

SUSTAINABLE FLOW OF WATER IS

ESSENTIAL FOR ECONOMIC GROWTH

OF PAKISTAN

well organized and quite relevant

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I. "Thousands have lived without love, not one without water." This truth holds even greater significance for a country like Pakistan, whose economy thrives on the consistent availability of water. In Pakistan, a country whose economy is predominantly agro-based, a sustainable and uninterrupted flow of water is not just a developmental need but also a necessity. However, availability decreasing from 5,260 cubic meter in 1951 to less than 1000 cubic meter today, Pakistan now faces an acute water crisis that threatens its food security, energy stability, industrial growth, and overall economic condition. Historical mismanagement of resources, climate change, outdated irrigation practices, rapid population, limited water storage capacity, lack of public awareness and of all the above reasons transboundary disputes have further amplified the the already worsened situation. In contrast, a

Sustainable water supply system can revitalise agriculture, boost industrial productivity, enable hydropower generation, maintain healthy environment all of which leads to the development of a better economy. Therefore, ensuring a consistent and sustainable water flow through new water storage facilities, adoption of modern techniques, creating public awareness about the issue, and lastly strengthening institutional framework for water management is vital for the economic growth and long term stability of Pakistan.

At independence in 1947, Pakistan inherited a

canal based irrigation system heavily reliant on the Indus river and its tributaries. The 1960

Indus water treaty with India allocated water rights over six rivers, with Pakistan receiving

control over the western rivers. But the

continuing tension between Pakistan and India

government have created way more problem for the consistent flow of water, as in the

recent time 2025, the indus river flow has been stopped. while domestically the water accord in 1991 between provinces have regulated the inter-provincial water distribution. However, over the year mismanagement lack of infrastructure development, and political changes have led to inefficient water distribution.

A. Climate change has emerged as a major catalyst intensifying the water crisis in Pakistan. The reason is that it alters rainfall patterns, accelerate glacier melt and increase the frequency of droughts and floods. According to Pakistan Meteorological Department and UNDP reports, the country has witnessed a 20% decrease in annual rainfall over the past two decades, leading to severe water shortages in the Indus river Basin, which supplies over 90% of nation's agriculture water.

Thus, the impacts of climate change have significantly strained Pakistan's water resources, threatening the country to a prolonged water crisis.

quite appropriate in building narrative over data

~~B.~~ Sedimentation in ~~Pakistan~~ major reservoirs has significantly reduced their water storage capacity, magnifying the country's water scarcity challenges. As sedimentation is a big problem in the way of storing water. According to KIAPDA and PCRWR reports, sedimentation has reduced the capacity of the Tarbela Dam by 36% and that of Mangla Dam by around 25% since their commissioning. Hence, the unchecked amount of sediments in reservoirs has critically weakened Pakistan's ability to store water, directly aggravating its water crisis.

~~C.~~ Outdated and inefficient irrigation practices has severely deepened water wastage in Pakistan, undermining the optimal use of already scarce water resources. The reason is that in Pakistan all individuals use the conventional methods of irrigation which are inefficient. According to Pakistan Economic Survey report, more than 60% of water diverted for irrigation is lost due to seepage, evaporation and mismanagement of traditional flood irrigation systems. Thus, the scarce

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water resource has not only been depleted but also worsened the agriculture Sector and may led to future water crises.

D. The rapid population growth in Pakistan has led to surge in water demand, placing immense pressure on the country's already stressed water resources. Because as population increases the water use will amplify which will create more water problems.

A report by IMF warns that Pakistan's water availability is declining at an alarming rate of 1% annually, primarily due to rapid population growth and urbanization. It predicts that by 2025, Pakistan could reach absolute water scarcity.

Thus, with no population control and demand improved water management, the growing demand will continue to intensify Pakistan's water crisis.

the inadequate water storage

E. The lack of adequate water storage infrastructure has critically limited the country's ability to store water in surplus time for use during time of scarcity. Because, Pakistan don't have that much water storage facilities. According to reports by

WAPDA and the World Bank, the country can store only about 13% of its annual river flows, where global average stands around 40%. As a result, Pakistan today holds only a 30-day water reserve - a figure drastically lower than 120-day standard needed for water security. Thus, the absence of modern water storage facilities has severely undermined Pakistan's resilience against seasonal and long-term water shortages.

F. Cross-border disputes with India have increasingly threatened Pakistan's water security by disrupting the agreed flow of water under Indus water treaty. For the reason that with every concerning issue, India stops the flow of Indus river water. According to IRS report, India's Kishanganga Dam, completed in 2018, diverts up to 40% of Neelum River water - a tributary of Jhelum - directly affecting irrigation flow in Azad Kashmir. Therefore, unresolved water tension with India pose a serious threat to Pakistan's access to its rightful share of river water.

G. The unregulated extraction of groundwater in Pakistan has led to serious depletion of aquifers, threatening long term water security and sustainability. Because all individuals extract water on their own, there is no regulatory authority for it. A report by Pakistan Council of Research in Water Resources (PCRWR) more than 60% of Pakistan's irrigation and 90% of domestic water needs are met through groundwater. Thus, for the water scarcity, one of the major reasons is unregulated extraction of groundwater.

