Sociology & Cultural Research Review (SCRR)
Available Online: https://scrrjournal.com
Print ISSN: 3007-3103 Online ISSN: 3007-3111
Platform & Workflow by: Open Journal Systems

# Climate Stress, River Control, and Interstate Rivalry: The Evolution of Pakistan-India Water Politics from 1947 to 2025

**Dr. Syed Munib Ali Bukhari**
Assistant Professor of Political Science at Govt. Graduate College, Satellite Town, Rawalpindi
**Muhammad Nazim**
Assistant Professor of Political Science at Govt. Graduate College, Satellite Town, Rawalpindi

**ABSTRACT**
*The water relationship between Pakistan and India has developed into one of the most complex geopolitical issues in South Asia. Since 1947, the division of the Indus Basin has shaped political tensions and security anxieties between the two states. Pakistan's heavy dependence on the Indus River system for agriculture, energy, and national livelihood has made water a matter of national survival. India's upstream geographic position and its growing construction of hydropower and storage infrastructure have intensified Pakistan's concerns over long term water security. Climate stress has further complicated this situation by introducing unpredictable hydrological patterns, rapid glacial melt, and increasing monsoon variability, making Pakistan more vulnerable to water scarcity. This study examines the evolution of Pakistan India water politics from 1947 to 2025 by analyzing the interconnected influence of climate stress, river control, and interstate rivalry. By applying a single theoretical lens, this research explains how environmental pressures, strategic behavior, and geopolitical competition shape water politics in the region. The analysis emphasizes Pakistan's perspective because the country faces greater vulnerability due to its downstream location and dependence on the Indus Basin. This study contributes to a deeper understanding of the long term political and environmental forces that continue to influence water politics between Pakistan and India and highlights the need for cooperative approaches in the face of rising climate challenges.*

***Keywords***: *Climate Stress, River Control, Interstate Rivalry, Evolution of Pakistan-India, Water Politics.*

## Introduction

The evolution of water politics between Pakistan and India represents one of the most sensitive and strategically significant dimensions of South Asian interstate relations. From the moment of Partition in 1947, the division of the Indus Basin (1960) created fundamental tensions that have shaped the political, economic, and security environment of the region. The Indus River system had historically functioned as a single integrated hydrological unit under British rule, but Partition transformed it into an international river basin split between two sovereign states. This new configuration created structural vulnerabilities for Pakistan, which became entirely dependent on the waters originating in India. Scholars describe this condition as an inherent asymmetry that continues to shape bilateral relations (Wolf, 1999).

Pakistan's national dependence on the Indus River system is unparalleled. More than ninety (90 %) percent of Pakistan's agriculture relies on irrigation drawn from the western rivers. The basin supports food production, industry, power generation, and rural livelihoods across the country. The centrality of water to Pakistan's national existence has created deep strategic anxieties regarding India's upstream capabilities. Research shows that downstream states often interpret upstream water control as a potential threat, especially when political relations are hostile (Mustafa, 2010). Pakistan's security concerns originate from this

structural disadvantage, which gives India the ability to influence water flows during key agricultural seasons.

Climate stress has further intensified Pakistan's vulnerability. Rising temperatures in the Himalayan region have accelerated glacial melt, which initially increases river flows but leads to long term reduction once glaciers shrink. Irregular rainfall patterns, frequent floods, and extreme dry periods have also destabilized Pakistan's water supply. Climate scientists classify Pakistan as one of the most climate affected countries, with severe risks to its hydrological stability (Khan, 2020). These environmental pressures interact with geopolitical tensions, making Pakistan increasingly anxious about future water availability.

The signing of the Indus Waters Treaty in 1960 established a formal framework for water sharing between Pakistan and India. The Treaty allocated the eastern rivers to India and the western rivers to Pakistan and remains one of the most durable water agreements in the world. Despite its success, disputes have emerged regarding the interpretation of technical clauses, particularly concerning Indian hydropower projects on the western rivers. Pakistan argues that certain designs may give India temporary control over flows, which could adversely affect Pakistan during sowing seasons. These repeated concerns reflect Pakistan's belief that water security is directly linked to national security (Malik, 2019).

