

Water management/governance systems in Pakistan

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20 November 2018

Question

- Document existing water management/governance systems (urban and rural) in the Khyber Pakhtunkhwa and Punjab provinces of Pakistan.
- Analyse the published literature on issues, solutions attempted and the impact in relation to KP/Punjab regions.

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1. Summary

Provincial governments in Pakistan are responsible for water and sanitation and in 2001 devolved responsibility for service delivery to local governments. In Khyber Pakhtunkhwa (KP) and Punjab provinces, a number of institutional actors are involved in water management and governance. The provincial Public Health Engineering Departments (PHEDs) install drinking water supply projects in rural areas and in some cases urban areas. Tehsil Municipal Authorities (TMAs) are responsible for water and sanitation services in urban areas and in some cities have delegated this responsibility to Water and Sanitation Agencies (WASAs) who are also responsible for operation and maintenance. A key difference between KP and Punjab provinces is that in the Punjab, rural water supply schemes are transferred to community-based organisations (CBOs) after construction for operation and maintenance, whereas in KP, the PHED is responsible for operation and maintenance. Non-governmental organisations (NGOs), including WaterAid and Action Against Hunger also install water supply and sanitation systems in the two provinces, often creating localised water management institutions and governance systems.

Schemes constructed and operated by government/formal water actors do not reach all residents with water and sanitation, and self-provision is common in both KP and the Punjab (IBRD, 2013). For example, Punjab Province's PHED constructed schemes only reach 32% of the province's 60 million rural population (World Bank, 2016). This review found limited information on customary water management in the rural areas of KP and the Punjab during the review's timeframe of six days research. A case study of water management in Chitral District, KP, outlines customary water management practices, largely through the lens of irrigation, including methods for distributing water between households and communities, informal governance structures called 'grams', communal water harvesting and systems for maintenance of irrigation channels (Nadeem, Younis & Ahmed, 2013).

This review largely focuses on government/formal water management and governance systems in KP and Punjab provinces and outlines a number of key challenges that are common across the two provinces. Challenges can be grouped into three categories.

Challenges at the management and governance level: The State Bank of Pakistan (2017) argues that the water sector in Pakistan is characterised by multiple authorities with overlapping responsibilities and duplication of work and as such in terms of domestic and industrial water supply, the problem is not so much water availability but the system of water management and governance. Both the TMAs and the WASAs suffer from a lack of capacity in terms of both human resources and management systems (Lerebours, 2017). Wastewater and waste management are serious challenges in both Peshawar and Lahore, the two provincial capitals and the WASAs lack capacity, infrastructure and systems, including functioning water treatment plants (Lerebours, 2017).

Challenges related to financial stability and lack of investment: service delivery organisations are not financially viable due to low revenue recovery and low tariffs (IUCN, 2014). The provincial government in the Punjab does not allocate any resources to operation and maintenance (O&M) of rural water supply schemes (World Bank, 2016). Approximately 100 rural water supply schemes become dysfunctional every year, partially due to a lack of provincial and local government support to CBOs for O&M and issues such as non-payment of electricity bills (World Bank, 2016). Availability of spare parts, low levels of maintenance training for CBOs and a lack of repairmen also contribute to system breakdown (Lerebours, 2017).

Challenges related to mega-trends: urbanisation and population growth are driving water competition between different users and sectors and contributing to groundwater over-extraction, deteriorating water quality and extensive decline of groundwater tables (Qureshi & Sayed, 2014)¹. For example, in KP, drinking water is often contaminated and institutions cannot afford to conduct water quality tests (Lerebours, 2017). In Lahore, the capital of the Punjab, the water table is depleting at a rate of more than one metre per annum (AIIB, 2018).

Recommendations for improving formal water management and governance include improving monitoring and evaluation, capacity building, installing water meters, proper waste and wastewater management and regulation including building treatment plants, and raising awareness of water conservation (SBP, 2017; IUCN, 2014, p. 33). To reduce the number of dysfunctional water schemes, the World Bank has worked with the Government of Punjab to create a back-up support mechanism for CBOs to allow them to access funding for repairs before the system becomes dysfunctional (World Bank, 2016).

Gender is extremely important in terms of both access to water and sanitation and participation in decision-making processes and governance (see for example, Nadeem et al., 2013). In KP, most district and local government staff are men as women are often not allowed to work or go out alone in public places (Lerebours, 2017). Lady Health Workers in KP, employed by the local government to promote hygiene, are often not allowed to be away from home for too long and lack training on issues including the link between WASH and nutrition (Lerebours, 2017).

This report is the first in a two-part series. The second report, Cooper (2018) focuses on access to water, sanitation and hygiene (WASH) services in rural and urban areas, and features both government-led and NGO provision as well as WASH in schools and a focus on sanitation. This first report focuses on formal water governance and management, and key challenges. As such it draws on official government policies and plans, NGO reviews and reports, and development organisation reports. The review is limited to English-language resources.

2. Overview of formal water governance

In Pakistan, water and sanitation are a provincial responsibility (Lerebours & Villemint, 2017, p. 4). The 2001 Local Government Ordinances transferred responsibility for the delivery of water supply and sanitation services from the Provincial governments to newly created local government institutions (IUCN, 2014, p. 32). Local governments are responsible for water supply and sanitation services (WSS), solid waste management, treatment and disposal and wastewater management, treatment and disposal (Lerebours, 2017). Implementing agencies include the Tehsil Municipal Authorities, and Water and Sanitation Agencies. However, there is little regulation of their performance (IUCN, 2014, p. 32). A second wave of Local Government Ordinances followed in 2013, following national decentralisation from the Federal Government to the Provincial Governments (Lerebours, 2017). Devolution has been a slow process and local governments are still in a transition period as local elections only occurred in 2016 (Lerebours, 2017, p. 21).

Responsibilities for WASH at different levels of government include:

¹ Across Pakistan 93% of water is used for irrigation (Lerebours, 2017). This report does not consider irrigation water management, but it is worth noting the importance of the sector.

