Water Governance Structure in Pakistan

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I. Introduction

Pakistan heavily relies on its water resources for agriculture, industry, and domestic use. It is considered an agriculture-based economy because 37 percent of its workforce is employed in the sector and it contributes around 19 percent to the Gross Domestic Product. Pakistan is reliant on the Indus Water System and underground water for its extensive irrigation network. The governance structure has been very loose and unstructured because the informal sector used to manage water in different rural regions. In urban areas, municipal authorities and water and sanitation agencies (WASAs) are mandated to manage and provide water and related services. Pakistan faces many challenges that impact its water governance, security, and socio-economic development. Some of these challenges are water scarcity, unequal distribution, climate change impacts, and inefficient water management. The objective of this paper is to understand the water governance structure of the country and the main stakeholders. As water management challenges continue to mount, the importance of stakeholders and enforcement agencies will grow as well. The paper will also analyze the overlap of authority among different enforcement agencies.

II. Water Governance in Pakistan: Overview

According to Stockholm International Water Institute, Water governance is one of the most important areas to improve the sustainable development of water resources and services. It refers to the political, social, economic, and administrative systems that affect water use and management[1]. Water stewardship* is essentially about who gets what water, when and how, and who has the right to water, related services, and benefits. Good water governance ensures water security, distributes water resources fairly, and avoids disputes. Importance is placed on resource management because management

[1] "Project: UNDP-Siwi Water Governance Facilitywhat Is Water Governance?" SIWI. Accessed June 23, 2023. https://siwi.org/undp-siwi-water-governance-facility/what-is-water-governance.

*Water stewardship is defined as using water in a way that is socially equitable, environmentally sustainable and economically beneficial

ensures its provision to the citizens. Proper management of resources is considered essential for the realization of sustainable development goals.

Institutional Framework for water governance in Pakistan

The water governance structure in Pakistan is complex. Different entities share rights and authority over water which dampens the enforcement actions. Until, the local government ordinance, water was a central and provincial issue, but with the local government ordinance 2001, Water and Sanitation Agencies (WASAs) have been devolved to Tehsil Municipal Authorities (TMAs), but WASAs have remained under the control of the provincial government with a separate budget parallel to TMAs making WASAs accountability unclear[2]. The institutional framework for water governance is unclear. Here are the three levels of the governance structure[3].

National Level: At the federal level there is a Ministry of Water Resources although water is a provincial matter. The Ministry works on the development of water resources in the country and manages Indus Water Treaty, the Indus Basin, WAPDA, the Indus River System Authority (ISRA), and transboundary water organizations. There is no Water, Sanitation, and Hygiene ministry however a cell was formed by UNICEF under the Ministry of Climate Change on WASH, and the Education Ministry and the Ministry of National Food Security and Research have some WASH portfolios.

Provincial Level: Water is a provincial subject and the local governments and the Public Health Engineering Department (PHED), Housing and Urban Development handle the WASH issues[4]. The provincial health, education, and planning department provide guidance on water, sanitation, and hygiene issues. In cities, the Water and Sanitation Agencies (WASAs) function, which are corporate bodies under the provincial act.

Local Level: The local government has three tiers: District, Tehsil, and Union.

[2] Mezzera, "Devolution Row: An Assessment of Pakistan's 2001 Local Government Ordinance."
[3] Cooper, "Water Management/Governance Systems in Pakistan."
[4] Cooper.

District: PHED along with the District Health officer work on WASH issues at the district level. In some districts, District Disaster Management Units are also involved.

Tehsil: Tehsils have TMAs to handle WASH issues, however, in urban areas, TMAs are replaced by WASAs

Union Council: The smallest unit works at the village level and it also manages the Lady Health Workers (LHWs) and sanitary workers for WASH challenges in Punjab and Khyber Pakhtunkhwa.