The broader political rivalry between Pakistan and India influences every aspect of water negotiations. Territorial disputes, especially over Kashmir, reinforce mistrust and make technical disagreements highly politicized. Pakistan perceives Indian statements on water control during times of conflict as evidence that India may use water as a political tool. Scholars note that water in South Asia is deeply embedded within the region's adversarial political environment and cannot be separated from broader security tensions (Rasul, 2021).

Pakistan's domestic context also shapes its water insecurity. Rapid population growth, expanding agricultural demands, industrialization, urbanization, and poor water management have increased internal pressure on freshwater resources. Pakistan's population has crossed more than 250 million, placing heavy demands on the Indus Basin. Researchers argue that Pakistan faces a combination of hydrological scarcity and geopolitical fragility that makes water a long term strategic challenge (Baig, 2022).

Three major forces shape the trajectory of Pakistan India water politics. The first is climate stress, which affects the long term reliability of river flows. The second is river control, including dams and hydropower projects constructed by India that influence Pakistan's perception of vulnerability. The third is interstate rivalry, which transforms technical disputes into political confrontations. Together, these factors explain how water has become a strategic and emotional issue in Pakistan's national security landscape.

This research paper examines the evolution of Pakistan India water politics from 1947 to 2025, focusing on the combined effects of climate stress, river control, and interstate rivalry. The analysis is framed primarily from a Pakistani perspective because Pakistan faces greater hydrological risk as a downstream state. The study provides a comprehensive understanding of how climate pressures, geopolitical tensions, and historical grievances shape contemporary water relations in South Asia. It also highlights why water will remain a critical challenge for Pakistan's national security and development for decades to come.

**Early Historical Background of Pakistan India Water Relations**

The water relationship between Pakistan and India began immediately after the Partition of British India in nineteen forty seven. At that time, the division of territory disrupted a historically unified irrigation system. The Indus River and its tributaries, which had been administered as a single network during British rule, suddenly became split between two

sovereign states. Pakistan inherited the lower riparian position, meaning that it depended entirely on rivers originating in India. This geographic reality created an inherent vulnerability for Pakistan, as any upstream intervention by India could directly affect its agriculture, energy supply, and rural livelihoods (Wolf, 1999).

The initial period after Partition was characterized by administrative confusion. Many engineers and technical staff had migrated, leaving head works, barrages, and canal networks without proper supervision. Early disputes arose regarding access to key canals such as the Ferozepur head works on the Ravi River and the Madhopur head works on the Sutlej River, which remained under Indian control. Pakistan argued that these waters were critical for irrigating its agricultural lands and ensuring food security, while India initially asserted sovereignty over head works located within its territory. The lack of institutional mechanisms for cross-border water management intensified the tension (Mustafa, 2010).

**The Water Stoppage of Nineteen Forty Eight**

One of the earliest and most significant conflicts occurred on 27 April 1948, when India temporarily stopped the flow of water to Pakistani canals originating from the Bari Doab Canal and Dipalpur Canal. India justified the stoppage by claiming that prior administrative arrangements had ended with Partition. Pakistan perceived this act as a direct threat to its survival, as thousands of acres of farmland were at risk during a crucial agricultural season. The incident lasted only a short period but left a lasting impact on Pakistan's perception of water as a strategic asset and potential political tool (Qureshi, 2018).

The stoppage was resolved through a temporary agreement called the Inter Dominion Accord. However, the psychological impact on Pakistan's leadership was profound. Pakistan began to treat water as an existential security concern rather than merely an economic or development issue. Scholars note that this early incident shaped the trajectory of Pakistan India water relations for decades and reinforced Pakistan's determination to secure legally binding guarantees for water flows (Malik, 2019).

**Negotiation Period from Nineteen Forty Eight to Nineteen Fifty Nine**

Following the stoppage, both countries recognized the need for a permanent solution to the water dispute. Negotiations began bilaterally but soon became protracted due to divergent positions. Pakistan insisted on historical water usage rights and stressed the vulnerability of its agriculture, arguing that any interruption of flows would create severe economic and social consequences. India, in contrast, emphasized its sovereign rights over rivers within its territory and insisted on development of the eastern rivers to support its growing population and industrial needs (Khan, 2020).

In the year 1952, the World Bank became involved as a mediator. The Bank proposed dividing the rivers rather than attempting joint administration. Pakistan was initially cautious, fearing that it might lose access to certain eastern rivers, but it eventually recognized that a formal division could provide more reliable and legally enforceable water guarantees. The negotiation process also addressed financial compensation, replacement works, and the construction of dams and barrages on the western rivers. These discussions laid the foundation for the Indus Waters Treaty and demonstrated the importance of international mediation in resolving cross-border water disputes (Rasul, 2021).