National: There is no Federal Water Ministry as WASH is a provincial matter. In 2017, with UNICEF support a WASH cell was established in the Ministry of Climate Change (Lerebours, 2017, p. 19). Other ministries that play a role in WASH include the Planning Commission, the Ministry of Education, and the Ministry of Agriculture (Lerebours, 2017, p. 19).

Provincial: Local Government and Public Health Engineering Departments (PHED) steer water and sanitation; Provincial Health departments provide leadership for hygiene; and, Education Departments are responsible for WASH in schools. Development of drinking water and sewerage infrastructure is the responsibility of PHED, except if the location is home to less than 500 people, when it falls under the remit of the Rural Development Department (Lerebours, 2017, p. 20).

Local Government has three tiers: District (Zila), Tehsil (sub-district) and Union. In a simplified form, recognising that differences occur amongst the Provinces, WASH responsibilities for the three tiers approximately include:

District:

- PHED works at the District level, largely in rural service provision;
- the District Health Officer oversees the running of health facilities and health problems including undernutrition and waterborne diseases;
- in some areas there are District Disaster Management Units and District WASH Forums (which bring together relevant institutions, e.g. PHED, Tehsil Municipal Authority and Health);
- the District Council, which has representatives from the Tehsil Municipal Authorities and focuses on strategy (Lerebours, 2017, p. 20).

Tehsil:

- Each Tehsil has a Tehsil Municipal Authority (TMA) and municipal services include water and sanitation. At the municipal level, work is divided between different branches including engineering, sanitation, tax and accounts. The Mayor sits on the Tehsil Council with representatives from the Union Councils to oversee operations.
- In urban areas, Development Authorities, Water and Sanitation Authorities (WASAs) and TMAs are involved in water and sanitation. In Peshawar, the TMA has delegated its water and sanitation services in urban areas to WSSP, established in 2014, with plan to replicate the model in six other cities (Lerebours, 2017, p. 21). Depending on capacities and funds available, PHED are sometime asked to construct a WASH scheme as PHED has better engineering capacities than TMAs (Lerebours, 2017, p. 21).

Union:

- The Union Councils are the smallest unit of local government. Union Council committee groups work together to address issues and lead projects;
- Union Councils employ Ladies Health Workers and Sanitary Officers to promote hygiene and sanitation (Lerebours, 2017, p. 21).

Legislation

A number of national policies, including the 2006 National Sanitation Policy and the 2009 National Drinking Water, govern the WASH sector, however the involvement of national institutions is limited as water is a provincial subject (Lerebours, 2017, p. 3). A 2014 IUCN review argues that a lack of exclusive legislation governing the subject of WSS at the Federal or Provincial level is a challenge for effective water governance and management (IUCN, 2014, p. 32).

Rural water management and governance

The Provincial Public Health Engineering Department is responsible for rural water supply (World Bank, 2016). In the 1990s, Pakistan's four Provinces adopted a Uniform Policy for PHEDs, which saw beneficiary communities playing a greater role in WSS (World Bank, 2016). This included contributing 4.5% of the capital cost and taking over responsibility for operation and maintenance (O&M) once the scheme was complete (World Bank, 2016). This policy was designed to strengthen community participation, whilst community management would free up resources to invest in bridging the piper water access gap (World Bank, 2016). However, a lack of support to communities for financial and technical management of schemes meant that a number of schemes became dysfunctional, requiring reinvestment (World Bank, 2016).

Communities face a number of challenges related to effective O&M including lack of knowledge about how to fix minor repairs and undertake preventative maintenance; a lack of trained repairmen; and, a lack of available spare parts at local markets (Lerebours, 2017). For example, in Khyber Pakhtunkhwa, the few companies that do sell spare parts are only located in urban areas and often do not sell individual spare parts for minor repairs, instead preferring to sell big packages of parts (Lerebours, 2017, p. 39).

Water management and governance challenges

A number of challenges exist across the Provinces in relation to water management and governance, including:

- **Fragmentation and duplication of roles and responsibilities:** this has led to a lack of clear reporting lines, a lack of clarity about roles and responsibilities creating confusion about who is responsible for what, and a lack of coordination and official coordination mechanisms (Lerebours, 2017).
- **Technical capacity and human resources:** both PHED and the TMAs lack qualified human resources to run and maintain properly the schemes and expand access to WASH facilities. The TMAs lack the managerial capacity for both general and financial management (Lerebours, 2017, p. 35; IUCN, 2014). As of 2017, KP was hiring more Lady Health Workers and Sanitary Officers to increase coverage from 50% of districts (Lerebours, 2017). Challenges for Lady Health Workers include not being able to reach rural areas or spend too much time away from their husbands and families and training needs, including the links between WASH and nutrition (Lerebours, 2017, p. 35). In 2017, UNICEF are supporting a capacity needs assessment in KP, which will be the basis for a capacity development plan for the government (Lerebours, 2017, pp. 35-6).
- **Monitoring:** there is no regular monitoring mechanism in place for data collection on WSS (IUCN, 2014). Official monitoring tools are either not being used or are not working

well (Lerebours & Villeminot, 2017, p. 3). In KP, a water information management system is being set-up with support from UNICEF (Lerebours, 2017). This system aims at grouping together the data on all schemes in the province, tracking the needs in real time, and facilitating better O&M (Lerebours, 2017).

- **Political interferences** are common in the WASH sector and take the form of political hiring, corruption, and biased selection of project locations (Lerebours & Villeminot, 2017, p. 4).

Challenges related to financial stability and lack of investment include service delivery companies are acutely 'cash strapped', which affects both their operational quality and their ability to expand the service delivery network. Low tariffs and low revenue collection do not cover O&M, and revenue collection is generally lower in rural areas than urban areas (IUCN, 2014). There are almost no or limited laws to deal with those who do not pay water bills or have illegal water connections (Lerebours, 2017, pp. 40-1).

