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Pakistan's water crisis and its national security implications

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Essay

"Anyone who can solve the problem of water will be worthy of two noble prizes- one for peace and one for science".

John F. Kennedy

Water is the essence of life, yet for Pakistan- a country historically blessed with rivers, glaciers, and fertile plains. It has become a source of mountaing crisis. Despite possessing the mighty Indus River system and vast ground water resources, Pakistan is now among the most water stressed nations in the world. According to the IMF, the country's annual water availability has fallen to just 1,017 m^3 per person, barely above the 1000 cubic meter above the threshold that indicates absolute scarcity. In 2009, this figure was approximately 1,500 cubic meters, highlighting a sharp decline within a single decade.

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Analysts predict that Pakistan already ranked 14th globally for extremely high baseline water stress, will face severe shortage by 2025 and could become most water stressed state in the region by 2040.

The drivers of this crisis are multifaceted: population growth, climate change, mismanagement and regional water disputes have ~~coverag~~ converged to deplete supplies and threaten livelihoods. Climatic change has intensified both floods and droughts, exemplified by the devastating floods of 2025 and the recurring droughts in Balochistan. Industrial pollution and inadequate storage capacity further worsen the situation, with Pakistan retaining only 10-20% of its annual water while the rest flows unchecked into the arabian Sea.

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This scarcity is not merely an environmental issue but a national security imperative with agriculture consuming nearly 15% of available resources and employing almost half the work-force, declining water availability threatens food security, economic stability and interprovincial harmony. Additionally, transboundary disputes with India and Afghanistan raise the specter of regional tensions.

This essay argues that Pakistan's water scarcity is both a governance and security crisis requiring urgent reforms in water resource managment, climate adaptation and regional co-operation to secure a sustainable future.

2- Causes of water Crisis

Pakistan is one of one of the most blessed with

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immense natural resources and reserves. It also has several rivers that are tributaries to the Indus. Besides rivers, rainfall, glaciers, dams and ground-water are significant water resources in Pakistan. Despite possessing numerous resources, Pakistan is facing a severe water crisis.

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 2000 kilometers before entering the Arabian Sea. The country's dependence on single river system is extremely risky as the Indus river system accounts for 95.8 percent of the total renewable water resources of Pakistan. Moreover, the water

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originating from outside the of Pakistan accounts for over three-fourths (78 percent) of total water resources of the country, making it vulnerable.

There are two major types of water security challenges

- Internal challenges.
- External challenges.

Among Internal challenges, many factors such as population explosion, climate change, global warming and water pollution etc are involved which are discussed in the following paragraphs.

Pakistan is the world's fifth most populous nation, yet the resources and socio-economic tools needed to provide for over 240 million peoples are sererely lacking. The demand for and use of natural resources, such as water which is essential

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form of life, is directly impacted by population growth. Thomas malthus, is his seminal work "An Essay on the principle of population", famously stated that

"The power of population is indefinitely greater than the power of in the earth to produce subsistence for man."

If the immediate action is not taken, Pakistan, one of the 36 nation now identified as experiencing water stress, is predicted to face water shortage by 2025 and will rank as the region's most stressed state by 2040.

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 glaciers outburst and heavy flooding in Gilgit-Baltistan (GB). Climate

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change influencing the entire hydrological cycle and its potential effects on water system and water use. A warmer climate is expected to accelerate the hydrological cycle, altering rainfall patterns and the magnitude and timing of runoff.

These change can lead to increased floods and droughts, significantly effecting the freshwater availability. While the impact of the warming process on water resources has been difficult to identify, evidence has accumulated that global warming is occuring due to increased greenhouse gases.

Pakistan is one of the most susceptible to climate related disasters, despite of making a negligible contribution to global greenhouse gas emissions. The economic and social costs are already profound, as evidence by the devastating 2010 and 2022 floods

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which caused billions of dollars in damages and forced massive displacement and high future capital investment.

" Global warming threatens our health, our economy, our natural resources and our children's future. It is clear we must act."

(Eliot Spitzer)

The effects of population explosion, diminishing land resources, energy demands, environmental limits and water shortages are happening simultaneously and more severely than in the past.

