Vol. 3 No. 6 (2025)

Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

The Hydro-Politics of Indus River Basin: The Role of Water in Pak-India Relations

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Article Details:

Received on 25 May 2025
Accepted on 29 June 2025
Published on 01 July 2025

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Abstract

Among the shared river basins in South Asia, the Indus River Basin (IRB) ranks highly in political importance and water significance. This study looks at the strategy of water in shaping the partnership of these two nuclear states and examines the changing patterns of water politics through the Indus Waters Treaty (IWT) of 1960. A case study method is applied in the research to study the ways geopolitics, water management within the country and environmental issues interact. Water issues were previously technical, but through analysis, the authors found that political leaders are now frequently using them, especially after a major event like the 2019 Pulwama attack. Research indicates that in the past, the IWT played a key role in keeping its parties at peace, though now it is experiencing fatigue because it cannot adjust to new problems such as glacial retreat, unusual monsoon patterns and questions about the legality of non-consumptive uses. Additionally, because politics within Pakistan and India are often divided, it complicates the agreement process and makes diplomatic talks harder. It illustrates that the IWT can be made more suitable for the future by putting in place climate-related protections, making its information more easily accessible and allowing greater public involvement in management. It calls for adopting adaptive methods for joint river management rather than seeing the IRB as a source of conflict between countries. The paper highlights both the risks and opportunities offered by the IRB on the topic of transboundary water governance and peace efforts in regions prone to conflict. The future is bright for Indo-Pakistani relations on water if political decisions focus on looking past competition and working on solutions together.

Keywords: Indus River Basin, Hydro-politics, Indus Waters Treaty, Pakistan-India Relations, Transboundary Water Governance, Climate Change, Hydro-diplomacy

Vol. 3 No. 6 (2025)

Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

Introduction

Transboundary water problems impact many regions around the world, now play an essential role in international relations. The environmental, political and strategic situations are reflected in the IRB, where India and Pakistan meet. As the most institutionalized river basin in South Asia, the IRB is governed by the Indus Waters Treaty (IWT) of 1960 an agreement often hailed as a model of transboundary water cooperation despite entrenched hostilities between its signatories (Uprety & Salman, 2011). Yet, the increasing strain posed by climate change, population growth, changing monsoonal patterns, and nationalist discourses has renewed focus on the IRB as a zone of both potential cooperation and escalating conflict (Wirsing, 2007; Haq, Ahmad & Khan, 2024).

Water, beyond its ecological role, serves as a political resource capable of shaping diplomatic engagements and territorial narratives. In the context of South Asia, particularly between India and Pakistan, rivers are more than physical flows; they are imbued with questions of sovereignty, identity, and national security (Nabeel & Cheema, 2021). The IRB contributes more than 80% of Pakistan's agricultural water, making it existentially vital (Cheema & Qamar, 2019). India, as the upper riparian state, holds significant hydrological control, which has periodically raised alarm in Pakistan over potential violations of the IWT and perceived threats to downstream flows (Ahmadzai, 2024).

Historically, the IWT has withstood three wars between the two nations, largely due to its technocratic design and the mediation role played by the World Bank. However, scholars increasingly critique the treaty for being static in a dynamic ecological and geopolitical landscape (Qureshi, 2017). The treaty allocates the eastern rivers (Ravi, Beas, and Sutlej) to India and the western rivers (Indus, Jhelum, and Chenab) to Pakistan, but leaves little room for adaptive governance in response to climatic uncertainties or shifts in power dynamics (Jayaram, 2020). With India constructing hydroelectric projects on the western rivers most notably the Kishanganga and Ratle projects Pakistan perceives strategic encroachment, even when such projects comply technically with the IWT's stipulations (Sattar & Shah, 2023).

In recent years, the hydro-political tensions have been further complicated by shifting geopolitical alliances, water scarcity, and regional insecurity. For instance, India's threat in 2019 to "review" the IWT following the Pulwama attack was not only symbolic but indicative of how water is now increasingly used as a tool of political signalling (Mallick, 2020). At the same time, scholars such as Barua, Vij, and Rahman (2018) argue that hydro-diplomacy can act as a confidence-building measure, reducing the likelihood of direct conflict by institutionalizing dialogue and data-sharing mechanisms.

