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Citation: Aqdus, Malik Muhammad. "Law, Governance and Policy in Pakistan Regarding Water Crisis: A Critical Analysis and the Way Forward." Indus Journal of Law and Social Sciences 4, no. 1 (Spring 2024): 36–47. https://doi.org/10.70540/ijlss.2024(IV-I).04

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Law, Governance and Policy in Pakistan Regarding Water Crisis: A Critical Analysis and the Way Forward

Pages:1– 11 **Vol.**IV, **No.**I (Spring 2024) **p- ISSN:**3078-3666 **e- ISSN:**3078-3283

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Doi:*10.70540/ijlss.2024(IV-I).04* *Doi Link:* *https://doi.org/10.70540/ijlss.2024(IV-I).04*

Contents

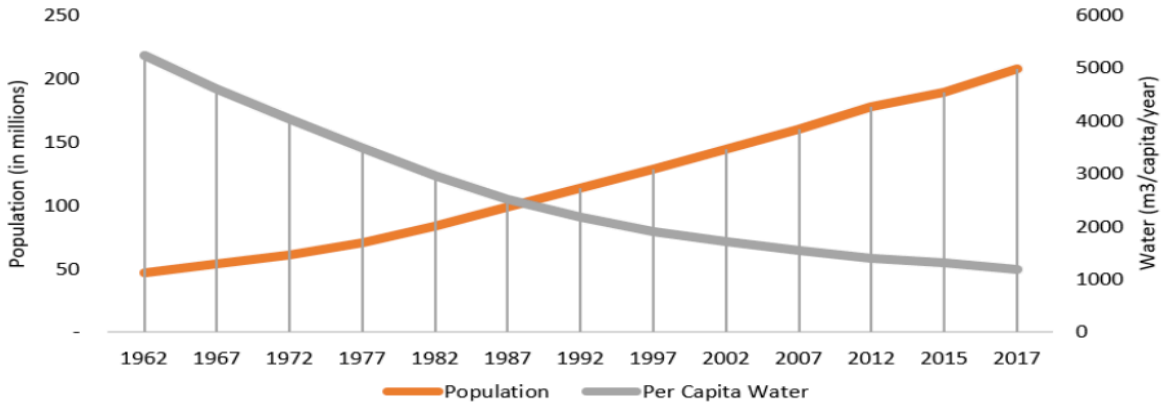
Abstract: *Water shortage has become a threatening issue in Pakistan. This instant paper will evaluate the policy and legal frameworks in Pakistan regarding the water crisis, focusing on recognising the loopholes and proposing practicable solutions. The main objective is to analyse the existing laws, policies, and institutional roles in managing water resources and moderating scarcity. The research methodology is qualitative, based on a doctrinal legal approach, analysis of constitutional provisions and laws, existing policies, and judicial views, corroborated by other sources, including scholarly articles and reports. The findings include that Pakistan's water governance is fractured, old-fashioned, and improperly applied, with overlying institutional roles, fragile enforcement mechanisms, and improper heed to climate change and overpopulation. The paper insists on comprehensive legal reforms, improved policy coherence, and the assumption of eco-friendly management practices. It concludes by proposing comprehensive amendments in water law and policy frameworks, better governance and resource management.*

Keywords:
Pakistan's Crisis of Water, Management of water, Law of water, Policy of water, Water governance, efficient allocation of water, Governance issues.

1. Introduction

Since its inception in 1947, Pakistan, being an agricultural country, has faced a series of economic challenges. At the heart of the main causes lies the stressful water shortage which is gradually developing into a giant problem of water scarcity. After independence, Pakistan was detached from the life-giving waters of the Ravi, Bias and Sutlej, which became part of India. Now, the influx through the "River Indus", flowing from "Kashmir to the Arabian Sea" (North to South), is the lifeline of the 251.3 million population of Pakistan.[1] The water crisis began in Pakistan soon after its separation from India during the First Kashmir war in 1948, when India stopped water flow from its territory. Being a lower riparian State to India, Pakistan began its sufferings which continue to date. Pakistan ranks 36th among the most water suffering countries around the world in terms of total renewable water resources (Nazam Maqbool, 2022), and the per-person water availability has further reduced to an alarming figure of 1188 m^3/year in 2017 (See "Figure 1").

Figure 1: "Trends in Pakistan regarding Water per capita availability w.r.t growing population from 1962-2017"



Source: Water Availability: Use and Challenges in Pakistan, FAO United Nations (2021)

These trends are the consequences of continuous negligence towards the growing challenges of overpopulation, changes in climate and renewable resources, which have significantly added their influence to the current water stresses in the country. The laws and the policy frameworks are outdated. Even no adequate attention was being given to this threatening issue. Moreover, bad governance in

[1] Population "estimated by World Bank, United States Census Bureau" (2024). https://data.worldbank.org/country/Pakistan#:~:text=Population%2C%20total-,Population%2C%20total,2024%20Million%20150%20257%20Pakistan (accessed on 4 September 2025)

relation to water management and inadequate assessments regarding the growing need for water with respect to population also constituted a great threat to Pakistan. The population is expanding day by day, and resources are getting scarce. Climate change is posing serious challenges but no adequate preparation has been formulated "to combat the effects of climate change". Flooding is becoming common in Pakistan, and every year, it causes serious life and property loss to the country, as it has in recent years.

