Inclusive development and multilevel transboundary water governance

The Kabul River

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8

ANALYSIS OF MULTILEVEL FRESHWATER GOVERNANCE IN PAKISTAN

8.1 INTRODUCTION

This chapter describes and analyses multilevel freshwater governance in Pakistan and intends to answer the following questions: (1) How are the various characteristics including BESS and drivers of freshwater problems taken into account at multiple geographic levels in Pakistan? (2) How have freshwater governance frameworks evolved at multiple geographic levels in Pakistan? (3) Which governance instruments address the drivers of freshwater problems at multiple geographic levels in Pakistan? (4) How does legal pluralism occur at multiple geographic levels in Pakistan? (5) How do power and institutions influence freshwater governance frameworks at multiple geographic levels in Pakistan?

To answer these questions and using the methodology in Chapter 2, this chapter describes the political organisation of water sharing within Pakistan (8.2), various ESS (8.3) and drivers of freshwater problems (s8.4) at multiple geographic levels; discusses the evolution of freshwater governance (8.5); discusses goals, principles and instruments (8.6); conducts a legal pluralism analysis (8.7); explores the relationship between governance instruments and drivers and their contribution in achieving inclusive and sustainable development (8.8) and draws inferences (8.9) about the hybrid role of power and institutions in influencing freshwater sharing within Pakistan.

8.2 THE CONTEXT OF WATER GOVERNANCE WITHIN PAKISTAN

Pakistan‘s water sector has numerous challenges. Colonial legacies, outdated laws and insufficient management capacity of water related disasters have failed to address the challenges of droughts and floods (Young et al. 2019). Poor sanitiation and hygiene practices have led to the high child mortality rate (Sarfaraz 2014). Predictions regarding glaciers melting remains worrying in the Himalayas. Furthermore, water storage and generation of hydro-power are essential for irrigation development and to cope with energy crisis in Pakistan (Hanasz 2011). Despite these threatening issues, still various opportunities exist in the water governance field in Pakistan. For instance, the impacts of climate change empowers decision makers to observe water scarcity issue within the context of changing climate (Yousaf 2017). The currently changing local, regional, and global political dynamics as well as the peace processes in Afghanistan encourages Pakistan to seek for greater cooperation within the country and among Pakistan and its nehbouring countries.

The National Water Policy of Pakistan (2018) addresses that mananging and developing water resources in Pakistan have severe challenges to resolve many associated issues. The sustainability and expansion of irrigated agriculture is being exposed to: (a) the growing demand of water to meet the requirements of a increasing population in addition to socioeconomic demands; (b) historical and spatial disparities in available water resources (e.g. 65% of rainfall and approximately 81% of flow in the river occurs during the monsoon season for about three months; similarly, groundwater quality varies with respect to depth and location); (c) reduction in freshwater availability due to silt deposits in dams; (d) poor maintenance of the irrigation canals; (e) salinsation and waterlogging in various canals; (f) lack of interests from relevant organisations to establish a drainage network for the

existing irrigation network; (g) depletion and pollution of aquifers; (h) poorly disposing off saline effluent, industrial & household waste as well as contaminants from fertilizer and pesticides; (k) inadequate participatory practices; (l) increase frequency of droughts and floods; (m) lack of consensus-building as well as mistrust among the four provinces over equitable water sharing, poor pricing, valuation of water; and degrading water quality.

8.2.1 The China-Pakistan Economic Corridor (CPEC) and Freshwater Challenges

The China-Pakistan Economic Corridor (CPEC) project aims to enhance the strategic relationship as well as trade and economic cooperation between China and Pakistan. CPEC was formally launched during the Chinese Premier‘s visit to Pakistan in May 2013 where he emphasised the construction of the 2033 km long trade corridor (The Diplomat 2014). The then Government of Pakistan and all other subsequent governments have also shown considerable enthusiasm for this project. This corridor will link the deep-sea port of Gwadar in Balochistan Province of Pakistan to Kashgar city of North-western China. Since February 2013, the port of Gwadar is undertaking a major extension to make it one of the biggest commercial port (South China Morning Post 2014). The economic corridor – through Pakistan – will link China with the Middle East, Europe and Africa. Besides fulfilling China‘s energy needs and alleviating poverty in its western region, CPEC also intends to improve Pakistan‘s economy and enhance economic cooperation among South Asian countries (China Daily 2013).

However in 2017, when the Master Plan of CPEC was publicly disclosed, the Chinese plans and primacies in Pakistan for the next two decades became acknowledged to the Pakistani citizens (Husain 2017). For instance, some of the important activities include: (1) leasing out of thousands of acres of agricultural land to the Chinese enterprises; (2) round-the-clock video recordings and surveillance from Peshawar to Karachi on roads and in commercial areas to maintain law and order; (3) and building of a nation-wide fibre optic for internet traffic and digital TV. The plan predicts a deep saturation of Pakistan‘s economy by Chinese enterprises and culture. The large scale commercial agricultural projects by Chinese enterprises may cause displacement of small local farmers leading to social and political unrest. In addition, the landowners in southern Punjab and Sindh would risk losing political influence if they sell their land (ICG 2018). Furthermore, water resources may be further depleted by the extensive CPEC activities as warned by the then Governor of Balochistan which could be very serious as the water table in many parts of Baluchistan has been falling for decades (The DAWN 2016).

8.3 ECOSYSTEM SERVICES OF FRESHWATER IN PAKISTAN

This section highlights freshwater biodiversity and the four categories of ecosystem services (ESS) provided by freshwater in Pakistan.

8.3.1 Freshwater Biodiversity in Pakistan

Pakistan has a variety of the world‘s animals, plants and birds due to its location between three zoogeographical zones: The Palearctic, the Oriental and the Ethiopian. However, Pakistan also has experienced rapid changes in attitude that has a significant impact on its flora and fauna (IUCN 1997; Akhtar, Saeed, and Khan 2014). In the North of Pakistan, three mighty mountain ranges meet – the Himalaya, Karakoram and Hindukush (HKH). These snow and ice covered mountains host the endangered snow leopard (biological name: Panthera uncia) which has survived due to its spotted coat and survival skills (Jackson et al. 2006; Khatoon et al. 2017) despite the barrages at different locations in the Indus River (Braulik 2012; Braulik et al. 2014; Waqas et al. 2012). Similarly, the South of the country hosts the endangered Indus dolphin (Biological name: Platanista gangetica). The Indus wetlands in the South is also critical for the migratory waterfowl population in winter. Moreover, the Indus flyway is recognised worldwide as the fourth major bird migration route (Umar et al. 2018). Similarly among plants, the locally known plant Kut (biological name: Saussurealappa) is common to the alpine regions and is considered a threatened species (Shaheen et al. 2017). Another medicinal plant in the alpine regions is the sea grape (biological name: Ephedra procera) which is more commonly used as a cardiac tonic and a remedy for respiratory asthma and hay fever (IUCN 1997; Qasem 2015). Pakistan has a long history of human settlements starting from Mehergarh to the Mohenjo-Daro to the Gandhara civilisation (Violatti 2013; Yadav et al. 2010). However, these civilisations survived in relative environmental harmony until the 20th century; after which point society negatively impacted the natural environment (Milligan et al. 2009; Vlek and Steg 2007). Human development, industrialisation and urbanisation led to the extinction of many species that were earlier common (McCaffery 2015). Similarly, more forests have been cleared for human settlements and agriculture practices (Piesse 2015).