Nevertheless, institutional mechanisms alone may no longer suffice. The broader discourse on hydro-politics in South Asia now recognizes the importance of considering historical, cultural, and nationalistic narratives that underpin state behavior toward shared water resources (Nagheeby & Warner, 2018). As water security becomes a more pressing national agenda item exacerbated by climate-induced hydrological changes traditional frameworks for cooperation may falter without substantial reform. For example, the retreat of Himalayan glaciers and erratic rainfall have introduced new uncertainties into river flows, undermining the assumptions on which the IWT was originally designed (Haq, Ahmad & Khan, 2024).

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Journal of Social Signs Review

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Moreover, the political economy of water within each state significantly influences bilateral negotiations. In Pakistan, inter-provincial disputes and internal mismanagement of irrigation infrastructure weaken its bargaining capacity on the international stage (Nabeel & Cheema, 2021). India, in turn, views upstream hydro-development as both a development imperative and a strategic tool often leveraging its riparian advantage in the broader matrix of regional power (Ahmadzai, 2024). These internal variables complicate external diplomacy, suggesting that effective conflict resolution mechanisms must also consider domestic water politics.

Academic scholarship has increasingly adopted interdisciplinary approaches to address these challenges. Recent studies combine hydrological modeling with political analysis to assess the implications of dam construction, river diversions, and changing precipitation patterns (Aijaz, Kamran, & Shivakoti, 2017). Others employ game theory and institutional analysis to examine strategic behavior and compliance incentives within treaty frameworks (Barua, Baruah, & Vij, 2025). This body of research points to the need for more flexible, adaptive water-sharing regimes that incorporate early warning systems, joint monitoring, and climate-resilient infrastructure planning.

This paper contributes to the evolving scholarship by investigating how water resources influence bilateral political dynamics between India and Pakistan, with the Indus River Basin as a focal lens. It evaluates existing institutional mechanisms under the IWT, explores potential pathways for cooperation or conflict, and contextualizes the historical evolution of water-sharing arrangements within broader geopolitical shifts. By employing a qualitative case study approach, the study builds on expert interviews, policy analysis, and hydrological assessments to provide a nuanced understanding of how water functions as both a source of tension and a potential medium for peacebuilding.

Because South Asia deals with mounting challenges on both the political and environmental fronts, it is clear that the ways transboundary water is governed must be revised. The model that the IRB teaches is successful but is facing greater challenges. It depends on whether the two countries with nuclear weapons can go beyond winning and losing and practice water diplomacy that is more welcoming and flexible. By doings, they might save their rivers and add to the stability and sustainable progress of their region.

Historical Context of the Indus River Basin

South Asia's history, culture and politics have been influenced by the Indus River Basin for more than five thousand years. Connected to its fertile river plains, the Indus Valley Civilization (3300–1300 BCE) rose in this area and flourished for this reason. Sites such as Mohenjo-daro and Harappa reveal that people relied on the river for both their cities, farms and business activities.

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Journal of Social Signs Review

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Thanks to their large canal and water regulation projects, the British caused changes to the basin's natural river system which later created differences and tension after the British left. As a result of the partition of British India in 1947 which established India, Pakistan and Bangladesh in Asia, there has been an upstream-downstream division, causing hydropolitical issues ever since.

In 1960, the World Bank helped Pakistan and India settle river conflicts by assigning the eastern rivers (Ravi, Beas, Sutlej) to India and the western rivers (Indus, Jhelum, Chenab) to Pakistan. Even after decades of war, the treaty hasn't changed much. Yet, people have begun to question the law's and environment's suitability as conditions such as climate variability, more hydropower projects and growing demand for food change (Khan et al., 2025; Chowdhury et al., 2024).

It has been emphasized by recent studies that geography, historical colonial influences and local and national politics impact how the basin manages its water. By adding projections of climate changes to this mix, other problems may be added to the already tense region filled with militarized borders and disputes among nations (Mutin et al., 2025; Besseiche et al., 2025). Looking at the history of the Indus River Basin demonstrates that the actions of nature are often integrated into affairs of nations and security planning.

Geopolitical Significance of Water Resources

Due to its importance, water is now treated as a valuable tool in foreign and domestic affairs. Viewing the Indus River system which borders Pakistan and India, we can see that controlling and sharing water matters are both environmental and political issues. Because the shortage of freshwater increases due to various reasons, countries are now competing for water resources more fiercely, leading to the need for countries to cooperate.