Legal and policy framework for water management

There are a number of national policies like 2006 National Sanitation Policy, the 2009 National Drinking Water Policy, the National Environmental Policy 2005, and the latest 2018 National Water Policy which governs water at the national level, but since water is a provincial matter, the enforcement and implementation of these policies are tricky as they have to align with provincial policies. Punjab introduced its Drinking Water Policy in 2011 before any other province, and it drafted a Water policy in 2018[5]. The Policy works to end food insecurity, hunger, and malnutrition. For both consumptive and non-consumptive uses of water, the top 3 priorities are as follows: WASH (water, sanitation, and hygiene), irrigation, livestock, fisheries, and wildlife, in that order[6]. Moreover, Khyber Pakhtunkhwa had its drinking water policy in 2015 and in 2020 it introduced its Water Act 2020[7]. With the aim of sustainability and conservation, this Act was passed to manage and regulate water resources in Khyber Pakhtunkhwa in its entirety. Sindh also formulated its drinking water policy in 2017, but it does not have a provincial water policy[8]. Balochistan and Gilgit Baltistan have yet to draft their water policy for general use and for drinking. The lack of uniform policy opens caveats in the functioning of the

[5] Punjab Water Policy 2018
[6] Punjab Drinking Water Policy
[7] Khyber Pakhtunkhwa drinking water policy 2015 and Water Act 2020.
[8] Sindh Drinking Water Policy

relevant departments and a power tussle emerges which makes the accountability framework murky.

III. Water Governance Infrastructure in Pakistan

Since the management of water is blurry and complex on paper, there is no dearth of water management institutions at the federal, provincial, and local levels. This section will highlight the different agencies managing water in Pakistan.

1. **Federal and provincial water agencies**

Although water is a provincial subject, yet the federal government has a working ministry for water resources in the country. The Ministry of Water Resources has different departments and affiliate ministries that manage water.

- Ministry of Water Resources
- Federal Water Management Cell (FWMC)
- International Sedimentation, Water Logging, and Sanitation
- Pakistan Commissioner for Indus Water
- Pakistan Council of Research in Water Resources (Research)

Provincial Water Agencies

- Water and Sanitation Authority, Balochistan
- Water and Sanitation Authority, Punjab
- Agriculture Engineering and Water Management, Sindh
- Karachi Water and Sewerage Board

2. **River basin organizations**

River basin organizations (RBOs) are significant institutional groups in charge of directing the management and development of water resources at the watershed level, which can include both domestic and international resources. Pakistan is home to

multiple rivers, but the Indus River is its lifeline. The concept of River basin organization is only limited to the Indus River.

- The Indus River System Authority is responsible for regulating water in the river according to the 1992 water accord[9].
- There is no dedicated river basin organization that works for the development and improvement of river basins in the country, the basin requires more active organizations[10].

Recently, the government has announced a project titled, 'Living Indus' a comprehensive initiative to conserve and restore the Indus Basin and to help the communities around it as the river serves as the lifeline of the country. With an estimated cost of $11-17 billion, the project will try to engage diverse stakeholders for its finances and implementation[11].

3. Irrigation departments

Agriculture contributes 22.9 percent to the GDP and it employs 37.4 percent of the workforce[12]. Therefore, agriculture is fully supported by provincial governments. Irrigation departments are primarily tasked to ensure the supply of water to farmers during the Kharif and Rabi crops. They manage the extensive canal system in the country. The irrigation projects are dated to the time of Mughal rule in India, later under the British they were formalized and expanded. Currently, these departments work to ensure water is equitably distributed across their respective provinces and effectively manage overflows during the flood and rainy seasons. Every province has an irrigation department.

