AL-ISRA
Vol.:4, Issue: 2, Jul - Dec 2025 PP: 23-38

OPEN ACCESS
AL-ISRA
International Journal of
Islamic Thought
ISSN: 2959-3603
www.israjr.com

Water Security Challenges in Pakistan: A Growing Concern

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Abstract

Pakistan is confronting an acute water crisis that imperils its economic stability, food security, and social fabric. The per capita water availability has plummeted to below 1,000 cubic meters, classifying it among the most water-stressed nations. Rapid population growth, erratic climate patterns manifesting as prolonged droughts and devastating floods, antiquated irrigation infrastructure, and chronic inter-provincial disputes over water sharing compound the predicament. This study asserts that without urgent reforms, the looming scarcity will undermine agricultural output, industrial productivity, and human well-being, thus threatening national security. The significance of addressing this challenge lies in its potential to sustain livelihoods, ensure food self-sufficiency, and foster regional stability. Adopting a mixed-methods approach, the research combines quantitative analysis of hydrological data, climate models, and policy documents with qualitative interviews of stakeholders from federal and provincial water agencies, farmers, and civil society organizations. Findings reveal systemic governance gaps, inefficient water allocation mechanisms, and low adaptive capacity to climate change, while highlighting successful pilot projects in water conservation and community-based management as scalable solutions. The study underscores the imperative of integrated water resource management, institutional coordination, and policy overhaul to safeguard Pakistan's water future.

Keywords: *Water, Pakistan, Flood.*

Introduction

Pakistan's economic stability, security, and public health are at stake due to the country's severe water security crisis. With over 240 million people on the planet, the demand for water is growing rapidly, but the supply of its resources is rapidly diminishing. Water scarcity, polluted water, inefficient water management, and the effects of climate change are some of the problems facing the country's water system. Pakistan is considered a water-stressed country. The amount of water available per person has decreased from 1,500 cubic meters in 2009 to 1,017 cubic meters in 2021. Nearly 53,000 children under the age of one die in Pakistan every year, with 70 percent of the population drinking contaminated water. About 95 percent of Pakistan's water is used for agriculture, and the waste is a result of an inefficient irrigation system.[1]Water supply and quality are being affected by climate change, with Pakistan's glaciers melting at a rate of about 2.3 percent per year. Water security issues are compounded by poor border and governance, and trade, particularly with India, over transboundary water disputes. Water insecurity has far-reaching economic, public health, agricultural, and environmental impacts. Pakistan's water security issues require improved water management, infrastructure development, and climate adaptation strategies. Water security in the country is a critical issue that requires urgent attention. Inaction can have serious implications for public health, food security, and economic growth.[2]

Pakistan's water resources are in danger, so securing the nation's water security requires an all-encompassing and long-term strategy. To solve Pakistan's water security issues and guarantee a sustainable future, the government, civil society, and international community must cooperate. Unless immediate action is taken, Pakistan's water security crisis is likely to get worse given the current trends and difficulties. The nation's capacity to successfully handle the problems related to water security will determine its future stability and prosperity.

IMPORTANCE OF WATER SECURITY

Water security is essential for Pakistan's survival and development. The availability and sustainability of water resources are critical to the country's economy, food security, and public health. Pakistan's agricultural industry, which uses about 95 percent of the country's water, is the backbone of the economy, supporting millions of people and contributing significantly to GDP. However, water scarcity threatens agricultural production, which can result in unstable economies and food insecurity. Access to clean and safe drinking water is a fundamental human right, and public health depends on water security. Millions of people suffer from water-borne diseases caused by contaminated water, especially young children who are more susceptible to diarrheal diseases.[3]

