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Impact of Revocation of the Indus Waters Treaty by India: Measures to Offset Its Impact and Future Water Security Strategy for Pakistan

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Abstract *— April 2025 saw India pause the 1960 Indus Waters Treaty after the Pahalgam incident, exposing deep flaws in how Pakistan handles its water needs. World Bank helped arrange that deal back then, with signatures added on September 19, giving Pakistan control over the Indus, Jhelum, and Chenab rivers. India received rights to the Ravi, Beas, and Sutlej instead. For more than sixty years, this agreement quietly held together water sharing between two nations armed with nuclear weapons. Now, its abrupt halt stirs sharp worry over whether Pakistan can keep feeding farms, running industries, and filling homes with water. This work looks into the legal, political, economic, and ecological sides of halting the Indus Waters Treaty, maybe for good. Because of past agreements, scientific studies, official documents, plus findings from real-world monitoring across Pakistan's river system, one point stands out: ending the treaty breaks global rules, yet Islamabad still needs stronger local responses - upgraded systems, smarter usage habits, new supply options, legal safeguards, along with steady talks abroad. When climate shifts shape decisions, farming methods change fast, ties with neighbors stay firm, survival odds improve sharply. Using deep analysis instead of numbers alone, it introduces a plan named FWSF meant to guide Pakistan forward under pressure. Indus Waters Treaty shapes Pakistan water security amid shifting India-Pakistan relations.*

Keywords *— **Indus Waters Treaty, Pakistan water security, India-Pakistan relations, transboundary water law, water governance, hydro-politics, Indus Basin, climate adaptation.***

I. INTRODUCTION

Flowing through history, water shaped survival and conflict across South Asia. Stretching over 1.12 million square kilometers, the Indus River System feeds Pakistan's farms - its economic pulse - and sustains well beyond 220 million lives. Nearly all of the nation's food springs from waters drawn here; about one-fourth of national income ties back to this network (Janjua et al., 2021). The Indus Waters Treaty was signed in 1960. For Pakistan, this treaty was very important. Pakistan is located downstream from India, which has control over the water. The treaty protected Pakistan from being hurt by India.

One Tuesday in April India decided to stop following the treaty. India said it would only start following the treaty if Pakistan stopped supporting attacks across the border. This decision was made after there was violence near Pahalgam, which is in territory controlled by India. The decision to stop following the treaty was a deal. It broke a standing agreement that had stayed in place even during times of fighting and tension. Voices inside New Delhi made clear they meant every word: zero water flowing into Pakistani channels, not one bit. Soon after, lakes behind dams at Baglihar and Kishanganga emptied out, going against what was once agreed. Come summertime, there was no turning back - the deal stood discarded.

Now things are different. A big problem with water has become very urgent. It is not about farming anymore. When Pakistan does not have water, it cannot feed its people produce power keep its regions stable protect health and support its economy. This study looks at one question: how much will Pakistan be hurt if India stops following the Indus Waters Treaty. It also looks at how Pakistan should respond to this situation.

Here is how the rest of this study will work. The next part will look at what has been written about the Indus Waters Treaty in the past. It will also look at the relationship between India and Pakistan over water and the problems Pakistan has with managing its water supply. The third part will explain how this study was done. The fourth part will look at what was found out about the law, money, farming, the environment and talks between countries. The fifth part will look at the issues and outline a way forward for water safety in Pakistan. Wrapping up, Section 6 lays out steps officials might consider taking next.

Historical Context of India-Pakistan Water Relations

These interactions have historically been marked by consistent security measures and issue-linkage, which has managed to stymie concrete cooperation outside of the basic tenets laid out in 1960 (Rigi & Warner, 2020). The historical stalemate, compounded by the lack of broader economic cooperation, has left the riparian states unable to address the contemporary system gaps, such as the uncontrolled proliferation of power generation projects and the growing impact of climate-induced hydrological variability (Hafeez & Kausar, 2022). Despite growing evidence that climate-induced unpredictability – in the form of extreme weather events and unpredictable river flows – presents an existential threat to both countries (Maqbool, 2025), there is a persistent failure to separate resource management from larger political conflict.