Water is important in politics because it helps provide food, electricity and support for people's well-being. For those nations higher up along a river, guiding the flow represents an advantage, while low-lying states tend to see this as a risk to both their governance and existence. As a case in point, the IWT (the treaty signed for water sharing between India and Pakistan in 1960) is considered a key document in water diplomacy for the region, yet current regional conflicts have made it less likely that the treaty will sustain its original goals for the foreseeable future (Jaiswal & Kumar, 2025). Even though the treaty helped prevent a complete war, Pakistan has become concerned again due to India building unilateral water works (Riak & Badeng, 2025).

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Examples from around the globe prove that water governance plays a significant role in international matters. Ethiopia's Grand Renaissance Dam in the Nile Basin has brought about new changes in the relationship between Egypt, Sudan and Ethiopia (Riak & Badeng, 2025). Furthermore, struggles exist in the Tigris-Euphrates Basin since Turkey takes water from rivers before Syria and Iraq can use it (Sedighi et al., 2025). The situation in Asia similar to the Pakistan-India conflict, where what India does in these countries is often seen as a concern of national security in Pakistan.

Water problems are also connected to overall political strategies and economic plans. More involvement from China and similar powers in projects related to water infrastructure in Asia and Africa makes the situation in those regions more complex (Balmaceda, 2025). Environmental changes, for example, melting glaciers and weather changes in monsoons, have increased seasonal differences, affecting both countries' farming industry and stability of their economies.

Overall, water should be managed and safeguarded since it can shape political, military and economic policies. To achieve the same, we need effective cooperation, different mediators and ways to share data. Knowledge about the effects of water resources on countries is necessary for peace and stability in regions of South Asia, along with the study of hydrology and environmental science.

Literature Review

Transboundary Water Governance in South Asia

Relations between India and Pakistan with regard to shared water are mainly influenced by old colonial ideas, slow-changing institutions and present-day geopolitics. In 1960, the World Bank arranged the Indus Waters Treaty (IWT) which is still regarded as the strongest water-sharing agreement in the region. Uprety and Salman (2011) note that the IWT has remained strong despite experiencing numerous wars and conflicts. Even so, it makes the system overlook serious weaknesses in governance when climate changes and when there are changes in infrastructure.

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Ajiaz, Kamran and Shivakoti (2017) note that the IWT is strongly tied to processes, but at the same time, ignores broad shifts in nature and society. In comparison to current international water treaties, the IWT focuses only on one river and can be understood narrowly and strictly. Because of this, critics point out that it does not focus on new concerns about the environment (Qureshi, 2017).

The author further points out that while the treaty helped promote peace at first, its primary aim of splitting resources creates ongoing problems for the environment. Because there are no clear systems for dealing with climate issues, public concerns and conflicts, the treaty is losing its influence.

Hydro-politics and Power Asymmetries

Unequal distribution of power is a key characteristic of hydro-politics in the Indus River Basin. India, as the upper riparian state, wields both geopolitical and hydrological leverage. Pakistan, meanwhile, remains hydrologically vulnerable, with nearly 90% of its agricultural economy dependent on Indus flows (Cheema & Qamar, 2019).

Barua, Vij, and Rahman (2018) argue that the existing asymmetry extends beyond physical geography to include economic, diplomatic, and military capabilities. They note that India's dam-building on the western rivers though permissible under the IWT often raises fears in Pakistan of water weaponization. Ahmadzai (2024) introduces the concept of the "sub-state–supra-state nexus," where actors beyond central governments including provincial entities and international financial institutions shape water politics in invisible yet powerful ways.

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Journal of Social Signs Review

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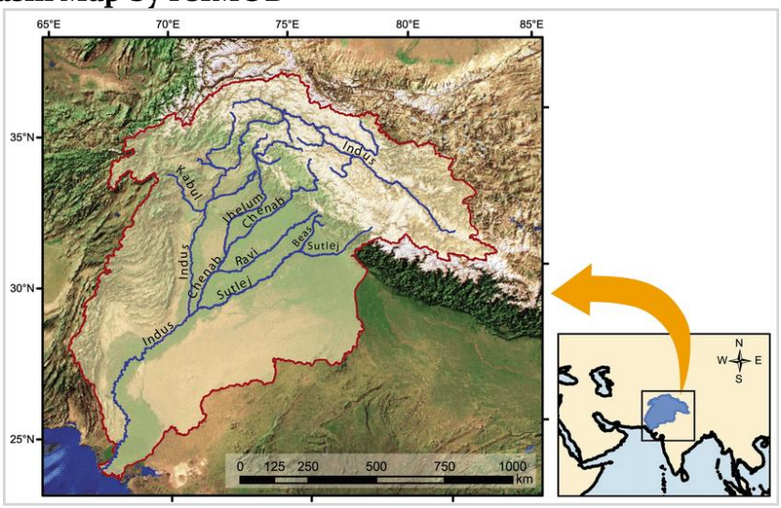
Print ISSN 3006-466X

