashmir was given to India which was very threatening condition for Pakistan. The partition plan did not considered the suffering of inhabitants of Pakistan, morals and norms, and just gave political grip to India over the Vena Jugulars of Pakistan.[438]

Territoriality is the process by which any state asserts the control on geography, is embedded in water conflicts. The decision of giving Gurdaspur and parts of Ferozpur to India at eleventh hour was another unfavorable decision regarding partition made by Radcliffe.[439] The control of these areas was strategically very important with respect to their critical geographic location. This unjust distribution made severe water scarcity in Pakistan when India stopped the water of Sutlej and Ravi rivers in 1948, bringing both countries at the verge of war.

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[436] Crispin Bates, "The Hidden Story of Partition and Its Legacies," BBC History, March 3, 2011 http://www.bbc.co.uk/history/british/modern/partition1947_01.shtml

[437] Kar Lipschutzi, "Global Insider: The India-Pakistan Water Dispute," *World Politics Review*, (June 10, 2010) http://www.worldpoliticsreview.com/trendlines/ 5756/global-insider-the-India-Pakistan-water-dispute

[438] Muhammad Nasrullah Mirza,. "Indus water disputes and India-Pakistan relations." (PhD thesis, 2016).

[439] Interview with Ex Ambassador Shafqat Kakakhel

Both newly formed fragile governments laid claims on Indus Rivers for their economies, sovereignty and nation making. [440] India being upstream, stressed a sovereign right to use all Indus water flowing within its borders. While Pakistan being downstream, asserted that the historical uses of water resources from the rivers of Indus Basin overruled the Indian exclusive right of autonomous sovereignty over water resources.[441] Consequently, the conflicting interests and resultant tensions between Pakistan and India preexist the very foundation of the both states and sets forth foundation for future tensions.

In light of all this explanation it is very clear that instead of making compromise between both parties regarding control of headworks in order to bring peaceful coexistence, the exclusive sovereign control of water headworks was awarded to India. Therefore, partition and the division of political boundaries led to resources competition between both states since their independence in 1947.[442]

5.2.2: History of Water Stoppage

Historical background of water resource conflict should be well known before analyzing conflicts and differences over water resources. In case of Indus Basin conflict, between nuclear armed Pakistan and India, the discord started with the partition of Subcontinent in 1947 with uneven distribution of territories and resources. The water dispute emanate from the incident water stoppage by upper riparian India to lower riparian Pakistan in 1948. This irresponsible act by neighboring up stream riparian left deep imprints on Pakistan and authorities realized their vulnerability against the idiosyncrasies of upper riparian that could strangulate the economy. Being an upstream region, India was able to get control over all water courses flowing to Pakistan and could maintain and construct structures on water resources without taking wellbeing and prosperity of Pakistan in account.[443] The geographic location of the water resources along with their control, rendered the hegemony over the vital resource to upper riparian i.e. India that is manifested by stoppage of water in 1948 and is continued till today.

5.2.3: Trust Deficit Issues

The trust deficit in Pak-India relations is a significant obstacle to improving bilateral ties. Infrequent and inconclusive talks between both states have hindered the development of trust and understanding between Pakistan and India. The unresolved Kashmir dispute remains

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[440] Daniel Haines, *Rivers Divided: Indus Basin Water in the Making of India and Pakistan* (Oxford University Press, 2016), 23.
[441] ibid
[442] Muhammad Nasrullah Mirza, "Indus water disputes and India-Pakistan relations." (PhD thesis, 2016).
[443] Ashfaq Mahmood, *Hydro-diplomacy: Preventing water war between nuclear armed Pakistan and India* (Islamabad: IPS Press 2018), 157.

a major point of contention, with both countries having different narratives and claims. The nationalist sentiments and political considerations in domestic politics of both nations often hinder constructive engagement. The strategic military installations along the border and the development of new weapons systems also have created security concerns. Some external factors, like China's support for Pakistan and the growing ties of America with India, have added complexity to their bilateral relationship.

Water is fundamental necessity and essential for human security. Keeping in mind the prevalent fragile relationship between Pakistan and India, predominant with mistrust, the simple likelihood of Indian manipulation of its strategic territorial control and probable economic strangling of lower riparian through hydro-hegemony is a cause for profound concerns in Pakistan. It is very clearly conveyed by Pakistan that the economic strangulation by India is one of its supposed "red lines," which, if crossed, would give rise to an escalation in conflict. As pointed out by John Briscoe, "If both states of Pakistan and India had usual bilateral relations based on mutual trust, there would be a mutually-verified observing procedure on the flow of water through the Indus Basin. This would ensure that there is no alteration in the route of water channels flowing to Pakistan. In an even more ideal world, the water flow during the critical planting seasons, could be increased by as a good will gesture. This would consequently give significant benefits to agricultural economy of Pakistan and have very little impacts on power generation in India."[444]

Mutual rivalry and confrontation is prevalent in bilateral relationship of Pakistan and India. This can be seen in trade, economy, sports, culture, security and even media. The hydro-politics between Pakistan and India is a reflection of the overall mindset predominant in both states. Both states compete in almost all regional and global platforms, challenging each other as arch rivals. The diplomatic engagement between both countries is frozen strategically, after the revocation of the Kashmiri status in Indian constitution in 2019. In this context, water resources are analyzed through the prism of national security in both states. Fear-mongering by populist politicians and fueling nationalist sentiments on social media can challenge the spirit of cooperation.

There is a conflict resolution mechanism chalked out in IWT allowing for bilateral discussion on issues that emerge between the two countries. But recent referrals to a court of arbitration clearly shows that many sensitivities exist. While the treaty has worked for over 60 or more years, the emerging challenges from climate change will test its mettle. In Pakistan's

[444] John Briscoe "War or Peace on the Indus", *The News International* (Islamabad), April 3, 2010

case cross border allegations on terrorism, upper-lower riparian stresses and ever increasing demand for water, open windows for further conflict but also could prove an element of reciprocity for cooperation as was witnessed in the 1950's.

5.2.4: Nuclear Race in South Asia

Pakistan and India are intertwined in long-running and incendiary differences since their independence in August 1947. Both are nuclear armed states, and overpassing a combative threshold might flare up a nuclear warfare between them. Undeniably, South Asia has been identified as one of the world's probable nuclear flashpoints by the political observers. The Himalayan belt comprising the two nuclear states of the region is one of the most militarized areas on the globe. Kashmir has been termed as the most dangerous place on the earth by the former US President Bill Clinton.[445] Various diplomatic mediations have helped to defuse the military tensions previously, but a persistent and long-term peace is an elusive reality. Both Pakistan and Indian have huge military presence along the disputed border of Line of Control and military encounters are normal.

It has long been debated in the global security spheres that the possession of the nuclear-powered arms deters states from using them in war. While the possession of nuclear weapons may anticipate a nuclear exchange, at the same time these nuclear capabilities do not stop the states from using the conventional military power against each another. Since the conventional military skirmishes can swiftly intensify and escalate, the probability of a nuclear exchange is considered as a tangible phenomenon, if prospectively a distant possibility. In case of South Asia, both Pakistan and India have between 165 and 160 warheads as of 2022.[446]

In Feb 2019, when strikes were ordered by Indian Prime minister Narendra Modi on limited targets in Khyber Pakhtunkhwa province of Pakistan, [447]his counterpart Imran Khan, the prime minister of Pakistan indicated that any further military escalation between both the two neighbors would result in consequences beyond the control of political leadership. He thus warned: "With the weapons you have and the weapons we have, can we afford miscalculation? Shouldn't we think that if this escalates, what will it lead to?"[448]The cumulative number of nuclear arsenals possessed by Pakistan and India are less as comparison with the nuclear weapons of US, China or Russia. But keeping in mind the animosity between them, these arsenals could unleash astounding devastation if arrayed against the civilian population across

[445] Annie Waqar, "Nuclear war between India and Pakistan?" The Conversation, March 6, 2019.
[446] James Eagel: Nuclear Warheads by Country (1945-2022), The visual Capital, March 21, 2022.
[447] Balakot: Indian air strikes target militants in Pakistan, *BBC News*, March 01, 2019.
[448] Annie Waqar, "Nuclear war between India and Pakistan?" The Conversation, March 6, 2019.

the borders. A controlled exchange even of nuclear weapons between Pakistan and India would be among the most catastrophic ever within seconds, nevertheless the perils of the radioactive repercussion and the longstanding enduring impacts on the environmental and ecological balance of the region.

Pakistan's hydropolitical political discourse became dominant particularly in the 1990's after the beginning of controversial projects of Baghlihar and Kishenganga dams by India. Salal Dam Issue was resolved through bilateral resolution process. But the relations began to sore when the designs of KHEP and BHEP were objected by Pakistan and the issue was not resolved under the dispute resolution method envisaged by IWT. As the disputes were contested on several platforms over several years, the sentiments on both sides were escalated by media reporting that was misguided at many occasions. The reaction to the decisions of various cases were hailed as victory in one country while the others criticized the loss as failure of their governments. The sentiments of hegemony and sovereignty over the water resources were reignited in India in various factions.[449]

In Pakistan the feelings intensified that India always tried to impose hegemony and control the waters of Pakistan. The linkage of water issue with Kashmir dispute also get highlighted in one way or the other. The agitation get so intensified at times that though small but some quarters in Pakistan threatened to attack India with nuclear bomb.[450] On the other hand, the Prime Minister also publicly threatened to revoke IWT and strangulate Pakistan's supply of water. Instead of trying to comprehend and resolve the issues amicably and prudently, several provocative statements were uttered and reported in media. Narendar Modi, Indian Prime Minister wooed the voters with a promise to abrogate the IWT.[451] There are various visible and invisible pressures on the respective governments of Pakistan and India from media, public, politicians, defense establishments and fanatic elements. Any compromising situation by any state might be labelled as traitor. As the impending issues face delay from Indian counterparts about the resolution of issues bilaterally and apply delay tactics, the resentment increases on both sides and resultantly tensions are mounted.

Both Pakistan and India are trapped in ensuing conflict having roots in other complex contextual factors like historical legacy of mistrust and rivalry, antagonism and contending ideological leanings. Hence, increasing the risk of nuclear exchange where already there is

[449] Ashfaq Mehmood, *Hydro-Diplomacy: Preventing Water War between Nuclear Armed Pakistan and India* (Islamabad: IPI Press, 2018), 180.
[450] ibid
[451] https://indianexpress.com/article/india/india-news-india/departments-will-brief-pm-narendra-modi-on-indus-waters-treaty-today-3050235/

scarce availability of water, droughts or flooding, surging population and increased demand of water for agricultural, industrial and communal usage. Pakistan and India though are showing some vital restraint in the nuclear domain but both states should cooperate mutually for a durable long-lasting fix because even a mishap or a mistake, can propagate into a nuclear exchange causing devastation for the civilian population across the boundaries of two rival South Asian neighbors.

5.2.5: Data Sharing Issues

Transparent and continuous sharing of data among the cop riparian is a key to build mutual trust. The smooth sharing of data helps to manage floods and droughts that can cause damage to the population, economic strength of states. Generally the lower riparian needs data for smooth functioning of the treaties and agreements between riparian as it is dependent on the upper riparian for flow of water. According to Article VI of Indus Water Treaty, it has been recommended to both Pakistan and India to exchange data related to daily and monthly flow of water in Indus Basin River System with each other. IWT provides enough provisions for sharing of data because it helps for effective utilization of available water resources, managing the life-threatening events like flooding or droughts and also for future planning to harness the potential of shared river system.

Furthermore two neighboring countries as per treaty should exchange all data linked to water resources of Indus Basin every month and it should not be delayed more than three months. According to the Indus Water Treaty, both countries should share daily data like recordings of river flow, reservoirs, canals, and link canals on a monthly basis. Additionally, it was recommended to both countries to exchange data related to engineering works such as dams or barrages before its construction, for example, storage capacity of dam, dam's design, height of walls of barrage, discharge of tributaries and if any of them wanted more information it should be provided. Additionally, in Article IV of Indus water Treaty both of them was suggested to share data with each other related to any climate change effect, so that precautionary measures should be taken in time to avoid floods or droughts that may be resulted from changing climatic conditions.

In initial years of post-Indus water treaty, India had shared data without any deviation with Pakistan related to construction of the Salal Dam, as it was in line with provisions of Indus Water Treaty. In contrast to this project, India's other projects like Baglihar project on Chenab River, Dul Husti project and Rattle Dam, Neelam -Jhelum River's Kishenganga dam and Indus River's Tulbul Navigation Dam or Wullar barrage became conflictive as data had not been shared properly by India. This lack of data sharing issue caused conflicts between both

countries. Consequently, this intransigence behavior of India towards data sharing with exceptions caused a threat to Pakistan and hence Pakistan objected to all those projects due to which those projects remained incomplete. Furthermore, being upper riparian, India would have to inform Pakistan for any event related to water disaster but India had not shared that data properly with Pakistan due to which Pakistan had faced consequences such as floods.[452]

5.2.6: Kashmir Issue: Manifestation of Indian Hydro hegemony

Kashmir issue is a territorial dispute over the region of Jammu and Kashmir, mainly between Pakistan and India. Kashmir dispute is also the unfinished agenda of partition and a major source of conflict between both states since independence in 1947.[453] Since both Pakistan and India claimed their right on the entire former Princely State of Jammu and Kashmir, the dispute resulted in three military wars between both neighboring states on the region along with several other armed skirmishes. Kashmir is a region from where Indus and its tributaries originate and passes through India finally reaching Pakistan. For this reason Kashmir got topographical importance for both neighboring countries. One third part (33%) of Kashmir had been owned by Pakistan and named as Azad Kashmir, whereas other two third part of Kashmir (67%) with origin of Indus Basin and its tributaries has been occupied by India and called as occupied Jammu and Kashmir.[454]

The Indus Basin Dispute between both states is intricately associated to the disputed region of Jammu and Kashmir, because the primary transboundary water resources flow in Pakistan and India through this region. The contending Pakistani and Indian articulations of the causative link between territorial sovereignty and the water control has become strongly evident in the context of the Kashmir dispute. The two tributaries of Indus, the Jhelum and Chenab River, spring from this disputed area. Physical domination and control of Kashmir therefore means resource capture and having early access to river water. The former president of Pakistan, Pervez Musharraf said that the Jammu and Kashmir issue is basically centered on the sharing of the water of the Indus River and its tributaries between Pakistan and India. If one side of the dispute is resolved, the other side will not exist.[455]

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[452] Waseem Ahmad Qureshi, "The Indus Basin: Water Cooperation, International Law And The Indus Waters Treaty," *Denver Journal of International Law & Policy* 46, no 1, (2017): 56

[453] Erum Sattar, Jayson Robison, Daniel Mccool, "Evolutions of Water Institutions in the Indus Basin: Reflections from the law of the Colorado River," *University of Michigan Journal of Law Reform* 51, Issue 4 (2018): 743.