As water is a very essential constituent of human life and is regarded as an inalienable and fundamental right, thereby making it the state's responsibility to provide its citizens with pure and clean drinking water and sanitation to ensure their right to life and dignity".[2] This fundamental nature was further corroborated by "UN Committee on economic, social, and cultural rights, when it declared the right to water as essential for life and dignity".[3]

Keeping in view the significance and legal weightage of water, this research paper while adopting a doctrinal legal approach and methods of qualitative analysis, investigates the constitutional, legal and policy frameworks of Pakistan that govern water resources management in the country. Meanwhile, the paper analyzes the effectiveness of these existing laws. Moreover, it also examines the institutional roles and loopholes in the governance mechanisms which have contributed to the present crisis of water in Pakistan. Lastly, this article will also suggest some legal, institutional and policy reforms in the existing frameworks so as to cope with the present challenges and enhanced governance by optimum utilization and management of resources. In doing so, the primary sources consulted include, *inter alia,* the Constitution of Pakistan and its interpretations by the national judiciary, relevant legislation, policy frameworks, institutional mechanisms and reviews. The secondary sources include, but are not limited to, international legal instruments, scholars' studies, international organisations' research and reviews, etc.

[2] Article 9, Constitution of Pakistan, 1973
[3] General Comment No. 15 (2002), UN Committee on economic, social and cultural rights established under ICESCR

2. Defining "Water Governance" And its Relation with Water's Legal And Policy Frameworks

"Water Governance" is defined as the regulatory frameworks, processes, and procedures for receiving, making use of, and managing water resources and supervising or resolving water-related issues (FAO, 2018). It's like a political, societal, and administrative attempt to efficiently manage the resources and effectively serve different fields of society encompassing the local and communal levels (Ahmad et al., 2021; Maharjan, 2018). Further, water governance also includes efficient water management on a consistent basis, i.e. even "regular, monthly, seasonal, or annual basis through collaborative efforts of all related institutions, shareholders and infrastructure" (FAO, 2018). In addition to these, water governance also explains how allocation of resources, policies and regulations or "politics are involved regarding water allocation through formal or informal institutions" as to estimates that "who is getting what and how much he is getting, and who is doing what", while ensuring the principles of transparency and equality (Jiménez et al., 2020).

Many water crisis in Pakistan are primarily associated with bad water governance and management". Despite of the fact "that climate change and trans-border tensions, particularly with India, badly affected water availability in the country", but it should be accepted that bad water governance and inappropriate management has further shaped "water crisis in Pakistan" (Shafiq, Gillani, & Shafiq, 2021). It has changed the water surplus status of the country into water water-stressed country, as the availability of water per person has significantly decreased over the period of past decades (See Figure 1). Due to governance gaps, an unsound regulatory system, lack of cooperation among stakeholders, or appropriate finances are among the main factors that hinder good water governance (Mirjat et al., 2017).

Legal and Policy frameworks are the main controlling factors of governance in every sector; water governance is, therefore, no exception. There is a deep link between the enactments and institutional workings. In order to understand the impact of controlling factors with that of institutional arrangements, an adequate understanding of these existing constitutional, legal and policy frameworks is a *sine qua non.*

3. Constitutional And Legal Frameworks on Water in Pakistan

As life began with water, it is sustained through water. Water is an essential constituent of human life and has been consistently interpreted as a fundamental right under the provision of the Right to Life.[4] *Shehla Zia vs. WAPDA*[5], a landmark judgment of Pakistan's Supreme Court in this regard. A very key aspect of this judgment includes the Supreme Court's emphasis on how the word "life" under Article 9 has to be interpreted. The Court conferred a much wider meaning to the term and held that it must not be restricted to refer to a vegetative state or the time interval between conception and death. The term "life" should be expanded to apply to the protection of citizens from all environmental hazards and the provision of clean drinking water facilities for ensuring life with dignity and well well-being of citizens. This key role of the Government is also among the most vital principles of the policy of the State.[6] Therefore, it is among the key responsibilities of the Pakistani federal government to allocate or distribute water resources to its citizens through provincial governments, manage trans-border water conflicts, ensure resource building, "optimum utilization of water resources, adequate usage, and sustainability of water frameworks" (Ranjan, 2019). Furthermore, the development of hydro power infrastructure, i.e. Dams, is the responsibility of federal institutions, particularly the Ministry of Water Resources, Pakistan (Saleem, 2017). Here we will discuss some of the water related laws in Pakistan, in addition to the Water policy and institutional works followed by the challenges in the present water governance. There will also be a critique of existing laws and frameworks as they are not up to the mark.