Indus River Basin Map by ICIMOD



Nagheeby and Warner (2018) expand on the notion of "geopolitical overlay," emphasizing that transboundary water relations are rarely just bilateral or environmental. They are embedded in broader regional security complexes and historical grievances. As such, cooperation is less about shared water needs and more about the negotiation of strategic interests.

Climate Change and Environmental Stressors

The hydro-political landscape of the IRB is increasingly shaped by climate change. Glacial retreat in the Himalayas, erratic monsoons, and intensified flooding or droughts now pose existential challenges to water security in both countries (Haq, Ahmad & Khan, 2024). Yet, the IWT contains no provisions for climate adaptation or integrated resource management, thereby exposing critical policy gaps.

Cheema and Qamar (2019) warn that the compounding effects of climate change and upstream dam construction may result in "tipping points" for regional stability. Increasing environmental changes mainly harm Pakistan, because its water management and government systems are not well organized.

According to Jayaram (2020), future hydrodiplomacy ought to address environmental concerns and include ways to help nations endure environmental changes. They also urge for climate management strategies that collaborate with several countries and involve civil society, academic groups and groups not connected with governments.

Systems of Rules and Framework for Institutions

Many research papers have disputed that the IWT relies on rigid and narrow institutions. In a similar way, both these studies (Qureshi in 2017 and Sattar and Shah in 2023) highlight that the Permanent Indus Commission is slow to move forward and does not address recent arguments well.

Salman and Uprety explain (1999) that, in comparison to Mekong and Nile river basins, the IWT lacks unified planning, the ability to adapt to change and methods to deal with disputes peacefully. Experts in international law believe the treaty is historically significant, though they generally believe it calls for mainly "soft" changes which include making more information public, increasing sharing of data and allowing civil society more opportunities to engage (Nagheeby & Warner, 2018).

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The Kishanganga Dam demonstrates some of the constraints faced by institutions. Even though India won the case in arbitration, the project led to increased suspicions and highlighted doubts in how various provisions of the treaty are understood (Haq et al., 2024).

On the international stage, nations support hydro-diplomacy and take part in Confidence-Building Measures.

Hydro-diplomacy is being viewed as a means to promote regional peace. Kraska explains that "hydro-diplomacy" helps promote peace by facilitating talks and building relationships of dependence among nations. Mallick examines how water diplomacy acts as a substitute for informal talks between Pakistan and India when negotiations are not possible.

According to Barua et al. (2025), including third-party arbitration or working on commissions increases the chances of cooperation amongst river countries.

Jayaram (2020) and Hill (2017) advocate a shift toward adaptive cooperation, where environmental interdependence becomes a foundation for peace. These scholars suggest that the IRB could serve as a pilot basin for eco-diplomacy if institutional inertia can be overcome.

Domestic Water Politics and Interprovincial Struggles

Transboundary hydro-politics are often influenced by intrastate factors. Nabeel and Cheema (2021) examine how Pakistan's internal water conflicts especially between Punjab and Sindh affect its credibility and coherence in international negotiations. Similarly, India's federal structure and the growing assertiveness of states like Jammu & Kashmir or Punjab complicate the execution of national water policies (Ahmadzai, 2024).

Aijaz et al. (2017) stress the importance of "nested institutions," where effective transboundary governance must be matched by efficient domestic water management systems. Without this symmetry, bilateral treaties remain fragile and vulnerable to domestic disruptions.

Moreover, public perception and political rhetoric often shape water narratives. During heightened political tensions, leaders in both countries have used water as a symbolic tool whether to threaten revocation of the IWT or to stoke nationalist sentiment (Wirsing, 2007; Mallick, 2020). They weaken trust in the organization and complicate the process of diplomacy.