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

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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.

According to the statistics approximately, 20 Large and 80 small industrial estates lack facilities for treating industrial waste, instead dumping garbage into water bodies. Municipal and industrial ~~waste~~ sources account for 70% and 30% of the total waste-water discharge respectively, with each contributing 50% to the overall pollutant burden.

Because several rivers in Pakistan, including to Chenab, Ravi and Sutlej are already heavily polluted, the country's water shortage problem has worsened.

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Insufficient water reservoirs

Along with other natural resources, water's inability to multiply or regenerate is one of its most prevalent characteristics. God has gave Pakistan its geography but a gift can not be helpful if the recipient does not know how to use it.

The northern Himalayan ice cap is the source of most of Pakistan's rivers, which are affected by the Indus Water Treaty. The last two crucial water reservoirs constructed were Farbela 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. Although Terbala and mangla are still in operation, the amount of water they can store is decreasing due to Earth's surface being filled with water.

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According to survey, Pakistan can retain only 10-20% of the water it uses annually, while the rest flows into Arabian sea due to the lack of storage facilities. As a result, substantial amount of water is lost annually. It would have ~~been~~ benefited in several ways if Pakistan had more water storage.

When building water reservoirs, a national agreement is necessary; otherwise, the country's stability would be in danger.

Unquestionably, building water reservoirs is urgently needed ~~that~~ and it is the only option to avert the looming calamity that is due to hit Pakistan most severely.

Melting of glaciers

Pakistan is home to various mountain ranges,

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some of which are among the tallest in the world, including the karakoram and the Himalayas. These mountains maintain the ecological balance 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, glacier 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. But due to climatic changes, the Himalayan glaciers are melting at an alarming rate, jeopardizing the lives of local population. and causing the economic loss. The solution to this is to manage the situation otherwise

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there would be more burden than advantage.

Water pollution.

According to multiple reports, only 20% of Pakistan's potty 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.

This is due to lack of proper SOPs for waste disposal. According to IMF, Pakistan has is ranked third among nations with a severe water deficit. 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.

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Mismanagement by the Government.

Following partition, Pakistan faced the dilemma that most of its water resources were in the west due to 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.

Water distribution in Pakistan is heavily influenced by power dynamics and governance structures that disproportionately benefit elite interests while marginalising vulnerable population. The Canal and Drainage Act of 1873, a colonial-era law, continues to regulate water allocation, enabling major agricultural landowners to pay minimal fees

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for irrigations while urban and rural poor face significantly higher costs for basic access. In cities, such as Karachi, the informal tanker mafias continue to control the water supply, exploiting regulatory flaws and goverance short comings. By causing shortages and artificially rising the price of water, these networks, which are typically backed by political figures; mediates the distribution of water and transform it ~~into~~ from a public benefit into an expensive commodity.

Lastly, the water crisis in Pakistan is a gorernance 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 dinded system, benefiting the elite at the expense of the general populace.

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3- Impacts of water crisis in Pakistan.

Pakistan's worsening water crisis poses multidimensional threats to its economy, food security, public health, governance and national stability. The country's per capita water ability has fallen to 1,017 cubic meters - just above the scarcity threshold of 1,000 cubic meters and it is projected to decline further due to rapid population growth and climate change. Ranked 14th globally in baseline water stress, Pakistan faces both internal and transboundary challenges that ripple across all sectors of national life.

Water scarcity directly undermines Pakistan's economic foundation. Agriculture which majorly contributes in economy that is around 21% of GDP, is sererely affected by irrigation shortages.

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Approximately 33% of irrigated land suffers from water logging and salinity, reducing productivity by 25%, while reduced crops yields force higher food impact, straining foreign reserves and increasing inflationary pressure

About 80% of Pakistan's arable land depends on irrigation, making agriculture highly vulnerable to decline water availability. Water shortages threaten staple crops like wheat, rice and sugarcane, leading to food insecurity for millions. Climate change - driven glacial melt initially increases floods but eventually dimishes long-term water supplies

Disputes over water distribution between provinces - especially between punjab and Sindh - remain deeply politicized. Despite the 1991 Water Apportionment Accord, mistrust persists due to unequal

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irrigation practises and opposition to large dam projects like kalabagh. Such conflicts hinder national consensus on water infrastructure development.

