

Hydro-Hegemony or Institutional Cooperation? Evaluating the Role of the Indus Waters Treaty in Managing India–Pakistan Water Relations .

Abstract

The Indus Waters Treaty (IWT), signed between India and Pakistan in 1960, remains one of the most durable transboundary water-sharing agreements despite decades of political tension and conflict. This paper examines the extent to which the treaty has constrained hydro-hegemonic behaviour and promoted institutional cooperation between the two countries. Using secondary research, it analyses the treaty's historical development, institutional mechanisms, power asymmetries, and major hydroelectric disputes involving Baglihar, Kishenganga, and Ratle. The study finds that the treaty has created meaningful restraints through river-allocation rules, the Permanent Indus Commission, data-sharing requirements, and dispute-resolution mechanisms. However, India's upstream geographical position and greater economic and technical capacity continue to create structural advantages. The paper concludes that cooperation and hydro-hegemonic dynamics have coexisted within the Indus Basin. Climate change, rising water demand, groundwater stress, and growing securitisation further challenge the treaty, highlighting the need for stronger institutions, greater transparency, and adaptive governance going forward.

Keywords

Indus Waters Treaty, hydro-hegemony, India–Pakistan relations, transboundary water governance, institutional cooperation, water security, hydropolitics, Indus River Basin

22 **Chapter 1: Introduction**

23 **1.1 Introduction to Transboundary Water Relations**

24 The Indus system can be known as a transboundary river. This refers to a river whose basin
25 spans multiple sovereign territories and forces neighboring countries into an interdependent
26 relationship whether they prefer it or not. Zeitoun and Warner (2006) argue that this kind of
27 dependence attracts a great deal of international tension since control over water upstream
28 can mean leverage over a downstream state's agriculture, energy supply, and general
29 economic stability.

30 Because water security is so strongly connected to food security and energy production, there
31 is a high chance such cases bleed into national security thinking quickly. Zeitoun and Warner
32 (2006) also note that where power between riparian states is unevenly distributed, water can
33 hold a lot of influence instead of just being a resource to be managed together. This dynamic
34 is most often why shared rivers carry the potential for both conflict and cooperation
35 depending on how the relationship is handled.

36 **1.2 Overview of the Indus River Basin**

37 The Indus system is made up of the Indus River along with five major tributaries. Together,
38 they form one of the largest irrigation-dependent river networks in the world. The system is
39 generally split into the eastern rivers, the Ravi, Beas, and Sutlej, and the western rivers, the
40 Indus, Jhelum, and Chenab. This division would later become important in understanding
41 how the basin's water was formally allocated between India and Pakistan (Britannica, 2026).

42 Both countries depend heavily on this basin, but the nature of that dependence differs a lot.
43 Pakistan's Indus Basin Irrigation System is one of the largest contiguous irrigation networks
44 on the planet. Irrigated agriculture contributes roughly a quarter of the country's GDP and
45 employs about half its labor force, which makes the reliability of Indus flows a matter of
46 direct economic survival.

47 **1.3 India–Pakistan Water Relations**

48 Water tensions between India and Pakistan can be traced back almost immediately to
49 Partition in 1947, when the boundary line was drawn straight through an integrated irrigation
50 network that had never been designed with a hard border in mind. Because key headworks
51 controlling canal supplies to Pakistani Punjab ended up on the Indian side of the line, the two
52 newly formed states inherited a water-sharing problem before either had fully organized its
53 own government.

54 This geography also created a structural imbalance that has shaped the relationship ever
55 since. India sits upstream on most of the system, while Pakistan, as the downstream riparian,
56 depends on flows it cannot directly control, a position that scholars studying hydro-hegemony
57 (a powerful state's political domination and control over common transboundary water

resources) describe as inherently vulnerable to the strategic advantages that come with upstream geography (Zeitoun & Warner, 2006).

1.4 Introduction to the Indus Waters Treaty

After nearly a decade of failed bilateral talks, the Indus Waters Treaty was signed on September 19, 1960, by Indian Prime Minister Jawaharlal Nehru and Pakistani President Ayub Khan. The World Bank had served as a third signatory and mediator throughout this process. The point of the treaty was to settle the dispute by dividing the six rivers of the basin rather than managing them jointly, granting India control over the eastern rivers and Pakistan primary rights over the western rivers.

Former U.S. President Dwight Eisenhower once called the agreement "one bright spot in a very depressing world picture.". This reputation has been sustained for decades, and the Indus Waters Treaty is widely cited in the literature as a rare example of cooperation between two states that have otherwise struggled to maintain stable relations (World Bank, 2025).

1.5 Research Problem

Despite the treaty's long existence, disputes over the basin have not fully disappeared. There are continuous conflicts over Indian hydroelectric projects on the western rivers, including Baglihar, Kishenganga, and Ratle. These have consistently challenged the treaty's dispute-resolution mechanisms and, in some cases, produced proceedings before different adjudicatory bodies (ASIL, 2025).