4. The "Canal and Drainage Act of 1873"

The allocation of water is a long standing issue in the subcontinent; therefore, one of the earliest legal frameworks on water was enacted in the colonial era, named the "Northern Indian Canal and Drainage Act, 1873". As Sindh was part of the Bombay Presidency, the "Bombay Irrigation Act, 1879" governed water distribution for the province of Sindh at that time. After partition, these laws were called the "Punjab Irrigation and Drainage Act, 1873 and Sindh Irrigation and Drainage Act, 1879", respectively. There is also a complete legal framework regarding water management for Khyber Pakhtunkhwa, called as "Khyber Pakhtunkhuwa Irrigation and Drainage Act, 1873", which is now applicable to the territory previously called as North West Frontier Province. The chemistry of all these Acts is similar, as they empower the provincial governments to ensure better governing mechanisms and distribution of water

[4] Article 9, Constitution of Pakistan, 1973
[5] PLD 1994 Supreme Court 693
[6] Article 38, Constitution of Pakistan, 1973

resources. These laws have now been amended but are still enforced in the country (Ahmed Rafay Alam, 2019). These frameworks mark the historical enactments legislated and promulgated by the British in United India. But after partition in 1947, two riparian states came into being, and Pakistan became a lower riparian State to India. Since 1947 to date, many legal frameworks have been enacted to govern the federal, provincial and trans-border water resources.

Table 1: Water Laws In Pakistan

Sr. #	Legislation	Year	Scope	Objectives
1.	The "Canal and Drainage Act"	1873	Central and Provincial	Framework for irrigation purposes
2.	"Water and the Power Development Authority Act" (WAPDA)	1958	Central and Provincial	To establish an institution to adequately manage water resources
3.	"Indus Waters Treaty"	1960	International	An agreement "between India and Pakistan" to utilize the Indus Water resources
4.	The "Territorial Waters and Maritime Zones Act"	1976	Central and International	Defines maritime territory and boundaries
5.	"National Environmental Quality Standards"	1993	Federal and Provincial	Oversee domestic and industrial pollution
6.	The "Provincial Irrigation and Drainage Authority Act"	1997	Provincial	Regulate Drainage and Irrigation systems in all provinces
7.	"National Disaster Management Act"	2010	Central and Provincial	For reducing vulnerabilities and efficient recovery from disasters
8.	"18th Amendment"	2010	Federal	Impacted water management as provinces gained autonomy to manage their resources
9.	Water Act of Punjab	2019	Provincial	Regulatory framework for Provincial water
10.	Water Act of KPK	2020	Provincial	Provincial water regulatory framework

"Source: (Young et al., 2019; Mustafa and Akhter, 2013)"

5. **"Water and Power Development Authority Act, 1958"**

The "Water and Power Development Authority Act, 1958" was passed by the Parliament of Pakistan as "Act No. XXXI of 1958 to establish Water and Power Development Authority" (WAPDA). The Authority was granted wide powers and duties under this Act including, *inter alia,* to make an inclusive plan for the betterment and optimum "utilization of water and power resources on a single, unified and multi-dimensional basis in Pakistan". WAPDA was also empowered under the Act to frame schemes for a Province or any are within any province providing for all or any of the matters including, but not limited to, supply of water, drainage, matters related to irrigation and other creative use of water resources; flood control; the preparation, supply, and allocation of power; the building up, preservation and operation of power houses including hydro-electricity generating power stations; and inland navigation. The WAPDA was also vested with the power to exercise technical or administrative supervision of any scheme announced by any other agency of any Province, with the approval of the federal government.[7] Therefore, this Act is of great significance in relation to water governance and management.

6. **The "Indus Waters Treaty, 1960"**

"Indus Waters Treaty, 1960" is a very significant legal framework between India and Pakistan that governs the usage, distribution and management of Indus water between the two riparian countries. It was one of the most negotiated documents, mediated by the World Bank, wherein Pakistan was required to make certain reforms in its legal and institutional frameworks to adequately utilize the water resources of the Indus River (Amir & Blackmore, 2005). The treaty is famous due to its strategic division of the Indus River. In accordance with the treaty, "the right of eastern rivers including Ravi, Beas and Sutlej was given to India and the right of Western rivers including Indus, Chenab and Jehlum was given to Pakistan".[8] The treaty also required Pakistan "to design, construct, and implement, with due consideration for economy and expedition, that portion of a system of works that will replace water supplies for irrigation canals in Pakistan that relied on water supplies from the Eastern Rivers with those from the Western Rivers and other sources, as of August 15, 1947".[9] As a result, Pakistan started building its dams. The very first and oldest dam is the Warsak dam, completed in 1960 and was expanded in 1981 and is situated on the Kabul river. A brief list of dams in Pakistan is summarized

[7] Chapter III, WAPDA Act, 1958
[8] Article 2 and 3, Indus Water Treaty, 1960
[9] Article 4, Indus Water Treaty, 1960

below:

Table 2: Dams of Pakistan

Region	No. of Large Dams	No. of Small Dams	No. of Proposed Dams	In Construction Phase
Islamabad	2	-	-	-
Punjab	31	29	4	1
Sindh	3	-	-	1
Balochistan	29	-	5	1
Khyber Pakhtunkhwa (KPK)	28	2	1	5
Azad Jammu & Kashmir (AJK)	2	-	-	-
Gilgit Baltistan	3	-	02	01

Source: (Aisha Saddiqa and others, 2022)