Thus, the current concern with territorial disputes still masks the urgent need for collective action to mitigate the effects of glacier melting in the Hindu Kush-Karakoram-Himalaya that provides up to 80% of the flow of the Indus River (Sultan et al., 2022). Furthermore, Pakistan's agricultural economy is highly dependent on this single hydrological source and increased susceptibility to climate events is creating a more unstable national security environment than ever before (Klare, 2020).

This dependency is further heightened by the fact that Pakistan being a lower-riparian country is highly vulnerable to the diversionary activities of its neighbors including the ongoing construction of dams on the Kabul River (Tariq et al., 2020). The situation is made more difficult by the fact that Pakistan being a tributary riparian is still very vulnerable to the diversionary activities of its neighbors including the ongoing construction of dams on the Kabul River (Tariq et al., 2020). Tense relations between nations are further exacerbated by internal governance failures, with inadequate distribution of water and low capacity for storage, currently averaging only 150 m3 per capita, leaving the country ill-equipped to absorb these external shocks (Zahra et al., 2023).

These governance deficits are compounded by an absence of trust among provinces. Climate change increases tensions on water equity and further complicates the role of the Indus River System Authority (Asif et al. 2025). This situation is further aggravated by the deterioration of the good bilateral relations and the securitization of water due to the continued border skirmishes and other disputes, creating a situation of extreme complexity where the application of technical solutions on the basin remains politically, and not technically, feasible (Bashir 2024, Jamadhagni 2023). Given the specific geopolitics of the regional spaces, which further complicate transboundary collaboration, it is imperative to move from a securitized approach to hydro-politics (Mahla 2026).

Research Problem

Pakistan's water security will be threatened by India's possible withdrawal from the Indus Waters Treaty as Pakistan is a lower riparian state and relies on the Indus Basin for nearly 75 % of its almost wholly agricultural water. This uncertain reliance brings an obligation to design scenarios and countermeasures needed to withstand the risks of adversity to Pakistan's agricultural economy. Although the IWT has faced geopolitical pressures, there has now and continues to be, a unique pressure from severe water scarcity compounded by the continuous construction of hydropower dams by India on the western rivers, which have formed the basis of collaborations for

years. This unprecedented pressure coupled with India's ongoing construction of hydropower plants on the western rivers challenges the cooperation framework for the Indus Waters Treaty. If Pakistan is to ensure water security, it will have to pursue initiatives to raise concerns over the weakening provisions of the Indus Waters Treaty.

Research Significance

The study attempts to analyze the changes in policy options to provide the Pakistan decision-maker with the best responses. The study attempts to provide the first study for transboundary water governance for South Asia. The study attempts to identify the Indus Waters Treaty loopholes and provide recommendations for the improvement of the treaty. The Indus Waters Treaty has had a history of success. The current treaty structure, however, has faced criticism for the inability to incorporate climate change and the urgency for stakeholder engagement.

Pakistan's management of its water resources must be reconsidered because of these weaknesses, the challenges of treaty changes by India, the design of river flow obstruction schemes.

II. LITERATURE REVIEW

Historical Origins and Structural Architecture of the IWT

The Indus Waters Treaty (IWT) emerged in the wake of Partition's Destruction. The Partition of British India in August 1947 placed the upper reaches of the Indus Rivers mainly in India, putting Pakistan at an acute flow-locked locational disadvantage (Nosheen & Toheeda, 2011). In 1948 India halted flow to Pakistan's irrigation canals on one April. A weak and fragile agreement in May of that year brought temporary respite and relief, but external support was critical for the situation to have any stability in the medium to long term. After a long and dragged out phase of negotiations, a guided round of negotiations by the World Bank, brought the talks to a successful conclusion. Pakistan's Ayub Khan and India's Jawaharlal Nehru signed the treaty on September 19, 1960, during a ceremony in Karachi (World Bank, 1960). Further, the IRS partition of six rivers was simplistic. Pakistan received the full right and control of the Indus, Jhelum and Chenab Rivers, and in turn India received control of the eastern trifecta of rivers, the Ravi, Beas and Sutlej. India continued control of the western rivers while Pakistan was, and still is, treaty bound to maintaining the flow alterations. For example, Pakistan is allowed minor flow alterations of the western rivers for the purpose of hydro power. (Ali & Khuhro, 2021). Article VIII of the Treaty set up the Permanent Indus Commission, which was assigned control of the Treaty.