[454] Christopher L. Slater, Joseph John Hobbs, *Essentials of World Regional Geography* (Thomson Learning Brooks/Cole, 2003), 312.

[455] Pervez Musharraf, *In the Line of Fire: A Memoir* (New York: Simon and Schuster, 2006), 352.

India has the leverage of its geographical location and is in a much better position vis-a-vis Pakistan due to its upstream location and possess comprehensive control on the water resources, which creates a sense of insecurity in Pakistan in the backdrop of strained bilateral relations. The issue of access to water resources of western rivers for hydropower generation projects and commercial irrigation in Kashmir is a major concern for Pakistan. Indian policy makers and authorities argue that Kashmir issue is not just an ideological or emotional issue rather it is more a geographical and economical issue because of its intertwined nature with water supply."[456] India's new legislation violates the core principles of right to self-determination for Kashmiris. These new developments are detrimental to both Kashmiri and Pakistan's water interests. [457]

Indian determination to bring disputed region of Kashmir under its control is continued by New Delhi. Indian administration in 2022 and 2023 clamped down on independent media in the valley of Kashmir, remodeled the electoral map to honor Hindu-majority areas in Jammu and Kashmir, and also convened a G20 tourism summit in Srinagar.[458] The population of Kashmir criticizes and protests against the governmental policies vocally at all levels. The Indus Waters Treaty presented water settlement as division of rivers in Pakistan and India but did not address the geopolitical challenges posed by Kashmir issue. Due to this reason the hydropolitical relationship between both neighbors remain controversial.[459]

5.2.7: Antagonistic Relations between Riparian Effecting Water Sharing

A major irritant in the hydro-political relations between Pakistan and India is directly related to overall hostile bilateral relations between both states. Normalization in antagonistic relations between both could avert an ecological calamity in South Asia, however the failure of pacification of issues could fuel the fires of dissatisfaction that might lead to terrorism and extremism.[460] The hydro-political relations of Pakistan and India are affected by the long nourished antagonism and enmity. Over the past seven decades, Pakistan and India have battled three major wars and had been engaged in various incidents of minor skirmishes. The enmity between them relate to a number of problems that range from border disputes to cross border terrorism and water access. A profound sense of mutual suspicion has infused bilateral relations between both states since independence. Hathaway, researcher in Washington-based Woodrow

[456] Jasjit Singh, *Kargil 1999: Pakistan's Fourth War for Kashmir* (New Delhi: Knowledge World, 1999), 1-3.
[457] Interview with Dr. Pervaiz Amir:
[458] Krishn Kaushik, "India boosts security for G20 meeting in Kashmir after attacks," *Reuters,* 2023.
[459] Daniel Haines, *Indus Divided: India-Pakistan and the river basin dispute* (India: Penguin Random House, 2018), 23.
[460] Asif Ali Zardari, "Partnering With Pakistan," *The Washington Post*, January 28, 2009.

Wilson International Center said that both Pakistan and India have been hostile and unfriendly towards each other since independence in 1947.[461] This hostility between them have made South Asian region as one of the least integrated areas in the world.

One of the main causes of the conflict is the ideological and religious difference between Pakistan and India. The hostility between cultural traditions shape their attitudes towards each other. Some analysts even go as far as to believe that Pakistan and India will never be able to establish a lasting friendship due to deep socio-political and cultural conflicts. Mistrust and mutual impasse resulting from it is natural and inevitable. The overall regional environment is shaped by conflicting historical legacies, the unjust partition pattern of 1947, socio-cultural conflicts, and their interactions, which lead to opposing policies towards each other. The leaders use their influence to gain strategic concessions from regional and global powers for their respective countries.

Similarly the initial problems like the disputes over Kashmir, Junagarh and Manavadar, the distribution of water resources and subsequent stoppage of water by India, the massacre of the people fleeing across the newly created Pakistan-India boundary, became the analytical lenses for future coordination. Further the role played by India in East Pakistan crisis 1971, Siachin dispute, Brass-tacks crisis 1986-87, all point out to the Indian antagonism. So much that Kulbhushan Yadev, a commander in Indian Navy was arrested from Baluchistan in 2016 who as involved in subversive activities.[462] These factors became the impediments in maintain a normalization of bilateral relations between both states.

Pak-India bilateral relationship are stuck in power politics that make the two neighboring states as rivals with opposing and contradictory identities and interests. India considers itself as a regional hegemon with the authority to interfere in the affairs of South Asian nations but Pakistan has long repelled India's dominant doctrine and believed in the sovereign equality of two nations. Both neighboring countries live in a perpetual security dilemma condition and are locked in the patterns of persistent rivalry, aggressive national security paradigms, and militarized geopolitics. In spite of efforts by several administrations of Pakistan and India to resolve their differences, there seems to be a trend that some incident derails the process whenever Pakistan and India edge closer towards dialogues.

Officially, both the sides have uncompromising an intransigent attitudes and rely on certain preconditions for any peace progression and bilateral channel of communication. Delhi

[461] Srinivas Mazumdaru, "Antagonistic relation," *In focus DW*, Sep. 8, 2013. https://www.dw.com/en/india-pakistan-an-antagonistic-relationship/a-17025326

[462] "Kulbhushan Jadhav saga unfolded," *The Dawn*, July 17, 2019. https://www.dawn.com/news/1493236

upholds that Pakistan needs to halt cross-border terrorist activities for commencement of any dialogue both states. In an interview with ANI, S. Jaishankar, the External Affairs Minister recently iterated analogous preconditions, by saying that India is ready to engage with Pakistan but not under such circumstances where terrorism and violence is seen as a legitimate tool for diplomatic exchange.[463] Similarly, Pakistan has conditioned bilateral engagements on the retreating the Indian abrogation of Article 370 that altered the special status of Kashmir in August 2019 and validated by the Indian Supreme Court.

For successive years, the political leaders of both the states have used this absence of a normalized bilateral relationship for their respective national political narrative building also whenever in election mode. This antagonistic governmental rhetoric in both countries has restricted the probabilities to permit the political leadership of each country to pursue sustainable peace in the region. Both Pakistan and India, spend a considerable huge amounts of finances (around 2.6 percent of their GDP in 2011) on the modernization of their military prowess and purchasing new weaponries. While according to the World Bank, the public financial disbursement for health care amounted to only 1.1 percent of the GDP in India and even less than one percent in Pakistan.[464]

5.2.8: Political Leadership and Rhetoric of Water Using as Weapon Against Pakistan

The vitality of water can be weaponized by political actors through three primary means i.e. reducing the quality of water by contamination, supplying too much water causing flooding, or constraining the water access by manipulation and control of water flow. India currently utilizes around 94 percent of water resources of eastern rivers of Indus Basin and is rigorously planning to construct water projects for utilization of the remaining water rather than letting those waters to flow to Pakistan as per IWT. In the wake of the Pulwama incident in Feb 2019, India's water resources minister, Nitin Gadkari, stated that India needs to stop even "a single drop of water" from flowing to Pakistan.[465] Present Prime Minister of India N. Modi had given a warning to Pakistan in which they can utilize water as a political weapon against Pakistan. For Pakistan's survival this warning of India's PM proved to be a red signal. After this warning, water shortage of 30K cusec feet in River Chenab and 10K cusec

[463] https://thediplomat.com/2024/01/could-the-india-pakistan-relationship-normalize-in-2024/
[464] Srinivas Mazumdaru, "Antagonistic relation," *In focus DW*, Sep 8, 2013. https://www.dw.com/en/india-pakistan-an-antagonistic-relationship/a-17025326
[465] Joanna Slater, "India wants to use water as a weapon against Pakistan. A 59-year-old treaty stands in the way," *The Washington Post,* February 22, 2019.

feet water shortage at Head Marala has been a clear sign of irresistible control of India of River Chenab and attempt to use water as a weapon against Pakistan[466].

Water experts in India like Brahma Chellaney believed that India is too generous towards Pakistan and should devise more strategies to utilize water as leverage and political tool against Pakistan. He also suggested that India may suspend the participation in the normal regular consultations of the Indus water commission that monitors the IWT. He further said, that India should also stop the sharing of data related to the flow of water levels with Pakistan. He further added that India can contend from a legal perspective that the use of terrorism by Pakistan profoundly alters the indispensable foundation of the treaty, and India could withdraw from IWT" reiterated Chellaney.[467] Pakistan has cautioned that such a move of withdrawal from the treaty unilaterally by India would be perceived as "an act of war." [468]India had violated Indus Water Treaty same as in case of Violation of Article 370 of Constitution of India in which Jammu and Kashmir Portion of Princely state occupied by India given special place.

Narendra Modi, Indian Prime Minister in 2016 avowed that "blood and water can't flow together".[469] This statement clearly points out the future inclinations of India of using water as a political tool against Pakistan in the midst of its disappointment to create its writ among the agitated but firm resolution of people of the disputed Jammu and Kashmir. In another effort to mount war hysteria, Arjun Mehghwal, India's Union Minister for Water Resources proclaimed in March 2019 that India had already held 0.53 MAF water resources of the three eastern rivers from flowing into Pakistan. The political rhetoric spinning around the sensitive and vital issue of transboundary water sharing between Pakistan and India, has gained impetus during recently domestic pressures for Prime Minister Modi and his Bharatiya Janata Party in their election campaigns.[470] Such political rhetoric between rival riparian states fuel the enduring rivalries and have consequent repercussions on the cooperative potential of transboundary water resource.

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[466] Sheikh Waleed Rasool, Manzor Nazim, "Hydro Politics as Hybrid War: The correlation to Kashmir and Pakistan Survival," *Abasyn Journal of Social Sciences* 10, (2017): 169.

[467] Joanna Slater, "India wants to use water as a weapon against Pakistan. A 59-year-old treaty stands in the way," *The Washington Post*, February 22, 2019.

[468] ibid

[469] "Blood and water cannot flow together: PM Modi at Indus Water Treaty meeting," Indian Express, September 27, 2016, accessed June 10, 2023, https://indianexpress.com/article/india/india-news-india/indus-water-treaty-blood-and-water-cant-flow-together-pm-modi-pakistan-uri-attack/

[470] India blocks free flow of water from three eastern rivers, *The Express Tribune,* 11 March 2019.

Despite the success of a water treaty with India, tensions over withdrawal and new infrastructure projects continue between both states. Demographic modifications and economic development, predominantly increasing population growth, rising demands, and climate change is expected to disturb supply in various forms. Considering these risks, the repercussions of key changes in Indus watersheds can be dire. But water should not be an avenue to escalate conflict. Instead, reckoning its vitality and significance for human societies, we can build bridges to peace through cooperation as access to water is a basic human right.

Chapter Six

Hydro-politics between Pakistan and India: Future Prospects

Indus River Basin is a complex basin serving as a natural asset and food basket to the population inhabiting in it. The rivers of the basin were severed after the partition of subcontinent and hence water became a topic of friction between the newly independent states in South Asia. South Asia is nestling around 21 per cent of the world population, however the region must manage with just 8.3 per cent of world water resources.[471] Growing population as result of instantaneous urbanization is increasing the demand for water at an unsustainable degree in South Asia. Climate variations and environmental degradation is affecting the melting rate of Himalayan glaciers and consequently is exacerbating the problem of water availability.[472] Simple scarce availability of water resource is not the only causative trigger of water conflicts in South Asia rather the major controversies between riparian emerge due to the geostrategic location and the construction of hydel infrastructure by riparian states sharing transboundary water resources.[473] Additionally, mutual suspicions and the reluctance of cooperation between riparian states may mar well timed appropriate approaches to any joint collaborative action, dealing with complications of non-traditional security pressures like hydro political dynamics in the region.[474] Undeniably, there are fears intensifying regarding the probability of 'resource wars' in South Asia. But the reality of water conflicts is a complex phenomenon and the potential of conflict or cooperation of transboundary water resource does not apparently present itself in the one-dimensional dual proposition of war and peace.

Hydro-politics in South Asia in all its aspects ranging from the beginning of the conflict, leading to the negotiation process, ratification of Indus Water Treaty with its pros and cons, manifestation of hydro-hegemony by India by construction of dams on the western rivers, and the exploration of causative and contextual factors of the conflict have been analyzed in the previous chapters. This chapter focuses on the future prospects of the hydro-politics between Pakistan and India based on the previous patterns of conflictive engagement and cooperation/

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[471] Brahma Chellaney*, Water: Asia's New Battleground* (Washington D.C., Georgetown University Press, 2011), 277.

[472] Michael Renner, "Water Challenges in Central-South Asia," Noref Policy Brief No 4 (Oslo: The Norwegian Peacebuilding Centre, December 2009): 8.

