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Governance and Civic Capacity for the Provision of Drinking Water in Urban Sindh

Final Report 2019

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
ADP	Annual Development Plan
AGC	Assessed Government Connections
AKUH	Agha Khan University Hospital
BCM	Billion Cubic Metres
CCB	Citizen Community Board
CCI	Council of Common Interests
CPP	Changa Pani Program
CPR	Common Pool Resources
CSO	Civil Society Organization
DC	Distrcit Commissioner
DCO	District Commissioner Office
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
FFC	Federal Flood Commission
FGD	Focus Group Discussion
FO	Farmer Organization
GCA	Gross Command Area
GoS	Government of Sindh
HDP	Hyderabad Development Package
HESCO	Hyderabad Electric Supply Company
HMC	Hyderabad Municipal Corporation
HPC	Heterotrophic Plate Count
IAPP	International Association for Public Participation
IBA	Institute of Business Administration
IBIS	Indus Basin Irrigation System
IGC	International Growth Centre
IMF	International Monetary Fund
IPOE	International Panel of Experts
IRSA	Indus River System Authority

IWASRI	International Waterlogging and Salinity Research Institute
IWT	Indus Water Treaty
KWSB	Karachi Water and Sewerage Board
LG	Local Government
LGA	Local Government Act
LGD	Local Government Department
LGO	Local Government Ordinance
MAF	Million Acre Feet
MD	Managing Director
MGD	Million Gallons per Day
Mha	Million Hectares
MOWR	Ministry of Water Resources
MPA	Member Provincial Assembly
MQM	Muttahida Qaumi Movement
MUET	Mehran University of Engineering and Technology
NGO	Non-Government Organization
NRSP	National Rural Support Program
NRW	Non-Revenue Water
NSDWQ	National Standards for Drinking Water Quality
NSUSC	North Sindh Urban Services Corporation Limited
NTU	Nephelometric Turbidity Units
O&M	Operation and Maintenance
OECD	Organization for Economic Cooperation and Development
OZT	Octroi and Zila Tax
P&D	Planning and Development
P&DD	Planning and Development Department
PCRWR	Pakistan Council for Research in Water Resources
PEPCO	Pakistan Electric Power Company
PFM	Public Financial Management
PHED	Public Health Engineering Department

PPP	Public-Private Partnership
PROOF	Public Record of Operations and Finance
PSLM	Pakistan Social and Living Standards Measurement
PSU	Program Support Unit
RDD	Rural Development Department
RO	Reverse Osmosis
SBP	State Bank of Pakistan
SCARP	Salinity Control and Reclamation Project
SCIIP	Sindh Cities Improvement Investment Program
SEPA	Sindh Environmental Protection Act
SIDA	Sindh Irrigation and Drainage Authority
SITE	Sindh Industrial Trading Estate
SMC	Sukkur Municipal Corporation
SRSO	Sindh Rural Support Organization
SWM	Solid Waste Management
TMA	Tehsil Municipal Administration
UC	Union Council
UNDP	United Nations Development Program
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
VDA	Village Development Authorities
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency
WB	World Bank
WHO	World Health Organization
WWM	Waste Water Management

EXECUTIVE SUMMARY

A. Brief Overview

The dialogue on the water sector of Pakistan is currently more focused on building water reservoirs, which will undoubtedly help to overcome some water shortages during the dry season in the country. However, it is equally important to address other issues faced by the water sector. Inefficient water usage, especially by the agriculture sector, and low quality of drinking water, are some of the severe problems emanating from the poor governance of the water sector. The quality of water supplied to households through taps is almost uniformly poor across the country. In the Sindh province, with rapid urbanization, traditional governance structures are unable to operate and maintain the water infrastructure sustainably. Traditional bureaucratic solutions for water supply still dominate in Pakistan. Yet, the scholarship and policy discussions are focused on more of the same with technological improvement and a higher level of public investment.

Instead of considering water as only a traditional market good, it should be taken as a collective resource available for communities. In this context, the self-governance and polycentric framework for the management of Common Pool Resources (CPR) is highly relevant. Much can be gained by strengthening civic capacity (collective action) and developing a partnership between communities and governments to help in better management of shared water resources. The purpose of this report is to analyze governance and civic capacity for service delivery in the drinking water sector in urban Sindh, specifically, Hyderabad and Sukkur. This research was designed to systematically analyze the relative importance of civic capacity in explaining patterns of success and failure of drinking water initiatives in Hyderabad and Sukkur. Moreover, it also aimed at highlighting incentives for different actors involved in infrastructure development and maintenance, pricing, and regulation. The two main research questions of this study are;

- Can community engagement and participation improve the supply of water to users in Hyderabad and Sukkur?
- What type of governance model is more appropriate for ensuring clean drinking water in urban Sindh?

The findings and recommendations of the study may inform policymakers at the provincial and city level, of the appropriate levels of community involvement. This can help ensure sustainable water governance and efficient service delivery for the provision of one of the most fundamental human rights; access to clean drinking water.

B. Diagnostic

1. Poor Public Investment Management

I. Weak local government/Lack of decentralization and local empowerment

II. Soft budget constraint distorting incentives

- ☐ Imprudent spending
- ☐ Suboptimal maintenance
- ☐ Ghost employees

i. Lack of integrated water management, legislation and planning framework

ii. Lack of transparency in spending in the water sector

iii. Overlapping responsibilities among various stakeholders

iv. No clear mechanism for performance benchmarking

v. No institutionalization of water quality monitoring

2. Lack of Public Participation in Drinking Water Sector

i. Lack of willingness of provincial authorities to delegate power to local level

ii. Lack of community's willingness and capacity to self-organize

iii. Low levels of desired homogeneity to undertake collective action

iv. Trust deficit between community and government agencies

v. Lack of awareness about importance of clean drinking water

The table below lists the six typologies of community participation developed by Sarzynski (2015) in the case of climate change adaptation. Local examples in the form of water supply schemes in Sindh are ascribed to each typology along with a brief description.

Type of participation	Sindh water supply schemes case studies	Brief description
Traditional government-led	Water schemes in the Annual Development Plan (ADP)	Public sector funded schemes are identified and designed either by political office holders or bureaucrats.
Non-governmental planning	UNICEF's Financial Support for Water Sector Plan of Hyderabad City	UNICEF has recently provided financial support to WASA Hyderabad for developing a comprehensive water safety plan for the city.
Inclusive planning	Willingness of Hyderabad and Sukkur Chambers of Commerce and Industry to participate in the Planning of Drinking Water Sector Improvement	The business community showed keen interest to collaborate with water authorities.
Partnerships	1. WASA Hyderabad's bill outsourcing to private vendors 2. Approval of Karachi Water and Sewage Board's Dhabiji Pumping Station	1WASA Hyderabad has outsourced the recovery of water bills that have improved the recovery. KWSB has recently obtained the approval of the Public-Private Partnership Board to engage private investors for the upgradation of Dhabiji Pumping station.
Non-governmental provision	RO Plants in Hyderabad and Sukkur	Many NGOs (charity organizations) have installed RO plants in both cities without taking any contribution or charges from the local people or government.
Co-production	1. Sodo Sarwari, Near Sukkur 2. Tando Soomro Model village 3. Tando Agha 4. Failed effort to initiate a new scheme in Sukkur	These cases were jointly designed by both the local community and government stakeholders.

C. Lessons Learnt From Participatory Water Schemes

i. **History of Collective Efforts:** Partnerships take place based on the history of the local community. Small steps give confidence to agents to plan the next round of collective efforts. Thus, collective action does not arise in a vacuum and needs a history of marginal efforts that can ultimately culminate into broader coalitions and platforms.

ii. **Continuous Iterations:** Partnerships and collective action require constant iteration. Generally, agents refrain from undertaking new activities after failure in the initial rounds of partnership initiatives. The failures should be analyzed to come up with iterative adjustments.

iii. **Willingness of the Public Sector:** The public sector's willingness to promote partnerships is of key importance. Pessimistic attitudes about community involvement amongst public sector officials are highly discouraging for partnerships to culminate. The willingness of public sector officials in Sindh was found to vary, with higher willingness at local governance levels.

iv. **Presence of a Social Entrepreneur or Champion:** A paramount factor behind the success of partnerships and collective action is the presence of a social entrepreneur and/or a change agent who can intelligently and dedicatedly garner the support of the community and also lead interaction with the public sector.

v. **Effective Communication and Transparency by Community Planner:** Communication plays a vital role in promoting partnerships and collective action. Village Tando Soomro's special focus on transparency of expenditures and other budgetary matters has proven to be the most effective tool of collaboration and partnership.

vi. **Contextual Design of Partnership Initiatives:** Community partnership initiatives often fail due to poor design. For instance, NGO-installed RO plants provide upfront cost and running expenditures for some time, and assume that the community will take care of maintenance thus forth. However, many RO plants were disbanded after financial support from NGOs ceased. This may be considered as a design failure as communities should be engaged from the onset of such initiatives.

vii. **Strategy for Social Mobilization:** The strategy for social mobilization holds key importance for the success of such initiatives. An official involved in social mobilization informed that community mobilizers should spend sufficient time with local communities for understanding the culture, demography and power dynamics. Consultation with the community should not be a one-time event; rather, it should be a carefully crafted process.

D. Recommendations

i. **Improve Transparency:** Improve stakeholders' access to information; invest in careful monitoring of employees; revision in preparation of PC-1 to include input by local communities.

ii. **Pricing:** Include O&M as an integral part of planned infrastructure investments; rationalize tariff structure; introduce water metering; improve recovery of bills; enforce disconnection of service in case of non-payment of bill.

iii. **Addressing Overlapping Responsibilities:** A clear mandate should be defined for each stakeholder; clarify demarcations between urban and rural settings so that there is no ambiguity in schemes ownership; merge PHED with LGD along with efforts to enhance the capacity of municipalities.

iv. **Promote Partnerships:** Need to introduce PPPs in pumping stations, filtration plants and distribution systems; community-government partnerships; outsourcing of ancillary activities; involve civil society.

v. **Water Quality and Monitoring:** Ensure implementation of quality benchmarks set by NSDWQ; a three-tier system for quality monitoring, i.e. federal, provincial and local; EPA should make it a priority to control all activities that lead to water contamination.

vi. **Performance Benchmarking:** It is vital for water management authorities to get out of project-based development and move towards long term goals, sustainable practices and focus of maintenance. Performance goals at the agency level should be trickled to the level of staff operating in a water agency.

1. INTRODUCTION

Over the years, Pakistan's surface and groundwater sources have continuously been depleting, and the country has been facing severe water stress (USAID, 2009). Water availability per capita has reduced from 5000 cubic meters in 1951 to 1017 cubic meters in 2015 (IMF, 2015). Pakistan is on of the most water-stressed countries in the world. It's per capita annual water availability is perilously close to the scarcity threshold of 1,000 cubic meters (Shams, 2017). However, it is important to appreciate that there are only 16 countries in the world that have higher levels of total overall water availability than Pakistan (World Bank, 2019). But the rapid population growth and mismanagement of the water sector have together contributed mainly to the decline in per capita water availability.

The dialogue on the water sector of Pakistan is currently more focused on building water reservoirs, which will undoubtedly help to overcome some water shortages during the dry season in the country. However, it is equally important to address other issues faced by the water sector. The inefficient water usage, especially by the agriculture sector, and poor quality of drinking water, are some of the severe problems emanating from the poor governance of the water sector. The water supplied to households through taps is almost uniformly poor across the country. Resultantly, the country ranks 80th among 122 nations in quality of drinking water (Azizullah *et al.*, 2011). To this end, Pakistan Council for Research in Water Resources (PCRWR) has found that 58% of the publicly owned water supply infrastructure (pumps, filtration, and water treatment plants) is dysfunctional (PCRWR, 2010).

Pakistan is urbanizing at an annual rate of 3%, which is the highest rate of urbanization in South Asia[1]. It is estimated that by 2025, nearly 50% of Pakistan's population will be living in urban areas. Sindh, the second largest province of Pakistan, has always been the most urbanized province (particularly the post-independence figures reflect on rapid urbanization, increasing from 29.24% in 1951 to 52.02 % in 2017). Moreover, the province has experienced a rapid increase in its population, which has grown from 41.248 million in 2010 to 47.88 million in 2017 and is expected to reach 70 million or more by 2050. Urbanization provides great opportunities to improve the quality of life and to enhance overall income levels of the population. By contrast, the poor quality of urbanization can make cities hubs of crimes, despair, and diseases (Glaeser, 2012). We consider that drinking water is the fundamental requirement for urban centers to thrive, and the governance of the drinking water sector can also be considered a reflection of the overall capability and performance of the public sector.

The gist of the problem in the Sindh province is that with rapid urbanization, the

1 Burki, Shahid Javed. 2011. "Historical trends in Pakistan's demographics and population policy." In Michael Kugelman and Robert M. Hathaway, eds. *Reaping the Dividend: Overcoming Pakistan's Demographic Challenges*. Washington, DC: Woodrow Wilson Center. <http://www.wilsoncenter.org/sites/default/files/Reapingthe- DividendFINAL.pdf>

traditional governance structures are unable to operate and maintain the water infrastructure sustainably. Traditional bureaucratic solutions for water supply still dominate in Pakistan. Yet, the scholarship and policy discussions are focused on more of the same with technological improvement and a higher level of public investment. Hyderabad and Sukkur may be considered as the worst examples of unplanned urbanization. Moreover, due to the severe effects of climate change, Hyderabad and Sukkur rank among the top 3 hotspots in Pakistan with poor water availability[2], at 0.4 and 0.9, respectively[3].

Moreover, climate change exacerbates a combination of systemic inefficiencies and leads to reduced water availability. It has also affected the primary source of water feeding in Himalayan glaciers, which are now melting rapidly due to the changing climate. This leaves much less water on the whole. Riverbeds around the country are also drying up. These factors will result in an extreme water crisis if not managed appropriately and efficiently (Dominguez, 2015).

Despite the challenges mentioned above, the discussion of different ways to improve water governance is rather scarce in Pakistan, and that is why there is a lack of innovative strategies to deal with the challenges. There is a need to look for more innovative governance solutions, including collective action by stakeholders, especially in an era of increasing complexity, where challenges have become more intense.

There is a dire need to change the fundamental system of water governance in the country. Many challenges related to international and provincial water distribution such as water storage, the impact of excessive water extraction from natural resources on climate change, water associated disasters, deforestation, and recharge of aquifer still exist. Pakistan is on its way to fast urbanization. With 70% of urbanization and acute water shortages on the horizon, it seems imperative to yield the prosperity dividend of urbanization to its urban population by solving the problems related to clean water supply.

Instead of considering water as only a traditional market good, it should indeed be taken as a collective resource available for communities. In this context, the self-governance and polycentric framework for the management of Common Pool Resources (CPR) is highly relevant (Ostrom and Gardner, 1993). Much can be gained by strengthening civic capacity (collective action) and developing a partnership between communities and governments to help in better management of shared water resources. It also matters who design the rules. When the community takes ownership of rules and regulations,

2 "Water availability" refers to the ratio of surface water use to groundwater use. Thus a higher ratio signifies better sustainability.

3 South Asia's Hotspots: The Impact of Temperature and Precipitation Changes on Living Standards. 2018. The World Bank Group

there are higher chances that they will be enforced. However, the complexity of governance structures in modern times highlight the need for partnerships and multi-level governance.

It is, therefore, a blended entrepreneurial model of public-private partnership, where the community is also involved. One such model for water distribution, which has documented success and expansion is the Bhalwal's Changa Pani (clean water) Program (CPP) in District Sargodha in Punjab. The CPP has also inspired the overall objectives and approach of this study.

This research mainly focuses on governance and civic capacity for service delivery in the drinking water sector in urban Sindh, documenting the experience of two rapidly urbanizing cities, Hyderabad and Sukkur.

The two main research questions of this study are;

- Can community engagement and participation improve the supply of water to users in Hyderabad and Sukkur?
- What type of governance model is more appropriate for ensuring clean drinking water in urban Sindh?

This research, therefore, was designed to systematically analyze the relative importance of civic capacity in explaining patterns of success and failure of drinking water initiatives in Hyderabad and Sukkur. Moreover, it also aimed at highlighting incentives for different actors involved in infrastructure development and maintenance, pricing and regulation. In this regard, the research examines the application of user fees and analyses community and publicly managed schemes for success and failure of user fee collection.

Hence, this study has the following main objectives:

- Assess the governance and civic capacity for the provision of clean drinking water in urban Sindh, Hyderabad, and Sukkur.
- Analyze the impact of variations in the governance and collective action on service delivery in the drinking water sector.
- Propose appropriate governance and civic capacity frameworks/models to improve access to clean drinking water in Hyderabad and Sukkur, with applicability to urban Sindh.
- Enhance the learning and capacity of stakeholders through dialogue (Workshops) around civic capacity frameworks in water governance.
- Contribute to the scholarship around water sector governance through evidence from an urban setting in Pakistan.

The findings and recommendations of the study may inform policymakers at the

provincial and city level, of the appropriate levels of community involvement. This can help ensure sustainable water governance and efficient service delivery for the provision of one of the most fundamental human rights; access to clean drinking water.

The remaining report is structured as follows; the second section presents a literature review. The third section discusses the methodology. The fourth section shares the diagnostic of the drinking water sector in Sindh (especially Hyderabad and Sukkur). The fifth section discusses partnerships and collective action in the water sector. The sixth section presents policy recommendations to improve water service delivery in the urban Sindh, and finally, the seventh section concludes the report.

2. LITERATURE REVIEW

2.1 Water Sector Landscape

With an average annual rainfall of less than 310 mm[4], Pakistan is considered an arid to semi-arid country. However, it is also a country that has the most extensive contiguous irrigation system in the form of the Indus Basin Irrigation System (IBIS). The agriculture sector is said to absorb around 90% of the water coming into the country, and most of the water-use in the agriculture sector is considered inefficient.

The Indus Water Treaty (IWT) provides a binding framework for sharing water between Pakistan and India. In the negotiations of the IWT, Pakistan was given rights to the Western rivers of Indus, Chenab and Jhelum. The immediate effect of the treaty was that the eastern agricultural lands which had been feeding off the rivers now designated for Indian use had become water-starved, which led to the second challenge of building a system to accommodate this mismatch (Table 2.1)

According to the World Bank (2005), the IBIS has only 30 days of storage capacity. The standard minimum requirement is 120 days, and most advanced nations have a capacity of 1-2 years. The Murray-Darling basin in Australia and the Colorado Basin in the U.S. can contain up to 900 days of storage capacity[5] (USAID, 2009). The three major reservoirs (Mangla, Tarbela and Chashma) have a designed capacity of 15.75 MAF which has reduced to 13.1 MAF as a result of sedimentation (SBP, 2017).

One of the significant challenges the country had to face is that massive amount of water was stored underground, which raised water tables and led to twin menace commonly known as waterlogging and salinity. World Bank (2005) has estimated that approximately 15 million tons of salt are being stored somewhere in the basin.

The Indus Basin receives 172 BCM of river water per year. If it were homogeneously distributed across the irrigated land, there would be an addition of 2,150 tons of salt per hectare per year (Aslam and Prathapar, 2006). Without a system in place to remove this salt from the root zone, salinization is inevitable. According to World Bank (2005) report, in the wake of this twin curse of waterlogging and salinity, Pakistan's water scientists along with some international support approached these issues in the wisest way possible: "The 'solution' was not the obvious one of lining canals and putting less water on the land but of increasing the use of groundwater, thus both increasing evapotranspiration, drawing down the groundwater table, and leaching much of the salts down and out of the root zone."

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4 Calculated from 1991 to 2015 http://sdwebx.worldbank.org/climateportal/index.cfm?page=downscaled_data_download&menu=historical

5 Pakistan neighboring country, India, has a strorage capacity of 120 days while Egypt can store up to 1,000 days' worth

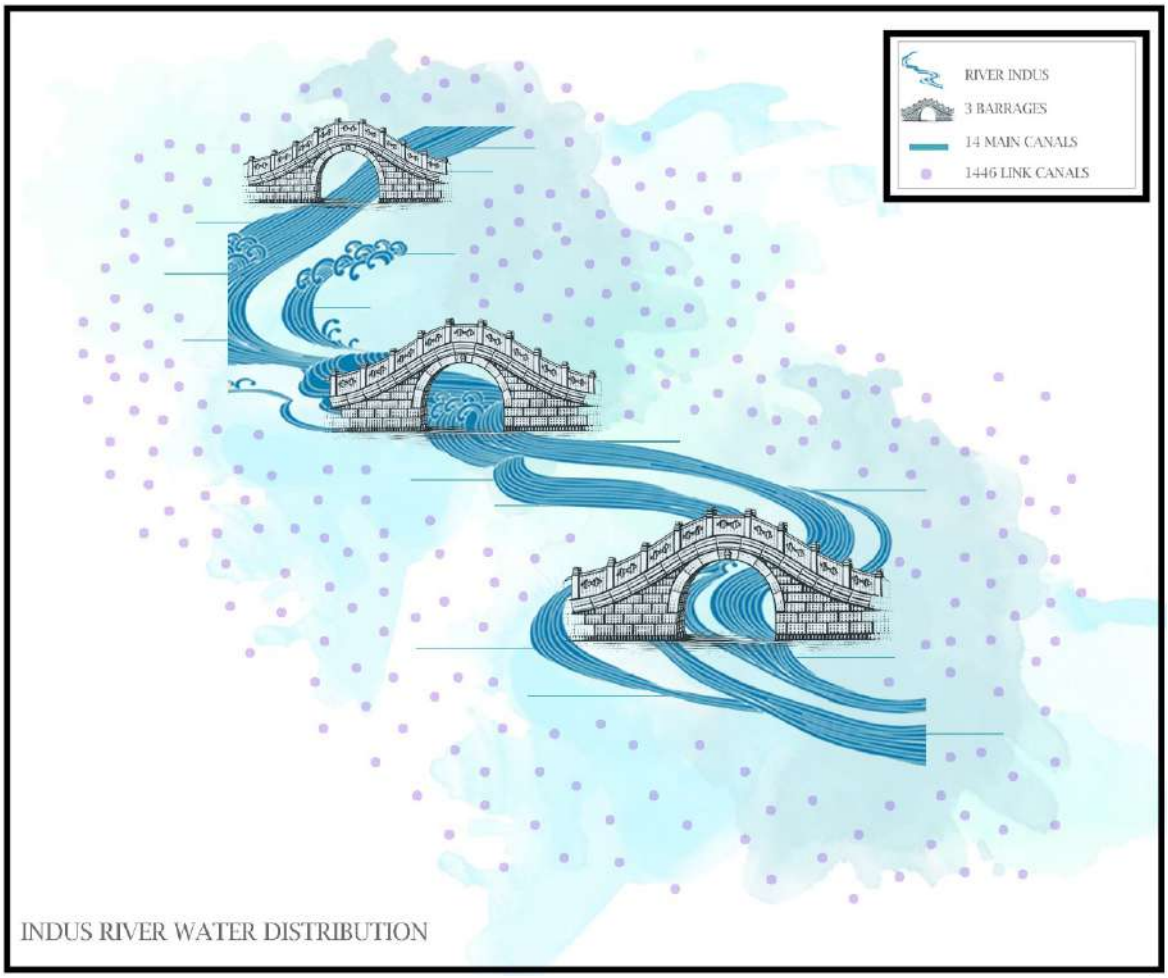
WAPDA initiated the Salinity Control and Reclamation Project (SCARP), under which 20,000 high capacity state-owned tube-wells were installed to lower the water table and improve agricultural yields. The program managed to alleviate the waterlogging problem significantly; the groundwater level was brought below 1.5 m over an area of 2 million hectares and below 3 m over an area of 4 million hectares. Furthermore, the area adversely affected by salinity was reduced from 7 million hectares to 4.5 million hectares (Qamar, 1998).

Table 2.1: Major waterworks: Pakistan and Sindh

The Indus Basin Irrigation System consists of:	Sindh's Water Infrastructure (Fig. 2.1):
☐ The Indus River and its tributaries – Jhelum, Chenab, Ravi, Beas and Sutlej ☐ Three major storage reservoirs: Tarbela, Mangla and Chashma ☐ 19 barrages ☐ 12 inter river link canals ☐ 43 irrigation canal commands, covering 38 million acres through 63,000 km of canals ☐ More than 110,000 watercourses delivering water to farms	☐ Three major and almost 50 small dams in Sindh ☐ Three barrages: Guddu, Sukkur and Kotri ☐ Total gross command area (GCA) is 14.391 million acres ☐ 14 main canals ☐ 1,446 branch canals, distributaries and minors, and 42,000 watercourses ☐ More than 95% of the irrigation is from canal water ☐ The system runs 13,234 miles in the form of main canals, branch canals, distributary canals and minor canals ☐ Approximately 80% of the area is underlain by saline groundwater ☐ 13 existing surface drainage systems which serve a total area of over 6.2 million acres (2.5 Mha) and have an aggregate length of about 2,981 miles (4,800 km) ☐ Two sub-surface drainage systems, which serve an area of 0.10 million acres (0.04 Mha)

Source: Developed by authers based on Sindh Strategic Sector Plan, 2016-2026

As a result of climate change and the construction of large infrastructures, water and sediment cycles have changed, and as water is made to alter its course through man-made channels, water and salt balances seek new equilibriums. To understand and



Source: Developed by authors

Fig. 2.1: Indus River water distribution in Sindh

manage a system so extensive and complicated, there must be an investment in building a knowledge base about this ecosystem and building human and institutional capacity to manage the water systems. However, while some investments have been made in developing infrastructure, little attention has been paid to maintaining and repairing it. The quality of implementation has also declined drastically. Inefficiencies, delays in procurement and completion, non-compliance with rehabilitation programs, weak monitoring systems, and inadequate preparation for transition from construction to operations are common ailments in water sector projects. "The water bureaucracy has yet to make the vital mental transition from builder to that of manager" (World Bank, 2005).

The issues related to water usage in the agriculture sector and overall storage capacity also have a profound impact on the water availability for drinking purposes.

2.2 Water Governance and Collective Action

"*Altering our path to a more desirable future requires new thinking and new social research, leading to new water management approaches and importantly, their political and social acceptance. Society tends to stick to conventional thinking and prevailing*

practices. Past investments and education tend to perpetuate a way of thinking among people, causing them to formulate and execute policies even if they are inferior to known alternatives" (Cosgrove and Loucks, 2015)

Within the literature review, we have attempted to cover aspects and evidence of alternatives to current governance practices, building a case to be path independent in the present customary path dependent policy formulation. According to Cosgrove and Loucks (2015), "to prevent a severe water management crisis, we need to be creative. If we continue to follow a business□as□usual pathway, it could lead to a situation in which our current predictive models may not work at all. We need to identify, establish and then set in motion systems of governance and regulation that are capable of forcing us on a path that will lead us toward long□term sustainable development." We will discuss the issue of drinking water supply and quality, as it exists, followed by a discussion on water governance, water pricing and lastly, water supply in an urban context.