It was to oversee the coordination and the exchange of information as well as the communication of specialists involved. The disputes were to be also addressed by the commission. If the disputes were to escalate, the residual articles of the treaty provided for measures to be undertaken. From the commission, things could progress to a neutral factoring reviewer. If unresolved issues persist, it could lead to an arbitral court (Yaqoob, 2016).

The treaty has held strong, experts agree. Through the wars of 1965 and 1971, then again during Kargil in 1999, it remained intact - rare for neighbors at odds (Khan, 2025). Still, behind that strength, pressures built up slowly. Shifting weather patterns played a part. So did rising numbers of people. India is growing network of dams on western rivers added strain over time (Ali & Khuhro, 2021; Nosheen & Toheeda, 2011).

India's Violations and Hydro-Hegemonic Behavior

Recent research into the transboundary waters of India and Pakistan has examined the relationship using the hydro-hegemonic framework. The superior upstream nation reaps the maximum benefit (Riaz et al., 2020). Following India's building of the Baglihar Dam on the Chenab River, Pakistan grew concerned over the Dam's potential repercussions regarding downstream countries. Pakistan executed and caused a flurry of activity on the international front by activating the neutral expert clause of the Indus Waters Treaty. In 2007, the expert made the decision and would then be neutral to the construction of the project. It is the view of a number of Pakistani analysts that, even with changes made to the project, the principle of equity and fairness is almost always absent (Ali & Khuhro, 2021).

New legal challenges concerning the Indus Water Treaty have emerged due to India's building of the Kishanganga dam on the Neelum River which is a tributary of the Jhelum. Pakistan is of the opinion that India is infringing the Indus Water Treaty because, by

doing so, India is obstructing water from reaching Pakistan's Neelum-Jhelum Hydropower Project which is still being built (Riaz et al., 2020). There is construction of public works by India that gradually, materially and directly, reduces the supply of water to Pakistan. India may even purposefully manage the flows by intentionally delaying the supply of water to Pakistan.India's move in April to totally disregard the treaty is itself indicative of India's overall disposition now (Khan, 2025). The decision made in April 2025 is worthless and sets an example for similar future decisions regarding Pahalgam.

This seems to mark the end of a long series of time outs. Analysts at Chatham House suggests that New Delhi's patience was wearing thin with the dam construction being stalled, and the refusal to address the changing river flows due to the rising temperatures. There were opportunities to act when New Delhi's focus was elsewhere and when most of the big players in world politics were looking away, the consequences of inaction did as well. Clingendael research clearly describes that virtually no resistance was posed to New Delhi's actions.

Pakistan's Internal Water Governance Challenges

India's control over shared waters adds pressure to Pakistan's already troubled water systems. Not far beneath the surface, deeper problems take root - population rise pushes thirst higher, while pipes and canals crumble with age. Split responsibilities between national and regional bodies weaken coordination, making responses slow and scattered. Corruption weaves through distribution networks, siphoning off fairness before water reaches farms or homes. Back in 1951, each person had about 5,000 cubic meters yearly; decades later, that shrank sharply - to just over 1,000 by the start of the 2010s. Forecasts point downward still, with supply expected to miss demand by one-third within a few years, leaving enough food unproduced to feed millions several times over.