Challenges related to mega-trends include decreasing water availability due to population growth, urbanisation, over-exploitation of groundwater and climate change (Lerebours, 2017). Water quality is a challenge in many areas due to contamination (Lerebours, 2017). Consequently, the tensions between water users and the Provinces is growing (Lerebours & Villeminot, 2017, p. 3). Due to growing water scarcity and population growth there is a need to regulate domestic water supply (IUCN, 2014, p. 32). Seepage, leaks and a lack of rainwater and water conservation are also contributing to water shortages (Lerebours, 2017, p. 36).

Wastewater and solid waste management: across Pakistan 43% of urban areas and 94% of rural areas have no garbage collection systems, only 50% of effluents are collected and only 10% of those are treated (Lerebours, 2017, p. 11). This increases wastewater pollution of surface water supplies (Lerebours, 2017, p. 11). In Punjab Province, underground sewerage systems exist in Lahore and other cities, but due to the rapid pace of industrialisation since the 1970s, these systems have not been able to expand their coverage or cope with the increasing demand at the same pace, leading to water pollution (Government of Punjab, 2015). Across Punjab Province, there is no garbage collection system in approximately 36% of urban areas and 93% of rural areas; of the services that are available, 45% of coverage in urban areas and 1% of coverage in rural areas is provided by municipal services (Government of Punjab, 2015).

3. Khyber Pakhtunkhwa Province

Khyber Pakhtunkhwa (KP) is home to 26 million people and 1.5 million registered Afghan refugees, with 83% living in rural areas in 2012 (Lerebours, 2017, p. 3; World Bank, 2016). KP has a higher than average incidence of poverty (39.2% compared to average of 34% in Pakistan) and poverty is higher in rural areas (41.1% in 2004) than urban areas (28.1% in 2004) (Lerebours, 2017, p. 3; IBRD, 2013). The majority of the urban population live in the ten largest cities, with 3.3 million people approximately living in Peshawar, the Provincial capital (IBRD, 2013, p. 21; Lerebours, 2017, p. 12). The mainstay of KP's economy is agriculture (Lerebours, 2017, p. 12). Approximately 71% of the population have access to an improved water supply and 39% to sanitary latrines (Lerebours, 2017, p. 3).

The province is regularly affected by disasters including the 2005 earthquake and concurrent flooding in 2010- 2015 that devastated the province; it also suffers from insecurity due to the

insurgency in Afghanistan and existing sectarian, tribal and factional tensions (Lerebours, 2017, p. 11-12).

Responsibility for water service provision is evolving: currently, WASAs are responsible for services in the capital and the city of Mardan, the TMAs are responsible for the small and medium towns and PHED is responsible for rural areas (World Bank, 2016). Formal water management and governance institutions include:

- The Provincial PHED: responsible for the construction and operation of rural water supply and sanitation systems with resources provided by the Provincial governments. Between 2009 and 2011, PHED received approximately 81% of the capital investment funds for WASH and constructed 86% of the schemes (IBRD, 2013, p. 25)².
- TMAs: PHED develops new assets and hands them over to the municipal bodies who are responsible for operation and maintenance. The technical and financial capacity of these bodies is primarily dependent on their size. The TMAs report to the Local Government and Rural Development Department and are staffed by personnel from the Provincial Unified Group of Functionaries (senior level/management/engineering staff) and local employees. IBRD (2013, p. 21) argues that the ability of these bodies to undertake operation and maintenance is limited, and if they are to successfully manage devolved services, it will require significant capacity building.
- Water and Sanitation Service Peshawar (WSSP) established in 2014 as an autonomous corporation providing and improving water supply, sanitation and solid waste services in urban areas of Peshawar (IBRD, 2013, p. 21).
- Water and Sanitation Services Company Mardan (WSSCM), owned and established by the Provincial Government. The company is responsible for providing water supply, solid waste management and waste water management services in 14 Urban Union Council (serving approximately 500,000 people) (Khan, n.d).
- The WASH Cluster in KP coordinates humanitarian organisations and NGOs response to crises. It is currently only active on complex emergencies and focuses on refugees, IDPs and returnees (Lerebours, 2017, p. 22).

Most rural water supplies are managed privately or by NGOs, whilst the government or public companies are the main suppliers in urban areas (Lerebours, 2017, p. 12). NGOs active in WASH service provision, such as Action Against Hunger (ACF) train community-based water committees to manage their water and sanitation infrastructure themselves and organise village health teams to model good sanitation and hygiene practises (Lerebours, 2017, p. 14).

Water management and governance challenges

Key challenges in the provinces water management and governance include limited accountability for service delivery due to divided responsibility for services; and, the need for capacity development of municipal authorities and/or the creation of alternative service delivery

² Other departments with WASH roles include the Provincial and District Health Departments, and the Planning and Development Department (Lerebours, 2017, p. 4). The Provincial Local Government and Rural Development Department has established a Water/Sanitation Cell to coordinate the activities of the WASH Cluster, NGOs and UNICEF (Local Government & Rural Development Department, 2016).

mechanisms in order to overcome weak municipal capacity (IBRD, 2013). Other challenges include:

- increasing competition for water between agricultural and industrial users, which is contributing to depleted groundwater reserves and declining water quality;
- low maintenance of systems due to lack of interest and low funding, leading to growing water losses;
- health hazards from household wastewater, which discharges untreated into the open (Lerebours, 2017, p. 12).

Budget and logistics: There is a funding gap for WASH in KP (Lerebours, 2017, p. 38). Money is allocated to the provinces by the federal government, who spend it according to their provincial development plans, with local government projects fitting into this plan (Lerebours, 2017, p. 38). WASH plans can be compiled by the TMAs, the Union Council, the PHED and the Health Department and sent to the Ministry of Finance at the Provincial level (Lerebours, 2017, p. 38). Only 16% of schemes funded between 2009 and 2011 were for sewerage and sanitation (IBRD, 2013).

Revenue collection: Issues in collecting revenues threaten the sustainability of the whole system and include a lack of systems in rural areas to facilitate collection (Lerebours, 2017). In urban areas, customers are often able to avoid paying bills without consequences (Lerebours, 2017). Customers also face barriers to paying bills, for example, they have to go to the company's office to pay as it is not possible to pay online or at a bank (Lerebours, 2017, p. 38). There is no financial scheme to make WASH services affordable to disadvantaged groups (Lerebours, 2017, p. 38).

