



Climate Change and Legal Gaps in the Indus Water-Sharing Framework

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ABSTRACT

The Indus Waters dispute remains one of the most enduring and complex water conflicts in South Asia, rooted in the partition of British India in 1947 and sustained by deep-seated geopolitical tensions between India and Pakistan. This research article critically examines the historical, political, environmental, and governance dimensions of the conflict, focusing on the Indus Waters Treaty (IWT) of 1960 as both a milestone in hydro-diplomacy and a framework under growing strain. Employing qualitative thematic analysis, the study identifies recurring patterns across key themes such as treaty compliance, climate change, rising water scarcity, and strategic infrastructure development. Despite its longevity and initial success in averting direct conflict, the IWT faces mounting challenges due to glacial melt, erratic monsoons, and competing domestic water demands in both countries. India's hydroelectric projects and Pakistan's recurring appeals for arbitration highlight the treaty's limitations in addressing contemporary environmental and technical complexities.





INTRODUCTION

Particularly in the relationship between India and Pakistan, the area of South Asia's water resources have strategic value. Common to both nations, the Indus basin has been a source of conflict since 1947 because of competing claims over water supplies. A classic deal achieved under the World Bank's supervision, the Indus Waters Treaty of 1960 offered a mechanism for water-sharing. Rising water requirements, global warming, and political constraints have tried this deal, nevertheless.

Beginning with the 1947 split of British India, the conflict between Indian-Pakistani over river flows is among the longest-running one in South Asia. While Pakistan, a downstream country, depends on these rivers for agriculture, drinking water, and basic existence, this division left India in control of the headwaters of the Indus River system. Designed by the World Bank, the 1960 Indus Waters Treaty (IWT) sought to settle this conflict and set forth a mechanism for river sharing. Whereas Pakistan gained exclusive rights to the three western rivers—Indus, Jhelum, and Chenab—the treaty handed India the three eastern rivers: Ravi, Beas, and Sutlej. Though among the most effective water-sharing accords, the one has not stayed free from political, environmental, and governance-related problems.

In the strained India-Pakistan relationship, the water problem has been a major point of dispute throughout the decades. Complicating matters have been charges of treaty violations, disputes over hydroelectric projects, and the consequences of climate change. Moreover, the strategic value of water in a geopolitically unstable area like South Asia makes the resolution of this conflict essential for peace and stability. The operation of the Indus Waters Treaty, and the multidimensional aspects of the conflict, ranging from political tensions, environmental stresses, and governance challenges, depends on this resolution of this conflict. It also picks up approaching difficulties like population pressures, water scarcity, and climate-driven vulnerabilities endangering the fragile balance maintained by the pact. By means of an examination of these elements, the research emphasises the indispensable need of cooperation processes, trust-building, and sustainable practices in order to support equitable water distribution and regional peace.

Review of Literature

The Indus Waters dispute has generated a considerable body of literature over the decades, reflecting the geopolitical, environmental, and hydrological complexities of water sharing between India and Pakistan. The foundational work on this issue begins with the historical context of the Indus Basin and the implications of the 1947 partition of British India, which divided the basin between the two nascent nations. This review critically assesses scholarly perspectives on the Indus Waters Treaty (IWT), its effectiveness and limitations, the geopolitical tensions underlying the conflict, and emerging challenges such as climate change and governance.

A significant portion of the existing literature is centered around the Indus Waters Treaty (1960)—a landmark agreement brokered by the World Bank that divided the six rivers of the Indus basin between India and Pakistan. Scholars like Briscoe (2010) and Biswas (2011) hail the IWT as one of the most successful water-sharing accords in history, largely credited for maintaining peace over water between two often-hostile neighbors. Briscoe (2010) emphasizes the treaty's resilience, noting that even during wartime and periods of diplomatic breakdown, the IWT functioned relatively uninterrupted.

However, many academics argue that the treaty, while historically effective, is increasingly misaligned with modern realities. Alam (2002) and Iyer (2002) argue that the IWT was designed during a different era, one that did not foresee rising water demand, hydroelectric development, or climate variability. Iyer critiques the rigid structure of the treaty, pointing out that it does not adequately address disputes stemming from new water infrastructure projects like the Kishenganga and Baglihar dams, which India maintains are compliant with the treaty, but Pakistan views as threats to its water security.