This raises a question about how the treaty should be understood. Some treat its endurance as proof of cooperation superseding political hostility, while others may argue that India's upstream position and growing willingness to link water policy to security concerns points toward a more hegemonic dynamic that operates by hiding behind the pretense of actual compliance (Zeitoun & Warner, 2006).

1.6 Research Question

This research question for this paper is: to what extent has the Indus Waters Treaty constrained hydro-hegemonic behavior and promoted durable institutional cooperation between India and Pakistan since 1960? Answering this requires looking closely at both how the treaty has functioned and how power discrepancies between the two states have shaped its outcomes over time.

Chapter 2: Historical Development of India–Pakistan Water Relations

2.1 The Indus Basin Before Partition

Much before Partition, the Indus basin had been transformed into one of the most significantly engineered irrigation systems in the world. This happened under British colonial administration. Canal networks were built to connect the basin's rivers to agricultural land in

Punjab and Sindh, creating an integrated system that treated the basin as a single unit instead of as a set of separate national territories.

This colonial-era infrastructure meant that by the time independence arrived, the basin's canals, barrages, and headworks were deeply interconnected across what would soon become an international border. That interconnectedness is part of why the 1947 partition created such an immediate crisis, because dividing the territory politically did nothing to separate the physical water infrastructure that both new states now depended on.

2.2 Partition and the Division of Water Infrastructure

When India and Pakistan were created in 1947, the boundary line was drawn without much regard for the irrigation system running beneath it, leaving critical headworks such as those at Madhopur and Ferozepur inside Indian territory while the canals they fed ran into Pakistan (Vajiram & Ravi, 2026). This mismatch between political borders and engineering infrastructure set the stage for the upstream-downstream dependence that would define the relationship for many upcoming decades.

Pakistan's position, being downstream, made it reliant on India's willingness to maintain the flows that its irrigation system, and indirectly its agricultural economy, depended on. This structural vulnerability is a large part of why water quickly became one of the most sensitive issues in their relationship, well before broader disputes like Kashmir had fully taken form.

2.3 The 1948 Canal Water Dispute

The vulnerability created by Partition required attention almost immediately. In 1948, India temporarily halted water flowing into Pakistani canals. This interruption, even though it was brief, confirmed Pakistan's worst fears about depending on an upstream neighbor with whom relations were already strained (LSE South Asia, 2018).

India and Pakistan signed the Inter-Dominion Agreement later that year, a temporary arrangement meant to restore water flows while a more permanent solution was worked out. This event made clear that ad hoc bilateral agreements alone were not going to be enough to manage a river system this deeply shared, and it set the stage for the more structured negotiations that would eventually be implemented.

2.4 Early Negotiations and the Role of the World Bank

Direct negotiations between India and Pakistan in the years after the 1948 dispute repeatedly stalled, with technical discussions between engineers from both countries unable to overcome the underlying political mistrust. The World Bank, then led by President Eugene Black, stepped in as a mediator starting in 1952. It proposed that the basin's rivers be divided between the two countries rather than jointly managed (LSE South Asia, 2018).

Its initial 1954 proposal, while accepted by India, was rejected by Pakistan, arguing that the plan did not provide enough water storage capacity to meet its irrigation needs. It took several

129 more years of negotiation and revision, along with financial commitments to fund new
130 infrastructure, before both sides settled upon a mutually acceptable version of the plan.

131 **2.5 Negotiation of the Indus Waters Treaty**

132 India and Pakistan approached the negotiations with different priorities. India wanted the
133 freedom to develop its own irrigation and hydroelectric potential on the rivers within its
134 territory, while Pakistan needed reliable guarantees that its existing irrigation system,
135 dependent on rivers now flowing through Indian-controlled headworks, would not be
136 disrupted.

137 Eventually, a compromise was reached that divided the basin's rivers functionally instead of
138 managing them as a whole, giving each country primary control over three rivers. It also
139 involved financial and infrastructural support to help Pakistan construct replacement canals
140 for water it would no longer draw from the eastern rivers. This structure, negotiated over
141 nearly a decade, reflected a pragmatic recognition that joint basin-wide management was
142 politically unworkable given the level of mistrust between the two sides.

143 **2.6 Signing and Early Implementation of the Treaty**

144 The treaty was formally signed on September 19, 1960, establishing permanent rules for how
145 the basin's waters would be divided. The treat was to be put to effect on April 1 of that year.
146 Alongside the allocation rules, the agreement created lasting institutional mechanisms,
147 including the Permanent Indus Commission, meant to keep both countries in regular technical
148 contact even as broader diplomatic relations fluctuated.

149 Initially, its implementation focused heavily on physical infrastructure, as Pakistan used
150 World Bank-arranged financing to build replacement canals and storage works that would let
151 it substitute for the eastern river water it had given up. This construction phase was important
152 in making the treaty's allocation framework actually possible on the ground, instead of letting
153 it decay into just a paper agreement.