Legislation

The Provincial Cabinet approved the Province's Water Policy in 2015, and, as of 2016, a Sanitation Policy was pending approval (Local Government & Rural Development Department, 2016). The Local Government & Rural Development Department (2016) states that a WASH sectoral plan would be initiated in 2017.

Rural water management

By 2015, PHED had constructed 4,110 drinking water schemes (World Bank, 2016). PHED has gone through a number of changes. Under KP's devolution plan, between 2001 and 2009, PHED was merged with the Provincial Communication and Works Department and the creation of rural water schemes dropped dramatically due to the Department's focus on buildings and roads (World Bank, 2016). In 2009, PHED was re-established as an independent department responsible for the provision of rural water and drainage services (World Bank, 2016).

Between 1993 and 2010, approximately 1,161 water supply schemes were developed and handed over to Village Development Organisations (VDOs) for O&M as part of the Uniform Policy for PHEDS (IBRD, 2013, p. 22). However, KP's PHED was not able to continue with this Policy due to political resistance to the community managed rural water model (World Bank, 2016). Consequently, in 2011, PHED took over the O&M of all rural schemes from the VDOs (World Bank, 2016).

IBRD (2013) recommends supporting and developing the VDO model for planning, implementation and operation of rural water supply and sanitation: this model has proved more sustainable in other parts of Pakistan. They argue that PHED taking back responsibility for the rural schemes that had been transferred to VDOs could lead to a disconnect with the communities being served in terms of appropriateness of design, adequacy of service level and oversight of implementation (IBRD, 2013, p. 25). The community should be involved in planning, construction and post-construction stages to ensure sustainability and ownership and there is a need to explore which model of community engagement would be most appropriate for the Province (IBRD, 2013, p. 25). Related to this IBRD (2013) recommends establishing an administrative facility within an existing provincial department to support and mainstream providers in the management of their systems, including ongoing support for training and recording/disseminating best practice.

Water quality

Rural monitoring of water quality is very limited, mainly due to cost as PHED and TMAs do not have the means to pay regularly for testing (Lerebours, 2017, p. 28). Water-points owned by individuals, communities and small water vendors are not tested and when a hand pump is installed it is often not tested before operation (Lerebours, 2017, p. 28). PHED Peshawar told ACF in a meeting in 2016 that a quality mapping of the province is under development (Lerebours, 2017, p. 28).

Water quality monitoring in rural areas of four districts of Khyber Pakhtunkhwa was conducted in 2003: 1,200 samples were tested and 93% were unsafe to drink due to contaminations including coliforms and nitrates (Lerebours, 2017).

Projects to tackle the challenges

The World Bank's Technical Assistance (TA) 'Strengthening Local Providers for Improved Rural Water Supply in Pakistan' had a limited focus on KP. In Khyber Pakhtunkhwa, the TA designed and established a Sector Reform Unit within the PHED with a mandate to carry out research and planning, capacity building and monitoring (World Bank, 2016). The unit was functional as of December 2015 (World Bank, 2016). Following the TA, the World Bank (2016) recommended that the government should strengthen and mainstream the focus on sustainable O&M of rural water supply schemes, including PHED re-engaging with the community in planning, construction and post construction of rural water schemes to ensure sustainability and ownership. There is a need to explore models that could be effective (World Bank, 2016).

Urban water management

The Water and Sanitation Services Peshawar

WSSP serves 1.945 million residents in 45 union councils in urban Peshawar (Lerebours, 2017, p. 46). WSSP claims to have improved service provision: for example, increasing solid waste collection from 58% to 76% of the city and neighbouring union councils have lobbied WSSP to expand solid waste collection to their locations (Lerebours, 2017, p. 46). However, services remain underdeveloped compared to the population (Lerebours, 2017, p. 46).

Key challenges faced by WSSP include revenue collection and generation, communication with users, interruptions of electricity provision, aging systems and limited finances (Lerebours, 2017,

p. 5). WSSP is currently receiving subsidies from the government, but aims to be financially autonomous by June 2019 (Lerebours, 2017). After initial difficulties in receiving its government subsidies, an agreement has been reached between WSSP and the provincial finance department to receive money directly from the department as opposed to via the TMA: this subsidy mainly covers staff salaries (Lerebours, 2017, p. 47).

In order to increase revenue collection, WSSP aims to revise tariffs from Rs.150 per month; pilot water meters; and, building its ability to collect tariffs (Lerebours, 2017). Issues with water tariffs include flat rates favour rich people and do not encourage water conservation; in contrast water meters could encourage water conservation and would allow government subsidies to go to the poor (Lerebours, 2017).

Sewerage treatment plants: As of 2014, only one of Peshawar's four sewerage plants built in the early 1990s was functioning³. The plants were built as part an initiative to treat sewerage water before it entered the Kabul River and local canals⁴. According to press reports, the plants are not functioning because they were built in unfeasible locations and are now being used as dumping grounds for garbage and the untreated water flowing into the canals is making the water unfit for irrigation⁵. Leaks from sewage, aging pipes and contamination during transportation are all risks to water quality in Peshawar city (Lerebours, 2017, p. 26).

Water and Sanitation Services Company Mardan

WSSCM serves approximately 500,000 people in 14 Urban Union Councils (Khan, n.d.). In December 2016, it began operating water supply, solid waste management services previously delivered by the TMAs (Khan, n.d.). WSSCM faces a number of challenges including limitations to the distribution network, which mean not all areas are served with drinking water and water is supplied in three shifts of 3-4 hour intervals (Khan, n.d.). Revenue generation is nominal, meaning the company is reliant on government funding (Khan, n.d.). Currently, 500 staff are responsible for collecting solid waste and drain cleaning and the sewerage treatment plant has been non-functional for a decade (Khan, n.d.). Solid waste is currently open dumped, which is an environmental threat (Khan, n.d.). Company plans to tackle these challenges include capacity building, developing an IT management system and improving solid waste and wastewater management (Khan, n.d.).