Research on hydro-politics in the Indus River Basin suggests that there are many issues related to environmental changes, uneven power, inflexible institutions and disputes between nations at play. The Indus Waters Treaty has been successful in managing resources together; however, because of new challenges, especially due to climate change and changing politics, cooperation is requiring a new approach.

Scholars are promoting a move from fixed and centralized water distributions to flexible and inclusive water management. Hydro-diplomacy, planning on a basin scale, trust-building efforts and governance across different levels are good options, even if their application often faces many tough political and structural hurdles. Scientists need to investigate how new institutional approaches, realistic thinking about the environment and supportive political leadership can work together to improve the stability of the South Asian hydro-political regime.

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Case Studies of Water Conflicts

Nowadays, water conflicts are considered as much about security, international affairs and diplomacy as they are about managing the environment. This makes its appearance most clearly in the Indus River Basin, where India and Pakistan have clashed since their partition. Reviewing cases that discuss shared water resources, cooperation, competition and adaptation reveals the ways countries handle such issues.

The importance of the Indus Valley Treaty in tough circumstances

Many describe the Indus Water Treaty (IWT) as a leading example of successful agreements on sharing water between neighboring nations. Since the treaty, the six Indus Basin rivers have been divided, giving control of the western parts (Indus, Jhelum, Chenab) to Pakistan and the eastern (Ravi, Beas, Sutlej) to India. Also, it introduced the Permanent Indus Commission so that matters could be managed, inspections arranged and information exchanged (Wolf & Newton, 2008).

Many people view the IWT as an impressive success in diplomacy, even though there have been many wars and hostilities between the two nations. Still, these habits have affected the environment. Some experts say that the agreement's main concern is technology which ignores recent changes like movements in the climate, the accumulation of sediment and India's use of hydropower upstream. Consequently, different ways of competing have come to light, specifically because India is using Kashmir's water for energy purposes (Qureshi, 2016).

Matters like the Kishanganga and Ratle dam conflicts have highlighted that the treaty is not as flexible as hoped in today's world. Even though international arbitration has been applied, the uncertainties and doubts felt by each side have damaged their trust in each other. As a result, the IWT still supports the governance in the Indus Basin, but is showing signs of weakening under increasing pressures (Roic et al., 2017).

Water Distribution Conflicts in Sindh Province

Although major water disputes involve different countries, those within nations are just as significant in hydro-political analysis of the Indus Basin. In Sindh it is often claimed that Punjab, the province upstream from Sindh, is controlling too much of the water. This problem reaches its peak during the dry months, since there isn't enough water to produce food or supply drinking water to regions farther down (Magsi & Atif, 2012).

It has been revealed through studies that those with large farms usually control the water systems, leaving little to no reach for ordinary farmers. The situation is made worse by the lack of strong systems to supervise how the waters are shared according to the water

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accords. In addition, the Indus delta has been heavily damaged by a lack of freshwater supply, making salt levels in the water rise and the coast suffer (Ahmad & Iqbal, 2016).

Because Pakistan often has disagreements within its government, it struggles to speak with one voice internationally. Because of weak water management, compounded by political manipulation, the nation's leaders are not united on water matters. Tackling local issues in Sindh matters for ensuring equal rights in the province and for better handling discussions with India at the foreign level (Janjua & Hassan, 2020).

Examining the Treaty Again: Issues and Changes

With changes in the regional situation, people are again questioning the validity and fairness of the Indus Waters Treaty. Over the past few years, India has insisted that its share of water from the western rivers has been used less than it should, justifying its increased use of these waters. These signals are not mere rhetoric; major infrastructure projects like the Baglihar, Kishanganga, and Ratle dams have been constructed or planned on western tributaries (Qureshi, 2016).

Such developments have generated diplomatic backlash from Pakistan, which perceives these as treaty violations that could reduce water availability during critical periods. Legal battles have ensued, with mixed results. The mechanisms offered by the World Bank have been relied on, but there have been too many delays and words in the treaties that make these outcomes less effective. Both sides disagree on the ways "non-consumptive use" is defined and the storage capacity that can be used in the river (Ahmad & Iqbal, 2016).

The case study points out that the treaty is not clear in many ways and can change with any movement in geopolitical thinking. Since regional water shortages and nationalism are rising, the way international treaties are managed should be updated to deal with hydro-diplomacy. Whereas once renegotiating or amending treaties was considered unlikely, it is now addressed in both countries' debates because of greater understanding that water is strategic (Wolf & Newton, 2008).