154 **Chapter 3: Institutional Structure of the Indus Waters Treaty**

155 **3.1 Division of the Eastern and Western Rivers**

156 In the end, the treaty resolved the dispute through a territorial division, not through joint
157 management. The eastern rivers, the Ravi, Beas, and Sutlej, were allocated to India, while the
158 western rivers, the Indus, Jhelum, and Chenab, were allocated primarily to Pakistan
159 (Britannica, 2026). This approach enabled an effective partition of the basin instead of
160 treating it as a shared resource that had to be governed together.

161 While this division simplified the politics of the agreement considerably, compared to trying
162 to negotiate basin-wide management, it also meant the treaty was built around separation
163 rather than genuine collaboration. This choice has been heavily discussed by researchers,

some pointing out questions about how deep the treaty's cooperative character really runs (Zeitoun & Warner, 2006).

3.2 Rights and Obligations of India

Under the treaty, India received essentially unrestricted use of the eastern rivers for irrigation, storage, and any other purpose it saw fit. On the western rivers, by contrast, India's rights were considerably narrower, limited mainly to specified agricultural uses, domestic consumption, and the right to build run-of-river hydroelectric projects that do not significantly alter the natural flow of water downstream (Britannica, 2026).

This run-of-river provision has become one of the treaty's most challenged parts in practice since it allows India to construct hydroelectric infrastructure on rivers technically allocated to Pakistan if the design meets specific technical criteria. This criteria has become the subject of repeated disputes discussed later in this paper.

3.3 Rights and Obligations of Pakistan

Similar to India's access to eastern rivers, Pakistan's is entitled to unrestricted use of the western rivers under the treaty. These supply the bulk of the water feeding its vast irrigation network. In exchange for giving up the eastern rivers, Pakistan received financial support to build replacement infrastructure, canals, and storage works capable of redirecting western river water to areas that had previously depended on the eastern system.

Beyond these physical entitlements, Pakistan also holds obligations under the treaty's institutional framework, including participation in data sharing and the ongoing work of the Permanent Indus Commission. These commitments matter just as much as the water allocations themselves, since they are what keep the two countries in regular technical dialogue even when broader relations are not going well.

3.4 The Permanent Indus Commission

The treaty established the Permanent Indus Commission as its main institutional mechanism. It is made up of a commissioner appointed by each country who is required to meet regularly to discuss implementation issues. For over five decades, the commission has met annually, exchanging data even when diplomatic communication between the two governments has otherwise fluctuated or broken down (CPR, 2026).

Except for the annual meetings, the commission is also responsible for inspecting engineering projects and facilitating the exchange of information between both the countries. This type of engagement is frequently cited in the literature as one of the treaty's most important cooperative features, since it kept a channel of communication open even through multiple wars.

3.5 Data Sharing and Project Notification

A core function built into the treaty's design is the requirement that each country share river-flow data and formally notify the other before undertaking any new engineering projects on the rivers covered by the agreement. This process has been formulated to give the other party an opportunity to review the proposed project designs and raise any objections that they may have before construction proceeds too far.

In reality, this system has been a source of friction very often since India and Pakistan often disagree on how much technical detail a notification needs to include, and disputes over information disclosure have shown up constantly in cases involving India's hydroelectric projects on the western rivers (Zeitoun & Warner, 2006).

3.6 Dispute-Resolution Mechanisms

The treaty was built in a three-tier process for resolving disagreements. Under Article IX, disputes are first meant to be raised within the Permanent Indus Commission itself. If they cannot be resolved there, technical questions are presented to a Neutral Expert appointed by the World Bank, while broader legal differences can possibly be escalated to a Court of Arbitration (National Interest, 2026).

This was deliberately designed to prevent the same dispute from being litigated in multiple forums at once, though as later part of this paper will show, that design has not always held up in practice. India has argued that Pakistan's simultaneous pursuit of both a Neutral Expert process and a Court of Arbitration on the Kishenganga and Ratle disputes violates this order (ASIL, 2025).

Chapter 4: Conceptual Framework: Hydro-Hegemony and Institutional Cooperation

4.1 Concept of Hydro-Hegemony

Hydro-hegemony, as thought of by Zeitoun and Warner (2006), is a situation in which one state uses its position of power over a shared water resource to influence how transboundary relations work. This often happens in ways that favors the said country and is at the expense of a more equitable arrangement. This framework draws on Gramscian notions of hegemony and Lukes' three dimensions of power. It essentially argues that this kind of dominance is achieved through a mix of hard and soft power exercised between formally equal sovereign states.

Hydro-hegemony is useful due to its attention to power asymmetries, something that conventional treaty analysis often looks over. Zeitoun and Warner (2006) argue that traditional approaches tend to treat situations of cooperation as inherently unproblematic, even when that cooperation is occurring within a deeply asymmetrical power relationship. This is exactly the kind of dynamic this paper examines, particularly, in the context of the India-Pakistan case.

4.2 Sources of Hydro-Hegemonic Power

Hydro-hegemony theory has identified multiple sources from which a dominant riparian state can draw leverage. Upstream geographical position is often the most important factor, since physical control over where a river originates gives the state the opportunity to regulate flow before it ever reaches its downstream neighbor (Zeitoun & Warner, 2006).