Externally, India's upstream projects on Indus Basin rivers and Afganistan's planned dams on the Kabul River intensify geopolitical tensions. Internally, unequal water access empowers elite landlords and urban "tanker mafia", badly effecting rural farmers and poor communities. This deepens social inequality and weakens state legitimacy. The water crisis thus transcends environmental concerns - it is a national security imperative that threatens Pakistan's economic stability, social cohesion and regional peace.

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National Security Implications.

Pakistan's water crisis poses one of the gravest threat to its national security, as it undermines economic stability, aggravates internal divisions, and hightens regional tensions. The securitisation of water - treating it as an existential concern rather than a purely environmental or derelopmental issue - reflects the growing recognition that water scarcity can destabilize the state. According to the National Security Policy (2018 - 2023), sustainable access to clean water is now considered an essential pillar of national defence and human security.

Pakistan's water insecurity has critical geostrategic dimensions. The country's dependence on the Indus River System, originating largely in India, makes it

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vulnerable to upstream diversions and hydroelectric projects that new Delhi has undertaken the Indus Water Treaty. Similarly, Afghanistan's plan to construct dams on the Kabul River, with indian technical assistance, could reduce water inflows into Pakistan, threatening its agriculture and power sectors. These developments introduce a new layer of hydropolitical competition in South Asia, amplifying mistrust and increasing the risk of cross-border tension.

Ultimately, Pakistan's water crisis is not merely an environmental problem, it is a comprehensive national security challenge. Addressing it requires co-ordinated water governance reforms, investment in infrastructure and regional diplomacy to ensure that water becomes a source of

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Co-operation rather than conflict in South Asia.

Measuresments to control water crisis. ~~and addres~~

To mitigate Pakistan's worsening water crisis and its national security implications, a comprehensive and co-ordinated strategy is essential. The goremment must prioritize Integrated Water Resource Management (IWRM) to ensure efficient allocation, conservation and equitable distribution across provinces. Building new storage reservoirs like the Diamer-Bhasha and Dasu Dam, alongside rehabilitating aging infrastructure such as Tarbela and mangla, will enhance wate. storage capacity and reduce wastages.

Policy reforms are needed to modernize the

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outdated irrigation systems and regulate groundwater extractions, which currently remains largely unmonitored. Strengthing insitition, like WAPDA and the Indus River System Authority (IRSA) can Improve governance and reduce inter-provincial tensions. Furthermore, promoting water-efficient crops and modern irrigation techniques, such as drip and sprinkler systems, can conserve agricultural water.

Addressing industrial pollution and expanding wastewater treatment facilities will also protect public health. On the diplomatic front, regional co-operation with India and Afghanistan through transparent water-sharing agreements is vital to prevent hydropolitical conflicts. Finally, public awarenss compaigns promoting water conservation and

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responsible consumption can foster national solidarity. Ensuring sustainable water management is thus not only an environmental necessity but a cornerstone of Pakistan's long term national security and stability.

Conclusion

In essence, Pakistan's dwindling water resources have evolved from an environmental concern into a multidimensional challenge threatening its economic progress, societal harmony and geopolitical balance. The crisis affect agriculture, livelihoods and health while deepening regional disparities and fueling political frictions both within and beyond national borders. Without decisive intervention, these ~~picture~~ pressures could

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to intensify instability and hinder sustainable development. However, adopting efficient management practices, modern technology and inclusive policymaking can transform scarcity into resilience. Strengthening institutional co-ordination, investing in infrastructure and fostering diplomatic collaboration over shared rivers are vital steps toward lasting security. Ultimately, ensuring equitable and sustainable water access is not merely a developmental goal - it is integral to Pakistan's sovereignty, social cohension and future prosperity. Safegurding this essential resource will determine the national's capacity to achieve stability and progress in an increasingly water-stressed world.