Projects to tackle the challenges

The World Bank's 'Governance and Policy Program (GPP) for Khyber Pakhtunkhwa, 2017-2020', focuses on improving public sector investment management, and accountability of public service delivery in the water sector (World Bank, 2018). Project components include increasing capacity for revenue mobilisation and public financial management; improving public investment management and accountability; and, providing effective support for the coordination of

³ Accessed 19 November 2018: <https://www.dawn.com/news/1088223>

⁴ Accessed 19 November 2018: <https://www.dawn.com/news/1088223>

⁵ Accessed 19 November 2018: <https://www.dawn.com/news/1088223>

governance reforms and operational management (World Bank, 2018). Project activities directly related to water governance include:

- Working with the Planning and Development Department to geo-map all drinking water assets in the districts of Peshawar, Mansehra and Mardan (323 drinking water assets have been geo-tagged and published online);
- Citizen feedback surveys on drinking water and sanitation were undertaken in the districts of Mansehra and Mardan with a total of 692 respondents (134 women). The World Bank argues that feedback needs to be disseminated and systematically collected at least once a year and the activity extended to more districts on a priority basis;
- The GPP is working with the Water and Sanitation Services Peshawar (WSSP) to replicate their Grievance Redress/public complaints system to other companies/districts starting with Mardan and Kohat.
- A Memorandum of Understanding (MOU) was signed between GPP and the Water and Sanitation Companies of Peshawar, Mardan and Kohat on January 25th 2018 (World Bank, 2018).

The geo-tagging and citizen feedback activities aim to help the Government of KP better assess and plan for citizen needs as well as address issues and complaints in order to improve service delivery in the water sector (World Bank, 2018). The Project has found that 20% of water projects are completed within their original schedule, and sets a target for increasing this to 60% by June 2020 (World Bank, 2018).

The Swiss Agency for Development and Cooperation funded ‘Water Governance in KP’ 2018-2019 project will support improved water management and equitable access to safe drinking water in Peshawar and Mardan (EDA, 2018). Project funds will be managed by WSSP and WSSCM, and monitored by an independent project steering committee (EDA, 2018).

4. Punjab

Punjab, Pakistan’s most populous province is home to an estimated 100 million people (half of Pakistan’s population) and 95% have access to an improved water source (World Bank, 2016; Government of Punjab, 2015). The Provincial, capital, Lahore was home to an estimated 8 million in 2012, with four other cities have populations in excess of 1 million people: half the Province’s urban population lives in these five cities (IBRD, 2013, p. 27). The Punjab has the highest rate of urban poverty (32%) of all the Provinces (IBRD, 2013, p. 27). The financial allocation for the water sector in the Province’s Annual Development Plan is low: 4.9% was allocated to PHED in 2011-12 (World Bank, 2016).

In Punjab Province, the following administrative structures exist: 36 districts, 140 Tehsils, 5 city districts, 3,464 Union councils (978 urban and 2,486 rural) and 20 Cantonment Boards (Government of Punjab, 2015). Responsibilities for WSS are divided as follows:

- Provincial level: the two departments Housing, Urban Development and PHED, and the Local Government and Community Development Department (Government of Punjab, 2015).
- The Province’s PHED: responsible for water supply in the rural areas including construction and major rehabilitation of rural water supply and sanitation schemes. Community Based Organisations (CBOs) are responsible for operation and maintenance.

Communities are meant to have capacity to operate and maintain systems, but this capacity is often lacking or insufficient for more complex issues such as redesign, retrofit, or major repairs of schemes (IBRD, 2013, p. 27)⁶.

- Water and Sanitation Agencies (WASAs): the Punjab's five biggest cities (Lahore, Faisalabad, Gujranwala, Rawalpindi, and Multan) each have a WASA. These are corporate bodies created by provincial acts and reporting to the Housing and Urban Development department (HUD) and PHED (IBRD, 2013). A press report from January 2017 suggest that WASAs may become part of Punjab's new Water Resources Department funded by the Asian Development Bank and the Japan Fund for Poverty Reduction⁷.
- Tehsil Municipal Administrations: responsible for water and sanitation in urban areas outside the jurisdiction of the WASAs and report to the Punjab Local Government and Rural Development Department (World Bank, 2016). Due to limited technical and financial capacity, they are reliant on PHED to construct new assets. Once complete, PHED hands the schemes over to the TMAs for O&M. Both the Government of Punjab (2015) and IBRD (2013) argue that there are operational capacity concerns about the TMAs. For example, the majority of managerial staff at the WASAs have an engineering background from the parent department, PHED, TMA staff often originate from different provincial departments or local government bodies and there are concerns about their capacity for community development and mobilisation (Government of Punjab, 2015).
- National and international partners include UNICEF, WSP, WaterAid, WSSCC, Plan International and UN-Habitat (Government of Punjab, 2015).

The IBRD (2013) argues that similar to KP, Punjab's institutional water management arrangements lead to a number of challenges including limited accountability for service delivery and service quality; weak TMA capacity; poor financial sustainability due to low capacity and weak incentives to recover costs; and the need to build institutional and technical support for CBOs. As part of strengthening the CBOs, the IBRD (2013) recommends establishing an administrative facility at the provincial level to proactively support CBOs in management of their systems. Capital investment is skewed towards urban schemes, for example, in 2009-2012 only 30% of the WSS budget was disbursed to rural schemes (IBRD, 2013, p. 30). Less than 0.5% of the capital investment was spent on sector planning and project management, as compared to an international benchmark of about 5% (IBRD, 2013, p. 30).