Except geography, the framework also includes asymmetries in a broader manner. Particularly, in economic, military, and technological capacity as sources of power, since a wealthier or more technically advanced state can better build large-scale infrastructure and sustain long, complex disputes than a state with fewer resources. Control over engineering information and technical data deepens this asymmetry since the party that has more advanced monitoring and design capability can shape the terms of any technical dispute in its favor.

4.3 Strategies of Hydro-Hegemony

A riparian state that holds hegemonic power over others can apply various strategies to overpower access to a shared basin. This may involve unilateral infrastructure development and building dams or diversion projects without waiting for full agreement from downstream states since it allows the upstream state to shape the physical boundaries of the basin on its own timeline (Zeitoun & Warner, 2006).

Resource capture and flow regulation represent a more operational strategy because they involve the actual manipulation of water timing and volume to extract concessions or exert pressure. Political pressure and the securitization of water, framing water policy explicitly in terms of national security, add more layers to this framework, and this last strategy has become increasingly visible in the India-Pakistan relationship as water has turned out to be more directly linked to the countries' broader security disputes (DSA, 2026).

4.4 Concept of Institutional Cooperation

The concept of institutional cooperation is set against hydro-hegemony. This is the idea that formal treaties and rules-based mechanisms can actually constrain how power is exercised between riparian states, even when those states have unequal capabilities. Institutional cooperation works by reducing uncertainty, establishing predictable procedures, creating channels for communication and monitoring those that persist independently of the broader political relationship.

The Indus Waters Treaty is very frequently cited as an example of this kind of cooperation since its combination of a neutral mediator, a technical commission, and a structured dispute-resolution process make the agreement, arguably, more durable than purely bilateral historical arrangements (PolSci Institute, 2025).

4.5 Relationship Between Power and Cooperation

The relationship between hydro-hegemony and institutional cooperation is not necessarily an either-or proposition. Zeitoun and Warner (2006) have suggested that power asymmetry and cooperative behavior can coexist within the same relationship. This means a treaty can produce true restraint on the dominant party's behavior even without fully balancing the power scale that exists between the states involved.

This coexistence is precisely what makes the Indus case interesting. The treaty has clearly placed some limits on unilateral Indian action, most notably through the notification and dispute-resolution requirements as discussed above, even as India's upstream position continues to give it advantages that Pakistan cannot fully offset through the treaty's formal mechanisms alone.

Chapter 5: Institutional Cooperation and Treaty Resilience

5.1 Meaning and Indicators of Treaty Resilience

Treaty resilience, especially in the context of the Indus Waters Treaty, is generally measured by the agreement's whether it will continue functioning through phases of severe political stress or if it will collapse or be abandoned. Key indicators of this resilience include consistent implementation of the treaty's provisions during the crises, regular functioning of its mechanisms, and the maintenance of communication channels between the two countries even when other pathways of diplomatic relations are frozen (MDPI, 2026).

Scholars analyzing the treaty's compliance record have pointed to continuity of following provisions and open communication channels during adverse political contexts as one of the clearest pointers of good-faith participation, arguing that India's adherence to the treaty during periods of acute hostility, such as after the 2001 Indian Parliament attack, illustrates a level of institutional commitment that goes beyond simple legal obligation (MDPI, 2026).

5.2 Treaty Operation During Armed Conflicts

Elaborating on this theme, what makes the Indus Waters Treaty stand out in the wide range of literature on international agreements is that it continued to function through three full-scale wars between India and Pakistan, in 1965, 1971, and the 1999 Kargil conflict. None of these led either side to formally suspend the agreement (CPR, 2026). Throughout these conflicts, India continued making its treaty-mandated payments and its commissioners kept attending meetings of the Permanent Indus Commission.

It is said hydrological data also continued flowing across the border during these periods, even as military conflict was occurring simultaneously along the same frontier. This continued cooperation even despite active warfare is a large part of why the treaty has been so widely cited in international relations scholarship as a benchmark case of durable resource management between hostile states.

5.3 Role of the Permanent Indus Commission

The Permanent Indus Commission's regular interactions have played a central role in keeping the treaty intact through periods when higher-level diplomatic contact was either minimal or nonexistent. By regularly continuing to exchange project information and hydrological data, the commission created a stable relationship that operated somewhat independently of the broader political relationship between the two governments (CPR, 2026).

This continued engagement has served a stabilizing function apart from its immediate administrative purpose, since maintaining a functioning channel of communication, even a narrow, technically-focused one, has often helped prevent smaller water-related disagreements from escalating into larger political confrontations during periods of heightened tension.

5.4 Role of Third-Party Mechanisms

Various aspects, including the treaty's third-party mechanisms, the World Bank's continued procedural role, the Neutral Expert process, and international arbitration, have provided more strengthened resilience against conflicts. This has happened by giving both countries a formal platform running on proper rules to resolve disputes without resorting to unilateral action. For instance, the Baglihar dispute that was resolved through a Neutral Expert determination in 2007 made use of this mechanism as intended (ASIL, 2025).