Pakistan holds back just one tenth of its yearly river water - well under the 40 percent norm seen in nations facing similar shortages (Nazli et al., 2024). Around each person, stored supply sits near 150 cubic meters; across the U.S. and Australia, it climbs past five thousand (Janjua et al., 2021). By mid-decade, silt buildup plus shifting weather patterns could shrink current reservoir space by nearly a third (World Bank, 2020–2021). Across 22 million farm-covered hectares, outdated flood watering remains common - an inefficient practice where better use might save much, yet slow movement on policy keeps changes at bay (Chaudhry, 2010).

Water conflicts between provinces make things harder. The Indus Waters Treaty signed in 1991 to ensure equitable distribution of the water of River Indus between different provinces of Pakistan. The disagreement. From time to time, Sindh claims Punjab takes more than it's due. Meanwhile, Balochistan gets far less water than needed. Internal disagreements like these - according to Janjua and others in 2021 - pose a sharper threat to stability right now compared to tensions with India.

Climate Change as a Threat Multiplier

Pakistan faces some of the sharpest impacts from shifting weather patterns. Rising heat pushes faster melting in the Hindu Kush-Himalayan ice fields, feeding large parts of the upper Indus River. Pakistan is also threatened by climate change. The country already is feeling the impact of shifting weather patterns. But scientists say runoff from glaciers will first grow and then shrink sharply as glaciers decline. This is called 'peak water' (Mirza & Mahmood, 2022). With floods such as those of 2010 and 2022, the rivers overflow and reveal the weaknesses of the systems that are supposed to manage the water.

The Indus Waters Treaty does not mention climate change at all. This is a flaw of the treaty. Consequently, India has been able to brush aside Pakistan's complaints about the changing water patterns. Helping to update the treaty to include flood predictions, tracking glacier loss and ways to adapt to the changing climate could help (Qamar et al., 2019).

Legal Framework Governing Treaty Termination

One rule is clear: treaties in force must be carried out in good faith. This is provided for in Article 26 of the Vienna Convention on the Law of Treaties. "Countries don't want to be put in a position where they are leaving a treaty. Indus Waters Treaty, a treaty between India and Pakistan that governs the flow of water between the two countries. If India walks out of the treaty unilaterally, it will be against the norm among countries (Yaqoob, 2016).

Article 12 of the Indus Waters Treaty states that the treaty can be terminated by mutual agreement between the two countries. India's decision to stop adhering to the treaty was labelled a "pause" which could help it escape legal consequences. But Pakistan has a case to challenge this stance and can make it in international courts.

III. RESEARCH METHODOLOGY

Research Design

This work intends to limit over-analysis and extensive document reading, legal analysis, and policy evaluation. This topic involves water science, international treaties, country interactions, financial flows, and government activities. Therefore, basic strategies are ineffective. This approach, to the extent of analyzing reality, enables one to reconcile the complexity and critics will focus on the real interactive predicament of survival and balance.

Data Sources

Looking into this work, it rests on three main kinds of materials. Legal texts and official papers form one part - these are things like the Indus Waters Treaty itself, the Vienna deal about how treaties work, the 1997 UN agreement on rivers, studies done by the World Bank, plus decisions made through the treaty's conflict handling system. This consists of two other layers. To begin with, there is academic writing in Water Policy, Regional Studies, the NDU Journal, Abasyn Journal of Social Sciences, Perennial Journal of History and many other peer reviewed places. You will also find some background material from think tanks and media organizations: CSIS, Chatham House, Clingendael; The Diplomat, stories from major dailies. Every document handed out for the course became a base point - works by Janjua and team (2021), Yaqoob (2016), Khan (2025), Riaz and others (2020), along with the original 1960 blueprint drawn up by the World Bank, were used throughout.

Analytical Framework

This study bridges disciplines to examine how treaties in suspension operate. It checks whether Indias move is permissible under rules. It also assesses the damage from water shortage to Pakistan. The study examines countries in similar circumstances to see what works for them in surviving water shortages. It utilizes papers, reports and records to help Pakistan in case of reduction in its water supply.