A substantial body of work connects the IWT with broader geopolitical tensions between India and Pakistan. Bhatnagar and Gupta (2015) and Singh (2017) argue that water has been increasingly used as a political tool in bilateral relations. The disputes surrounding Indian hydroelectric projects are not only seen through a legal lens but also through a strategic one, especially in the context of Kashmir. Because most of the rivers of the Indus system originate in or pass through the disputed region, water has gained heightened strategic



significance. Pakistan's fear of Indian control over upstream flows contributes to its perception of vulnerability, a concern echoed in Gleick's (1993) seminal work on water as a potential source of conflict and insecurity.

In addition to the geopolitical dimension, scholars have highlighted the governance challenges embedded in the implementation of the IWT. Kirmani (1990) and Kakakhel (2014) discuss the weaknesses of the Permanent Indus Commission (PIC), the institutional mechanism tasked with resolving disputes and monitoring treaty compliance. They point to its limited enforcement capabilities, lack of transparency, and inability to adapt to contemporary challenges like climate change and environmental degradation. Ali and Bhargava (2021) advocate for transforming the PIC into a more proactive, data-driven, and transparent platform that fosters trust rather than merely functioning as a crisis management mechanism.

Climate change emerges in the literature as a critical, yet under-addressed, dimension of the Indus water dispute. Jalil and Zafar (2021) and Chaturvedi and Verma (2018) draw attention to the increasing variability in water flows due to glacial melt, shifting monsoon patterns, and prolonged droughts or floods. These environmental stressors are compounded by rising population growth and agricultural demands in both countries, creating what Swain (2001) termed a "conflict-prone water scarcity zone." Despite these looming threats, the IWT lacks a built-in mechanism to address climate change adaptation, leaving both countries unprepared for shared vulnerabilities.

Academic literature also stresses the asymmetry of the treaty and its impact on perceptions of equity. While the IWT grants India full rights over the eastern rivers and restricts its use of the western rivers to non-consumptive purposes, Pakistan often interprets Indian dam-building activity as a breach of the spirit, if not the letter, of the treaty. Ahmed (2019) and Qureshi (2017) explore these perceptions of asymmetry and suggest that the IWT needs revision not only for technical compliance but also for promoting a sense of fairness and mutual trust.

Moreover, environmentalists and international legal scholars such as Salman and Upreti (2002) and Wolf (1999) emphasize the need for equitable water sharing models rooted in international law. They argue that existing treaties,

including the IWT, often prioritize allocation without sufficient attention to ecological sustainability, social justice, or community-level impacts. Wolf (1999) introduces the idea of "criteria for equitable allocations," which includes considerations of historical use, dependency, economic needs, and ecological balance—factors inadequately addressed by the IWT.

Studies such as Mustafa (2010) and Naseem and Bajpai (2020) also call for rethinking the water dispute in light of broader development and human security. They argue that technical and legalistic frameworks overlook the human dimension—how water insecurity affects livelihoods, food systems, and socio-economic development in Pakistan's rural areas. Mustafa further suggests that "hydro-hegemony" may be emerging, wherein upstream states such as India exert disproportionate control, undermining regional cooperation.

Recent literature also focuses on the role of third-party mediation and the limitations of international arbitration. While the IWT provides for mechanisms such as Neutral Expert review and recourse to the International Court of Arbitration, scholars like Akhtar (2010) and Prakash (2011) argue that these forums often deliver short-term solutions and fail to resolve deeper political mistrust. In several instances, such as the Kishenganga arbitration, decisions were seen as technical victories but failed to reduce tensions between the states.

Another important angle is the potential for cooperative water management and integrated river basin development. Ali and Khuhro (2021) explore how hydro-diplomacy could foster a more sustainable and peaceful South Asian region. They recommend joint technical commissions, basin-wide planning, and even co-development of water infrastructure. While these ideas remain largely aspirational, they are increasingly necessary in a world grappling with water scarcity and ecological fragility.

Methodology

The study adopts a qualitative thematic analysis approach to explore the river water dispute. Secondary data from academic publications, government reports, international treaties, and media sources are analysed. Thematic analysis is used to identify recurring patterns and themes, which are categorized into four key areas: historical



context, geopolitical tensions, environmental factors, and governance challenges. The thematic analysis method enables an in-depth understanding of the underlying issues and their interconnections. This approach is particularly useful for examining complex disputes like the India-Pakistan water conflict, where historical, political, and environmental factors intersect.

Statement of the Problem

The river water dispute between India and Pakistan poses a significant challenge to regional peace and stability. Despite the existence of the Indus Waters Treaty, disputes over water-sharing mechanisms, dam construction, and water flow management persist. Both countries have accused each other of treaty violations, leading to diplomatic tensions and periodic conflicts. The growing impacts of climate change, such as glacial melting and erratic monsoons, exacerbate water scarcity in the region. The increasing population and agricultural demands further strain the available resources. These factors underscore the need for a revaluation of the treaty and the development of sustainable water management practices.