Since rural areas and marginalized communities are disproportionately affected by water insecurity, which exacerbates poverty

and inequality, there is a link between water security and regional disparities. Reducing the potential for conflicts over water and promoting social cohesion are two benefits of addressing water security issues. Moreover, since hydropower constitutes a large part of Pakistan's energy mix, water security is essential for the country's energy security. Water resources must be sustainable to meet the country's growing energy needs. Furthermore, since competition for water resources and water scarcity can lead to regional tensions and conflicts, water security has implications for national security.[4] Pakistan's relations with its neighbors, particularly India and Afghanistan, with whom it shares transboundary water resources, are crucial to its water security. More generally, Pakistan's economic development, social stability, public health, energy security, and national security all depend on water security. A comprehensive and sustainable strategy is needed to address the country's water security issues, which includes improved water management, infrastructure development, and climate adaptation strategies. Water security in Pakistan is an urgent issue that needs to be addressed urgently. Inaction can have serious consequences for the country's public health, food security, and economic growth. The government, civil society, and the international community must work together to address Pakistan's water security challenges and ensure a sustainable future.[5]

The importance of water security in Pakistan cannot be overstated. All stakeholders must work together to address this critical issue to secure the nation's future stability and prosperity. Pakistan can address its development challenges and improve the quality of life of its people by prioritizing water security. Since the effects of water scarcity and insecurity can have significant impacts on regional and global stability, water security is not only a national issue but also a global one. Pakistan's efforts to address its problems with water security and sustainable water management techniques require the support of the international community. Pakistan's economy, public health, social stability, energy security, and national security are all significantly affected by the issue of water security. A comprehensive and sustainable strategy is needed to address the country's water security challenges, which includes improved water management, infrastructure development, and climate adaptation strategies.

WATER RESOURCES IN PAKISTAN

The Indus River system, which includes the Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej rivers, is the primary source of water for Pakistan. Pakistan's water environment is relatively fragile as the Indus Basin provides about 95 percent of the country's renewable water resources. With an annual flow of about 146 million-acre feet (MAF) of water diverted to canals, the Indus River system is the primary source of surface water. 70 percent of domestic water across the country and 90 percent in rural areas comes from groundwater. It also supplies more than half of the water used in agriculture,

making it essential. Agriculture uses about 93 percent of Pakistan's water resources, with the rest used for domestic and industrial purposes.[6]

Water scarcity, contaminated drinking water, inefficient water management, and the impacts of climate change are some of the problems facing the country's water sector. Between 1951 and 2016, the amount of water available per person decreased from 5,260 cubic meters to about 1,000 cubic meters. Climate change is affecting water availability and quality, as rising temperatures are causing glaciers to melt. Every year, irrigation contributes about 16 million tons of salt to the Indus Basin, threatening agricultural production and soil health. Pakistan's water resources are under threat, so a comprehensive and long-term strategy is needed to secure the country's water security. The government, civil society, and the international community must work together to address Pakistan's water security issues and ensure a sustainable future. If urgent action is not taken, Pakistan's water security crisis is likely to worsen given current trends and challenges. The nation's ability to successfully address water security issues will determine its future stability and prosperity.[7]

SURFACE WATER RESOURCES

The Indus River system, which includes the Indus, Jhelum, Chenab, Ravi, Beas and Sutlej, is the main source of surface water in Pakistan. Of the 176 billion cubic metres of water that flows through Pakistan's Indus Basin each year, about 90 percent is used for irrigation. Melting snow and glaciers from the Himalayas have a major impact on the system's water flow, accounting for about 45 percent of the flow in the basin. The Indus River is mainly fed by snowmelt, glacier runoff and monsoon rains from May to September. Irrigating about 150,000 square kilometers of cropland, the Indus Basin Irrigation System is the largest interconnected irrigation system in the world.[8]

However, Pakistan's surface water resources management is fraught with challenges. Water scarcity is one of these problems. In 2023, the amount of water available per person has declined from about 5,600 cubic meters in 1947 to just 930 cubic meters. The lack of understanding of the direction of canal water from the Indus system to the fields leads to significant water wastage in the inefficient irrigation system. Pakistan's water supply and quality are being affected by climate change, with glaciers melting due to temperature changes. Every year, irrigation contributes about 16 tons of salt to the Indus Basin, which threatens agricultural production and health. Pakistan's water storage capacity is significantly underdeveloped by developed countries. Their impact on the economy, public health, agriculture, and inequality issues. Improving water management institutions, building infrastructure, and preparing for climate adaptation are essential to addressing Pakistan's resource challenges at the grassroots level.