Research Limitations

Examine the constraints of the analysis. Since May 2025, India has not provided water flow updates, which not only creates additional issues for the analysis, but also changes the context daily due to, at best, inconsistent and unofficial communications between India and Pakistan. Groundwork? Nope. Interviews with relatives? Nope. Everything relies on what was publicly accessible (publications, diplomatic papers, official intermediaries). All the papers were generated after the case became active.

IV. RESULTS

- Legal and Political Dimensions of the IWT Suspension

Illegality of Unilateral Suspension under International Law

India's argument is undermined by international law. The Indus Waters Treaty has no article that grants a country the right to suspend or withdraw from the Treaty without the agreement of the other party. Article XII dictates that only both parties can agree to the termination of the Treaty. It is still a violation of the Treaty. Even the "temporary suspension" of the Treaty, in the absence of mutual agreement, Treaty obligations continue to them. International law has a general rule that a country that is a party to a treaty is obligated to respect its provisions, and this remains true for the Treaty, no matter how 'temporary' or permanent the suspension is (Yaqoob, 2016; JURIST, 2025).

Still, everyday global rules - written down in parts five, six, seven of the UN river agreement - require nations to share cross-border rivers fairly, while avoiding major damage to neighbors downstream. Should India cut off water flow toward Pakistan, it breaks those duties, regardless of whether the Indus deal still stands officially (Yaqoob, 2016). Evidence shows Pakistan's lawyers have quietly gathered filings aimed at arbitration court, maybe even world justice body, listing ways India strayed from agreed terms - a move backed up by close review of India's past treaty breaches (Khan, 2025; Riaz et al., 2020).

Geopolitical and Precedent-Setting Risks

When India halts a water agreement, it doesn't just affect treaties - it shakes how nations manage shared

rivers. Should upstream countries like India change terms at will, others may follow suit without warning. Upstream power shifts matter, especially since China controls waters feeding the Sutlej and Brahmaputra before they reach India. We're Beijing to reroute part of the Sutlej flow, key dams in northern India might lose their supply fast. That drop in volume would cut hydroelectric output across Punjab and Himachal Pradesh sharply. So while one move strengthens control now, later ripple effects weaken cooperation frameworks downriver.

- *Economic and Agricultural Impacts on Pakistan*

Out of nowhere, the halt in IWT operations could trigger massive financial fallout. Flowing through vast stretches, the Indus River network fuels close to a quarter of Pakistan's economy. Nearly all locally grown food relies on these waters, with studies pointing to about ninety percent dependence. Most people earn their living thanks to farming made possible by river-fed fields. These farmlands cover around 22 million hectares, weaving into lives across villages and cities alike. Western rivers, assigned under treaty terms, now sit at the center of survival for three out of four citizens.

By 2025, Pakistan could face a water gap of 32%, according to early forecasts from the World Bank covering 2020 to 2021 - a figure calculated before any impact from disrupted Indus Water Treaty flows. Should supplies from western rivers shrink or stop, that shortage would grow faster, possibly leading to a drop in food output near 70 million tons (Janjua et al., 2021). Behind such a scenario lies widespread rural hardship: farm incomes crumbling, large numbers out of work in farming regions, rising costs for basic foods, even hunger emerging where crops depend heavily on irrigation across parts of Punjab and Sindh.

Tensions rose within Pakistan's leadership circle; take June 2025, when Foreign Minister Bilawal Bhutto Zardari stated Islamabad might claim control over all six major rivers unless fair sharing continued. Then came August 2025, with military chief Asim Munir making clear during public remarks that the Indus belongs to no single nation, rejecting the idea it is India's private domain (CSIS, 2025; Chatham House, 2026).

Water shapes much of Pakistan's power supply. From Tarbela to Neelum-Jhelum, dams rely on rivers flowing westward. When flow changes happen upstream, trouble follows downstream. In May 2025, India released water from Baglihar and Kishanganga, affecting how much reaches Pakistan. That shift hits electricity output hard, especially where blackouts are common. Less data sharing means less warning too. Without steady numbers on river levels, preparing for floods grows harder. Monitoring contamination slips away just when it matters most.