Though, these mechanisms don't always operate smoothly. India and Pakistan were seen pursuing parallel and, sometimes, conflicting proceedings during the more recent Kishenganga and Ratle disputes. This was due to the presence of a Neutral Expert process favored by India and a Court of Arbitration favored by Pakistan, raising real questions about whether the treaty's dispute-resolution architecture can still function as a single, coherent system (ASIL, 2025).

5.5 Treaty Survival Versus Genuine Cooperation

While the treaty's longevity has been much discussed, several scholars caution against interpreting survival with genuine, substantive cooperation. One such analysis argues that beneath the widely celebrated narrative of resilience, a different dynamic that is more strained has been quietly building for years. In the former one, compliance persisted even as underlying trust between the two countries steadily eroded.

This distinction matters because it reframes what the treaty's durability actually demonstrates. Rather than reflecting deep mutual trust or truly joint management of the basin, the treaty's survival may reflect something narrower, procedural compliance running on political calculation rather than a shared commitment to cooperative water governance. This possibility is consistent in the presence of power asymmetry and institutional restraint as described by Zeitoun and Warner (2006).

Chapter 6: Hydro-Hegemony and Power Asymmetry in the Indus Basin

6.1 India's Upstream Geographical Advantage

India's position as the upstream riparian state on the western rivers has given it an advantage that a policy arrangement cannot fully offset. Because these rivers originate in or pass through Indian-controlled territory before reaching Pakistan, India can construct dams and hydroelectric projects that, in principle, influence the timing of downstream flows (Britannica, 2026).

This geographical reality is exactly the kind of upstream power that hydro-hegemony theory recognizes as leverage in inter-boundary water relations (Zeitoun & Warner, 2006). Even where the treaty places legal limits on how India can use this position, this geographical advantage is a constant feature of the relationship that Pakistan has no asset against.

6.2 Pakistan's Downstream Dependence

Pakistan's dependence on the Indus system for food security is difficult to overstate. Its vast irrigation network draws overwhelming amounts from the western rivers, and with roughly a quarter of national GDP tied to agriculture, any disruption to these flows has consequences that are felt well beyond the agricultural sector, especially in terms of broader economic and social stability.

This dependence is highlighted even more by the country's limited access to alternative freshwater resources, since Pakistan's arid and semi-arid geography leaves it with few viable substitutes if Indus flows were to be reduced. This structural vulnerability is a part of why Pakistan has consistently treated the treaty, and any threat to it, as a matter of vital importance rather than just a diplomatic issue.

6.3 Economic and Technical Power Asymmetry

Except for geography, India and Pakistan differ substantially in the economic and technical resources they can bring to bear on water disputes. India has a larger economy and more extensive engineering capacity. This gives it an edge in designing, defending, and sustaining complex hydroelectric projects.

These contrasts also affect the countries' ability to manage long disputes, since drawn-out arbitration or Neutral Expert proceedings require a lot of legal and technical resources to continue over years. Cases like Kishenganga, Ratle, and Baglihar were each drawn over years, raising costs and slowing construction. A country with fewer resources is generally less able to absorb these costs without strain (National Interest, 2026).

6.4 Infrastructure and Information as Sources of Power

Upstream dams carry strategic significance well beyond their actual purpose of simple power generation. This is because they also give the state that controls them detailed operational knowledge about flow patterns and storage capacity that the downstream state just does not have access to. This kind of technical complexity, particularly in the design of run-of-river

hydroelectric projects, has repeatedly become a flashpoint in India-Pakistan disputes (Zeitoun & Warner, 2006).

Disagreements over how much project information needs to be disclosed during the treaty's notification process illustrate this dilemma clearly. Pakistan has frequently argued that India's project notifications lack sufficient technical detail to allow for a meaningful review. This is a complaint that reflects the broader informational imbalance built into an arrangement where one party controls both the infrastructure and its engineering data.

6.5 Political and Security Use of Water

Recently, water has become more and more mixed with broader security politics between the two countries. After the terror attack in Pahalgam in April 2025, India announced that it would hold the Indus Waters Treaty in abeyance. This was done because India explicitly linked the decision to Pakistan's alleged support for the said attack. This can be noted as the first time water cooperation had been formally suspended over a security-related issue (Britannica, 2026).

This move, for future politics, represents a broader precedent where water is not just as an irrigation or engineering matter, it is also a tool of strategic leverage. Analysts note that although India currently does not have the infrastructure to fully block western river flows in the short term, the decision to suspend the treaty was more about the symbolic and strategic weight it would carry, signaling that water cooperation would not remain isolated, and is directly to national security behavior (DSA, 2026).

6.6 Limits of the Hydro-Hegemony Argument

Despite these events, there are many features of the treaty that limit how India's upstream advantage results in unilateral control. The treaty's legal restrictions on India's use of the western rivers, particularly the run-of-river design requirements, mean that India cannot just build storage capacity or divert flows as per their choice without risking a formal dispute (Britannica, 2026).