8.3.2 Supporting Services

Supporting services of freshwater in Pakistan include sediment preservation, soil foundation, nutrient cycling, recycling and nutrients processing (see Table 8.1). As the sediments accumulates, lakes and marshes are naturally filling and drying up leading to the formation of valuable land suitable for agriculture. This process is basically threatened by encroachment or settlements near rivers and lakes. Flood plains near rivers accumulate nutrients and contribute in removing these from building up in both flowing and still waters where they might create problems. This is because high level of nutrients in water can lead to algal blooms which may kill fish and effect water supply. In a country like Pakistan, wetlands play a very useful role in reducing the risk from agricultural runoff with high fertilizer content.

8.3.3 Provisioning Services

The provisioning services of freshwater in Pakistan include production of fish, fruits, fibre, fuelwood, fodder, and water retention for household, industry, and agricultural purposes (see Table 8.1). Fish production in Indus River systems are locally important, promoting aquaculture among

local communities. Similarly, Indus Flyway is recognised as one of the primary and important migration route for wildfowl and ducks. Many bird species would not be able to capable to complete their usual migrations without the Indus Flyway. These migratory birds are the important food sources for local people living around the rivers and lakes. Freshwater irrigates 17 million ha of farmland which is the primary source of food production and provides employment to approximately 40% population. Pakistan is an arid country and currently suffering from water shortages, therefore the efficient utilisation and storage of water resources is critical for domestic, industrial, and agriculture usage. Forests surrounding the rivers provide fuelwood and timber for local people. Mangoroes used to be the main source of fuel for river navigation up the Indus in the past.

8.3.4 Regulating

The regulating services include climate regulation (e.g. GHG sinks, variability in regional and local temperature, rainfall and other relevant processes); regulation of water (e.g. hydrological flows); recharge and discharge of groundwater aquifers; waste-water treatment and purification; retrieval and elimination of extra nutrients and other contaminants; erosion regulation, preservation of sediments and soils; flood control; protection against storms; and habitat for pollinators (see Table 8.1). Forests have a significant impact on the local climate as they help shape rainfall patterns, reduce temperatures, and enhance humidity. Glacial melting in the HKH region is of high concern in Pakistan as it provides about 70% of the water source in the Indus River. Since 1930, the glacial area of HKH has fallen by 35% - 50%, and hundreds of smaller glaciers have already disappeared. The Kabul-Indus basin hosts three quarters of Pakistan‘s populations, providing them food and water security and irrigating 80% percent of the cropland.

Ecosystem degradation in the Indus Delta due to increased abstraction of water upstream may affect downstream communities living in the delta area. The 1991 Water Apportionment Accord among the four provinces indicated a discharge of minimum 10 MAF of freshwater (Rajput 2014) per year below Kotri Barrage. This amount is essential to sustain ESS in the Indus delta. However, it was rarely the case during 1994–2004 where the average annual water release was between 2 MAF (in dry seasons) and 6.8 MAF (in the wet season). Additionally, the waste water treatment, water purification, and removal of surplus nutrients are also some of the important regulating services of freshwater.

Through biological procedures, rivers carry away organic contaminants from households and industries. These biological processes have severe threats from untreated trashes, resulting in degradation of wetlands. Majority of rivers and coastal wetlands of Pakistan are exceptionally polluted due to wastes of major cities. This leads to the loss of biodiversity and efficiency. Similarly freshwater offers erosion regulation which slow down the water flow through a catchment. Furthermore, siltation of dams can reduces the life of dams and reservoirs. The life of dams and reservoirs can only be enhanced through a proper watershed management. Floodplains has the potential to reduce the flood intensity by providing an escape route to floodwater. It is a well-known

fact that honeybees provide an important ecosystem service, however its role of pollinators is rarely overlooked.

8.3.5 Cultural Services

The cultural services of freshwater comprise of recreational opportunities, spiritual basis of inspiration; and learning prospects for both informal and formal education (see Table 8.1). Pakistan has quite a few spiritual and religious features of freshwater with tombs and shrines of Saints, Sufis, Pirs, and other sacred personalities in various coastal and wetlands areas. For example, the Kalakahar Lake located in the Salt Range has various archaeological and historical sites that fascinate tourists. There are some fairy-tales associated with lakes and riverine wetlands (e.g. Lake Saiful Muluk). The recreational values and importance of these lakes and rivers have been used to justify the tourism authorities throughout Pakistan, e.g., Tourism Corporation Development of Pakistan (TCDP), Tourism Corporation Khyber Pakhtunkhwa (TCKP), Tourism Development Corporation of Punjab (TDCP), Sindh Tourism Development Corporation (STDC) and The Department of Culture, Archives and Tourism Balochistan. Riverine wetlands, lakes and ponds are being used for research and learning purposes, providing awareness about the importance of water amongst local schools and colleges.

Table 8.1: Major ecosystem services provided by freshwater in Pakistan

Kinds of freshwater	**Supporting Services**		
	Sediment holding furnish soil formation; organic matter accumulation; storage, recycling, processing, and acquisition of nutrients; freshwater wetlands reduce the risk of pollution from agriculture runoff		
	Provisioning	**Regulating**	**Cultural**
Rainbow water	Huge storage of water on Earth; habitat for birds & insects	Climate regulation, hydrological regulation	Aesthetic (inspiration for art), spiritual (rain Gods/ Gods of thunder), inspiring knowledge)
Blue surface & groundwater	Production of food, fish, fruits, fibre, fuelwood and fodder; preservation of water for household, industrial, and agricultural use; Indus Flyway serve as migration route for ducks and wildfowl which provide local food sources for communities; irrigates 17 million ha of farmland and provides employment to 40% population; Mangroves & riverine forests are source of timber and fuelwood for local population	hydrological flows and groundwater recharge/discharge; water treatment by removing nutrients and other pollutants; natural hazards regulation, protection against storm; pollination habitat for pollinators; Kabul-Indus basin support three quarters of Pakistani population and irrigates 80% cropland; erosion regulation slow down water flow; river beds provide support in flood control and reduce flood intensity	Religious & spiritual aspects of freshwater comprise of shrines in some coastal areas; Kalakahar Lake has archaeological and historical areas and featurs that can attract visitors; fairy-tales attract visitors during festivals; recreational values of lakes, streams and rivers helped in establishing special tourism authorities throughout Pakistan; rivers, lakes & streams used for educational purposes, creating awareness amongst local schools & colleges about the importance of water
Green water	Fodder, food, pastureland, herbs & shrubs	Evaporation (flowing downwind to later fall as precipitation); aquifer recharge	Forests and landscapes for tourism, spiritual needs and education
Grey water	Rice & vegetable production, fodder crops, energy production, mining,	Climate and water regulation, evaporation towards downwind that fals as precipitation	Educational services regarding its potential uses in agriculture (UNEP, 2010)
Black water	Animal fodder, insects & worms as birds‘ food	Spreads disease unless managed	Educational services regarding its negative effects
White frozen water/glaciers	Habitat for markhor and snow leopard, storage of water	Albedo effect	Preserving data for humans, information about CO_2 in the past, preserving life forms frozen in the past

Source: Modified from Hayat and Gupta 2016

8.4 DRIVERS OF FRESHWATER PROBLEMS IN PAKISTAN

In Pakistan freshwater has both quality and quantity related issues. These issues are further aggravated by several drivers at national and sub-national levels. In this section I discuss national and sub-national level direct (see 8.3.1) and indirect (8.3.2) drivers which also include drivers that are identified in the case studies as well as in the literature whicn might not be case specific.