- *Environmental and Ecological Impacts*

Downriver, life in the Indus Delta depends on steady river flow. Freshwater reaching this region has dropped sharply over recent decades because more water gets pulled out farther up the river. With less inflow, seawater creeps deeper into the wetlands. Mangroves begin to shrink when salt levels rise too high. These trees once held firm against erosion while sheltering fish populations. Coastal communities relying on those waters face growing uncertainty. Fishing families see their options fade as habitats degrade. A weaker river means a weakened coast - this shift hits hardest where people depend most on what the delta provides (Irfan et al., 2019).

Low river flows put stress on wetlands, harm fish numbers, leave river ecosystems weaker. Found only in Pakistan's part of the Indus, the blind dolphin struggles as water shrinks and its home splits apart. With tube wells pulling too much underground water already, less surface supply makes the drop faster - soil turns salty, fields flood, reserves vanish quicker (Janjua et al., 2021). Over years, damaged land grows more common when nature's balance keeps shifting.

- *Domestic Water Governance Findings*

Looking closer at how Pakistan handles its own water systems shows deep-rooted problems weakening responses when outside pressures hit. Old canals, many built under British rule, now run far below what they were meant to carry, worn down by years without proper upkeep, poor oversight, and lack of funds (Qureshi, 2011). Water vanishes along the way - soaked into soil or lost to air - with nearly half of what's pulled from rivers never reaching its target, an avoidable waste that might otherwise ease shortages from dwindling flows upriver.

Pricing water cheaply on farms across Pakistan means saving it rarely matters. Though drip and spray methods cut usage sharply versus traditional

flooding, hardly any fields use them. With no clear national plan, weak rules for underground reserves, or charges based on how much is drawn, handling shortages gets harder. Efforts to control demand stay scattered, leaving resources stretched thin.

Right now, Pakistan holds back just a tenth of its yearly river water. Most experts say countries short on water should keep hold of nearly half. Silt buildup plus shifting weather patterns are expected to shrink current reserves sharply within years. Take Tarbela and Mangla - they're already running far under what they were built for. We need to construct water storage facilities." Slow decision-making and issues have kept big projects like the Diamer-Bhasha dam incomplete. (Nazli et al., 2024; Ishaque et al., 2023).

V. DISCUSSION

- *Proposed Future Water Security Framework (FWSF) for Pakistan*

Building water storage facilities has become necessary. However big projects like the Diamer-Bhasha dam are still unfinished due to problems and slow decision-making.

Pillar One: Legal and Diplomatic Counter-Strategy

Pakistan's next steps in this situation must involve expanding and diversifying their diplomatic and legal strategies. The first step must involve moving the Indus Waters Treaty (IWT) case to the Court of Arbitration (most likely the ICJ) and arguing that India has repeatedly violated the IWT by constructing dams on the Indus (as well as the other IWT rivers) without proper notice to Pakistan and thereby obstructing Pakistan's IWT compliance. The latest problems involve India's releases of water and the refusal to provide river data during the data exchange which has since ceased. Previously completed research such as Yaqub (2016) and JURIST (2025) and Article XII of the IWT and provisions 5-7 of the UN Watercourses Treaty indicate that it is not of little standing for Pakistan to pursue this legaly as it is based on international law.

Pakistan will most certainly try to legally establish river basin partnerships with China (of course, India is also known to dominate the Brahmaputra waters), Bangladesh, Bhutan, and Nepal to jointly deal with river basin management problems. Pakistan will most probably also have to reassess its position regarding the International Water Laws of the United Nations and World Bank which also have supported the Indus Waters Treaty from the beginning. Pakistan will have no option but to advocate for the IWT to include cooperative, adaptive data and impact monitoring. Pakistan will place India in a position, from a diplomatic perspective, in which there will be no option other than to accept the proposed changes.