Results and Discussion

Historical Context

The water dispute has its roots in the 1947 division of British India. Partition divided Punjab, where the headwaters of the Indus Basin Rivers fell within India and Pakistan mostly depends on these rivers downstream. Early conflicts over the usage of canal water produced the Indus Waters Treaty of 1960. The treaty handed India the eastern rivers (Sutlej, Beas, and Ravi) and Pakistan the western rivers (Indus, Jhelum, Chenab). One of the best examples of collaboration among extreme hostility, the pact has been praised. Still, over time its flaws have become apparent. For instance, it ignores fully how India's building of dams and hydroelectric facilities on western rivers by India is seen as a threat to Pakistan's water supplies. The basis of water-sharing systems between India and Pakistan still is the Indus Waters Treaty of 1960. With the east rivers headed to India and the west rivers headed to Pakistan, it split the Indus River system. As long as it wouldn't reduce Pakistan's water supply, the treaty gave India some usage of the western rivers for non-consumptive purposes like hydroelectricity and shipping. Although the pact has been used as a model for worldwide water-sharing, it has been attacked for not being able to predict

future issues such climate change and changing water requirements.

Geopolitical Tensions

The water conflict is intricately linked with the greater India-Pakistan conflict, especially in Kashmir. Most of the rivers of the Indus basin have their headwaters in or pass through the disputed region, and water is thus an essential strategic resource. Pakistan sees India's water facilities, like the Kishenganga and Baglihar dams, as efforts to dominate its water resources.

India, on the other hand, maintains that its projects are in line with the provisions of the treaty. The two countries' mistrust fuels the conflict, and water is usually employed as a political weapon. The conflict has also been a source of nationalist rhetoric, which makes negotiations even more difficult. Water has turned into a strategic resource in the India-Pakistan conflict, especially in the context of the Kashmir conflict. Indus Basin Rivers begin in or pass through Jammu and Kashmir, so water is a politically charged subject. The development of hydroelectric facilities such as the Kishenganga and Baglihar dams on the western rivers by India has been contentious, with Pakistan claiming that they are contrary to the provisions of the treaty. These claims have frequently led to international arbitration, pointing to the deficiency of current mechanisms for dealing with new conflicts.

Present Status of the Dispute

The river water controversy is the most contentious issue in India-Pakistan relations. Recently, the issue has escalated as a result of India's move to re-examine the treaty in response to the 2016 Uri attack and the 2019 Pulwama attack. Assertions by Indian politicians on the possibilities of using more water from the western rivers have sent shock waves through Pakistan, which considers such moves a blatant threat to its water security. Conversely, Pakistan has stepped up its diplomatic push to bring the issue to international forums, framing India's schemes as treaty violations. Both countries still depend on international arbitration processes, but these have tended to yield stopgap measures instead of solving the underlying causes of the dispute.

The India-Pakistan water conflict is still unresolved and a source of strain in their bilateral relationship. Although the Indus Waters Treaty (IWT) of 1960 has generally held, recent events



indicate growing challenges to its enforcement because of geopolitical tensions, climate change, and competing domestic pressures.

India's Stance and Developments: India has increasingly asserted its rights under the IWT to construct schemes on the western rivers that Pakistan is entitled to, including the Pakal Dul, Ratle, and Kishenganga Hydroelectric Schemes. These schemes are well within the limits of the non-consumptive use provisions in the treaty, but Pakistan objected, claiming disregard for the treaty's spirit. India has also been frustrated at the use by Pakistan of international arbitration to delay such projects, as in the case of Kishenganga, which was decided by the Hague-based Court of Arbitration in 2013. In the wake of the 2016 Uri attack, India indicated consideration of the suspension of the IWT as part of its overall approach to applying pressure to Pakistan. Although no formal action has yet been taken to abrogate the treaty, such rhetoric has added to suspicion.

Pakistan's Concerns: Pakistan remains highly sensitive to India's upstream activities, viewing them as potential threats to its water security. It frequently accuses India of manipulating water flows, particularly during the monsoon season when floods occur in Pakistan. The country has also sought international arbitration on several occasions, highlighting its reliance on the western rivers for agriculture and drinking water.