Water under the Constitution of Pakistan, 1973 and Effects of the 18th Amendment

Unlike the "Govt. of India Act, 1935 and 1956 Constitution of Pakistan, the 1973 Constitution of Pakistan, divided the executive and legislative responsibilities of the federation and provinces under the Federal and Provincial Legislative Lists".[10] The Federal Legislative list in the fourth (IV) Schedule does not include water as a subject. Instead, it is a subject under Provincial lists. However, it does not preclude the constitutional responsibilities of the Federal Government or the Legislature with respect to Parliament, as the Federal government has authority to manage institutions and all regulatory bodies mentioned under Part II of the Federal Legislative Lists (Ahmed Rafay Alam, 2019). Examples of such authorities are "Water and Power Development Authority (WAPDA)"[11] and "Indus Rivers System Authority (IRSA)"[12]. The "1973 Constitution also provides for the provinces to confer legislative powers to the Parliament to legislate on provincial subjects".[13] Such power was also exercised by the Parliament

[10] Article 142, Constitution of Pakistan, 1973
[11] Established under "Water and Power Development Authority Act, 1958"
[12] Established under "Indus River Systems Authority Act, 1992"
[13] Article 144, Constitution of Pakistan, 1973

in the past.[14] Even after the 18th Amendment, wherein the provinces were granted legislative autonomy, there were no changes in the subject of water governance. It remained a provincial domain since partition (Ahmed Rafay Alam, 2019). However, the present Constitution, like earlier constitutions, provides for a forum to adjudicate complaints between provinces regarding disputes concerning their interests in relation to a natural source of water supply. Such adjudication shall be the absolute function of the Council of Common Interests (CCI), comprising the Prime Minister, Chief Ministers, three (03) members of the Federal Government and reports to Parliament.[15] The role of CCI in dispute adjudication was invoked once in the past, wherein the Council of Common Interests discussed establishing a Commission on the division and water sharing from the Indus River System in its third meeting held on 31st December 1976 (Ahmad Mehmood Zahid, 2013).

7. Other Water Laws in Pakistan, Legal Doctrines and Judicial Precedents

In exclusion to the above discussed laws, there were various other enactments related to water in Pakistan. As mentioned in (Table 1), Pakistan has legislated certain laws like "Territorial Waters and Maritime Zones Act, 1976", which elaborates Pakistan's territorial waters and maritime zones, aligning itself with the "UN Convention on the Law of the Sea, 1958". Moreover, there are "National Environmental Quality Standards of 1993" which deal with the control of domestic and industrial pollution to ensure an eco-friendly environment for farmers and all other citizens. The judicial precedents by the Apex Court of the country that is, the Supreme Court of Pakistan also played its role in affirming the necessity of environmental protection and natural resources. The very first precedent in this way was the case of *Shehla Zia vs. WAPDA",*[16] wherein "the right to life" was interpreted in a way to encompass clean and healthy environment, as discussed earlier in this article. The Supreme Court also "declared the right to access clean drinking water is vital part of Fundamental right to life and to a clean and healthy environment, in the same year, in the case of *West Pakistan Salt Mines Labour Union (CBA) Khewra, Jhelum vs. The Director, Industries and Mineral Development, Punjab, Lahore"*.[17] Another significant development in the Water laws of Pakistan was the Doctrine of Public Trust, first discussed by Mr. Justice S. Ali. Aslam Jafri "in the case of *Sindh Institute of Urology and Transplantation vs. Nestle Milkpak Limited"*,[18] wherein the Honorable Judge introduced the aforementioned Doctrine in

[14] The Seeds Act, 1976 and National Disater management Act, 2010 are its examples.
[15] Article 155, Constitution of Pakistan
[16] PLD 1994 Supreme Court 693
[17] 1994 SCMR 2061. See also "Nazim UC Allah Bachayo Shore vs. The State, 2004 YLR 2077 "(Sindh)
[18] 2005 CLC 424 (Karachi)

paras. 23 and 24 as:

> 23. *"No civilized society shall permit the unfettered exploitation of its natural resources by anyone particularly in respect of the water which is a necessity of life. Ground water is a national wealth and belongs to the entire society. It is Nectar, sustaining life on earth and without water, the earth would be a desert. I find myself in agreement with Principle to Stockholm Declaration, 1972 as reproduced above in para. 13 of this order that the natural resources of the earth, including air water, land, flora and fauna especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate. . ."*
>
> 24. *"It is well-settled that natural resources like air, sea, waters and forests are like Public Trust. The said resources being a gift of nature, they should be made freely available to everyone irrespective of status. "Doctrine of Public Trust", as developed during the days of the ancient Roman Empire, enjoins upon the Government to protect the resources for the enjoyment of the general public rather than to permit their use for private ownership or commercial purposes. Even under Islamic law certain water resources are to be protected from misuse and over exploitation…"*

This legal principle was approved and has been applied in numerous cases by the Supreme Court and prescribes that all natural resources in Pakistan may be thought of as a Trust, "where the Trustee is the State and the Beneficiaries are the people of Pakistan". The Doctrine also restrain that such resources shall not be consumed for any private or commercial use.[19]

[19] See, for example, "*Muhammad Tariq Abbasi vs. Defence Housing Authority* (2007 CLC 1358, Division Bench, Karachi), *Arshad Waheed vs. Province of Punjab* (PLD 2010 Lahore 510), *Chamber of Commerce and Industry in Quetta, Balochistan vs. Director-General, Quetta Development Authority* (PLD 2012 Quetta 31), *Maulana Abdul Haque Baloch vs. Government of Balochistan* (PLD 2013 Supreme Court 641) *and Young Doctors' Association vs. Government of Pakistan* (PLD 2015 Lahore 112)".