The governance landscape across the globe has evolved over the last 25 years. Rapid information flow means that deficiencies, failures, inefficiencies, and poor practices are revealed faster and more widely than before. The OECD (2015) evidence shows that a 'one-size-fits-all solution' to water challenges around the world is counterintuitive; responses must be tailored according to regional particularities, keeping in mind the highly context-dependent role of governance. The world over, decentralization has created a space for the customization of policies to local realities but has, at the same time, raised further capacity and coordination challenges in public service provision (OECD, 2015). Furthermore, there is now strong acknowledgement that "bottom-up and inclusive decision-making is key to effective water policies. Besides, several legal frameworks have triggered major evolutions in water policy; however, their implementation has faced governance bottlenecks" (OECD, 2015)

Institutional fragmentation in the water sector of Pakistan is recognized as an issue (WB 2016, GoS, 2016). While dealing with the supply of drinking water in urban contexts, institutional mandates are further layered and complex. Water supply, sanitation, wastewater treatment, stormwater drainage, and solid waste management have been planned and mainly delivered as isolated services. Too many institutions along with several laws govern the sector (Mohtadullah, 2014).

Moreover, traditional market interventions of incentives, taxes, and fines do not work correctly in many developing countries where formal institutions are not well developed, and enforcement is weak (Ashraf *et al.*, 2016). Countries who made significant investments in the water sector have developed better governance systems to address these issues (Glaeser, 2011).

Experience documented in developing countries elsewhere has found positive effects

of community participation on the performance of water supply schemes (Mimrose *et. al*., 2011; Opare, 2011). In Pakistan, collective action as a viable solution to address complex governance challenges has not garnered much currency despite several successful civic capacity initiatives (e.g., Orangi Pilot Project and Changa Pani Program).

Research on the governance of collective resources has rejuvenated building on Ostrom's (1990) seminal work. The literature of social construction of 'commons' argues that the performative aspect of the commons helps reshape institutions, cooperation and collective actions (Hannachi *et al.*, 2017).

There are various ways to define collective action. However, it is crucial to understand that it embodies a joint action of a group or by an authorized agent "*in pursuit of members' perceived shared interest*" (Marshal, 1998). Scholars have identified and recognized many categories of players around the governance of collective resource as the "Full owners", the "Proprietors", the "Authorized claimants", the "Authorized users", the "Authorized entrants" and differing roles as "Access" and "Management". All these categories and roles reflect on collective governance and the institutions around it (Ostrom, 1992; Schlager *et al.*, 1994; Ostrom, 2003; Orsi, 2013). Similarly, Arnstein's (1969) conception of citizen participation aligns forms of participation as rungs of a ladder. The lowest rungs exhibit non-participation modes of interaction (manipulation and therapy). The middle rungs show evidence of token forms of participation, with a small degree of authority or influence permitted to civic engagement. The highest rungs on Arnstein's ladder are the most influential and include citizen control, where substantial power is granted to citizens, and the role of self-governance is strong.

Putnam *et al.* (1993) have especially emphasized the role of networks, norms, and trust that helps to ensure coordination and cooperation for a shared goal. The concept of civic capacity, however, goes beyond iterative interactions that help to develop confidence among different actors in a society or group. As explained by Stone (2001), civic capacity goes beyond informal interactions and incorporates a joint action by various stakeholders to develop and implement a shared agenda; "*civic capacity concerns the extent to which different sectors of the community— business, parents, educators, state and local officeholders, nonprofits, and others—act in concert around a matter of community-wide import*". The literature has reported evidence about how an improvement in civic capacity has led to improved service delivery and legitimizing democracy in many parts of the world (Briggs, 2008).

There are many such initiatives in developing countries which have yet to receive due attention by academics. Iftikhar *et al.* (2018) have documented a case of collective action in Bhalwal for the provision of clean drinking water. Similar examples can be found in other spheres. Orangi Pilot Project in Karachi is also a manifestation of civic

Changa Pani Program Bhalwal

The Bhalwal model of community-government, documented by Iftikhar *et al.* (2018), has partly inspired this study to explore such potential in urban Sindh. This is a component Sharing Model first started in Faisalabad and later, it was implemented in parts of Lahore and Bhalwal. It adopted a participatory planning and an integrated approach for 24/7 metered water and sanitation systems. An intermediary civil society organization (*Anjuman Samaji Behbood*) mobilized the community to form a local organization to negotiate with the government to develop partnership. After much back and forth, an agreement was reached in which the government agreed to lay out infrastructure in the form of tube wells, overhead tank, disposal system, treatment system and main pipes. Community was to participate in the procurement process and contribute financially for water supply pipes (3 inches), sewerage pipes (9 inches) and water meters; and the local community organization would then operate and maintain. The water scheme is operational with over 2000 metered water connections for drinking water. The recovery rate of water bills is over 90% as compared to below 50% in the case of traditional model. The success of the model lies in these elements' immediate maintenance, community engagement and quasi-market model leading to water conservation.

capacity as Dr. Akhtar Hameed Khan inspired collective action in informal settlements in Karachi to improve civic amenities. Sialkot city of Pakistan is considered a glaring example of collective action and civic capacity. The business community, citizens, and government institutions have jointly improved municipal services and developed complex infrastructure like an international airport.

The key issue lies in the fact that such examples are rare, and there is little research on the success and failures of such initiatives in different contexts. Moreover, the existing literature is also silent about replicability and scalability of such initiatives. Considering the complex challenges faced in water sector governance, it would be useful to analyze the prevalence and dynamics of civic capacity in the water sector.

The concept of collective action has to be nuanced. A plethora of anthropological literature is available documenting the management of common-pool resources through bottom-up associations (Cooke and Kothari, 2001; Tsing *et al*., 2005). Water Users Associations is one such bottom-up structure. However, it is argued that appropriation by international development partners wanes the 'participatory' aspects. Works on construction of commons and commons imagery (Wagner, 2012; Hannachi *et al.*, 2017), therefore, argue for an organic process of a resource becoming part of the social imagination. They maintain that this process produces the ancillary institutions

required, collective action, and cooperation (Hannachi *et al.,* 2017). Therefore, not going into the debate on the distinction between open access resources and common-pool resources, Bromley's (1992) critical distinction between the resource and the property 'regime' through which rights are exercised is essential to reemphasize cultural behavior. Local communities organize cooperative relations for the management of natural resources, including water, and creating collective action solutions when faced with limited resources (Ostrom, 1990).

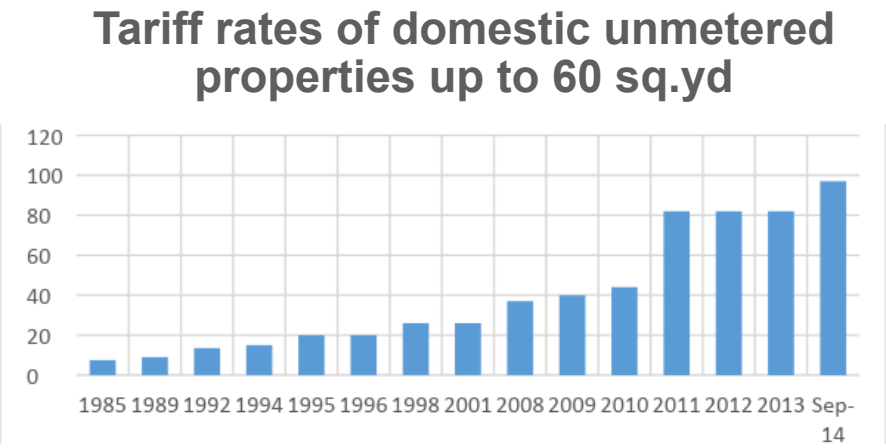
Some of the factors leading to effective collective action in CPR management include sustainable social relations, relations of trust and reliability, individual commitment, and leadership, that is the ability to become an object of emulation for others (Schroeter *et al.*, 2016). Also important is the notion that sustainable management is affordable without costly, time-consuming political processes, granted that the blend of market rules, fiscal incentives and property rights is correctly struck (Tsing *et al.*, 2005). As a quasi-market model, the Bhalwal brings-in all these elements, which, for the purposes of this research, will also be nuanced. Further, these will be linked to water pricing in terms of the adequate water user fee and innovation in municipal models for holistic governance.

2.3 Water Pricing

Appropriate pricing of water remains one of the major loopholes in the effective and efficient governance of water, especially in urban areas. In Pakistan, users of water pay a very small portion of the bill. Water tariffs charged across the country are not uniform and, perhaps, undervalued. Water suppliers end up receiving significantly less revenue than what is required for appropriate rehabilitation and maintenance of water supply systems. The money that is collected is used primarily for the payment of heavily overstaffed bureaucracies, leaving little behind for operations and maintenance. This creates a vicious cycle where users refuse to pay due to suboptimal level of service provided only to end up with even weaker services due to a lack of funds with the responsible government entity (World Bank, 2005). For domestic use, the water tariff is charged in reference to the square feet occupied by a residential household, e.g. Karachi Water and Sewerage Board (KWSB) charges a flat rate of PKR 97 per month for domestic unmetered water to properties occupying up to 60 square yards.

The graph in Fig. 2.2 shows the evolution of KWSB tariff rates for domestic unmetered water supply to households occupying up to 60 square yards.

Charging a flat tariff rate based on floor area, low collection efficiency (54 percent), and unchecked high consumption of water by the connected households are some of the reasons for a low tariff rate in Karachi. Only 0.3% of the connections in Karachi are metered, and remaining are charged with a flat rate tariff based on floor areas occupied by domestic properties. This results in over-consumption of water by domestic



Source: The Karachi Water and Sewerage Board

Fig. 2.2: Tariff rates of domestic unmetered water supply

users. Karachi needs better governance and planned investments for improving tap water supply infrastructure for its operation and maintenance to improve the water efficiencies and water quality in the city. Revenue collection in the urban drinking water sector is inadequate throughout the country due to low tariff rates and poor monitoring in bill payments. Refusal to pay electricity bills results in shutting off of electricity in the respective household; however, in most cases, no such mechanism exists in the water sector. Due to the insufficient revenue collected through water bills, expenditures on operations and maintenance are uncovered, creating the need for payments from the government.

As with all common-pool resources, pricing and willingness to pay remain a major challenge. In Pakistan, there exists a perception that in lower-income groups, willingness to pay is marginal as people believe that water, being a natural resource, ought to be provided free of cost. However, in the face of the government's failure to provide water through piped infrastructure, residents ultimately do pay a fee, either by extracting water through hand pumps, travelling long distances to collect it or purchasing water from local vendors or in bottled form. Asim and Lohano (2015) adopt the contingent valuation method to estimate the average willingness to pay for improved tap water services. The study uses various techniques to develop a range for the willingness to pay for piped water in Karachi city: the profit model, interval data model and bivariate profit model are employed using household data from Gulshan-e-Iqbal Town of Karachi. The study finds that the average willingness to pay is in the range of PKR 1922 - 2126 per month, substantially higher than the monthly average bill at the time, which was Rs 703. Residents are therefore willing to pay much more than what they currently do.

On the irrigation side, canal water is charged a minimal rate against the land area occupied by a farm. This creates a sizeable wedge between the cost of irrigation incurred by farmers owning irrigated land and those farmers who have to extract

groundwater and pay the high cost of electricity. Hence, the water tariff is defined based on a crude metric (size of landholding), which results in immense wastage of water as those who are receiving water supplies take it for granted. In most cities of Pakistan, there is no repercussion if residents do not pay their bill, i.e., the water supply is not cut off. Water use should be metered, as is the case for all other utilities such as gas and electricity. Water utilities have often been frustrated in their ability to raise water rates; the KWSB has tried to raise the water rate but is subjected to political influence as any change in the tariff requires approval from the provincial government[6]. Between 1985 and 2014, the KWSB has only revised its tariff rate 11 times (Kosco, 2018). A study using primary data in Hyderabad in 2006 estimates that the average willingness to pay, keeping all explanatory variables at the mean level, is PKR 310 per year, which translates to approximately PKR 800 today.

2.4 Urbanization and Provision of Water

Urbanization is considered to be one of the most important trends of the 21st century. In 2016, 54.5% (3.95 billion) or more of the world's population lived in cities[7]. By 2050, cities around the globe are expected to home 70% of the world's population. A striking feature of 21st-century urbanization is that most of it is happening in developing countries. It is estimated that by 2050, cities in developing countries will attract more than two billion new inhabitants, representing 95% of global urban growth[8].

A dire challenge that urbanization brings with it is the insufficient attention paid to infrastructural capacity and public services provision. Water supply and piped infrastructure is an essential public service as water is a necessity central to health, welfare and economic growth in cities (IGC, 2015).

The most critical role of urban government is to provide clean water. The enormous expense of water investments creates a close tie between municipal public finance and clean water supply (Glaeser, 2012).

Cutler and Miller (2006) argue that widespread water improvements only became possible as American cities got robust access to credit markets in the early 20th century. They point out that American cities in the early 20th century were spending as much on clean water as the federal government was spending on everything except for the post office and the army. It remains an open question whether private utilities and city governments are spending enough to maintain this infrastructure, and indeed, some critics allege that they are not (Ibid).

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6 Kosco, 2018

7 Development (OECD). Organization for Economic Co-Operation and Environment Outlook to 2050: The Consequences of Inaction; OECD Publishing: Paris, France, 2012

8 https://oecd-development-matters.org/2016/06/08/a-21st-century-vision-for-urbanisation/ accessed on 15 Jan 2019

"This will require innovative institutional mechanisms and a balance between autonomy and cooperation. Urban water planning, development, and management need new strategies because water is just one component, albeit an important one, of an increasingly complex interlinked system" (Cosgrove and Loucks, 2015).

2.5 Drinking Water in Sindh: Quality and Supply

Every fifth person in Asia (around 700 million) has no access to clean drinking water. Similarly, 1.8 billion people globally, that makes up half of the region's population do not have access to basic sanitation. As urbanization rates and population growth are at a rise in the region, the stress on water resources in Asia is intensifying rapidly. Furthermore, climate change is expected to exacerbate the situation further (UNDP, 2006). The official statistics in many countries report that access to water is much higher than the actual on-ground situation. For example, Pakistan reports that nearly 90% of its population has access to drinking water. However, independent studies report a different scenario; 64% of the population in Pakistan is deprived of safe drinking water [9].

According to the Intergovernmental Panel on Climate Change (IPCC) calculations, climate change will have negative impacts on water resources and affect more than 1 billion people by 2050 (UNDP, 2006). It also projected that unavailability or reduced access to safe or fresh water would lead to many consequences including loss of livelihood security, impaired food production, increased geopolitical instabilities, and large-scale migration within and across borders.

The scarcity of freshwater is acute across the borders, particularly in Pakistan and India (John, 2011). High population growth, declining food production, widespread poverty, and a rapidly rising demand for freshwater for agricultural, domestic and industrial uses are a common phenomenon in both the countries and climate change is adding more problems (John, 2011).

One of the fundamental reasons, among all others, is the poor piped water infrastructure in Pakistan. In many areas, the pipes date back to pre-partition. They have atrophied to a point where leakages are so high that even filtered water becomes entirely contaminated by the time it reaches the end-user. Capital expenditure per connection in Karachi is one of the lowest in the region at only US$ 7 per year. The average capital expenditure in major Asian cities is US$ 88, while it is US$ 78 in Delhi and US$ 140 in Dhaka. Thus, Karachi stands far behind major cities, even in the South Asian territory.

The water supplied to households through taps is almost uniformly poor across the country. Pakistan ranks at 80 out of 122 nations in drinking water quality (Azizullah *et al.*, 2011). PCRWR (2010) reports that 77-90% of sources of drinking water, publicly and privately supplied, are deemed unfit for human consumption. Shar *et al.* (2010) collected

9 https://www.pakistantoday.com.pk/2019/03/22/64-pakistanis-deprived-of-safe-drinking-water-says-wb-report/

96 water samples from pre-storage selected hand pumps, post-storage groundwater samples from households, and municipal water from main storage reservoirs across Rohri in Sindh. Results showed that nearly all the municipal water samples collected from homes and main reservoirs were contaminated. Bacteriological quality of drinking water was assessed through various indicators, including the heterotrophic plate count (HPC), total coliform, and *E. coli*.

In 2012, a district and session judge, Amjad Ali Bohyo, acting on the complaint of a social activist, ordered the inspection of the New Filtration Plant on Jamshoro Road, Hyderabad. Samples were collected, and according to results from PCRWR and AKUH, turbidity levels stood at 13 NTU (Nephelometric Turbidity Units) at the filtration plant and 77 NTU in residential areas. The WHO standard for safe drinking water is 5 NTU. Water samples in some areas of Hyderabad also revealed dangerously high levels of bacteria and pathogenic organisms[10].

One of the significant challenges faced by governments across the developing world is the high levels of water lost either during transmission (leakages) and theft or losses due to the provision of domestic or commercial unmetered water supply. Water management efficiency varies vastly across the world. Latin America, for instance, loses about 9 trillion cubic meters of water, which amounts to 33% of the water collected and treated for public consumption (Savedorf and Spiller, 1999). Singapore loses approximately 8% while losses in the United States average 4%. High water losses translate into challenges that affect the financial viability of water utilities, reducing their ability to arrange much-needed expansion and maintenance of the water supply infrastructure, especially in urban areas. Reducing the level of non-revenue water (NRW) can increase treated water availability, greater access, higher self-generated cash flow, fairness among consumers, and reduced domestic and commercial wastage.

10 https://tribune.com.pk/story/420941/tainted-water-being-supplied-in-hyderabad-court-told/

3. METHODOLOGY

The conceptual approach to the study is broadly that of blended institutionalization anchored in a common pool resource-based participatory framework. The study analyses the roles of collective action, partnerships, cooperation and governmental and regulatory oversight related to drinking water.

The study focuses on the following hypotheses:

1. Majority of purely government-run water supply schemes (initiated in the last 10 years) are dysfunctional and ineffective in delivering clean drinking water in Hyderabad and Sukkur.
2. A higher level of participation of the community in the design, implementation, and operations of water supply schemes is positively related to the functioning and effectiveness of the projects.
3. Government officials, businesses, non-governmental organizations, and citizens are willing to undertake collective action to improve the governance and service delivery in the drinking water sector, provided the public sector develops a conducive partnership framework.

We adopted a mixed-method approach, explained diagrammatically in Fig. 3.1. To operationalize the hypothesis, the study

1. Collected data on government-run water supply schemes (Quantitative)
2. Collected data on the level of participation in water supply schemes (Qualitative)
3. Emic perceptions of functioning and effectiveness (Qualitative and Quantitative)
4. Systems of cooperation within communities and collaboration between communities and the government (Quantitative and Qualitative)
5. Perceptions of partnership avenues (Quantitative and Qualitative)

Data Collection Units

The following units of data collection were used: individual water users (male and female) from the community, water user collectives at the community levels, individuals from water supply institutions within the government and government documents.

Data Analysis Units

The data were analyzed at the level of three distinct units: individuals (male and female), organizations (suppliers within the government sector and at the community level), schemes (government-run and community-run) and social relations (partnerships).

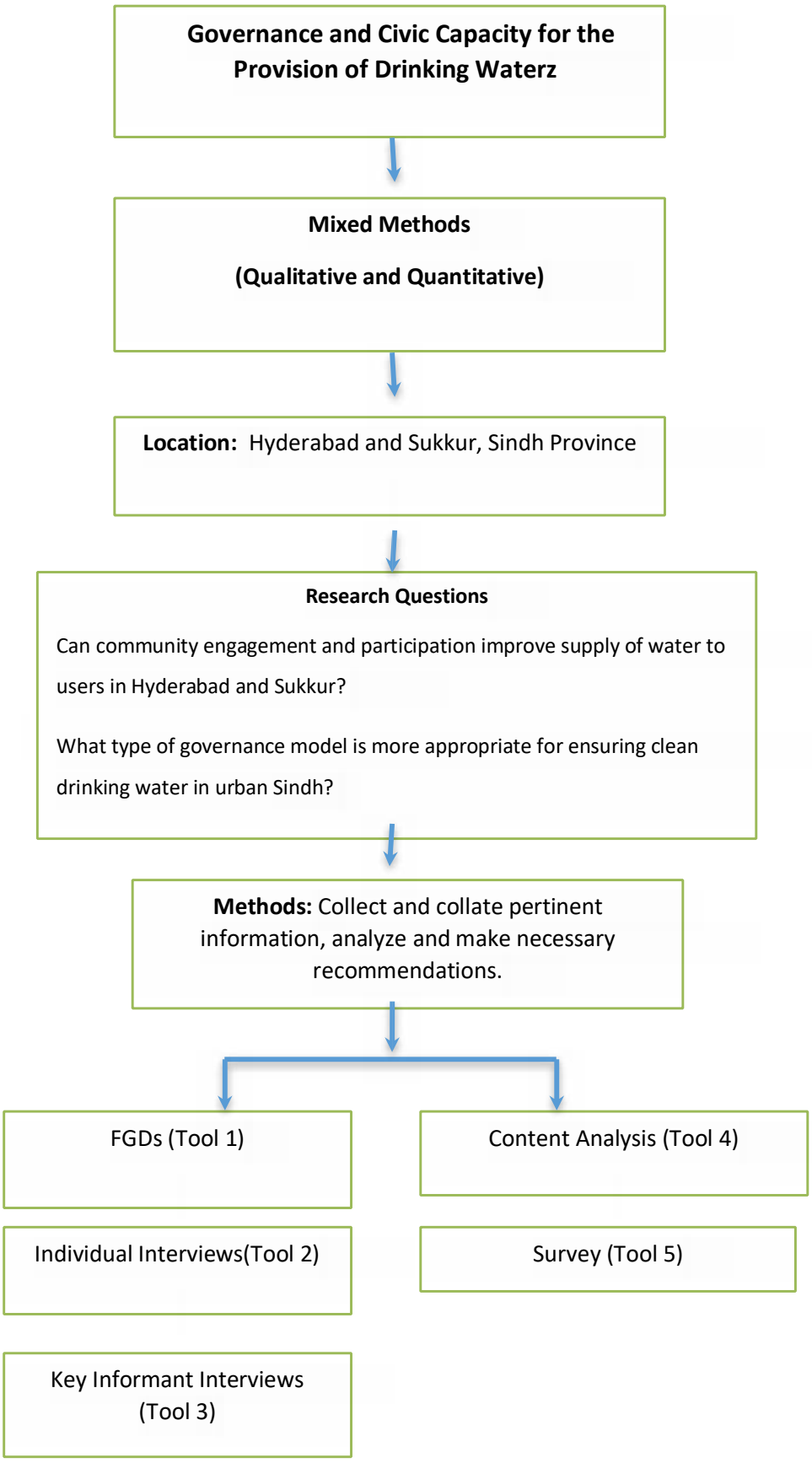

Fig. 3.1: Mixed methods approach used in the study

3.1 Data Collection Tools

In line with the mixed methods approach, the following tools were used to collect data:

3.1.1 Focus Group Discussions (FGDs)

FGDs were conducted in each city, namely Hyderabad and Sukkur. About 10 to 15 people participated in each FGD. The participants were selected from different segments including government employees, representatives of non-profit organizations and civil service organizations, welfare workers, local government officials and consumers (both at the household level and commercial level).

The participants were approached through telephone calls, and formal invitations letters were dispatched to their respective addresses to participate in the FGDs. Enumerators in both the cities personally visited the participants with the invitation letter and requested them to participate. A total of four FGDs were conducted, two each in Hyderabad and Sukkur. Multiple responses were recorded due to diversity in opinions. These opinions helped the research team to understand better the current situation of drinking water in both cities.

The themes emphasized within the group discussions were around regimes of cooperation within communities and the government along with emic perceptions of partnership avenues.

It also shed light on reasons for the lack of participation of the majority of people in the planning and implementation of water schemes. Feedback during the FGDs centered around water supply and quality-related issues, causes of poor governance, and unavailability of any mechanism to get the public input or opinion on using water supply services.

3.1.2 Semi-Structured Interviews

Semi-structured interviews were conducted in each city (Karachi, Hyderabad and Sukkur) with relevant officials and stakeholders as listed in Annex 1. Semi-structured interviews allowed us to focus on core themes of the study along with adequate flexibility to capture any pertinent information that was not incorporated in the instruments initially. It also helped us to explore various perspectives more deeply. The tools for data collection are attached as Annex 2.

Two types of semi-structured interviews were used for data collection:

a. Key Informant Interviews

b. Individual Interviews with Consumers

Key Informant Interviews

The participants were selected purposefully, representing all stakeholders involved in water management in each city. Stakeholders included public sector officials (WASA Hyderabad, Sukkur Municipal Corporation (SMC), Public Health Engineering Department (PHED), Hyderabad Municipal Corporation (HMC), Local Government, Planning and Development Department Sindh, politicians (Mayor of Sukkur), consumers, civil society organizations (NRSP, SRSO, UNDP), academics (MUET, IBA Sukkur), and business people (Chambers of Commerce in Hyderabad and Sukkur).

Individual Interviews with Consumers

More than 35 interviews were conducted during visits to Karachi, Hyderabad and Sukkur. The information received from interviews was utilized in the report to understand property regimes in the water sector in addition to emic perceptions of functioning, effectiveness and partnership avenues.

The use of quotes from participants is a typical and necessary component of any qualitative research report. Quotes and statements are carefully selected for being the most descriptive/explanatory for the conceptual interpretation of the data. Information was related to the quality and supply of water being used by citizens in both cities.

3.2 Content Analysis

Quantitative data is the outcome of desk research and review of the Annual Development Plan (ADP) of Sindh for water schemes at the district level.

During the interviews, we received presentations from WASA, NSUSC and P&D Sindh. These presentations provided detailed information regarding the current status of water supply in Hyderabad, details about the operations of NSUSC and the role of the P&D department. The demand and gap in supply were also well elaborated in the presentation of WASA Hyderabad. Data from presentations were utilized in various parts of the report for facts and figures. Quantitative data abtained from interwiews and were coded and analyzed. Quantitative data collected from ADP Sindh were also analyzed using statistical techniques.

3.3 Facility Level Survey

A field survey has been conducted in Hyderabad and Sukkur to verify physically and to know the current status of all the filtration plants in Hyderabad and Sukkur. At least 10 consumers in the periphery of each filtration plant were interviewed to verify the data received from ADP, interviews, and FGDs. The results of the survey were analyzed and utilized in the preparation of the report. The questionnaire prepared for the survey is attached as Annex 3.

3.4 Participatory Framework

The study adopted the typology of community participation developed by Sarzynski (2015) in the case of climate change adaptation. It involved the following elements that were used in this study for water sector governance:

a. Traditional government-led planning

b. Non-governmental planning

c. Inclusive planning

d. Partnerships

e. Non-governmental provision

f. Co-production

Sarzynski (2015) has built the typology of citizen participation based on Arnstein's (1969) conception of citizen participation to delineate forms of the involvement as rungs of a ladder in the climate change context. The lowest rungs exhibit non-participation modes of interaction (manipulation and therapy). The middle rungs show evidence of token forms of participation, with a small degree of authority or influence permitted to civic engagement. The highest rungs on Arnstein's ladder are the most influential and include citizen control, where substantial power is granted to citizens, and the role of self-governance is strong. This typology has been used to analyze the cases of participatory water schemes and initiatives in Sindh. In Sarzynski's (2015) typology, the level of participation increases as we go down, i.e. traditional government-led planning represents the lowest form of participation while co-production reflects the highest form.