8.4.1 Direct Drivers

The key direct drivers of water problems in Pakistan are (see Table 8.2): (i) agriculture development (e.g., commercial agricultural practices including animal husbandry, the extractive sector and water

use in energy),[78] (ii) industry (including services and infrastructure),[79] (iii) municipal water supply and sanitation services e.g., household usage (drinking water, hygiene and sanitation) and subsistence agriculture,[80] (iv) demographic shifts[81] such as (a) growing population (2% growth rate in 2018) and unsustainable urbanisation (3.19% growth in 2016) where population density has reached a record 260 persons/km^2 as of 2018 in contrast to 60 persons/km^2 in 1961; (b) rapid urbanisation which is further increasing water demand and affecting water quality.

8.4.2 Indirect Drivers

The key indirect drivers of water problems in Pakistan are (see Table 8.2): (a) political dynamics within the state i.e. mistrust and imbalanced power relations among and within provinces where small provinces (Khyber Pakhtunkhwa and Balochistan) blame big provinces (i.e., Punjab and Sindh) for inequitable water distribution despite the 1991 Interprovincial Water Sharing Accord which ensures fixed allocation among provinces, but lacks clearly stated objectives (e.g., to enhance water accounting in the Indus basin and to improve the operating rules) and hence leaves room for interpretation, which is often biased and favours powerful actors,[82] (b) culture and ethnic elements (attitudes regarding access and allocation, wasteful use of resources, etc.),[83] (c) non-water-related policies (agriculture & food security, land tenure, land use, and economic development),[84] (d) economy (economic growth),[85] (e) poverty, (f) technological advances (agriculture intensification),[86] (g) international trade (e.g. ‗globalisation' or trade in virtual water)[87] and the possible trade route with China, and (h) natural change and variability in weather, droughts, floods, landslides, and tectonic movement.[88] The impacts of climate change in the Kabul-Indus Basin over the next 25 years are likely to place the Interprovincial Accord under increased scrutiny. Similarly, transboundary water issues with India (in addition to building dams in Afghanistan) are projected to become key challenges in the national and water security context and often mask domestic water governance issues. It is expected that Pakistan may face high temperature rises due to its geographical location. Only 24% of the area in Pakistan receives rainfall between 250-500 mm while the remaining area receives less than 250 mm of rainfall per year. The receding of glaciers in the HKH region due to climate variability may influence major rivers in Pakistan as they are primarily fed by these glaciers due to climate variability (Barnett et al. 2005; Hasson 2016; Stocker 2014). Moreover, Pakistan's climate sensitive agrarian economy has also potential threats from variability in monsoon rains where droughts and floods have caused large scale destruction already.

[78] Interviewee 1, 2, 3, 5, 7, 33, 34, 36.
[79] Interviewee 3, 4.
[80] Interviewee 5, 7, 19.
[81] Interviewee 2, 3, 5, 9, 13, 22.
[82] Interviewee 11, 12.
[83] Interviewee 13, 17, 40.
[84] Interviewee 1, 8, 26.
[85] Interviewee, 25, 26, 27.
[86] Interviewee 25, 38, 39.
[87] Interviewee 12, 20, 21, 33.
[88] Interviewee 6, 21, 23, 34.

Table 8.2: Drivers of freshwater challenges in Pakistan

Direct Drivers	**Key References**
Agriculture development (e.g., commercial agriculture practices including animal husbandry, the extractive sector and water use in energy)	Raza, Ali, and Mehboob 2012; Rehman et al. 2013 Interviewee 1, 2, 3, 5, 7, 33, 34, 36
Industry (including services and infrastructure)	Loayza and Wada 2012; Ahmed, Abbas, and Ahmed 2013; Umer 2018 Interviewee 3, 4
Municipal water supply, sanitation e.g., domestic uses (drinking water, sanitation and hygiene) including sustenance agriculture	Haydar, Arshad, and Aziz 2016; Young et al. 2019 Interviewee 5, 7, 19
Demographic shifts (i.e., migration, population growth, increase in population density, urbanisation, population growth)	Gazdar 2003; Khan, Inamullah, and Shams 2009; Mahmood and Chaudhary 2012; Kugelman 2013 Interviewee 2, 3, 5, 9, 13, 22
Indirect Drivers	
Political dynamics between states	Richter 1979; Malik 1996; Sharif 2010; Anwar and Bhatti 2017 Interviewee 11, 12
Culture and ethnic elements (attitudes about access & allocation, careless resource use)	Briscoe et al. 2005; Lead Pakistan 2018 Interviewee 13, 17, 40
Non-water-related policies (food and agriculture, food security, land tenure, & other economic development activities)	Murgai, Ali, and Byerlee 2001; Ahmad and Farooq 2010; Rehman et al. 2015; Qureshi 2018 Interviewee 1, 8, 26
Economy (economic growth)	Briscoe et al. 2005; Afzal 2009; Yu et al. 2013; Rehman et al. 2015 Interviewee, 25, 26, 27
Poverty	Faruqui 2004; Abbass 2009; Syed Attaullah Shah 2014; Syed A. Shah, Hoag, and Loomis 2017 Interviewee 25, 38, 39
Technological advances (agriculture intensification)	Briscoe et al. 2005; Yu et al. 2013; F. Rehman et al. 2013; A. Rehman et al. 2015 Interviewee 12, 20, 21, 33
International trade (e.g. „globalisation‘ or trade in virtual water); CPEC	Yu et al. 2013; Ahmed and Mustafa 2014; Ramay 2018 Interviewee 6, 21, 23, 34
Natural change and variability in weather, Droughts; Floods; Landslides, tectonic movement.	Farooqi, Khan, and Mir 2005; Hussain et al. 2005; Ahmed et al. 2016 Interviewee 6, 21, 23, 34

8.5 EVOLUTION OF THE FRESHWATER AND RELATED INSTITUTIONS IN PAKISTAN

8.5.1 Overview of Water Governance Institutions & Practices in Pakistan

Water is a provincial subject according to the 18th amendment in the 1973 Constitution of Pakistan (Constitution 1973: Chap. 3, Art. 155). However, federal government use its authority to ensure equity and access among provinces (National Water Policy of Pakistan 2018). Water sharing among provinces is also regulated and administered by the constitutional and parliamentary bodies e.g. the Council of Common Interests (CCI) and Parliamentary Committee on Water Resources (Ranjan 2012a; Sharif 2010). Water and Power Development Authority (WAPDA) has legitimate authority to carry out water development schemes (UNDP 2016; WAPDA Act 1958: Art. 8). Similarly, the

Indus River System Authority (IRSA) regulate water sharing among provinces under the 1991 Water Apportionment Accord (Anwar and Bhatti 2017; Ranjan 2012b). IRSA contained one representative from each of the four provinces and a federal member. Furthermore, the chairman of IRSA is selected on rotational basis from each province (IRSA 1992: Art. 2/1). At the sub-national levels in Pakistan, provincial irrigation departments and the provincial Environment Protection Agencies (EPA)[89] provide the core regulatory framework (Anwar and Bhatti 2017; Sharif 2010). Similarly, at local level, the local government as well as Water and Sanitation Agencies (WASAs) regulate the provision of clean drinking water and sewage disposal (Khan and Javed 2007).