Pakistan also has safeguards and protections through the treaty's dispute-resolution structure, even when those mechanisms do not always function as intended. The continued use of Neutral Expert and arbitration procedures, however contested their overlapping use has become, can be used to infer that the treaty still provides Pakistan with real, if limited, sources to contest Indian projects rather than being left entirely without options. This is exactly the kind of institutional restraint on hegemonic behavior that Zeitoun and Warner's (2006) framework anticipates can coexist alongside power asymmetry.

Chapter 7: Major Hydroelectric Disputes and Case Studies

7.1 Significance of Hydroelectric Disputes

India's growing energy needs have caused a surge of hydroelectric development on the western rivers, and each new project has triggered fresh Pakistani objections about compliance with the treaty's technical design requirements. More than the engineering details, these disputes matter since what begins as a technical disagreement over dam design can also escalate into a larger political matter of tension between the two countries (ASIL, 2025).

The recurring nature of these disputes, Baglihar, Kishenganga, and Ratle following a similar pattern, indicates that there might be tension built into the treaty's run-of-river provisions rather than there being a series of isolated incidents. This pattern is central to evaluating whether the treaty's dispute-resolution framework can keep up with the speed of India's hydroelectric development.

7.2 The Baglihar Hydroelectric Project

The Baglihar dispute occurred because of India's dam design on the Chenab River. It turned out to be the treaty's first real test of its dispute-resolution process outside the Permanent Indus Commission. After Pakistan objected to some specific design elements, including the dam's freeboard, they presented the argument that India exceeded what the treaty's run-of-river provisions allowed. India, on the other hand, defended the design as consistent with its treaty rights (ASIL, 2025).

Neutral Expert Raymond Lafitte, a Swiss engineer appointed by the World Bank, finally resolved the dispute in 2007. He determined the permissible technical specifications for the project, setting an important precedent for how technical hydroelectric disputes could be resolved under the treaty and for the specific design parameters that would later be invoked in subsequent disputes like Ratle (National Strategies, 2025).

7.3 The Kishenganga Hydroelectric Project

The Kishenganga dispute was based on India's diversion of water from a tributary of the Jhelum for hydroelectric power generation. Pakistan argued that this project would significantly reduce downstream flows into the Neelum River. Unlike the Baglihar case, this dispute proceeded to a full Court of Arbitration, which issued a partial award in 2011 and then a final award in 2013 (ASIL, 2025).

The Court's ruling represented a partial victory for both sides: it confirmed India's right to divert water for the Kishenganga project, but required India to maintain specified minimum storage levels and release a minimum flow of nine cubic meters per second downstream at all times, including explicit environmental-flow requirements meant to protect the river ecosystem (ASIL, 2025).

7.4 The Ratle Hydroelectric Project

Pakistan raised technical objections to the Ratle Hydroelectric Project on the Chenab River in 2012. This time, the objections closely mirrored the design concerns raised in the Baglihar

case. Unlike Baglihar, however, this dispute is mixed with the parallel Kishenganga proceedings, with India and Pakistan disagreeing sharply over which dispute-resolution forum, a Neutral Expert or a Court of Arbitration, has proper jurisdiction (National Strategies, 2025).

This disagreement led to an unusual situation in which both a Neutral Expert and a Court of Arbitration were simultaneously examining overlapping technical questions about the Ratle and Kishenganga projects, with India participating only in the Neutral Expert process and not supporting the involvement of the Court of Arbitration, stating that it was improperly constituted (ASIL, 2025). In January 2025, the Neutral Expert ruled that he would decide upon the disputed points, a decision India supported as per its previously stated preferences (National Strategies, 2025).

Chapter 8: Emerging Challenges and the Future of the Treaty

8.1 Climate Change and Hydrological Variability

The treaty's water-sharing formulas were built around previous hydrological data that assumed relatively stable long-term flow patterns. But, climate change is increasingly proving this assumption wrong. Roughly 45 percent of the water flowing into the Indus basin originates from Himalayan snow and glacier melt. Accelerated glacier melt will alter both the volume and timing of these flows significantly in the coming decades.

Researchers examining this issue directly warn that the treaty has no provision for climate change or a framework for handling the kind of shifts that a warming climate expects to produce. Projections suggest that while glacier melt may temporarily boost river flows in the near term, normal flows in the Indus system could decline considerably later this century, pushing actual river flows below the historical benchmarks the treaty's allocation system was actually designed around.

8.2 Population, Agriculture and Water Demand

Rising populations in both India and Pakistan are placing steadily increasing pressure on a water supply that the treaty's allocation formulas never anticipated growing so quickly. Because both countries are very dependent on water-intensive agriculture, demand continues to rise even as the reliability of supply will become more uncertain due to climatic shifts. Particularly in Pakistan, where irrigation absorbs the vast majority of available water, this situation will become a prominent issue in the future.

This growing gap between demand and supply is compounded by rapid urban and industrial growth in both countries, adding further competing claims on a water system that is already under a lot of strain. Together, these demographic and economic pressures suggest that the treaty's rigid, decades-old framework will face tons of difficulty when accommodating the basin's future water needs.