[473] Douglas Hill, "Boundaries, Scale and Power in South Asia," in Devleena Ghosh, Heather Goodall and Stephanie Hemelryk-Donald eds. *Water, Sovereignty and Borders in Asia and Oceania* (New York: Routledge, 2009), 96.

[474] Michael Renner, "Water Challenges in Central-South Asia," Noref Policy Brief No 4 (Oslo: The Norwegian Peacebuilding Centre, December 2009): 8.

collaboration among riparian states. I will recapitulate the major causative and contextual factors that act as independent variables and consequently determine the prospective potential of conflict or cooperation between riparian states sharing transboundary water resource in South Asian Hydro Political Complex. Further it also analyzes the prospects of hydro-political relations in future because currently there is neither primarily more cooperation, nor more conflicts. Conflict or cooperation is not a single causal factor instead they are product of multi-dimensional and complex interlinked factors. They are identified as the relative riparian geographical location, environmental and ecological degradation, population growth, power asymmetry and mismanagement of intrastate and interstate natural resources. All these work together in complex manner to determine the prospects of conflict or cooperation.

6.1: Power Asymmetry

According to Hydro-hegemony Theory, power asymmetry between riparian states can be analyzed on three different levels. They are geographical scale, technical power potential, structural power (economic, military and political) and ideological power or bargaining power. By analyzing the various aspects of hydro-politics between Pakistan and India, in order to conclude the research and estimate the prospects we need to apply the conceptual framework on the case study therefore, each aspect is summed up in following paras.

6.1.1: Relative Geographical Riparian Position

Geographic factors have always affected the politics among nations. One can choose enemies and friends but can't choose neighbors. Therefore, India will remain upper riparian and this feature has always manipulated by India throughout history since creation of both states. India as an upper riparian state in the Indus Basin can potentially turn Western Punjab of Pakistan into a desert that is the breadbasket and backbone of Pakistani agricultural economy.[475] This geographical power asymmetry between the two riparian states of Indus basin is substantially important. The research by the Woodrow Wilson International Center in 2009 reported that the availability of water resources in Pakistan has dropped to 70% as compared to per capita 1,500 cubic meters water available in 1950's.[476] This is anticipated to reach the level of 1,000-cubic-meter/capita in next 25 years when Pakistan will be officially considered as "water scarce state" by global standards. Indus Water treaty assured Pakistan 55,000 cusecs of water but the state has only received 13,000 cusecs in 2009 in the winter season and a

[475] Robert Mandel, "Sources of international river basin disputes," *Conflict quarterly* 12 (1992): 25–56. http://www.lib.unb.ca/Texts/JCS/CQ/vol012_4fall1992/mandel.pdf

[476] A. Sharma, T. Wright, "India and Pakistan Feud Over Indus Waters: Fight Threatens Peace Talks as Islamabad Requests Arbitration Over New Delhi's Plans for a Hydroelectric Plant," *The Wall Street journal, World,* 2010. http://online.wsj.com/article/SB10001424052702304370304575151591013994592.html

maximum flow of 29,000 cusecs throughout the summer season.[477] India, as an upper riparian state, is constructing various hydel infrastructures upstream to manipulate the water flow to Pakistan in order to establish hydro-hegemony and enjoy political supremacy in the region. As discussed in previous chapters, theses constructed projects can potentially regulate and manipulate the flow of water in Pakistan despite having bilateral treaty.

6.1.2: Technical Competence

India has greatly developed its technical capability of making dams as compared to Pakistan, with 5334 dams. It is projected that in future another 2500 big dams will be necessary for achieving the storing capacity to use it for the socio-economic improvement.[478] Irrespective of the Indus Water Treaty, India is developing hydro management infrastructures vehemently on the western rivers upstream. Many projects on these rivers have been completed or are under construction in Kashmir on the disputed water resources. Baglihar Hydro Power Project, Tulbul Navigation Project on Wullar Lake, Kishenganga Project on Chenab River, and Rattle and in Kashmir are the noteworthy projects that have been objected by Pakistan on the grounds that they might disturb the water flow into Pakistan.[479]Pakistan has shown reservations about numerous construction works by India over the western waters that were assigned under IWT for the unobstructed use of Pakistan. These construction projects are also of significance owing to the geostrategic location of Kashmir, as all of the freshwater supplies flowing to Pakistan originate from Kashmir under Indian control. India as an upper riparian state, is capitalizing its geographical location, so as to gain full regulatory control of water supplies granted to Pakistan.

6.1.3: Economic Status

The Economic status of India has also improved as in 2003 it was the 12th biggest economy and now in 2023 it is the 5th largest economy. The economic ranking of Pakistan is not as good as the economic ranking of India. The economic ranking of Pakistan 2019 was at the status of 44th and this further declined to 161st in 2023.[480] The per capita gross domestic product (GDP) of any states is a suitable indicator that points to its economic might. In 2002, India's per capita income was $2,410.9 in 2022,[481] while the per capita income in Pakistan

[477] R. Mogwai, "India and Pakistan Face Water War: Tulbul Navigation Project may cause conflict," (2009). Available at http://www.orato.com/world-affairs/india-pakistanface-water-war

[478] ICID (2004) "Appropriate Decision Making particularly for Irrigation, Drainage and Flood Management‖ Government of India. http://www.icid.org/tf5_paper.pdf

[479] Ropesh Kumar, "The Indus Water Treaty: issues and Challenges," *Journal of Law* 6: Issue I (2019): 75-77.

[480] Emma. (2018, December 28). GDP rankings of the world's largest economies, 2019. CEOWORLD Magazine. https://ceoworld.biz/2018/12/28/gdp-rankings-of-the-worlds-largest-economies-2019/

[481] https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=IN&

stands at 1,588.9.[482] Indian GDP is around 10.55 times higher than the GDP of Pakistan, with Indian GDP at $3,937 billion and Pakistan's GDP at $373 billion.[483] The GDP growth ratio of India in the financial year of 2023 stands at 7.6% while on other hand the overall GDP growth of Pakistan is 2.8% in 2023.[484] Overall, India's larger economy and global influence give it significant economic leverage over Pakistan. However, Pakistan's strategic location and natural resources provide some counter-leverage. India has greater global economic influence, allowing it to shape international economic policies and decisions. Moreover, India has more developed financial markets, allowing it to attract foreign investment and influence global financial flows.

6.1.4: International Military Standing

The international military ranking of India is the 4th largest military in the world. Yet, Pakistan is the 7th largest military power internationally in 2023.[485] The military might is comprised of two foremost kinds i.e., conventional capability, and nuclear command. In terms of conventional military power, equality exists between both states but after conducting nuclear tests in 1998 and attaining nuclear technology, the concept of nuclear deterrence is prevalent in South Asia. Though, the nuclear deterrence is established yet both states are entangled in an interminable arms race. Both Pakistan and India have prompted a new aerospace race and cyber race to upcoming standards of the prevailing global power standing. Measurement of military power of states is more complex than it might seem. The national security of a state and strategic goals can develop as its national power capability develops. The inventory of Armed Forces of India mostly consists of Russian origin equipment beside with a slighter mix of domestically-produced and Western arms. Russia, France, US and Israel are also among the major arms suppliers to India[486]. The military inventory of Pakistan embraces a comprehensive mix of equipment from France, Russia, Turkey, UK, US and primarily China. Pakistan has also massive domestic defense industry.

6.1.5: The Bargaining Proficiency

The Indian power of bargaining can be gauged by triple dynamic factors. The first advantage to India is its geographical location, where India is Upper riparian, and this position increases its bargaining power. Harmon Doctrine of absolute territorial sovereignty is adopted

[482] ibid
[483] https://statisticstimes.com/economy/india-vs-pakistan-economy.php
[484] www.finance.gov.pk › economic › economic_update_May_2023
[485] Woody, C. (2018, November 22). The most powerful militaries in the world in 2018. Business Insider. https://www.businessinsider.com/most-powerful-militaries-in-the-world-ranked-2018-11#17-pakistan-9.
[486] https://armedforces.eu/compare/country_India_vs_Pakistan

by Indian authorities being upper riparian state. Secondly, India has good professionals to defend its position in front of neutral experts, as evident from their victory in the case of Baglihar project. Pakistan lost the case and India got permission to build the dam after incorporating amendments pertaining to the design of the dam as suggested by the neutral expert. The proficiency of various available water and technical experts augments its bargaining power in the correspondence of Indus Water Commission, arbitration court of law, and the neutral experts.

Indian improving trade relations with other countries are also manifestation of its bargaining power. Indian developing economic and military status also improves its bargaining power position. The weakness in the bargaining power of Pakistan does not mean end of the game. For example, when water issue is associated with the Kashmir issue then the bargaining power of India might affect as Indian stance on Kashmir and its occupation status affects the overall Indian might. The revocation of article 370 and 35 A and the validation by the Indian Supreme court, is a clear example that India wants to legalize the manipulation of water flow by declaring Kashmir as an integral part of India and its unrestricted right of the Indus rivers.[487]

6.1.6: Ideational Influence

The practice of ideational influence by one riparian over other, to acquire manipulative control on transboundary water resources is owing to the lacunas International Water Law that is merely linked with the reasonable and equitable and distribution of transboundary waters and consequently not taking into consideration the factual reasons which may stop this objective from being realized.[488] The ideational power of India is associated to its bargaining supremacy, since Pakistan is completely reliant on the waters of Indus Basin that pass through the Indian occupied state of Jammu and Kashmir. India is unwilling to acknowledge that recognizing the accession of the State of Kashmir to India in 1947 in division of Subcontinent is an unquestionable fact and therefore favors to couple the Kashmir associated strains with numerous other issues in the composite dialogue.[489]

6.1.7: Political Power

Another feature that enhances Indian political power is its strategic associations with potentially powerful countries that back India generally on regional or global forums. India has usually preserved friendly relations with major powerful players in the region and across the

[487] Interview of Ahmar Bilal Soofi

[488] Mark Zeitoun, M. Woodhouse, "Hydro-hegemony and international water law: grappling with the gaps of power and law" *Water* 02, (2008): 103-119.

[489] Christine Fair, “India and Pakistan Engagement: Prospects for Breakthrough or Breakdown?” USIP (2005). http://www.usip.org/files/resources/sr129.pdf

globe as well like Russia, US, Israel, Saudi-Arabia, Afghanistan, China to enhance its bargaining power. India receives the leaders of powerful states and conducts bilateral visits, the main concern is to warrant the Asia‘s third largest economy, beneficial for their economies while when same leaders come to Pakistan, they have one thing in their mind that Pakistan should assist them in countering terrorism strategies. The Indian structural power is getting stronger by its massive economic role and the investment from highly developed and stable economies of the world. Whereas Pakistan is entangled in big power rivalry like China-US on international fronts and a weak political structure at home, effecting its overall political standing in comity of nations.

6.1.8: Ideological Power

Ideological power is implemented by construction of ideas and concepts coupled with knowledge creation. Powerful states employ their dogmatic premise to serve their interests potentially against the weaker nations in order to make their hegemonic design reasonably acceptable and justified. In 1948, India stopped Pakistan’s water flow and decided to reinstate restricted water supply after one month on getting seignior age for water supplies. The condition of seigniorage payment was agreed by Pakistan because of the Indian ideological power. India advocated the concept that while India is upper-riparian therefore it has the autonomous right controlling the water flow, and Pakistan as a lower-riparian state must pay seigniorage for water supply. Briefly, it is identified as “power of ideas/concepts.” Subsequently obtaining all the forms of power, the hydro-hegemon country can formulate, endorse or even modify the rules of game.

6.2: WATER CONTROL STRATEGIES IN TRANSBOUNDARY RESOURCE

6.2.1: Cooperative Mechanism: Shared water control

The cooperative mechanism is the condition in which the hydro-hegemon riparian agrees for shared water control. Positive role is displayed by the leadership of hydro-hegemon state and therefore it embraces the strategy of incorporation and accommodation. The hydro-hegemon riparian state interacts with its co-riparian states to acquire the mutual control of water flow hence cooperation is accomplished among riparian states. The states that share transboundary water resource undertake equitable distribution of water resources and consequently no conflict would be evident in any accommodating/cooperating situation. This mutual water control state was observed in Pakistan-India hydro-politics in September 1960 when after a prolonged negotiations on water sharing dispute, official treaty was signed with

the mediatory role of the World Bank.[490] It was agreed upon that the water assets would be divided equally on the ratio of 3:3 that meant that the three western rivers and three eastern rivers were given to Pakistan and India respectively.

6.2.2: Indus Water Treaty: Manifestation of Cooperative Mechanism

Various global agreements between bilateral or multilateral parties are rare occurrences of pure cooperation rather they are more often outcomes of power asymmetry and conflictive engagements. Indus Water Treaty is both a sign of cooperation between the two rival countries because it has withstood armed skirmishes and a conflict because it remains to foster resentment prevalent in both riparian sharing transboundary resources. Therefore, it demonstrates that conflictive engagement and cooperative mechanism exists together between disputants simultaneously as two faces of same coin,[491] and explains that the absence of warfare is not analogous to an operative and reasonable solution.[492] Though it is frequently welcomed as a great instance of bilateral collaboration in midst of conflict between the two rival riparian states, this squabble disregards the historical likelihoods that were substantially imperative in restraining Pakistan's early scope of action**.**

Even though there was the presence of concession, after the facilitation by the World Bank, India exercised its supremacy as a hydro-hegemon state and accomplished its goals.[493] However after the eight-year long negotiation process, Indus Water Treaty was a significant exercise in conciliation and confidence building between the two rival neighboring states with diverse ideological tilts. Both states desired the eastern basin of the Indus River System that is more suitable for agricultural development, but Pakistan abandoned that and decided instead to improve the western basin of Indus water resources. India retained the control of the upstream areas.[494] Pakistan and India are permitted under certain circumstances, specifically defined conditions, to utilize the waters of each other's share of Indus Rivers. In reality, Pakistan could hardly benefit from this facility, because no main rivers originate from within

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[490] Muhammad Uzair Qamar, Muhammad Azmat, Pierluigi Claps, "Pitfalls in transboundary Indus Water Treaty: a perspective to prevent unattended threats to the global security," *Perspective NPJ Clean Water* 2, no.1, (2019): 1-9.