Water is governed through a mix of informal and formal mechanisms in Pakistan (FoDP 2012; Qureshi 2002). The informal practices date back to over 9000 years, all of which have a unique link with the Indus River (Alam et al. 2007) such as: Baluchistan's Mehergarh (9000-7000 BCE) (Aamir 2015; Notezai 2017); Khyber Pakhtunkhwa's Rehman Dheri (the Pre-Harappan 3300 BCE) (Jan et al. 2008; Khan et al. 2002), Punjab's Harappa (3000 BC) and Sindh's Mohenjo-Daro (2500 BCE) (Angelakis and Rose 2014; Fuller 2001; Possehl 2002). It was discovered that ages ago before the Pharaohs or the Mesopotamians, earlier settlers of Mehergarh were using flood water to grow crops. These settlers had properly trained animals for farming (Grewal 2005; Khan et al. 2014). The remains of the 5000 years old (3300 BCE) large sand and mud dams were also revealed in the Khuzdar district in Baluchistan (Manuel et al. 2018; Shaffer and Thapar 1992). These practices were improved by the Indus Civilisation of Mohenjo-Daro (in Sindh Province) and Harappa (in Punjab's Province) in 3000 BCE which projected that a composite society existed at that time which sustained these sand and mud (Khan et al. 2014; Manuel et al. 2018). The civilisation encouraged water management, water supply, sanitation services, washing platforms and a dedicated waste disposal system (Angelakis and Rose 2014; Cullet and Gupta 2009). Similarly, in the KPK and Punjab Provinces, customary irrigation practices are as old as 330 BCE (Ahmed 2000; Bhutta and Smedema 2007; Mehari et al. 2011). The extensive mysterious ‗gabarbands[90] that averted water from the dry rivers in that period can still be found in various parts of Sindh and Baluchistan provinces (e.g., Larkana, Dadu and Las Bela districts) (Khan et al. 2014).

The adoption and pattern of formal rules in Pakistan are drawn from the earlier civilisation of the Indus, the Aryans, the Arabs, the Moghuls and more recently, the British (Badruddin 2012; McIntosh 2018). The Islamic Principles are founded on equitable sharing and the recognition of collective control over water (Abderrahman 2000; Cullet and Gupta 2009). The codification of water-related rules and practices in Pakistan were first started by the British Colonial Administration in 1860 from the Pakistan Penal Code to prevent contamination and preserve ecosystems. This was followed by the codification of customary irrigation practices – ‗warabandi' in 1873 to promote cooperation and ensure equitable and efficient utilisation of shared water resources among farmers. All these rules and practices were recorded in registers called the ‗Kuliyat-e-Abpashi (set of guidelines for diverting flood flows)' and ‗Riwajat-e-Abpashi (set of customary practices for

[89] Interviewee 5.
[90] The gabarbands are ‗stone-built dam construction designed to control and store water' (Wright, 2010: 31).

diverting flood water)'[91] (Khan et al. 2014). The succeeding British Colonial Rules imposed firm compliance to accomplish management of water shortages (Cullet and Gupta 2009; Mehsud 2015). After the formation of Pakistan, the rules and procedures created by the British Colonial Administration were revised from time to time to meet explicit commitments, but the basic structure of the original rules has persisted (Jurriens et al. 1996; Khan et al. 2014; Subrahmanyam 2006). For evolution of formal/informal multilevel water governance frameworks in Pakistan along with included principles see Figure 8.1 which shows the accumulated inclusion of different categories of principles over different eras. Similarly Figure 8.2(a) presents the number of adopted principles for each category over time; Figure 8.2(b) explains the trends of different categories of principles over time; and Figure 8.2(c) presents the actual progress and regress of different categories of principles over time.

8.5.2 Water Governance before the Common Era (BCE)

The healthy flow of freshwater in rivers gave birth to different civilisations as one civilisation after another rose and fell (Juuti et al. 2016; The DAWN 2012). However, these civilisation died out eventually when the river changed its course or dried up (The DAWN 2012). Obvious examples of such civilisations exist in almost every province of Pakistan. Early cities in these civilisations have died out but left behind traces of earlier development which the modern world follows. Mehergarh (9000-7000 BCE) is located in present day Baluchistan and is seen as the earliest sites of established farming (barley and wheat) (Moulherat et al. 2002; The Express Tribune 2019), metallurgy (Kenoyer 2006; Possehl 2002), and herding (goats, sheeps, and large cattle) in South Asia (Teufel et al. 2010; Zeder 2012). The storing of water and grains for later consumption in that time shows preparedness to cope with food and water insecurities (Angelakis and Zheng 2015; Fardin et al. 2014). The location of the site on the main route between modern day Afghanistan and the Indus Valley illustrates a navigation and trading route between the Indian subcontinent and Near East (Stevens et al. 2016). The structure of the houses on the banks of the Indus River in the flood-resilient locations reveals the skills related to flood protection (Macklin and Lewin 2015)

The remnants of ancient cities Harappa (in the province of Punjab) and Mohenjo-Daro (in the province of Sindh) from 3000-2500 BC discloses that rivers were a significant source of navigation which helped them trade with central and northern India as well as the coastal areas of Mesopotamia and ancient Persia (Majumdar et al. 1978: 34 in Stevens et al. 2016). Water were used mainly for domestic and irrigation purposes (Angelakis and Zheng 2015). The development of earlier irrigation system indicates that agriculture has been the prime source of employment (Weiss and Zohary 2011). However, this too had conseqeunces which caused deforestation and changes in land use (Dellapenna and Gupta 2009). Mohenjo-Daro had over 700 wells while Harappa had as few as 30 (Menon 2018; Ratnagar 2016). The reason for an increased number of wells in Mohenjo-Daro may be due to the fact that it was a bit far from the Indus River and were receiving less winter rain (Petrie

[91] _Abpashi' means irrigation; _Haqooq' means rights; _Kuliyat' means comprehensive description; Riwajat' means customs.

2019; Possehl 2002). The Great Bath some 4500 years ago had water channels (Angelakis et al. 2018; Voudouris et al. 2019) and a temple, where priests and rulers bathed in religious ceremonies (Ratnagar 2016; Voudouris et al. 2019). People of Indus Valley had clean water and excellent drains (Angelakis et al. 2018). Almost every home had a separate bathing area and a latrine where the run-off from these designated areas were carefully managed (Antoniou et al. 2016; Khan 2012). The run-off water was reused after removing waste through the sewer into the Indus (Khan 2012). These actions of ancient societies clearly shows that they protected their natural environment to make their resource base stronger.

