PAKISTAN'S WATER CRISIS AND ITS NATIONAL SECURITY IMPLICATIONS

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Abstract

This research examines Pakistan's water crisis and its impact on national security, highlighting key factors such as population growth, climate change, and inadequate water resource management. The article emphasises the urgent need for thorough qualitative changes and improved infrastructure to guarantee sustainable access to clean water. This research employs a qualitative approach to examine the complex relationship between regional relations and water security, with a focus on Pakistan's transboundary water challenges. Through securitisation theory, the study aims to analyse how water scarcity is framed as a water security issue, exploring the securitisation process and its implications for national security. Utilizing an explanatory research design and document analysis, this study comprehensively assesses both internal and external water security threats to Pakistan's national security. Additionally, it highlights the importance of regional cooperation and diplomacy in managing shared water resources. Addressing the water crisis is an environmental concern and a vital national security imperative. A comprehensive strategy encompassing legislative changes, technical advancements, and international collaboration is required to mitigate the threat and protect Pakistan's stability.

Keywords: National Security, Hydro-politics, Securitisation, Water Crisis, Regional Security.

Introduction

Pakistan is one of the populous countries in South Asia. It came into being in 1947 after the partition of British India. Pakistan is blessed with immense natural resources and reserves. It also has several rivers that are tributaries to the Indus. Besides rivers, rainfall, glaciers, dams, and groundwater are significant water resources in Pakistan. Despite possessing numerous resources, Pakistan is facing a severe water crisis. According to analysts, this semi-arid country is expected to transition from a state of water stress to one of water scarcity by 2030.[1] The massive Indus River begins in Tibet's Himalayan Kailash Range, near the foot of Mount Everest. It flows about a thousand miles between the Himalayan, Hindukush, and Karakoram Mountain ranges before emptying into the plains of Punjab and Sindh. From Eastern Karachi, it flows for over 2,000 kilometres before entering the Arabian Sea.[2]

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The river and irrigation system that was divided among the provinces before the partition and passed down to Pakistan. Due to its roots in the partition plan, the external water issue between Pakistan and India has implications for Pakistan's territorial integrity. Besides national security threats like floods and droughts, two water-related climatic extremes emphasize climate change as one of Pakistan's new challenges. As seen by the recent floods in 2022 and the preceding ten-year drought in the country's southwest, environmental dangers have evident repercussions for human and economic security. After the partition, Pakistan shifted from internal water management to resolving its water conflict with India.[3] The most significant challenge in Pakistan's attempt to implement integrated water management was the politicization of its water resources.

The primary objective of this research is to demonstrate that, although water is not a direct cause of conflict, it is an aggravating factor that puts Pakistan's political fragility at risk on several fronts. Pakistan is facing both external and internal water security challenges that impact the country's national security. To grasp Pakistan's resource management difficulties and security risks, it is essential to comprehend the availability, allocation processes, variability, and water demand.

Securitising the Water Crisis

The Copenhagen school's securitisation model is a social construct. Instead of a state being strictly and alone, as in realism, this school classifies five different types of places that can serve as referent objects in the security model. It employs a multi-sectoral approach as the referent objects can be states, national sovereignties, ideologies, enterprises, collective identities, species, or habitats. According to the Copenhagen school, problems must be presented as immediate, existential, and of such significance that they cannot be addressed through typical political turmoil but instead require the immediate attention of senior leaders.[4]

Water is vital for Pakistan, as the country has faced water-related issues with India. When defining the term security, speech act theory is crucial. The security is described as a "Speech Act" by the Copenhagen School. Protection from many hazards that may affect multiple areas, such as food, shelter, and water, is related to security. The most critical and urgent need for the human body, as well as for other aspects of daily life, is water. As a result, security is a key component in defending against attacks that call for specific responses. Security satisfies the needs and demands of the necessary associated fields.[5]

If the state is the referent object under threat, water may be advanced to a position of national security significance when it gets securitised. According to the Copenhagen School, this interaction is metaphorical: it involves a discourse between a securitising actor and an audience concerning a referent object and whatever the object is being threatened by. When something is labeled a security matter, it becomes

a security issue due to the practice of labeling it as such, rather than because it poses a genuine threat. Thus, this framing of a situation securitises it.[6]

Pakistan's water crisis impacts economic stability, food security, internal disputes, regional conflicts, etc., and requires urgent attention. Political actors and institutions are increasingly securitising the water crisis by framing it as an existential threat linked to national and global security concerns. This securitisation process is evident in how the water crisis is incorporated into Pakistan's National Security Policy, shifting it from an environmental issue to a high-priority security challenge that requires immediate action.