Recent Diplomatic Engagements: The Permanent Indus Commission (PIC) continues to meet annually, but its effectiveness is limited by broader political tensions. In 2023, technical talks under the PIC focused on resolving disputes over the designs of Indian projects like Ratle. However, no significant breakthroughs were achieved.

Climate and Emerging Challenges: Climate change is adding a new dimension to the dispute, with both countries facing increasing water scarcity and erratic river flows due to glacial melting and changing precipitation patterns. The treaty does not address these emerging challenges, leaving gaps in cooperative water governance.

While the IWT remains a critical mechanism for managing the water dispute, its effectiveness is being tested by political tensions, domestic pressures, and environmental changes. Without mutual trust and a willingness to adapt the treaty to contemporary challenges, the water dispute will continue to strain India-Pakistan relations.

Impact on Bilateral Relations

The already strained bilateral ties between India and Pakistan are severely affected by the water dispute. Water has also been a tool for geopolitical leverage; India has sometimes threatened to review the pact as a reprisal against terrorism linked to Pakistan. This behaviour aggravates mistrust and fuels more animosity in public conversation. Similar efforts to establish direct contact and collaboration are undermined by Pakistan's constant allegations and worldwide pleas. The disagreement also limits opportunities for more extensive joint effort on environmental and economic issues. For instance, political conflicts often lead integrated water management programs—which would benefit both nations greatly in addressing water scarcity and climate change—to be shelved. Furthermore, the struggle over water resources fuels nationalistic goals in both nations, which complicates productive talks. Within their bilateral relationship, one of the most divisive problems is the water dispute between India and Pakistan. Based on the split of British India in 1947, the Indus River system developed dependencies; Pakistan's agriculture mostly depends on freshwater coming from India.

Under the World Bank's direction in 1960, the Indus Waters Treaty (IWT) awarded the eastern rivers (Ravi, Beas, and Sutlej) to India and the western rivers (Indus, Chenab, and Jhelum) to Pakistan with restricted use rights to both nations. Political and security concerns have put considerable pressure on the deal even though it is regarded as one of the most effective water-sharing accords. By developing dams and hydroelectric plants on the western rivers, notably the Baglihar Dam on the Chenab and the Kishenganga Hydroelectric Project on the Jhelum, Pakistan says India is violating the pact. India, however, argues a right to limited use of such rivers for non-consumptive reasons. During droughts or floods, things worsen; Pakistan accuses India of manipulating water flow to play games. The 2016 Uri incident and the Indian "review" of the IWT in response underlined how geopolitics has entwined water disputes. Sometimes Indian officials have indicated that they will use the pact as a diplomatic negotiating tool, therefore aggravating Pakistani concerns. Rising water shortage and climate change further drive the conflict as both nations have increasing domestic water requirements. The water issue has seriously challenged bilateral ties, fostering distrust and impeding diplomatic contacts. India charges Pakistan with



internationalising the issue; Pakistan sees India's actions as a danger to its water security. Only depoliticising water management and supporting technical collaboration within the IWT framework can help to overcome this issue thereby guaranteeing fair and sustainable use of shared resources.

Environmental Factors

Rising as a serious danger to Indus basin water supplies is climate change. Melts of Himalayan glaciers, irregular monsoons, and more frequent floods and droughts endanger the stability of the water resource. Both countries suffer severe water scarcity; Pakistan is particularly vulnerable given its great reliance on the Indus system. Deforestation and pollution among other environmental problems aggravate things even worse. While addressing these problems calls for a cooperative approach, India's lack of confidence towards Pakistan makes group environmental projects difficult.

Both influencing the access to water resources and the character of the bilateral relationship, environmental factors are a main cause of extending the water dispute between Pakistan and India. Crucially important for irrigation in agriculture, industry, and household needs in both nations, the Indus Basin system is very vulnerable to environmental factors like glacier melting, deforestation, and climate change. Since the Indus River system relies much on Himalayan glacier melt, climate change is a somewhat important issue. Global warming reportedly is causing Himalayan glaciers to recede quickly. While short-term increased water flow may result from this, long-term severe shortages would impact lives and crops. The twin challenges facing India and Pakistan are water shortages during low flow seasons and flood management during high flow seasons.

Reduced water holding capacity resulting from soil degradation and deforestation in the Indus basin increases flood frequency and extent. Particularly in the upstream areas, deforestation has also produced siltation of rivers and dams, therefore reducing their storage and hydroelectric capacity. Increased water demand on both sides of the border brought on by urbanisation and population growth has led to over-extraction of groundwater and water resource pollution. The unrestricted discharge of urban and industrial waste into rivers also degrades water quality, which makes dependability on the

shared water resources more challenging downstream users.