H. The lack of awareness by public regarding the importance of conservation of water has worsened the situation, creating water crisis. Because the public does not know about the current situation of water in the country. A 2021 study by "PWF" Pakistan Water Partnership revealed that nearly 70% of Pakistanis are unaware of the country's increasing water scarcity and vital role of water conservation. Thus, raising public awareness about the importance of water and its efficient use is essential to mitigate Pakistan's water crisis.

A. Sustainable water flow is essential to ensure agriculture productivity, which forms the backbone of Pakistan's economy and is crucial for national food security. For the reason that when enough water is available agriculture productivity increases. According to Pakistan Economic Survey (2022-23), agriculture contributes 19.2% to Pakistan's GDP and employs ~~over~~ 38% of the labor force. Thus, for the agriculture productivity to be at maximum level the uninterrupted water flow is very important.

B. For the industrial sectors to give maximum yield, a stable water supply is vital for it, such as for processing and cooling operations. Because every industry requires water supply, without it industries cannot function properly. The Asian Development Bank has also warned that water scarcity could reduce industrial productivity by up to 18% in the year 2025 if left unaddressed. However, for the growth of economy and industrial growth, sustainable water flow is very ~~vital~~ important.

C. Sustainable water flow plays a critical role in enabling hydropower generation, to meet Pakistan's energy demands and reduce dependence on imported fuels. For the reason that we produce electricity from water. According to NEPRA's 2023 report, Hydropower contributes around 27% of Pakistan's total electricity generation. Thus, to get the one third of electricity for Pakistan, the stable flow of water is very critical for it.

D. To maintain good public health by ensuring proper sanitation, a sustainable and clean water flow is very important. Because of clean water the disease outbreak reduces especially waterborne diseases. According to UNICEF and Pakistan Bureau of Statistics (2022), around 40 million people in Pakistan lack access to safe drinking water and over 70% of household in rural areas do not have access to proper sanitation. Thus, clean and sustainable water flow is not only crucial for sanitation but also for safeguarding public health.

E. Sustainable water flow is important for preserving ecosystem and biodiversity, which in turn supports agriculture, climate regulation and overall stability of environment. For the reason that water keeps the environment clean and fresh from pollutants. According to WWF Pakistan (2022) irregular and reduced water flows due to upstream diversions, over-extraction and climate change have degraded 65% of Pakistan's freshwater ecosystems. Hence, maintaining sustainable water flow is essential to protect ecological health and our ecosystem.

~~E~~ Sustainable water flow helps stabilize Pakistan's economy by averting water crises that can disrupt agriculture, industry, health and energy production. For the reason that uninterrupted water flow helps very much in boosting the economy. A 2023 World Bank report estimated that inefficient water management and recurrent shortages cost Pakistan up to 6% of its GDP annually. Therefore, for the economy to be stable and keep growing the stable water flow is very important for it.

~~V. A. The development of new water storage facilities is a critical step toward managing seasonal water availability, which can reduce the risk of water crisis. For the reason that water storage facility stores water which we can use at any time of the year. As reported by (PC-RWR), Pakistan loses an estimated 30-million acre-feet (MAF) of water annually due to lack of proper water storage infrastructure. Thus, investing in modern, large-scale water reservoirs is essential to meet the challenge of water crisis.~~

~~B. The adoption of modern irrigation techniques is essential to minimize water wastage and improve agricultural productivity. For the reason that in latest techniques of irrigation water wastage is low. According to Food and Agriculture Organization (FAO), Pakistan's irrigation system is the least efficient in the world, with over 60% of water lost due to outdated methods like flood irrigation. While in modern ways water usage can be reduced upto 30-70% while increasing crop yields. Therefore, scaling up modern irrigation methods is vital for conserving water resources while sustaining agricultural productivity.~~

c. Raising public awareness through campaigns is crucial to promote responsible water usage and foster a collective response to the water crisis in Pakistan. Because if public knows the importance of water they will not dare to waste it. In 2021 the Punjab Irrigation Department launched the "Pani Bachao, Paista Kamao" campaign, which demonstrated how educating farmers about water metering and usage efficiency led to a 35% reduction in unnecessary water use. Hence, a nationwide awareness initiative are necessary to create culture of saving water between the citizens to meet the challenge of water crises.

d. A strong institutional framework is required for effective water governance and to mitigate water crisis in Pakistan. For the reason that without law and proper policy this cannot be achieved. The National water Policy (2018) was a step forward, but its implementation has remained weak due to limited capacity, poor funding and improper monitoring. Thus, institutional reforms and inter-province coordination are imperative for developing an efficient and accountable water management system in Pakistan.

VI. In a nutshell, the sustainable flow of water is not merely an environmental necessity but a fundamental pillar for Pakistan's economic stability and development. As an agrarian economy with growing industrial and energy demands, the country cannot afford further delay in addressing its looming water crisis. For the ~~which~~ major reasons are climate change, sedimentation, outdated irrigation ways, rapid population growth, poor infrastructure for water and cross-border disputes on water. While the sustainable water flow will ensure ~~us~~ agriculture productivity, industrial operations, energy generation, creating better environment, also helps in growing the economy. Above all to address the issue of water crisis, it requires modern water storage facilities, modern farming techniques, public awareness campaign and of all the above a strong political will and long term planning rooted in national interest. There remains hope that with timely reforms, political will, and nation consensus, Pakistan can overcome its water crisis and

and pave the way for sustainable economic growth and prosperity.