GROUNDWATER RESOURCES

Pakistan's economy, domestic water supply, and agriculture rely heavily on its land resources. 70 percent of the country's households and 90 percent of its rural areas are irrigated. About $2 billion of irrigation water is used for irrigation, and it also provides more than half of agriculture. However, Pakistan's groundwater resources face many markets. Given the land's rate of runoff of 5 cubic kilometers of water, its maximum recovery rate is a serious concern. As a result, groundwater tables are rapidly declining across the country. Another problem is irrigation, which primarily affects Sindh and affects 35 percent of the canal commission area of the Indus Basin Irrigation System. Furthermore, each year, irrigation contributes about 16 tons of salt to the Indus Basin, which affects agricultural production and soil health.[9]

Effective groundwater management is essential for Pakistan's future. The World Bank has developed a roadmap that emphasizes the selection of an agency that integrates groundwater management, develops a modern groundwater database, jointly manages water resources, and meets groundwater quality standards. Pakistan can ensure the sustainability of its groundwater resources and address these issues to advance public health, food security, and economic development. Pakistan has a limited groundwater resource base, and a comprehensive and long-term strategy is needed to ensure water security in the country. The government, civil society, and the international community must work together to address groundwater issues and ensure Pakistan's stability. If urgent action is not taken, the current situation and challenges are likely to worsen Pakistan's groundwater crisis. The nation's ability to overcome its groundwater challenges will determine its future stability and prosperity. Climate change, demands, and overexploitation have already posed a challenge to Pakistan's groundwater resources. Due to over-reliance on groundwater, the country's agriculture is particularly vulnerable.[10]

The water table in the Indus Basin Aquifer, a major source of groundwater, is dropping significantly. In some places, the drops can reach 1-2 meters. The effects of groundwater depletion go beyond agriculture. Water scarcity has hit major cities like Karachi, Lahore and Islamabad. In some places, the shortages reach several places every day. In rural areas, where access to clean and safe water is already scarce, the situation is even worse. They need Pakistan to manage groundwater more sustainably. This includes supporting laws to support the use of groundwater, investing in water equipment, and using it for alternative control of wastewater and rainwater. More studies and data collection are also needed to better and more effectively manage the country's groundwater resources. Inaction will have serious consequences that will affect the health, economic growth and food security of the general public. Pakistan needs to prioritize groundwater management and work quickly to address the water crisis.[11]

WATER AVAILABILITY AND DEMAND

Pakistan's water resources are in high demand, with unprecedented examples of water and climate change, making the situation of supply and demand in the country even more urgent. Water scarcity, polluted water, inefficient water management, and the effects of climate change are some of the problems facing the country's water system. The Indus River system, which includes the Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej rivers, is the primary source of water for Pakistan. Of the 176 billion cubic meters of water that flows through Pakistan's Indus Basin each year, about 90 percent is used for irrigation. Water is becoming increasingly scarce in the country, with per capita water availability declining from about 5,600 cubic meters in 1947 to just 930 cubic meters in 2023.[12]

The largest consumer of water in Pakistan is agriculture, which accounts for about 93 percent of the country's water use. This industry is the livelihood of the people's friends. Due to economic instability and insecurity, agricultural production cannot be achieved due to water scarcity. Public sector development, economic growth, and population expansion contribute to the rapid increase in water demand. With a population growth rate of 2%, Pakistan is facing a water scarcity crisis. As the country's cities grow, so too does the need for household water supply. With the development of water, the industrial nation is also in demand. The country's water shortage is expected to reach 31% by 2022, reflecting the growing gap between demand and supply. The situation is dire; according to some estimates, Pakistan could run out of water by 2025 if current trends continue. Climate change is further exacerbating the water crisis by changing rainfall patterns and melting glaciers due to rising temperatures. Pakistan's water reserves can only hold 15% of the country's river flows, compared to the 4% to 50% that is considered normal worldwide. Addressing Pakistan's problems with water availability and demand requires a comprehensive strategy that utilizes improved water management techniques, infrastructure development, and climate adaptation strategies. Collaborating with the government, civil society, and the international community to address the water crisis and ensure Pakistan's sustainability in the future.[13]