8. Policy Frameworks And Institutions

There are a number of water policies adopted over a period of time in Pakistan. These frameworks have gone through several stages. Many institutions were also set up by the Government. In essence, water related issues in Pakistan depend on present regulatory policies, institutions and governance. Water Resources Management is a way to regulate water resources allocation among different sectors through law making, building effective plans, and allocation mechanisms. Pakistan has adopted different water governance policies and regulations, and certain institutions have also been built. The 2018 National Water Policy is important in this regard which explicitly provides a framework for sustainable water governance (GOP, 2018). It promotes mutual collaboration between "federal, provincial, and local government and other politicians" (Cooper, R. 2018). Below is the table which lists certain policy frameworks and institutions are given:

Table 3: Water Policy Frameworks and Institutions in Pakistan

Sr. #	Institutions & Policies	Year	Scope	Aims/Function
1.	The "Council of Common Interests (CCI)"	1973	Federal	Adjudicate provincial disputes related to water
2.	Water Apportionment Accord (WAA)	1991	Provincial	Water Allocation among the provinces
3.	Indus River Systems Authority (IRSA)	1992	Provincial	Federal and Provincial water coordinating organization
4.	WAPDA Water Vision 2025	2001	Federal and Provincial	To frame consistent infrastructure and developmental projects regarding water and power
5.	National Environment Policy	2005	Federal and Provincial	Pollution control and safety of environmental
6.	National Drinking Water Policy	2009	Federal	A framework to ensure pure and clean drinking water in all provinces
7.	Pakistan Vision 2030	2007	Federal and Provincial	A futuristic policy that highlights the effects of water insecurity, etc.
8.	National Policy of Climate Change	2012	Federal	Policy for addressing the effects of climate change

9.	Pakistan Vision 2025	2015	Federal	Strategy and roadmap to achieve the SDGs
10.	National Water Policy	2018	Federal and Provincial	Present regulatory framework for "water governance in Pakistan"

Source: ("Young et al., 2019; Mustafa and Akhtar, 2013")

These policy frameworks and institutions have shaped the present corpus regarding "water governance", and the "National Water Policy, 2018" is the present governing policy related to water governance in the country. Now, we will dive into the challenges and identify loopholes present in the existing legal and policy frameworks that affect water governance.

9. Challenges And Loopholes In Water Laws, Policy Frameworks And Institutions Of Pakistan

Water law is an underdeveloped law in Pakistan. There is a lack of coherence, clarity of objectives and functions. The institutions have overlapping roles which make them ineffective and therefore, are unable to address water security issues. Personal Interests of the Provincial Governments are prevailing over the National interests of the people.

10. Constitutional Challenges

As water law is a provincial matter, therefore, it is difficult for the federal government to legislate or frame a comprehensive and effective law or policy, despite many national and international studies highlighting the issues of water governance. This is a very crucial challenge as there is no clarity on whether water governance is to be managed by the Federation or independently by the provinces or through certain negotiated means. Provinces have not yet resolved to let the Federation intervene to enact a unified and comprehensive water policy. Despite many appealing reports that Pakistan will become arid within the next few years, no province has ever taken a step to involve the Federation in Law making process. This raises questions regarding the democratic and constitutional mandate for integrated water management, undermining the scope and effectiveness of the National Water Policy, 2018 (Ahmed Rafay Alam, 2019).

Several national and international papers that address water governance challenges have caught the interest of higher authorities. For example: “Chapters 6, 17, and 18 of the National Commission on Agriculture's 1988 report”; “The Asian Development Bank's Water Sector Strategy (2002)”, “the Inter-Provincial Committee on the Apportionment of the Indus Waters' 1991 Report”, and “WAPDA's Vision 2025 Report (2003); Pakistan's Water Economy Running Dry in 2005”, “a report by John Brisco, World Wildlife Fund (2012)”, “Integrated River Basin Management Development for the Indus Basin Pakistan Vision 2025: Pillar IV: Energy, Water, and Food Security by the Planning Commission, Government of Pakistan” (GOP, 2018). “Friends of Democratic Pakistan's report, "A Productive and Water Secure Pakistan" (Water Sector Task Force, 2012); ADB and the Post-dam Institute for Climate Impact Research's 2017 report, A Region at Risk: The Human Dimension of Climate Change in Asia and the Pacific, further sparked this discussion in scholarly and professional circles” (MWP, 2018).

Now, constitutionally, it is the biggest challenge that provinces are not on a single page and are not giving adequate attention to framing water policies. In order to invoke the federal intervention in water laws and governance, Provinces should confer on the Federal Government the power to frame a national policy. It could also be understood with an example of Kalabagh Dam, which was never built, and the political tensions again undermined the national interests, and the people of Pakistan are not only being deprived of water resources but also of cheap electricity.