Examining Issues in Inter-Provincial Conflict Using Game Theory

To solve water conflicts involving Pakistani provinces, researchers use methods such as game theory and methods based on bankruptcy allocation. They aim to ensure fair water sharing and the use of systems ensures the topic remains clear and solid where it is often seen as highly sensitive. Specific software models are being used in the Indus Basin to simulate ways of moving water to Punjab, Sindh, Balochistan and Khyber Pakhtunkhwa (Janjua & Hassan, 2020).

Interestingly, bankruptcy methods are designed to solve deficits which is not the focus of other methods. For Pakistan, this is especially significant since seasonal shortages and increasing need can cause a crisis in the country's power system. As a result of using these models, researchers have suggested methods that take into account both history and future concerns, leading to solutions that can be accepted by political leaders (Roic et al., 2017).

Still, the real problem happens when trying to carry out the ideas in real life. Adoption of these tools by the state is still hampered by slow progress, lack of the necessary skills and doubt within provinces. At the same time, applying game theory to water governance supports reducing political influences and introducing analysis-based planning into talks among the provinces (Magsi & Atif, 2012).

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Hydropower and Conflicts Involving the Chenab River: A Case of International Tension

Both India and Pakistan are in conflict over the Chenab River, one of Pakistan's western rivers. The construction of hydroelectric projects by India on the Chenab, particularly the Baglihar and Kishanganga dams, has been met with vociferous objections by Pakistan. The core concern revolves around reduced water flow during the sowing season, affecting Pakistan's critical agricultural output (Ahmad & Iqbal, 2016).

Legal assessments of the disputes have led to international arbitration, including hearings at the Permanent Court of Arbitration and expert-level reviews. While some decisions have favored Pakistan such as mandating minimum flow releases others have endorsed India's right to construct "run-of-the-river" projects. This legal ambiguity continues to fuel mistrust and challenges the dispute resolution mechanisms embedded within the IWT (Qureshi, 2016).

Beyond legalism, the Chenab dispute encapsulates broader concerns about upstream-downstream power asymmetries. For Pakistan, these developments heighten existential anxieties about water security. For India, they represent sovereign rights to development. The conflict underscores the growing overlap between hydropower diplomacy and regional strategic posturing in South Asia (Yaqoob, 2019).

Objectives

This study seeks to contribute to the growing body of scholarship on transboundary water governance and hydro-political dynamics in South Asia by focusing on the Indus River Basin, a pivotal shared water resource between Pakistan and India. Drawing on qualitative research methodologies and policy analysis, the study is structured around the following three core objectives:

1. This study looks into the Indus River Basin as the focus of diplomatic relations between Pakistan and India and how water helps solve some bilateral issues, as well as creates challenges.
2. To understand how well the Indus Waters Treaty (1960) with its institutions respond to the challenges caused by geopolitical issues, dams in upstream areas, climate change and weather patterns in the region.
3. To review options for resolving issues or resolving disputes along the Indus River, with an evaluation of how water agreements are made, the role of political decisions and the opportunities created by emerging methods of managing the area as things evolve.

Methodology

The study applies the case study method to find out how problems related to the Indus River affect Pakistan and India's political relations. The reason for choosing the Indus River Basin is that it reflects an important international water system controlled by the Indus Waters Treaty concluded in 1960. Previously, the treaty encouraged both countries to cooperate, but challenges because of global warming, rising water needs and new dams have emerged lately. For this reason, the basin offers a good example for exploring relationships involving both peace and tension among countries in the same river system.

Data for the study is collected from several different sources. Treaties, agreements related to water among countries, policy papers and reports prepared by international agencies are considered to find out the rules and structures governing the basin. Moreover, experts such as hydrologists, policy professionals, retired diplomats and those who work in South Asian geopolitics and water management are interviewed. By speaking to

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Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

interviewees, we uncover the impact of politics, the environment and methods on how those decisions are made. To gain background knowledge, I also analyze academic articles, studies by research organizations and reliable information from news sources.

Information collected is examined using various approaches. To begin, the sharing of water is examined to see what political goals and strategies are being followed in the region. Second, a study of rainfall patterns, river flows and anything that occurs at the dams is done to learn about any changes occurring in the basin. In addition, this approach examines the way that water-sharing arrangements have changed in the past and if today's versions are suitably effective.