Water Security Challenges to Pakistan

There are two major types of water security challenges:

- Internal Challenges
- External Challenges

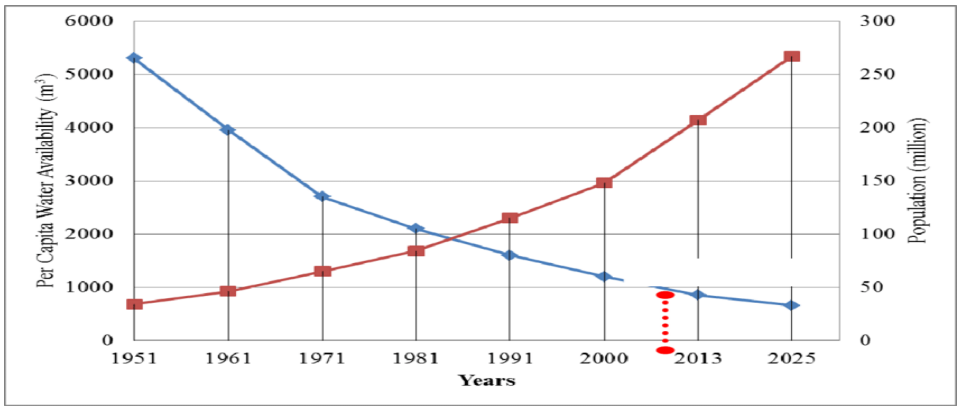
Internal Challenges

Several internal factors are exacerbating Pakistan's water security challenges, which are discussed in the following paragraphs.

Population Explosion

As has already been mentioned, the demand for and use of natural resources, such as water, which is essential for all life forms, is directly impacted by population growth. If immediate action is not taken, Pakistan, one of the 36 nations now identified as experiencing water stress, is predicted to face water shortages by 2025 and will rank as the region's most stressed state by 2040.[7]

Figure 1: Population and Water Availability in Pakistan



Source: International Water Management Institute

Pakistan crossed the water stress threshold in 1990 and is currently listed as having an extremely high baseline water stress level, ranking 14th on the World Resources Institute's list of states. Where water reservoirs' storage capabilities are insufficient, the natural water supply typically discharges more than 80% of its annual volume into the sea. This dynamic also implies that Pakistan is prone to emergency scenarios, such as droughts or increased water withdrawals, due to the slight difference between supply and demand. According to the IMF, Pakistan's annual water availability per person is 1,017 cubic meters, just above the 1,000 cubic meter mark that indicates a water shortage. Pakistan's water availability in 2009 was approximately 1,500 cubic meters, indicating a significant decline in water sources over the previous decade. An increase in population will gradually exacerbate the issue in a state where several disagreements exist over the distribution of water among the provinces.[8]

Climate Change and Global Warming

One of the effects of Climate change was evident in 2022, when the temperature rose to 49.5 degrees Celsius, leading to glacier outbursts and heavy flooding in Gilgit-Baltistan (GB). Due to the growing global population and the related trends of urbanization and industrialization, there are increasing limitations on agriculture. Since there is no available spare capacity to utilise, the effects of population expansion, diminishing land resources, energy demands, environmental limits, and water shortages are happening simultaneously and more severely than in the past.

Resource scarcity is increasingly being mentioned as a "precondition" for and potential catalyst for future conflict. Scientists have noted that this issue is not stopping but is steadily worsening. If global warming is not prevented within a set time, temperatures may rise to 10 degrees Fahrenheit by the end of this century.[9] A depleted or degraded resource may be caused by population expansion, increased per capita use, or unequal distribution of resources..