**Indus Waters Treaty of Nineteen Sixty**

The Indus Waters Treaty, signed in September 1960 in Karachi, established a durable legal framework for water allocation between Pakistan and India. Under the Treaty, Pakistan received exclusive rights over the western rivers – the Indus, Jhelum, and Chenab – while India obtained exclusive rights over the eastern rivers – the Ravi, Beas, and Sutlej. India was allowed

limited technical and hydropower use of the western rivers under strict conditions. The Treaty also established the Permanent Indus Commission, which provides a mechanism for communication, dispute resolution, and technical review between the two countries (Baig, 2022).

The Treaty is widely regarded as one of the most successful water agreements in history. Despite wars in 1965 and 1971, as well as periods of heightened tension, the Treaty has largely survived intact. For Pakistan, it ensured a reliable flow of water to sustain its agriculture, which remains vital to the country's economy and food security. The construction of major replacement works, such as Mangla Dam and Tarbela Dam, helped Pakistan adapt to the allocation of waters and strengthen its irrigation network (Mustafa, 2010).

**Strategic Implications of Early Water Politics**

The early phase of Pakistan India water relations established several enduring patterns. First, Pakistan's perception of vulnerability as a downstream state has remained central to its national strategy. Second, India's upstream position provides it with structural advantage, which Pakistan has consistently interpreted as a potential political tool. Third, the need for formal legal agreements and international arbitration emerged as a central feature of bilateral relations. The combination of geography, climate, and political rivalry shaped a water security paradigm that continues to influence Pakistan's policies in the Indus Basin to the present day (Malik, 2019).

The early historical phase demonstrates that water is not only a technical or economic resource but also a strategic asset intertwined with interstate relations. These lessons remain relevant, particularly as climate stress, population growth, and industrial demand increasingly pressure the Indus Basin system.

**Post Treaty Developments and Emerging Challenges**

After the signing of the Indus Waters Treaty, Pakistan entered a period of relative hydrological security. The allocation of the western rivers allowed Pakistan to plan irrigation, hydropower, and agricultural development. The construction of major infrastructure such as Mangla Dam and Tarbela Dam provided replacement capacity for water previously available from the eastern rivers, which now fell under India's exclusive control. These projects helped Pakistan reduce vulnerability and strengthen its national water security (Mustafa, 2010).

Despite the formal framework provided by the Treaty, disputes and tensions emerged over the interpretation of technical clauses. India began constructing run-of-the-river hydropower projects on the western rivers, claiming these were permitted under the Treaty's provisions. Pakistan argued that some of these projects, such as Baglihar Dam and Kishanganga Hydropower Project, could temporarily control water flows and affect downstream irrigation during critical sowing periods. These disputes highlighted a fundamental asymmetry in power and capacity: India, as the upstream state, has greater control over timing and management of river flows, while Pakistan, as the downstream state, is highly sensitive to even minor variations (Rasul, 2021).

**Baglihar and Kishanganga Disputes**

The Baglihar Dam dispute arose when India began construction on the Chenab River in the early 21st century. Pakistan raised objections that the dam's design could violate the flow restrictions of the Treaty. After diplomatic negotiations failed, the dispute was referred to a neutral expert appointed under the Treaty. The expert ruled that India could continue construction but required certain modifications to ensure compliance with the Treaty. This case demonstrated the importance of legal and technical mechanisms within the Treaty,

while also highlighting Pakistan's continued vulnerability as the downstream state (Malik, 2019).

The Kishanganga Hydropower Project on the Jhelum River created similar controversy. Pakistan argued that the project could divert significant flows away from Pakistan's Neelum-Jhelum Hydropower Project. India maintained that the project was permissible under the Treaty. The dispute led to international arbitration, with the Permanent Court of Arbitration in The Hague issuing a decision that balanced India's construction rights with Pakistan's downstream needs. Both cases reflect the ongoing strategic tension inherent in the Indus Basin, showing how legal mechanisms have mitigated conflict but not eliminated Pakistan's perception of threat (Baig, 2022).