Suspicion has grown about non-cooperative management of environmental sustainability and catastrophe response. For instance, Pakistan often criticises India for spewing too much monsoon water that floods areas downstream. Under the cover of the Indus Waters Treaty, all these environmental challenges can only be resolved by means of collaboration including joint climate resilience measures, environmental impact assessments, and application of sustainable water management methods. Ignoring these acts, environmental damage will keep aggravating the water problem, so straying bilateral relations.

Governance Challenges

The Indus Waters Treaty is administered by the Permanent Indus Commission, which also acts as a forum for resolving disputes. The effectiveness of the commission has been hindered by political interference and lack of transparency. India's development of hydroelectric projects on the western rivers has resulted in controversy regarding their treaty compliance. Pakistan has continuously invoked international arbitration, demonstrating the weakness of current mechanisms in meeting emerging concerns. Good governance and dialogue are imperative in order to overcome such issues.

The management of cooperative water resources shared by India and Pakistan is being confronted with monumental challenges that have intensified the water conflict and crippled bilateral cooperation. These are influenced by political, institutional, as well as technical factors, and are further accelerated by poor diplomatic relations.

Political Tensions and Lack of Trust: The tense political relationship between the two nations greatly hampers good governance. The water conflict has been politicized, with both countries employing water as a bargaining chip instead of promoting mutual cooperation. India's periodic demands to renegotiate or suspend the Indus Waters Treaty (IWT), especially following terrorist attacks such as the Uri attack in 2016, and Pakistan's allegations of treaty breaches, reflect the absence of trust. This politicization hinders productive discussion on water-sharing matters.

Weak Institutional Frameworks: Although the IWT created the Permanent Indus Commission (PIC) to monitor treaty implementation, the commission frequently falters



because of limited powers and constant conflicts. Its failure to settle disputes like those regarding the Baglihar Dam or the Kishenganga Hydroelectric Project reveals shortcomings in its mandate and efficacy. Furthermore, the lack of overarching water governance mechanisms outside the treaty means that key issues such as environmental degradation and climate change remain unresolved.

Technical and Data-Related Challenges:

Disagreements regarding data-sharing mechanisms, particularly during monsoon seasons, have further strained relations. Pakistan often accuses India of failing to provide timely or correct hydrological data, especially during monsoons. Lack of transparency in data exchange fuels suspicion, and it becomes challenging to handle water crises together.

Domestic Governance Issues: Both countries face internal governance problems, such as corruption, inefficient water management systems, and poor infrastructure maintenance. These issues reduce the capacity to utilize available water resources effectively and often divert focus from bilateral cooperation to internal crises.

Climate and Water Management Governance: Neither of the nations has properly integrated climate resilience into their water governance systems. The IWT governance structures do not address new issues like glacial melt, growing water demand, and decreasing water quality, thus restricting their potential to deal with issues of the present time.

Mitigating these governance issues entails depoliticizing water management, enhancing the PIC, enhancing data-sharing systems, and mainstreaming climate adaptation measures into bilateral frameworks. Absent these, failures in governance will continue to intensify mistrust, stifling any meaningful settlement of the water conflict.

Recommendations

1. **Modernizing the Indus Waters Treaty:** Update the treaty to address new challenges, such as climate change, hydroelectric projects, and population growth, while ensuring equitable sharing of resources.
2. **Joint Water Management Initiatives:** Establish bilateral mechanisms for joint monitoring of water flows, glacial Behavior,

and environmental degradation, leveraging technology for real-time data sharing.

3. **Strengthening the Permanent Indus Commission:** Enhance the commission's capacity and independence to address disputes effectively and promote trust between the parties.
4. **Climate Adaptation Strategies:** Develop regional strategies for climate change adaptation, including water conservation, flood management, and sustainable agricultural practices.
5. **Confidence-Building Measures:** Foster dialogue and trust through collaborative projects, such as joint dam construction, and engage international mediators to facilitate negotiations.

CONCLUSION

The Indian-Pakistani river waters conflict continues to be a knotty and multidimensional problem of far-reaching consequences to regional stability. The Indus Waters Treaty, though a milestone pact, must be modified to accommodate current challenges such as climate change and rising water demands. Thematic analysis discloses the interlinked character of historical, geopolitical, environmental, and governance drivers behind the conflict. Solving these problems involves establishing confidence, improving communication, and fostering sustainable water management. It is through cooperation, not confrontation, that fair water sharing and regional stability can be assured.

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