Industrial Pollution

Only 2-3 percent of Pakistan's freshwater resources are utilized in industry. However, industrial waste, one of the nation's leading causes of water pollution, raises concerns. In Pakistan, there are no established waste disposal processes or industry safety requirements, and even if they exist, they are not consistently followed. Typically, industrial waste is deposited directly into rivers, water streams, or sewage networks. Industrial establishments in Pakistan contribute significantly to water pollution due to their inadequate wastewater treatment capabilities. According to statistics, approximately 20 large and 80 small industrial estates lack facilities for treating industrial waste, instead dumping garbage into water bodies. Municipal and industrial sources account for 70% and 30% of the total wastewater discharge, respectively, with each contributing 50% to the overall pollutant burden. Two to three million cubic meters (MCM) of wastewater are thought to be discharged into the sea

daily, of which 0.5 to 0.75 MCM comes from industrial sources[10]. Because several rivers in Pakistan, including the Chenab, Ravi, and Sutlej, are already heavily polluted, the country's water shortage problem has worsened.[11]

Insufficient Water Reservoirs

Along with other natural resources, water's inability to multiply or regenerate is one of its most prevalent characteristics. It can only be produced using a natural biological system, which requires rain, a resource that Pakistan currently lacks in great abundance. As a result, it ranks below the global average in terms of rainfall.

Unfortunately, Pakistan has been unable to build appropriate water storage facilities, which has posed challenges due to increased water demand and falling availability. God gave Pakistan its geography, but a gift cannot be helpful if the recipient does not know how to use it.[12]

The northern Himalayan Ice Cap is the source of most of Pakistan's rivers, which are affected by the Indus Water Treaty (IWT). The last two crucial water reservoirs constructed were Tarbela on the Indus and Mangla on the Jhelum, both in the 1960s in Ayub Khan's era. Since then, there has been no significant dam construction, which was urgently required and would have cost Pakistan a significant amount of money. Although Tarbela and Mangla are still in operation, the amount of water they can store is decreasing due to the Earth's surface being filled with water. According to a survey, Pakistan can retain only 10-20% of the water it uses annually, while the rest flows into the Arabian Sea due to the lack of storage facilities. As a result, a substantial amount of water is lost annually. It would have benefited in several ways if Pakistan had more water storage.[13]

When building water reservoirs, a national agreement is necessary; otherwise, the country's stability would be in danger. We saw how the Kala Bagh dam, a massive construction project, became politicised due to ridiculous disputes. The government of GB has begun constructing the Diamir Basha dam, despite it being significantly more expensive and taking far longer to complete than the Kala Bagh, which was more feasible due to its natural dam site. Unquestionably, building water reservoirs is urgently needed, and it is the only option to avert the looming calamity that is due to hit Pakistan most severely.[14]

Melting of Glaciers

Pakistan is home to various mountain ranges, some of which are among the tallest in the world, including the Karakoram and the Himalayas. These mountains maintain the ecological balance necessary for biodiversity and wildlife, yielding numerous economic benefits to the country. According to multiple studies, Pakistan contains more glaciers than any other place on Earth except the polar regions, since 7,253 glaciers have been discovered there, including 543 in the Chitral Valley alone. Approximately 75% of the country's total supply of stored water, which at least 220

million people use, comes from these glaciers, a significant source of water.ce[15]. However, the story is not over yet, as climate change has also impacted Pakistan's glaciers, causing them to melt more quickly. This will result in an augmented or abundant water supply in the short term, but when the glacier melts entirely, the nation's water supply will be severely affected.

The Himalayan glaciers are melting at an alarming rate due to climate change. There have been many glacier outbursts recently. More than 7 million people are at risk due to these eruptions, which also increase the risk of floods and cause economic loss[16]. Many of the glaciers in the area are melting rapidly, jeopardizing the lives of the local population, and many have already undergone significant melting. The trick is to make the most of this situation and successfully manage the difficulties; otherwise, the state and its residents will face more burden than advantage. Since the North of Pakistan has tremendous tourism potential, Pakistan may successfully manage the environmental difficulties and transform them into encouraging economic growth in the region.[17]

Water Pollution

According to multiple reports, only 20% of Pakistan's population has access to safe drinking water, and the remaining 80% are compelled to drink water polluted by industrial effluents, pesticides, fertilizers, and sewage as a secondary source[18]. This is due to the lack of proper SOPs for waste disposal. The study also shows that this high concentration of contaminants is causing severe viral infections, which account for around 80% of all illnesses and 30% of fatalities in Pakistan. In just one week, a single E. Coli bacteria can multiply into billions, and these pipelines provide water without any filtration[19].