Pakistan's water resources are in short supply, for this a coordinated and long-term strategy is needed to secure the country's water security. The government, civil society and the international community must cooperate to solve the water crisis and ensure Pakistan's stability in the future. If urgent action is not taken, Pakistan's water security crisis is likely to worsen given the current situation and challenges. The nation's ability to successfully meet its water demands and challenges will determine its future stability and prosperity. Water scarcity, contaminated drinking water, inefficient water management, and the impacts of climate change are among the challenges facing the country's water sector. A comprehensive strategy is needed to address these challenges, which includes improved water management

techniques, infrastructure development, and climate adaptation strategies. Inaction will have serious consequences that will affect the health, economic growth, and food security of the common people. Pakistan must prioritize water management and work to address the water crisis. Pakistan's water resources are in short supply, and this requires a coordinated and long-term strategy to secure the country's water security.[14]

The government, civil society, and the international community must work together to address the water crisis and ensure Pakistan's future stability. Water scarcity, contaminated drinking water, inefficient water management, and the impacts of climate change are among the problems facing the country's water sector. A comprehensive strategy is needed to address these issues, which includes improved water management techniques, infrastructure development, and climate adaptation strategies. The future of water is uncertain and addressing the water crisis requires an all-out effort by Pakistan. The nation's water demand and ability to successfully address the issues will determine its future stability and prosperity. Pakistan's water resources are limited, and a coordinated and long-term strategy is needed to secure the country's water security. The government, civil society, and the international community must work together to address the water crisis and ensure Pakistan's future stability. If urgent action is not taken, Pakistan's water security crisis is likely to worsen given the current circumstances and challenges. The nation's water demand and ability to successfully address the issues will determine its future stability and prosperity. Water scarcity, contaminated drinking water, inefficient water management, and the impacts of climate change are among the problems that the country's water sector is grappling with. Addressing these issues requires a comprehensive strategy that incorporates improved water management techniques, infrastructure development, and climate adaptation strategies.[15]

Inaction will have dire repercussions that could affect public health, economic growth, and food security. Pakistan must give water management top priority and act quickly to resolve the impending water crisis. Pakistan's water resources are in danger, so securing the nation's water security requires an all-encompassing and long-term strategy. To solve the water crisis and guarantee Pakistan's sustainability in the future, the government, civil society, and international community must cooperate. Water scarcity, tainted drinking water, ineffective water management, and the effects of climate change are just a few of the issues the nation's water sector is dealing with.[16] A comprehensive strategy that incorporates better water management techniques, infrastructure development, and climate adaptation tactics is needed to address these issues. Pakistan's water future is uncertain and resolving the water crisis requires a coordinated effort from all parties involved. The ability of the nation to successfully handle the issues of water demand and availability will determine its future stability and prosperity.

Pakistan's water resources are in danger, so securing the nation's water security requires an all-encompassing and long-term strategy. To solve the water crisis and guarantee Pakistan's sustainability in the future, the government, civil society, and international community must cooperate. Unless immediate action is taken, Pakistan's water security crisis is likely to get worse given the current trends and difficulties. The ability of the nation to successfully handle the issues of water demand and availability will determine its future stability and prosperity. Water scarcity, tainted drinking water, ineffective water management, and the effects of climate change are just a few of the issues the nation's water sector is dealing with. A comprehensive strategy that incorporates better water management techniques, infrastructure development, and climate adaptation tactics is needed to address these issues.[17]

CAUSES OF WATER SECURITY CHALLENGES

Pakistan's water resources are facing unprecedented threats from over-extraction, pollution and climate change. The situation of water availability and demand in the country has become more urgent. Water scarcity, contaminated drinking water, inefficient water management, and the impacts of climate change are some of the issues facing the country's water sector. The Indus River system, which includes the Indus, Jhelum, Chenab, Ravi, Beas and Sutlej rivers, is the main source of water for Pakistan. Pakistan's Indus Basin discharges 176 billion cubic meters of water every year, of which about 90 percent is used for irrigation. Water availability in the country is rapidly decreasing, although per capita water availability has declined from about 5,600 cubic meters in 1947 to just 930 cubic meters in 2023.[18]