[491] Zeitoun and Mirumachi, 'Transboundary Water Interaction 1," *International Environmental Agreements* 8, no. 4 (2008): 299.

[492] Singh Uttam, Trans-boundary Water Politics and Conflicts in South Asia, p. 32.

[493] Douglas Hill, "Boundaries, Scale and Power in South Asia," in Water*, Sovereignty and Borders in Asia and Oceania,* ed. Devleena Ghosh, Heather Goodall, Stephanie Hemelryk Donald (UK: Routledge, 2008), 89.

[494] Shuntaro Yamamoto, 'The Indus Water Dispute and its Relation with Domestic Policies', in *International Water Security: Domestic Threats and Opportunities* ed. Nevelina I. Pachova, Mikiyasu Nakayama and Libor Jansky, (USA: United Nations University Press, 2008), pp. 30-31.

its political boundaries. On the other hand, India however, can considerably control and limit the supply of water from these rivers flowing into Pakistan.

6.2.3: Consolidated Control Through Construction of Dams

Consolidated control is embraced by India by building number of dams over three western rivers that are allocated to Pakistan in the Jammu and Kashmir area. To achieve its complete hydro hegemony on the resources of Indus Basin, it is controlling Jammu and Kashmir by altering the territorial status of the Kashmir Valley. By constructing an enormous array of hydro infrastructures in Kashmir region, India wants to control the water supply to Pakistan. These upstream proposed or completed dams on the rivers of Indus Basin provide India with the ability to flood or drought Pakistan's land from these projects. India is also simultaneously illegally diverting water from Pakistan as[495] is evident in case of Baglihar dam on Chenab River, where India is generating 450 Mega Watt hydropower but also diverting more than 7,000 cusecs of the water on daily basis from River Chenab for irrigation. This is a clear violation of Indus Water Treaty. It is a clear manifestation of the consolidated water control strategy to get access to additional water resources in the prevailing hydro competition in scarce resources environment. Within such competitive milieu, we notice a cold conflict between states in general and Pakistan and India particularly where parties contest for scarce natural resources. India by exploiting the power asymmetry between both states, is reluctant to share any substantial information before the beginning of the new project on western rivers and this non-cooperative Indian approach take years to settle any conflicting project.

6.2.4: Contested Control Leading to Conflict

Conflict occurs in shared transboundary water resources when the hydro-hegemon country engages in intense competition to attain the contested control on the water resources. Uncertainty is involved and it was noticed at the time of 01 April 1948, when India stopped the supply of water to Pakistan from two headworks of Madhopur and Ferozepor positioned on the River Ravi and Sutlej in Kashmir respectively. Additionally, two other headworks i.e. Marala and Mangla were captured by India that were situated on river Chenab and Jhelum respectively to intimidate Pakistan in the Kashmir war of 1948. The conflict intensified when in May 1948 Pakistani mobilized its armed forces to strengthen its defense. The issue was decided finally when India took the matter to the United Nations and the Security Council got involved. Both

[495] Rizwan Farid, Ijaz Ahmad, Rana ain Nabi Khan, "Design of upstream overflow Cofferdam of Patrind Hydropower project," International Conference on Hydropower (UET Lahore: Centre of Excellence in Water Resources Engineering, 2017)

Pakistan and India recognized the resolution of Security Council for organization of a plebiscite/referendum in Kashmir under which Kashmiri people would decide for their future exercising their right of self-determination. India desired to acquire contested control over Indus water resources to compel lower riparian Pakistan in the intense conflict. But after the intervention of United Nations decision the conflict was resolved. Therefore, Kashmir holds significant place in the hydro-politics between Pakistan and India. The dynamics of water issue in South Asia and Kashmir conflict is interconnected.[496]

6.2.5: Data Sharing Issues

An analysis of disputes over India's projects in western rivers shows that the absence of well-timed and correct data sharing issues has significantly politicized the issues related to water. This has led to deepening mistrust between the two countries and raised Pakistan's concerns. Indian determination on confidentiality regarding the sharing of hydrological statistics is a causative factor that contributes significantly to an environment of mistrust in the South Asian region, and thereby escalating tensions related to transboundary water management. A prominent feature of numerous transboundary hydropower generation projects in South Asia is that were known by the public media and not through the correspondence between governments. Appropriate, precise and well timed data regarding new propose projects is never provided easily. This is particularly true regarding complaints by Pakistan in dispute over Baglihar plan, and Bangladeshi reservations over the Tipaimukh and National River Linking Project in India.[497] Indian 2012 National Water Policy indicates the declassification of more hydro data,[498] but as the balance of power is at present tilted in Indian favor, arguably there is little political vitality to do such collaborative actions. Additionally, an attitude of concealment and distrust prevails across all administrations in South Asian region, thus impeding any disposition to publish or share any statistical data.[499]

6.2.6: Environmental Causes

It is evident scientifically now that the environmental degradation and erratic patterns of climatic have greatly affected the hydrology of various river basins. The assessments reports

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[496] Samit Ganguly, Michal Sametana, Sannia Abdullah, Ales Karzamin, "India, Pakistan, and the Kashmir dispute: unpacking the dynamics of a South Asian frozen conflict," Asia Europe Journal 17, no.5 (2019): 129-143.

[497] Richa Singh, "Trans-boundary Water Politics and Conflicts in South Asia," Heinrich Boll Foundation, (New Delhi: Centre for Democracy and Social Action, 2009): 16.

[498] "National Water Policy," Government of India, (2012).

[499] Navnita Chadha Behera, 'Forging New Solidarities: Nonofficial Dialogues', in *Searching for Peace in Central and South Asia: An Overview of Conflict Prevention and Peacebuilding Activities, ed.* Mekenkamp, Monique, Tongeren, Paul van, Veen, Hans van de (Boulder: Lynne Rienner Publishers, 2002), 227.

by Inter-Governmental Panel on Climate Change (IPCC) - the expert panel on climate change employed by the United Nations identified that climate change would greatly affect the water availability both quantitatively and qualitatively. These changes include rise in sea level, which causes salinization of cultivated land, surface water, and groundwater.[500] The rapid melting of snow and ice caps in the Hindu Kush Himalayan Karakoram glaciers would initially increase the flow of water downstream but eventually would lead to decreasing water levels. Monsoon rainfall patterns are disrupted, causing droughts and floods. It also includes natural disastrous events such as hurricanes, massive land sliding and typhoons, threatening population, accommodation settlements, hydro infrastructure, including aquifers.[501]

Since Indus Basin, as compared to other basins, relies on glaciers for a large portion of its water (50-70 percent), the effects of glacier retreat and changes in the time period, duration, and potency of monsoon rains is particularly worrying. Reduction and destruction of water resources and high temperature, which increases the thirst for water for livestock as well as crops, plants and trees, leads to a decrease in the yield of crops, particularly rice, corn, wheat, corn and sugarcane, and staple food production in rural areas reduces and threatens people's livelihood. Dairy farming and fisheries can also be at risk if water becomes scarce or surplus during droughts or floods. As seen during the drought, Pakistani and Indian hydropower capacity will decrease when water resources run out. The reduction of water and the increase in pollution caused by severe accidents resultantly increase the possibility of infections and contagious water-borne ailments. These environmental changes influence the humanity at large further posing serious challenges to the welfare of people in third world states. All this further emphasizes the future of water relations between Pakistan and India while providing avenues of cooperation for both the countries for the uplift of their people across the borders. Conversely, the securitization of water upstream by upper riparian in the backdrop of complex bilateral relations between both states, it is thus feared that a water war between these nations is an imminent possibility

By a keen analysis of the causative and contextual factors between Pakistan and India and the application of the water intensity scale by Zeitoun on this case study, the prospects of future patterns of conflict and cooperation can be predicted. As per the scale, the conflict post

[500] Assessment of observed changes and responses in natural and managed systems, p 80-82 available at chrome extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter1-1.pdf

[501] Anwar Arif, Touseef Bhatti, "Pakistan's Water Apportionment Accord of 1991:25 Years and Beyond," *Journal of Water Resources Planning and Management* 144, Issue 1 (2017): 1-2

partition of subcontinent when India behaving like a hydro-hegemon cut off the water flow for the first time. Consequently, both entered into hydro-political complex and negotiation process started for almost ten years resulting in the cooperative arrangement in the form of IWT. Post treaty issues emerged as India started construction of water infrastructure on the western rivers controlling the water flow. These interactions between both riparian further enmeshed into a complex relationship where we find both accommodation and animosity. Given this background I will now analyze the future drivers of conflict and cooperation by comparing the existing status of both riparian i.e. power asymmetry in its various shades, riparian position, factors of mismanagement, population growth and ecological degradation and their cumulative impact on the water resources of Indus Basin.

6.3: Patterns of Conflict and Cooperation

Hydropolitics is expected to be the most contentious problem between Pakistan and India in the future. Contrary on the other hand water could become the basis for enduring bilateral cooperation with prudent imagination and political will. Concerns about reduced availability of water resources due to the Indian Dam construction have caused diplomatic tensions between Pakistan and India. Water issue is acting like a sleeper threat between both states. Bilateral political discourse particularly concerning the interpretation of treaty provisions in Pakistan and India is thought to increase the probability of water conflict. In India, reports of attacks on civilians by Islamic terrorist groups affiliated with Pakistan are used to justify diplomatic withdrawal and even threats to cut off Pakistan's water supply. Pakistan also fears that India might use its upstream geographical position as a political tool through dams to manipulate the water flow down into Pakistan. The intrinsic distrust and suspicion is also been providing breeding ground for promotion of antagonism and conflict between both countries. With the help of the Water Intensity Scale by Zeitoun we can conclude that Pak-India hydro political relationship have shades of conflict as well as cooperation as mentioned above. Cooperation doesn't mean absence of conflict and while both ratified the treaty, still the issues of divergence persist in several forms. The regular meetings and correspondence between Indus Water Commissioners have also proved to be unproductive and ineffective most of the times.

On the cooperation scale both Pakistan and India have reached the point of ratification of treaty but at the same time because of the significant role of contextual factors as discussed in chapter five, both also have reached to the level of -5 here both the states have coercive military exchanges as well. Due to this in the recent time as discussed earlier, the bilateral relationship between both states are at historically very low edge after the revocation of articles

370 and 35 A. Tensions have mounted and small scale military clashes have been seen like the Feb 2019. With this background, India has also threatened to abrogate the treaty unilaterally in March 2023 followed by the legal battle at Hague.[502] After threatening to suspend the treaty in worst possible scenario, India has illegally unilaterally suspended the treaty post Pahalgam terrorist attack in Kashmir on 23rd April 2025.[503]

Figure 31: Water Event Intensity Scale (WEIS)

SCALE	EVENT DESCRIPTION
-7	FORMAL DECLARATION OF WAR
-6	EXTENSIVE WAR ACTS CAUSING CASUALITIES, DISLOCATION OR HIGH STRATEGIC COSTS
-5	SMALL SCALE MILITARY ACTS
-4	POLITICAL- MILITARY HOSTILE ACTIONS
-3	DIPLOMATIC-ECONOMIC HOSTILE ACTIONS, UNILATERAL CONSTRUCTION OF WATER INFRASTRUCTURE, MANIPULATION OF WATER FLOW, ABROGATION OF WATER AGREEMENTS
-2	VERBAL EXCHANGE OF HOSTILITIES
-1	MILD DISCORD IN VERBAL EXCHANGE IN BOTH OFFICIAL AND UNOFFICIAL INTERACTION, DIPLOMATIC NOTES OF PROTEST
0	**NEUTRAL**
1	MINOR OFFICIAL VERBAL EXCHANGE, TALKS OR POLICY EXPRESSIONS
2	OFFICIAL SUPPORT OF MUTUAL GOALS
3	CULTURAL/SCIENTIFIC AGREEMENTS TO SET UP JOINT WORKING GROUPS
4	NON-MILITARY, ECONOMI, TECHNOLOGICAL OR INDUSTRIALAGREEMENT,LEGAL COOPERATIVE AGREEMENTS OR COOPERATIVE PROJECTS FOR WATERSHED MANAGEMENT, IRRIGATION AND POVERTY ALLEVIATION
5	MILITARY, ECONOMIC OR STRATEGIC SUPPORT
6	MAJOR STRATEGIC ALLIANCE, INTERNATIONAL FRESH WATER TREATY
7	VOLUNTRY UNIFICATION IN ONE NATION

SOURCE: Yoffe et al. (2001: 71) in Zeitoun and Warner (2006: 7)

Given the political ambiguity and uncertainty in South Asia, the water distribution between Pakistan and India continuously draws apprehensions of conflict, even though the Indus Water Treaty remains functional. In order to figure out the trajectory of conflict and cooperation in future the decisive factors from the above discussions may be chalked out as following:

[502] Interview with Shafqat Kakakhel, ex- ambassador

[503] "Suspending the Indus Waters Treaty: What It Means and Why It Matters," *New Security Beat*, June 2025, https://www.newsecuritybeat.org/2025/06/suspending-the-indus-waters-treaty-what-it-means-and-why-it-matters/

- **Hydro-hegemonic attitude of India:** Constant construction of hydro structures on Indus rivers, delaying tactics in correspondence of Indus water commission, legal proceedings of arbitration in international courts, subnational hydro-politics inside India and growing water needs and hardened public and governmental stance of water sharing with Pakistan in the backdrop of conflicting ideologies with neighboring states.
- **Pakistan's position:** Reduced availability of water because of Indian water control and water diversions coupled with climatic change, post treaty issues, mismanagement of available water resources in Pakistan, political and economic ranking and strength of Pakistan in region and role of contextual factors affecting the hydro political relationship with India.
- **Divergent Political posture:** The inconsistent and unpredictable prospects of Pakistan-India bilateral relations is a decisive factor having a significant influence on the effective functioning of the Indus Water Treaty. The fraught relationship between both states impact the water issues as well as those discussed earlier in the chapter on the role of causative and contextual factors. Any event like Mumbai attacks, Balakot incident or approaching elections in both states specifically in India, will exert stress in IWT, either to be modified or even annulment.
- **Kashmir Issue:** Kashmir issue has central role in all the case study. Kashmir is the land from where the Indus rivers originate and India has officially made Kashmir part of the Indian Republic through legislation along with the validation from Supreme Court. Both issues are interlinked and any development in either case will affect the other.
- **Climatic factors:** The reduction in availability of water due to climate change coupled with securitization of water resources will add fuel to the fire. Lacking adequate comprehension of environmental degradation and climate change across borders in both states, can lead to further misinterpretations and misperceptions.
- **Global opinion:** World Bank is acts as a facilitator in smooth operation of Indus Water Treaty, and has the global institutional interest in reducing tensions in both rival nuclear armed riparian. By keeping in mind the geo-strategic significance and vulnerability induced by climate change in South

Asia, the World Bank would like to utilize its good offices to rework on formulating a revised formula for the quantitative redistribution of the transboundary waters of Indus River Basin.