According to the IMF, Pakistan is ranked third among nations with a severe water deficit. According to the Pakistan Council of Research in Water Resources (PCRWR), by 2025, the overall population in Pakistan will not have access to sufficient clean water, or to any water at all. When the national authority on water makes a statement like this, it should alarm everyone enough to start exploring all the options, as it highlights the critical nature of the situation for the state.[20]

Mismanagement by the Government

Following Partition, Pakistan faced the dilemma that most of its water resources were in the west due to the IWT's acquisition of the Indus, Jhelum, and Chenab, while most of its arable land was in the east. According to the Drinking Water Policy of 2011, less than 30% of the rural population in Punjab has access to clean, piped drinking water. Inadequate resource allocation, a supply deficiency based on demand, and a lack of government administrative, technical, and financial support are all issues facing Punjab's rural population. The fundamental problem is also regarded as having a weak institutional structure.[21]

Pakistan produces 4 BCM of wastewater annually, but less than 1% is treated. Ed.[22] According to reports, the Ravi and Sutlej rivers now receive water from connecting canals from western rivers, which contain the most polluted wastewater with industrial waste. Water sharing remains a contentious issue even now, after the 1991 accord. Floods have caused significant damage. Consistent flooding, occurring every five years from 2010 to 2015, resulted in substantial losses. These losses could be minimised if the government managed them well and promptly.[23]

According to IWC Syed Mehr Ali Shah, experts said Pakistan needed a dam with a 6 MAF capacity every ten years when Tarbela was built. However, after Tarbela, we were unable to make any significant reservoirs. Successive governments have resisted dam investments due to the high construction costs worldwide and the lengthy gestation periods associated with projects that cannot be completed within five years.

Water distribution in Pakistan is heavily influenced by power dynamics and governance structures that disproportionately benefit elite interests while marginalising vulnerable populations. Large landowners and politically connected agriculturalists dominate access to canal irrigation, leaving small-scale farmers reliant on unpredictable rainfall or costly private water sources. The Canal and Drainage Act of 1873, a colonial-era law, continues to regulate water allocation, enabling major agricultural landowners to pay minimal fees for irrigation while urban and rural poor face significantly higher costs for basic access[24].

In cities such as Karachi, the informal tanker mafias continue to control the water supply, exploiting regulatory flaws and governance shortcomings. By causing shortages and artificially raising the price of water, these networks, which are typically backed by political figures, mediate the distribution of water and transform it from a public benefit into an expensive commodity. Poor communities pay proportionately higher rates for necessities due to improper regulation, exacerbating socioeconomic inequality. A similar pattern is observed in rural areas, where smaller farmers are charged high irrigation costs by feudal landlords who control the local water supply. Unofficial and unregulated water markets further erode state authority, as private actors can control distribution based on their political and economic clout rather than actual need, because government institutions cannot guarantee fair access.

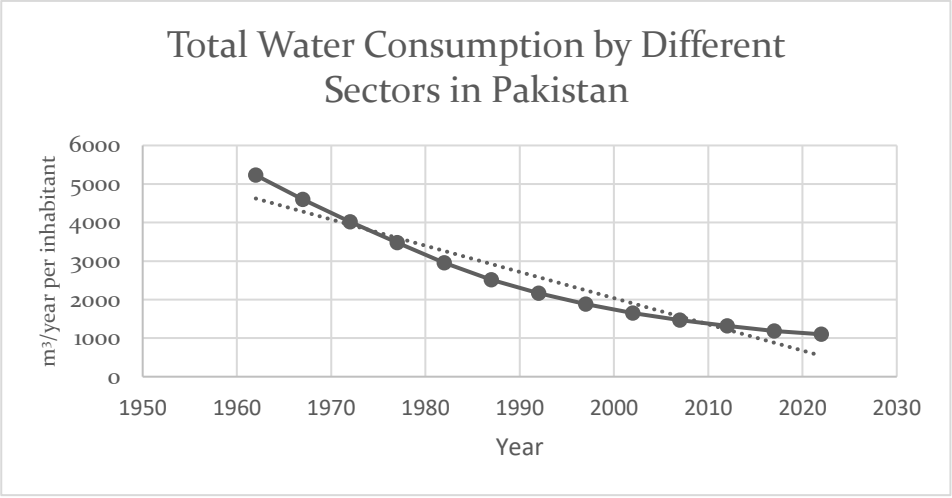
Pakistan's agricultural policies also contribute to water insecurity by prioritizing water-intensive cash crops, such as rice, cotton, and sugarcane. Although agriculture accounts for around 75% of the country's water supply, state incentives continue to support high-consumption crops rather than promoting more environmentally friendly alternatives. The cotton and sugar industries use nearly one-third of Pakistan's water. Still, these sectors primarily benefit large farmers who receive subsidies and favourable pricing arrangements, thus widening socioeconomic gaps that are already present.