8.5.3 The Emergence of the Islamic Way of Water Governance

Islam, as a faith and political social order launched in Asia in the 7th century during Muhammad´s lifetime (Khalid 2014; Lewis 2010). It is said that Islam have arrived in 615 AD to Manipur (Northeast India) in the era of silk route trades through Chittagong in Bangladesh (Asimov 1999; Jettmar 1994). Islam‘s expansion into South Asia caused the development of a flexible legitimate system (Kugle 2001). Islam extended in many directions from Arabia to South and Central Asia in the era of Muhammad – as the first head of the city-state of Medina (622–32) – followed by the Caliphate (i.e., Abu Bakr, Umar, Usman, and Ali) (632–61), later on by the Umayyad (661–751) and then Abbasid (751–1258) (Khan 2015). Islamic law and jurisprudence evolved from the succession of prohibitions enclosed in what followers respect as the exact word of God: the Quran as revealed to the Prophet Muhammad (Coulson 2017; Dutton 2013). After the Quran‘s revelation, Islamic scholars consistently relied upon the Sunnah[92] (Abdullah and Nadvi 2011). The principles of Sunnah were used to review the diverse Quranic instructions (Khan 2015).

Classical Islamic Law treat water as public property (Abdullah and Nadvi 2011; Naff and Dellapenna 2002; Zahraa and Mahmor 2001) because it is essential for the customary acts of worship and supporting human life (Abdullah and Nadvi 2011). Principles of Islamic Law related to water include a right of thirst to reduce the thirst of human and animals from any available water resources (Faruqui et al. 2001; Koumparou 2018). The Holy Quran identifies significance of water, mentioning its importance in _Surah‘ 21:30, _we have made every living thing of water‘ (Abumoghli 2010; Faruqui et al. 2001). Islamic Law usually discourage private ownership of water rights (Faruqui et al. 2001; Sattar 2015) but one can utlize public water resources for as long as they do not damage people‘s fields or properties (Faruqui et al. 2001). Sahih Bukhari[93] explains that, _it is forbidden to exploit water by polluting or wasting it‘ (Naff 2009: p. 20). Islamic Law has principles related to dispute resolution. It prescribes techniques for the 148etermining rights by a local expert, who is perceived to have final authority in the matter (Abdalla 2001; Brower and Sharpe 2003; Powell 2015). Islamic scholars and rulers applied principles of Islamic law to the Muslim population

[92] Regarded as a second law in Islam or the body of precedents attributed to the Prophet Muhammad (PBUH).
[93] Sahih Bukhari also known as Bukhari Sharif is one of the six major prophetic traditions (or hadith) collections of Sunni Islam. Sunni Muslims view this as one of the two most trusted collections of hadith along with Sahih Muslim. In some circles, it is considered the most authentic book after the Quran. The Arabic word Sahih translates as authentic.

in the past while non-Muslims were encouraged to follow their own systems (Lugo et al. 2013). Table 8.3 summerises the priciples of both customes and sharia.

Table 8.3: Principles of customs and Sharia

Customs	Sharia
Community-based management structures with elected or, more often, selected water masters	In Sharia water is reflected as a community right; Private water ownership rights are forbidden
Water allocation rights are linked with land ownership, the size of the land and the level of the assistance to the construction and maintenance of water infrastructures	Types of water is defined (e.g., lake water, river water, and rainwater)
Traditional structures are not necessarily inclusive and can often be subject to elite capture	Priority of use (i.e., the nearest cultivated plot has first priority) or whose crops are most urgently in need of water may go first
Water can be primarily used for domestic and personal use as well as irrigation	The right to water
Customs encourage reuse of wastewater	No harm principles where Islamic law forbids a person from exploiting or polluting water

8.5.4 Water Governance in the Colonial Era

The history of colonialism in British India (which included Pakistan) dates back to the sixteenth century with the invasion of European colonialists (Stuchtey 2017). During England‘s industrial revolution period in 1858, the British colonialists transformed the Indian economy from a food production to a commodity-oriented economy (Dellapenna and Gupta 2009; Mukherjee 2010). British Colonialists promoted the market-based economy and transformed customary and social practices (Dellapenna and Gupta 2009; Lange et al. 2006). Subsistence agriculture gave way to commercial agriculture using more natural resources benefitting individuals rather than the community (Banerjee and Iyer 2005). Forests were cleared to gain access to coal, timber and agricultural land (Dangwal 2005; Islam and Hyakumura 2019). In addition, the 1873 Canal and Drainage Act, authorised the colonial administration to control surface water resources and replace community-managed irrigation with State-owned irrigation (Banerjee and Iyer 2005; Mustafa 2001). Similarly, the Indian Forest Act 1927 gave forest ownership to British colonialists (Ghosh and Sinha 2016; Sharma 2017). These colonial activities widened the income disparities and exacerbated poverty in rural areas, and increased water logging and salinity (Angeles 2007; Roy 2018).

The Colonial administration did not interfere with local customs if they did not present a direct threat to the British (Maddison 2013; The DAWN 2010). Infrastructure related to water including irrigation facilities were developed and regulated by the British colonial administration after the

1857 revolution (Dellapenna and Gupta 2009). Colonial water law: 1) protected and regulated water rights through common law principles (e.g., ensuring landowners' access to water resources) (Cullet and Gupta 2009; Smith 2005); and 2) made rules to secure land, safeguard and sustain embankments, and implement these regulations (e.g., see Iyer 2009; Cullet and Gupta 2009). According to Mustafa (2001) and Mosse (2006), the colonial irrigation projects and policies favoured bureaucracy over the needs of farmers and led to the deterioration of customary irrigation institutions.

8.5.5 Water Governance in the Post-Colonial Era

After the partition, Pakistan's water management policies continued the British Colonial legacy[94] (Chuadhry and Chaudhry 2012; Rahman et al. 2018) where they merged and restructured colonial control of water resources rather than aim at public well-being or equity[95] (D'Souza 2006; van Koppen et al. 2007). Currently, freshwater resources are governed by both provincial as well as federal frameworks throughout Pakistan. Overall water management falls under the federal authority i.e. Water and Power Development Authority (WAPDA).[96] The 18th amendment to the 1973 Constitution devolves water to provincial governments[97] and WAPDA only articulates plans for infrastructure development based on data provided by the Indus River System Authority (IRSA).[98] These plans are regulated by WAPDA Act 1958, IRSA Act 1992, Environmental Protection Act 1997 and the Constitution under articles dealing with inter-provincial coordination and conflict resolution by the Council of Common Interests (CCI).[99] The Punjab Canal and Drainage Act of 1873, the Sindh Irrigation Act of 1879, and KP Canal and Drainage Act of 1997 provide the main legal basis at provincial level.[100]

Freshwater resources in present day Pakistan are governed by rules from ancient customs, religion and British Colonisation.[101] Since 1947, two instruments govern freshwater at federal, provincial and local levels: the West Pakistan WAPDA Act 1958 and the 1973 Constitution of the Islamic Republic of Pakistan.[102] These laws target and guide both general and specific uses and users on human rights, access, pollution and conflict prevention and allow women, youth and indigenous peoples to practice their rights. By 1997 another four laws were adopted[103] covering water quality and quantity issues and penalties for violations. The IRSA Accord is one of the successful inter-provincial water sharing agreements of the Indus Basin in this period which is based on the historical use of water by the provinces in Pakistan.[104] Between 2007 and 2017, new policies were adopted: National Drinking

[94] Interviewee 10
[95] Interviewee 1, 2
[96] Interviewee 2.
[97] Interviewee 1, 5, 16
[98] Interviewee 8, 9.
[99] Interviewee 1, 2, 3.
[100] Interviewee 12.
[101] Interviewee 3.
[102] Interviewee 1, 2.
[103] Interviewee 10.
[104] Interviewee 10, 11.