- Irrigation Department, Punjab
- Irrigation Department, Sindh

[9] Alam, Rafay Ahmad. "Environment and the 18th Amendment." The Express Tribune, March 22, 2012. https://tribune.com.pk/story/353639/environment-and-the-18th-amendment-2.
[10]Bandeali, "Water Governance and Management in Indus Basin - Challenges & Threats."
[11] App. "Govt to Launch 'Living Indus' Project to Protect Civilisations Vulnerable to Climate Change." DAWN.COM, September 29, 2022. https://www.dawn.com/news/1712583.
[12] Pakistan Economic Survey 2022-23

- Irrigation Department, Khyber Pakhtunkhwa
- Irrigation Department, Baluchistan
- Irrigation and Hyde Power Directorate, FATA (now merging with KP department)
- Irrigation Department, AJK
- Irrigation Sector of Works Department, Gilgit Baltistan

These departments control major water infrastructure in the respective provinces and agricultural areas and units are in their domain.

Regulatory bodies

At the national level, the Ministry of Water Resources is the supreme water regulatory authority, but it does not have enforcement rights.

1. National water regulatory authority

At the national level, the Ministry for Water Resources manages and coordinates water issues in coordination with stakeholders and international organizations. Most of the water regulatory authorities reside in the provinces. The Ministry was restructured in 2017 by dissolving the Ministry of Water and Power. Power was merged with the Ministry of Petroleum and Natural Resources.

2. Provincial water regulatory authorities

The provinces have their respective regulatory authorities to ensure the management, storage, distribution, and other services related to water. These authorities draw their powers from the provincial legislation on water.

- Under the Punjab Water Act of 2019, Punjab Water Services Regulatory Authority functions under the Punjab Water Resources Commission headed by the Chief Minister while the regulatory authority is headed by a chief secretary. Under the

act, the commission decides on water and sewerage undertakers, and water supply undertakers, and the authority ensures compliance and delivery[13].

- Under the Khyber Pakhtunkhwa Water Act 2020, a similar structure exists. The Khyber Pakhtunkhwa Water Resources Commission works under the Chief Minister, which manages the Khyber Pakhtunkhwa Water Resources Regulatory Authority headed by an additional chief secretary, Planning and Development Department. The commission decides on the water and sewerage service providers and the authority ensures their compliance[14].
- Baluchistan does not have a water act, thus it does not have a single provincial authority on water but it has different acts to manage water. For instance, Baluchistan Irrigation and Drainage Act 1997, Baluchistan Ground Water Rights Administration Ordinance 1978, and the Quetta Water and sanitation authority act 2004.
- In Sindh, the Sindh Water Management Ordinance 2002 established Sindh Irrigation and Drainage Authority and Area Water Boards, Farmer organizations to maintain, operate, and manage water in the province[15].
- Gilgit Baltistan has not acted on water, but the Gilgit Baltistan Environmental Protection Act 2015 includes water as well. The provincial government recently announced the drafting of its Water Policy.

Water infrastructure development agency (Water and Power Development Authority (WAPDA)

The Water and Power Development Authority was established through an act of parliament in 1958 to provide for the unified and co-coordinated development of the Water and power resources of Pakistan. WAPDA is operating 21 projects, 10 are under

[13] Punjab Water Act 2019
[14] Khyber Pakhtunkhwa Water Act 2020
[15] Sindh Water Management Ordinance 2022

construction, and 20 are planned for future development. The agency has accumulated experience and resources to be the one-window Water and Power work operator.

IV. Stakeholders in Water Governance

1) Water users and beneficiaries

According to the National Institute of Population Studies (NIPS), the estimated population of Pakistan is 229.22 million in 2022. Some independent agencies place the number between 240-250 million. Providing water to such an expanse is a herculean task. Water is primarily used in three sectors: agriculture, domestic consumption, and industry. The agriculture sector takes the majority share because of the outdated mode of agriculture. According to the Pakistan Council of Research in Water Resources, the country has the largest connected irrigation system that uses 93% of the water. The sector is also responsible for water losses that occur due to seepage from canals and flood irrigation methods. The remaining 7 % is used up by the domestic and industrial sectors.

However, the users do not have ready access to water, especially in urban areas. Access to water is a growing issue because of poor management, not less supply[16].