Lastly, the water crisis in Pakistan is a governance issue rooted in systemic inequality rather than a resource shortage. Ineffective water management, political power, and antiquated legal customs have combined to create an exclusive and divided system, benefiting the elite at the expense of the general populace.

Groundwater Management

In 1960, groundwater contributed up to 8% of the total water required for agricultural use. re[25]. As a result, it was easier to control the inconsistent water flow in canals disrupted by large dam construction projects that altered the water supply from eastern rivers. Most of the early tube wells were drilled in Punjab, where the water's salinity was at its lowest. These tube wells could replace the inconsistent water supply from the water channels, mainly near the mouths of tertiary water channels. By 1964, the system comprised 30,000 privately owned tube wells, and substantial groundwater extraction from these wells had begun. This figure rose to 300,000 by 1996; by 2006, private tube wells supplied 60% of the water used in the system. Em.[26]. In Pakistan, extracting groundwater was not difficult because no laws or regulations governing it.[27]

Figure 2: Total Water Consumption by Different Sectors in Pakistan



Source: FAO 2023

Authorities responsible for water development and regulation are under extreme financial pressure. In Pakistan, NGOs and private groups are actively involved in water assessments and addressing water-related concerns. Rapid urbanization, population explosion, rising living standards, and a lack of legal protection are the key causes of the impending disaster. Laws to address management difficulties are urgently needed in the wake of the fast crisis. WASA cut off the water supply to 280 car wash facilities in Lahore, an unprecedented move, and imposed a water charge of Rs. 10,000 on each of them. Four hundred gallons of water are used at the water

stations to wash one automobile. According to WASA estimates, 400 gallons of water are used at the water stations to wash one automobile. Almost 280 of the 550 total auto stations in the city used WASA water hookups, while the other 270 relied on motor pumps.[28].

Economic Impacts

Agriculture is the backbone of Pakistan's economy, with water serving as its lifeline. Any reduction in water availability poses significant economic and social challenges. According to federal government estimates, drought conditions could result in approximately PKR 90 billion losses for the agricultural sector. or[29]. Given that agriculture is crucial to sustaining Pakistan's fragile economy, its impact is particularly critical in terms of food security and employment for the country's rapidly growing population.

The agricultural sector contributes approximately 21% to Pakistan's GDP and employs around 44% of the labour force, accounting for 65% of the country's export earnings. However, water shortages pose a significant threat to economic stability. Around 80% of the country's arable land depends on irrigation. Still, nearly 33% of this land is affected by waterlogging and soil salinity, resulting in a 25% reduction in agricultural productivity, particularly in downstream regions[30]. These challenges decrease crop yields and increase reliance on costly imports to meet domestic food demands, thereby placing a strain on the national economy.

Furthermore, declining agricultural exports weaken Pakistan's foreign exchange reserves, exacerbating economic vulnerabilities. The water crisis, therefore, has far-reaching consequences, affecting trade balances, employment, and overall economic growth. Without urgent reforms in water governance and resource management, Pakistan risks prolonged economic instability driven by declining agricultural output and increasing food insecurity.