**Climate Change Implications**

In addition to legal and technical disputes, climate change has emerged as a significant factor influencing Pakistan India water politics. Glacial retreat in the Himalayas is altering the timing and volume of river flows, which may increase variability and unpredictability for Pakistan. Research indicates that Pakistan could face both severe flooding and extreme water shortages due to accelerated glacial melt and changing monsoon patterns (Khan, 2020). These environmental pressures exacerbate the structural vulnerability of Pakistan as the downstream state. Hydrologists warn that without adaptive infrastructure and enhanced cooperative mechanisms, climate stress could transform technical disagreements into larger political disputes (Qureshi, 2018).

**Strategic and Political Dimensions**

Water politics between Pakistan and India is inseparable from broader political and security dynamics. Periods of heightened tension over Kashmir or other geopolitical disputes tend to increase Pakistan's perception of vulnerability. For instance, during crises, Pakistan fears that India could use upstream water control as a strategic lever, even if the Treaty remains legally binding. Scholars argue that water disputes in South Asia are rarely purely technical; they are intrinsically linked to interstate rivalry and security competition (Rasul, 2021).

Pakistan's policy response has therefore included three major dimensions:

Legal and diplomatic engagement through Treaty mechanisms and arbitration.

Infrastructure development to reduce reliance on variable flows, including reservoirs and link canals.

Emphasis on climate adaptation and water conservation to mitigate environmental risks (Mustafa, 2010).

**Lessons from Post-Treaty Experience**

The post-Treaty period highlights several important lessons for Pakistan. First, formal agreements like the Indus Waters Treaty can provide long-term security but cannot eliminate structural asymmetry. Second, upstream development by India, combined with geopolitical tensions, continues to create strategic uncertainty. Third, climate change has introduced new risks that require Pakistan to adopt both technical and diplomatic measures to safeguard water security. Finally, the combination of environmental stress, interstate rivalry, and hydrological dependence demonstrates the need for a comprehensive approach that integrates technical, legal, political, and environmental strategies (Baig, 2022).

The post-Treaty experience also illustrates the resilience of the Indus Waters Treaty, which has survived multiple wars and political crises. This resilience provides a model for how downstream states like Pakistan can use legal and institutional mechanisms to manage asymmetry and reduce conflict, even in conditions of extreme vulnerability.

**Pakistan's Water Security Challenges in the Twenty First Century**

Pakistan faces increasing water security challenges arising from population growth, rapid urbanization, industrial expansion, and climate stress. The population of Pakistan has surpassed two hundred and twenty million, placing enormous pressure on the Indus Basin for agricultural production, domestic consumption, and industrial needs. Experts emphasize that Pakistan's per capita water availability has declined sharply over the past decades, making it one of the most water stressed countries in the world (Khan, 2020). This demographic pressure amplifies the significance of upstream control by India, as even minor fluctuations in river flows can have severe consequences for food security and economic stability.

Water management in Pakistan is further complicated by inefficiencies in infrastructure, high water losses in irrigation systems, and limited storage capacity. Researchers argue that while Pakistan has made progress through large reservoirs such as Mangla and Tarbela, these measures are insufficient to fully mitigate the combined impact of upstream interventions and climate variability (Mustafa, 2010). As a result, Pakistan remains highly dependent on the reliability of flows from the western rivers.

**Climate Stress and Hydrological Variability**

Climate change has emerged as a major determinant of water availability in Pakistan. Glacial melt in the Himalayas is accelerating, creating short term increases in river flows but reducing long term water availability. Monsoon variability has increased the frequency and severity of floods, while periods of drought have become more prolonged and intense (Qureshi, 2018). These changes exacerbate the inherent vulnerability of Pakistan as a downstream state and increase the potential for conflict over water allocation.

Studies indicate that the combined effect of climate stress and upstream development by India could significantly reduce water availability in Pakistan during critical agricultural periods (Baig, 2022). Seasonal shifts in river flows also threaten hydroelectric generation, irrigation scheduling, and urban water supply. Scholars warn that without comprehensive adaptation strategies, Pakistan could face both water scarcity and flood risk simultaneously, creating a dual challenge for national planning and regional diplomacy (Khan, 2020).

**Interstate Rivalry and Strategic Dimensions**

The Pakistan India water relationship cannot be understood in isolation from broader interstate rivalry. Historical conflicts, territorial disputes, and political tensions, particularly over Kashmir, continue to influence perceptions of water as a strategic asset. Pakistan's policy analysts argue that India's upstream position allows it to exert leverage during political crises, potentially affecting Pakistan's water security even under the Indus Waters Treaty framework (Rasul, 2021).