2) Civil society organizations

International, national, and local non-governmental organizations fill the gap left behind by the government and private sector in the provision of water and sanitation facilities. UNICEF is leading the charge on WASH initiatives in the country through a network of private-public partnerships. There is a long list of NGOs having water in their portfolio. These are just a few major organizations: Hissar Foundation, Paani Project, WaterAid, the Aga Khan Agency for Habitat, and Bondh E Shams. They play a very vibrant role and assist to bridge the gap in service delivery, policy improvement, and project implementation. Their work has also emphasized creating and functioning community-based organizations (CBOs). The CBOs are an essential component of water management

[16] Cooper, "Water Management/Governance Systems in Pakistan."

and operations. In Punjab, the PHED develops water schemes and hands them over to CBOs for operations, management, and revenue collection. The government does not allocate any O&M budget to CBOs but builds new schemes annually[17]. CBOs are also essential in mobilizing and sensitizing communities for necessary WASH initiatives. They are considered essential for public health initiatives and other programs.

3) Water user associations (WUAs)

Water user associations (WUAs) are present all over Pakistan through informal channels and formal channels enacted by ordinances from the provincial governments. These ordinances were promulgated in 1981 in Punjab, Khyber Pakhtunkhwa, and Baluchistan and in 1982 in Sindh[18]. The Water User's Association Ordinances empower these associations to operate, maintain and improve watercourses, improve underground water supply, and on-farm management. Fifty-one percent of the irrigators must agree on the formation of a water user association only then the application can be taken up by the field officer and seventy-five percent must consent to the formation of the association after submitting an application to the field officer[19]. Sindh however repealed the Sindh Irrigation Water User's Association Ordinance 1982 with the introduction of the Sindh Water Management Ordinance 2002. WUAs are democratic bodies with a board of directors and a sitting chairman.

4) Research and academic institutions

There are a number of research institutes working in the country providing the government with cutting-edge knowledge and guidance on water management. Pakistan Council of Research in Water Resources (PCRWR) was established in 1964. In particular, PCRWR is tasked with conducting, organizing, coordinating, and promoting research on irrigation, drainage, surface and groundwater management, groundwater recharge, watershed management, rainfall harvesting, desertification control, water quality, and

[17] Cooper.
[18] Water User Association Ordinance
[19] Water User Association Ordinance (Punjab, Khyber Pakhutkhwa, Baluchistan)

the overall environment. The research space is now vibrant with other organizations working on the water. A few of the organizations are:

- Climate, Energy, and Water Research Insitute (CEWRI) under Pakistan Agricultural Research Council
- Water Management Research Center (University of Faisalabad)
- Center for Water Informatics and Technology (Lahore University of Management Sciences)
- US-Pakistan Center for Advanced Studies in Water (Mehran University of Engineering and Technology)

In addition, there are Think tanks and Policy research institutes across the country working and engaging experts on the water for policy inputs.

5) **International organizations and donors**

International organizations have been active in the water sector. The famous Indus Water Treaty (IWT) was also a result of the World Bank's efforts. The World Bank (WB), and USAID have been key international players actively assisting the government in not only building water infrastructure in the country but also conducting research and managing the depleting resources. Moreover, international organizations like the International Water Management Institute (IWMI), and WaterAid are also actively engaged in water research in Pakistan in close collaboration with PCRWR and the government of Pakistan. UNICEF has been a driving force behind the major countrywide WASH initiatives in the country. Similarly, WWF has done a lot of work in water and nature conservation in the country.