The largest water-consuming sector in Pakistan is agriculture, which uses about 93 percent of the country's water resources. The industry supports millions of people and contributes significantly to GDP, making it the backbone of the national economy. However, water scarcity threatens agricultural production, which can lead to food insecurity and unstable economies. Urbanization, economic growth, and population expansion are all contributing to a rapid increase in water demand. With a population growth rate of over 2 percent, Pakistan's water resources are under severe pressure. As the country's cities grow, so does the need for domestic water supply. The industrial sector is also expanding to meet the growing demand for water. The country's water shortage is expected to reach 31 percent by 2025, reflecting a growing gap between demand and supply. The situation is dire; some estimates suggest that Pakistan could run out of water by 2025 if current trends continue.[19]

Climate change is exacerbating the water crisis by melting glaciers due to changing rainfall patterns and rising temperatures. Pakistan's water reservoirs can hold only 15 percent of the country's annual river flow, less

than the 40-50 percent considered normal worldwide. Addressing Pakistan's water availability and demand issues requires a comprehensive strategy that includes improved water management techniques, infrastructure development, and climate adaptation strategies. The government, civil society, and the international community must collaborate to address the water crisis and ensure Pakistan's future sustainability. Increasing water storage capacity, encouraging water conservation, and implementing effective irrigation systems are some of the possible remedies. The Kalabagh Dam and Diamer-Bhasha Dam are two potential water storage projects identified by the Indus River System Authority (IRSA). These measures could help control water flow and increase water storage capacity.[20]

WATER SCARCITY IN PAKISTAN

Per capita water availability has declined from about 5,600 cubic meters in 1947 to just 930 cubic meters in 2023, with the country facing a severe water shortage. Pakistan, a water-intensive agricultural country, uses about 93 percent of its water resources. However, water scarcity threatens agricultural production, which can result in unsustainable economies and food insecurity. Places like Karachi, Karachi and Abad have been hit by water scarcity, and the effects of water on agriculture have increasingly affected people. Another major concern is groundwater depletion, as overuse threatens the sustainability of its resources and lowers water tables.[21]

Droughts and floods are becoming more frequent due to climate change, as temperatures change and rainfall patterns change. Pakistan needs to address these issues in a comprehensive manner, including better climate change management, infrastructure development, and management techniques. Increasing water storage capacity, encouraging water conservation, and implementing efficient irrigation systems are some of the positive solutions. Two proposed dams that can help regulate water flow and increase water storage capacity are the Demer Bhasha Dam and the Kalabagh Dam. Better management and treatment of water is also needed to provide water to the water. Ensuring public awareness about water conservation and sustainable water management arrangements is essential to ensure efforts to address the water crisis. Inaction will have serious consequences that can affect health, economic growth, and food security in general. Pakistan needs to move quickly to address the water crisis and address the water crisis. The government, society, and the international community must work together to address the crisis and ensure the stability of Pakistan's future. Pakistan's water future is uncertain and all stakeholders need to be engaged in addressing the water crisis. The nation's ability to successfully address water scarcity will determine the stability and prosperity of that future.[22]

WATER QUALITY ISSUES

Water scarcity problem and its impacts in Pakistan Per capita water has fallen from about 5,600 cubic meters in 1947 to just 930 cubic meters in

2023, with the nation facing a water shortage. Agriculture is the most water-intensive resource in Pakistan, accounting for about 93 percent of the country's water use. However, water scarcity benefits agricultural production, which can result in unsustainable economies and food insecurity. The effects of water scarcity and water-stressed agriculture in places like Karachi, Lahore and Islamabad have reached an increasing number of people. Another major problem is groundwater depletion, which threatens the sustainability of its resources and lowers water tables.[23]

Droughts and floods are becoming more frequent due to rising temperatures and changing rainfall patterns. Pakistan needs to adopt a comprehensive approach to address these issues, including climate adaptation, infrastructure development and improved water management capabilities. Increasing water storage capacity, encouraging water conservation, implementing effective irrigation systems are some of the measures. Two proposed dams that can help regulate water flow and increase water storage capacity are the Bhasha Dam and Kalabagh Dam. Improved water management and treatment are also needed to reduce water scarcity and water availability. To ensure that the public is committed to efforts to address the water crisis, it is necessary to examine the awareness of water conservation and sustainable water management options.[24]