Water Policy 2009, Pakistan National Wetlands Policy 2009, National Climate Change Policy 2012; Biodiversity Action Plan 2015, National Forest Policy 2015 and the Draft National Food Security Policy 2017. The National Climate Change Policy and the Draft National Food Policy integrates previous policies and laws with the adoption of modern dimensions related to climate change andsustainable development.[105]

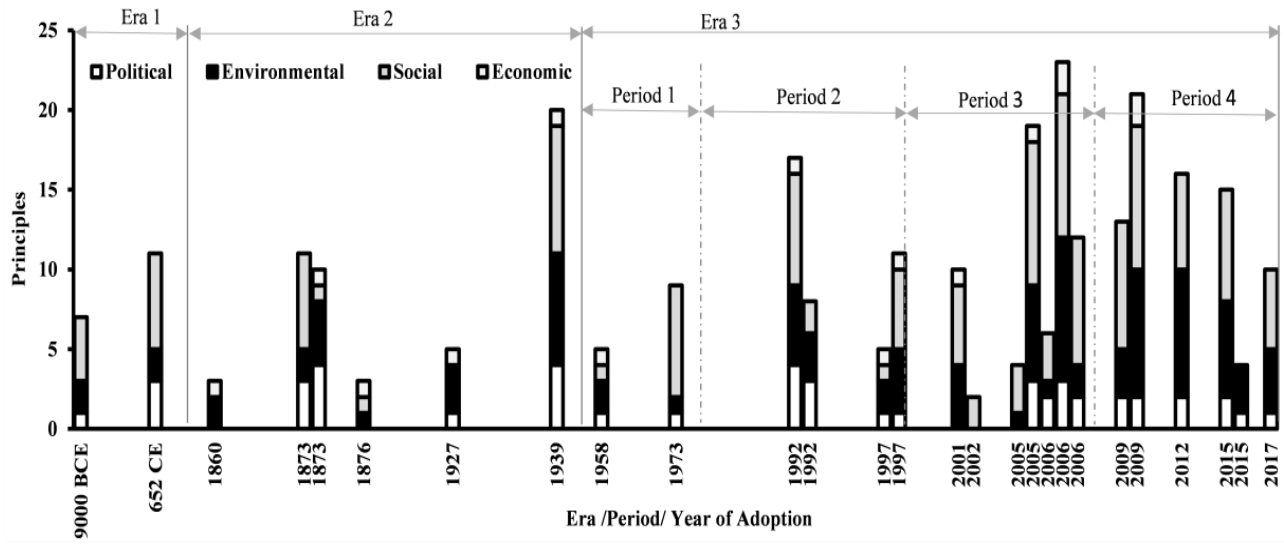

Figure 8.1: Evolution of water governance in Pakistan

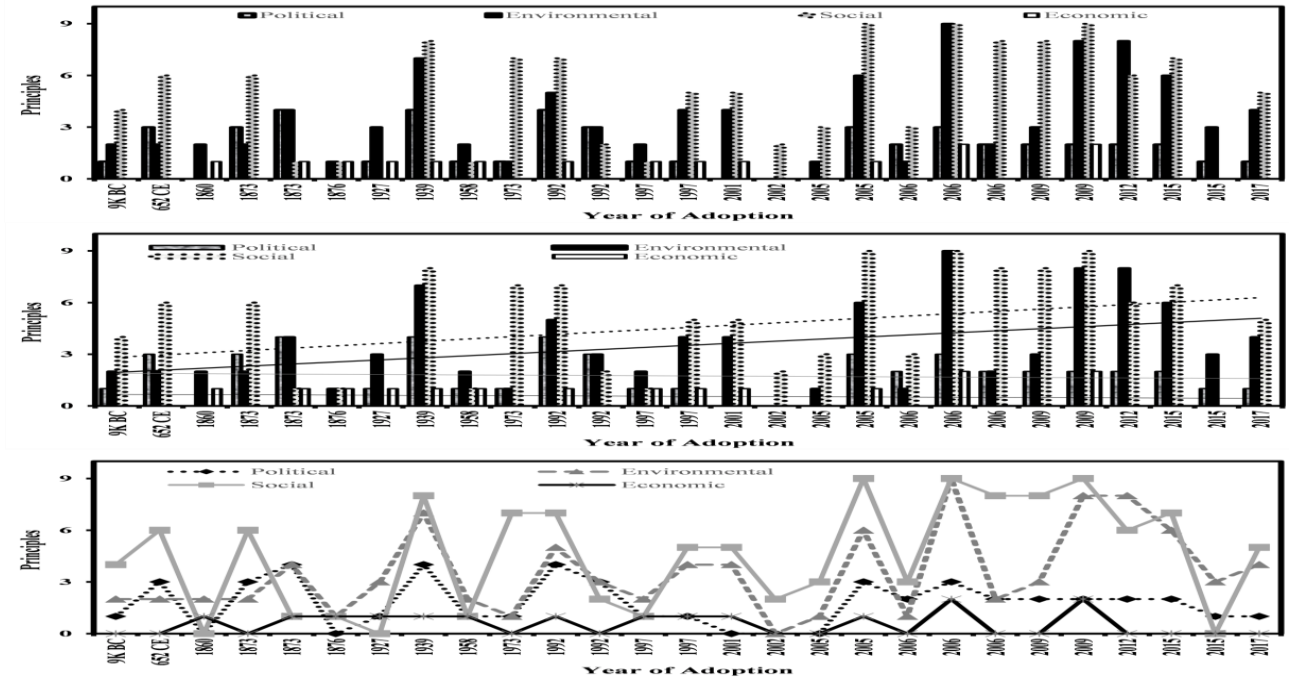

Figure 8.2: (a) Number of included principles (b) overall progress & (c) trend analysis

[105] Interviewee 3, 8.