To interpret the information, significant themes are highlighted and arranged along ideas of cooperation, conflicts, durable treaties and building trust. Thanks to these themes, we can analyse water's role in both increasing stress and promoting diplomacy. Although the study explores water politics in detail, it also recognizes certain problems it faces. These problems are outlined by restricted access to diplomatic records, only a small number of interviews with experts and the obstacle of connecting water changes to political steps. Still, the approach helps understand the strategic significance of water in the relations between Pakistan and India.

Analysis and Discussion

The study explores the ways issues involving shared water on the Indus River Basin (IRB) connect to the complicated and tense relationship between Pakistan and India. Researchers have looked into South Asia's most concerning relationship by combining case study techniques, analyzing treaties, drawing from the opinions of experts and evaluating geopolitics.

Focusing on the first objective of this study, it is obvious that water has now become a key player in India–Pakistan bilateral affairs. Being the upstream country in the Indus system gives India both water-related and political influence and Pakistan now feels increasingly concerned about it. The construction of major hydroelectric projects by India, such as the Kishanganga and Ratle dams, although within the legal boundaries of the Indus Waters Treaty (IWT), are seen in Islamabad as efforts to undermine downstream water availability during critical agricultural periods.

This perception is not purely technical it is embedded in historical mistrust, national security discourses, and unresolved territorial disputes, especially over Kashmir. The use of water as a political signal exemplified by India's 2019 threat to "review" the IWT following the Pulwama attack illustrates how hydrological issues have entered the core of strategic competition between the two nuclear-armed nations. Water, in this context, is not only an ecological resource but a symbol of sovereignty and national survival, particularly for Pakistan, whose agriculture is overwhelmingly dependent on the Indus system.

In addressing the second research objective evaluating the effectiveness and adaptability of the IWT the study finds that the treaty, while remarkably durable, increasingly struggles to remain effective in a dynamic and politically charged environment. While the IWT has served as a buffer during armed conflicts, its institutional mechanisms, notably the Permanent Indus Commission (PIC), have not evolved to address the new realities of climate variability, growing water demand, and contested dam construction.

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Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

Legal contests over Indian dam projects highlight not only Pakistan's procedural frustrations but also the limitations of the IWT's static framework. Despite Pakistan's repeated diplomatic efforts to contest upstream projects, arbitration outcomes have often favored India's interpretation of "non-consumptive use," exacerbating Islamabad's perception of marginalization. The absence of clear, enforceable climate and environmental provisions within the treaty further weakens its ability to mediate emerging hydro-political risks.

The IRB is facing intensifying climate-related pressures, including glacial melt, erratic rainfall, and frequent flooding. Because it is downstream and depends on farming more, Pakistan suffers more gravely than India. Nevertheless, no clauses are included for cooperative responses to climate change or for monitoring the environment which reveals a significant gap in how IWT is organized.

It is evident from qualitative evidence that both ongoing projects in India and weather changes create uncertainty for Pakistan. As a result, ensuring water security is a major issue mentioned in Islamabad's national policy discussions. On the other hand, India commonly describes these worries as misleading or linked to political goals which only serves to reduce the trust between the two countries and slow true dialogue.

The study's methodology revealed that the various divisions among Pakistan's government in water issues are a major factor weakening its ability to negotiate with nations outside. There is evidence of a lack of domestic consensus when Punjab and Sindh argue over how the Indus waters should be distributed. Because of mismanagement and lack of transparency, Pakistan finds it difficult to be united in water talks with India.

Furthermore, how water is managed in India is shaped by its system of federal government and the political situation in Jammu & Kashmir, where major dams are built. The impact of subnational factors on ratifying treaties suggests that cross-border issues are influenced just as much by internal political situations as by international regulations.

In spite of the strong disagreement, the Indus Waters Treaty has enabled regular cooperation between India and Pakistan. Yet, the information collected points out that simply having strong institutions may not be enough. For development to be resilient, data should be freely shared, a third-party group must guide activities and joint systems should give early warnings and evaluate the environment.

Hydro-diplomacy can help create a link in a frozen relationship between two countries. Troubles faced by many, like retreating glaciers and unusual monsoon seasons, may make it easy for countries to cooperate realistically. Yet, we must look at water as being shared by people and nature, instead of being a resource that can only be gained or lost. The experts interviewed for this project pointed out that talk to bring in these elements of the treaties structure, reinforce discussion among actors, make governance more participative and include items about climate.