Legislation

Relevant legislation includes the Province's 2011 Drinking Water Policy, which emphasises strong community engagement in rural water schemes; strengthening community management models; reaching out to the underserved population; building government and community capacity; and improving monitoring of schemes handed over to communities (World Bank, 2016)⁸

⁶ Other Provincial Departments with a role in WASH include Works and Services, Health, and Education for WASH in schools (Government of Punjab, 2015)

⁷ Accessed 19 November 2018: <https://www.dawn.com/news/1311462>

⁸ The full text of the Punjab's Drinking Water Policy can be accessed here: <https://waterinfo.net.pk/sites/default/files/knowledge/Punjab%20Drinking%20Water%20Policy.pdf>

The 2007 Urban Water and Sanitation Policy is intended to guide and support provincial institutions, district governments, TMAs, water utilities and companies for improving WSS (IUCN, 2014, p. 14). However, as the policy outlines how the Government of Punjab will prepare and notify a legal and regulatory framework and develop effective environmental conservation, and health and hygiene education programmes, IUCN (2014) argue that it does not directly address the issues faced by the WASAs.

According to the World Bank (2016), the Province has recently drafted a Municipal Water Act, which is waiting for Cabinet's approval. This Act requires the government to establish a Water Commission to regulate the abstraction, quality of water services and pricing of water (World Bank, 2016).

The Government of Punjab's Sector Development Plan for Water, Sanitation and Hygiene 2014-2024

The sector plan recognises the crosscutting and cross-sectoral nature of water and sanitation (Government of Punjab, 2015). It identifies a number of challenges related to O&M, urbanisation, and governance/management (Government of Punjab, 2015). The plan was developed with assistance from UNICEF and UN agencies and is an integrated response to drinking water, sanitation and solid waste management (Government of Punjab, 2015).

O&M: A 2011 technical assessment of water supply schemes in 21 districts in north and central Punjab found that 35% of schemes were non-functional, and that water samples collected from the functional schemes found 79% were unsafe for drinking purposes (Government of Punjab, 2015). Of the functional schemes, 43% supplied water less than 5 hours a day and 31% for 5-10 hours a day (Government of Punjab, 2015). Continuous provision of water supply does not exist in any city in the Punjab: one of the reasons for this is intermittent power supply (Government of Punjab, 2015). Inadequate tariff setting and revenue collection also exacerbate inefficiencies in the system (Government of Punjab, 2015).

To tackle these challenges the Sector Plan seeks to rehabilitate non-functional water supply schemes, increase access to tap water, introduce innovative approaches including energy efficient water supply schemes and enhance water storage capacities with regular maintenance (Government of Punjab, 2015).

Urbanisation brings a number of water and sanitation related challenges and the inter-connected nature of the two sectors is also recognised by Punjab's Urban Development Sector Plan, which identifies water and sanitation as one of its principal components (Government of Punjab, 2015). Challenges include wastewater and solid waste management from domestic, commercial and industrial sources (Government of Punjab, 2015). Across the Province's urban areas, only 64% of solid waste is collected by municipal services or privately, and there is no solid waste collection and disposal system in 93% of rural districts (Government of Punjab, 2015). For cities and towns to remain clean at least, 75% of waste must be collected, however data for nine cities in the Punjab shows that only approximately 53% of waste is collected (Government of Punjab, 2015).

To tackle these challenges, the Sector Plan seeks to increase sewerage and drainage coverage; ensure sewerage maintenance facilities and equipment; replace contaminated sewer liners; make solid waste management an integral component of district WASH plans; ensure safe

disposal or industrial and slaughter waste; and, introduce waste to energy solutions where feasible (Government of Punjab, 2014).

Governance and Management challenges include institutional capacity, a lack of coordination between stakeholders and adequate funding levels. The Sector Plan outlines a number of actions to tackle these challenges, including:

- formulating a legal framework and operationalising the Punjab Water Commission to govern municipal water in addition to implementing the Local Government Act 2013;
- Introduce compulsory training in community development for all staff engaged in WASH programmes;
- Increasing funding for WASH: costs for 2014-2024 are estimated at Pakistani Rupees (Rs.) 42 billion annually, but, in 2013-13, the government invested Rs. 12 billion (Government of Punjab, 2015). (These estimated costs are not based on universal water supply coverage but on estimates of 80% urban and 65% rural piped water coverage and 82% urban and 70% rural coverage with underground drains) (Government of Punjab, 2015);
- Establish a steering committee and programme management unit as part of the Punjab Water Commission to strengthen coordination and monitoring and evaluation: currently there is no mechanism for coordinating WASH stakeholders and for setting and delivering the WASH agenda (Government of Punjab, 2015).
- Improve monitoring and evaluation in the sector: currently M&E is fragmented and complexities exist due to the different stakeholders involved in the sector. The Government wants to compile an annual sector status report and district dashboard or WASH scorecard with clear indicators (Government of Punjab, 2015).

The Punjab also faces water quality and nonrevenue water issues (Government of Punjab, 2015). Consequently, the Government will:

- rationalise per capita production for water supply, reduce system leakage losses and ensure water metering in all new schemes and high income areas;
- strengthen periodic water quality testing at source and distribution network with regular chlorination of overhead reservoirs and storage tanks (Government of Punjab, 2015).

Rural water management

The Punjab PHED serves approximately 32% of the Province's 60 million rural population (World Bank, 2016). It develops new schemes and rehabilitates dysfunctional schemes (World Bank, 2016). Between 1970 and 2015, PHED constructed 4,258 water schemes (World Bank, 2016). These schemes are normally

- tube wells designed for a single village serving 150-200 households;
- cost between USD175,000 and 205,000;
- comprise a rising main, overhead reservoir and distribution network, with their specifications varying depending on the water source and population;
- built on land is often donated by the community, who also make a commitment to take over O&M once the scheme is complete, with O&M managed by a Community Based Organisation (CBO) (World Bank, 2016).

CBOs' roles in rural water management include:

- Signing a MoU with PHED to take on responsibility for O&M including repair and maintenance costs, electricity bills, and operational staff salaries;
- Generating revenue through recovery of water charges from consumers: the average tariff is Rs. 70-300 per month (USD 0.70- 3.00) and should be set at level to allow full-cost recovery plus emergency savings;
- Operating as corporate bodies, fully independent in terms of setting tariffs, service timings, disconnection policy and subsidies to poor customers;
- CBOs are encouraged to establish a joint account managed by the CBO officer bearers to help with sound financial management;
- CBOs are accountable to PHED for their performance and quality of operations and have to submit periodic reports of their operations and financial management (World Bank, 2016).