The post-Treaty period demonstrates that water issues are rarely purely technical. Disputes such as Baglihar and Kishanganga illustrate how legal and institutional mechanisms can resolve technical disagreements, but political tensions continue to shape strategic perceptions. Scholars note that downstream vulnerability combined with upstream control is a persistent source of geopolitical tension in asymmetric river basins worldwide (Malik, 2019).

Pakistan's response to interstate rivalry has been multi-dimensional:

- Strengthening infrastructure to reduce reliance on upstream flows.
- Engaging in diplomatic and legal forums to ensure Treaty compliance.
- Developing climate adaptation and water conservation strategies to reduce environmental vulnerability (Mustafa, 2010).

**Policy Implications and Strategic Recommendations**

The evolving Pakistan India water politics highlights several key policy implications. Firstly, Pakistan must continue investing in water storage, irrigation efficiency, and flood control to

reduce vulnerability. Secondly, diplomatic engagement with India remains essential to ensure Treaty compliance and to address new projects or disputes before they escalate. Thirdly, climate adaptation policies, including glacier monitoring, rainfall forecasting, and disaster preparedness, are critical for long term water security.

International cooperation and expert-led technical arbitration have proven effective in managing disputes. Pakistan can further leverage international institutions and climate adaptation funds to enhance resilience. Research suggests that a combination of infrastructure, diplomacy, and environmental management provides the most effective framework for downstream states in asymmetric river systems (Baig, 2022).

In the twenty first century, Pakistan's water security is shaped by the convergence of demographic pressures, climate stress, upstream interventions, and interstate rivalry. The Indus Waters Treaty has provided legal stability, but Pakistan remains sensitive to both technical and political risks. Climate change introduces additional uncertainty that requires integrated planning and proactive diplomacy. Lessons from past disputes demonstrate that water management in South Asia is inseparable from broader security considerations, making Pakistan's approach to water a central element of national policy, economic development, and strategic planning (Khan, 2020).

**Future Water Scenarios and Climate Projections**

Pakistan's water future is shaped by the interplay of population growth, industrialization, climate stress, and upstream management by India. Projections indicate that by twenty fifty, Pakistan's water demand could exceed the available supply unless significant conservation and storage measures are implemented. Per capita water availability is expected to decline further, intensifying the risk of scarcity for both domestic consumption and agricultural irrigation (Khan, 2020). The combination of climate variability and continued upstream development by India makes long-term planning essential for national security and economic stability.

Climate models predict continued glacial retreat in the Himalayas, leading to more extreme seasonal flows in the Indus River system. Initially, glacier melts increases water flows, potentially causing floods. However, as glaciers shrink, long-term flows are projected to decline, reducing water availability during dry seasons. Monsoon rainfall is expected to become more erratic, increasing both flood and drought risks (Qureshi, 2018). These trends highlight the need for Pakistan to adopt flexible water management strategies that can address both surplus and deficit conditions.

**Interstate Cooperation and Conflict Mitigation**

While interstate rivalry remains a defining feature of Pakistan India water politics, the long-term sustainability of the Indus Basin requires cooperative measures. International legal frameworks, such as the Indus Waters Treaty, provide a mechanism for dispute resolution, but scholars emphasize the need for proactive collaboration on climate adaptation, flood control, and hydrological monitoring (Baig, 2022). Joint data sharing, early warning systems, and coordinated water management could reduce the risk of conflict and enhance resilience to climate-induced variability.

Pakistan has invested in both technical and institutional mechanisms to strengthen its negotiating position. The Permanent Indus Commission remains active in monitoring Indian projects, while hydropower and irrigation projects like the Diamer Basha Dam aim to increase storage capacity and reduce vulnerability to seasonal fluctuations. These measures demonstrate the strategic integration of infrastructure development, legal diplomacy, and climate adaptation in Pakistan's water policy (Mustafa, 2010).

**Strategic Recommendations for Pakistan**

To ensure sustainable water security in the coming decades, Pakistan must pursue a multi-pronged strategy. First, expanding water storage and improving irrigation efficiency are essential to buffer against variability in river flows. Second, continuous diplomatic engagement with India, supported by technical and legal expertise, is necessary to ensure Treaty compliance and prevent disputes from escalating. Third, climate adaptation policies should include glacier monitoring, advanced hydrological forecasting, flood management, and drought preparedness programs (Khan, 2020).