8.6 GOALS, PRINCIPLES AND INSTRUMENTS

8.6.1 Goals of Freshwater Governance Framework at Multiple Level in Pakistan

Governance frameworks in Pakistan intend to ensure food security and diminish increasing poverty levels by encouraging efficient and sustainable water practices through optimal supply and better management. Furthermore, these policies also aim to accomplish: (1) proper conservation of water resources; (2) water resource development; (3) completion of water related projects in minimum time and cost; (4) equitable distribution of water resources in canal irrigated areas; (5) measuring and reversing fast declining aquifers in low-recharge areas; (6) sustainable groundwater utilisation in high-recharge areas; (7) maximised crop production; (8) improved flood control; (9) ensuring acceptable and safe quality of drinking water; (9) minimisation of salt build-up and other ecological risks in irrigated areas; and (10) institutional reforms in order to make the managing organisations more vibrant and approachable.

8.6.2 Governance Principles in Pakistan's Multilevel Freshwater Governance Frameworks

The governing principles include:

a. Political Principles: Political principles in the local level water governance frameworks include notification about emergencies and planned measures; obligation to cooperate; peaceful settlement of disputes; and exchange of information. The provincial level frameworks include data and information exchange; notification about emergency situations and planned measures; peaceful settlement of disputes; obligation to cooperate. Similarly, the federal/national level include notification about emergency situations and planned measures; peaceful settlement of disputes; information exchange; and obligation to cooperate. Moreover, principles, such as notification about emergency situations and planned measures; obligation to cooperate; peaceful settlement of disputes; exchange of information are common at multiple geographic levels.

b. Social-Relational Principles: Social principles at the local level include equitable and reasonable use; human right to water and sanitation; ensuring public participation; priority of use; public awareness and education; rights of women, youth, and indigenous peoples; intergenerational equity; and poverty eradication. The provincial level frameworks include prior informed consent; equitable and reasonable use; priority of use. Similarly, the federal/national level principles include rights to water and sanitation; public awareness and education; capacity building; equitable and reasonable use; intergenerational equity; poverty eradication; access of general public to information; participation of users; priority of use; women's rights, including youth and indigenous peoples.

c. Ecological Principles: Ecological principles at local level include monitoring; pollution prevention; treating water as a finite resource; and the precautionary principle. Similarly the provincial level frameworks include the river basin as the unit of management; prevention of

pollution; precautionary principle; protected areas for water; monitoring; and water as a limited resource. Similarly, the federal/national level includes prevention of pollution; conservation and protection of ecosystems; monitoring; the principle of precautionary use; protected areas for water use; water as a limited resource; EIA; invasive species; protected areas for recharge and zones for discharge; conjunctive use; and subsidiarity.

Annex I presents the evolution of governance principles in the various frameworks. It shows (a) the principles that are currently in use; the principles that have not been included and principles that are no longer being used. Of course, this does not imply that these principles are actually being implemented all over the country.

8.6.3 Governance Instruments in Pakistan's Multilevel Freshwater Governance Frameworks

This section discusses the instruments through which the principles in the national and sub-national level water governance frameworks are operationalised in Pakistan. These instruments are divided into four categories such as: national level water-specific regulatory (fines, licences, metering, mapping & zoning); economic (subsidies, water pricing); suasive (awareness raising); and management (WUAs) instruments as well as non-water related[106] regulatory (fine, punishment, mapping and zoning), economic (water charges), suasive (awareness raising), and no management instrument. Similarly, provincial level instruments consist of regulatory (telemetry system for monitoring, rules formulation, dispute resolution mechanism), economic (water charges, maintenance of drainage infrastructure, cost recovery), suasive (policies and research for addressing salinity and water logging) and management (area water board, farmer organisation, participatory decision making) instruments. Despite the existence of the above-mentioned complete list of instruments in multilevel water governance frameworks, they have not been effective when it comes to operation on the ground. For example, the telemetry system for real-time data collection for monitoring to ensure inter-provincial trust for water sharing has not been effective as it was tampered with One theory is that the system was deliberately tampered with due to an ownership dispute between the irrigation departments and WAPDA so that they could continue with their corrupt practices with the support of some political elites to take advantage of the situation and advance their political agendas on water sharing. Moreover, the other existing instruments have been ineffective due to weak enforcement mechanisms in the form of low amount of fines, fees for permits and licences and imprisonment as described in the Pakistan Penal Code (1860), which are unable to change the behaviour of actors consuming large quantities of water. Furthermore, suasive instruments are scarcely used and as a consequence people are unaware of the need for changed behaviour.

[106] This is because non-water related policies can directly impact water governance in the country (e.g. food policies, energy policy, environmental policies etc)

8.7 LEGAL PLURALISM ANALYSIS

The analysis of the historical evolution of water governance indicates that water resources in Pakistan are governed through three parallel governance system: the local customs (mostly at community level), sharia law (mostly at community level) and the state legal codes, laws and policies (also see 7.7). Establishing the true relationship among these governance frameworks is complex and a subject of further investigation. However, these governance systems differentially dominate the different levels in Pakistan; and both water-specific and non-water specific laws and policies are governing freshwater resources (see 8.5). Some of these legal and policy instruments are coherent while others are contradictory.

A legal pluralism analysis reveals, first, that when water governance and many water-related matters were decentralised to the provinces particularly after the 18th amendment to the 1973 Constitution of Pakistan, national laws were not automatically translated to the provincial level. Second, on occasion the State integrates principles and instruments from local customs and Sharia Law in water law (see 7.7). Third, legal pluralism occurs when freshwater governance occurs implicitly and explicitly through multiple non-water policies (e.g. environment, forest, agriculture, pasture, food and mining).

As Table 8.4 shows there are instances where the three types of policies lack an operational relationship (type 1) in addressing water issues. These include: 1) water policy promoting water pricing which is missing in other directly relevant policies (e.g. food security policy 2017); 2) Sharia defines types of water as well as promotes conservation and efficient water use whereas these are not well defined in local customs and practices; 3) mapping and zoning for safe and resilient cities are defined in water policies whereas other relevant policies do not address this; 4) WUAs are empowered to collect water charges but these are so minimal that they hardly cover a small portion of O & M costs and; 5) non-water policies mention drainage charges but water policies at national and provincial levels omit this important aspect.

There are policies and customary practices that contradict each other (type 2). These are as follows: 1) the national policy recommends water pricing for productive sectors but these are insignificant particularly in the agriculture sector which is the largest user of freshwater resources in the country; 2) national policies suggest subsidies for enhancing access to clean drinking water whereas non-water policies recommend charges for water supply and drainage; 3) national water policy goals of sustainable water use can be undermined by the provision of subsidies for groundwater tube wells which can deplete water resources without proper regulation. Local customs and Sharia also have contradictions which can undermine achieving policy goals especially at the sub-national level. These include (type 2): 1) local customs allow private ownership which are forbidden in the Sharia; 2) water is treated as an economic good in state laws and policies whereas it is a human right in the Sharia; 4) Sharia has defined priority of uses for drinking, agriculture and livestock as opposed to local customs which do not prioritise water usage for different purpose.

It is also important that different legal instruments, principles and local customs accommodate (type 3) each other by recognising their relevant elements that apply on addressing similar water issues. One example is the participatory water management practices by formulation of WUAs and FOs at the local level.