As CBOs are responsible for O&M, Punjab Province does not allocate any financial resources for O&M and focuses on constructing approximately 70 new schemes annually (World Bank, 2016). This contributes to the high level of dysfunctional schemes in the Province and results in PHED undertaking rehabilitation of approximately 100 dysfunctional schemes annually as part of the Province's Annual Development Plan, which means communities wait at least one year before PHED can rehabilitate their scheme (World Bank, 2016). During this, period communities switch to alternative (mostly unimproved sources) and PHED's Community Development Unit (CDU), who is responsible for social mobilisation, has to re-organise the CBOs again once the scheme is rehabilitated (World Bank, 2016). PHED's focus on community formulation for new schemes rather than continuous support to the CBOs undertaking O&M of existing schemes affects sustainability (World Bank, 2016).

A 2012 third party assessment of the Punjab's 4,258 rural water supply schemes found that 33% were dysfunction due to source failure, major defects in key components (machinery, rising main, distribution network), non-payment of dues/disconnection and theft of major components (World Bank, 2016).

Projects to tackle the challenges

The World Bank's Technical Assistance on Strengthening Local Providers for Improved Rural Water Supply in Pakistan focused on Punjab Province, but grew to include limited activities in Khyber Pakhtunkhwa with the aim of exposing KP to best practises from the Punjab in terms of support for the community management model (World Bank, 2016). PHED Punjab requested WB Technical Assistance in carrying out a diagnostic study to identify the root causes of CBO/scheme failures and to propose long-term recommendations for improving the sustainability of CBO managed schemes (World Bank, 2016).

The project delivered the following:

- Back-up support mechanism for CBOs: performance based support system for the 2,448 functional CBOs, allowing them to access financial support for major repairs. Government of Punjab approved USD2.5 million for the fund in FY 2014-15 and USD 5million for FY 2015-16;

- Tools for improving governance through ICT: successfully piloted a web based platform (integrated with PHED's management information system) offering an SMS and Interactive Voice Recording (IVR) in six districts where 644 schemes were geotagged and 550,000 messages were sent to customers for feedback;
- A Performance Award competition for CBOs;
- Capacity building: following a training needs assessment of the CBOs and PHED's Community Development Unit, the TA delivered joint training sessions for 100 PHED staff and 300 CBO members on the social, technical and financial management aspects of rural water supply (World Bank, 2016).

The World Bank (2016) makes a number of recommendations for improving water governance, including:

- The Government of Punjab should continue to support a CBO model for rural water provision and support capacity building for the CBOs through the PHED as well as developing an administrative backstop facility, which could assist with policy and legal reforms, tariff setting and metering, and monitoring and evaluation;
- A technical backstop facility to proactively support CBOs in dealing with technical challenges of service delivery e.g. repairs and rehabilitation of systems;
- A second-generation management model has sprung up in Punjab where CBO member (individually or collectively) are taking over the management of schemes from other CBOs. This sub-contracting by CBOs to individuals or groups appears to be performing well, but it is informal and does not have the backing of PHED. It is recommended that PHED assess and potentially strengthen this model thus offering an alternate to CBOs (who are not performing) and promoting an entrepreneurial culture in the water sector.

Urban water management: the case of Lahore

Lahore District is dominated by Lahore City, home to approximately 11.1 million people (AIIB, 2018). The River Ravi and the Lahore aquifer are the main water sources in Lahore.

Responsibilities for and feature of WSS in Lahore include:

- WASA supplies drinking water to more than 6 million people via 484 tube wells that run 14-18 hours a day and distribute water to households: only 78% of households in WASA areas are connected to piped water and demand in WASA served areas has increased from 180 litres per capita per day in 1967 to 247 litres per capita per day in 2013;
- WASA has provided over 32,500 connections for commercial and institutional water uses (e.g. hospitals, shops, mosques etc.);
- The Lahore Cantonment Board, the Walton Cantonment Board, the Defence Housing Authority, Model Town Society, Pakistan Railway and a large number of private housing schemes are responsible for supplying water to their respective housing areas;
- Piped water is available to 50% of households in non-WASA areas, and the remaining 50% access water through hand pumps, public water standpoints or directly through groundwater pumping by using small suction pumps;
- There is no municipal water Act or water rights law, consequently private housing schemes, industry and self-supply residents pump water indiscriminately;

- In rural areas of Lahore District, PHED installs water supply schemes: 13 out of 16 schemes installed by PHED are non-functioning due to non-payment of electricity bills (Qureshi & Sayed, 2014).

The challenge of groundwater abstraction⁹

Lahore depends on groundwater abstraction: currently 576 tube wells are in operation and the institutions outlined above are abstracting approximately 3.65 million cubic metres per day (AIIB, 2018). Groundwater is extracted from a depth of 120-200 metres for domestic (53% of extraction), industrial (13% of extraction) and commercial/institutional (10% of extraction) purposes (Qureshi & Sayed, 2014)¹⁰. Urbanisation means that groundwater recharge is minimal and a higher rate of discharge than the rate of recharge is the main reason for rapid depletion of groundwater in the city (Qureshi & Sayed, 2014). The Ravi River is essential for groundwater recharge, contributing 82% of recharge (Qureshi & Sayed, 2014). However, the water table in Lahore aquifer is declining (Qureshi & Ravi, 2014). Water table depletion is currently more than metre per annum and several existing shallow tube wells have dried up and are no longer operational, consequently, AIIB (2018) argue that Lahore is facing severe water shortages and the groundwater source does not seem to be a reliable future source (AIIB, 2018).

A 2014 WWF-Pakistan study of Lahore's water predicts increasing stress on Lahore's water and sanitation sectors: the population of Lahore District is predicted to be 22 million in 2025, with 84% living in urban areas (Qureshi & Sayed, 2014). Qureshi & Sayed (2014) estimate that by 2030, WASA Lahore will have to extend its services to 9 million people compared to 6 million in 2013. This will increase water demand to 3,200 million cubic metres a year from 1,985 million cubic metres and require the installation of an additional 358 tube wells by WASA, whilst increasing the number of non-WASA tube wells from 240 to 435 (Qureshi & Sayed, 2014).