8.3 Groundwater and Environmental Concerns

One notable gap in the treaty's original design is its almost complete silence on groundwater, even though groundwater depletion has become a serious concern across the basin with surface water becoming less predictable. Because the 1960 agreement was drafted around surface-water allocation between the two countries, it has no real framework for managing the shared aquifers that underlie much of the basin.

Water-quality and broader ecological concerns present a similar blind spot. While the Kishenganga arbitration did introduce some environmental-flow requirements into the treaty's practical application, these are still narrow exceptions rather than a comprehensive framework for addressing the basin's ecological health. It remains as an issue researchers increasingly argue needs a lot of more direct attention.

8.4 Politicisation and Securitisation of Water

Water has increasingly been reframed in both countries' public discourse as a matter of national security rather than purely technical resource management. This is a shift most visibly demonstrated by India's 2025 decision to hold the treaty in abeyance after the Pahalgam attack. This kind of action represents exactly the sort of political strategy available to a dominant riparian state that hydro-hegemony theory identifies (Zeitoun & Warner, 2006).

Continued bilateral crises have repeatedly spilled over into water diplomacy in ways the treaty's drafters likely never anticipated. Pakistani officials have warned that any unilateral disruption of treaty-governed flows could itself be treated as an act approaching war, emphasizing just how thoroughly water and broader security concerns are intertwined in the status quo of the two countries.

8.5 Limitations of the Existing Treaty

Altogether, these emerging pressures have brought out several limitations in a treaty that has been designed not to adapt to recent situations, but for the hydrological and political realities of 1960. Its rigid river-by-river allocation system does not leave little room for the kind of flexible, adaptive management that a changing climate most probably requires, and its dispute-resolution architecture, however historically effective, has increasingly struggled with the kind of overlapping, simultaneous proceedings seen in the Kishenganga and Ratle cases.

Most importantly, the treaty was never designed around comprehensive, basin-wide management. Its territorial division of rivers avoided the harder political work of building actually genuine collaborative institutions, a choice that even though made the treaty easier to negotiate in 1960, it left it increasingly ill-equipped to handle the interconnected challenges the basin faces related to water, climate, and security now.

Chapter 9: Conclusion and Recommendations

9.1 Summary of Major Findings

This paper aimed to evaluate whether the Indus Waters Treaty has genuinely constrained hydro-hegemonic behavior or has instead functioned as a survivable but shallow framework for institutional cooperation. From all the evidence that has been gathered throughout the paper, it can be inferred that there is a mixed answer to this question. The treaty has demonstrated resilience in times of hardship and strain, continuing to function through three wars and repeated diplomatic crises. Its dispute-resolution mechanisms have provided Pakistan with real, even if they are imperfect, ways to challenge Indian projects.

At the same time, however, the power differences between the two states, stemming from India's upstream geography and greater economic and technical abilities, have never been fully balanced out because of the way the treaty is designed. The hydroelectric case studies examined in Chapter 7, along with India's decision to hold the treaty in abeyance, indicate that formal compliance and treaty survival have coexisted with this unbalanced and asymmetrical dynamic all along, exactly the kind of coexistence that Zeitoun and Warner's (2006) framework anticipates.

9.2 Recommendations for Institutional Reform

Several reforms could help strengthen the treaty's institutional cooperation going forward. Strengthening the Permanent Indus Commission's mandate, even potentially expanding its authority to address emerging issues like groundwater and climate variability that the original treaty never expected, would help close some of the structural gaps identified in Chapter 8.

Providing more clear and consistent project data and strengthening the disclosure requirements would also help reduce disputes based on informational gaps that have repeatedly complicated cases like Baglihar and Ratle. Finally, properly clarifying the treaty's dispute-resolution order, particularly around when a Neutral Expert or a Court of Arbitration has jurisdiction, could help prevent the kind of parallel, overlapping proceedings that have strained the Kishenganga and Ratle disputes in recent years.

9.3 Limitations and Future Research

This analysis relies primarily on secondary sources, including legal filings, arbitration records, and existing scholarly literature, rather than on direct access to confidential bilateral negotiations, which inevitably limits how fully the internal political calculations behind key decisions can be construed. Future research would benefit from closer comparative analysis with other transboundary river treaties facing similar climate and power-asymmetry pressures.

There is also a lot of scope for more community-level research examining how the treaty's provisions, and its recent suspension, are actually experienced by farmers and communities who depend directly on the basin's water. The perspective of state-level treaty analysis like this one is generally not well positioned to capture on its own.