Interprovincial Politics

Since 1945, when Punjab and Sindh reached their first water-sharing deal, there have been interprovincial disputes. The Government of India Act of 1935 granted full provincial status to Punjab and granted the British considerable authority in various areas, including irrigation and water.[31]. In that initial deal, signed in 1945, Punjab received 94% of the water from eastern tributaries, while Sindh received 6% of the main stem Indus water. Problems arose due to Sindh's lower riparian status and Punjab's upper riparian status. Throughout the subcontinent, the issue of water management has been highly politicised. The Government of India Act of 1935 granted the provinces significant authority over water management, and the Punjab and Sindh Agreement of 1945 further expanded their powers.[32]

Pakistan's western provinces were combined into a single entity in 1955 to regulate regionalism through the East and West wings. Due to the involvement of political figures and economists rather than engineers, water has remained politicised over the years. Tight central control caused several political issues that later surfaced. Pakistan created WAPDA, the country's most centralised water management system, to replace the water and irrigation departments.

In Sindh, all committees and attempts to find a technical solution for water distribution among the provinces were viewed as political issues. The central government initiated the development of the basin as an integrated unit after the IWT, which Sindh strongly opposed and resented. The basis for this is also a 1945 agreement between the chief engineers of Sindh and Punjab, which was never recognised, and which granted Punjab 94% of the shares of all five rivers due to higher prevalence, while allocating Sindh 75% of the Indus River's shares, treating it as a separate river.[33]

Mangla Dam's construction eventually received some approval due to its location on the main Jhelum. Still, the construction of the Tarbela Dam on the Sindh River was perceived as an attack on Sindh. In 1972, Prime Minister Zulfiqar Ali Bhutto established a committee to determine whether the Chashma-Jhelum Link Canal should be opened only during years when Sindh had a surplus of water, despite the canal also supplying water to some areas of Sindh. This was because the argument had become so politicised and the issue so contentious. Similarly, the Kalabagh Dam controversy in Sindh was so politicised that Punjab entirely viewed it as water theft. Although construction was supposed to begin in the mid-1980s, it never materialised.[34]

External Challenges

Pakistan's severe water shortage, driven by regional factors, escalates tensions with its neighbouring states and destabilises the region, with specific threats outlined below.

Pakistan and India

Since the partition, there have been several problems between Pakistan and India. Strategic analysts believe that the Radcliffe award was intentionally designed to give India an advantage in several areas. India began exploiting it as soon as possible to pressurise Pakistan politically, and it did so in the most successful manner conceivably.

India cut off the water supply to Pakistani rivers when the country was established. Pakistan has a large population and a rich agricultural heritage. Water is essential to meet these two demands, whether used for drinking, residential purposes, or agricultural purposes. Therefore, access to water has been and remains essential for social and economic existence, as well as a fundamental human necessity. The Indus

Water Treaty is frequently regarded as the most thorough framework for allocating water resources across international water bodies. Due to the significant population growth in both states, Pakistan's population was 44.99 million in 1960, compared to India's 450.5 million. The distribution of water resources has become a source of contention for governments. As of 2018, India's population was 1.353 billion, and Pakistan's was 212.2 million—both enormous. The populations of Pakistan and India are growing at rates of between 1.4% and 2% annually. The patterns show that they will continue to rise.[35]

India functions as both a lower and upper riparian state. It has had conflicts with most of its neighbours over concerns about water sharing due to its position, size, and proximity to other South Asian nations. Bangladesh, which borders India at a lower elevation than Pakistan, has also expressed severe concerns about sharing water fairly with India. India and Bangladesh signed the Ganges Water-Sharing Treaty (GWST) in 1996. Although the Farakka barrage on the Ganges was the subject of a controversy settled by the treaty, disagreements remain regarding Bangladesh's share of water during the dry season. The Indus Water Treaty (IWT) between Pakistan and India differs from other problematic water-sharing agreements signed between various South Asian nations because it addresses specific water allocation issues and offers special design specifications for dams to ensure a constant water flow and the production of hydroelectricity.[36]

Over more than three decades (1960-1990), the Indus Water Treaty played a primary role in determining how disputes between India and Pakistan were resolved. Since the early 1990s, the Treaty has been criticised due to increased water stress in the basin states. The treaty does not provide an option for withdrawal, although it could struggle to last over the next ten years. Increased Pakistani demand and India's ongoing building of hydroelectric and other dams on the western rivers might threaten the treaty. As India extends its numerous water projects with Pakistan, its objectives must be clear.