While water-related challenges can cause frequent tensions in Pakistan-India relations, these challenges also hold great potential for joint resolution as well. Three main constraints have been identified in the effective cooperation in water sharing in transboundary river basin. These include the lack of incisive political leadership globally in water diplomacy, deficiency of strategic synchronization and correspondence between the key stakeholders, and lastly the limited individual, organizational and fiscal capacity. Prudent political leadership is needed to comprehend the potent probable synergy between technical and political bridged participation. Construction of water infrastructures like dams and irrigation improvements often offer technical remedy to water scarcity and fluctuations, nonetheless they also have negative ecological and social impacts, raising concerns about availability and management of water downstream state. These transnational political complications require sensible and far sighted foreign policy efforts that supports solution of bilateral issues with strong political mandate, influence, and visionary diplomatic insight.

Second, better coordination needs assurance within governments and between governments that basins are not pushed to the backburner, leading to prolonged strategic games between the riparian states rather than engaging in cooperative mechanism. Interactions between the "low politics" of procedural and economic collaboration and the "high politics" of foreign policy formulation can be much improved if they are intended to empower and facilitate both sides.

Third, several factors of capacity issues hinder cooperative mechanism in transboundary waters sharing disputes. Capacity building issues can be addressed by investing in education, increasing confidence-building efforts, and improving mechanisms for water-related crisis response and conflict resolution.

6.4: Avenues of Possible Cooperation in Indus Basin between Pakistan and India

While analyzing the patterns of conflict and cooperation in hydro-politics between Pakistan and India and identification of the hindrances in cooperative mechanism, the silver lining of hydro diplomacy can bring both states on common platform for sustainable development and peace of South Asia. There are certain areas of cooperation where joint efforts by both riparian can diminish the prevalent tensions. The probable avenues of cooperative mechanism might include:

- **Data Collection**: The cooperation in timely collection and sharing of data regarding the availability of water and water flow in Indus Basin, commencement of hydropower projects with project design, transboundary aquifers, regulations for abstraction of ground water through telemetry.
- **Strengthening PIC**: It is imperative to strengthen the capacity and authority of Permanent Indus Commission platform for amicable resolutions of technical issues pertaining to the hydropower projects especially on western rivers. Technical details of new projects conveyed on appropriate time through the official forums can improve the functionality of the commission.
- **Modalities in dry seasons**: Water availability reduces mostly in dry seasons in the Indus basin. Therefore to avoid any clash between the upper and lower riparian, modalities regarding water sharing should be discussed and settled in dry seasons.
- **Cooperation in enhanced water resource management**: Both states can jointly assess the cumulative impacts of hydro-structures by upper riparian on the water availability of lower riparian. Similarly, both states can work together on sharing efficient methods of water resource management related to modern irrigating methods like drip irrigation and water pricing. As both states face issues regarding water management at domestic level that catalyzes hydro-politics between both nations in the milieu of complex bilateral relationship.
- **Knowledge Base for Climatic variations**: Both states can cooperate on creating a knowledge base for collection and analyzing data regarding environmental degradation and changing climatic pattern in Indus Basin. This knowledge base of glacial melt rate in Himalaya or the changing monsoon patterns will facilitate the decision making regarding water flow in rivers of Indus Basin.

In order to address water challenges either confronted because of causative factors or contextual factors, both states should engage in hydro diplomacy to cooperate and avoid further escalation in hydro-political issues between both states. The vulnerability due to changes in climate can transform into window of opportunity provided if both states engage constructively in cooperative mechanism for the betterment of humans facing water stress across their borders. Such collaboration can pave the way for improvement in overall tense relations between Pakistan and India that has hampered the peace and sustainability in South Asia.

6.5: From Hydro-Hegemony to Hydro-Diplomacy: A Roadmap for the Future of Indus River Basin

To move beyond reactive crisis management and toward anticipatory governance, a new analytical lens is required. Therefore, a progressive roadmap is proposed to map the complex interplay of forces that will determine the future patterns of cooperation and conflict between Pakistan and India. This is built upon four interdependent analytical dimensions: Hydro-climatic Stress, Power Asymmetry and Political Relations, Institutional Adaptability, and Technological and Knowledge Integration. The examination of collaborations and feedback loops between these dimensions aims to provide policymakers and scholars with a dynamic tool to identify critical intervention points and assess the probability of future hydropolitical trajectories, ranging from collaborative basin management to overt resource conflict.

The forward-looking analytical trajectory views the Indus Basin as a living, evolving system rather than a static arrangement of water-sharing rules. It recognizes that the basin's future will be shaped by the interplay between climate change, political power dynamics, and institutional transformation. Shifting hydrological patterns—such as accelerated glacial melt, erratic rainfall, and unpredictable river flows—are expected to intensify water stress across the region. Yet, these same pressures also open space for innovation and cooperation, offering Pakistan and India a chance to pursue joint adaptation strategies, shared technologies, and coordinated disaster management. In this light, climate change is not only a threat but also a structural force for redefining interdependence, compelling both nations to see water governance as a form of collective climate security rather than a contest of control.

At the same time, it emphasizes that power asymmetry and institutional evolution remain central to how hydropolitics will unfold in the coming decades. India's position as the upstream state continues to grant it leverage, but that dominance is increasingly balanced by international norms, treaty obligations, and the growing weight of global climate diplomacy that encourages cooperative environmental management. The enduring relevance of the Indus Water Treaty (IWT) will depend on how effectively it can adapt to new realities—by introducing climate-sensitive operational rules, transparent data-sharing mechanisms, and stronger local participation in governance. Ultimately, the framework suggests that the basin's stability will depend on whether India and Pakistan can transform power asymmetry into strategic interdependence, moving from hydro-hegemony toward hydro-diplomacy, where shared vulnerability becomes the foundation for mutual resilience and sustainable peace.

Hydro competition is becoming more severe between Pakistan and India because of certain well defined causative factors and protracted contextual factors. The application of conceptual framework on the hydropolitical relationship between Pakistan and India gives a thorough understanding of the cooperative and conflicting mechanism behind the dispute despite the treaty concluded between them in 1960. The conceptual framework identified five major elements like environmental degradation, geographical location, urbanization/ population growth, power asymmetry and management of hydro resources. Among all these five the most dynamic factors are the power asymmetry between riparian states at basin level and management of water resources at domestic level i.e. subnational hydro politics within Pakistan and India. Power asymmetry by hydro-hegemony framework demonstrates that India is trying to remain dominant by accomplishment of consolidated water control (inequitable or more) by the strategy of resource capture providing grounds for current and prospective future conflict.

Cooperation and shared water strategy was observed between both states in 1960 because of the positive behaviour of upper riparian and mediation of third party. Indian behaviour more often is like a hydro-hegemon riparian because of three main reasons that include the geographical position as upstream state, enhanced technical competence for water control strategy and all elements of power asymmetry. India might cause droughts and floods in lower riparian Pakistan at whim.[504] According to an estimate, in case of conflict India may stop all water supplies to Pakistan for around twenty-six successive days.[505] Hence, Indian ability to hold water supplies of Pakistan is synonymous to a political maneuver to endorse Indian political hegemony in any war or conflict.[506] The chances of prospective cooperative mechanism between Pakistan and India are bleak because India is constantly trying to achieve consolidated water control by building water infrastructures that might lead to conflict scenario in future in the milieu of frozen ties between both nations post 2019.

Recently the developments on the two disputed dams i.e. Kishenganga and Rattle hydropower projects between Pakistan and India implies that despite the treaty and defined principles of agreement, conflicts emerge over the difference of water discourse in both states. Meanwhile India is has issued notice for renegotiating the treaty or else they may discontinue the existing legal framework of Indus Water Treaty. These Indian endeavors demonstrate the

[504] Andrew Guzman, *Overheated: The Human Cost of Climate Change* (Oxford University Press, 2013), 159.
[505] Khalid Chandio, "India Re-Thinking Indus Waters Treaty," *1PRI Review* (Aug. 27, 2014). http://www.ipripak.org/india-re-thinking-indus-water-treaty/.
[506] Abdul Rauf Iqbal, "Hydro-Politics in India and its Impact on Pakistan,") ISSRA Papers 6, 1 (2014)" 107-110.

hydro-hegemonic rationale behind such efforts. The geographic location as an upper riparian along with economic, political, and ideological strengths provide leverage to India to gain hydro-hegemony in the Indus water basins against Pakistan. Powerful upper riparian states with strong military, political, economic, and diplomatic potency tend to enjoy hydro hegemony in the shared river basins. Consequently hydro hegemonic tactics employed by upper riparian in turn contributes to mounting regional water disputes.[507] As a cautious warning by The New York Times notified that Pakistan could face grave water shortages in the near future: "energy-starved Pakistanis, their economy battered by chronic fuel and electricity shortages, may soon have to contend with a new resource crisis: major water shortages."[508]

Indian recently adopted aggressive resolve to unilaterally revoke the Indus Water Treaty has further intensified hydro politics between both states.[509] The meetings of Indus Water Commission are either deferred or end without any productive outcome. Therefore, it is apprehended that because of emerging problems of scarce availability of water, energy shortage, and increasing population in Pakistan, are supplemented with intimidations to navigate the waters of the western rivers - a water war between both nations is inexorable.[510] India is further squeezing water supplies of Pakistan through levitating water management infrastructures over the western rivers allocated to Pakistan s per treaty. [511]Indus River is continuously depleting at the current rate.[512] The reduction in the flow of Indus River might be result of climate change and environmental degradation that is disturbing the glacial melting pattern of Himalaya, or even the diversions upstream in rivers by India. Certainly, there is a prevalent sensitivity in Pakistan that the control of the Indus waters by India can be misused to block water to Pakistan and devastate its economy.[513] The reflection is an indicator of the Indian soft power wielded as a hydro hegemon. In this environment of mistrust, disagreements over water sharing will prospectively continue to weaken the vision of a sustainable peace between Pakistan and India.

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[507] Robert G. Wirsing , Daniel C. Stoll , Christopher Jasparro, *International Conflict Over Water Resources in Himalayan Asia* (London: Palgrave Macmillan,2012), 12.
[508] Salman Masood, Starved for Energy. Pakistan Braces for a Water Crisis, *New York Times,* Feb. 12, 2015. https://www.nytimes.com/2015/02/13/world/asia/pakistan-braces-for-major-water shortages.html
[509] ibid
[510] Andrew Guzman, *Overheated: The Human Cost of Climate Change* (Oxford University Press, 2013), 161.
[511] Moonis Ahmar, *The Challenges of Confidence-Building Measures in South Asia* (New Delhi: Har-Anand Publications, 2001), 397-398.
[512] Brahma Chellaney, *Water: Asia's New Battleground*, p. 227.
[513] Richa Singh, "Trans-boundary Water Politics and Conflicts in South Asia," Heinrich Boll Foundation, (New Delhi: Centre for Democracy and Social Action, 2009): 10.

Typically, in order to protect the interests and to evade violent means for resolution of water conflicts, countries put your faith in instituting water sharing settlements through cooperative mechanisms. Though, achievement of consensus in formulation of a treaty for the equitable sharing of water resources is an intricate and complicated mechanism, especially between riparian like Pakistan and India. Pakistan and India agreed on the river allocation in 1960 after a long and protracted journey. States can be benefitted mutually through sheer cooperation and this cooperative mechanism helps in accomplishing a better water management system, enhanced environmental safeguard, sustainable peace in the region, and, therefore, reduced regional tensions and conflicts.

Water conflicts between Pakistan and India are not a new phenomenon, since they have deep roots and with the given circumstances in future most probable scenario will be status quo situation where conflict and cooperation coexists side by side, though the most likely future challenges will require both states to cooperate for the welfare of huge population on either side as per the requirements of human security. The Indus Water Treaty's Article VII (I) states that the two sides consent they share an interest in the rivers' optimal development and encourages them to work together as much as possible on engineering projects along the waterways. No one can ever see the final stage of the Indus Basin river basins dispute if they keep thinking in a narrow, fixed way. The river water problem is complicated by a number of dynamic aspects, including a loss of social will, geologically based stands, a great ratio of suspicion and mistrust between the citizens of both states, the linkage of the Jammu and Kashmir issue along with depth of buried resentments rekindled by a slight unpleasant development. Whereas, hydro-diplomacy emphasizes that the representatives can obtain peace dividends by capitalizing watershed cooperation that might aid resolution of approaching conflicts, avert future conflicts thereby creating goodwill that may spill to other spheres of mutual relations.