Inaction will have serious consequences that will affect the health, economic growth and food security of the common people. Pakistan must give top priority to water management and work towards solving the water crisis. The government, civil society and the international community must cooperate to solve the water crisis and ensure the future stability of Pakistan. The future of water is uncertain and the effort to solve the water crisis is needed by all of Pakistan. The nation's ability to prosper as a result of water scarcity will determine the stability and prosperity of that future.[25]

WATER DISTRIBUTION AND MANAGEMENT

Pakistan's water distribution and management system is fraught with problems. It has a large irrigation system, but it is inefficient and loses water due to poor maintenance and inadequate infrastructure. Although the Indus River System Authority (IRSA) is in charge of controlling how much water is distributed among the provinces, it has a considerable degree of instability. Although the agricultural industry consumes the most water, it also has improved irrigation techniques and a sufficient amount of water capacity. An inefficient irrigation system, lack of infrastructure, seasonal water distribution conflicts, low public awareness about conservation, and some of the major problems currently facing Pakistan's distribution and management system.[26]

Pakistan needs society as a whole to address these problems, including promoting public reforms and education, investing in infrastructure development, strengthening institutions and the regulatory framework, improving irrigation efficiency, and policies to mitigate the impacts of climate

change. Modernizing irrigation systems, implementing water-use technologies, and encouraging public-private partnerships to develop infrastructure and promote water management are some positive remedies. Supporting the government, civil society, and the international community to address Pakistan's water distribution and management challenges and guarantee a sustainable future for the country's water resources.[27]

GOVERNANCE AND INSTITUTIONAL CHALLENGES

Pakistan's weak institutional framework for water management hinders effective governance and management of water resources. Insufficient coordination among different stakeholders, unclear roles and responsibilities, and lack of capacity and expertise are characteristics of the current institutional framework. Confusion, duplication of efforts, and failure in water management are the result. For example, lack of accountability, gaps in service delivery, and functional overlap can arise from unclear roles and responsibilities. Furthermore, lack of accountability, fragmented decision-making, and inefficient use of resources can result from poor stakeholder coordination.[28]

Another major problem with Pakistani water management is inadequate implementation of policies. Despite the existence of laws and policies, their implementation is often hampered by a lack of political will, inadequate funding, and inadequate capacity. The effectiveness of water management initiatives is undermined by the gap that exists between policy formulation and implementation. For example, lack of funding for key water infrastructure projects can worsen water scarcity and reduce the productivity of water resources due to lack of political will to implement water policies. Effective water management in Pakistan is severely hampered by a lack of coordination among stakeholders. Government institutions, civil society groups, farmers, and industrial users are all involved. Insufficient coordination results in disjointed decision-making, wasteful use of resources, and lack of accountability. Confusion among stakeholders can also result in disagreements and conflicts over water resources.[29] For example, lack of accountability, duplication of efforts, and function overlap can arise from a lack of coordination among government institutions. Corruption and incompetence pose serious problems for water management in Pakistan. The allocation of water supplies, the distribution of water resources, and the implementation of water projects are some of the levels at which corruption can occur. Poor project management, lack of accountability and transparency, and inadequate planning can all lead to inefficiency. Significant financial losses, reduced water availability, and a loss of trust in water management organizations can result from these problems. For example, inequitable water distribution can result from corruption in the allocation of water resources. This can lead to water scarcity and reduced water resource productivity. One of Pakistan's biggest challenges is the lack of resources and funding for water

management. Water management requires major investments in institutions, infrastructure, and capacity building. However, the government often allocates insufficient funds for water management, resulting in a lack of resources for critical tasks such as capacity building, monitoring and enforcement, and maintenance of water infrastructure. This can lead to increased conflicts over water resources, and water availability and quality can decline.[30]