4. DIAGNOSTIC

4.1 Mapping of Relevant Actors in the Water Sector

4.1.1 Federal level institutes

The Ministry of Water Resources (MOWR) holds responsibility for the overall development of water resources management and development. The Water Wing of the Ministry deals with the water and hydropower sector in matters involving federal funding. This includes the development of new and the rehabilitation of existing hydropower projects, dams, main canals and the distribution network, drains, flood protection, etc. (www.mowr.gov.pk). Executing agencies such as WAPDA may propose new schemes; the approval, financial and technical monitoring of these schemes is attended to by the MOWR. Operational matters related to Indus River System Authority (IRSA), the Federal Flood Commission (FFC) and preparation of the Annual Public Sector Development Budget for water sector projects also fall under the purview of the Ministry.

While the establishment of the Ministry is a recent endeavor[11], WAPDA dates back to 1958. It is an autonomous body under the Federal Government, with a mandate to develop water and hydropower resources efficiently. WAPDA's domain includes all projects falling under the irrigation, drainage and hydropower sectors; major water projects such as large dams also fall under their purview. In 2007, WAPDA was bifurcated into Water and Power Wings with WAPDA responsible for the water wing while the latter was transferred to a holding company PEPCO (Pakistan Electric Power Company) having further disintegration into distribution, generation and transmission companies. WAPDA holds responsibility for water and hydropower development whereas PEPCO oversees thermal power generation, transmission, distribution and billing[12]. The International Waterlogging and Salinity Research Institute (IWASRI) was established in 1986 as a research institute to investigate waterlogging and salinity, and other environmental concerns.

During the early post-independence era, when the country was faced with a multitude of water-related challenges and difficulties, WAPDA proved to be highly successful and developed international reputation for effective planning, construction and operations. However, the same institutions that were once admired the world over have now atrophied as they failed to evolve in the face of changing circumstances and newly emerging incentives (World Bank, 2005). It is now widely agreed that WAPDA and the irrigation departments have not been able to rise to the new challenges posed in the water sector.

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11 The Ministry of Water Resources (MOWR) was formed in 2017 after dissolving the Ministry of Water and Power. The later historically had two wings: The Water Wing (now known as the MOWR) and the Power Division (now merged with Ministry of Energy.

12 www.wapda.gov.pk

The Pakistan Council of Research in Water Resources (PCRWR) is another noteworthy research institute which has published reports on areas such as water quality, water management and rainwater harvesting. Planning Commission of Pakistan is responsible for the national-level planning and approval of the federal government's development projects in the water sector. It also processes examination/approval of provincial projects funded by the international organizations, federal government and even from the provincial resources beyond a certain threshold of project amount.

4.1.2 Provincial level organizations in Sindh

Several actors are participating in the water supply sector. These include the Irrigation Department, Local Government Department (LGD), Public Health Engineering Department (PHED), Municipalities, private housing colonies and cantonments, small scale private sector providers, and self-provision by households. The roles and mandates of these actors are explained below.

4.1.3 LGD, PHED, RDD and TMAs

At the provincial level in Sindh, water supply and sanitation in rural areas is controlled and managed by the PHED, and the Rural Development Department (RDD). Till recently, PHED and RDD were under the purview of Local Government Department (LGD), they have now been established as separate line departments. PHED is in charge of proposing, planning and developing water supply and sanitation facilities in rural areas. However, Operation and Maintenance (O&M) of water supply, sanitation and drainage schemes fall under the domain of RDD. LGD is the line department for WASA Hyderabad, KWSB, and municipalities.

In urban areas, two frameworks exist depending on the size of the city.

1. In large cities, the entire responsibility of water supply, sewerage and drainage is handed over to Water and Sanitation Authorities (WASAs). There are only two such frameworks in Sindh: WASA Hyderabad and the Karachi Water and Sanitation Board (KWSB). WASA Hyderabad is a semi-autonomous water utility, which works as a directorate of the Hyderabad Development Authority. There are seven WASAs across the country, five of which are in Punjab, one in Quetta and one in Hyderabad.
2. In smaller urban settlements like small cities and towns, PHED is responsible for all water supply and sanitation construction. The PHED is not in charge of O&M in urban schemes; small scale, routine O&M functions are handled by Municipal Corporations. This framework of urban water management shows a critical disconnect between those who build assets and those in charge of the management of assets. Without creating these much-needed synergies in the provincial government, water resource management will remain fragile and unbounded.

4.1.4 NSUSC

The North Sindh Urban Services Corporation (NSUSC) is a regional utility, which was established in 2008 for the construction and management of water supply schemes in six secondary cities across Northern Sindh[13]. It was part of the Sindh Cities Improvement Investment Program (SCIIP), a 10-year, $300 million multi-tranche financing facility approved by the Asian Development Bank (ADB). The program was designed to improve the "quality, coverage, and reliability of water supply, wastewater management (WWM), and solid waste management (SWM) services in these secondary cities" (ADB, 2017). Tranche 1 was approved with funding of $38 million in 2008. The Planning and Development Department (P&DD), Government of Sindh (GoS), through the program support unit (PSU) established NSUSC as the implementing agency of the program. The Urban Unit, a wing of the P&DD, GoS, was established in 2009, its primary role being to support relevant Taluka Municipal Administration (TMAs) in monitoring NSUSC performance. This target was not achieved due to weak institutional arrangements. The TMAs and Local Government Rural Department were not considered at the time of design, and the lack of precise and clear performance benchmarks rendered the agreement between TMAs and NSUSC unwarranted.

Tranche 1 had four components, of which one was focused on water supply and wastewater management improvements. Under this component, five water treatment plants were to be made operational in Sukkur and Khairpur, but three plants were still incomplete by the end of Tranche 1. In Sukkur, the construction and operations of two plants were completed in the last quarter of 2016 during the second Tranche. Of the 18,000 meters of pipeline that were planned to be installed for bulk and individual consumers, only 2752 meters were installed. It did not result in any decrease in non-revenue water as a volumetric tariff was not adopted, and a meter-reading regime was not put into place (ADB, 2017). The water supply component had the following aims:

- ☐ Enhance revenues by updating the consumer base and increasing tariff collection efficiency so that bill collection would cover at least 5% of O&M expenditure. This target was not met at the completion of Tranche 1 as by 2015 only 4% of O&M cost was recovered. However, the customer base did increase by 30% from 2010 to 2016, of which 19% of the households were in the project area.
- ☐ Reduce illegal connections and non-revenue water consumption from 50% in the base year to 40-50% at the end of Tranche 1. The borrower reported achieving 45-55% by completion period.
- ☐ Develop a system to monitor the quality of groundwater.
- ☐ In March 2017, the Supreme Court of Pakistan ordered that NSUSC be

13 These cities include Sukkur, New Sukkur, Rohri, Khairpur, Larkana and Shikarpur.

demobilized on account of substandard service delivery. Municipal functions were handed back to the TMAs of the towns and cities. During our field visits to Hyderabad and Sukkur, we found that there are varying perspectives and opinions on NSUSC's performance and reasons for failure.

"*NSUSC failed on all accounts. The company was good at showcasing, filing, and making fancy presentations. All the funding they were given went out as salaries. The main reason for failure is the lack of political will; they had no lack of funds. PKR 65 million was to be given to NSUSC had it not been abandoned*." A district government official in Sukkur.

One of the major flaws observed in governance, particularly the operations by NSUSC, is that there is too much focus on one-time projects, and much-needed attention is not paid to O&M expenses and plans. Rather than considering long term plans for development, injections in the form of projects are given; a positive step in one sector may lead to the impairment of recent work in another sector, but no heed is paid to this. Furthermore, the projects are handled by experts unfamiliar with the dynamics of the particular region in question.

"*NSUSC consultants came from Lahore and started operations without much-needed homework. Theoretically, it was a nice presentation, but the site from where NSUSC picked up water was downstream Rohri, which is a dumping spot for wastewater. Flashy equipment was used, and air mufflers were installed to avoid noise, but there were basic operational failures, e.g. roads were dug to install pipes and were not refilled properly. When it rained, the dirt sank, and roads were ruined."* A businessman in Sukkur.

Another major reason for the failure of NSUSC is that the responsibility switched hands too many times, leading to blame-shifting and a lack of ownership by those in charge.

"*NSUSC was bound to fail ultimately because DC kept changing. In 6 years, there were 13 MDs and 16 Project Directors. An allocation of $6 billion was approved from ADB but not spent due to tranches set up for NSUSC. When NSUSC was shut down by Chief Justice Hani, the entire system (drainage, sanitation, water supply) was handed over to SMC. It was too much burden to handle it after seven years of inactivity. SMC did not have the capacity to handle the city's water management."* The former officer of NSUSC.

"*NSUSC was a new experiment established in 2009. It was supposed to be a community-based approach, but due to interference from the bureaucracy, politicians and the Government of Sindh, the program failed. An independent board of governors was not there initially, and pending decisions kept on piling. The structure was clear at first, but then it became unclear to the Board of Governors and managers. ADB rules were being violated, and while tenders and designs were made, there were too many conflicts. Tenders were at the award stage when the Supreme Court announced its decision to suspend and ultimately cancel all*

operations under NSUSC. The decision was made based on past performance and not the present performance. NSUSC performed well in its first year, but then performance slid. Recently they had tried to get back on track by having audits for the last four years and made attempts to follow ADB rules. A new Board of Governors was appointed and tried to resolve conflicts. No new filtration schemes were set up under NSUSC; rather the distribution network was expanded by laying out an extra distribution zone, which goes into narrow alleys. Existing filtration plants were rehabilitated under NSUSC. There was a gap in planning because filtration plants should have been set up before expanding the network." A local politician in Sukkur.

"NSUSC was considered to be a reform plan but turned out to be infrastructure improvement. The fact that NSUSC was a company and not a corporation had raised people's expectations and hopes. NSUSC stopped midway into the first tranche. They were asked to hire the same management-level employees that were already working at SMC. They were offered a 20% raise. However, under SMC, the problem of ghost employment is severe; these employees were not used to working. Out of 1000 employees, hardly 200 would show up. It was difficult to manage and implement any lasting change with the same infrastructure as before." An official of Government of Sindh.

"NSUSC was a good experience. It was more transparent than other water authorities. It is unfortunate that the model has not evolved fully, and it was dismantled halfway". A Public Financial Management Expert in Karachi.

Hence the perspectives of different stakeholders are mixed about the performance and shut-down of NSUSC. Further examination into the company's performance merits a separate research study.

4.1.5 Other actors

Private housing colonies and Cantonment Boards are responsible for water delivery services to their residents but are not captured in the planning or monitoring of the sector. It places pressure on resources, especially at times when the river is relatively dry. Small-scale water providers (vendors) also play an important role. In areas where water filtration plants are not existent or dysfunctional, urban and rural citizens rely on private suppliers of bottled drinking water. There is no proper mechanism of licensing or monitoring the quality of the water being provided to the public. Self-provision is also prevalent across the province, in both urban and rural settlements. The use of hand-pumps, motor pumps, and wells is common in areas where groundwater is sweet. However, locals relying on this source are unaware of the potentially hazardous levels of contamination, especially in certain areas where water supply lines are laid in the same regions as sewerage lines. 45% of Sindh's population reported reliance on hand pumps or motor pumps for drinking water, according to PSLM (Government of Pakistan, 2016).

4.2 Reforms, Regulations and Policies

4.2.1 Legislations and policies at the federal and provincial levels

Water-related legislations and policies (Federal level) are given in Table 4.1 and the timeline in Fig. 4.1.

Table 4.1: Pakistan's water-related legislations and policies

S.No.	Legislation name	Purpose
1	WAPDA Act 1958 (amended in 1994)	Development and utilization of water and power resources
2	Indus Water Treaty 1960	Water rights allocation between Pakistan and India over six major rivers. Eastern rivers allocated to India, Western rivers to Pakistan
3	Indus Apportionment Accord 1991	Allocation of waters of River Indus among the provinces
4	Indus River System Authority (IRSA) Act 1992	IRSA established through Act of Parliament to implement the Indus Water Accord 1991
5	Pakistan EPA Act 1997	An Act to protect and conserve the environment, to prevent and control pollution, to promote sustainable development
6	Pakistan Water Sector Strategy 2002	Undertaken by the Ministry of Water and Power to prepare a road map for the future development of the water sector towards efficient service delivery and optimum utilization of resources
7	National Sanitation Policy 2006	Provides broad framework and policy guidelines to enhance and support sanitation coverage in the country, with a primary objective to install sanitary latrines
8	National Standards for Drinking Water Quality 2008	Provides comprehensive quality control measures set by the Ministry of Health in collaboration with WHO
9	National Drinking Water Policy 2009	To prioritize drinking water over other uses, to ensure enhanced and equitable access, to develop water quality standards
10	National Water Policy 2018	To recognize the emerging water crisis and provide an overall policy framework to develop and manage water resources

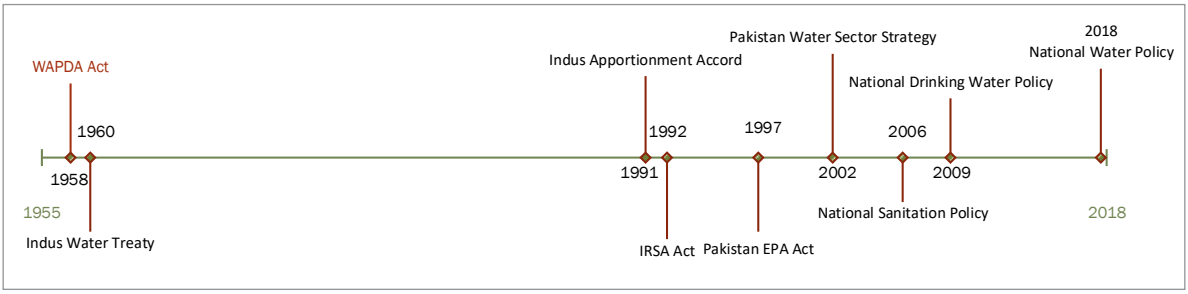


Fig. 4.1: Timeline for federal policies

Sindh's water-related legislations and policies are presented in Table 4.2, and the timeline is given in Fig. 4.2.

Table 4.2: Sindh's water-related legislations and policies

S.No.	Legislation name	Purpose
1	KWSB Act 1996	To provide for the establishment of a board (KWSB) for the supply of water and disposal of sewerage in the Karachi Division
2	Sindh Irrigation and Drainage Authority (SIDA) Act 1997	Establishment of SIDA in Sindh for equitable distribution of irrigation water and effective drainage and flood control through the participation of beneficiaries in the operation and management of irrigation and drainage network
3	Sindh Water Management Ordinance 2002	Provides details of operations and functions of SIDA along with functions and tasks of area water boards, farmer organizations and water-related committees and associations
4	Sindh Sanitation Strategy 2006	Provincial-level policy in line with National Sanitation Policy
5	Sindh Municipal Water Act (Draft) 2012	To recognize, regulate and manage water in Sindh; provides guidelines for private water treatment and supply in Sindh, which includes permits
6	Sindh Environmental Protection Act (SEPA) 2014	Pollution control of water sources by the prohibition of domestic and industrial waste over and above the provincial environmental quality standards
7	Draft Sindh Drinking Water Policy 2016	In line with National Drinking Water Policy 2009; the main purpose is the provision of potable water ensuring adequate quantity and quality

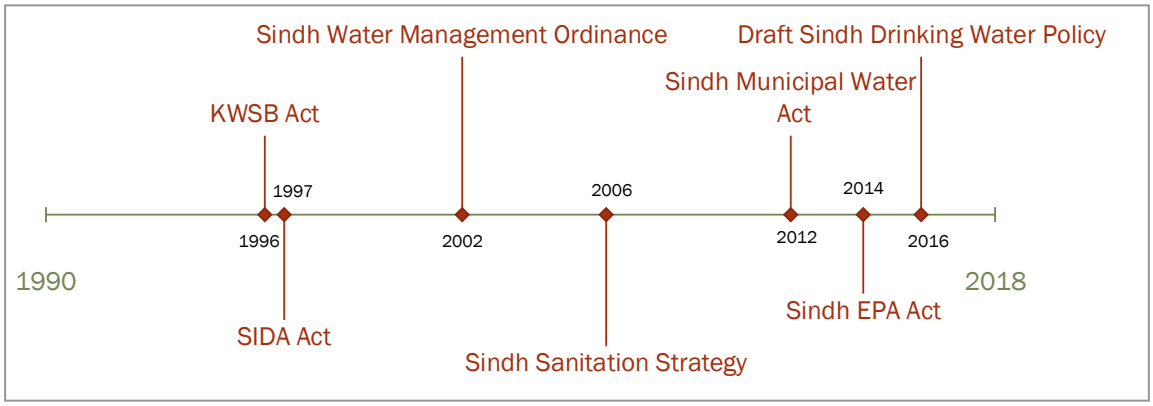


Fig. 4.2: Timeline for provincial policies of Sindh

4.2.2 The Water Accord

Pakistan's Water Apportionment Accord 1991 allocates the waters of the Indus River System and is hailed as a historic agreement. After independence in 1947, water was divided among the provinces on an informal, ad-hoc basis. The Accord was the first official consensus document which was finalized through input from all stakeholders. It is signed by the highest officer of each of the four provinces and consists of 14 clauses and 8 appendices. A year after the signing of the Accord, IRSA (Indus River System Authority) was established through an Act of Parliament to implement the Accord. Sindh, being the lower riparian, has had historical conflicts with Punjab over the division of water. The upper riparian has the tendency to take a larger share of water in times of shortages. In contrast, in periods of excess water, the lower riparian receives most of the floodwater. The lower riparian can, therefore, end up being a victim in both extremes.

While the Accord has successfully been implemented, it suffers from some weaknesses. Although the Accord apportions volumes, there is no clear definition of what constitutes Waters of the River Indus. Geographical limits are undefined; moreover, whether the system included groundwater and/or surface water is ambiguous. The widely accepted understanding is that the water to be apportioned flows through a network of gauging (rim) stations and includes surface water only (Anwar and Bhatti, 2017). Unlike the Colorado River Compact (CRC, 1922) or the Water Act (Murray Darling River, Australia), Pakistan's Water Accord is a consensus rather than a law (Anwar and Bhatti, 2017).

Furthermore, there are no clearly defined objectives; rather, the document states challenges to overcome. The total water to be allocated is 144.7 Gm^3/year. The Accord apportions 48.92% to Punjab, 42.64% to Sindh, 5.05% to KPK and 3.38% to Baluchistan. In situations of variability in water flow, the Accord states that balance of river supplies shall be distributed as follows: 53.06% to Punjab, 42.37% to Sindh, 2.98% to KPK and 1.59% to Baluchistan (according to Proportions 1977-1982). The term 'balance' has not been explicitly defined in the Accord, leaving it open to interpretation. It is

understood to be the amount of water over and above the baseline allocation volume of 144.7 G/year. There is also ambiguity in the document about the difference between 'balance' and 'surplus'. Recently, it was agreed that an apportionment of 0.179 G/year will be allocated for potable water to the twin cities of Rawalpindi and Islamabad in proportions given by Clause 4. This is a bone of contention between Sindh and Punjab as both provinces forsake 37% even though Punjab takes the larger share.

Reduced river flows below the Kotri Barrage have rendered the deltaic environment fragile, bringing in harm's way to the endangered fauna, flora, forests, mangroves, fisheries and the coastal area at large. The Indus Delta is the 5th largest delta in the world and constitutes a diverse ecosystem consisting of irrigated plains, riverine forests, brackish wetlands and freshwater lakes.

Silt-laden freshwater flows from the River Indus provide the prime sustenance needed for the endurance of the Indus Delta (SIDA, 2011). The IPOE recommends a flow of 5 MAF in a year or a continuous flow of 141.58 cubic meters per second. According to the Water Accord, 10 MAF is committed downstream Kotri. However, there is some conflict in the literature regarding required flows into the Indus Delta. The International Union for Conservation of Nature, Pakistan has calculated that release of 27 MAF (33 billion cubic meters) per year flows are required to sustain a healthy deltaic ecosystem. Gonzalez *et al.* (2005) recommend continuous discharge of 141.69 cubic meters per second with an occasional surplus discharge such that 30.861 billion cubic meters be released into the Arabian Sea yearly.

Data on the annual volume measured at Kotri Barrage and assumed to flow into the Arabian Sea is collected by IRSA; since 1975, there have been three years when flows to the sea fell below 5 G/year and six years when flows fell below 10 G/year. It is alarming that all these cases are post-2000. While a healthy deltaic ecosystem should be a national priority, any top-slicing from the baseline volume for environmental flows would imply less apportionment for all provinces. Punjab would, therefore, prefer that environmental flows be a part of Sindh's apportioned volume. This is an issue that should be addressed in the Water Accord; however, it mentions no such explicit apportionment for environmental flows of any kind.

Despite the Accord, issues remain between the provinces over the distribution of water. Sindh, in particular, claims that it receives less water than its apportioned share. Besides, there is insufficient flow to the Arabian Sea because of which seawater now flows 100 km inland, leading to increased salinity rendering the lands of lower Sindh unfit for agriculture.

4.2.3 Insights into Pakistan's national and provincial water policies

The Council of Common Interests (CCI) signed the National Water Charter on 24 April 2018. On the same day, the CCI also approved the National Water Policy prepared by

the Ministry of Water Resources. The signing of the Water Charter by the heads of all four provinces and the Prime Minister of Pakistan is hailed as a landmark in Pakistan's history as it is the first time that the leaders of the nation were able to reach a political consensus regarding water distribution. While this display of strong political will is certainly a step in the right direction, there are fundamental questions regarding the legality of the Water Policy. The CCI's Constitutional function confers on it the authority to regulate and approve policies concerning WAPDA. Still, legally it cannot approve a water policy outside the scope of the Authority. The Federal Government may not be able to implement parts of the policy that fall under the mandate of departments in the Provincial Governments (Alam, 2018).

The National Water Policy states integrated water resource management as one of its main objectives. In order to achieve this goal, a holistic understanding of each province's dynamics and water issues is required, along with an in-depth review of the needs of various sectors like agriculture, industry, drinking water, etc. Therefore, ideally, the integrated water resource management strategy should be bottom-up with provinces framing their water policies and then federation preparing the national policy on that basis. The current approach remains top-down, and its enforceability remains limited. There is a lack of sector-wise allocation of the water resources in the country; the issue is primarily a provincial subject and continues to be addressed at the provincial level. As a result, there is a lack of integration in water resource management amongst various relevant departments of the government; irrigation departments consider themselves as custodians of groundwater whereas PHED and housing departments consider the public as having the first right on groundwater for domestic use.

> "*If we don't change the land tenure system, the 97% water being absorbed by the agriculture will not change. It is against the law for an individual to extract water from the canals, but everyone does it. Big farmers refuse to pay taxes; they don't pay the abiaana, they don't pay income tax, they steal and cheat and don't get caught by the regulatory authorities*." A renowned water expert and head of a civil society organization.

The Ministry of Environment formulated the National Drinking Water policy in 2009. It is designed as a guiding framework for provincial governments to address critical issues and challenges facing the country in the provision of safe and adequate drinking water. Provincial governments have passed their own drinking water policies in response. Policy guidelines in the document cover areas such as increasing access, protection of water sources, water treatment and safety, the role of community participation, public-private partnerships, and public awareness.

The Policy is a good first attempt at addressing the drinking water sector but fails to

provide a holistic approach to managing water supply and quality from catchment to end-user. Targets and objectives should be more narrowly defined as broadly defined goals are challenging to track. The Australian Drinking Water Guidelines 6 (2011), for instance, provides a solid framework for the management of drinking water quality. The framework takes account of the various agencies and stakeholders involved in management from catchment to end-user. It allows them to identify their areas of responsibility and become involved and offers the outcome of a cooperative and coordinated approach with an improved understanding of the responsibilities of all parties. It also provides a forum for communication with the public and with employees. Pakistan's National Water Policy fails in both these attributes as it does not offer an integrated approach to drinking water management, nor does it make any provision for interaction with the public or employees.

Existing frameworks of water governance are failing due to the highly centralized and top-down approach adopted in this sector. Pakistan's National Water Policy should make a strong case and move towards public-private partnerships (PPPs) and higher levels of participation from the public. Section 6.8 provides but a slight brush-up against PPPs and community participation. According to Section 6.8 of the National Drinking Water Policy: "*Private entrepreneurship and public-private partnerships for enhancing access of safe drinking water, operation and maintenance of water supply systems, resource mobilization and capacity development will be promoted. The role of civil society organizations to support the government's efforts in this context will also be encouraged.*" Despite it being part of the policy, by far there has hardly been any initiative to encourage participation from the private sector or CSOs.

Over recent years, the water industry in Australia has been restructured such that catchment and water resource management has increasingly been transferred to agencies other than drinking water suppliers. These agencies include natural resource and environment departments, water resource departments, local governments, agriculture departments, planning authorities, catchment water management boards, and community-based organizations. With many agencies being involved, clearly defined responsibilities are crucial. The Punjab Drinking Water Policy does address the roles and responsibilities of PHED, WASA's and TMA's, but there remain many cases of responsibility overlapping. The Sindh Drinking Water Policy, however, makes no mention of the various agencies whatsoever.

The National Drinking Water Policy states that drinking water is to be treated so that it complies with the National Drinking Water Quality Standards, a document prepared in 2008 by the Ministry of Environment in collaboration with the Ministry of Health, WHO and UNICEF. The benchmarks prescribed in this document are based on comprehensively designed standards that take into account the physical parameters (color, taste, odor, turbidity), microbial standards (minimum allowed detection of various

forms of bacteria expected to be found in water sources such as E.coli), and organic and inorganic chemical attributes (minimum values of essential chemicals and upper limits for toxic chemicals). The standards prescribed vary slightly as compared to WHO defined standards, which are more rigidly detailed as compared to those in Pakistan's Water Quality Standards. However, these standards are hardly implemented. During our visits to Hyderabad and Sukkur, we observed that quality standards are checked at the filtration plant by the water providing authority itself. This is a nation-wide loophole in water governance; monitoring authorities should be independent to avoid biased reports. Moreover, the piped infrastructure in some areas dates to pre-partition, so when water passes through the pipes, it becomes contaminated. There is no provision in place by the Government of Sindh to monitor the quality of water that is provided to the domestic user.

