



Water Wars: The Looming Crisis Over Pakistan's Water Resources

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Abstract:

Pakistan is approaching the vicious cycle of water wars; the primary source of water in Pakistan is the Indus River and its branches, flowing through the territory of the country, water resources are under stress due to climate change, population growth, water management inefficiency, and geopolitical instability. Continued use and pollution of water source as well as water flow from the upstream countries particularly India are some of the factors that are causing the problem. This crisis is a menace to Pakistan's agriculture whose water is from the Indus basin and is a danger to the economy, health and stability of the country. Thus, the article reveals historical and modern water-sharing agreements such as the Indus Waters Treaty, and the relationships between Pakistan and India and other neighbours, which make the problem of water deficiency in Pakistan more profound. It describes the social and economic impacts of water scarcity for agriculture, for the loss of bio-diversity, for increased domestic conflict all over the world. In addition, the article provides recommendations such as policy changes, new technologies, development of new structures, and collaboration with other countries to solve the crisis. Stressing on the escalating problem, it urges the policymakers, communities, and global actors to act now for the conservation of water resources and stability of the region.

Keywords: Depletion, groundwater, biodiversity, infrastructural improvements, water wars

Introduction

The international water crisis is ranked among the most critical problems of the contemporary world affecting individuals in billions across the globe. Thus, population growth, industrialization and climate change put pressure on the availability of water, and countries of



the world are already feeling the impact of the scarcity of freshwater. Pakistan, a country which is more or less an agricultural country, is certainly not an exception in this regard. The country is at the brink of a water crisis now due to population pressure, water mismanagement and upsurge in regional water conflict. Most of the water resources of Pakistan have been the Indus river system and its affiliated waters which supported the agriculture based economy of the country. However, the availability of water resources has reached a critical level due to the high demand for the resource as well as the unpredictable weather patterns which have put pressure on the available resources to the extent that they are a threat to the nation's food production, economic, and social order (Mustafa, 2020).

The formation of Pakistan's water issues began with its historical background regarding water resources management. After getting a new identity in 1947, Pakistan was blessed with a number of rivers and canals especially those are related to Indus River system. The Indus Waters Treaty of 1960 was signed between the governments of India and Pakistan when the World Bank played a mediator to divide the waters of the Indus River and its affiliated rivers for both the countries to ensure fair sharing and control the disputes. However, the problems have continued to surface compounded by the increasing population and effects of climate change. Mismanagement of water resources, pollution of water sources, and improper utilization have added to the problem and thus there is a drastic reduction of per capita water available for use. Given the forecasts suggesting that Pakistan might be among countries with a critical water shortage by 2025, it becomes evident that this problem will not wait indefinitely (World Bank, 2019).

Historical Overview of Pakistan's Water Resources

After the creation of Pakistan in 1947, the focus of water resources has mainly been confined to the Indus River Basin which comprises of a number of rivers, canals, and affluent. Five major rivers namely Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej have always been the backbone of Pakistan's agriculture, providing source of drinking water, irrigation water and industrial water to millions of users. The area relies on these water sources to the present day, and during the Mughal period, elaborate irrigation systems were established; for instance, channelling of river water to the desert to enhance agriculture (Ali, 2015). After the independence this complex system was inherited by the new country of Pakistan but there were problems in its operation and distribution particularly in the context of the new provinces of Pakistan and new division of the existing resources with India.

Water infrastructure development in Pakistan has been a progressive process that was based on the country's needs and advancement and the semi-arid climatic condition of the region. After independence new Pakistan planned and started constructing large numbers of dams, barrages and canal systems on the Indus River and its affluent. Large scale schemes like Mangla Dam, which was constructed in 1967 and Tarbela Dam which was completed in 1976 played a role in water supply for irrigation, generation of hydroelectricity and flood control (WAPDA, 2018). These projects had a positive impact on increasing agricultural yields and thus played a role in the



development of the economy. However, the most significant decision that defined Pakistan's water resources regime occurred in 1960 when Pakistan and India signed the Indus Waters Treaty with mediation from the World Bank. This treaty divided the waters of the Indus as well as its affluent between the two countries where Pakistan got the rights of the western rivers, which include the Indus, Jhelum and Chenab Rivers while India got the rights of the eastern rivers that are Ravi, Beas and Sutlej Rivers. Nonetheless, the treaty is recognized as one of the most successful cases of international water allocation management despite the existing conflict and difficulties in the agreement's application (World Bank, 2019).

Current Water Resources and Usage

Pakistan's water resources are primarily derived from the Indus River Basin, which includes the Indus River and its tributaries: which include the Jhelum, Chenab, and Ravi, Beas, and Sutlej rivers. These rivers together feed the nation's Water resources that caters the over 90% of the nation's Water requirement for agriculture (Arif, 2020). Apart from the rivers, Pakistan has other sources of water such as groundwater, lakes, and reservoirs though the amounts are very limited. The three major water reservoirs are Tarbela, Mangla, and Chashma and they are used to control the water flow, availability of water in dry season, and water for irrigation and Hydro electricity production. However, these resources are under pressure due to both the growing demand coupled with water management practices and due to climate changes, which is changing precipitation patterns and reducing river flow (FAO, 2019).