11. **Insufficient Cooperation between the Federal and Provincial Levels**

Since “Pakistan has both constitutional and federal systems” (Ranjan, 2019), there is a significant lack of coordination between the majority of pertinent institutions, including the federal and provincial governments. This was initially a “major obstacle in the enforcement and execution of water policies” (Cooper, 2018), and things became more complicated “after the 18th Amendment. At the federal and provincial levels, the devolution process produced over 18 distinct entities and bodies” (Alam, 2019). “Different ministries including climate change, defense, industry, and agriculture are also stakeholders in the water governance”. Reaching workable solutions to issues is difficult due to conflicts of interest between stakeholders and policymakers (Winston, Yang, Savitsky, Alford, & Brown, 2013). There are occasionally gaps in communication between the relevant authorities, which eventually result in non-cooperation problems (Saleem, 2017). Authorities and stakeholders only collaborate when it suits their interests; “there is no platform at any level that fosters coordination between them” (Lerebours &

Villeminot, 2017).

The majority of the powers and duties for domestic and agricultural water delivery overlap "at the federal and provincial levels", as per the "State Bank of Pakistan's 2017 study" (Ali, Ashfaq, & Masood, 2017). "Several departments in Punjab and Sindh create policies for drinking water and sanitation without being involved in their execution" (Ayesha Saddiqah and others, 2022). The difficulties and conflicts are further increased by the execution of policies by other agencies (Sleet, 2019). Consequently, there has been a larger slowdown in the development of water laws and policies.

12. **Accountability and Transparency Concerns**

One of the enduring characteristics of Pakistan's political system is corruption. Adequate administrative checks on authority are severely lacking. Politicians and other stakeholders have an impact on water bureaucracy (Mustafa & Akhter, 2013); as a result, accountability systems are inadequate, and policy frameworks are therefore poorly implemented. Along with significant outside investment, the government provided cash for "several water projects, including the Mangla and Tarbela dams, SCARP, and LBOD". Nevertheless, the majority of the projects continue to lack proper maintenance (Ayesha Saddiqah and others, 2022). "The salaries of the water bureaucracy account for a significant amount of the budget" (Kugelman & Hathaway, 2009).

13. **Ineffectiveness and a Lack of Useful Planning with regards to Resources**

Water is the least important issue for "the Ministry of Water and Power, which is primarily responsible for overseeing the development and management of water resources" (Ayesha Saddiqah and others, 2022). Five of the Ministry's six joint secretaries are employed in the power industry, whereas only one of them handles the water sector (Saleem, 2017). Furthermore, there has not been a "national water policy for the past 70 years. 2018 saw the passage of the first National Water Policy".

WAPDA is a major water management organization in the nation. It was created by the WAPDA Act of 1958, a constitutional statute, to "facilitate strategic planning for the water sector and the development of hydro projects. It continued to be a productive organization, finishing several hydro projects in the 1970s and 1980s" (Ranjan, 2012). However, because of the division of skilled personnel and poor design, its work efficiency significantly declined when it was split into two distinct wings, each with its own mandates for electricity generation and water management (Ayesha Saddiqah and others, 2022).

Furthermore, three significant dams in Pakistan have lost their average yearly flow of 10% and their storage capacity of 35% as a result of slits and sediments (Qureshi & Ashraf, 2019). The nation has a water scarcity in the winter because of a lack of storage. At the same time, severe floods are brought on by the excessive monsoon rainfall. As a result, the Arabian Sea receives the surplus water (Ayesha Saddiqah and others, 2022). Every year, "29 million acre feet (MAF) of water falls into the Arabian Sea in Pakistan; one MAF can irrigate four million acres of land and is worth one billion dollars" (Khan, 2020). The result is an annual economic loss to the nation of USD 29 billion.

14. **Water pollution and unhealthy water quality**

Pakistan is dealing with "low water quality" and a shortage of water. In Pakistan, about "60% of the population lacks access to safe drinking water" (Ayesha Saddiqah et al., 2022). Untreated industrial waste and sewer line leaks "have an impact on both surface and groundwater" (Sleet, 2019). There are "hundreds of micrograms of arsenic per liter in the drinking water of the majority of Sindh and Punjabi cities". However, the "World Health Organization has set a limit of 10 micrograms of arsenic per litre" (Ranjan, 2019). Every year, thousands of people are afflicted with waterborne illnesses. A 2016 study by "the Pakistan Council of Research in Water Resources indicated that 255 sources of water were deemed dangerous out of 369 samples taken from 23 major cities in the nation" (Daud et al., 2017).

Stressful water problems are being made worse by polluted water. "Approximately half of the two million wet tons of human waste that are produced annually end up contaminating Pakistan's water supply" (GOP, 2016). "A study found that 60 million people in Pakistan could be exposed to elevated levels of arsenic in groundwater on the Indus Plain" (Podgorski et al. 2017). One of the main causes of death and suffering in Pakistan is water-borne illnesses. In Pakistan, "over 60% of the population suffers from one or more of the major illnesses linked to poor access to potable water and better sanitation" (GOP 2009). 'About 40% of all premature deaths in the nation are caused by them, and they occupy roughly one-third of hospital beds" (Haydar et al. 2009). Diseases including "polio, dengue fever, and hepatitis A and E have also recently emerged" and resurfaced in Pakistan. According to Sahi (2013), diarrhea alone causes 54,000 fatalities in children under five, meaning that more than five children pass away from diarrhea every hour. This made the current water governance procedures more intense and called them into question.