Another major problem in Pakistan is the lack of water management capacity and knowledge. Hydrology, finance and social sciences are specialized knowledge and skills for water management. However, there is a shortage of qualified experts in these fields, which can result in project implementation, inadequate planning and resource utilization. This can lead to increased conflicts over water resources, and water availability and quality can decline. Pakistan needs to manage its water resources in a sustainable and effective manner. This includes strengthening institutions, enhancing policy implementation, improving stakeholder coordination, and investing in more resources, resources and capacities to address corruption and inefficiency. Pakistan's water management can be planned, mitigated, and addressed to ensure a secure future for its water resources. Pakistan must prioritize governance and recognize that it is essential for the country's social and economic development, including adequate provision for water management, accountability and transparency, and involving stakeholders in the decision-making process. Pakistan can reduce the burden of water scarcity, improve water quality, and ensure more sustainable and equitable use of water resources by making water management a top priority. Pakistan's water management experience and best practices can be learned. This includes implementing water conservation strategies, adopting modern technologies, and encouraging stakeholder engagement.[31] Pakistan can learn from other countries to advance its water management strategy and reduce the cost of water scarcity.[32] Determine Pakistan's water management in the near future. Pakistan can ensure a secure future for its people and promote the country's economic and social development through water management-related issues. This requires a sustained commitment to water management, the ability to use and develop new strategies, and the development of expertise. Pakistan can advance water management for cooperation and water scarcity is your concern. A single institutional framework, poor policy implementation, lack of cohesion among stakeholders, corruption and inefficiency, inadequate economization and resource allocation, and lack of capacity are some of the major problems facing Pakistan's water management. Pakistan must prioritize water management, adopt a comprehensive and holistic approach to it, and accept that it is essential for the country and its development to move forward. Pakistan can guarantee its secure future by doing so, and water management cannot be held responsible for water scarcity.

Better water management in Pakistan has immense benefits. Better

water management measures can be taken for crop production, food security, and economic growth. Furthermore, it can advance public health, reduce poverty, and protect the environment.[33]

By prioritizing water management, Pakistan can ensure more equitable and sustainable use of water resources. This is crucial for the country's social and economic development. Determine Pakistan's water management for the future today Pakistan can ensure water security for itself and for the future and address water management issues to promote the country's economic and social development. This requires a sustained commitment to water management, a readiness to adopt new strategies, and a focus on skills and capacity. Pakistan can reduce water scarcity and advance water management through cooperation.[34]

There are many advantages to better water management in Pakistan. Crop yields, food security, and economic growth can all be enhanced with better water management. Additionally, it can enhance public health, lessen poverty, and safeguard the environment. Pakistan can guarantee a more equitable and sustainable use of water resources by giving water management top priority. This is crucial for the nation's social and economic advancement. The decisions made today will determine Pakistan's water management in the future. Pakistan can guarantee a more water-secure future for its citizens and promote the nation's economic and social development by tackling the issues surrounding water management. This calls for a persistent dedication to water management, a readiness to embrace novel strategies and technologies, and an emphasis on developing expertise and capacity. Pakistan can lessen the risks related to water scarcity and enhance water management by cooperating.

CONCLUSION

Pakistan's water security problems are becoming increasingly acute with seasonal water shortages, water inefficiencies, and climate change. Especially in agriculture, which uses about 90 percent of Pakistan's water resources. Due to exposure to polluted water, people are struggling to achieve water-related public health, economic development, and food security. Pakistan is one of the most water-stressed countries in the world, with per capita water availability declining from about 5,600 cubic meters in 1947 to just 930 cubic meters in 2023. It is estimated that the situation will worsen further, with Pakistan facing water scarcity by 2025.

Pakistan needs to improve its water storage capacity, promote water conservation issues, and establish effective systems to support them. It is also important to develop a strategy to mitigate the effects of climate change. A comprehensive and long-term strategy involving the efforts of the government, civil society, and the international community is needed to secure the country's future stability and prosperity. The road ahead is difficult, but Pakistan has the potential to overcome its water security

challenges and realize a sustainable future. The impact of water construction can be mitigated by implementing effective water management techniques, investing in infrastructure, and raising public awareness about water conservation. Pakistan can take decisive action to guarantee a prosperous and sustainable future for its people and economy.

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