The consumption and the patterns of water utilization in Pakistan are inclined more towards agriculture since Pakistan is an agrarian country. Pakistan's water supply mainly goes to agriculture, and the products include wheat, rice, and cotton that are essential for local consumption and export. Industrial usage attracts 3% while domestic usage is only 2% (Khan, 2021). However, these sectors could hardly optimize the use of water which is a crucial resource in industrial applications. Some of the conventional techniques of irrigation like flooding leads to lot of water losses in the process of evaporation and percolation. In addition, the fixed structures of the water distribution networks by canals and pipelines are in many cases outdated and in a very bad condition so that they also contribute to the inefficiency. There have been activities to increase the facilities on water storage and delivery with focuses on increasing the capacity of water reservoirs, constructing new dams and optimizing irrigation systems.

Causes of the Water Crisis

The other major factor that has aggravated water shortage situation in Pakistan is population explosion which has created a lot of pressure on the available water resources. Over the past few decades, the population of Pakistan has risen significantly which increases the demand of water for domestic, agriculture and industrial sectors. This burgeoning demand has outstripped the availability of water resources thus exerting lots of pressure on the country's limited water supply. Also, the problem is compounded by the process of urbanization: with cities growing and thereby necessitating the need for more water in the population as well as for consumption, cleaning, and various purposes. The agricultural sector which is the largest user of water still uses the



conventional water irrigation techniques that are relatively inefficient hence pumping more pressure on the available water resources (World Bank, 2019). It clearly illustrates that as population grows the availability of water further decreases and the existing gap of supply and demand further increases in order to fulfill the needs of the people and the economy.

Climate change is another cause of water problems in Pakistan as well as in many parts of the world. Shifts in the amount of rainfall, frequent droughts and melting of glaciers particularly in the Himalayas have all affected the availability of water. The Indus River which is provided by glaciers melt water and monsoon is witnessing low flows for irrigation and hydropower. Also, an increase in temperature and the duration of heatwaves enhances evaporation, thus lowering the overall availability of water. These problems are further exacerbated by poor management and unsustainably high water usage including ineffective and outdated irrigation methods that result in high levels of water losses primarily through leakage and evaporation. Contamination of the water sources due to industrial waste, poor agriculture drainage systems, and poor sewage treatment add to the list of factors that lead to scarcity of clean water for human consumption. Water disputes with India, especially over distribution of the Indus River Basin waters, is another dimension because both countries have water issues to deal with due to scarcity and rising geopolitical tensions (Mustafa, 2020).

Impact of water crisis

The world water crisis impacts on agriculture, with ramifications for food security and existence of rural populations. Lack of clean water hampers irrigation and thereby the yields of crops reducing food production and increases the susceptibility of droughts (FAO, 2018). In most of the developing areas where agriculture remains the main source of income, water shortage contributes to poverty and malnutrition as most farmers cannot keep their crops and animals alive (Molden et al., 2007). The fact that agriculture requires predictable water supply has reinforced the necessity of sustainable water management in order to feed the world and support the rural population (Rockström et al., 2009). Socially, the water crisis raises the rates of diseases and death, particularly in the community. Companies that use water in their production line, for instance, the cloth manufacturing sector, breweries, and electricity production, experience production hitches and high costs as a result of water shortage (UNESCO, 2019). This a result impacts on employment and economic stability especially where industries that use large volumes of water are key players in the economy (World Bank, 2016). Moreover, the unavailability of clean water for domestic use and industries hinders investment which in turn retarded development and aggravated the current disparity (McKinsey & Company, 2009). Water management is therefore a critical input that drives industrial development and overall economy of the affected areas.

Government and Policy Responses

The government of Pakistan has developed various policies and regulations to manage water supply to cater for the increasing demand. Some of the policies include the National Water Policy (NWP) 2018 which provides a framework on the usage of water resources in the country,



stressing on efficient usage, sharing, and availability of new water resources. Some of the objectives that the policy aims to meet are water usages, efficiency, pollution, and climate change. Furthermore, there are also several water management and conservation policies in the federal and provincial government that cover the areas of irrigation and water management with the efforts to modernize the irrigation system and water storage facilities and water governance (GoP, 2018). WAPDA is one of the major institutions of Pakistan which are directly involved in the management and development of water resources of the country. WAPDA is involved in the development and management of the major water structures such as dams, barrages and canals.

Some of the recent government projects carried out by WAPDA are Diamer-Bhasha Dam and Mohmand Dam which is planned to store more water and generate hydel electricity. Further, there are programs like the National Program for Improvement of Watercourses (NPIW) and the On-Farm Water Management Program that look into the issue of improving efficiency in irrigation systems and preventing unnecessary losses of water. Nevertheless, the efficiency of these measures has not been very high. There are several issues that may affect the achievement of significant improvements in water storage and supplies by the infrastructure projects; these include bureaucratic delays in implementation of the projects, inadequate funding and lack of co-ordination among the various agencies. Moreover, focusing on the big picture, the big projects, eliminates the opportunity to invest in long-term, locally applicable sustainable water management solutions that could help the water stressed regions right now (Khan, 2021).