Conclusion

Four riparian nations China, India, Pakistan and Afghanistan have highlands that are drained by the Indus River Basin. Afghanistan and China are claiming their rights to a fair portion of the water from the tributaries of Indus that flow through their territory, despite the fact that the rocky terrain adjacent the river has thus far limited these states' capacity to develop the river within their borders. Owing to the contentious nature of political bilateral relationship between Pakistan and India, the hydro-politics in the Indus basin have gathered enormous attention particularly in South Asia and generally throughout the world. The most important thing to keep in mind from the perspective of conflict analysis is that if a disagreement over water resources is founded in a larger political engagement, then the water issue cannot be seen as an independent conflict.

Since the distribution of this resource has become an issue of geopolitical contention between Pakistan and India, the situation on both sides of the line of control has been, and continues to be, fraught with tension and uncertainty. A growing figure of Indian projects, and diversions plans of water flow of the western rivers, as well as worries as a lower riparian state in Indus basin, trigger the water discourse in Pakistan, which includes leaders, politicians, bureaucrats, agronomists, media, and the public. Pakistan is acutely aware of its frailty to the repercussions of Indian initiatives and projects on the retention, space, setting up of projects, and innovation of the Indus plain because of the politicization of its water crisis. The animosity between Pakistan and India over the Kashmir problem is now the greatest barrier to settling the water dispute. The only way for India, Islamabad, and Kashmir to route a workable resolution of the water dispute is to give right to the divided people of Kashmir, a proud future of their choosing.

The complexity of Pak-Indo conflicts makes the prospect of a peaceful conclusion of their rivalry seem like a distant dream. With time, nuclear capability of each state is becoming stronger. The expansion of their nuclear program must be contained and the focus should be on the welfare of the people of both states and ensuring human security. In such a situation, nuclear weapons become a critical factor in even the most trivial bilateral disputes. Similarly, one such arena of conflict is the competition between Pakistan and India is hydro-politics in South Asia. Water securitization is a major priority for both countries at the moment. Both of their identities are heavily influenced by their dependence on their enormous agricultural fields. Despite their misgivings, both Pakistan and India must abide by the IWT's requirements. India, as the upstream nation, has a responsibility to be open and honest with its downstream neighbor Pakistan about its plans to build additional water storage basins and other infrastructure.

Pakistan needs prompt and open disclosure of these facts so that neither country has any trouble adhering to the treaty's terms and doubts are eliminated. It is important that officials from both nations meet regularly after a certain amount of time has passed.

The analytical focus of this study addressed the dynamics of hydropolitics in the Indus River Basin and the cooperative and conflictive mechanism in hydropolitical relationship between the riparian states, post-independence era of Pakistan and India .This study has been conducted to explore the hydropolitical relationship between two neighboring rival nuclear armed states. The central focus of the thesis was to investigate the case study on all scales of time i.e. past, present and future prospects. This thesis examined the origin of the hydro-politics in South Asia with the independence of the two nations having conflicting and diverging ideological leaning.

The first chapter introduces the topic and lays the foundation for conceptual clarity of the topic. The chapter discussed the significance of environmental issues in global politics and their inclusion in the security domain as important anchor of non-traditional security concept in post-cold war era. It debated on emerging water paradigms in international politics. Moreover, the chapter also identified the core factors that are woven together under conceptual framework to explore the patterns of conflict or cooperation among the riparian states sharing transboundary water resource. These factors identified as causative and contextual factors played their role as independent variables in the complex hydro-politics in South Asia whereas the patterns of conflict or cooperation being the dependent variables.

The next chapter focused on the negotiation process between Pakistan and India regarding the resolution of water dispute after the water stoppage by India to Pakistan. The conflict was resolved with the mediation of third party i.e. the World Bank with the ratification of Indus water Treaty that distributed the Indus Basin Rivers in two states. One of the contribution of this study is the exploration of the negotiation process because this laid the foundation for the future ups and down in hydro-political relation between riparian. The long negotiation process highlighted the patterns of conflict and cooperation that were based on various factors like exercise of hydro-hegemony by India in 1948 and consequent cooperation mechanism by agreement. Later the issue in the backdrop of cold war, got the attention of west and involvement of third party. It also explains the role of World Bank in ratification of international treaty between both the rival states.

The third chapter gives a critical analysis of the Indus Water Treaty in detail with the discussion on the dispute resolution mechanism, strengths and weakness in the treaty and also the widely discussed modifications in the treaty. The treaty itself is hailed as the climax of

cooperative mechanism between Pakistan and India and despite the fraught relations between both the nuclear armed states, the Treaty has withstood the test of time in times of war also. The fourth chapter gives an in-depth analysis of the issues of several water control strategies employed by India through construction of hydro structures on the western rivers apportioned to Pakistan as per the provisions of Indus Water Treaty. A new dimension of conflict emerged in case of Salal Dam, Baglihar project, Wullar Lake project, and Kishenganga and Rattle hydropower generation by India. Each conflict is discussed at incredible level of analysis in the chapter.

Next chapter uncovers the roots of hydro-politics in South Asia and sheds light on the causative and contextual factors of the intricate and complicated factors of water issue. It digs out the root causes of disagreement and then further chalks out the role played by other independent variables of the conflict like the antagonistic relationship of Pakistan and India, mistrust, data sharing issues and incompatibility prevalent at various political, economic and strategic level between both states. Absence of conflict doesn't mean cooperation and cooperation on the other end also doesn't mean absence of conflict. Importance of Kashmir issue is also reinforced because it is interlinked with water issues at large. One of the significant aspect of this chapter is the role of subnational hydro-politics played at various levels in Pakistan and India at domestic level, thereby multiplying the divergence and intensifying the conflict.

Last chapter of the thesis gives the prospects of hydro-politics in future on the basis of the cumulative effects of independent variables like power asymmetry at all levels and environmental factors at large that will catalyze the chances of conflictive water control strategies by India where already it has threatened to abrogate the treaty unilaterally. The water linkages with conflict and cooperation by Zeitoun is applied on the case study and reveals that Pakistan-India hydro-politics have simultaneously climbed both ladders of accommodation/cooperation and disagreement/conflict. The overall troubled bilateral relationship between both states have deep and profound impacts on their water relations. River System can serve as a unifying force for the riparian nations and their inhabitants as well as a fundamental resource for economic growth for the shareholders. Water sharing mechanisms, on the other hand, are intricate problems that involve many variables and aim to maximize economic, social, political, and ecological benefits.

Hence the existing tensions exacerbating at all levels may lead to conflict. The avenues of cooperation also exists because both states are facing the challenges of environmental and ecological degradation impacting their population at large. Therefore, if their prevalent tone of

mistrust in leadership and bureaucratic level fails to improve in future, we may witness the status quo in the hydro-political relationship with little chances of improvement.

7.1: Findings

- Water resource use has exceeded sustainability limits in most South Asian countries. Rapid population growth, urban expansion, industrial development, mining patterns, rigorous irrigation and agriculture combined with ineffective water use resulted in reduced availability of water both in quality and quantity. Consequently fueling conflicts on water sharing between states and within states.
- Despite intense post-1947 geopolitical rivalry, the complex nature of the Indus Basin compelled Pakistan and India to establish a formal treaty for its management, revealing that structural interdependence can drive cooperation even in hostile political environments.
- The ratification of IWT illustrates that conditional cooperation is possible even under rivalry when power asymmetries, shared ecological dependencies, and third-party facilitation interact within a geopolitical context.
- Post-treaty era is shaped by recurring contestation over dam design and storage capacity. Dispute settlement (PIC meetings, NEs, arbitration) ensures procedural stability but not reduced trust deficit.
- Climate-driven scarcity is augmenting water insecurity in the Indus Basin as a structural driver, fueling the politicization of transboundary water sharing between Pakistan and India.
- The Kashmir issue remains central to Pakistan–India hydropolitical relations, as its strategic significance directly influences water-sharing disputes.
- The Indus Commission's meetings and forums remained largely procedural, lacking adaptive strategies to address the rapidly evolving and complex water challenges in Indus Basin.
- The subnational hydro-politics is exerting pressure on water related institutional hierarchies at domestic, provincial, inter provincial levels thereby having repercussions on interstate level as well.
- Water disputes escalate during periods of territorial, military, or diplomatic tension, demonstrating that the Indus Basin functions as a regional hydropolitical complex where water politics are inseparable from security politics

- Hydropolitics in the Indus Basin is likely to exhibit cycles of conditional cooperation and recurring conflict, driven by power asymmetries, upstream climate stress, and enduring geopolitical and subnational tensions.
- The research maintains that water sharing is a double edged sword. It may cause conflictive dynamics leading to resource war in worst scenario, and also could serve as a facilitator for cooperative mechanism leading to peaceful engagements. The outcome depends on two variables i.e. geographical location of the resource and the nature of relationship between the riparian countries sharing transboundary resource. In this case study both cooperation and conflict have been identified in the hydro political relationship of Pakistan and India.

7.2: Recommendations

- Initiate structured dialogue within the framework of the Indus Water Treaty to address immediate water-related disputes, modifications in treaty and gradually incorporating broader transboundary conflict areas.
- Pakistan and India should decouple routine water management from broader security and territorial disputes.
- For revision of Indus Water Treaty, both states should first state the new challenges, quantify the likely impacts, identify vulnerable areas and open a dialogue for a fixed period to clearly delineate positions, problems and emerging challenges.
- Enhance institutional capacity building of the PIC by expanding expertise beyond engineering and legal matters to include hydrology, basin-wide planning, watershed management, flood control, glacier science, and groundwater monitoring.
- Pakistan should prioritize investment in both small and large-scale hydro-infrastructures to meet growing water demands that balances provincial water needs, national energy goals, and ecological sustainability. Also focus on water preservation/ storage methods and technologies.
- Pakistan must adopt a multi-pronged approach combing legal enforcement, diplomatic engagement, and technical monitoring to turn recurring disputes into sustained cooperation under the Indus Water Treaty.
- Expand Indus Basin management framework that formally includes all riparian states i.e. China, India, Afghanistan, and Pakistan to enable coordinated watershed management to mitigate climate impacts on water resources.

- Establish a formal water-sharing mechanism for the Kabul River through sustained diplomatic engagement, ensuring equitable allocation, and legal safeguards for this critical tributary of the Indus Basin.
- Trust deficit is the key underpinning in hydro political relationship between both states. The foremost issue that is key to all problems is bridging the trust gap between both nations. The crucial element in building trust gap lies in efficient and transparent sharing of data by riparian states for effective management of issues. This may include data regarding operation of dams, fluctuation in water flow, storage levels and information regarding new projects.
- Non-controversial hydrologists, water practitioners, academicians, and well reputed politicians from all the provinces should be engaged by the government of Pakistan to develop a national consensus for building new hydro structures throughout the country on identified sites.

The waters of Transboundary Rivers connect its riparian sharing these waters in a very complicated network of ecological, economic, security and strategic interdependencies. In South Asia the riparian sharing transboundary water resources have been engaged in cooperative and conflictive mechanism. The presence of cooperation among South Asian riparian does not mean that competition and clashes over these water is nonexistent. Due to the changing environmental patterns and varying climatic effects, water has become a contested commodity especially in the region that has been victim of diverging national interests. Therefore water in South Asian region will continuously be deeply political because of the lack of trust and cooperation regardless of mutually agreed framework for utilization of vital natural resource. As external factors of hydro political relations, historical legacy, geographical position of riparian states and hegemonic approach plays imperative part in comprehending the premeditated dealing amongst riparian countries and in the circumstantial background under what situations political actors meddle in water sharing mechanism determine the outcome of interaction, whether cooperation or conflict. Alternatively, if these external factors are dealt prudently by the governments on both sides, hydro diplomacy can act as a neutralizing dynamic factor that might help in diminishing the intensity of tense political circumstances. As an internal causative factor, the effective water management on domestic level has great impact on overall water sharing mechanism between riparian sharing transboundary rivers. The scarcity of resource is magnified by ineffective water management by governments inside their state. Both Pakistan and India have water management problems inside their states that needs

to be addressed along with the population surge. These internal factors coincide with divergent political opinion and external factors to further complicate the complexity of hydro-politics.

If the major nuclear powers of Southern Asia are ever going to get along, they'll need to figure out how to share water peacefully. The efficient working of the Indus Water Treaty and the restraint in military confrontation on water issues may be credited to the reasonable partitioning of the rivers of the Indus Basin between neighboring riparian nuclear states of the region. But this cooperative milieu is marred by the securitization of water resources by upper riparian where Pakistan has serious concerns on the designs and storage capacity of the water infrastructure built on western rivers. Due to the prevalent tense ties, "water has been vulnerable to developmental nationalism and geostrategic calculation" between Pakistan and India. This "going it alone" strategy promotes distrust and adds fuel to the cycle of rising insecurity. India should rethink its problematic hydro-power generating project and storage tank projects like dams to design them in compliance with the treaty if it wants to turn its problems with Pakistan into collaboration, and vice versa. And as equal members of the UNO and the global community, both the riparian states have a special responsibility to work together for the mutually beneficial use of Indus Basin River System.

INTERVIEW QUESTIONS

1. Does politics matter in Water Resource Management? If yes, how does water policies reflect (or are reflected by) domestic, regional and international politics?

2. What are the main challenges to achieve effective water sharing in Indus River Basin? Are the hydro political issues between Pakistan and India of technical, managerial, institutional, or political nature?

3. How are the current dynamics of transboundary water issues shaping conflict and cooperation between Pakistan and India?

4. Pakistan holds great water potential, however its hydraulic infrastructures and management is still poor. What are the causes and possible solutions to this situation?

5. What‘s your opinion on recent Indian development of water infrastructures in Kashmir and consequent repercussions on economy of Pakistan?