References

558 Zeitoun, M., & Warner, J. (2006). Hydro-hegemony – A framework for analysis of trans-
559 boundary water conflicts. *Water Policy*, 8(5), 435–460. <https://doi.org/10.2166/wp.2006.054>

560 Encyclopaedia Britannica. (2026, July). *Indus Waters Treaty*. In *Encyclopedia Britannica*.
561 <https://www.britannica.com/event/Indus-Waters-Treaty>

562 World Bank. (2025). *Fact sheet: The Indus Waters Treaty 1960 and the role of the World*
563 *Bank*. [https://www.worldbank.org/en/region/sar/brief/fact-sheet-the-indus-waters-treaty-](https://www.worldbank.org/en/region/sar/brief/fact-sheet-the-indus-waters-treaty-1960-and-the-world-bank)
564 [1960-and-the-world-bank](https://www.worldbank.org/en/region/sar/brief/fact-sheet-the-indus-waters-treaty-1960-and-the-world-bank)

565 American Society of International Law. (2025). The Indus Waters Treaty—Recurring
566 conflicts, non-participation and parallel proceedings in the Kishenganga and Ratle disputes.
567 *ASIL Insights*, 29(6). <https://asil.org/insights/volume/29/issue/6>

568 Vajiram & Ravi. (2026). *Indus Water Treaty 1960, map, key features, timeline, Pahalgam*
569 *attack*. <https://vajiramandravi.com/upsc-exam/indus-water-treaty/>

570 South Asia @ LSE. (2018, June 25). *The Indus Waters Treaty: An exemplar of cooperation*.
571 LSE Blogs. [https://blogs.lse.ac.uk/southasia/2018/06/25/the-indus-waters-treaty-an-exemplar-](https://blogs.lse.ac.uk/southasia/2018/06/25/the-indus-waters-treaty-an-exemplar-of-cooperation/)
572 [of-cooperation/](https://blogs.lse.ac.uk/southasia/2018/06/25/the-indus-waters-treaty-an-exemplar-of-cooperation/)

573 Centre for Policy Research. (2026). *Six words and a sixty-year treaty*. CPR India.
574 <https://cprindia.org/indus-water-treaty-six-words-and-a-sixty-year-treaty/>

575 National Interest. (2026). *The case for India's suspension of the Indus Waters Treaty*.
576 [https://nationalinterest.org/blog/silk-road-rivalries/the-case-for-indias-suspension-of-the-](https://nationalinterest.org/blog/silk-road-rivalries/the-case-for-indias-suspension-of-the-indus-waters-treaty)
577 [indus-waters-treaty](https://nationalinterest.org/blog/silk-road-rivalries/the-case-for-indias-suspension-of-the-indus-waters-treaty)

578 Defence and Security Alert. (2026). *The Indus Waters Treaty: India's strategic water*
579 *calculus*. <https://dsalert.org/the-indus-waters-treaty-indias-strategic-water-calculus/>

580 PolSci Institute. (2025). *The Indus Water Treaty: A model for Indo-Pak cooperation*.
581 <https://polsci.institute/india-foreign-policy/indus-water-treaty-indo-pak-cooperation/>

582 Indus Water Treaty (IWT): Competing interpretations of India and Pakistan. (2026). *Water*,
583 18(13), Article 1556. <https://www.mdpi.com/2073-4441/18/13/1556>

584 Pressenza. (2026, July). *The Indus Waters Treaty was never about water*.
585 <https://www.pressenza.com/2026/07/the-indus-waters-treaty-was-never-about-water/>

586 National Strategies. (2025). *Indus waters dispute: India's strategic victory in neutral expert*
587 *proceedings*. [https://www.natstrat.org/articledetail/publications/indus-waters-dispute-india-s-](https://www.natstrat.org/articledetail/publications/indus-waters-dispute-india-s-strategic-victory-in-neutral-expert-proceedings-179.html)
588 [strategic-victory-in-neutral-expert-proceedings-179.html](https://www.natstrat.org/articledetail/publications/indus-waters-dispute-india-s-strategic-victory-in-neutral-expert-proceedings-179.html)

589 Impact of climate change on water scarcity in Pakistan: Implications for water management
590 and policy. (2024). *Journal of Water and Climate Change*, 15(8), 3602–3620.
591 <https://iwaponline.com/jwcc/article/15/8/3602/103263/>

592 Indus River Basin glacier melt at the subbasin scale. (2022). *Frontiers in Earth Science*, 10,
593 Article 767411. [https://www.frontiersin.org/journals/earth-](https://www.frontiersin.org/journals/earth-science/articles/10.3389/feart.2022.767411/full)
594 [science/articles/10.3389/feart.2022.767411/full](https://www.frontiersin.org/journals/earth-science/articles/10.3389/feart.2022.767411/full)

595 Assessing glacier changes and hydrological impacts in the upper Indus Basin under CMIP6
596 climate scenarios. (2025). *PMC*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC12355155/>

597 Melting glaciers and the Indus Water Treaty: A looming crisis. (2023). *Global Legal Studies*
598 *Review*, 8(2). <https://www.humapub.com/admin/alljournals/glsr/papers/M29q7W2AQC.pdf>

599 Fatima, N. (2025). Impact of climate change on glacier melting and water security in the
600 Karakoram and Himalayan region of Pakistan. *Indus Journal of Bioscience Research*.
601 <https://ijbr.com.pk/IJBR/article/view/2595>

602 Zaheer, I. (2026). Hydropolitics and climate security in the Indus Basin: A green theory
603 analysis of Pakistan's water vulnerability. *Journal for Social Science Archives*, 4(1), 1401–
604 1414. <https://doi.org/10.59075/jssa.v4i1.582>

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607