Pakistan's National Drinking Water Policy 2009 was designed as a guiding framework from which the provincial governments were expected to align and draw from in order to prepare their own drinking water policies. The Government of Punjab drafted the Punjab Drinking Water Policy in 2011; this is a 21-page document with policy targets covering legislation, institutional reforms in urban water provision, the role of tehsil municipal administrations (TMAs) and rural water supply schemes. Institutional reforms outlined for urban water provision address the need for improved O&M; WASA's inability to set a rationalized tariff and collect it effectively from end-users has become a financial and administrative burden on the nation's exchequer. The Policy also addresses the need for and importance of appropriate monitoring. Section E of the Punjab Drinking Water Policy outlines the key concerns regarding monitoring of quality and states that "the EPD and the PHED/WASAs through their laboratories will establish a system of monitoring of water quality standards at the source as well as the user's end." While the roles of relevant departments have been identified, the issue at hand is yet to be tackled since quality control remains in the hands of the water supplier. The document is a good first attempt at addressing drinking water management in Punjab, but many loopholes remain. To ensure high-quality drinking water, it is necessary to manage water quality at all points of the delivery chain from catchment point to household. Sindh's Drinking Water Policy, on the other hand, is a failed attempt and barely qualifies as paper-work. It is a 4-page document with unspecific, broad targets and has not been prepared in line with the National Drinking Water Policy. It is expected that when a provincial level document is prepared, it would be more focused on well-defined targets as compared to the federal level policy document. It was prepared in 2018, seven years after the National Drinking Water Policy. To improve management in the drinking water sector, step one entails a well-thought-out structured policy document with clear, trackable objectives, and specified targets. Implementing the National Drinking Water Policy lies in the hands of provincial governments. Still, the Sindh

Government has not made drinking water a priority, nor has it made a concerted effort towards this cause, a fact that is evident from the failed state of safe and sufficient water provision in Hyderabad and Sukkur. The Sindh Municipal Water Act 2012, on the other hand, is a more comprehensive document.

While many policies have been framed at the federal and provincial level, implementation and enforcement is a task undone. For example, there is no regulation on groundwater extraction. The Sindh Municipal Water Act prohibits the extraction of groundwater without a permit. It states that appropriation of groundwater for domestic use by a landowner without registration with the Sindh Municipal Water Commission is not allowed and anyone violating this clause is to be fined. However, this policy is not implemented on ground; residents across Hyderabad and Sukkur are extracting groundwater without permits or registration. Similarly, water theft is a common crime and goes unchecked.

> "*Industrialists in Karachi steal water by connecting their own pipes to the mainline. There should be a check on the flow of water at the start and end of the pipe. However, with weak law enforcement everywhere, more checks may not be the best way to deliver results. In Hyderabad, water theft is quite prevalent as building owners and renters take connections from the main pipe themselves."* An academic working on the Water Sector.

4.3 Public Investment Management

4.3.1 Weak local government/lack of decentralization and local empowerment

Well-planned local governments play a crucial role in improving governance and service delivery in the drinking water sector. The local governments primarily deal with it in most of the countries in the world. However, Pakistan has not pursued devolution to the grassroots level in a true spirit; hence provincial governments are directly responsible for allocation of resources, identification of development schemes and operations. Many scholars believe that this is the legacy of the colonial history of the indo-continent region. Local Government Ordinance 2001 is generally considered the most ambitious initiative to strengthen local government in the history of Pakistan. One of the academics based in Hyderabad expressed his view about the success of the community-based approach as follows;

> "*Citizen Community Boards (CCBs) were established in Musharraf's era to promote community participation, on 20-80 partnership where 20% of the cost was to be paid by the community, and 80% paid by the government. Villages are willing to provide labor but are less willing to pay cash. There have been many successful cases in the past where villagers gave land and labor for water supply schemes."*

Pakistan has been marked by discord due to frequent modifications in the local government. The Basic Democracies Order of 1959 disbanded national and provincial

assemblies and declared local governments as the only representative layer of government. Under this Order, municipal committees and union committees were set up in urban areas; union councils, taluka councils and district councils made up the tiers of local government in rural areas. However, this system was a response to provincial autonomy through centralization, seeking legitimacy through local government. The system of basic democracies was put to an end in 1969 as it failed to mobilize the rural population around the institutions of national integration. The extensive level of centralization eventually led to broad political discontent (UNDP, 2013).

The Local Government Ordinance 1979 revived local governments, further expanding LG bodies and empowering deputy commissioners. However, local elections were organized on a non-party based electoral system, which led to personalized politics and strengthened individual and tribal patronage at the local level. It was an adoption of the same model of promoting local government while clenching on to centralized control at the federal level. The Local Government Ordinance (LGO) 2001 introduced by Musharraf devolved administrative, financial and development power to the elected officials in the local councils. The rural-urban divide was abolished in this order as local government was established at three levels: Union council, Taluka Council and District Council. This Ordinance again did not create a hierarchical relationship between the provincial and local governments but instead established a correspondence between the National Reconstruction Bureau and the President's Office (UNDP, 2014). During this era, the political stage in Sindh was dominated by PPP and MQM. PPP had provincial support from rural areas while MQM was the standard-bearer of urban citizens in Karachi and Hyderabad. Musharraf's Local Government system did not create much spark at first, but soon PPP began to voice its concerns as certain changes were seen to only benefit MQM at the cost of PPP. Thus, there was strong resistance from PPP (Murtaza and Rid, 2017). Many locals praise the LGO 2001 across Sukkur and Hyderabad as it provided forums such as Citizens Community Boards (CCBs) to encourage and enhance participation from the public to oversee and develop schemes, and Citizen Police Liaison Committees to promote rights protection and the rule of law.

> *"The Karachi Water Partnerships supported by the Global Water Partnerships were active when we had the local government system back in 2003-04. Under this, our NGO found philanthropists to donate for water and sanitation, and we worked with KWSB; they would do the outside work, and we would work from the inside. Ever since the LG system ended, we have no basis for forming a partnership; there is no funding now. Throughout Pakistan, we had 32 water partnerships, but they suffered when the local governments were dissolved."* A renowned water expert and head of a civil society organization

The 18th Amendment to the Constitution aimed to reform the constitution in light of the Charter of Democracy, which highlighted the importance of *subsidiarity* and called for the establishment of local government systems in the provinces. Under Article 140-A of the Constitution: "*Each Province shall, by law, establish a local government system and devolve political, administrative and financial responsibility and authority to the elected representatives of the local governments. Elections to the local governments shall be held by the Election Commission of Pakistan*". This is the first time in Pakistan's history that a democratic government has taken the initiative towards devolution and strengthening local government systems.

While previous ordinances and acts have been passed at the federal level, the LGA 2013 is notable in that it puts provincial governments in charge of local government elections, thus maintaining the hierarchy between the federal, provincial and local tiers of governance. Following Article 140A, Sindh passed its Local Government Act in 2013. All four provinces under this act retain the power to remove heads of an elected local government, and the Finance Department of the province still controls the Local Government Fund. Therefore, it is questionable whether enough functions and powers have been delegated to the local government under the LG Act 2013. However, the extent to which powers have been devolved remains questionable.

Under the 18th Amendment, it was hoped that the provinces would further devolve powers and resources to the local governments. Unfortunately, that is not the case which is evident from the local government systems introduced by the provinces in 2013. Under these local governments, their power remains limited and sufficient resources have not been provided. WASAs continue to be administered by the Local Government for provinces. PHED is a provincial department which retains the power to design and develop urban sector water schemes, whereas O&M is handed over to TMAs. Due to lack of coordination, blame-shifting is common as TMAs claim that projects are not designed according to local requirements. In contrast, PHED officials shift the blame on TMAs and assert that maintenance and rehabilitation are not performed according to desired standards. Local governments informed us that PHED rarely consults them before designing schemes. It is one of the significant flaws in governance; not a single department takes ownership due to this responsibility overlap.

> *"Coordination between different agencies is the main issue. There are gaps in the planning process. The departments are not oriented or directed in tandem. When schemes are handed over to the companies or agencies, they complain that they were not involved in the planning process, which makes implementation difficult for them and sets up a project for failure. There is a top-down approach and not a bottom-up approach. All stakeholders should be involved at the onset of a project, its implementation and maintenance as well.*" A senior official from the LGD Sindh.

How can devolved and empowered local governments prove to be more helpful to ensure smooth supply of water? One line of argument is related to the engagement of citizens at the local level for designing and monitoring water supply schemes. During our interviews, even chambers of commerce officials informed us that they were unaware of any water development plan at the city level. This indifference of citizens towards the water sector has mainly emanated from centralization for water sector schemes at the provincial level. Citizens can hold local politicians accountable as compared to executive officials sitting in Karachi. One of the participants of the Focus Group Discussions in Hyderabad informed us:

> *"The government does not ever consult the community regarding various water schemes or filtration plants. If some new project or policy is drafted, it is directly implemented. There is no consultation at any level from the government. In some colonies, the government does not take any responsibility and claims that it is the builder's duty to provide water.*"

Provincial officials are less aware of city dynamics and tend to set up projects without an in-depth understanding of what is needed and what the constraints are. For instance, many locals complained that the main intake points near Rohri, Sukkur are downstream of dumping sites for waste by industrialists. Such issues are likely to be known to local officials. In such a case, either the activity of dumping waste upstream of the intake point should be strictly prohibited and monitored, or the position of the intake point should be revised. Without sufficient political, financial and administrative devolution, local governments can end up imposing high costs without providing due benefits.

> "*Waste is not supposed to be dumped by law, but since there is no enforcement, this practice continues. Dilution is the solution to pollution. The solution is to treat the water to some extent before dumping it into the river. This practice has caused all sorts of water-borne diseases. In some areas, water is dumped very close to and upstream of water intake points." A senior official dealing with the Irrigation Sector in Sindh*

4.3.2 Soft budget constraints

Local governments and other agencies dealing with the water sector can approach provincial finance department for any shortage of funds even for ex-post approvals of expenditures, which may be considered as a dynamic commitment problem (Kornai *et al*., 2003). A soft budget constraint thus emerges when the supporting organization (such as the provincial government) is willing to cover the costs of the budget-constraint organization in case revenue collection does not meet the mark. A budget-constraint organization faces a hard budget constraint when no such organization prevents its dissolution in case of financial failures.

This problem is obvious in the water governance sector; the local government department may claim that they will not bail out the municipalities in charge of water provision but may be forced to rescue it through subsidies (Kosco, 2018). The problem with water governance institutions in Sindh is exacerbated by the fact that WASA, KWSB and TMAs do not even set the target to make ends meet through revenues as they know that they can approach the provincial government in case of shortage of funds. When the water utility acts with the knowledge that financial inefficiency will result in a bailout rather than dissolution, it is more likely to engage in wasteful expenditures since it does not operate on a cost-minimizing target. This is a case of moral hazard as the organization would inevitably take on more risk, spend excessively or not make the required effort to collect revenue, knowing that another institution would bear the burden of a failure on its part. The same phenomenon is observed in the maintenance of schemes: most schemes are operating at a sub-optimal level**.** The cost of inaction in this regard leads to huge increases in capital costs in the coming years. Still, local authorities rarely consider such implications as provincial governments step forward with a new scheme every time this type of dysfunctionality occurs.

Another major impediment in governance is the 'ghost employee' phenomenon, whereby employees do not show up to perform their assigned duties. The media have highlighted the issue of ghost employee in schools and hospitals of Sindh in the recent past, but no mention of this overriding burden is made for water institutions. This concern was raised by officials in Sukkur as well as Hyderabad. The problem of ghost employees was so obvious to water authorities that it was raised even by one of the political leaders in Sindh with the following words;

> "*Most of the employees of water authorities and department do not show up in offices, and they perform either their private jobs or work at homes of politicians and senior bureaucrats. There is a need to take action against these ghost employees in the first instance and carry out managerial and accountability changes in the current water governance system."*

The organization facing a soft budget constraint may turn away from productive activity and move instead toward rent-seeking behavior. It is defined as "behavior in institutional settings where individual efforts to maximize value generate social waste rather than surplus" (Buchanan, 1980; Kosco, 2018). Those running the organization can either apply human resource towards serving and performing the institution's responsibilities and tasks or, they can make efforts towards individual gain or rent-seeking behavior. In the context of water management institutions in Sindh, this rent-seeking behavior can be observed at various levels of management. WASA Hyderabad, for instance, is unable to recover more than 30% of bills. It is common knowledge in WASA and SMC that bill collectors often collect a small bribe in return for waiving off the bill owed by households.

"Bill recovery was extremely low, and many household members complained that they did not even receive the water bill. This can be attributed to the fact that government-hired staff responsible for distributing bills were not performing the tasks assigned to them. Recently, WASA, Hyderabad outsourced its bill distribution and recovery to a private firm in an attempt to improve the recovery rate." An official WASA Hyderabad.

This is a classic symptom of soft budget constraints; those in charge are aware that there is no real repercussion of not being able to make ends meet. Hence, there is no incentive or check and balance in place to prohibit such behavior by employees. The ad-hoc system of financing creates a culture where the institution's first priority is to extract salaries from the funds available in the O&M budget, and there is no effort to cut down on costs.

4.3.3 Flaws in Legislation/Policy Framework

The analysis of the data collected on water schemes through multiple sources has revealed severe weaknesses in the various phases of public financial management (PFM), namely, policy, planning, execution, reporting, and monitoring. PFM holds vital importance in improving service delivery in various sectors. Some of the problems found in the water sector may also be observed in other sectors, but considering the significance of water provision to masses, it should be amongst the top priorities to resolve such challenges.

There is a lack of a comprehensive and integrated water policy to tackle issues in this sector across the province. Without such a policy, there is a gap regarding direction and interventions in the water sector. Water allocation between sectors and regions, for example, can only be addressed through a central policy. The Sindh government officials informed that new water policy is being drafted which may address some of the challenges mentioned above. Still, during our study period, local-level officials and citizens did not have any information regarding such developments.

Comprehensive water sector plans are missing at the level of cities and districts. Resultantly, water supply schemes for the annual development plan are designed haphazardly. There is no clarity amongst officials of different water-related agencies about the strategic priorities for public investment in the water sector. If there is any such plan, it is usually not cost, rendering it a redundant document. Moreover, such plans also give a direction about the future of the sector in terms of technology and governance. Hence, multiple projects and schemes can be observed as failures in terms of governance and technological usage. The absence of a strategic approach weakens the decision-making process. It results in over-reliance on new projects rather than maintenance, which in turn creates perverse incentives in the pay structure.

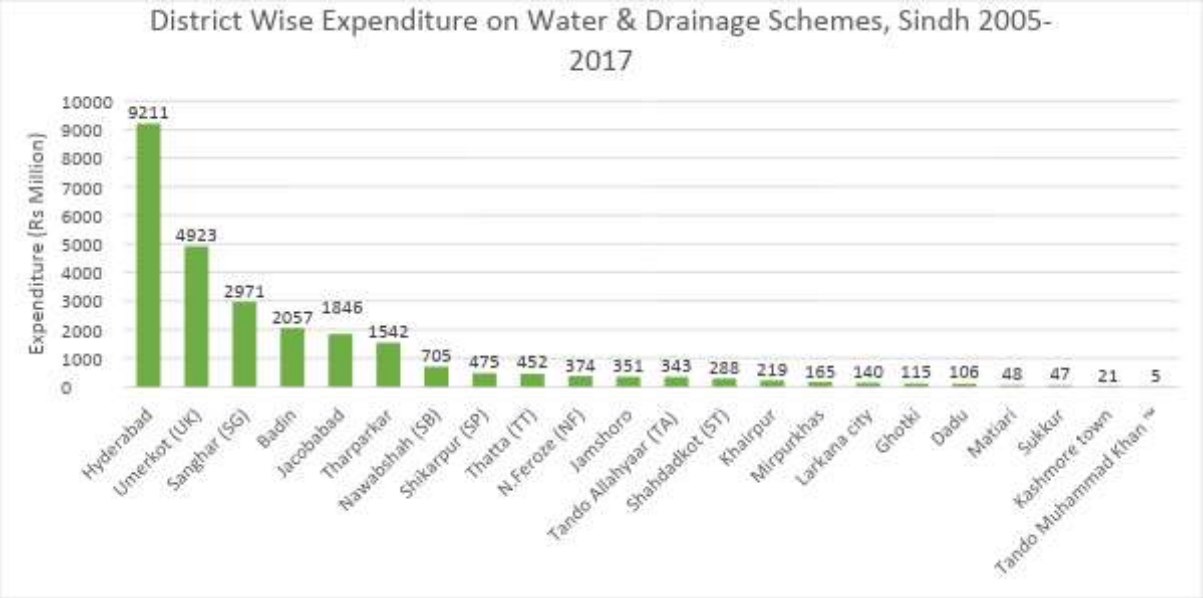
> *"Salary packages of secretaries are lower while subordinate officers serving in a project get higher salaries. This creates perverse incentives and fragmentation in the pay structure. Project approach in the government has weakened the capacity of mainstream government. System-level reform is needed to improve the water supply. One should look at systematic reasons why the structure is collapsing. One of the reasons is working in project mode, which tends to weaken the mainstream governance. And most of the projects are developed by contractors themselves with wrong cost estimates."* A senior official of PHED.

There are severe flaws in the designing and developing water supply schemes, especially in terms of needs assessment. Political representatives push most of the water supply schemes without realizing the value for money. Local citizens are not consulted before designing such schemes. It may hold in other infrastructure projects, but it is essential to differentiate water from other sectors. Water is a collective resource and a basic human need. Hence engagement of local citizens is necessary for effective governance and service delivery in the water sector. However, currently, there is no such practice under the mechanism of developing PC-1s (proforma for proposing a scheme under the development budget) for water supply schemes. Citizens generally remain unaware of what is going to happen in the water sector and when there will be any intervention to fix problems in the water system. This lack of citizen engagement has also resulted in inequitable water investments even within a city. Powerful politicians and other influential stakeholders can get a higher share of public investment. However, we observed that there is resistance to public participation at the higher levels of government.

> "*Community participation and PPPs are just buzzwords; these are Western ideas."* A senior official of PHED.

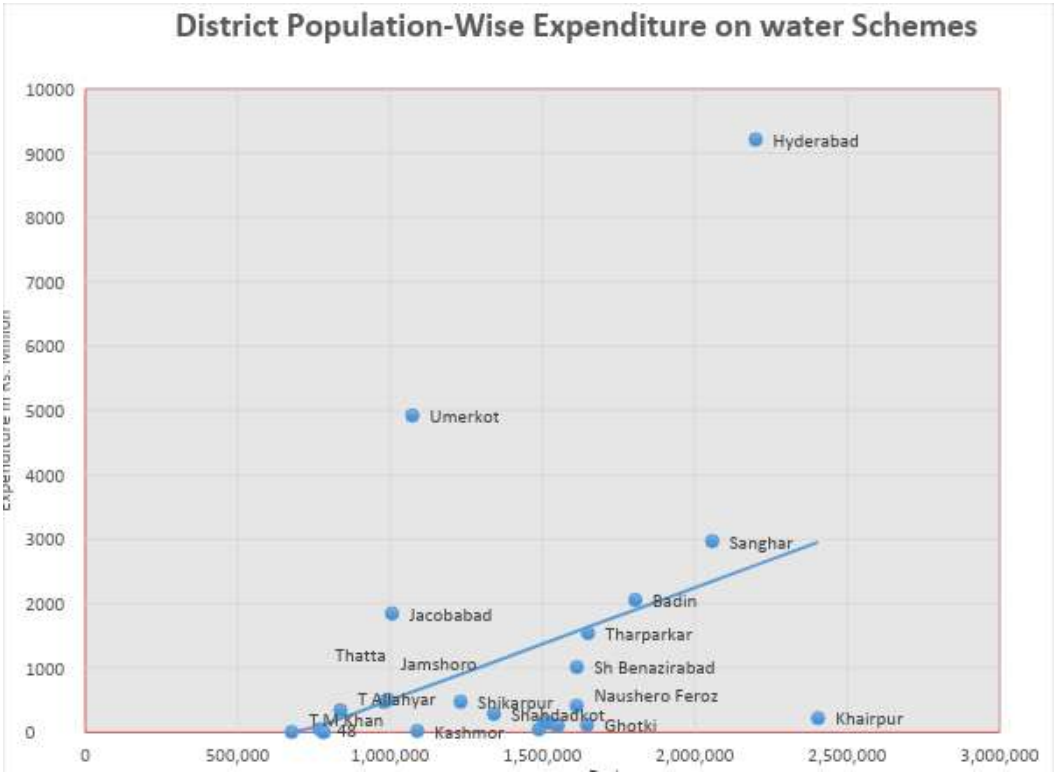
We argue that perhaps the route to major reform is through the people. According to the data from Sindh's Annual Development Plans, the district-wise expenditure on water and drainage schemes since 2005 is quite heterogeneous, with more than half of the spending being concentrated in Hyderabad and Umerkot. Fig. 4.3 shows the district-wise expenditures from 2005 to 2017.

An important aspect to consider is how the expenditure varies with the district population. Fig. 4.4 summarizes this. Those districts along or close to the linear curve are closer to the average expenditure given district population. The districts lying below the line, such as Ghotki, Dadu, Mirpurkhas, Larkana, etc. have expenses less than average given their population, whereas in Hyderabad and Umerkot, expenditures are higher than average.



Source: Based on the authors' analysis of water supply schemes in Sindh's Annual Development Plan

Fig. 4.3: District-wise expenditure on water and drainage, Sindh



Source: Based on the authors' analysis of water supply schemes in Sindh's Annual Development Plan

Fig. 4.4: District population-wise expenditure on water schemes

4.3.4 Transparency

There is a lack of transparency across all phases and sub-sectors of water supply schemes but it is more severe in the rehabilitation and maintenance of water supply schemes. Most of the water sector infrastructure lies underground, which makes it challenging to track expenditures on repair and maintenance. This has resulted in

corruption and mismanagement as reported by different citizens and officials. PC-1s prepared by the provincial governments do not take account of local dynamics and schemes are designed in isolation rather than in a structured manner that would complement the existing infrastructure.

> "*PC-1s are not based on ground realities. They are developed in drawing rooms. They are prepared with the intention of just obtaining and spending funds. That's why once a scheme is approved, its revisions start. Non-functional schemes are set aside, and then more schemes are approved for rehabilitation. Implementation and execution are poorly done." A senior official of PHED.*

The data indicates that almost 50% of water supply schemes are included in the annual development plan (ADP) of the province without approved PC-1 (Fig. 4.5). This shows flaws in the planning process and undue influence of various stakeholders to include a scheme in the ADP. Unapproved schemes create many complexities in public investment, such as unrealistic estimates of allocations and subsequent releases. Moreover, our analysis shows that the cost variation in unapproved schemes is higher than the approved ones.

> "*Most of the projects in the water sector are designed by contractors instead of technical staff from the relevant department. Furthermore, their estimates are unrealistic, and only powerful contractors get financial releases for their projects". A senior government official of a water agency.*

Without a clear public investment policy for the water sector, such problems can be observed in every city. The Supreme Court's National Water Commission has also pointed out that many schemes have become dysfunctional and redundant due to the sporadic flow of financial resources. There is a need for revision in release timings. It is often the case that a scheme designed to be constructed over the course of four years,

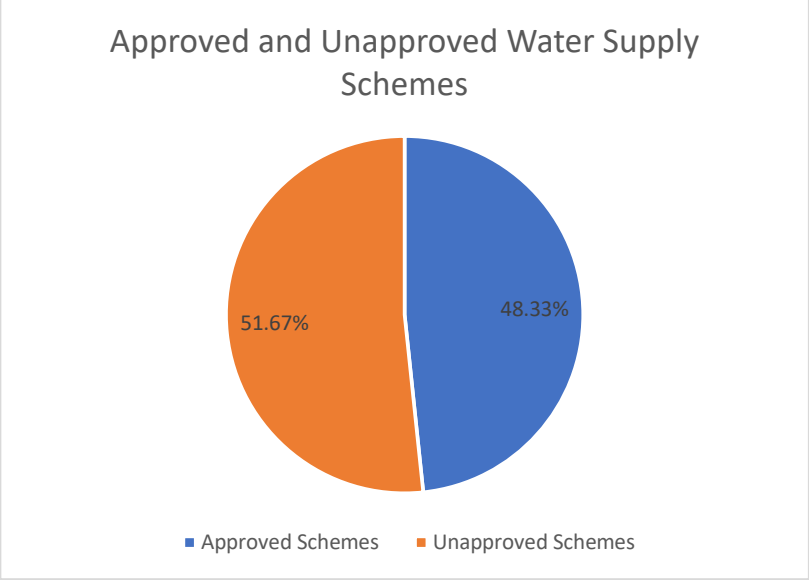


Fig. 4.5: Approved and unapproved water supply schemes

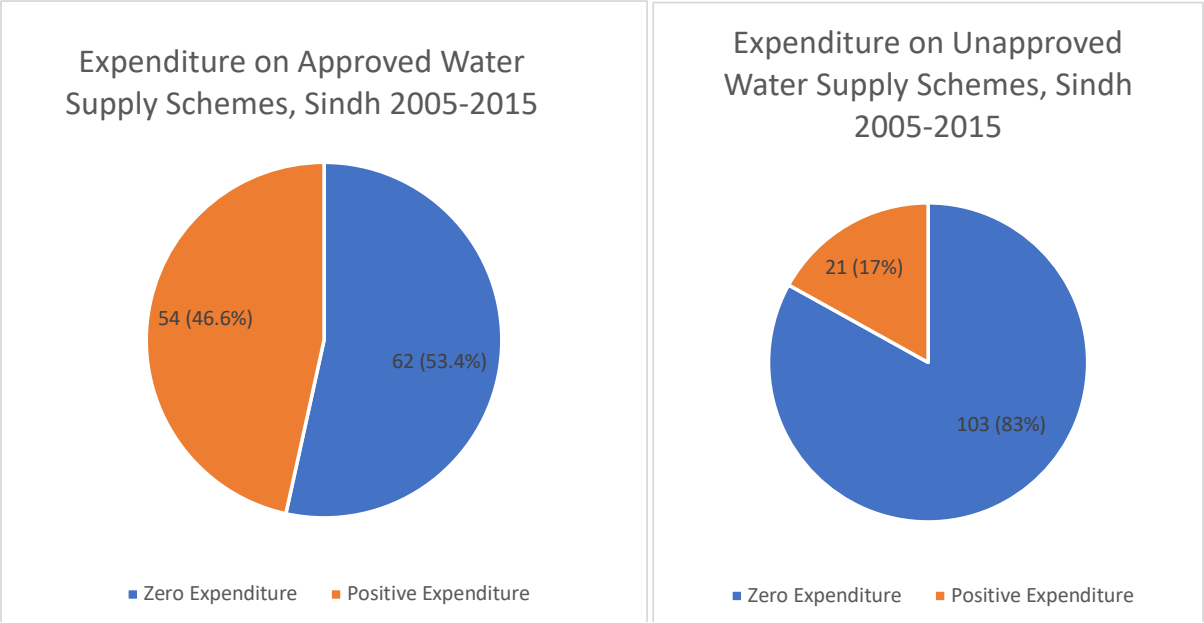
for instance, does not actually need that much time. In such cases, the contractors may spend the yearly release in the first few months, after which the development of the scheme comes to a halt for the remainder of the year, and then restarts after the next yearly release. Financial releases for water supply schemes are managed arbitrarily in response to pressure by different agents. This is not desirable for the construction and implementation of any type of project as it creates the need for revisions in PC-1 due to inflation. Planning should be done realistically with utmost priority given to efficient time and resource management. Furthermore, the appointment of contractors is not a transparent process.