6. What is the impact of climate change and changing patterns of rain and glacier melt on the interstate relationship and regional cooperation in South Asia especially in the context of Pak-Indo bilateral relationship?

7. How will prospectively the transboundary water issue determine Pak-Indian conflict and cooperation?

8. Is it possible to isolate transboundary water issues in overall bilateral relationship between India and Pakistan overshadowed by legacy of unresolved Kashmir issue?

9. Possibility of any mutual understanding in hydro-politics despite negative political statements and media narrative?

10. Should Pakistan and India renegotiate Indus Water Treaty of 1960 in the light of present-day challenges such as climate change or as Indian narrative for resolution of conflicts?

11. To what extent the internal Hydro management in Pakistan can be attributed as a factor in Pak-India water conflict?

Primary Source: List of Interviewees

Individual expert consultations

Face to Face Interview

- Muzammil Hussain
  Ex- Wapda Chairman
- Dr Shaheen Akhtar
  Academic expert on Indus River Basin
- Fatima Fehmi
  Unesco Water Chair, Comsats Pakistan
- Dr Saif ur Rehman
  Pakistan India Relations

Email Correspondance

- Dr. Pervez Aamir
  Senior environmental economist at the Asianic Agro division environmental.
- Ambassador Shafqat Kakakhel
- Ashfaq Mehmood
  Pakistan Commission for Indus Waters (PCIW), Indus River System Authority (IRSA), and Water and Power Development Authority (WAPDA)
  Please refer to that work if you would like to know my views *Hydro-Diplomacy: Preventing Water War Between Nuclear Armed Pakistan and India* (2018)
- Daniel Haines (Environmental History at the University of Bristol)
  His work focuses on the role of water, territory, and sovereignty in South Asia, especially in relation to the history of the Indus Basin dispute between India and Pakistan.
  Please refer to that work if you would like to know my views (Rivers Divided: Indus Basin Waters in the Making of India and Pakistan)

BIBLIOGRAPHY

- Aaron T. Wolf, Jeffrey A. Natharius, Jeffrey J. Danielson, Brian S. Ward, and Jan K. Pender. "International Rivers Basins of the World." *Water Resources Development* 15, no. 4 (2010): 387–427.
- Ahmad, Azhar. "Indus Waters Treaty: A Dispassionate Analysis." *Policy Perspectives* 8, no. 2 (2011): 73–83.
- Ahmad Wani, Khursheed, and P. Moorthy. "Indus Waters Treaty: An Emerging Flashpoint Between India and Pakistan." *Pakistan Horizon* 67, no. 2 (2014): 41–59.
- Aijaz, Abdul, and Majed Akhter. "From Building Dams to Fetching Water: Scales of Politicization in the Indus Basin." *Water* 12, no. 5 (May 10, 2020): 2–16. https://www.mdpi.com/2073-4441/12/5/1351
- Ahmar, Moonis. *The Challenges of Confidence-Building Measures in South Asia.* New Delhi: Har-Anand Publications, 2001.
- Ahmar, Moonis, ed. *The Challenge of Confidence-Building Measures in South Asia.* New Delhi: Har-Anand Publications, 2001.
- Akhtar, Shaheen. "Emerging Challenges to Indus Water Treaty: Issues of Compliance and Transboundary Impacts of Indian Hydro Projects on the Western Rivers." *Regional Studies* 28, no. 4 (2010): 3–66.
- Ali, Chaudhri Muhammad. *The Emergence of Pakistan.* New York and London: Columbia University Press, 1967.
- Ali Shah, Jamait. "Indus Waters Treaty under Stress: Imperatives of Climatic Change or Political Manipulation." *Margalla Papers* (2011): 1–14.
- Aloys, Michel. *Indus Rivers: A Study of the Effects of Partition.* USA: Yale University Press, 1967.
- Arif, Anwar, and Touseef Bhatti. "Pakistan's Water Apportionment Accord of 1991: 25 Years and Beyond." *Journal of Water Resources Planning and Management* 144, no. 1 (2017): 1–13.
- Arif, Khalid Mehmood. *Estranged Neighbours.* Islamabad: Dost Publishers, 2010.
- Ashraf, Tahir. "The Antecedents of Pakistan-India Conflict: Challenges and Prospects for Solution." *Pakistan Vision* 19, no. 2 (2018): 16–31.
- Asher, Robert E., and Edward S. Mason. *The World Bank since Bretton Woods.* Washington, DC: Brookings Institution Press, 1973.
- Baechler, Günther. "Why Environmental Transformation Causes Violence: A Synthesis." *Environmental Change and Security Project Report* 4 (Spring 1998): 22–43.
- Bagla, Pallava. "Along the Indus River, Saber Rattling over Water Security." *Science* 328, no. 5983 (2010): 1226–1227.
- Baqai, Huma. "New Trends and Paradigm Shifts in Pakistan and Pakistan-India Relations: Pakistan and India's Perspective." *Journal of International Relations and Foreign Policy* 1, no. 1 (June 2013): 55–68.
- Baqai, Huma. "Water-related Issues in South Asia: Conflicts in the Making." *Pakistan Horizon* 58, no. 3 (July 2005): 77–88.
- Barbier, Edward B. "Water and Growth in Developing Countries." In *Handbook of Water Economics*, edited by Ariel Dinar and Kurt Schwabe, 289–307. UK: Edward Elgar Publishing, 2015.
- Barrett, Scott. *Environment and Statecraft: The Strategy of Environmental Treaty-Making.* New York: Oxford University Press, 2005.

- Bashir, Ahmad. “Water Management: A Solution to Water Scarcity in Pakistan.” *Journal of Independent Studies and Research* 9, no. 2 (July 2011): 111–125.
- Bhatti, Nawaz Ahmad, Farzad Alvi, Asia Kashif, and Nabeela Akhtar. “Negotiating the Indus Waters Treaty: An Historical Assessment.” *Journal of the Research Society of Pakistan* 57, no. 1 (2020): 486–497.
- Bohannon, John. “Running out of Water – and Time.” *Science* 313, no. 5790 (2006): 1085–1087.
- Buzan, Barry, Ole Wæver, and Jaap de Wilde. *Security: A New Framework for Analysis.* London: Lynne Rienner Publishers, 1998.
- Chakraborty, Roshni, and Ismail Serageldin. “Sharing of River Waters among India and Its Neighbors in the 21st Century: War or Peace?” *Water International* 29, no. 2 (2004): 201–208.
- Chaudhri, Ghulam Waheed. *Pakistan’s Relations with India: 1947–1966.* London: Pall Mall Publishers, 1973.
- Chellenay, Brahma. *Water, Peace and War: Confronting the Global Water Crisis.* Rowman: Littlefield Publishers, 2013.
- Cohen, Stephen. *The Idea of Pakistan.* Washington, DC: Brookings Institution Press, 2004.
- Conca, Ken. “Environmental Governance after Johannesburg: From Stalled Legalization to Environmental Human Rights?” *Journal of International Law and International Relations* 1 (2005): 121–138.
- Davenport, Deborah. “Conflict and Cooperation over Natural Resources.” In *Introducing Global Issues,* edited by Michael T. Snarr and D. Neil Snarr. London: Lynne Rienner Publishers, 2005.
- Dixon, Homer. “Environmental Scarcities and Violent Conflict: Evidence from Cases.” *International Security* 19, no. 1 (1994): 5–40.
- Douglas Hill. “Boundaries, Scale and Power in South Asia.” In *Water, Sovereignty and Borders in Asia and Oceania,* edited by Devleena Ghosh, Heather Goodall, and Stephanie Hemelryk Donald. UK: Routledge, 2008.
- Elhance, Arun P. *Hydropolitics in the Third World: Conflict and Cooperation in International River Basins.* Washington, DC: United States Institute of Peace Press, 1999.
- Fairley, Jean. *The Lion River: The Indus.* London: John Day Co., 1975.
- Gerlak, Andrea K., Tanya Heikkila, and Mark Lubell. “The Promise and Performance of Collaborative Governance.” In *The Oxford Handbook of U.S. Environmental Policy,* edited by Sheldon Kamieniecki and Michael Kraft. New York: Oxford University Press, 2008.
- Gleick, Peter H. *Water in Crisis: A Guide to the World’s Fresh Water Resources.* New York: Oxford University Press, 1993.
- Ganguly, Samit, Michal Sametana, Sannia Abdullah, and Ales Karzamin. “India, Pakistan, and the Kashmir Dispute: Unpacking the Dynamics of a South Asian Frozen Conflict.” *Asia Europe Journal* 17, no. 5 (2019): 129–143.
- Gerlak, Andrea K., Tanya Heikkila, and Mark Lubell. “The Promise and Performance of Collaborative Governance.” In *The Oxford Handbook of U.S. Environmental Policy,* edited by Sheldon Kamieniecki and Michael Kraft. New York: Oxford University Press, 2008.
- Ghulhati, Niranjan Das. *Indus Water Treaty—An Exercise in International Mediation.* Bombay: Allied Publishers, 1973.

- Gleditsch, Nils Petter. “Armed Conflict and the Environment: A Critique of the Literature.” *Journal of Peace Research* 35, no. 3 (1998): 381–400.
- Gleick, Peter H. *Water in Crisis: A Guide to the World's Fresh Water Resources.* New York: Oxford University Press, 1993.
- Gulhati, Niranjan Das. *Indus Water Treaty—An Exercise in International Mediation.* Bombay: Allied Publishers, 1973.
- Guzman, Andrew. *Overheated: The Human Cost of Climate Change.* Oxford: Oxford University Press, 2013.
- G. Wirsing, Robert, Daniel C. Stoll, and Christopher Jasparro. *International Conflict over Water Resources in Himalayan Asia.* London: Palgrave Macmillan, 2012.
- Haftendorn, Helga. “Water and International Conflict.” *Third World Quarterly* 21, no. 1 (2000): 51–68.
- Haines, Daniel. “Disputed Rivers: Sovereignty, Territory and State-Making in South Asia, 1948–1951.” *Geopolitics* 19, no. 3 (2014): 632–655.
- Homer-Dixon, Thomas. *Environment, Scarcity, and Violence.* Princeton, NJ: Princeton University Press, 2001.
- Hussain, Ijaz. *Legal and Political Dimensions of the Indus Water Treaty.* Karachi: Oxford University Press, 2018.
- Hussain, Sajjad, Farrukh Faheem, and Saif Ul Islam. “Impact of Hydro-Politics and Kashmir Issue on Bilateral Relations of India and Pakistan.” *Journal of Humanities, Social and Management Sciences* 2, no. 1 (2021): 200–213.
- Iyer, Ramaswamy R. “Indus Treaty: A Different View.” *Economic and Political Weekly* 40, no. 29 (2005): 3140–3144.
- Janjua, Shahmir, Ishtiaq Hassan, Shoaib Muhammad, Saira Ahmed, and Afzal Ahmed. “Water Management in Pakistan's Indus Basin: Challenges and Opportunities.” *Water Policy* 23, no. 6 (2021): 1329–1343.
- Kakakhel, Shafqat. “The Indus River Basin and Climate Change.” *Criterion Quarterly* 10, no. 3 (2015): 139–146.
- Kendie, Daniel. “Egypt and Hydro-Politics of the Blue Nile River.” *Northeast African Studies* 6, nos. 1–2 (1999): 141–169.
- Khan, Mohammad Ayub. *Friends Not Masters: A Political Autobiography.* Lahore, Karachi, and Dacca: Oxford University Press, 1967.
- Kumar, Ropesh. “The Indus Water Treaty: Issues and Challenges.” *Journal of Law* 6, no. 1 (2019): 73–85.
- Kumar Sinha, Uttam. *Riverine Neighborhood: Hydro-politics in South Asia.* New Delhi: Pentagon Press, 2016.
- Laghari, Abdul Nasir, D. Vanham, and W. Rauch. “The Indus Basin in the Framework of Current and Future Water Resources Management.” *Hydrology and Earth System Sciences* 16, no. 4 (2012): 1063–1083.
- Lilienthal, David E. “Another ‘Korea’ in the Making?” *Collier’s* 128 (August 4, 1951): 21–22.
- Lutz, A. F., W. W. Immerzeel, P. D. A. Kraaijenbrink, A. B. Shrestha, and M. F. P. Bierkens. “Climate Change Impacts on the Upper Indus Hydrology: Sources, Shifts and Extremes.” *PLOS ONE* 11, no. 11 (2016): 1–33. https://doi.org/10.1371/journal.pone.0165630
- Majid, Abdul. “Pakistan-India Rivalry Hampering the SAARC to Become a Worthwhile Forum.” *Journal of the Research Society of Pakistan* 54, no. 2 (2017): 1–14.
- Malik, Bashir A. *Indus Water Treaty in Retrospect.* Lahore: Brite Books, 2005.