Table 1: Renewable Water Resources and Per Capita Water Availability in the Indus Basin

Indus Basin	**Total Renewable Water Resources MAF (km^3)**	**Per Capita Water Availability (m^3/person)**			
		1990	2000	2025	2050
Indus India	78.6 (97.0)	2487	2109	1590	1132
Indus Pakistan	154 (190.0)	1713	1332	761	545

Source: IUCN, 2011

Pakistan and Afghanistan

Along with a 2600 km border, Pakistan and Afghanistan share several waterways, notably the Kabul River. Even though both riparian countries are water-stressed, they have not taken advantage of the opportunity to protect and conserve their rapidly diminishing water supplies. Despite several attempts and support from the international organisation to set up a mechanism for controlling and administering the shared water resources between the two nations, there is still no treaty between the two countries that share water resources. The Afghan government's plans to build hydroelectric facilities on the Kabul River may alter the amount of water flowing to Pakistan, a lower riparian state. The agriculture sector of Pakistan, which is considered the backbone of the nation's economy, may be impacted by this. There is an even greater need for a deal on the shared water resources between the two governments to avoid future conflicts, maintain regional peace, and address the water and energy challenges in both countries. The issue can be resolved amicably if the two riparian governments along the Kabul River formally agree on a water distribution plan.[37]

To reduce the flow of the Indus, Afghanistan has begun constructing a dam on the Kabul River, a significant western tributary that flows from Afghanistan into Pakistan. India is facilitating this project. Analysts claim that India is applying political pressure on Pakistan by using water as a tactic. Pakistan is already extremely close to the 1,000 cubic meter scarcity level, barely surpassing it with 1017, 2172 in 1990. This could lead to a war between the two countries. It has decreased by more than half in just 30 years, and if prompt action is not taken, it may reach a point where the decrease is even more significant.[38]

Pakistan is highly concerned about the upcoming hydro projects in Afghanistan since they might endanger Pakistan's water rights and, as a result, water security. These projects raise concerns because they may give Afghanistan the authority to control Pakistani water flows by limiting them during dry seasons and releasing them during wet spells. Crop patterns and the timing of planting and cultivation may change due to the management and release of water from Afghanistan.

Pakistan's transboundary issues can be resolved by addressing the problems correctly, entering into bilateral agreements, strengthening existing agreements through dialogue, implementing policy reforms, collaborating on infrastructure, sharing data, promoting transparency, adopting innovative reforms, fostering regional cooperation, and encouraging shared economic incentives through joint hydroelectric projects. Many transboundary conflicts have been resolved through collaborative measures, such as the Colombia Water Treaty or the Jordan River Agreements.

National Water Security Policy

One of the early and unquestionably significant moves towards embracing the human security concept as a goal is Pakistan's National Security Policy (2018-2023). This move towards human security has yielded beneficial results, with a decrease in terrorist attacks in Pakistan during its initial phase, which is admirable work on the part of policy circles. This strategy is proactive rather than reactive and operates on two key principles: empowerment and protection. Empowerment employs a bottom-up approach, while protection necessitates a top-down approach. The policy's six Rs — Reorient, Re-imagine, Reconcile, Redistribute, Recognise —have tackled problems including terrorism, extremism, organised crime, cybercrime, and subnational variance. However, several areas require immediate attention from policy circles to make such policies more robust and comprehensive, including economic stability, environmental security, health, and food security.[39]

Creating infrastructure for water management and storage is a crucial aspect of Pakistan's national security strategy. This strategy envisions building dams, reservoirs, and canals to store and transport water to different locations. The government has started several sizable water projects, including the Diamer-Bhasha Dam and the Dasu Dam, to meet the nation's water demands. Another policy component related to water shortage is encouraging water conservation and the effective use of water resources.

Pakistan has also been negotiating with its neighbours, particularly India, to settle disagreements over water. The Indus Water Treaty played a crucial role in regulating the allocation of water resources between India and Pakistan. Nevertheless, disagreements have developed over time, and Pakistan has pushed for a just and equitable distribution of water resources.