> *"When a PC-I reaches the local department, there are issues in tendering as government officials withhold a chunk of the budget. The government withholds 60%, and 40% is given to the contractor. The contractor is chosen based on patronage and connections rather than merit or reputation, which dissolves the incentive to perform well." An official of P&D Department, Karachi.*

Data from Sindh's Annual Development Plans showed that out of 116 approved water supply schemes from 2005 to 2015, there were 62 schemes on which there was zero expenditure. This type of information is being reflected in Government documents, which shows that there is a lack of accountability in the water sector; ad-hoc financial releases is one of the reasons why PC-1s are revised again and again, which reduces transparency. More alarming is the fact that out of 124 unapproved schemes (2005-2015) that are part of the Annual Development Plans, Sindh, there were positive expenditures on 21 water supply schemes. Unapproved schemes should not be included in the Annual Development Plans, to begin with, the fact that positive spending reflected on such projects shows just how unchecked and prevalent corrupt practices prevail in the water sector in Sindh. The pie-charts summarize these findings for the period 2005-2015 (Fig. 4.6). Our data showed that since 2005, there was only one approved scheme in Sukkur in 2010 since operations during most of this period were handed over to NSUSC.

In our discussions about corruption and accountability, we found a lot of finger-pointing and blame-shifting between the different departments involved in water governance. Moreover, many were of the view that the biggest and most disastrous problem is not in planning, capacity or funds, instead, it lies in the system that allows the misappropriation of public property at the hands of corrupt officials. Embezzlement, bribery and extortion are common; little attention is paid to merit and decisions are made based on contacts and patronage.

> *"Funds are released based on political connections. Some schemes get funds immediately, while others get disbursements quite slowly. Non-functionality of water supply schemes occurs neither due to lack of funds nor due to capacity constraints.*



Source: Based on the authors' analysis of water supply schemes in Sindh's Annual Development Plan

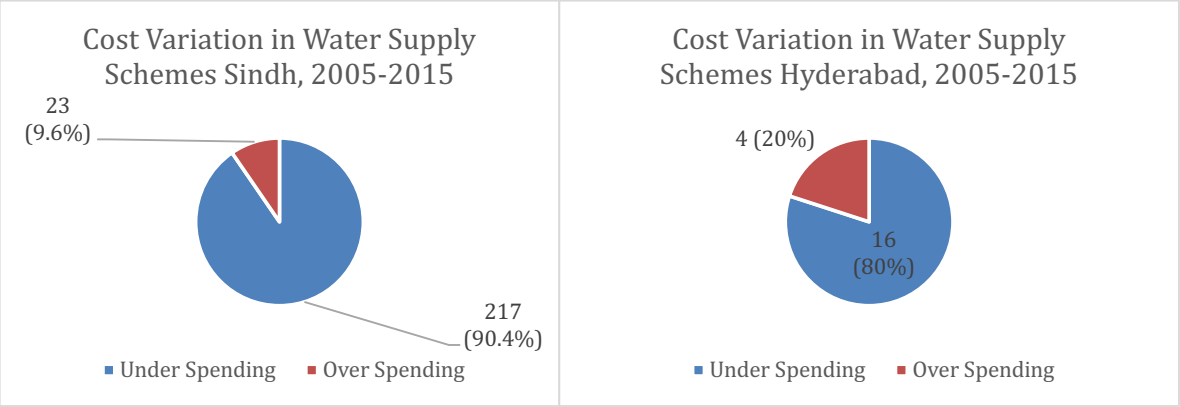
Fig. 4.6: Approved and unapproved water schemes in Sindh ADP

> *There is ill-intention behind the failure of water supply schemes. The lack of meritocracy and tenure protections for civil service is the main reason for the failure of governance in the water sector and other domains. When civil servants can be peddled by politicians, it creates a crumbling governance structure. If politicians are controlling engineers and civil servants, their main priority becomes to please the politician rather than to deliver. In such cases, interest lies with the politician while accountability lies with the government officials. All promotions and postings are decided on political grounds; half the civil servants are under NAB inquiry. A politician appoints even the Chair of Anticorruption."* A senior official of PHED.

Data from the Annual Development Plans also revealed cost variation in water supply schemes, where expenditure was either less or higher than the proposed cost. In Hyderabad, out of 20 water supply schemes since 2005, four schemes had positive cost variation (defined as expenditure minus cost as a percentage of the cost), i.e. there is overspending in 20% of the schemes. For the remaining 80% schemes, it showed underspending; not a single project is such where the expenditure matches the proposed cost. According to ADP Sindh, there were 240 approved and unapproved water supply schemes across Sindh, of which there was overspending in 9.6% and underspending in the remaining 90.4% schemes. The pie-charts (Fig. 4.7) summarize these findings.

4.3.5 Overlapping responsibilities

Within the drinking water sector, there is much confusion across the departments about roles and responsibilities. Demarcation of urban areas has not been done appropriately; as a result, WASA ends up catering to a much larger population than that stated in the



Source: Based on the authors' analysis of water supply schemes in Sindh's Annual Development Plan

Fig. 4.7: Cost variation in water supply schemes Sindh, 2005-2015

Census. As a result, there is a lack of accountability, and the concerned departments blame each other for the failure in governance.

> *"One of the weaknesses is that there is a lack of accountability because many departments are involved, which include PHED, WASA, and local government. So, when water supply schemes fail, there is a lack of accountability on all ends."* A senior official of P&D Department, Karachi.

Other than Karachi and Hyderabad cities, water supply schemes are designed by PHED and later handed over to the local government for operations and maintenance. Both sides shift the blame on each other for the failure of schemes. Local government officials complain that the design and planning of schemes by PHED are conducted inaccurately and poorly; PHED points towards incompetence of local government agencies to operate and maintain water supply schemes.

> *"Coordination between different agencies is the main issue. There are gaps in the planning process. The departments are not oriented or directed in tandem. When schemes are handed over to companies or agencies, they complain that they were not involved in the planning process, which makes implementation difficult and sets up a project for failure. There is a top-down approach. All stakeholders should be involved at the onset of a project, its implementation as well as its maintenance."* An official of Local Government Department, Karachi.

Hyderabad is divided into four regions, the main divisions being between Latifabad, Qasimabad and Inner Hyderabad. Several organizations are involved in the management of the city, which leads to administrative conflicts frequently.

> *"The responsibilities between WASA and the Municipal Authority are not defined properly. Small drains come under the jurisdiction of Municipal Authority while larger drains fall under the administration of WASA. However, it is difficult to identify which drain is small and which is large. WASA reports directly to Hyderabad Development*

Authority, whereas Municipal Authority represents the local government department. The biggest issue is the political interest that differs from area to area. Majority of public officials are appointed upon the will of political leaders, due to which the quality of work suffers. MPAs are more interested in doing development rather than creating an environment for development. Moreover, the allocation of funds needs to be mechanized. There are seven municipal zones in Hyderabad; each of them is in charge of different areas, so no one takes responsibility." A senior district government official in Hyderabad.

4.3.6 Performance benchmarking

There is no precise mechanism for performance assessment of water agencies and officials. This issue has led towards multiple layers of accountability without any effective result. Indeed, there is a need to link the performance of water agencies and officials with the quality of service delivery in their respective jurisdictions. The agencies and officials are rarely held accountable for delays in water projects and subsequent variations in the cost of water sector projects. This fact was reinforced by one of the officials at WASA, who stated:

"Many federal projects get stuck due to delays in releases, and it raises the costs of projects. There is an acute shortage of technical professionals in the system. That's why filtration plants become dysfunctional after some time."

The EPA of the provincial government has the mandate to monitor the quality of water, but no such monitoring takes place. The EPA published the National Standards for Drinking Water Quality in 2008, but these standards are never met. An official of EPA informed;

"*The department lacks human resource, funding and laboratories to collect and carry out the test of water samples. A political party recruited most of the employees of the agency, and they do not show up in offices*."

Moreover, employees is local provicial department lack the required skills.

4.4 Drinking Water Sector: Supply, Quality and Distribution

4.4.1 Urbanization

Sindh is the most urbanized province of Pakistan, with an urban population of 52.02%. The province has experienced a rapid increase in its population from 41.248 million in 2010 to 47.88 million in 2017, and is expected to reach 70 million or more by 2050. Rapid urbanization is putting pressure on transportation, sewage, electricity, sanitation, water-related infrastructure, and causing an increase in unemployment. Water agencies are responsible for reporting a larger population in urban areas than reported in the official figures of cities' population.

The capacity to provide services has not increased at the same pace as the increase in demand for services in urban settings senior official at P&D Department, GoS

In Sindh, Urban Centers with thick population density within 1 km is higher than most of South Asia. (NRSP Official)

Hyderabad is the second largest metropolitan city in the province of Sindh. Between 1998 and 2017, Hyderabad grew 129%, which shows rapid urbanization in the region. District Hyderabad has four administrative subdivisions: Hyderabad City, Latifabad, Qasimabad, and Hyderabad Taluka. The population statistics of these subdivisions are given in Table 4.3 as per census 1998 and 2017.

Table 4.3: Hyderabad population statistics from Census 1998 and Census 2017

S. No	Name of subdivisions	Total population Census 1998	Total population Census 2017
1	Hyderabad City	525,299	650,090
2	Latifabad	563,761	697,635
3	Qasimabad	115,374	142,820
4	Hyderabad Tal.	290,432	359,455
Total		**1,494,886**	**1,850,000**

Source: Statistics from Census 1998 and Census 2017

After Karachi and Hyderabad, Sukkur is the third largest district in the province. According to census 2017, the total population of district Sukkur is 1,487,903.

District Sukkur is divided into five administrative subdivisions that are known as Talukas (Tehsil). These are Sukkur City Taluka, New Sukkur Taluka, Pano Aqil Taluka, Rohri Taluka and Salehpat Taluka. Table 4.4 shows taluka-wise population statistics in district Sukkur according to the census 1998 and 2017.

Table 4.4: Sukkur population statistics from Census 1998 and Census 2017

S. No	Name of talukas	Total population Census 1998	Total population Census 2017
1	Sukkur city	338,384	231,589
2	*New Sukkur	36,166	319,768
3	Pano Aqil	268,201	435,823
4	Rohri	223,990	371,104
5	Salehpat	64,646	129,619
Total		**931,387**	**1,487,903**

Source: Statistics from Census 1998 and Census 2017

4.4.2 Water Supply in Sindh

The basic lifeline of Sindh province, and indeed Pakistan, is the River Indus. It is one of the twenty-one largest rivers in the world concerning annual flow. It is 3,180 km long and crosses China, India and Pakistan with a watershed of 1.165 million sq. km before merging into the Arabian Sea near Thatta. Overall in Sindh, 42% of households were using tap water as the main supply of drinking water in 2013-14 as compared to 43% in 2010-11, followed by hand pump with 37% in 2013-14 as compared to 34% in 2010-11 and motor pump with 8% in 2013-14 as compared to 12% in 2010.

While comparing districts, 73% of households in Hyderabad and 86% in Karachi districts use tap water as the main supply of drinking water, followed by Jamshoro with 38%, Mirpur Khas with 35%, and Sukkur with 33%. On the other hand, Dadu, Matiari, Tando Allah Yar, Tando Mohammad Khan, Jacobabad, Kashmore, Larkana, Shikarpur, Tharparkar, Khairpur and Nawabshah (Shaheed Benazirabad) have 10% or less of tap water. The main supply of drinking water in rural areas is hand pump (69%), followed by 'others' (9%).

The proportion of households using tap water as a leading supply of drinking water is higher in urban areas, 69.2% as compared to only 7.5% in rural areas. Hand pumps (8.4%) and motor pumps (11%) are the second main sources of water supplies. Followed by these, private water suppliers such as water supplied through water tankers and other vendors is 8%. Whereas, close wells, open wells, lakes, streams and filtration plants provide a smalls proportion of water supplies. These proportions are given in Fig. 4.8.

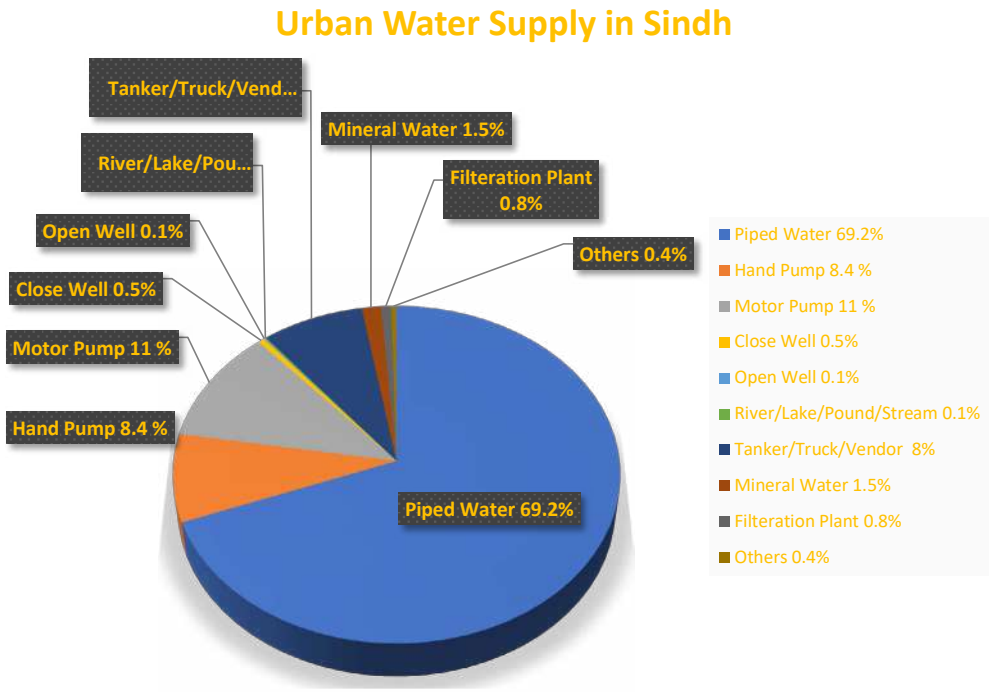


Fig. 4.8: Sources of urban water supply in Sindh

4.4.3 Water Supply in Hyderabad and Sukkur (Demand and Supply)

Presently total capacity of filtered water in WASA Hyderabad is 61 MGD. There are plans to extend this capacity by 26 MGD soon to cater to the needs of the public (Table 4.5).

Table 4.5: Hyderabad filtered water production capacity

S.No.	Location	Present capacity	Plans for Extension
1	New filter plant	30 MGD	20 MGD
2	Old filter plant	10 MGD	
3	Hala Naka	08 MGD	
4	Preetabad	08 MGD	
5	Hussainabad		06 MGD
6	Latifabad Unit No.4	05 MGD	
Total		**61 MGD**	**26 MGD**

Source: WASA Presentation given during the field visit

The current daily deficit of filtered water provided by WASA Hyderabad is about 53 MGD (Table 4.6). There are several projects in the pipeline to fulfil the shortage of water supply. According to WASA, there are plans to expand the capacity by 26 MGD in 2019 to lower the current deficit; the remaining 27 MGD is yet to be planned.

Table 4.6: Daily filtered water deficit in Hyderabad

Daily demand	Present supply	Deficit per day	Enhanced in 2019	Future planning required
114 MGD	61 MGD	53 MGD	26 MGD	27 MGD

Source: WASA Presentation given during the field visit

Table 4.7 shows the capacity of lagoons or water reservoirs where water is stored for further processing and distribution. Water reservoirs have a total capacity of 572 MDG. Thus, capacity enhancement for water filtration is required whereas catchment capacity is enough;

Table 4.7: Hyderabad lagoons (water reservoir)

S. No.	Location	Capacity
1	Lagoons at Jamshoro Road	400 MG
2	Hala Naka	80 MG
3	Preetabad	80 MG
4	Hussainabad	02 MG
5	Latifabad No.04	10 MG
Total		**572 MG**

Source: WASA Presentation given during the field visit

In Hyderabad, there are approximately 125,000 domestic users, almost 5000

commercial users and 476 government connections, of which some are bulk users who consume over 100 MGD. The existing number of consumers is given in Table 4.8 by the type of consumers and the water supply circle.

Table 4.8: Existing number of consumers in Hyderabad

Name of Circle	No of existing zones	Domestic connections	Private/ commercial connections	Assessed Govt. connections	Total
Central City	3	42954	1945	130	45029
Latifabad	4	30883	1104	130	32117
Qasimabad	2	22292	573	116	22981
Northern City Hirabad	3	28564	1262	100	29926
Total	**12**	**124693**	**4884**	**476**	**130053**

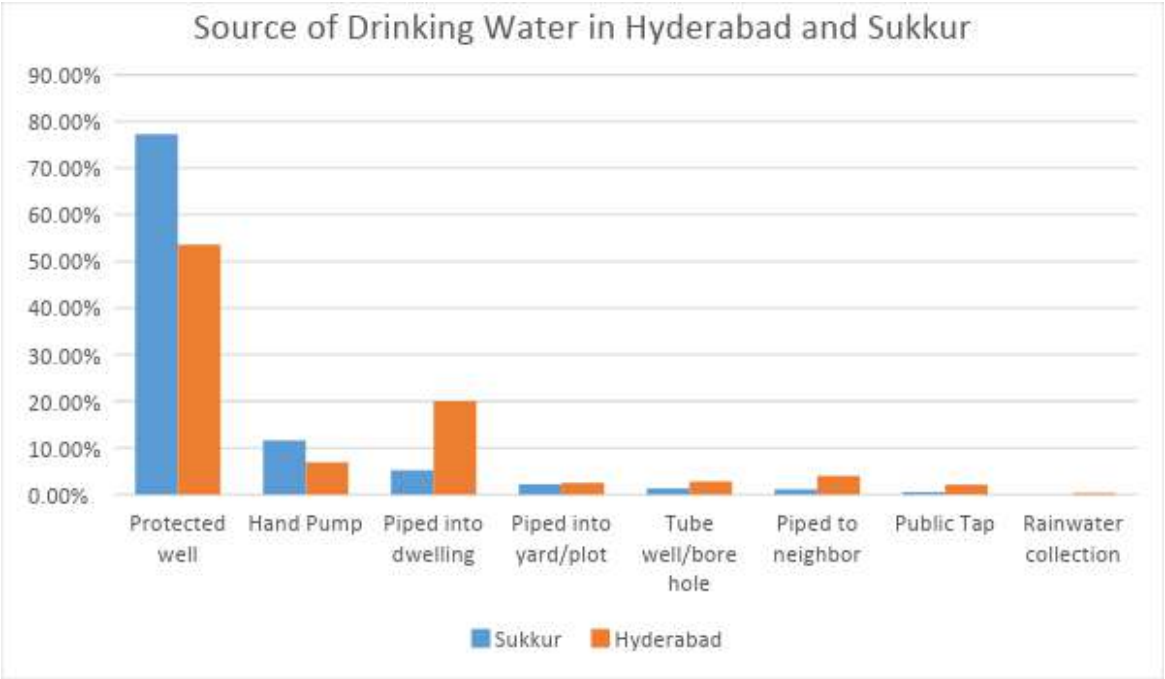
Source: *Source: WASA Presentation given during the field visit*

The total demand for water in Sukkur is 30 MGD. There are 28 water schemes in total. The primary water source in Sukkur is the Indus River. Areas close to the center of the city receive ample water, but households in suburban areas do not have access.

Some parts of Sukkur city do suffer due to intermittent supply of water, but the more significant problem relates to the quality of water owing to the poor distribution network. Due to dilapidated and rusty pipes, the water being delivered to the end-user is not drinkable. The access to the piped water supply is significantly more abundant in Hyderabad as compared to Sukkur. Hyderabad is having 20 percent of water supply through pipes, whereas Sukkur is supplying a tiny proportion of 5.2% (Fig. 4.9). The rest of the data indicates a high use of water from a protected well with the highest rates found in Hyderabad (53.6%) and Sukkur (77.3%). In both districts (Hyderabad and Sukkur), there is still heavy reliance on protected wells. Hyderabad has a better distribution network as compared to Sukkur as 20% of users in Hyderabad have access to piped water in their homes while Sukkur has 5%. Sukkur also has a higher reliance on hand pumps.

4.4.4 Water Pricing

Inadequate revenue generation and tariff collection are the key bottlenecks to the institutional and financial sustainability of water and sanitation services. The sector is highly subsidized, and any discussion of tariff reform meets with political opposition. Achieving the recommended long-run target of 100 percent piped and safe water supply will require water meters and tariffs that cover at least O&M costs and ensure sector sustainability.

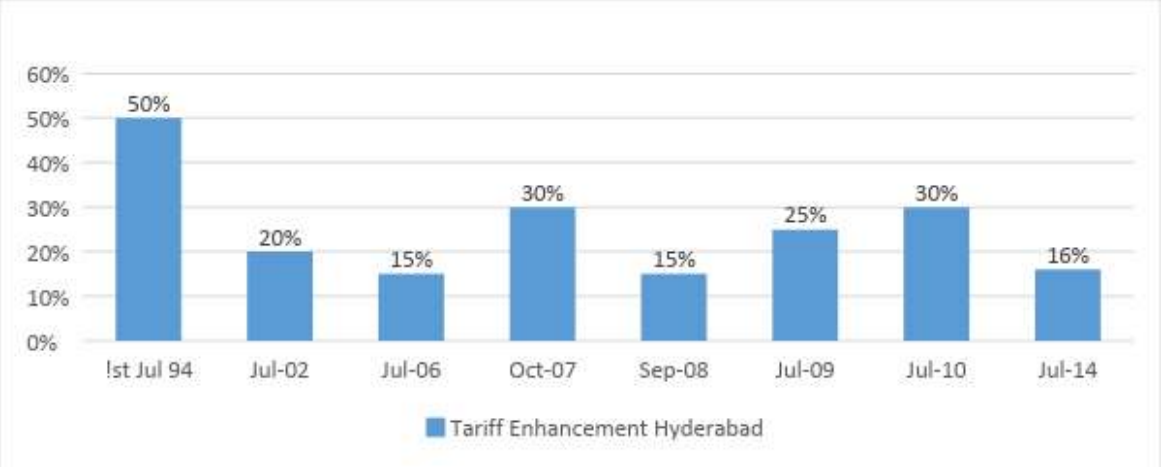


Source: Sindh Multiple Indicator Cluster Survey, 2014

Fig. 4.9: Sources of drinking water in Hyderabad and Sukkur

Fig. 4.10 describes the water tariff enhancement in Hyderabad from 1994 to 2014. The data shows that there is no consistency in tariff improvement; the tariffs were increased from 1994 to 2002, but no tariff was enhanced from 2010 to 2014.

In Hyderabad, the water charges are PKR 169 per month for domestic consumers and PKR 300 per 1000 gallons for commercial users. In Sukkur, PKR 360 per annum is charged for a domestic connection, PKR 720 for a commercial connection. NSUSC tried to implement water meters, but this was not successful. There are around 200,000 connections in Sukkur. Annual recovery is PKR 40,000 while the O&M cost is PKR 5,500,000. The Local Government Department bears the deficit amount.



Source: Data received from WASA Hyderabad

Fig. 4.10: Water tariff enhancement in Hyderabad (1994 - 2014)

The prevailing pricing structure, which has no link with consumption, discourages water conservation. Ideally, water prices should reflect the value that users generally place on their consumption. In this way, a proper pricing strategy can be used as a tool not only to recover the cost of operation and maintenance of the system but also to contain water losses and promote conservation. During the discussion regarding bill collection in Hyderabad FGDs, almost half of the participants reported that they do not pay their bills. WASA has introduced a new feature whereby you can pay your arrears in installments. Paying the bill is also a hassle. You have to stand in a line, but now there are easier methods of payment such as *easy paisa* (phone banking) and internet banking. One of the participants of an FGD in Hyderabad said;

> "*The government should not expect people to pay the bills when they are providing poor services. Most of the water provided to public is contaminated. Why should we pay the bills when we have to rely on the market for drinking water? Government has been failing to deliver water; we are paying to water vendors; it is unfair on the citizens*."

People are not afraid of having the water supply cut off because they are using boring water anyway. Table 4.9 shows the bills recovered in Hyderabad. In essence, a yearly deficit of PKR255 million exists due to poor recovery of bills, of which 40% is owed by bulk consumers, 30% by domestic consumers, 21% by commercial users, and 9% by AGC (Assessed Government Connections). Bulk consumers include other government departments, schools and hospitals, who do not pay their bills. This creates a problem of circular debt since one government department owes to another.

Table 4.9: Billing recovery in Hyderabad 2017-18

Billing Category	Monthly billing demand (MRs)	Yearly Billing demand (MRs)	Yearly recovery (MRs)	Difference between annual demand and recovery (MRs)
Domestic	19.231	230.772	156.08	74.692
Commercial	9.45	113.4	59.47	53.93
AGC	1.914	22.968	-	22.968
Bulk	23.949	287.388	183.86	103.528
Total	**54.54**	**654.48**	**399.41**	**255.07**

Source: Data received from WASA Hyderabad

WASA Hyderabad officials claim that reasons for the short recovery of bills revolve around consumers' dissatisfaction with service delivery. Frequent electricity breakdowns mean that motors cannot be switched on to fill up household tanks when water is available. The water supply is irregular; most of the participants in our FGDs in Hyderabad claimed that water is only open for 4 hours a day. If residents miss the time to fill up their water tanks, then they have to rely on sources other than piped

water. In the dry season, there are often complaints about the shortage of water. Poor quality of drinking water is a major factor; many residents complain that the water is contaminated, has a foul odor and is too turbid and brackish for consumption. WASA also claims that sometimes an agitation call is given by political parties or unions to the masses to stop paying bills. A failure on the part of WASA is that bill collectors offer residents a bill waiver in return for a small bribe. However, the primary reason for low recovery is simple: residents face no repercussion in not paying the bill. Low recovery is not a problem as such in the gas and electricity sectors because consumers are aware that if they fail to pay their bills, their connection would be cut off. But in the water sectors in Hyderabad and Sukkur, there is a lack of enforcement to pay bills. WASA Hyderabad suggested that the water bill be merged with the electricity bill so that consumers would be forced to pay for both utilities or else lose their electricity connection. However, this proposal was not accepted by HESCO.

WASA Hyderabad's average monthly expenditure is PKR 77 million of which 75% goes into salaries and other expenditures on the establishment. The Table 4.10 provides a bifurcation of expenditure by WASA Hyderabad.