- Mandel, Robert. “Sources of International River Basin Disputes.” *The Journal of Conflict Studies* 12 (1992): 25–56.
- Maite Martinez Aldaya, Alberto Garrido, M. Llamas, Consuelo Varela Ortega, Paula Novo, and Roberto Rodriguez Casado. “Challenging the Conventional Paradigm of Water Scarcity through the Water Footprint: The Spanish Example.” In *Water Policy in Spain*, edited by Arjen Hoekstra. Boca Raton: CRC Press, 2009.
- Mehmood, Ashfaq. *Hydro-Diplomacy: Preventing Water War between Nuclear Armed Pakistan and India.* Islamabad: IPS Press, 2018.
- Mehsud, Muhammad Imran, Azam Jan, and Tariq Anwar Khan. “War or Peace on the Rivers of South Asia?” *Liberal Arts and Social Sciences International Journal* 4, no. 1 (2020): 242–254.
- Michel, Aloys Arthur. *The Indus River: A Study of the Effects of Partition.* New Haven and London: Yale University Press, 1967.
- Mirza, Muhammad Nasrullah. *Water, War and Peace: Linkages and Scenarios in India–Pakistan Relations.* Saarbrücken: Lambert Academic Publishing, 2011.
- Mirza, Nasrullah. “Wullar Barrage.” *Pakistan Horizon* 47, no. 1 (1994): 47–66.
- Misra, Ashutosh. “The Tulbul Navigation Project/Wular Barrage and Storage Project Dispute: A Casualty of Linkage Politics?” In *India–Pakistan: Military Standoff, Political Process and Resolution Options*, edited by Ashutosh Misra and Michael E. Clarke. New York: Palgrave Macmillan, 2010.
- Mollinga, Peter P. “Water, Politics and Development: Framing a Political Sociology of Water Resources Management.” *Water Alternatives* 1, no. 1 (2008): 7–23.
- Moore, Scott. *Subnational Hydro-politics: Conflict, Cooperation, and Institution-Building in Shared River Basins.* New York: Oxford University Press, 2018.
- Musharraf, Pervez. *In the Line of Fire: A Memoir.* New York: Simon and Schuster, 2006.
- Mustafa, Daanish, and James L. Wescoat Jr. “Development of Flood Hazards Policy in the Indus River Basin of Pakistan, 1947–1996.” *Water International* 22, no. 4 (1997): 238–244.
- Mustafa, Ghulam, and Muhammad Ramzan Shahid. “Water Scarcity in Pakistan: Hydro-Politics in Indus Basin.” *Pakistan Languages and Humanities Review* 5, no. 2 (2021): 246–260.
- Myers, Norman. “Environment and Security.” *Foreign Policy* 74 (1989): 23–41.
- Myers, Norman. “Environmental Services of Biodiversity.” *Proceedings of the National Academy of Sciences* 93 (1996): 2764–2769.
- Nazakat Ali, Raja, Faiz ur Rehman, and Mehmood ur Rehman Wani. “Indus Waters Treaty between Pakistan and India: From Conciliation to Confrontation.” *Dialogue* 10, no. 2 (2015): 166–181.
- Neto, Susana, and Jeff Camkin. “Water Security in the South Asia Region: Challenges, Experiences, and Lessons Learned.” *World Water Policy* 9, no. 3 (2023): 289–292. https://doi.org/10.1002/wwp2.12126
- Navnita Chadha Behera. “Forging New Solidarities: Nonofficial Dialogues.” In *Searching for Peace in Central and South Asia: An Overview of Conflict Prevention and Peacebuilding Activities*, edited by Monique Mekenkamp, Paul van Tongeren, and Hans van de Veen. Boulder: Lynne Rienner Publishers, 2002.
- Obertreis, Julia. “Environment, Water, and Politics: The Making of Hydrosocial Orders in the Twentieth Century.” *Environment and History* 25, no. 4 (2019): 489–512.

- Pahari, Anshuman. “Revisiting the Indus Waters Treaty: Conflict, Cooperation, and the Way Forward.” *South Asian Studies* 34, no. 1 (2019): 1–18.
- Pandey, Vinay Kumar. “The Political Ecology of Water Conflicts in South Asia.” *International Journal of Social Science and Economic Research* 5, no. 5 (2020): 1154–1168.
- Pohl, Benjamin, Naho Mirumachi, Tobias Ide, and Martin Baumann. “Framing Transboundary Water Management: Discursive Depictions of Cooperation and Conflict in the Mekong and the Nile.” *Environmental Science & Policy* 64 (2016): 43–52.
- Postel, Sandra L. *Pillar of Sand: Can the Irrigation Miracle Last?* New York: W. W. Norton, 1999.
- Qureshi, Asim. Indus Basin Water Management: Policy, Institutions, and Politics. Lahore: Vanguard Books, 2011.
- Rahaman, M. M. “Principles of Transboundary Water Resources Management and Water-Related Agreements in Central Asia: An Analysis.” *International Journal of Water Resources Development* 25, no. 1 (2009): 159–173.
- Rasul, Golam. “Food, Water, and Energy Security in South Asia: A Nexus Perspective from the Hindu Kush Himalayan Region.” *Environmental Science & Policy* 39 (2014): 35–48.
- Ravnborg, Helle Munk, et al. “The Role of Dialogue in Managing Water Conflicts: Lessons from the Nile Basin.” *Water Policy* 20, no. 2 (2018): 227–243.
- Riaz, Ali. *Pakistan: A Political History.* Oxford: Oxford University Press, 2020.
- Rogers, Peter, and Alan Hall. “Effective Water Governance.” *TEC Background Papers*, no. 7. Global Water Partnership, 2003.
- Rothman, Franklin Daniel. “Environmental Movements in the Global South: Discourse, Networks, and Outcomes.” *Sociological Inquiry* 84, no. 3 (2014): 354–379.
- Sadoff, Claudia W., and David Grey. “Beyond the River: The Benefits of Cooperation on International Rivers.” *Water Policy* 4, no. 5 (2002): 389–403.
- Sahni, Varun. “The Politics of Water in South Asia: The Case of the Indus Waters Treaty.” *India Quarterly* 63, no. 1 (2007): 1–20.
- Salman, Salman M. A., and Kishor Uprety. *Conflict and Cooperation on South Asia’s International Rivers: A Legal Perspective.* Washington, DC: World Bank, 2002.
- Sarfraz, Hammad. “Revisiting the 1960 Indus Waters Treaty.” *Water International* 38, no. 2 (2013): 204–216.
- Shafqat, Saeed. *New Perspectives on Pakistan’s Political Economy: State, Class and Society.* Lahore: Oxford University Press, 2017.
- Sharma, Chandan. “Hydro-Hegemony and the Indus Water Disputes: A Critical Analysis.” *Asian Journal of Political Science* 28, no. 2 (2020): 122–137.
- Shrestha, A. B., and P. Wester. “Climate Change in the Himalayas: The Regional Impact on Water Resources and Glacier Retreat.” *Mountain Research and Development* 30, no. 1 (2010): 1–10.
- Sinha, Uttam Kumar. *Riverine Neighborhood: Hydro-politics in South Asia.* New Delhi: Pentagon Press, 2016.
- Sinha, Uttam Kumar, and Ashok Swain. “River Interlinking in India: Challenges and Prospects.” *Water Policy* 23, no. 1 (2021): 12–30.
- Stucki, Virpi, and Imraan Valodia. “Water Governance and Poverty: A Framework for Analysis.” *Water Policy* 13, no. 6 (2011): 829–846.

- Sultana, Farhana, and Alex Loftus, eds. *The Right to Water: Politics, Governance and Social Struggles.* London: Routledge, 2012.
- Thompson, William H. "World Bank Mediation and the Indus Waters Treaty: A Case Study of International Conflict Resolution." *Journal of Peace Research* 58, no. 3 (2021): 411–429.
- Treverton, Gregory F., and Seth G. Jones. *Measuring National Power.* Santa Monica: RAND Corporation, 2005.
- Turton, Anthony, and Roland Henwood, eds. *Hydropolitics in the Developing World: A Southern African Perspective.* Pretoria: African Water Issues Research Unit (AWIRU), 2002.
- UNESCO. *Water for People, Water for Life: The United Nations World Water Development Report.* Paris: UNESCO, 2003.
- United Nations Development Programme (UNDP). *Human Development Report 2006: Beyond Scarcity—Power, Poverty and the Global Water Crisis.* New York: Palgrave Macmillan, 2006.
- Usman, Qamar. "Water Security in South Asia: Emerging Threats and Challenges." *South Asian Studies* 30, no. 1 (2015): 39–56.
- Wirsing, Robert G., Christopher Jasparro, and Daniel Stoll. *International Conflict over Water Resources in Himalayan Asia.* London: Palgrave Macmillan, 2012.
- Wolf, Aaron T. "Conflict and Cooperation Along International Waterways." *Water Policy* 1, no. 2 (1998): 251–265. https://doi.org/10.1016/S1366-7017(98)00019-1
- Wolf, Aaron T., Shira B. Yoffe, and Mark Giordano. "International Waters: Identifying Basins at Risk." *Water Policy* 5, no. 1 (2003): 29–60.
- Wouters, Patricia, Sergei Vinogradov, and Bjørn-Oliver Magsig. *Water Security, Justice and the Right to Water: An International Perspective.* London: Routledge, 2013.
- Zeitoun, Mark, and Naho Mirumachi. "Transboundary Water Interaction I: Reconsidering Conflict and Cooperation." *International Environmental Agreements: Politics, Law and Economics* 8, no. 4 (2008): 297–316.
- Zeitoun, Mark, and Jeroen Warner. "Hydro-Hegemony: A Framework for Analysis of Trans-Boundary Water Conflicts." *Water Policy* 8, no. 5 (2006): 435–460.

Official Reports

- Announcement of Indus Water Treaty Signed on September 19, 1960 (English). Press Release, no. 1960-650 Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/127721589378651773/Announcement-of-Indus-Water-Treaty-Signed-on-September-19-1960.
- "Apportionment of the Waters of The Indus River System Between The Provinces Of Pakistan," Indus River System Authority IRSA, Government of Pakistan. Government of Pakistan, *Pakistan: The Struggle for Irrigation Water and Existence* (Embassy of Pakistan, US, 1953)
- Dr. Muhammad Ashraf, "Pakistan Council of Research in Water Resource Annual Report 2020-21," (Islamabad: PCRWR, 2021) chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://pcrwr.gov.pk/wp-content/uploads/2021/09/Annual-Report-2020-21.pdf
- Government of Pakistan, Canal Waters Dispute: Documents relating to the Negotiation under the Good Offices of the IBRD [World Bank], June 1958.

- Government of Pakistan, *Canal Waters Dispute: Documents relating to Negotiations under the Good Offices of the International Bank for Reconstruction and Development* 1 (June 1958), IBRD Press Release No. 380, Appendix 3, 1.
- Federal Flood Commission, "Annual Flood Report 2017," (Islamabad: Ministry of Water Resources)
- Planning Commission of Pakistan. Canal Water Pricing for Irrigation in Pakistan: Assessment, Issues, and Options. https://www.waterinfo.net.pk/sites/default/files/knowledge/Canal%20Water%20Pricing%20for%20Irrigation%20in%20Pakistan%20%20Assessment%20Issues%20and%20Options.pdf 2012
- 118th Meeting of the Pakistan-India Permanent Indus Commission, New Delhi India, available at https://mofa.gov.pk/118th-meeting-of-the-pakistan-india-permanent-indus-commission-new-delhi-india
- Amarasinghe, Upali A. and Vladimir Smakhtin, *Projected global water scarcity, 2025*, (Srilanka,International Water Management Institute, 2014), http://www.iwmi.cgiar.org/
- Annual Flood Report 2010, Ministry of Water and Power, Government of Pakistan, available at chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://mowr.gov.pk/SiteImage/Misc/files/2010%20Annual%20Flood%20Report%20of%20FFC.pdf
- Barlow, Maude. *Blue Gold: The Global Water Crisis and the Commodification of the World's Water Supply*. San Francisco: International Forum on Globalization, 2001.
- Bigas, Harriet. *Water Security & the Global Water Agenda* (Canada: UN-Water Analytical Brief, 2013) https://www.unwater.org/publications/water-security-and-global-water-agenda.
- *Global Risks 2015*, (Geneva: World Economic Forum, 2015), https://www.weforum.org/publications/global-risks-2015/
- Savitsky, Andre. Donald L Alford, Casey Brown, Dario Julian Debowicz, Sherman Robinson, James L Wescoat, Yi-Chen Ethan Yang, Winston Yu, *The Indus Basin of Pakistan The Impacts of Climate Risks on Water and Agriculture* (Washington D.C: World Bank Report, 2013). http://documents.worldbank.org/curated/en/650851468288636753/Indus-basin-of-Pakistan-impacts-of-climate-risks-on-water-and-agriculture
- Shrestha, Arun Bhakta, Nand Kishor Agrawal, Björn Alfthan, Sagar Ratna Bajracharya, Judith Maréchal, Bob van Oort. *The Himalayan Climate and Water Atlas: Impact of Climate Change on Water Resources in Five of Asia's Major River Basins.* Norway: ICIMOD, GRID-Arendal and CICERO, 2015. https://lib.icimod.org/record/31180.
- *Transboundary Waters: Sharing Benefits, Sharing Responsibilities*, (UN Water, 2008), www.unwater.org/downloads/UNW_TRANSBOUNDARY.pdf.
- *The International Year of Fresh water 2003*, UNESCO-IHE Institute for Water Education, available at UNESCO Digital Library
- "What is water security?", (UN Water, May 2013), https://www.unwater.org/publications/what-water-security-infographic
- Winston Yu, Yi-Chen Yang, Andre Savitsky, Donald Alford, Casey Brown, James Wescoat, Dario Debowicz, and Sherman Robinson, "The Indus Basin of Pakistan The Impacts of Climate Risks on Water and Agriculture," *World Bank Report* (Washington D.C, The WorldBank,2013). https://documents1.worldbank.org/curated/en/650851468288636753/pdf/Indus-basin-of-Pakistan-impacts-of-climate-risks-on-water-and-agriculture.pdf

- "*World population prospects 2017*" (Feb. 13, 2017) https://www.un.org/en/desa/world-population-prospects-2017-revision.
- "*United Nations, "Regional Cooperation Between Countries in The Management of Shared Water Resources: Case Studies of Some Countries In The ESCWA Region‖."* (New York, UNO, 2006). Accessed on Dec. 5, 2020 http://www.escwa.un.org/information/publications/edit/upload/sdpd05-15.pdf"
- UN Water, *Progress Update 2021: SDG 6 — water and sanitation for all*, Geneva: UN Water publications,2021, https://www.unwater.org/publications/summary-progress-update-2021-sdg-6-water-and-sanitation-all