Additionally, Pakistan should strengthen regional and international cooperation for technical expertise, investment in water infrastructure, and research on climate resilience. Building local capacities for water conservation, rainwater harvesting, and sustainable agriculture will complement large-scale strategic measures. Scholars argue that downstream states facing upstream asymmetry must combine infrastructure, diplomacy, and environmental management to secure long-term water security (Rasul, 2021).

The evolution of Pakistan India water politics from 1947 to 2025 demonstrates the interconnected influence of climate stress, river control, and interstate rivalry. Pakistan's downstream position, combined with India's upstream control, creates inherent vulnerability, which is further intensified by climate change and demographic pressures. Historical disputes, such as Baglihar and Kishanganga, illustrate how legal and technical mechanisms can mitigate conflict, but structural asymmetry and strategic concerns persist.

**Conclusion**

The Indus Waters Treaty remains a critical instrument for maintaining stability and managing disputes. However, Pakistan's long-term water security depends on an integrated approach that combines infrastructure development, climate adaptation, proactive diplomacy, and regional cooperation. Lessons from the past emphasize that water is not merely a resource but a central element of national survival, economic stability, and strategic planning. Addressing these challenges effectively will determine Pakistan's resilience in the face of environmental pressures and geopolitical complexity in the coming decades.

**References**

Ahmad, N. (2019). *Environmental change and water governance in South Asia*. Oxford University Press.

Ali, S. (2018). *Hydropolitics and regional security in the Indus Basin*. Routledge.

Allan, J. A. (2003). *Virtual water and the strategic significance of water scarcity*. Water International, 28(1), 4 to 11.

Baig, M. (2022). *Climate variability and water diplomacy in the Indus Basin*. Asian Journal of Water Policy, 14(2), 55 to 78.

Bhatnagar, A. (2019). *India's river development strategy and regional water politics*. Journal of Asian Security Studies, 6(3), 221 to 240.

Briscoe, J. (2010). *The Indus treaty and its future in a changing environment*. Water Policy, 12(1), 1 to 12.

Chellaney, B. (2011). *Water: Asia's new battleground*. Georgetown University Press.

Ehsan, Z. (2018). *Water scarcity and national security challenges for Pakistan*. Journal of Strategic Studies, 40(4), 91 to 115.

Farooqi, A. (2020). *Population dynamics and water stress in Pakistan*. Pakistan Development Review, 59(3), 201 to 225.

Gleick, P. (2014). *Water, climate change, and international conflict*. Annual Review of Environment and Resources, 39(1), 283 to 310.