Table 4.10: Monthly expenditure detail by WASA Hyderabad

Head of Expenditure	Expenditure (Rs Million)
Establishment	58.0
Operations and Maintenance	10.0
POL	6.0
Chemicals	3.0
Total	**77.0**

Source: Data received from WASA Hyderabad

The yearly recovery of Rs 399 million translates into a monthly recovery of Rs 33.25 million, implying a shortfall of Rs 43.75 million per month, which is paid by the provincial government.

4.4.5 O&M (operation and maintenance)

Analysion of global data reveals high levels of corruption that are found to be highly correlated with lower O&M spending, peroxied by higher spending on wages and salaries (Tanzi and Davoodi, 1998). This can be observed in many aspects of water provision in Pakistan. The gap between the utility's revenues and expenses (and thus the amount of government subsidy) is startling: WASA Hyderabad relies on an average monthly subsidy worth Rs 43.75 million.

The revenue collected is not sufficient to meet the cost of operation and maintenance (O&M) of the drinking water system, which has led to heavy dependence on government support for its functioning. Low recovery for O&M translates into poor maintenance of the water infrastructure, which imposes huge costs later on in the shape of high capital

costs for new equipment. Often the budgetary constraints result in maintenance delays; sometimes maintenance work suffered when a large share of O&M expenditure is made on operational heads such as salaries.

This situation results in a vicious circle where insufficient funds deteriorate the quality of service delivery in the water sector, which means that users are less willing to pay, leading to fewer funds becoming available for maintenance. Large investments to upgrade the water infrastructure and recovering its maintenance cost from users is one of the possible options. It may be noted that farmers already pay exorbitant amounts on diesel/electricity pumps for tube-wells, as this ensures them reliable supplies of water and results in higher productivity. Some interviewees were of the view that neither drinking water provision nor O&M of existing infrastructure is the priority of the Hyderabad Development Authority. One of the officials at the district level stated:

> *"In 2007, Hyderabad Development Package was announced, and a project worth PKR 11 billion was handed over to HDP for water supply, sewerage, drainage, flyover, parks and playgrounds, etc. New infrastructure was added, but there was no provision for O&M. Every new scheme's approval requires the information on O&M, but once a scheme is approved, there is no release of budget for O&M."*

Active monitoring of existing employees is also missing. It is a common fact that young employees hired as bill collectors collect bribes in return for bill waivers. Employees responsible for maintenance indulge in careless activities that cause harm to the existing equipment, like not switching motors off on time, or not changing the filters in RO plants and skipping maintenance activities that are required at regular intervals, which ultimately increases the cost of operations. One of the officials at WASA expressed his concerns:

> *"The young employees hired by the public sector to maintain ultra-filtration plants and ROs are careless. Often, the motor is switched on for too long, which leads to burning out. With a limited O&M budget, these motors go unfixed for long periods, defeating the purpose of having the filter plants installed in the first place."*

The officials at WASA Hyderabad lamented that the government subsidizes all WASAs across the country, but WASA Hyderabad does not receive any subsidy. Since 1992, the subsidies meant for Karachi and Hyderabad WASA have been withheld. Another major issue is the non-recovery of bills from provincial government departments.

> *"The Provincial Government, for example, allocated an amount of PKR 125 million against the billed amount of PKR 406 million. Total outstanding amount against the provincial government is Rs 2.6 billion. The Indus River carries pollution and municipal waste from its source to Hyderabad from approximately 40 cities. A huge amount of money is required to clean water in Hyderabad. It would cost PKR 1-1.5 million worth of chemicals to maintain the WHO prescribed standard. Since*

Hyderabad is bowl-shaped, the only way to get water is by pumping."

The officials at WASA Hyderabad were of the view that the huge amount owed by the provincial departments is a major impediment for the smooth operations of WASA. According to them, this amount has reached a colossal sum of Rs 2.6 billion due to the backlog of unpaid bills. They recommended that the Provincial Government deposit this lump-sum amount in banks and allow WASA to take the profit amount every month to ease operations. However, this proposal was rejected by the Sindh Government. According to WASA officials, the governing council of WASA rarely meets and hence remains unable to get approval for proposed actions and activities. There is no forum to discuss their issues and complaints. They also complained that it is part of the law to make water boards, but they do not exist. If water boards are established, they can attract development partners, who could help collaborate with the Sindh Government.

WASA Hyderabad introduced an innovative form of PPPs by outsourcing billing to a private company which improved recoveries by 30% and assisted in the smooth distribution of bills.

4.4.6 Water quality

Most of the industries and domestic sectors in Pakistan rely on groundwater resources for water supply. However, due to the poor quality of groundwater, surface water also plays a vital role in both irrigation and drinking water. Moreover, unmonitored groundwater exploitation is on the rise due to improper water provision.

A major issue beeing faced by Pakistan is the unregulated and excessive use of groundwater, which is leading to falling water tables and reduced quality. In Sindh, cities like Hyderabad and Sukkur are also facing a decline in groundwater levels. The unsustainable pumping rate has even led to the intrusion of brackish water into freshwater resources, thereby reducing the availability of quality groundwater as per the standards of the World Health Organization (WHO). Extremely low water tariffs are distorting incentives for water conservation. Ideally, water prices should reflect the value that users generally place on their consumption. A proper pricing strategy can be used as a tool not only to recover the cost of operation and maintenance of the system but also to contain water losses and promote conservation.

"At my residence, water is brackish. People are suffering of different diseases like black teeth, etc. due to drinking unsafe water. We have to fetch water from far away. Women prefer to fetch water from river" A participant in one of the FGDs in Sukkur.

During the FGDs participants informed that

"*In many parts of Rohri and Sukkur, people do not have access to piped water. but people manage to get drinking water from nearby filter plants. The water supply schemes provide water fit for bathing and washing, but not for drinking*."

"In New Sukkur, we mostly have groundwater, but some piped water is also available. Groundwater is suitable for drinking. Piped water is available in the evening for 3-4 hours, and we fill the tank that lasts for two weeks."

"One major challenge in ensuring the quality of drinking water is that the water supply network and sewerage network are parallel. Due to old pipes, the water supply becomes contaminated. The current distribution network has 2500 km of pipes. It is impossible to change the entire network; however, 400 m have been approved for rehabilitation in problem areas. Schemes work on the wishes of ministers whose only priority is to lay pipes to attract votes. They do not think about the source of water."

4.4.7 Physical verification of reverse osmosis (RO) plants

Physical verification survey was conducted in Hyderabad and Sukkur. This physical verification has informed us about the situation of RO plants through the perspectives of the end-users. The RO plants have been installed by various government and charity organizations in different neighborhoods. These RO plants treat the water supplied by WASA, or other water distribution agency and people can get water for drinking without any charges. Households generally fill a couple of large bottles or cans (20-30 liters each) for the daily use. Following data shows the results for Hyderabad. Out of a total of 31 RO plants, 06 are not functional, whereas only 13 plants are appropriately maintained (Table 4.11).

Table 4.11: Status of RO plants in Hyderabad

S #	Water filtration plant name	Start date	UC/Ward	Status	Remarks
1	Bhitai Town Filtration Plant	2007	4	Functional	Properly maintained
2	Marvi Town Filtration Plant	2007	4	Closed	Worked only 2 years after its installation
3	Village Karan Shoro Filtration Plant	2015	4	Functional	Owned and maintained by local Govt.
4	Karan Khan Shoro Filtration Plant	2012	4	Functional	Poorly maintained, last filter replacement was done 5 years ago
5	Haji Akbar Khan Pathan Goth Filtration Plant	2012	5	Functional	Installed by local Govt., maintained by locals
6	Bachal Khan Chandio Filtration Plant	2012	7	Functional	As per the information given by the operator, filters are replaced within one month
7	Bachal Soomro Filtration Plant	2012	6	Functional	In the past 12 months no maintenance
8	State Life colony Filtration Plant	2007		Functional	Dirty and poor maintenance
9	Alamdar Chowk Filtration plant	2012		Functional	Rare maintenance as per complaints by locals
10	Sheedi Goth Filtration Plant	2012		Closed	Worked for only 18 months after its installation
11	Hussainabad Filtration Plant	2015		Functional	Maintained
12	Wahdat Colony Filtration Plant	2012		Functional	Owned and maintained by local

13	New Wahdat Colony Govt. Park Filtration Plant	2008	12	Closed	Functional till April 2017
14	GOR Colony Filtration Plant	2012		Functional	Poor maintenance observed
15	Defense Garden Filtration Plant	2008	Cantonment Board	Functional	Maintained in good condition, next rehabilitation in 2021
16	Shah Faisal Colony Filtration Plant	2007	Cantonment Board	Functional	Maintained in good condition, next rehabilitation in 11/2018
17	Gymkhana Filtration Plant	2006	Cantonment Board	Functional	Maintained in good condition, next rehabilitation in 11/2018
18	Latifabad #7 Filtration plant	2008		Closed	Water lines and tiles of filtration plant are damaged
19	Govt. Girls Shah Latif College Latifabad	2008		Functional	Installed by Local Govt., maintained by the College Administration
20	Latifabad #9 Filtration Plant	2007		Functional	Poor maintenance observed
21	Latifabad #9 Govt. Park Filtration Plant	2009		Closed	Worst condition
22	Mir Fazal Town Latifabad #9 Filtration Plant	2010	70	Closed	Worked for 14 months after its installation
23	Sailani Filtration Plant Latifabad #10	2015		Functional	Neat and clean condition of plant, people from other towns coming for water

24	Rasheed Park Filtration Plant (near Naya pul railway line)	2007	12	Functional	Poor maintenance observed
25	Water Filtration Plant Saddar, opposite to Garrison	2005	Cantonment Board	Functional	Maintained in good condition, next rehabilitation in 2021
26	Govt. Filtration Plant (adjacent to Hayat Girls School and College Saddar)	2007	Cantonment Board	Functional	Maintained in good condition,
27	Pakka Qilla Filtration Plant near 2 Qabar	2012	22	Functional	Rare replacement of filters, maintained by locals
28	Mukhi Naraindas Parra Filtration Plant	2012	45	Functional	Rare replacement of filters, maintained by locals
29	Alkhidmat Filtration Plant Civil Hospital	2016	City	Functional	Properly maintained
30	Sailani Water Filtration Plant opposite to Civil Hospital emergency gate	2012	City	Functional	Maintained by Pakistan Rangers
31	Alkhidmat Filtration RO plant, Hirabad	2015	City	Functional	Filter replacement in 15-20 days

In Sukkur, out of a total of 18 RO plants, 12 are not functional, whereas only 03 plants are appropriately maintained (Table 4.12). The situation of RO plants in Sukkur is worse than in Hyderabad.

Table 4.12: Status of RO plants in Sukkur

Water filtration plant name	Start date	UC/Ward	Functional status
Bakhar Chowk Old Sukkur	2010	16	No
Shalimar Rekem Colony Sukkur	2016-17	1	No
Rehash of WTTP Phase 3, Namaish Gah	2011-12	15	Yes
New Jimat Building Islamic School Old Sukkur	2011	15	No
Local Board Sukkur	2009	1	No
Jinnah Chowk Sukkur	2009	5	Yes
Frere Road / Thalha Sukkur	2013	3	No
Ghaznavi Park Miam Road Sukkur	??	6	No
New Mehran Hotel Station Road Sukkur	2008	15	Yes
New Goth Sukkur	2011	9	No
Civil Hospital Sukkur	2018	2	Yes
Lal Mashaikah Rahija Sukkur	2013	15	No
Qureshi Goth Sukkur	2009	18	No
Shamshabad Sukkur	2018	10	Yes
Pak Colony Sukkur	2008	11	No
Miandad Khoso Goth	2011	21	No
Lal Mashakh	2011	21	No

4.4.8 Sindh water policy weaknesses

At the provincial level, sector planning frameworks are weak, and resource allocations are not aligned with policy priorities. Operationally, no sector-wide approach or multiyear planning and budgeting initiative is being implemented. Vision 2025 and SDG targets have yet to be internalized at the provincial level, and broad targets and goals have yet to translate into planning efforts that make them achievable. De facto, the planning horizon is limited to annual development plans, with political push factors, rather than sector needs driving initiatives. Resource allocation is often outside the ambit of the policy of both government and nongovernment actors, making the system meaningless.

Multiple departments in Sindh have put forth policies, but none has been implemented. Halcrow (a UK based engineering consulting firm) crafted a policy for drinking water in 1998, but it was never implemented. Ten years later, in 2008, the local government crafted its own policy which was also not implemented. After another gap of almost nine years, the Urban Unit issued the Sindh Water Policy in 2017. Under it, the Public Health and Engineering Department (PHED) has the sole mandate for water service delivery in both urban and rural Sindh. The overarching problem with all these efforts

Fig: 4.11 Children swimming in a water lagoon, Hyderabad

is that the department that develops the policy puts itself at center stage, ignoring all legal, and constitutional mandates that should, in principle guide the policy.

Like Punjab, Sindh has also witnessed multiple institutional authorities in the water and sanitation sector, with powers vested in them through a loose and unaccountable system that can be bypassed by strategic resource allocation decisions and executive orders. Institutional anomalies are evident from the fact that the Department of Special Initiatives was assigned the megaproject of installing filtration plants (reverse osmosis) across Sindh, whereas the local government remained on the sidelines. Similarly, PHED is granted vast funding for constructing water supply schemes but no funds for operation and maintenance (O&M). For this reason, it continues to transfer O&M responsibilities to local governments, which have neither ownership nor the technical capacity for O&M.

Fig: 4.12 Water extracted from a canal in Hyderabad

5. PARTICIPATION AND PARTNERSHIPS IN DRINKING WATER SUPPLY SCHEMES IN URBAN SINDH

Various typologies exist in the literature on partnerships. Different organizations present different categorizations. The International Association for Public Participation (IAPP), for example, presents a *spectrum* of such partnerships; from informing, consulting, involving, and collaborating to empowering citizens. The most popular and often quoted indisputably is that of Sherry Arnstein's *Ladder of Participation.* From manipulation, informing, consultation to partnerships and delegated power, Arnstein's typology covers the various levels of community involvement in any given project. Ysa (2007) takes a more granular view into types of partnerships: a) Networked Partnerships, b) Market Based Partnerships, and c) Hierarchal Partnerships. Sarzynski (2015) has a similar typology outlined. This is especially relevant in the context of urban collective action in the drinking water sector of Urban Sindh. The author identifies six forms of participation from the literature on the subject and uses it to examine climate change adaptation in urban centers in the United States.

An examination of Sindh's drinking water sector, both rural and urban, leads to one key point: **traditional models of managing water resources have failed.** When we refer to traditional models in Pakistan, we mean purely government-led initiatives.

Sindh province has actively been pursuing Public-Private Partnerships (PPPs) and other modes of public participation in various sectors such as road infrastructure, education, and health. Sindh's PPP law 2010 and subsequent development of policies and regulations provide a necessary framework for pursuing PPPs. The results of Farmer Organizations (FOs) in the irrigation sector are mixed, but there is a considerable effort towards enhancing the participation of farmers for managing the irrigation system. However, the drinking water sector has remained solely under the control of the public sector. It is, therefore, the right time to begin exploring the potential of partnerships and participation in smaller development projects about service delivery on social sector projects, including that of the drinking water sector. This study is to serve as a scoping exercise for identifying the current status of citizen engagement and multi-sector partnerships in the development arena.

5.1 Diagnostic of Participation and Partnerships

5.1.1 No participation at first glance

An initial incision into the local governance context of the selected two cities, Hyderabad and Sukkur, revealed little or no evidence of any participatory schemes or active citizenship in the drinking water sector. As supported by literature, there seems to be a stronghold of colonial legacy in Sindh. There is a mentality of dependence and expectation of top-down interventions in service delivery. The sense of self-

organization is rare in urban areas, but some evidence of successful instances was found in rural areas of Sindh adjacent to the selected cities[14]. A local civil society organization representative working with several communities in the region shared his views: "*The people of these cities believe that it is the responsibility of the government to provide such facilities. The ultra-poor have other priorities; clean drinking water is not on their list of basic necessities."*

However, the research team has identified a few cases in nearby peri-urban areas that fall within the diverse *spectrum* of participation outlined in the literature. Instances of participatory governance are not common in the water sector, but some models of involvement can be seen in health and education.

Furthermore, more in-depth investigation and data collection from a diversity of stakeholders revealed a different understanding of the concept of participation. One of the senior official in District Government in Hyderabad explains, *"Our society has indigenous models of participation since the beginning. The state has failed in so many ways that people know that they have to fend for themselves. If someone falls ill, the community manages to get him treated; if there is no water, the community figures out a way to ration it. So, people have come up with indigenous, intelligent ways of surviving; the patron attitude is not just the 'root of the problem'; it has also helped people survive."*

The existence of this phenomenon is supported by literature on developing countries and public-private partnerships, where it is common to find a difference of opinion and expectations on what partnerships entail. Thus, the research finds a little focus on participation and partnerships in the drinking water sector. The sector is predominantly managed through a top-down approach—purely public sector driven, and most of the planning is done in the provincial capital.

5.1.2 Lack of willingness to delegate power to local governments

The sentiment that the government is primarily responsible for the provision of basic services prevails. Self-organization at a community level or participation with real ownership remains an alien concept, even to politicians. An elected official of Sukkur Municipal Corporation (SMC) believes "*Participation models are unlikely to be successful in Sukkur due to the fragmentations in society. People are willing to pay when the quality of the service is satisfactory. The public will not own the scheme under the current circumstances. It is primarily the responsibility of the government to provide such services."*

The SMC officers have similar sentiments on the potential of participation: "*People*

14 Although in Sukkur it is difficult to ascertain rural and urban areas because peri-urban areas which are 2 or 3 km away from the city's perimeters are classified as rural in the census, but in essence have more urban characteristics. It is therefore surprising to see participation and citizen engagement only some kilometers away from the city and none or little evidence in the city.

only complain. There is no concept of even self-help. All they can do is to access groundwater because it is sweet in this area since it is located very close to Indus River."

In Sukkur, case studies of attempts at self-organization and participation reveal that the issue seems to lie more with the bureaucracy than politicians. One of the citizens (who was also a Government officer) explained that some years ago, people of his community initiated a campaign with the District Commissioner of Sukkur to get a water supply scheme worth 25 lakh rupees through a joint contribution of both the community and the government. There was such resistance at the local government level in terms of approving feasibilities and plans that the community's activism was fatigued with bureaucratic processes. The effort was eventually abandoned. One of the reasons behind the lack of participation in the water sector seems to be resistance by both politicians and bureaucrats.

5.1.3 Lack of community's willingness to self- organize

Policymakers often quote that the community is unwilling to take responsibility, and it is not the government who hesitates in delegating. Academics also support this viewpoint to some extent. A professor researching water management in Sindh opined, "*Community participation agendas are a part of Urban Development Strategy for Sukkur and Larkana. P&D Department has worked on and documented some projects involving the local community. However, people are stuck on issues like 'there is no pipe in my street' - they don't think beyond individual schemes."*

Hyderabad and Sukkur both have caught the whiff of decentralization to some extent at least at the local government level. However, the community is still suffering from the 'dependence syndrome' and a lack of belief in their ability to self-organize. Interviews with municipal corporations and local governments revealed low awareness of participation. It is widely understood that politicians are representatives of the people and are well aware of the local issues. When they make policies, it is assumed that they are taking into account local priorities and therefore, participation and 'buy-in' is ensured. Hyderabad Municipal Corporation gravitates towards ideas akin to those of Sukkur in their local government systems, "*Community is not doing anything. It only approaches their representatives. Politicians claim that they represent communities."*

In-depth interviews and focus group discussions revealed the sentiment in both Hyderabad and Sukkur that the state is responsible for the provision of clean drinking water and meeting daily water demands. A member of the community during a focus group discussion in Sukkur shared: *"This (water provision) is indeed the responsibility of City Mayor, and Union Council Chairman/Members should also partake, but they do not invite us to share our input."*

In Hyderabad, participants in focus group discussions included representatives of

community organizations. The participants had detailed knowledge on the timings that water was available (access) and observations on color and usability of water for drinking purposes (quality). They had devised self-help mechanisms to overcome the quality and quantity problems. The tools included getting water tankers from individual water vendors or setting up a daily routine of filling utensils with filtered water from a local filtration tap, but these measures were being taken individually at the household level. When questioned on whether the community has considered addressing these issues jointly, there was little or no insight. One fundamental limitation highlighted is the shortage of time to sit together and organize things at a neighborhood level.

A participant in the FGD stated, "*To gather the community and work on common problems together is an extremely time-consuming task. This FGD, for example, is very well organized but at the community level, we usually do not have such a budget and are dealing with some citizens who may be trouble makers."*

5.1.4 Low levels of the desired homogeneity

Observations from local government officials pointed towards another key impediment: the 'otherness' in neighborhoods. Despite facing severe water supply shortages, Hyderabad lacks community initiatives because of the diversity of identity systems within the urban settlement. There are ethnic, religious, socio-economic disparities in Hyderabad that make it difficult to organize. This is comparable to other developing countries, including African states and Latin American countries as supported by the literature. Head (2007) warns policymakers against assuming homogeneity in communities. The tendency these terms have for glossing over real social differences is a critical flaw in designing strategies to foster participation and partnerships in a locality. One of the participants in FGDs shared*: "People mostly act on individual levels by building tube-wells. We do have CSOs that are active, but we do not think that there would be any response from the community if a community-run scheme was proposed".*

In Hyderabad, WASA outsourced the recovery of bills to a private vendor, but that faced much retaliation within the local economy (see Section 5.2.5). A senior official informed, "*The firm started with Qasimabad and hired people from Karachi to interview locals from Hyderabad. Fights and conflicts broke out between the two sides due to cultural differences. Further, the previously employed and now sacked distributors started to rebel and bother the newly hired ones. As a result, the company had to hire some of the old distributors. However, vigilant monitoring by the firm reduced the problem of corrupt distributors to some extent. Thus, the company had to face some resistance and rebellion from the residents of Hyderabad."*

In Sukkur, water access and quality problems were less severe than in Hyderabad;

however, no link or relationship between less or more participation and severity of problems was found. Hyderabad was not more likely to self-organize compared to Sukkur. FGDs in Sukkur revealed different social dynamics. The population is smaller, so differences within communities do not get diluted with the pace of urban economic activity like in Hyderabad. Here, the potential for conflict between communities is greater and religious activism is also more evident in public places. Roads and main market places are showrooms for political as well as religious organizations to be vocal about issues. But instead of this contributing to civic engagement and fostering the ability to self- govern, it leads to further disenchantment of the community fueled by fear of extremism by these vocal groups. A local politician in Sukkur revealed, "*The population of Sukkur usually opposes development happening in any area other than their own. If a certain fragment of the population finds that a road, water supply scheme or any development project is taking place in some area that is not theirs, they insist that the project be moved to a location of their choice. In some cases, they go so far as to destroy the installations overnight."*

5.1.5 Trust deficit (e.g. failed experimentation in farmer's organizations)

One of the FGD participants in Hyderabad shared, "*People are aware and can see that there are problems but have become hopeless. Sometimes they gather and protest against a certain issue, the situation becomes better temporarily but then deteriorates after a few days. They don't bother after that and just look for alternatives to maintain their livelihoods and lifestyles."*

Interaction with the state has discouraged or demoralized the community at different levels. A failed or deserted attempt at participation in Sukkur standardizes the struggles the community has to face.

Consultations with academics at the US-Pakistan Center for Advanced Studies in Water at the Mehran University helped in understanding the context as to why the trust deficit arises in Sindh when it comes to partnerships with governments. "*In the past, partnerships have not been successful. The public provided lands while the responsibility of O&M was taken by Village Development Authorities (VDAs). 90-95% of such schemes could not succeed. There were supposed to be 500 PPP schemes, but they were not implemented. VDAs are no longer elected democratically, which creates loopholes in governance. Bureaucracy can still make things work, but politicians are ten times worse. Farmer Organizations tried to improve irrigation management, but due to the social fabric of our villages, FOs were unsuccessful, the main reason being a conflict between tribes (khandani maslay). The Sindh village context is such that there is one big 'Vadera' in charge of small farmers."*

Interviews with experts at the provincial level also hinted towards a similar experiential

trajectory, "*Regarding participation, the local government and town committees used to have good representation, but now the situation has changed."*

5.1.6 Lack of community's willingness vs capacity

Interviews with government officials and state representatives reinforce the idea that there is a lack of willingness from the community to participate in service delivery of subjects like water. In line with lessons we learn from other parts of the world where the community holds the State responsible for the provision of basic services, there is more to the puzzle of participation than just willingness. One can also observe a lack of capacity as one key issue. A student studying water management commented in one of the interviews, "*Most times, the government does not engage with the public, but when it does, people do not know how to take part*."

Case studies from different countries also hint at a community's capacity differing at various levels or opportunities for participation. It is common for communities to have some inertia in setting up a project but drastic improvements in willingness to participate once the project takes off. A student volunteer in one of the villages that had RO filters shared: *"Participation is difficult because collecting money is difficult from this bradari. But I think they will be willing to pay for basic operations and maintenance if not rehabilitation. We are already paying around PKR 1000 every month for water. But if we can get 8 lakhs for an initial outlay of rehab, then this amount can be used to pay for O&M."*

According to a former professional involved with NSUSC, "*Regarding participation, investments are needed before the community can pitch in for laying pipes. An initiative like NSUSC was taken for the first time by GoS."* Although the project failed due to other reasons related to governance, people did appreciate and showed willingness to cooperate.

However, as explained above, capacity is not the only issue. Sometimes, it is closely intertwined with expectations from government and lack of faith in the system. A member of the community during FGDs shared: *"The Mayor is not playing an active role in municipal services. The city is full of wastewater. The Mayor himself crosses streets filled with dirty water. The Deputy Commissioner has also never invited us as a community organization to talk about these issues."*

5.1.7 Gap between reality and perception of the severity of the problem

Another thematic argument emerged from the interviews and focus group discussions upon more in-depth investigation was, 'why despite the understanding of the situation and ability to organize in other sectors like education and security, there is little effort in the water sector'? It could be said that the water problem is not in reality as severe as it is perceived to be, or there are feasible alternatives to address the issues that

exist. This is also supported in the literature; the instances in which partnerships fail are usually those where other options are available to the beneficiaries.