V. Water Governance Challenges

Pakistan has crossed the water scarcity threshold, the per capita water availability had dropped below 1000 cubic meters[20]. Below 1000 cubic meters, the country faces water scarcity and below 500 cubic meters, it is absolute scarcity[21]. The demand is triggered by the ballooning population and the poor delivery of water to the people. Although the per capita availability is less than 1000 cubic meters, experts still believe that Pakistan is acutely suffering from the poor management of the resource, not its availability. The country extracts 60 (billion) bm3 from its underground water sources and has 130 bm3 available in the Indus basin[22]. With 1.2 million tube wells functioning, Pakistan is ranked fourth in the global underground water extraction list[22]. Surface water is lost because of the seepage in delivery canals and inefficient irrigation methods. The most important management and governance challenges are:

- There is no accountability because of the distributed authority and responsibility.
- TMA and WASA authorities lack the capacity and resources required for efficient service delivery[23].
- The lack of competition in water provision and sanitation services is another reason for poor services.
- Poor maintenance of canals and water systems because of poor funding leads to water losses. Agriculture consumes 93 percent of available water and 45.5-66 percent of water is lost because of seepage losses[24].
- Waste water is discharged untreated into open water sources.

[20] "Per Capita Water Availability May Fall to 860 Cubic Metres." 2019. The Express Tribune. June 28. https://tribune.com.pk/story/2002420/per-capita-water-availability-may-fall-860-cubic-metres.
[21] "Scarcity, Decade, Water For Life, 2015, UN-Water, United Nations, MDG, Water, Sanitation, Financing, Gender, IWRM, Human Right, Transboundary, Cities, Quality, Food Security." 2023. United Nations. United Nations. Accessed May 24. https://www.un.org/waterforlifedecade/scarcity.shtml.
[22] Qureshi, "Groundwater Governance in Pakistan."
[23] Cooper
[24] Shah, Z., Gabriel, H., Haider, S., and Jafri, T. (2020) Analysis of seepage loss from concrete lined irrigation canals in Punjab, Pakistan. Irrig. and Drain., 69: 668– 681. https://doi.org/10.1002/ird.2474.

- Unclear policy on underground extraction and consumption. Slow implementation of the National Water Policy 2018 which formulates new regulations on underground water.
- Climate change and recurring floods are making management and governance a difficult task.

VI. Recommendations

A lot of policy papers have been formulated and written on the improvement of water governance infrastructure in the country. The legal structure is robust, but also complex therefore the transparency and accountability in authority and jurisdiction must be clarified to ensure the regulatory frameworks function optimally. A few recommendations:

1. Stakeholder participation and engagement are essential in clarifying jurisdiction and control. As major projects rollout, the authority over water management and distribution becomes a contested ground, therefore, proactive engagement will ensure smooth working in the sector
2. The concept of integrated water resources management (IWRM) must be included in the training module for water resource managers across the country.
3. As studies have pointed out, the government and donors must invest in water infrastructure and technology and should build funds for the maintenance and operations of the once-installed schemes.
4. The on-ground institutions lack the necessary capacity and knowledge required to run water resources affairs as per modern-day requirements therefore capacity building and knowledge-sharing training must be developed and a cross-network framework must be developed to ensure continued knowledge sharing.

VII. Conclusion

The water governance structure in the country is complex with overlapping organization sharing authority, but lack accountability. This is furthered by the lack of maintenance

funds and capacity with implementation entities resulting in the discontinuation of services after installation. On the micro level, lack of funds and capacity with TMAs and WASAs result in poor service delivery, and on the macro level, the swelling population and urban sprawl results in poor water delivery. The management of the resource is contested on all three levels: national, provincial, and local. Although water is a provincial matter, the federal government and national entities working on water and provincial entities often see standoffs on water. The allocation of Indus Basin water to provinces is a contested issue that has not been settled even with the Water Apportionment Accords of 1992. The laws, regulations, and policies are in place, but their enforcement is minimal. With organizations dedicated to pushing for policy implementation and enforcement, it is expected that water policies will realize their purpose. The extensive horizontal and vertical network of organizations makes the water governance structure murky at all levels. This must be tackled with utmost urgency with stakeholder coordination and policy clarity because moving forward these challenges will compounded by the growing population and climate change.