Gopal, R. (2017). *Hydropower development in India and regional water competition*. India Quarterly, 73(2), 235 to 260.
Gupta, A. (2012). *Climate risk and water infrastructure in India*. Journal of Environmental Planning, 45(2), 170 to 195.
Hassan, M. (2016). *The political economy of water management in Pakistan*. Lahore Journal of Policy Studies, 5(2), 44 to 69.
Ikram, S. (2017). *Environmental stress and water governance in the Indus River Basin*. Journal of Asian Environmental Studies, 10(2), 113 to 137.
Iyer, R. R. (2003). *Water and the laws in India*. Sage Publications.
Jabeen, S. (2018). *Glacial melt and climate impacts on the Indus Basin*. Himalayan Journal of Climate Science, 9(1), 41 to 63.
Jalal, A. (2021). *Strategic vulnerabilities of Pakistan's water sector*. Journal of National Security Affairs, 13(1), 80 to 102.
Kahl, C. (2006). *States, scarcity, and civil strife in the developing world*. Princeton University Press.
Khan, A. A. (2020). *Water management challenges of Pakistan under climate stress*. Pakistan Journal of Environment, 11(3), 55 to 87.
Khan, H. (2017). *Indus Basin hydrology and changing climate*. Water Research Perspectives, 16(2), 45 to 70.
Khan, S. (2014). *India's upstream water projects and implications for Pakistan*. Journal of International Affairs, 4(2), 89 to 110.
Kugelman, M. (2016). *Pakistan's water crisis: A summary assessment*. Wilson Center.
Malik, A. (2019). *Hydrological uncertainty and agricultural vulnerability in Pakistan*. Agricultural Economics Review, 8(3), 133 to 155.
Malik, M. (2020). *Pakistan's vulnerability under the Indus Waters Treaty framework*. Strategic Review Quarterly, 9(1), 70 to 98.
Mehboob, S. (2020). *Climate stress and the future of the Indus River System*. South Asian Water Review, 12(2), 22 to 48.
Mustafa, D. (2010). *Hydropolitics in Pakistan: Perceptions and discourses*. Contemporary South Asia, 18(2), 163 to 179.
Mustafa, D., & Akhter, M. (2018). *Understanding the Indus Waters Treaty: Structure and implications*. Water International, 43(2), 205 to 223.
Najam, A. (2017). *Environmental security and Pakistan's water future*. Asia Policy Review, 5(3), 40 to 63.
Qureshi, A. (2018). *Glacier melt, monsoon variability, and water flows in the Indus Basin*. Journal of Climate and Water, 13(1), 18 to 39.
Qureshi, M. (2019). *Water governance issues in Pakistan: A policy analysis*. Policy Studies Review, 31(3), 113 to 142.
Rasul, G. (2021). *Climate change and hydrological patterns in South Asia*. Environmental Systems Research, 10(1), 1 to 14.
Rizvi, H. (2018). *Hydropower conflicts and India Pakistan relations*. Journal of South Asian Studies, 6(2), 145 to 168.
Rizwan, M. (2020). *Population growth and water scarcity dynamics in Pakistan*. Pakistan Journal of Social Sciences, 38(1), 55 to 72.
Salman, S. (2014). *The World Bank and the Indus Waters Treaty*. Water International, 39(2), 137 to 145.

Sarfraz, S. (2020). *Pakistan's water governance crisis: Institutional and policy gaps*. Journal of Development Policy, 15(4), 233 to 260.
Shah, N. (2019). *Hydropolitical tensions in the Indus Basin*. South Asian Strategic Studies, 11(2), 101 to 125.
Shahid, M. (2018). *Transboundary river management challenges in South Asia*. International Journal of Water Resources, 34(1), 19 to 40.
Sharma, P. (2017). *Hydropower and environmental governance in Jammu and Kashmir*. Indian Journal of Environmental Policy, 6(1), 33 to 57.
Singh, A. (2013). *Climate change and water stress in Northern India*. Regional Climate Studies, 9(2), 90 to 115.
Sinha, D. (2016). *Water nationalism and India's river policy*. Journal of Asian Public Policy, 9(3), 1 to 22.
Srinivasan, V. (2015). *River basin sustainability under climate change*. Water International, 40(6), 887 to 906.
Swain, A. (2011). *Challenges in transboundary water governance*. International Journal of Water Governance, 3(1), 1 to 10.
Tariq, S. (2021). *Pakistan's climate vulnerability assessment*. Climate Security Review, 8(2), 150 to 176.
Ullah, K. (2018). *Floods, droughts, and climate impacts in Pakistan*. Journal of Disaster Studies, 7(1), 74 to 98.
UNDP. (2016). *Water security and climate resilience in Pakistan*. United Nations Development Programme.
Waseem, M. (2017). *Water politics and national security in Pakistan*. Journal of Political Studies, 24(1), 35 to 57.
Wolf, A. (2007). *Shared waters: Conflict and cooperation*. UNESCO International Hydrological Programme.
World Bank. (2019). *Indus Basin water assessment report*. World Bank Publications.
Yamin, F. (2020). *Climate induced water challenges in Pakistan*. Asia Water Review, 14(1), 29 to 52.
Yasmin, R. (2021). *Adaptation strategies for water scarcity in Pakistan*. Journal of Environmental Adaptation, 5(4), 198 to 220.
Zafar, T. (2020). *Hydrological shifts in the Indus Basin due to climate change*. Journal of Water and Climate, 19(3), 255 to 281.
Zafar, U. (2019). *Water sustainability challenges in South Asia*. Sustainable Development Review, 12(2), 45 to 68.
Zaidi, S. (2018). *The political dimensions of India Pakistan water disputes*. Pakistan Journal of International Affairs, 2(2), 66 to 89.
Zia, A. (2018). *Legal perspectives on transboundary water management*. International Water Law Journal, 4(1), 52 to 78.