Pillar Two: Expansion and Modernization of Infrastructure

Pakistan must invest in its water infrastructure, such as in the Diamer-Bhasha dam. Once finished, the dam will hold a storage capacity of 8.1 million acre-feet and generate 4,500 megawatts of electricity (Hussain et al., 2020, Nabi et al. 2019). Additionally, small modular dams in specific locations in Khyber Pakhtunkhwa (particularly Bannu and D.I Khan) can be built within a shorter period, offering even more environmental benefits. Canal re-lining and repair can save water and increase the cost-effectiveness of the water transport system, reducing leakage by 20% to 30% (Cahudry, 2010, Yar et al, 2021).

These are not the only challenges. The combination of satellite technologies, mapping, and predictive modeling in real time can help distribute water more fairly throughout the Indus network. Building a national linking network of all the major river systems will transport water where it is most needed. This will require a large investment and inter-provincial collaboration but will be worthwhile over time.

Pillar Three: Agricultural Water Efficiency and Demand Management

Pakistan's water consumption is made up of 93% agriculture. Water conservation therefore hinges on agriculture. Using drip or sprinkler systems instead of flood irrigation can save 30-50% of water. This is due to some irrigation practices that can be less water demanding and can provide an equal or greater service in crop yields. It is relatively easier to make the shift because of adequate irrigation systems and on-farm inputs as well as the training and education of farmers. Crop yields have improved with the effective management of water in the soil, and the raised farm management has been positive with the practice having been adopted.

C. Chaudhry and Smolenaars et al. advocate moving away from water intensive crops like sugar cane and rice, to crops that are less water intensive and have a

higher economic return and nutritional value, such as maize, sunflower, and soybeans. In South and Central Asia, it has been demonstrated that irrigation systems based on the actual use of water, rather than land, have led to better cost and water savings.

Research indicates that in South and Central Asia, locally formed water management groups demonstrate minimal water wastage and the fairest distribution of water (Khadam et al., 2023). The "water-saving" strategy in South Asia and the Middle East also includes the installation of solar photovoltaic (PV) systems on farms to provide farm and water supply system electrical needs and to reduce the soil and climatic drying effects. (Muzammil et al., 2021, Asfahan et al., 2022).

Pillar Four: Alternative Water Source Development

Pakistan cannot depend only on the Indus to meet its water needs. Groundwater, used with the Indus as a supplement, helps meet shortfalls in river supplies. Deployment of necessary licenses and real-time monitoring of well digging aims to observe and prevent depletion. This way, the groundwater does not run dry. Khyber Pakhtunkhwa, Azad Kashmir, and the Potohar Plateau are the areas that experience effective Rainwater Harvesting due to their higher annual rainfall. There is a good justification in these areas for the construction of roof catchments with storage tanks.

Water from used sources sits mostly unused, yet it could feed city and nearby farm needs. Big towns in Pakistan keep expanding, producing tons of dirty water that spills into rivers without cleaning - dangerous for people, though full of untapped possibility. Along the Makran shore, machines pulling salt from seawater might give coastal areas more drinkable water, easing strain on the Indus network (Ishaque et al., 2023; Habib, 2004). Filling underground reserves on purpose - by guiding rainy season floods into special ground zones - may secure water stocks far ahead (Shafeeque et al., 2023).

Pillar Five: Institutional Reform and Climate-Adaptive Governance

Institutional changes are as critical as improvements in tools and systems in addressing the challenges of water management in the country. Water management in Pakistan has multiple fragmented systems and one such example is the group at the federal level IRSA, the local irrigation groups and the unofficial canal managers, etc. Modernization is a requirement. Planning, designing, implementing, and enforcing regulations and controls will require the integration of fragmented systems and the cooperation of stakeholders. The fragmented systems will be integrated by the proposed National Water Security Commission. It is designed to provide and enforce water use nationally and regionally, govern the control and management of water resources, and make policy and budget decisions on the infrastructure. It will also implement the Federal Water Security Framework. The proposed integration of local water management systems will be designed to ensure that Sindh and Balochistan are part of the national strategy on control of waters impacted by climate change.