Due to excessive pumping, the water table in the central part of Lahore City is already below 40 metres (Qureshi & Sayed, 2014). Continuing to extract from the groundwater depression zone in the central part of the city could accelerate saline water intrusion, which would have disastrous consequences for communities and industries, as there is no quick and simple way to clean the aquifer (Qureshi & Sayed, 2014). By 2025, the water table in most areas of the city could be below 70 metres and below 100 metres by 2040 (Qureshi & Sayed, 2014). Persistent energy crises mean that groundwater pumping from excessive depths will be a huge economic burden for WASA and other agencies: there will also be a risk of deterioration of groundwater quality (Qureshi & Sayed, 2014).

Institutional water management challenges have limited Lahore's ability to tackle the growing groundwater crisis (Qureshi & Sayed, 2014). For example, the Lahore Development Authority has not restricted groundwater extraction in any areas and there is a lack of coordination between different departments (Qureshi & Sayed, 2014). Qureshi & Sayed (2014) recommend:

⁹ Unmonitored groundwater extraction is also a problem in Faisalabad due to improper water provision: households have turned to groundwater due to inefficient supplies and non-monitoring by WASA (SBP, 2017). In KP, over-pumping has also lowered the water table in some areas, resulting in saline intrusion (SBP, 2017).

¹⁰ The remaining 24% is extracted for agriculture. Other sources of agricultural water include surface canals for irrigation (Qureshi & Sayed, 2014).

- regulatory organisations enhancing their monitoring of groundwater extraction and identifying critical areas where it should be restricted;
- developing the capacity of organisations to solve entitlement, pricing and regulatory issues;
- clearly defining the roles and responsibilities of different organisations as well as appropriate institutional arrangements for monitoring and evaluation of implementation of national policies for the public water sector;
- education and training for local communities about rainwater and runoff water harvesting for domestic use and agricultural use, and smart water use (to help control water demand);
- introducing water metres to charge for water on a volumetric basis, encouraging reductions in water use;
- explore the possibility of supplementing groundwater supplies with surface water for long-term sustainability of drinking water supplies, once water quality concerns have been addressed;

The challenge of waste and wastewater

As of May 2018, there was no wastewater treatment facility in Lahore and the River Ravi receives all the untreated domestic and industrial wastewater (AIIB, 2018). This has water quality ramifications, as the River Ravi is important in the recharge of the Lahore aquifer: this affects both drinking water and water for agriculture (AIIB, 2018). The Ravi River is the main water source flowing through the Punjab, and it contributes 50% of the pollution load to the Indus River Basin¹¹.

Water quality tests have shown the presence of faecal coliforms in the drinking water, with contaminated drinking water resulting in waterborne diseases including typhoid (Qureshi & Sayed, 2014). There are also high concentrations of arsenic in the pumped water, and in areas surrounding Lahore, these concentrations exceed WHO standards, particularly in shallow groundwater wells (Qureshi & Sayed, 2014). Sources of arsenic include kiln factories and fertilisers (Qureshi & Sayed, 2014). Water from the River Ravi is used in irrigation: for example, in the peri-urban areas of Lahore, farmers are using untreated sewerage/industrial water for vegetable production and waterborne diseases including cholera are common (Qureshi & Sayed, 2014). Water pollution also has regional impacts, as Lahore is located at the upstream end of the river, therefore its flows downstream and affects drinking and agriculture water in other areas (AIIB, 2018).

Qureshi & Sayed (2014) recommend a number of measures including:

- WASA and other agencies should enforce environmental laws to restrict industries from disposing of their waste in drains, canals and other water bodies without treatment;
- An appropriate solid waste management system should be introduced to prevent the dumping of solid waste into water bodies;
- Regular water quality testing.

¹¹ Accessed 19 November 2018: <http://www.wfpak.org/wwf-projects/WaterStewardshipwithLevis.php>

Projects to tackle the challenges

The Government of Punjab is seeking USD400 million in funding from the Asian Infrastructure Investment Bank for the **Lahore Water and Wastewater Management Project 2019-2023**. Combined with USD133 million investment from WASA Lahore, the project will undertake the following activities:

- Construct three wastewater treatment plants;
- Construct infrastructure to divert water from a nearby irrigation channel, the Banbawala Ravi Bedian Depalpur Canal, and construct a surface water treatment plant;
- Ensure 100% of schools and colleges in Lahore are connected to safe drinking water;
- Reduce the non-revenue water from a current level of 45% to less than 20% by replacing old pipes to reduce leakages and also reduce water pollution (wastewater is leaking into the pipes currently);
- Reducing water consumption through 100% metered connections and reduce water theft through bulk meter installations and ensuring 100% billing and at least 90% collection;
- Enhancement of existing laboratories for water quality testing and strengthening the water quality monitoring system and staff capacity;
- Capacity building for WASA Lahore including operation and management of water treatment plant, tariff setting, accounting and billing and collection, as well as technical assistance for the Government of Punjab to prepare a regulatory framework to strengthen partnerships with the private sector for both capital expansions and O&M (AIIB, 2018).

In 2018, WASA Lahore announced it will build six wastewater treatment plants in Lahore city: the feasibility studies of three of the plants had been completed according to sources in WASA in March 2018¹².

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Acknowledgements

We thank the following experts who voluntarily provided suggestions for relevant literature or other advice to the author to support the preparation of this report. The content of the report does not necessarily reflect the opinions of any of the experts consulted.

- Alix Lerebours, WEDC - Loughborough University & Independent Consultant in Water governance and International development
- Valérie Cavin, Senior WASH Advisor & Behaviour Change Focal Point, HELVETAS Swiss Intercooperation

Suggested citation

Cooper, R. (2018). *Water management/governance systems in Pakistan*. K4D Helpdesk Report. Brighton, UK: Institute of Development Studies.

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