The importance of water to the nation's economic, social, and environmental well-being is generally acknowledged in Pakistan's national security strategy on water shortage. The government's initiatives to combat water shortages ensure that Pakistan's water demands are addressed sustainably while fostering peace and stability by mediating water-related conflicts. The Policy called for the formation of a National Water Council, comprising the Prime Minister and the four Chief Ministers, to coordinate efforts on water management. This organisation was founded and has been operating since 2018. According to the policy, the Diamer-Basha dam must be built to increase Pakistan's water storage capacity. The project is expected to be completed in 2029, and all indications suggest it is on track to meet this deadline.[40] Here are some recommendations to mitigate water security challenges and enhance the effectiveness of water management and governance in the country:

- **Integrated Water Resource Management**: A comprehensive and integrated approach to water resource management should be implemented. This involves adopting a basin-wide strategy that

considers the entire water cycle and promotes coordinated planning and decision-making among related stakeholders.

- **Policy Reforms**: Existing water policies, laws, and regulations should be reviewed and updated to ensure they align with current challenges and prioritise water conservation, efficiency, and sustainability in policy frameworks. Stakeholder participation and consultation during policy formulation and implementation processes should be encouraged.
- **Institutional Strengthening**: Water management institutions, such as the Indus River System Authority (IRSA), should be strengthened by providing adequate resources, technical capacity, and authority to enforce regulations. Coordination among different federal, provincial, and local water-related agencies and departments should also be improved.
- **Data Collection and Monitoring**: Strengthening data collection, monitoring, and analysis systems will support evidence-based decision-making. Investment in hydrological monitoring networks, weather forecasting systems, and water data management platforms will ensure improved governance and planning. Data transparency and accessibility should be ensured in policy formulation and planning processes to promote informed decision-making.
- **Public Awareness and Participation**: Public awareness about water conservation and sustainable water management is crucial. Education campaigns, media, and community engagement programmes are essential in sustainable water management. Public participation in decision-making processes related to water management and governance promotes transparency and accountability.
- **International Cooperation:** Strengthening diplomatic engagements with neighbouring countries, particularly India, can facilitate dialogue, information sharing, and joint management mechanisms to address shared water challenges. Regional collaboration and knowledge exchange on water management practices will also increase opportunities for shared solutions.
- **Climate Change Adaptation**: Climate change considerations should be incorporated into water management plans and strategies. The potential impacts of climate change on water availability, quality, and distribution patterns should be analysed to develop adaptation measures and infrastructure that can resist changing climate conditions and extreme weather events.
- **Research and Innovation**: Investment in research and development related to water management, such as new technologies, water-efficient crops, and innovative approaches, should be encouraged. Collaboration between research institutions,

academia, and government agencies will foster innovation and knowledge dissemination.

Implementing these recommendations requires a strong political will, adequate financial resources, and a long-term commitment. Stakeholder engagement, including the involvement of local communities, farmers, and civil society, is crucial for the success of these initiatives.

Conclusion

Pakistan's water crisis poses a significant threat to the country's national security, driven by a rapidly growing population, a heavy reliance on agriculture, scarcity of water resources, and limited water availability. This research highlights the diverse sectors through which the water crisis undermines Pakistan's national security, including socioeconomic instability, food insecurity, regional tensions, and potential disputes over water resources. These challenges require wide-ranging strategies for efficient water management, investment in infrastructure, and institutional reforms. External factors, such as transboundary water conflicts, climate change impacts, regional geopolitics, and international water cooperation, require diplomatic engagement, effective treaties, and regional collaboration to address shared water resources and mitigate potential conflicts. Overcoming these hurdles will contribute to enhanced water security, sustainable development, and improved livelihoods for the people of Pakistan.

Pakistan's water crisis is often framed as a national security issue, focusing on external threats and competition over shared water resources, particularly with India. However, this perspective tends to surpass the critical governance and sociopolitical problems that contribute to water insecurity within the country. Instead of relying solely on large-scale infrastructure projects or militarized responses, Pakistan's water governance should prioritize decentralized and community-led solutions that ensure fair access for all, especially marginalized communities. Furthermore, transboundary water management should not be viewed as a source of conflict, but rather as an opportunity for cooperation and collaboration. By adopting a hydro-diplomacy framework that focuses on dialogue, shared benefits, and sustainable management, Pakistan can work towards achieving long-term regional stability while securing its water future more justly and resiliently.

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