Pakistan has a legal obligation to fulfill its commitments at the COP21 and this will only be possible if the country implements its National Adaptation Plan. This opens an avenue for Pakistan to finance the improvement of its water infrastructure with a combination of climate and water security adaptations. The real change will be a bottom up rather than a top down approach. A collective understanding of the ecosystem will be promoted.

Communities will develop the understanding that water is not an infinite resource, but rather, a finite resource that must be protected and is a shared resource.

- *Ceasefire and Diplomatic Window*

Fighting along the India-Pakistan border slowed in mid-2025. This permitted some temporary strategic shifts in Islamabad. Chatham House experts suggest that Islamabad will look to rebuild trust, and thus, the discussions of the most enduring of agreements, the Indus Waters Treaty, will likely be addressed. These will most likely be the first negotiations involving water distribution that could change the balance of power in South Asia. The World Bank will likely be important, as their participation will likely be the most important. The most positive scenario will occur if The Hague is offered the ability to arbitrate, even though the governments are likely to delay the signing of the treaty, the rules will be worth more than the conflicts.

- *Economic Diversification as a Parallel Strategy*

Pakistan relies primarily on agricultural systems that incorporate extensive water usage. Agriculture is important for economic development and employment. Water and agriculture remain extremely important for sustaining livelihoods. Some crop diversions are possible. Until then, agriculture should be forced to become water use efficient as possible. Imagine factories that use an annual crop as an input to produce a product that provides a continuous sustained supply of water. One can imagine a potential workforce providing a digital infrastructure, employment, and even a workshop type housing that is able to supply goods and services. The supply of goods and services would draw upon the water that is available, especially during dry periods, and when water supply is being diverted in the upstream in a conflict manner. It is the capital in the form of disruptive cross border loans that will cause the clutch points of the system to shift. It will be drip irrigation, climate smart trans cross and foundation type investments, and situation of the cross that will bind the system to flexible equilibrium and resilience to conflict and drought.

VI. CONCLUSIONS

In April 2025, India revoked the Indus Waters Treaty, which adversely affected Pakistan the most, and further aggravated the water shortage problem in the subcontinent. With the diminishing resources, farming and financial services are deteriorating, water-related illnesses are on the rise, and the population is facing these combined and compounded problems on a daily basis. If New Delhi permanently closes the gates or diverts river water, these problems and the water shortage will affect 240 million people. However, despite the challenges, Pakistan has sustained its position, and will not back off from India. This challenge provides the opportunity to formulate a multi-pronged strategy combining law, diplomacy, and regional cooperation.

Within the established Indus Waters Treaty system, Pakistan has the prerogative to turn the legal system against India to bring a favorable outcome. If Pakistan takes that route, along with offering genuine negotiations on treaty review and addressing the water problems resulting from a changing climate, it would present not a complaining Pakistan but a fair Pakistan. Even if things deteriorate on the border, the improvements in farming, state management, and enhanced water storage and supply, and better systems for design and management would stabilize and calm waters for Pakistan. It is obvious that by 2025, Pakistan will have a shortfall of a third of the water it needs. This has nothing to do with the other challenges that will come with the Indus Treaty.

Since that agreement isn't being utilized, and isn't likely to be utilized anytime soon, we can no longer rely on the luxury of time. We need to initiate the Diamer-Bhasha Dam project and apply newer and advanced irrigation systems to the fields. The timely establishment of a proper water management system will be of utmost importance, as we will not have the luxury of time. This is not a plan; this is the reality we face.

Water security is critical for Pakistan's survival and for the thousands of years of civilization on the banks of the Indus River. Our leaders must use all legal and diplomatic tools (and, most importantly, the systems and the tools) at their disposal to ensure that our resources are protected. The generation of our leaders will be held accountable for the legacy that we are leaving to the next generations.

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