15. Defective Water Supply Infrastructure

Another significant issue is inadequate and broken water infrastructure, which results in significant water waste. “Water diversions from watercourses to fields via canals, minor canals, and water channels account for about 61% of waste” (Winston et al., 2013). “Seepage and side leaks from unlined canals lose over 40% of irrigation water, and flood irrigation techniques squander 25% of it” (Ayesha Saddiqah and others, 2022).

Although accurate irrigation water waste statistics are not available for every province, Punjab's official data indicates that the watercourse's water delivery capacity has dropped by 30% from its original design as a result of “poor maintenance and a sluggish rehabilitation process” (Briscoe et al., 2005). Despite significant financial investments, “water systems are malfunctioning as a result of carelessness and inadequate upkeep” (Sleet, 2019). The authorities' belief in "build-neglect-rebuild" is frequently apparent. “Major dams and barrages in Pakistan” span thousands of hectares of land; if not adequately controlled, they could have catastrophic consequences (Briscoe et al., 2005).

16. Mismanagement of Water Resources and Issues of Capacity Building

Pakistan's water resources are not being well managed, and both surface and ground water are being misused and abused (Ali et al., 2017). The majority of water distribution legislation and rules date back to the colonial era and have not been sufficiently updated throughout time. After around 150 years, the Canal and Drainage Act, which was passed in 1873, is still in effect nationwide. Despite minor reforms in 1967, it remained unaltered legally (Sleet, 2019). Canal water is currently being exploited as a result of the introduction of the Warabandi (rotational water distribution technique) under this statute. This system's cyclical timetable, which distributes water based on time, acreage, and size rather than crop needs, encourages water inequality and exacerbates already dire circumstances (Ayesha Saddiqa and colleagues, 2022).

In addition to receiving more water, landowners in higher-ranking and prominent locations may also obtain others' water shares (Bisht, 2013). Those who can afford bribes also receive more water from local irrigation officials (Rinaudo, 2002). As a result, lower land areas could not receive enough water. However, excessive groundwater use has caused the groundwater table to drop to the dead level in several places, forcing them to use groundwater (Ayesha Saddiqah and others, 2022). Water demand was low when the Warabandi system was created, but as the population has grown, things have changed. Therefore, if the Warabandi system is not promptly discontinued, it may result in further water shortages

(Winston et al., 2013).

17. Overpopulation and Inefficient Planning of Resources

Overpopulation and ineffective resource planning are two of Pakistan's largest problems, contributing to the degradation of water supplies and a decline in the amount of water available per person. ‘With a 2.6-fold increase in population between 1972 and 2020, Pakistan rose from ninth to fifth place” (Nazam Maqbool, 2022). “Between 1977 and 2017, Pakistan's total water consumption rose by roughly 0.7% annually” (FAO, 2021; World Bank, 2021); at the same time, the “country's total water resources stayed constant at 246.8 billion cubic meters”, which caused the “per capita water resources to drop from 3,478 to 1,117 cubic meters annually” (Table 4).

The “ratio of water withdrawals to renewable water resources increased from 62% to 82% between 1977 and 2017, indicating an unequal increase in strain on water resources” (FAO, 2021). “By 2050, Pakistan's population is expected to have grown by more than half of 53 percent, reaching 338 million people. Additionally, it is anticipated that the percentage of people who live in cities will rise from 37.2% in 2020 to 52.2% in 2050” (Ali, 2013). If these issues are not promptly addressed and fixed, they will negatively impact Pakistani citizens' quality of life. Some statistics about population increase and resource burden are highlighted in the table below:

Table 4: Growth in Population and Resource Demand

	“1972”	“2020”	“Annual Growth rate”
“Population Total (millions)”	“61.4”	“221”	“2.7%’
“Total resources of renewable water [billion cubic meters (BCM)]”	“246.8”	“246.8”	“0.0%”
“Per capita amount of renewable water resources [cubic meters]”	“3,478”	“1,117”	“-2.3%”
“The total amount of water withdrawn [in billion cubic meters]”	“153.6*”	“200.0**”	“0.7%”

*Source: (World Bank 2021; and FAO, 2021). Note: * refer to data of 1977, and ** 2017.*

18. Climate Changes

"Pakistan is listed as being one of the top 10 nations most at risk from climate change worldwide, according to Global Climate Risk 2021" (Eckstein et al. 2021). Changes in "monsoon patterns, glacier melting, rising temperatures, and recurrent floods and droughts" are all signs that the nation is already confronting climate-related challenges to its water supplies (Nazam Maqbool, 2022). In the previous few years, as well as now in 2025, Pakistan has had many protracted droughts and floods. As an example, over 1500 people lost their lives, $14.8 billion worth of property was destroyed, and $15.2 billion was lost economically as a result of the floods in 2025 ("Pakistan: Monsoon Floods 2025 Flash Update #2 (as of 22 August 2025), 2025"). Climate change appears to have the potential to drastically reduce aggregate flow rates of water.

The majority of forecasts for the future indicate a downward trend and greater variability of the flows "over the next 50 to 75 years" (Khan, 2017). Due to its reliance on "glacial, snow-melt, and annual precipitation, Pakistan's lifeline water source, the Indus River Basin, has become extremely vulnerable to climate change". In the Sindh Province, where "a lack of water has forced many farmers to relocate to cities, it has already contracted into a canal" (Nazam Maqbool, 2022).