International and Regional Cooperation

International and regional cooperation is one of the most crucial areas for solving the problems of water supply in Pakistan. There are other sources of assistance from the international community in the form of loans, grants, and consultancy services from bodies such as the World Bank, the Asian Development Bank, and the UNDP. These global organizations fund infrastructure development, capacity development, and sustainable water resources utilization. Internationally, there is a need to cooperate with neighbouring countries especially India due to the shared water resource which is the Indus river. One of the fundamental components of this cooperation is the Indus Waters Treaty of 1960 signed through the mediation of the World Bank which defines the division of the water of the Indus River and its branches between India and Pakistan. Nevertheless, it can be said that the treaty has mainly worked successfully to address the issue of water distribution and avoid clashes. It is essential for the countries sharing the transboundary water resources to make sure that dialogue and cooperation will go on for the purpose of maintaining stability and sustainable use of water resources (World Bank, 2019).

Future Projections and Scenarios

The extrapolations of the water availability of Pakistan up to the next century depict a very grim picture if the situation remains same. Due to growth in population and industrialization the availability of water per head decreases and it is likely that in the year 2025 there will be very acute water problem. The anticipated decrease in the volume of water in the rivers in the future as a result of changes in climate like decrease in glacier melt, and variations in rainfall regime will



make the situation worse. There may be conflicts on water issues that lead to increased regional antagonism with the neighbouring countries who are the users of the Indus Basin water, thus causing geopolitical insecurity. If the crisis continues unresolved, then in the years to come the long term effects will be very grave for the economy of Pakistan as it will lead to a decline in agricultural production, further worsening the situation of food scarcity and leading to grave health problems associated with lack of proper water supply. The economic effects could be suppressed industrial development and compounded costs linked to water sourcing and fixing of damaged infrastructure, which would work against the general national development and increase poverty levels (FAO, 2019).

Solutions and Recommendations

It is therefore important for sustainable water management to be employed so as to mitigate the water problem in Pakistan. This entails the change of status of flood irrigation to that of drip and sprinkler irrigation that can help in the conservation of water hence increasing crop production. Other strategies that can help improve the sustainable use of water include the incorporation of rain water harvesting, the use of treated sewage water for purposes other than drinking. New technologies are used to enhance the efficiency of the utilization of water, for instance, advances like smart water application that involves the use of real time information to apply water. Also, integrated sophisticated water-saving technologies and the renewal of deteriorating infrastructure are very crucial in reducing wastage and thereby enhancing the availability of water (Khan, 2021). Regulatory and administrative changes are needed to fix the systems problems within the water policy of Pakistan. It is thus important, enhance the capacity of the institutions that are involved in water resource management, enhance the vertical and horizontal co-ordination between the federal and provincial levels and ensure that the management practices are transparent and accountable. Another important practice is the promotion of public awareness and the involvement of people in the community in the management and use of water so as to enhance conservation and standards that are adopted at the community level. Also, international collaboration and support can offer funds, professional advice and recommendations from other countries that have similar issues. Establishing diplomatic relations with the countries and international organizations to find ways on managing the water resources can go a long way in managing the disputes and ensuring that proper management of water resources is carried out on a larger scale (World Bank, 2019).

Conclusion

The water crisis in Pakistan is not a simple problem that can be easily addressed since its impacts are complex and span across all facets of life in the country. Among the major factors, the increasing population, climate changes, improper water utilization, and water conflicts related to the water crisis that have large effects on agriculture, economic development, health and environmental conservation. The water situation in Pakistan is alarming and the scarcity of fresh water is on the top list, due to water availability and demand which may further enhance food crisis, economic crash and social unrest. Another factor that poses a threat in the acquisition and



conservation of water resources is the ever-strained conflict with India over the use of water and in particular water resources. The solution to this crisis entails the use of effective and sustainable water management techniques as well as the use of advanced technology. By adopting better ways of irrigating crops, proper water management, and adopting new technologies can help a lot in water conservation. Other policies include those that seek to improve governance, upgrade the physical facilities, and mobilize the people.

This way, Pakistan can control its water resources and reduce the impact of the Water crisis in the country, Agriculture and Economy and society. Cooperation with other countries and collaboration at the regional level have their importance in overcoming the problems that Pakistan is facing regarding water. Coordinating with other international organizations and countries can help in the identification of suitable strategies in managing water in the country. Further assistance from the international community and continued respect for existing treaties like the Indus Waters Treaty should be preserved to sustain peace and fair water sharing. Addressing water crisis in Pakistan through domestic coupled with international cooperation intervention will help the country to secure a better water future which in turn will support economic development and the welfare of the population.

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