It has been found that the IWT which worked for many years, is no longer effective enough today to tackle the new and ongoing challenges of relations and the environment between India and Pakistan. What was unheard of in political discussion 15 years ago is now becoming common in the discussion of trade policy in both capitals.

As far as Islamabad is concerned, the approach should deal with unequal power and guarantee the rights of those who depend on water in dry months and important agricultural times. Maintaining both its treaty promises and its own growth is vital to the achievements of New Delhi in foreign and economic policy. Closing this gap involves

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Online ISSN 3006-4651

Print ISSN 3006-466X

negotiations guided by politics, cooperation between countries in the same area and using water jointly.

Conclusion

Both Pakistan and India share the Indus River Basin (IRB) which is known for helping unite them and also drawing conflicts between them. The continuity of the Indus Waters Treaty (IWT) has widely supported diplomatic efforts between the two states. At the same time, this study highlights that the established rules in the treaty are becoming too rigid for the current realities of climate change, tensions among nations, increased hydropower and poor water management in Pakistan.

Even though India dominates the supply of water and benefits from its geography, along with adverse environmental situations in the country, Pakistan considers water to be a serious matter for its national security, especially in farming. While India complies with all the legal requirements, reports of manipulating water for strategic ends still spark mistrust, especially after building the Kishanganga and Ratle dams. Because of these developments, the imbalance in power is apparent in the basin, with water being used as a political gesture when tension between countries increases.

It also shows that many difficulties within Pakistan's water system such as rivalry between provinces and lack of progress in offices, keep the country from negotiating successfully at the global level. Complications arise in carrying out policies in Kashmir, the main location for Indian hydro-developments, due to India's federal division. The linkage between domestic and international factors has made it much harder for countries to sustain cooperation.

Also, because the IWT does not deal with effects such as rising temperatures leading to more melting glaciers, erratic rainfall and increased use of water, the current laws and structures are found lacking. Because there are no unified agreements on the environment, climate change and decision-making, the future sustainability of the treaty could be under threat.

Even so, there is still a chance in the common ecological bonds linking the IRB. If used properly, water diplomacy might transition from fixing disputes as they arise to boosting trust, maintaining peace, stability and protecting the environment in a region that is prone to conflicts.

Recommendations

Reforming the ways bilateral and local mechanisms in the Indus River Basin are managed will help move Pakistan and India's disputes toward cooperation. The IWT (Indus Waters Treaty) was signed in history, but it should now be reconsidered because the world has changed a lot since 1960. A neutral party, whether the World Bank or the United Nations, should be asked to guide a review of the joint treaty to ensure that climate adaptation, protection of the environment and flexible methods for addressing conflicts are part of the agreement. It would also prepare nations to deal with things like glaciers melting and unpredictable monsoons, both of which are at present not covered by the treaty.

Furthermore, widespread sharing of important data will help both nations become more open and trustworthy. For countries to meet and cooperate on flood defense, it helps to instantly exchange information on rivers, dams and weather predictions. Also, a panel formed by hydrologists, engineers and legal experts from both nations could analyze sticky projects and advise about eco-friendly and neutral solutions.

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Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

Hydro-diplomacy should be incorporated regularly into bilateral efforts to promote confidence between countries. During times of political tension, scholars, civil activists, journalists and representatives from both countries can use these meetings to keep talking. These activities may encourage real talks and help water dialogue by fostering unity and ridding the topic of political issues. To shift how we view relations between countries, we should understand water is something that everyone shares, instead of regarding it as something only a few can own.

Inside Pakistan, it is necessary to handle issues that make its diplomatic gains abroad harder to achieve. There must be fair and open methods for Punjab and Sindh to resolve disputes over water during any period of plenty or shortage. The Indus River System Authority (IRSA) should have access to better technology and more autonomy from the government to manage allocations. Including the public in water governance in marginalized regions helps ensure that each organization is legitimate and holds those in charge accountable.

Stages such as the SAARC and SCO should be used to discuss water management with broader involvement from regional and international experts. When supported by partners from abroad, Pakistan and Bangladesh can invest in safe infrastructure, prepare for floods and protect the Indus Delta.

A strong vision for water diplomacy should depend on nature-focused planning and a sense of security. Community involvement in sustainable water use and environmental exploration will benefit the area, as well as encourage people to come together. Should both countries focus on viewing water as an opportunity for collaboration, the Indus River will sustain many and also promote peace and stability.

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