A senior water expert in a local NGO, also working on water, commented on why people do not self-organize or get agitated over the problem - "*Because they do get water in one or the other way and they don't even have to pay for it. Someone needs to commit time. We need to understand that the system is much larger than we imagine, and no one has the time to navigate it. We are also part of the system."*

One of the participants in focus group discussions commented on reasons why participation in the drinking water sector is missing: *"Bottled water is now a very lucrative business. There are some clean drinking water plants, and people go there, but they are few. Many community organizations are working in the city, but clean drinking water is an ignored cause."*

5.2 Case Studies of Partnerships, Participation and Collective Action

5.2.1 Tando Soomro village

Back in 1988, Tando Soomro Village, located in district Tando Allahyar, was just one among many other villages in rural Sindh. Interior Sindh is among those regions of the country that are immersed in abject poverty. Village communities have little economic activity apart from basic agriculture and livestock farming. Given that Tando Soomro is located on the southern side of the river Indus, access to water is precious. In the 1980s, Tando Soomro was attacked by the guards of influential and powerful landowners. The elders of the village requested the armed men not to harm their crops or cause any damage to their property, but given that the attackers were armed and also drunk, there was not much the villagers could do. However, the scare of the common threat compelled them to unite under the leadership of one of the affluent and educated residents in the village. He formed a group of village elders and educated people as they asked for contributions from each household to organize a village security force. They gathered the funds to build a boundary wall for the village, so outsiders could be deterred from entering and plundering village property. Later on, in 1992, this transformed into the Tando Soomro Development Organization. A Central Committee manages the organization to date. They organize an annual dinner for all residents to report the status of funds collection and expenditure on various development works. It also builds a sense of ownership. The committee organizes all ventures to improve water, health and sanitation, education, sewerage system, electricity and gas supply. They have also invested in floodwater drainage systems, water filtration and playgrounds for children. The village is so well organized that one does not feel it like a part of rural Sindh. It has an almost utopian feel to it. Tando Soomro is, therefore, an excellent example

of participation and collective action. This case of participation, however, has limited scalability as it emerged organically and with the impactful input of a local individual.

The village has established water filtration systems, health vaccination initiatives, street cleanliness measures and computer education for both boys and girls. The village committee collaborates with the public sector departments for shared development of schools, dispensary, and other necessary public services (Fig. 5.1, 5.2 and 5.3). The villagers also work with the same departments for optimal utilization of collective assets. A computer laboratory, for example, has been established by the village in one of the public schools Fig 5.4. A full-time instructor has been engaged to maintain the computer laboratory and provide training to young girls and boys in the evening.

Potential of PPPs in Hyderabad

WASA Hyderabad showed an interest in installing solar electricity supply at its pumping and water filtration stations in Latifabad. The officials informed that electricity load shedding is a severe problem which interrupts the smooth supply of water to citizens. They believe that the private sector can invest to replace the energy guzzler pumps installed a few decades ago, and WASA could invest in solar electricity to provide a smooth supply of water to citizens. Currently these stations have high electricity cost and even so cannot provide a steady supply of water. Subject to approval by the board, WASA officials were willing to initiate a first of its kind public private partnership project for the pumping station in Latifabad.

Fig: 5.1 Well-maintained street of Tando Soomro Village

Fig: 5.2 Guarded enterance to the walled village of Tando Soomro

Fig: 5.3 Collectively owned and maintained sport ground in village Tando Soomro

Fig: 5.4 Computer lab owned and managed from the village fund, Tando Soomro

5.2.2 UC Shamsabad

Union Council (UC) Shamsabad, located in Sukkur city, has no water supply for years. Connections exist, but there is no water supply. People either purchase water from vendors like the fire brigade or bring it from the river. Citizens have even tried to engage with SMC to request for only 4 hours a week of dirty water supply, but this basic demand couldn't be met. After some years of struggling for supply of water for domestic use, the residents of UC-6, led by a local resident who also happens to be a government officer, began to lobby with the district commissioner to help provide a new water scheme for UC-6. They spoke to officials at the Public Health and Engineering Department (PHED) and shared with them the estimates community members had made for the new scheme. It was a mere PKR 2.25 million benefitting at least 5000 households. This cost included a small room and a tube-well along the canal going towards the High Court and a 2-inch pipe covering 1.5 km from the tube-well to Shamsabad. Several times a small group of citizens went to DC office to help expedite matters. They tried to negotiate that the community can pitch in a proportion of the funds needed and the government can cover the rest. But both PHED and DCO raised concerns regarding technical feasibility and objected to plans for the scheme. For example, a pipe would have to come from 1.5 km away. Authorities had concerns about monitoring the infrastructure and ensuring its security, and who would bear the cost of electricity. However, no suggestions or efforts to help overcome these problems were made by the government. Eventually, bureaucratic delays exhausted the efforts of the citizens who had limited time resource to continue lobbying aggressively.

This example hints at the propensity of the community to self-organize and reach many levels of involved processes. The government seems to be the main culprit in quelling this spirit of participation and willingness to partner for social development.

5.2.3 Willingness of chambers of commerce and industries in Hyderabad and Sukkur

The research team held detailed meetings with the Chambers of Commerce and Industries in Hyderabad and Sukkur. Interviews with the top leadership of the Sukkur Chambers of Commerce and Industry confirmed a rigorous willingness and thorough awareness of the need for business people to partner with other stakeholders in the city to take ownership of city problems. The members informed the team that there had been countless discussions at the Chambers on the need for water sanitation and standard service delivery. The Chamber has approached various organization in-charges and has offered a platform to unite planning departments and have discussions involving multiple stakeholders. "*Sukkur is a small city, and we believe that our input should be inculcated in water schemes. We should know and take part in the nitty-gritty, like where will the pipes be laid, what is the timeline for the construction of a water scheme, etc.*"

The former President of Chambers of Commerce and Industries, Sukkur, and a prominent member recognized that:

"*Over the last ten years, problems have become chronic, and now people are migrating towards second-tier cities like Sukkur. Regarding local government representatives, governance problems all stem out from corruption, and there is no monitoring. The Chambers are willing to be part of a committee to find solutions*."

The conversation showed that they are also open to PPPs if they can be a part of projects including deliverables. Regarding efforts to develop a corporate entity within the public sector for drinking water in northern Sindh, their opinion was, *"NSUSC was awful."* The participants in the interview/ discussion recalled that before NSUSC, they used to get muddy water at least as compared to no water now.

They have previously participated in improving the living standards of the city. A Traffic Plan was developed and pursued by the Chambers on major intersections and was quite successfully implemented. There are fewer gridlocks now. They had to create maps and educate the police, but now the traffic system is improved, and cars are not stuck in long queues, especially at rush hours like closure time for schools. This goes to show that Chambers of Commerce can potentially make substantial differences in the city which reaps collective gains. The concept of Chambers of Commerce is in itself an example of collective action, and the government can gain much by engaging such a group in which some element of teamwork already exists.

Similarly, our meetings with the senior members of Hyderabad Chamber of Commerce revealed their willingness to collaborate and cooperate with WASA Hyderabad to address water woes in the city. Some members were willing to enter into PPP framework for the operation and maintenance of water infrastructure in the city. However, the members showed concern on the lack of any consultation by the water authorities on the investment, maintenance plans, and strategies.

5.2.4 Sodo Sarwari village (collective action for tube wells)

Sodo Sarwari is a village a few miles away from Sukkur. The Rohri canal, from where the village gets water for drinking purpose, gets dry for a couple of months, every year. The government has installed tube wells and a rudimentary water cleaning system, but during the dry season, the tube wells stop working, causing supply deficiency for irrigation and drinking purposes. The villagers, recognizing this pattern and how it affects their livelihood, approached the government to develop a scheme to drill a hole in the ground to access groundwater reserves near the canal bank. The incentive behind this was to ensure a consistent water supply when the canal is dry. However, the government showed no willingness to assist the villagers in this venture.

The villagers then started a campaign to raise funds for this exercise and for the installation of a tube well to utilize the groundwater. The cost was estimated at

Rs 250,000. In retrospect, one can safely say that had it been determined by the government, it would have cost much higher. But villagers did everything prudently and also provided a labor force for operations and maintenance. A civil society organization said that Sarwari Social Welfare Organization played a crucial role in mobilizing the community.

Villagers successfully raised the money needed for boring; tube wells from the government schemes were already available. Thus, the partnership between the village and the government resulted in an all-year water supply.

The village already had a history of collective action. They established a Madrassa school in 1992 through self-help and later an NGO donated funds for the construction of two additional rooms. The community initially provided teachers' salaries, and then later the government adopted this school. The village also keeps the streets clean through collective action and public messages on the street (Fig. 5.5, 5.6). The villagers are willing to contribute to partnerships for improving water quality if the government cooperates with them.

Fig: 5.5 Awareness messages to keep streets clean in Sodo Sarwari village.

Fig: 5.6 Collectively maintained streets of Sodo Sarwari village.

5.2.5 WASA Hyderabad bill outsourcing

WASA Hyderabad outsourced its bill distribution and recovery to a private firm in an attempt to improve the bill recovery rate. WASA had 5000 commercial users; the commercial rate is charged only to water-based industries. The department was facing a few issues at the time. First of all, bill recovery was extremely low, and many household members complained that they did not even receive the water bill. Some investigation into possible reasons revealed that WASA staff had not been delivering even water bills to consumers.

After the tendering process, a firm from Karachi was contracted out to deliver the bills to Hyderabad's residents. The contract, signed in April 2017, included the distribution of bills to consumers and software development to keep track of bills paid and unpaid. The first step was to conduct a survey. The firm started with Qasimabad and hired people from Karachi to interview locals from Hyderabad. Fights and conflicts broke out between the two sides due to cultural differences. Further, the previously employed and now sacked distributors started to rebel and bother the newly hired ones. As a result, the company had to hire some of the old distributors. However, vigilant monitoring by the firm reduced the problem of corrupt distributors to some extent. The company had to face some resistance and rebellion from the residents of Hyderabad, although the same company also operated in Karachi but did not face such issues there. The company was paid Rs 7.5 per bill for bills returned. Also, a percentage of the collection would be paid by WASA. Before outsourcing, WASA was able to collect 30% of water charges.

The company is offered x% of the current recovery for (30+x)% collected, i.e., if the company collects 31% of water charges, WASA pays them 1% of the current collection; if they collect 32%, WASA pays 2 of water charges. On average, the company was able to distribute 130,000 bills and collect 28,000 bills. Before billing was outsourced, WASA was collecting, on average, 15,000 bills, so recovery almost doubled after the company was hired. Initially, the results were quite disappointing as the company faced challenges in collecting bills from a different city with unique dynamics. But after a year of operations, performance has improved multifold. WASA has signed a three-year contract with the company; it took one full year for the company to establish their set up and resolve the issues caused by resistance from the citizens.

Earlier, WASA also experimented with the idea of outsourced billing. They engaged a courier company to deliver bills. The courier company charged double of what the private contracting firms charged but were effective at sorting untraceable individuals. Due to severe land/property conflicts, WASA has not yet pursued or tried to tackle the problem of bills being delivered to the wrong individuals.

5.2.6 Karachi water and sewage board's Dhabiji pumping station

Karachi Water and Sewage Board (KWSB) has recently developed a proposal to invite private investment for up-gradation of water pumps and electricity distribution at Dhabiji Pumping Station. This pumping station pumps around 350 MGD while its capacity is about 500 MGD. Due to old pumps and inefficient use of energy, the electricity expenditures have increased manifold. KWSB considers that by inviting private investment, pumps and other ancillary infrastructure can be redeveloped, which will save energy usage. The charges saved from electricity can be paid to the private investor, and the investor will be able to recover the investment in less than ten years. The PPP Policy Board has approved the proposal of the Government of Sindh; however, further progress is not visible yet. Another such project under PPPs is in progress that aims for water recycling in SITE (Sindh Industrial Trading Estate) area of Karachi for industrial use. However, there many challenges in initiating PPPs in the water sector as this market has not developed yet. Similar steps can be taken for the management of large-scale water filtration plants in cities. Sindh Government has initiated various models of partnerships in the education sector. A few interventions through PPPs can make a difference but it will be important to assets the value for money and especially social and economic cost in the case of PPPs in the drinking water sector. Similar efforts are needed in the water sector.

5.2.7 RO Plants in Hyderabad and Sukkur

RO plants have been installed by various government agencies and charity organizations in many cities in Pakistan, including Hyderabad and Sukkur (Fig. 5.7). People can fill bottles and cans free of charge from these plants. Most of the time, the organization that sponsors the installation of plants also provides operations and maintenance expenditures for a few months and then expect citizens to contribute. The physical verification has revealed the poor condition of RO plants in Hyderabad and Sukkur. According to the survey, 31 RO plants are existing in Hyderabad, out of which 6 plants are closed/not functional. According to the information received from the people living around the filtration plants in Hyderabad, almost 13 out of 31 RO plants are maintained regularly. Most of the remaining RO plants are poorly maintained, and they are not filtering water properly for drinking. Furthermore, for Sukkur, there are a total of 18 filtration plants, out of which only 3 plants are adequately maintained. The remaining plants are not monitored or receiving appropriate O&M expenditures, because of which water, if and when provided, is not safe to drink.

According to the Supreme Court's report published in 2017 "*Hyderabad's Overall analytical data show that out of 33 samples, 28 (85%) were found unsafe for drinking purpose, while only 5 (15%) samples were found fit for human consumption for analyzed parameters under prescribed standards*". Whereas, for Sukkur "*Overall analytical data*

of samples collected shows that out of 40 samples, 33(82%) were found unsafe for drinking purposes, while 7 (18%) samples were found safe for human consumption for analyzed parameters under prescribed standards" (Supreme Court, 2017).

Fig: 5.7 RO plant in Sukkur

5.2.8 Tando Agha community contributing to water pipes

In Tando Agha neighborhood of Hyderabad, some households were facing continuous problems regarding water supply due to the poor condition of pipelines. They were looking to the government for support to repair the pipes. After receiving a poor response from government agencies, all the households came together and decided to resolve the problem themselves instead of waiting for the Government to respond. Thirteen households that were facing the issue contributed around PKR 6,000/- each to repair the corroborated pipelines, and managed to do so utilizing their own funds.

5.3 Lessons Learned from Participatory Cases

The study finds that there is a willingness to participate at a community level in different pockets of opportunities. Yet, there is inertia within local governments and fear in the local community of engaging with the bureaucracy because such interactions often fail to bear fruit and result instead in a waste of people's time. The discourse on partnerships does have a consensus to varying degrees in which there is the involvement of different actors. Arnstein's *ladder of participation* or IAPP's *Spectrum of participation,* along with other typologies of this sort show that the community can be involved in different ways and at various levels in the governance of their locality, including development issues. There is evidence of these variations in the drinking water sector in Urban Sindh.

Some of the cases of partnerships studied during the data collection are modelled into Sarzynski's typology in Table 5.1. The boundaries among some of the cases are somewhat blurred. However, this framework guides to understand the nature of different water sector initiatives in and around Hyderabad and Sukkur. The number of cases is limited, so findings may not be generalized, but these cases do provide some lessons about success and failure of partnership initiatives in the water sector.

5.3.1 History of collective efforts

An in-depth review of the cases informs that partnerships and collective action take place based on the previous history of the local community. Small steps of collective action give confidence to agents to plan the next round of efforts. Thus, it shows that success creates success. Villagers of Tando Soomro informed that they initially started working together to protect the village from dacoits and thieves. The collective action to raise the village's security force, boundary wall and other protection measures, gave confidence later to the villagers to embark on social development initiatives in the education sector, water, and sanitation and health. Similarly, Sodo Sarwari village had a history in building schools through a collective effort and later agreed to raise funds to contribute to the installation of tube wells. Thus, collective action and participation cannot be implanted in a vacuum. Instead, it needs a history of small and marginal efforts that can ultimately culminate into broader coalitions and platforms. The critical lesson is to encourage even small steps towards collective action. Similarly, after the successful experience of helping the city police to improve traffic management, Sukkur Chamber of Commerce is now confident that they could help and engage with water agencies as well.

Table 5.1: Typology for participation

Type of participation	Sindh water supply schemes case studies	Brief description
Traditional government-led	Water schemes in the Annual Development Plan (ADP)	Public sector funded schemes are identified and designed either by political office holders or bureaucrats.
Non-governmental Planning	UNICEF's Financial Support for Water Sector Plan of Hyderabad City	UNICEF has recently provided financial support to WASA Hyderabad for developing a comprehensive water safety plan for the city (Advertisement for the consultants appears in Annex-IV)
Inclusive planning	Willingness of Hyderabad and Sukkur Chambers of Commerce and Industry to participate in the Planning of Drinking Water Sector Improvement	The business community showed keen interest to collaborate with water authorities.
Partnerships	1. WASA Hyderabad's bill outsourcing to private vendors 2. Approval of Karachi Water and Sewage Board's Dhabiji Pumping Station for PPP.	1. WASA Hyderabad has outsourced the recovery of water bill; recovery has shown tremendous improvement. 2. KWSB has recently obtained the approval of the Public-Private Partnership Board to engage private investors for the up-gradation of Dhabiji Pumping station.
Non-governmental provision	RO Plants in Hyderabad and Sukkur	Many NGOs (charity organizations) have installed RO plants in both cities without taking any contribution or charges from the local people or government.
Co-production	1. Sodo Sarwari, Near Sukkur 2. Tando Soomro Model village 3. Tando Agha 4. Failed effort to initiate a new scheme in Sukkur	These cases were jointly designed by both the local community and government stakeholders.

5.3.2 Continuous iterations

Partnerships, civic capacity and collective action require constant iterations. Generally, agents refrain from undertaking new or augmented activities after failure and weaknesses in the initial rounds of partnership initiatives. Rather than giving up after the first few trials, failures and deficiencies should be analyzed to come up with iterative adjustments. WASA Hyderabad's outsourcing of water billing is a prime example in this regard. The first round did not bring fruits as envisaged, but it provided lessons to undertake changes in the second round. In the case of UC Shamsabad, after the failure of the first attempt, the community did not try to come up with a different plan, and hence their efforts of collective action could not generate the required momentum. Residents of Village Tando Soomro have been iterating their development and partnership model over time, and it has now evolved into a mature collective action.

5.3.3 Willingness of the public sector

It is of utmost importance for the public sector to show some willingness to promote collective action and partnerships. A senior official of Government of Sindh, responsible for overseeing the development of water schemes across the province, opined that only government could manage the problems in the water sector whereas community involvement cannot prove to be helpful in this regard. With such an attitude, partnership with the private sector simply cannot culminate. However, this attitude also varies from person to person within the public sector. As a part of our discussions with the officials of the Government of Sindh, we came to know that the head of KWSB had recently developed an initiative to outsource Dhabiji Pumping Station. The purpose of the outsourcing is to bring new investment in water pumps, pipes and electricity systems in order to bring efficiency in water pumping[15].

Similarly, the management of WASA has shown keen interest in exploring options for the outsourcing of some of its pumping stations, especially those which face severe power cuts. With some private investment, solar energy can be installed for these pumping stations so that they continue to pump water during electricity load shedding. However, it is essential to appreciate that the willingness of officials of the public sector varies and it plays a vital role in pursuing partnerships and collective action. The frequent transfers and postings of officials add to the complexity in this regard. A wide variety of stakeholders attended the two workshops conducted by the research team, one at the Research & Training Wing of the Planning and Development Department, Government of Sindh, Karachi (Fig. 5.8) and the other in Mehran University of Engineering and Technology, Jamshoro (Fig. 5.9). The participant views on the effectiveness and practicality of collective action were diverse, yet there was consensus on the fact that the public sector is unwilling to take such initiatives.

15 However, the authors have checked recently and there is not much progress on this project

Fig: 5.8 Consultative Workshop at Research and Training Wing of P&D Department, Karachi

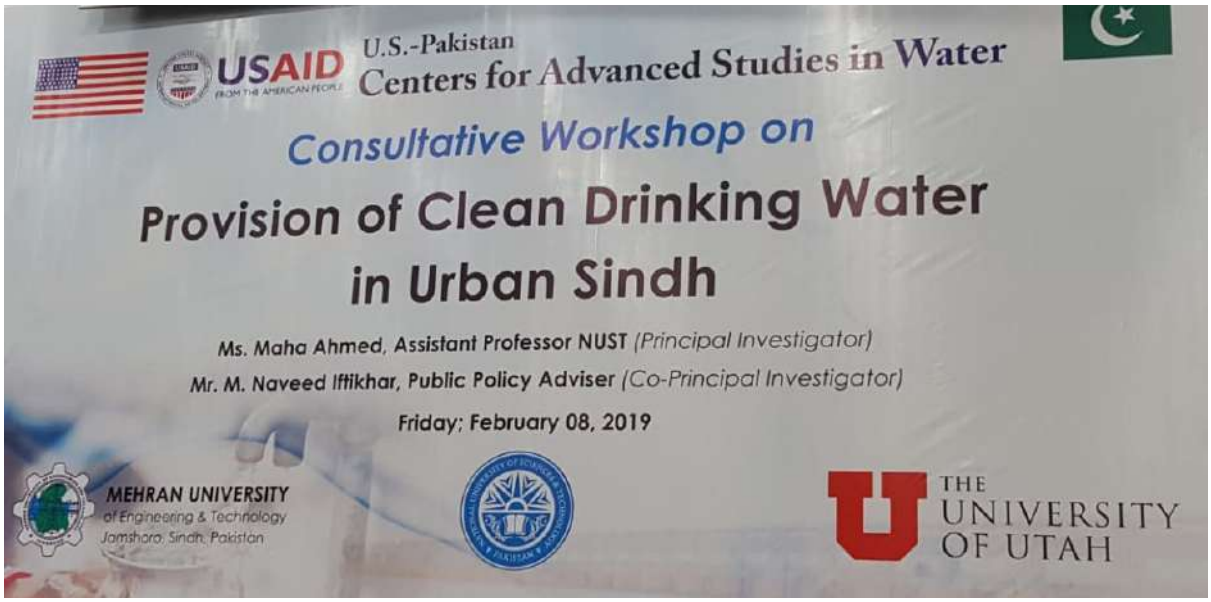


Fig: 5.9 Consultative Workshop at Mehran University of Engineering and Technology (MUET), Jamshoro, Sindh

5.3.4 Presence of a social entrepreneur or champion

The most crucial factor behind the success of partnerships and collective actions appears to be the presence of a social entrepreneur and/or a change agent who can intelligently and dedicatedly garner the support of the community. He also has to deal with the public sector interactively. In the case of Tando Soomro, a local landlord appeared to be the agent to spark collective action. The villagers informed that he does not use collective action or the community's support for his personal gains, and does not ask any villager to vote for the political leader supported by him. This is a

common phenomenon in the rural politics that the landlords (or the notables) generally garner the support of villagers for political gain. But in the case of Tando Soomro, the leader of collective action did not pursue such goals. The social entrepreneur or change agent may or may not be the one who contributes the largest share in terms of finances. In the case of Tando Soomro, the social entrepreneur or change agent is the landlord and the wealthiest person, but in the case of Sodo Sarwari, the same role was being played by the Headmaster of the local school.

5.3.5 Effective communication and transparency by community planners

Communication plays a vital role in promoting partnerships and collective action. During our discussions with WASA Hyderabad, we found that the officials were even not aware of the Public-Private Partnership Framework of the Government of Sindh. So, they informed that they were reluctant to initiate public-private partnerships or other similar initiatives except for the recent case of outsourcing of billing. Village Tando Soomro's particular focus on transparency of expenditures and other budgetary matters has proven to be the most effective tool of partnership. Similarly, when it comes to engaging different stakeholders, effective messages can help. During our discussions with Hyderabad and Sukkur Chambers of Commerce, we shared the situation for water sector with them based on our preliminary results, and they immediately responded to collaborate with the water authorities to fix these problems. Some of the businessmen were willing to contribute to the water sector financially while others were willing to pursue public-private partnerships.

5.3.6 Contextual design of partnership initiatives

There is a common perception that community partnership initiatives generally do not succeed in Pakistan. However, we understand that such initiatives often fail due to poor design. Many NGOs have installed RO plants in Hyderabad, Sukkur and other cities in Sindh and Pakistan. Most NGOs give donations or charities (raised from either personal contributions or other national/international donors) to install such plants in various neighborhoods. They provide total upfront cost and running expenditures for some time, and generally assume that the community will take care of maintenance and such other expenses after the expiry of support by the sponsoring NGO. The research team have found many dysfunctional RO plants which were disbanded after the expiry of financial support of NGOs who provided support for their installations. Indeed, this may be considered as a design failure. There is a need to engage communities from the very beginning of such initiatives. The community's ownership can only be ensured through their contribution and say at the beginning of the project.

5.3.7 Strategy for social mobilization

The strategy for social mobilization is a critical element in the success of community

participation initiatives. An official of the consulting firm, involved in social mobilization in various projects, informed that they had learnt a lesson about the need to spend sufficient time with the local communities for understanding the local culture, demography and other power dynamics, especially for community mobilizers. The consultation with the community should not be a one-time event. It should be a carefully crafted process. One of the officials of the Government of Sindh, heading an irrigation related initiative, informed that the performance of FOs has varied based on the initial support provided to those FOs in terms of explaining and preparing them for the role they were supposed to undertake. We do not have any evidence to substantiate this perspective. However, it appears intuitive, and is supported by international literature as well. FO performances and the experience of farmer participation in the Indian states of Maharashtra and Chhattisgarh, for example, have been entirely different from each other. In the former, locals have been made to participate for 15 years, and legislation on participatory irrigation management is yet to be passed wherein the local farmers are likely to have an input in the bill itself. In Maharashtra, the experience of community participation is exemplary. In Chhattisgarh, on the other hand, the experience has been the complete opposite as the approach was bottom-down and more focus was given to legislation rather than truly mobilizing the local community (Pant, 2008).

A community member of Tando Agha informed that most of the households in that street were from the same tribe and one of the elders of the community convinced the members to undertake this initiative. The elder was well aware of the financial constraints of the community and accordingly convinced the community members to do this despite their financial limitations. He informed them that it would be beneficial for them in the long-run.

5.4 Research Output

The research output below describes the various channels through which findings of the report have been disseminated, including research papers, workshops, focus group discussions, seminars, newspaper articles, interviews and brochure distribution.

5.4.1 Research papers

Based on this study, a research paper titled “Governance and Civic Capacity for the Provision of Drinking Water in Urban Sindh” has been submitted to ‘Journal of Development Policy, Research & Practice’ published by Sustainable Development Policy Institute (SDPI).

5.4.2 Focus group discussions (FGDs)

Three FGDs held in Sukkur and three in Hyderabad. The participants represented different segments of the society including government employees, representatives of non-profit and civil service organizations, welfare workers, local government officials and consumers (both at the household level and commercial level).

5.4.3 Project results dissemination seminars/workshops

1. Workshop at Planning and Development Department, Government of Sindh on “Governance and Civic Capacity for the Provision of Drinking Water in Urban Sindh”.
2. Seminar at US-Pakistan Centre for Advanced Studies in Water (USPCAS-W), MUET, Jamshoro titled “Governance and Civic Capacity for the Provision of Drinking Water in Urban Sindh”. Organized in collaboration with WASA Hyderabad, attended by students, faculty, and stakeholders.

5.4.4 Newspaper articles

1. OpEd by Naveed Iftikhar and Maha Ahmad titled “Water Woes: Time to Act Now”, published in Express Tribune in 2018.
2. OpEd by Naveed Iftikhar and Maha Ahmad titled “Access to Potable Water in Sindh”, published in Express Tribune in 2018.