"Poor governance" and "resource management" were also evident in the government's lack of foresight and the non-full implementation of the "National Climate Change Policy 2021". Given that runoff from snow and ice melts currently accounts for 50–80% of the Indus River basin's average water flows (Yu et al. 2013), this will undoubtedly cause landslides, severe flooding, "dam failures, and soil erosion in the short term, as well as drought and famine in the long term" (Bhutto, 2020).

19. Recommendations

In view of the above discussion, Pakistan needs certain measures which should be collectively framed and implemented in good faith. These are:

A. The politicians and stakeholders should develop a consensus and undertake responsibilities with regard to the water crisis, and take practical measures to resolve it. Michael Kugelman said: *"First of all, Pakistan's leaders and stakeholders need to take ownership of this challenge and declare their*

intention to tackle it. Simply blaming previous governments, or blaming India, for the crisis won't solve anything" (Baloch, 2018).

B. A coherent and comprehensive legal and policy framework is required, agreed by all provinces and enforced in good faith, thereby ensuring good governance. "Dr Ishrat Hussain" once said: *"We do not have a water crisis; we have a failure of governance with regard to water issues"* (Husain, 2017).

C. Appropriate training and capacity building should be arranged that can address inefficiencies and mismanagement of institutions, and boost staff commitment and efficiency. In addition, Pakistan must contact international consultants and draw in foreign direct investments for a variety of R&D initiatives, such as building new water reservoirs.

D. Proper policy-making should be done at the national level, keeping in view the devastating situations of climate change, overpopulation and their hazardous impacts on water. A national water policy should be drafted or modified which addresses all the present and rising concerns related to water governance and implemented in good faith.

E. The country needs to revoke the *Warabandi* system of water distribution, as it is too outdated, fragile and contrary to the demand. Instead of fulfilling people's demands, it causes huge economic losses, particularly to farmers, thereby affecting the agricultural yield.

F. The nation must prevent water waste and make sure that water is recycled because new dams will only hold water, not produce it. Therefore, in order to manage water resources and their allocation, improved tactics and effective policies are needed.

G. Government is required to arrange awareness campaigns or such programs using modern technology with respect to practical water usage. People should be given adequate knowledge regarding the importance of every drop of water.

H. The policy on flood irrigation is outdated. Only water that reaches the roots is used by the plants, while excess water is absorbed by the soil, resulting in waterlogging. To reduce salt and waterlogging, the government must frame a better water drainage policy regarding irrigation.

I. Water supply infrastructure should be improved to reduce water wastage, and adequate measures should be taken into consideration to get rid of water pollution. Indus River Systems Authority should be empower to develop a coherent national policy to improve water infrastructure and minimizing issues of bad governance.

J. The government should speed up the construction of new reservoirs to store water, and also multi purpose storage channels should be constructed with the consensus of provincial governments. These will assist to store huge water as a result of glacier melts and prevent rural and urban flooding. Moreover, the water released by India can also be stored in these dams and channels, preventing huge losses to lives, property and economy.

K. All the concerned ministries of the government should undertake to cooperate, coordinate and supervise the Research and Development projects. They should ensure that all laws and policy frameworks are coherent, inclusive, and comprehensive, align with the modern needs of people, and ensure better water governance and improved institutions.

Conclusion

In a nutshell, the law, governance and policy in relation to the water crisis in Pakistan were found to be inadequately implemented. The Governance structure is quite old-fashioned, even though there was no National Water Policy before 2018. This sector has remained a neglected one. The present institutions have overlapping roles and powers which resulted in disagreements, conflicts of interest and confrontation, fracturing the governance infrastructure. There is no such enforcement mechanism which could satisfy the needs of the hour and be regarded as up to the mark. Inappropriate and inadequate attention towards climate change, overpopulation, water supply infrastructure, governance and allocation of water resources and continuous decline in governance of water related matters have equally contributed to making the situation worse. In addition, lack of cooperation and consensus between provinces and misuse of constitutional power of legislation under the blanket of 18th Amendment, have further make worst the already deteriorated policy frameworks and mechanisms.

The need is for political unity under the umbrella of Parliament, sincere efforts for upholding national interests and efficient policy making and allocation of water resources to come out of this dilemma of water crisis. All provinces should submit a resolution to Parliament, demanding comprehensive legal reforms, coherent policies, and improved governance, all at the national level. The recommendations proposed after a keen analysis of constitutional, legal and policy frameworks related to water in Pakistan require implementation in good faith by the central and provincial governments. When the leadership of Pakistan would reach at one page on finding a way to improve water governance, the country will soon come out of the water crisis. What individuals can do is to use water very carefully, as in this regard there is a narration of the Holy Prophet (Peace Be Upon Him). “Abdullah ibn Amr reported: The Messenger of Allah, peace and blessings be upon him, passed by Sa’d while he was performing ablution. The Prophet said, ‘What is this extravagance?’ Sa’d said, ‘Is there extravagance with water in ablution?’ The Prophet said, ‘Yes, even if you were on the banks of a flowing river’ (Musnad Ahmed 7065)”.

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