5.4.5 Media interviews and other activities

1. Printing and distribution of brochures to disseminate key findings of the study at MUET and NUST.
2. Interview with Voice of America (Urdu) by Naveed Iftikhar
3. We are disseminating findings of this study among policy makers at different tiers of Government in Pakistan to incorporate community engagement and collective action in policy formulation processes in the water sector.

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The report concludes that water supplied to households through taps is almost uniformly poor across Sindh, especially in Hyderabad and Sukkur. Appropriate pricing of water remains one of the major loopholes in the effective and efficient governance of water. In Sindh (and across Pakistan), users of water pay a tiny portion of the bill, creating an unwarranted burden for the taxpayer. There is a lack of a comprehensive and integrated water policy to tackle issues in this sector across the province. There are severe flaws in designing and developing water supply schemes, especially in terms of needs assessment. Currently, in cities like Hyderabad and Sukkur, increasing population poses a threat to existing infrastructure. An initial incision into the local governance context of the selected two cities, Hyderabad and Sukkur, revealed little or no evidence of any participatory schemes or active citizenship.

Improvement in stakeholders' access to information can create an environment where they can participate in decision making more effectively. The projects/schemes should be prepared diligently, and completion time for each scheme should be considered before capital flows are released. The budget for O&M should be an integral part of all planned infrastructure investments. The tariff structure should be rationalized along with significant improvements in delivery service. Institutional flaws and duplication—such as the construction of water schemes by PHED and operations by the local governments—need to be paid special attention.

Participatory approaches in governance can be used to harness action from the community in designing, planning and overseeing water service delivery. Such models, when used effectively, can help inform policymakers, improve knowledge about existing infrastructure, enhance access to information and reduce corruption. For Sindh, several models can be pursued, i.e. public-private partnerships (PPPs), engagement of community organizations, and outsourcing of ancillary services. Bhalwal's CPP may provide important lessons for developing and operating water supply schemes in semi-urban and rural areas. The federal, provincial, and local governments should all play a role in monitoring water quality, and decisions should be made by water authorities as well as other environmental agencies. Further research is needed to analyze equity issues in the water sector around regional and sectoral disparities in Sindh.

6.2 Recommendations

The following recommendations are proposed in light of the findings and diagnostics identified in the study.

6.2.1 Improve transparency

The drinking-water sector is prone to misappropriation of resources by water agencies, especially when it comes to maintenance and rehabilitation, as the distribution network lies underground, making it challenging to track expenditures on maintenance. Water sector projects are also complicated as construction involves subcontractors and are implemented in phases. This makes it challenging to apply cost controls. What follows is mismanagement in the sector. Typical forms of misgovernance observed in the water sector in Sindh include nepotism and clientelism among others. The asymmetry in information also hampers transparency: contractors are always more aware of real prices than the public procurement agencies. Some remedial steps that can be taken to improve transparency in governance are outlined below

Access to information: Improving stakeholders' access to information can create an environment whereby they can participate in decision making more effectively. Water agencies' activities should be shared publicly so that the community is aware of upcoming projects, rehabilitation, and operations and maintenance. Open sharing of information promotes ownership within the public; if the people are aware of local government activities, they can help monitor. Furthermore, having user-friendly websites can be an essential tool for meeting the needs of citizens. During our FGDs, we found that many educated citizens in Hyderabad were aware that they did not need to stand in long queues to pay their water bill as the WASA Hyderabad website has this provision. In Sukkur, on the other hand, no such provision exists on the SMC website, and many participants in the FGD said that paying the bill is a hassle since one has to wait in lines, so they do not bother to do so.

Careful monitoring of employees: Employees working at water agencies should know what is expected from them. Upper management can create a sense of ownership by holding trainings and instituting across the board monitoring mechanisms to ensure that they adhere to their commitments and responsibilities. Government officials in Hyderabad and Sukkur were aware of these realities and shared that the issue of ghost employees is severe in Sindh's water sector. Sindh Minister for Local Government and Katchi Abaadis has recently taken notice of a few instances of ghost employment in Sukkur and has initiated an inquiry. However, such inquiries come and go; without a permanent solution and strict measures in place, the problem is likely to persist.[16]

Revisions in Planning: Weak planning and ad-hoc policies nurture the kind of culture that allows for systemic and petty corruption at all levels of management. The PC-1 should be prepared diligently and completion time for each scheme should be considered before capital flows are released. It is often the case that construction time needed is less than what is stated in the PC-1, and contractors end up halting operations

16 https://pakobserver.net/ghost-employees-badly-affecting-departt-performance/

mid-construction, which leads to inefficiency and poor allocation of resources. One of the interviewees shared that the payment system works through quarterly installments for a 5-10 year project which is highly inefficient as often the work is completed in a few weeks. Still, the contractor has to wait for an entire quarter for the next payment. Arbitrary and sporadic releases in financial flows lead to revisions in PC-1, which causes delays in the construction of water schemes. Often, a project is abandoned in the middle of construction, which is a huge loss in public resources. Furthermore, to improve urban management, the budget for O&M should be made an integral part of all planned infrastructure investments.

Unapproved Schemes in ADP. The Annual Development Plan (ADP) for Sindh consists of many unapproved schemes; our analysis showed that 48% of the projects in ADP from 2005-15 were unapproved and that the cost variation in unapproved schemes was higher. This is one of the most significant gaps in governance that subsequently leads to corruption and constant revisions in the PC-1. Some of the officials, during our interviews, informed us that PC-1s are prepared by contractors instead of the technical staff of the relevant department, hence poorly drafted. The PC-1 prepared for each water supply scheme should be translated in Urdu from English and should be made public along with the execution and monitoring of each scheme. The PC-1 proforma should be revised to provide for input by the relevant community before designing projects.

6.2.2 Pricing

In Hyderabad, the water charges are PKR 169 per month for domestic consumers and PKR 300 per 1000 gallons for commercial users. In Sukkur, PKR 360 per annum is charged for a domestic connection and PKR 720 for a commercial one. Prices charged for water supply are low in both cities. Charging a flat tariff rate, low collection efficiency, unchecked high consumption of water by the connected households, and bulk users and firms are some of the reasons for poor water supply management. Prices should be revised such that O&M is covered through tariff collection. Through our interviews, we learned that annual recovery in Sukkur is PKR 40,000 while the cost is PKR 5,500,000, which amounts to only 0.7% of the total running cost. The local government bears the deficit amount through the Octroi and Zila Tax (OZT) share, which is technically meant for employees specifically, but in this case, it is being used for operating costs. The recovery situation in Hyderabad is better and more encouraging; yearly bill demand in 2017-18 was PKR 654.48 million of which PKR 399.4 million was recovered from consumers, which amounts to approximately 61% recovery. However, during our interviews, WASA officials informed us that the average recovery rate is 40%. Regarding pricing, the following remedial steps are proposed:

Make payments hassle-free and rationalize tariff structure: During our FGDs, we learned that half the participants do not pay their bills. One of the participants in Sukkur shared that paying the bill is a hassle as you have to wait in long queues. There are easier methods of payment now, such as internet banking and easypaisa, but the Government still does not provide these services. Furthermore, he shared reluctance to pay the bill given that they rely on the market for water provision. The tariff structure should be rationalized along with significant improvements in delivery service.

Sustainable water metering infrastructure: NSUSC had planned to install water meters in its first phase, but of the 18,000 meters that were intended to be installed for bulk and individual consumers, only 2752 meters were installed. Currently, none of them is functioning. A flat tariff rate and unmetered services lead to inefficient water use by both households and industry. A sustainable water metering infrastructure is a necessity to improve recovery.

Curb bribery and corruption by bill collectors: Corruption in tariff collection is rampant in both cities; there is an urgent need to monitor this. Bill collectors bribe water consumers in return for waiving the bill. Hyderabad has, to some extent, countered this behavior by outsourcing tariff collection, but the situation remains dire in Sukkur.

Joint bill collection by WASA and HESCO: One of the significant flaws in the governance of water is that the water supply is not cut off when domestic consumers refuse to pay their bills. This problem is not faced by other utility providers such as electricity and gas suppliers, where the supply is cut off after a few warnings if people do not pay bills. WASA officials have shown keen interest in collaborating with HESCO for bill collection. It would serve WASA if the water bill could be an added feature in the electricity bill to enforce payment. The National Water Commission has raised this point, but HESCO refused to comply as it is a federal organization while WASA falls under the provincial government.

6.2.3 Addressing overlapping responsibilities

The existing institutional set up does not ensure a clear and well-defined structure for planning, coordination, or service delivery. After the passing of the 18th Amendment and the expected changes in the local government framework, institutional roles require updating at the provincial level. Key areas of concern are the separation of responsibilities for policymaking, regulation, and service provision. The Urban Unit of P&D Sindh issued the Sindh Water Policy 2017, which gives PHED the sole mandate for the provision of water supply in both urban and rural areas, except for urban areas in Karachi and Hyderabad where KWSB and WASA are responsible, respectively. The problem with this institutional architecture is that the PHED makes policy decisions keeping itself at center stage, ignoring legal, and constitutional mandates that should be in place.

Streamline number of institutions involved in water and sanitation: A clear mandate should be defined for each stakeholder. Sindh has witnessed multiple institutional authorities in the water and sanitation sector. The system is loosely defined with unaccountability rampant and can be bypassed by executive orders and strategic resource allocation decisions. Countless cases make obvious the institutional anomalies that exist. For instance, the Department of Special Initiatives was assigned the megaproject of installing filtration plants (reverse osmosis) across Sindh, while the local government was not involved. Another case is that NSUSC was handed control for a few years after which all operations were clumsily handed back over to Local Government after the Supreme Court halted the project in 2017. Unaligned policy priorities have resulted in wasteful spending and have crippled essential service delivery to the citizens of Sindh. The number of institutions involved should be streamlined with clearly defined and easy to monitor responsibilities and roles. Effective coordination in the planning of water supply investments requires a formal and consistent mechanism which does not exist. This creates fragmentation in budgeting allocations.

Clear rural-urban boundaries: Due to outdated rural-urban demarcations, PHED and local governments continue to have similar roles in policy initiatives. It is often unclear which schemes fall under the maintenance of which department, which results in blame-shifting. Rural-urban boundaries should be identified so that there is no confusion about which areas fall under the domain of rural and urban departments.

Merge PHED and Local Government Department: Water and sanitation should be an entirely local government subject. The current set up requires much coordination between PHED and local government, which is often difficult to sustain since PHED is a provincial department and operates from Karachi while local governments are set up within each respective city. Such lack of coordination leads to blame-shifting between the two. When water supply schemes become dysfunctional, PHED blames the local government for poor maintenance.

In contrast, local government departments point to poor infrastructure designs and PHED's centralized approach to setting up water supply schemes. There is a need to create capacity at the local government tier. The LGO 2001 merged PHED with Local Government, but it was separated in 2008; later it was combined again with LG in 2013 and then separated in 2016. The Sindh Water Policy 2017 issued by the Urban Unit gives PHED the sole mandate for managing water supply in both urban and rural Sindh. Still, under this approach, PHED does not give due consideration to local dynamics which are unique to each area. PHED should be merged with the Local Government Department along with consistent efforts to enhance the capacity of municipal governments at the city level.

6.2.4 Promote partnerships

Participatory approaches in governance can be used to harness action from the community and the private sector in designing, planning and overseeing water service delivery. Such models, when used effectively, can help inform policymakers, improve knowledge about existing infrastructure, enhance access to information, and reduce corruption. How can the community participate, and what are the potential benefits? For instance, irregular water delivery service is a common problem in both Hyderabad and Sukkur; water is supplied in irregular intervals, especially in Sukkur. The reason for this failure is poorly designed systems and lack of proper O&M. The community can participate by putting in place an iterative complaint system where users report faults to local government, and also by informing decision-makers about community needs and preferences. For Sindh, several participatory models, outlined below, can be pursued:

Public-private partnerships (PPPs): Pumping stations, filtration plants, and distribution systems can be outsourced to the private sector so that the local government is in charge of monitoring. Implementation of PPPs can prove to be a difficult task, and there are various reasons behind it. Urban water supply is capital intensive and entails massive fixed costs, with returns on investment accruing only over long periods. Thus, long term regulatory and legal stability is crucial for private sector attractiveness.

Furthermore, in the presence of alternative sources of water supply for consumer use, a high degree of coordination is required to manage the potentially negative effects on profitability. Thus, in order to breed an environment conducive to PPPs, it is mandatory to put in place carefully-crafted systems of regulation, planning, contracting and pricing. International experiences with PPPs in recent years have been good in some cases and bad in others. For instance, PPPs in the water and sanitation sector have been highly successful in China: from 2001 to 2012, there were 237 PPP projects in China's water and sanitation sector which accounts for 40% of all such projects globally. Only 8% of China's population was served by private water companies in 1989 compared to 38% being served by 2008. The experience in Latin America and the Caribbean, on the other hand, was not as optimistic, wherein by 2002, 75% of the contracts involving private sector investment ended up in cancellation or renegotiation. The Government of Sindh can gain many benefits by making efforts to involve the private sector. The Chambers of Commerce in Hyderabad and Sukkur both showed a willingness to cooperate with the government to improve the water supply delivery service in their respective cities. Such partnerships can be mutually beneficial if carefully devised and followed up.

Community-Government partnerships: Engaging communities by community organizations in semi-developed and slum areas can play a decisive role in governance.

While such initiatives are observed in other sectors like education (outsourced schools, for instance), they are not very prevalent in water and sanitation. Such initiatives can also be taken in the water sector but require a system of monitoring since water could be stolen and wasted easily, which makes such initiatives susceptible to free-riders. In such cases, community-led water supply schemes may only be suitable for close-knit areas, where all the residents of the locality are taken on-board to pitch on for fixed and/or running costs of the project at hand.[17]

Outsourcing of ancillary activities: The capacity and willingness of the private sector to take the role of a direct service provider are considered weak, both financially and managerially. Contracted duties in the water sector can include construction, design and financing. Lack of technical experience, substantial fixed costs and low pricing are some of the barriers to entry. In the absence of strong regulations and incentives, a framework where the private sector is involved in direct and core service provision may not be feasible. However, small steps towards incentivizing the private sector can be beneficial in improving service delivery. Ancillary services such as billing, customer service, laboratory services, vehicle maintenance, meter reading (if meters are installed) and provision of supplies to specialists can be outsourced. WASA Hyderabad outsourced the recovery of water supply bills in 2017 and has had a good experience with it as recovery almost doubled after the company was hired.

Utility-customer relationships and awareness campaigns: Civil society must be involved. International experience shows that remarkable increase in bill collection and reduction in illegal connections can be achieved by engaging users and civil society in a service that they want and are willing to pay for. The key is to develop a utility-customer relationship based on long-term community building rather than short-term contractual relationships. Effective awareness campaigns can also help increase tariffs with broad public support.

Collaborations: Various universities in Pakistan are now working on the issues faced by the water sector. The agencies need to collaborate with such academic institutions, so technological and managerial problems can be shared with faculty, students and startups for providing cost-effective and efficient solutions. National Incubation Centers established in each capital in the country have housed many technology startups and social enterprises. Close working with such incubators can provide beneficial partnerships on critical water management issues.

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17 Bhalwal's *Changa Pani* (clean water) model of community-government partnership can provide useful insights for replication in various cities of Sindh.

6.2.5 Water quality and monitoring

The Ministry of Environment published the National Standards of Drinking Water Quality (NSDWQ) document in collaboration with the Ministry of Health, the World Health Organization and UNICEF in 2008. The document gives clear benchmarks for drinking water standards but is not imposed on the ground in Sindh. Low quality of drinking water results in a high cost to society due to its hazardous health effects.

Multi-tier role of government in monitoring: To ensure that quality benchmarks in the NSDWQ are implemented, the federal, provincial and local governments should all play a role in monitoring water quality, and decisions should be made by water authorities as well as other environmental agencies. The role of monitoring played by the local government alone does not suffice as the action is not taken when the distribution of poor quality water is being reported. Accountability of municipalities requires that various levels of government must participate in monitoring.

Modernize piping infrastructure: The water supply pipes pass through wastewater sites, and it is incredibly detrimental for public health. In some cases, water supply pipes run alongside the sewerage system. The rusty, corroborated pipes mean that leakages are rampant, leading to dangerous contamination. The issue of modernizing the piped infrastructure should be taken up at the provincial level. It is imperative to rebuild all such networks so that the sewerage network and water supply infrastructure are constructed at a safe distance.

Use of modern and mechanized technology: The Sindh Government can take valuable lessons from IBA Sukkur on managing drinking water. Regular monitoring takes place at the tank as well as at the source reaching the end-user. IBA students and faculty on campus drink straight from the tap. The water is cleaned and delivered to a high-water tank by gravity alone. No electricity is used in distributing the water as smart technologies have been used whereby reliance is solely on gravity. The Local Government of Sukkur may learn from IBA; efficient, modern and mechanized technologies exist, but there is a dire need to create synergies between the government, academics and the private sector.

Controls on water contamination: By law, wastewater is not supposed to be dumped into rivers, but this practice continues due to lack of law enforcement. It has caused all sorts of water-borne diseases. The solution is to treat the water to some extent before dumping it into the river. In some areas like Rohri, toxic water is dumped upstream of water intake points. Such activities increase the burden of cleaning water and lead to high externalities. Dilution is the solution to pollution.

Licensing of private water suppliers: Private water suppliers in Sukkur and Hyderabad have no proper system of licensing or monitoring the quality of water being

sold. The local government must curtail such unchecked activities. There should be a provision for appropriate licensing so that sellers of water may be held accountable.

Use of air pressure relief valves: Treatment plants use pumps which run on electricity. Due to frequent load-shedding of electricity, all the treatment plants run their motors at the same time, which creates negative pressure in the pipes and sucks in surrounding water. If pipes are cracked, permeable rubber holders are used which damages water quality. In lines that are laid uphill, water hammers are created when there are electricity shortages because the water starts flowing backwards. Air pressure relief valves should be installed to counter this.

Performance benchmarking: Local Government departments should face repercussions if they are unable to meet the target performance, and this is a role that should be played by the provincial government. Given that there is substantial variation in the performance of municipalities between districts, customized benchmarks are the need of the hour. Benchmarking is defined as the process of comparing the performance of a utility with similar utilities or comparing one or more of its functions with other functions. It is vital for water management authorities to get out of project-based development and move towards long term goals, sustainable practices and focus on maintenance. The way forward is to empower local governments and municipalities and to curtail their dependence on the provincial government or international agencies in improving the state of water provision. Benchmarking efforts can help public utilities share knowledge and lessons from self-improvement techniques. Sustainable Development Goals (SDGs) also provide a useful framework for assigning targets to water agencies, and the same may be integrated at the level of each managerial staff.

مان به جي اکيون ٻوٽي
سمهي پوان ته رات جي
تارن کي تڙپائيندو ڪير؟

مان به جي مدهوش ٽي
ليٽي پوان ته پرهه جو
پيغام پهچائيندو ڪير؟

If I also close my
eyes to sleep, then
who will bother the
stars in the night?

If I also lay down
ignorant, then who
will convey the
message of beacon?

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Annex 1: List of Officials and Stakeholders Interviewed

City Name	Meeting with
Karachi	Officials from P& D Sindh
	Senior Official of Local Government department Sindh along with other officials
	Senior Official from PHED
	Senior official from Research and Training Wing, P&D
	Senior official from Hisaar Foundation
	Officials from Planning, P&D, Karachi
	Officials from Sindh Irrigation Development Authority
	Senior Official from Planning and Development Department, GoS
	Politician
Hyderabad	Senior officials from MUET
	Senior officials from WASA Hyderabad
	District management official
	Officials from non-profit organization
	Official from non-profit organization
	Director Finance, WASA Hyderabad
	Chambers of Commerce, Hyderabad
	Officials from SMC
Sukkur	Official from SMC
	Official from non-profit organization
	District management official
	Politicians
	Official from non-profit organization
	Official from NSUSC
	Officials from Chambers of Commerce, Sukkur
	Officials from SMC

Annex 2: Tool Used for Semi-structured Interview of Relevant Officials and Stakeholders

Following questions were asked during the various meetings with stakeholders;

1. What kind of water supply schemes in Sindh, and why do you think water supply schemes in Hyderabad and/or Sukkur have failed?
2. How does a water supply scheme get approval?
3. How does the provincial government monitor and what is the organizational structure for water resource management?
4. What in your opinion are the key areas of improvement to improve these management issues or governance gaps within the LG department or in the state machinery?
5. How can we involve the community in the O&M process?
6. Why do water supply schemes not sustain?
7. Can participation in the water sector improve the governance?
8. How to improve water governance?
9. What are the main issues in water sector?
10. Why has WASA been unable to provide access to clean drinking water?
11. What is the number of users under WASA system?
12. What is average recovery rate?
13. What are the systematic failures in water supply governance?
14. What are water charges?
15. What are the fundamental weaknesses in the current structure of WASA?
16. What is the current structure and what are the challenges in water governance?
17. Do you think there should be pricing of water?
18. What can be done to improve the current issues?
19. Can CCBs work?
20. Describe some Partial Solutions
21. Do Governance structures support water access and quality? (prologue on study design)
22. What do you think about pricing?
23. Why has the provision of clean drinking water not been possible in urban Sindh?

24. What is the allocation of water distribution network in the annual plan?
25. What is the quality of water in Sindh? How does it compare to the quality of water in the North of Pakistan?
26. Do you think water pricing is a solution?
27. What is your experience in working with international donors?
28. Do you think there is potential for participation from the local communities in Hyderabad and Sukkur?
29. What do you think is the way forward in improving access and better quality of drinking water?

Annex 3: Questionnaire Used for the Facility Level Survey in Hyderabad and Sukkur

*Name of Water Supply Scheme: _____

*Union Council: _____

*City: _____

Capacity: _____

Questions:

1. Is this scheme functional?
2. Do you use this source for drinking water?

If no, which source do you use for drinking purpose?

- Private supplier
- Home treated water
- Ground water

Other: _____

3. When was this scheme established?
4. How many hours does it supply water?
5. In the past year, how many months was the scheme functional for?
6. What is the quality of the water supplied?
7. Do you treat this water?
8. How often does rehabilitation take place?

Annex 4: Advertisement by WASA Hyderabad for RFP for Development of Water Safety Plan

WATER AND SANITATION AGENCY (WASA)
HYDERABAD DEVELOPMENT AUTHORITY (HDA)
REQUEST FOR PROPOSAL (RFP)

Sealed Technical and Financial proposals and Bidding documents are invited from reputed, renowned and experienced firms/companies for the below mentioned services on offer rate basis:

Tender No.	Bidding Procedure	Bidding Documents Collection		Proposal Submission Date/Time	Proposal Opening Date/Time	Bid Security
		First Date of Issuance	Last Date of Issuance		Opening	
WASA/DF C/12-01	Least cost selection method	18/12/2018	02/01/2019	02/01/2019 till 01:00 PM	02/01/2019 AT 02:00 pm after technically qualified bidders only Financial will be opened at 03:00 pm	5% of the bid offer by the bidder

S.No.	Scope of Work	Eligibility Criteria
1	WASA, Hyderabad intends to development of a comprehensive Water Safety Plan for the water supply distribution system used for Hyderabad city under the activity, SN-W-2.1.5 of rolling work plan 2018-2022. In the above context, UNICEF provided financial and technical support to WASA-Hyderabad. UNICEF has provided funds for institutional strengthening of water & sanitation provision.	i. NTN/Registration Certificate from SRB ii. SRB/Registration Certificate from SRB iii. Three years' experience and other technical criteria as mentioned in Bid Document iv. Financial Capacity as mentioned in Bid Document

Documents Collection	Bidding Procedure
Bid Document can be collected on submission of a written request on company's letterhead with Pay Order of Rs. 3,000/- (non-refundable) in favour of WASA HDA during the aforementioned dates between working hours from the following address: **Managing Director** **Water and Sanitation Agency (WASA)** **Hyderabad Development Authority (HDA)** **Hyderabad. Phone: 022-9200106**	For **"least cost selection method Rule 72(1)"**, the bid shall comprise a single package containing two separate envelopes. Each envelope shall contain separately the Financial Proposal and the Technical Proposal. The envelope shall be marked as **"FINANCIAL PROPOSAL"** and **"TECHNICAL PROPOSAL"** in bold and legible letters to avoid confusion.

Note:

- Bidder must submit an amount of 5% with bid as Bid Security in the form of Pay Order/Demand Draft in favour of MD WASA, HDA, Hyderabad. The original Pay Order/Demand Draft should be attached with Financial Proposal and the photocopy of same shall be attached with the technical proposal.
- Bidders are requested to submit all relevant documents with the bid.
- Those bidders whose bids confirm to technical specifications & requirements including terms & conditions of the contract shall be eligible for award of contract.
- Information given, if found incomplete/false at any stage, will result in immediate rejection of bid.
- WASA may ask any further information and detail at any time during evaluation/complaint Redressal period if required.
- Late submission of bids will not be entertained.

ہم دہشتگردی کے خلاف متحد ہیں۔

Say No to Corruption

Managing Director
Water And Sanitation Agency
HDA - Hyderabad

INF-KRY: 4348/18

About the Authors

Maha Ahmad is an Assistant Professor at the Department of Economics, School of Social Sciences and Humanities, National University of Sciences and Technology (NUST), Islamabad. She holds a Master's degree in Economics from McMaster University, Canada. Maha has eight years of experience in academics and research. Her research interests have centered on international trade, agriculture, water management, entrepreneurship and urban economics. Recently, she has gained an interest in research on urban mobility and flexible transit services. She has conducted research projects in collaboration with the World Bank, USAID, and is now working with the National Tariff Commission. Maha has taught at LUMS, Lahore and has conducted trainings on International Trade and Policy at the Foreign Service Academy of Pakistan. She has been actively involved in organizing student activities and has led the NUST Economics Society as President. She is set to start her PhD in Transportation Policy and Technology at the University of California, Davis, USA.

Dr. Muhammad Naveed Iftikhar is an Adjunct Faculty at Suleman Dawood School of Business of LUMS for MS (Business & Public Policy). He has been working with the public sector, academia, research centers, and international development organizations for two decades. His current focal areas are urban governance, entrepreneurship and public-private partnerships. Naveed has worked as Governance Specialist at the Economic Reforms Unit, Ministry of Finance and has been advising public sector organizations on public policy. Naveed is also an entrepreneur and has advised startups and business organizations. He has taught economics, management, public policy, and urban planning/economics courses in various universities and civil service training institutions. He regularly contributes to journals, conferences and newspapers. Naveed holds an M.Phil. in Economics and a PhD in Urban Affairs and Public Policy from the University of Delaware's Biden School of Public Policy and Administration. His PhD dissertation title is Entrepreneurship, Knowledge Spillover and Urbanization in Asia.

Main thrust of Applied Research component of the Water Center is to stimulate an environment that promotes multi-disciplinary research within the broader context of water-development nexus to support evidence-based policy making in the water sector. This is pursued using the framework provided by the six targets of the Sustainable Development Goal on Water i.e. SDG-6.

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