There are instruments within the water and non-water policies as well as local customs at the national, sub-national and local levels that are mutually supportive to achieve the national water goals (type 4). These include: 1) fines and licences for regulated use and pollution prevention to address the direct drivers of agriculture and industry in both water and non-water policies; 2) subsidies for increasing water access is supported by metering for water efficiency; 3) mapping and zoning for natural changes in all the policies at national and sub-national levels; 4) information and data sharing as well as real-time monitoring of river flows by IRSA is included to reduce water losses; 5) water charges are introduced to cover the costs of operation and maintenance of water infrastructure from productive sectors; 6) penalties are a salient feature of both Sharia and the national water policy for pollution prevention and; 7) research promotion and awareness raising to address natural changes (floods, droughts) are an important part of the Pakistan water governance framework. Furthermore, Pakistan‘s water policies encourage metering to increase accessibility by rational water use that can be supported by increasing water quality as envisaged in a number of non-water policies at the national level. Similarly, the National Water Policy recognises the Inter-Provincial Water Apportionment Accord 1991 that ensures pre-defined water sharing among the provinces to address the indirect driver of political dynamics between the provinces.

The analysis of legal pluralistic forms of water governance indicates that the three levels of water governance (national, provincial and local) as well as the three types of legal frameworks (local customs, Sharia and state laws) further complicate water governance and reduce effectiveness of water policies and their implementation. In addition to the issues linked to pluralistic forms of water governance, Pakistan‘s water governance frameworks are influenced by the national water security narratives that are often linked to the national security paradigm promoted by the security establishment which is a key player in shaping the foreign policy development especially with India and Afghanistan, both of which have transboundary water sharing mechanisms with Pakistan. For example, in India‘s case, water issues are often linked to India as using Pakistan‘s water share in the Indus, which overshadows other governance challenges linked to water conservation. Rather than focussing on water conservation issues within the country, the security narrative focuses on water usage by India (and more recently climate change) and advances the construction of large water storage reservoirs[107] to address Pakistan‘s water challenges.

[107] For example, the Supreme Court of Pakistan and the Prime Minister have established a fund for construction of two large water reservoirs (Dimaer-Bhasha and Mohmand): http://www.supremecourt.gov.pk/web/page.asp?id=2757

Table 8.4: Legal pluralism analysis of water governance frameworks in Pakistan

Quality	Weak relations	Strong relations
Contrary	***Type 1: Indifference*** - lack operational relationship among principles/instruments - Water pricing (water policy); not addressed in other policies (food policy) - Types of water defined in Sharia, but not specified in local customs (see Table 7.4) - Conservation & efficient water use well defined in Sharia but not in local customs & practices (see Table 7.4) - Mapping & zoning for safe & resilient cities (water policy) - Water charges collection by WUAs can ensure cost recovery for O & M when water pricing is adequate /sufficient - Drainage charges in non-water policies; missing in provincial & national policies	***Type 2: Competition*** - contradiction among principles/instruments - Water pricing for productive sectors whereas nominal charges in agriculture sector - Subsidies for increased access (water policy); charges for supply & drainage (non-water policies) - Subsidy for groundwater mining at provincial levels[108] (KP and Balochistan) undermines national water policy goals - Private ownership forbidden in Sharia but allowed in customs (see Table 7.4) - Water as an economic good (state law) & human right (Sharia) (see Table 7.4) - Priority of use in Sharia but not in local customs (see Table 7.4) - Water reuse in customs but prohibited in Sharia (see Table 7.4)
Affirmative	***Type 3: Accommodation*** - recognition of principles/instruments - Increasing accessibility by metering (water policy), increasing water quality through fines (non-water policies) - Recognition of Inter-provincial Water Apportionment Accord 1991 (water policy) - Policies & research on salinity & water logging to address agriculture development - Participatory water management through formation of FOs & WUAs including informal conflict resolution mechanisms (e.g. Jirga system) at local level	***Type 4: Mutual support*** - principles/ instruments support each other - Fines and licences for regulated use & pollution prevention addressing agriculture & industry - Increasing accessibility by subsidies for groundwater & increasing efficiencies by metering (water policy) - Mapping & zoning for addressing natural changes in water, non-water and provincial policies - Information & data sharing for all water uses - Real-time monitoring of rivers flows by IRSA to address water losses - Water charges recovery from productive for O & M of water infrastructure - Penalties for pollution in both water & Sharia law (see Table 7.4) - Awareness raising and research promotion for addressing natural changes & variability

Source: Modified from Bavinck and Gupta 2014

8.8 PRINCIPLES AND INSTRUMENTS ADDRESSING DRIVERS AND ACHIEVING INCLUSIVE AND SUSTAINABLE DEVELOPMENT

8.8.1 Principles and Instruments Addressing Drivers through the National Water Policy of Pakistan

In this section, I analyse how the four types of instruments at national level (regulatory, economic, suasive and management) are reflected in Pakistan‘s 2018 National Water Policy (NWP), and to what extent these instruments address the identified direct (agriculture, industry, demographic shifts)

[108] These subsidies in under-developed promote commercial use of groundwater, which can affect groundwater levels undermining water sustainability at local levels for subsistence use.

and indirect (political dynamics within states, culture and ethnic elements, non-water policies, economic growth, poverty, technology, international trade and natural changes) drivers that are responsible for freshwater problems at national level (see Table 8.5).[109] The evolution of freshwater governance policies at national level indicates that drivers of freshwater problems are not systematically addressed by the policy instruments in the 2018 NWP. Although normative principles of ESS protection, biodiversity conservation, ensuring access and equitable allocation and distribution of freshwater resources among the key sectors exist in more than half of freshwater and other environment-related policies in Pakistan, they are poorly implemented through instruments (e.g. regulatory, economic, suasive and management). For instance, provision of clean drinking water is a policy objective and a human right in a number of policies in Pakistan. However, 84% of the population does not have access to safe drinking water and only 42% of people have access to sanitation services out of which 65% are in urban areas and 30% are in rural areas (Daud et al. 2017; The DAWN 2017). According to the Global Joint Monitoring Programme Report, 25 million cases of diarrhoea are reported annually, and more than 300 children die every day due to poor sanitation and hygiene services in Pakistan. The high mortality rate for children under the age of five ranks Pakistan second in South Asia (Chao et al. 2018; The Express Tribune 2018). I analyse below whether the instruments adopted address the drivers.

a. **Regulatory instruments:** In terms of regulatory instruments, the National Water Policy relies on fines and licenses for regulated use and pollution prevention to address direct drivers. For example, water use licenses for regulated freshwater use in industries including commercial agriculture, manufacturing and mining (e.g. recent SC regularisation of mineral water companies)[110] is an effective policy measure for addressing scarce freshwater resources in the country. In terms of addressing direct drivers, the policy includes imprisonment for polluting by industries including commercial agriculture, manufacturing and mining. To address demographic drivers (e.g. to cater for the needs of growing population, increasing urbanisation), strict rules on licenses, penalties including imprisonment exists to govern water use sustainably. Moreover, metering of urban water provision services can also enhance access to WSS by reducing water losses and extend piped water to the poor. Penalties can result in enhanced access to improved freshwater quality and reduction in wastewater quantity. Similarly, mapping and zoning for flood protection and urban settlements is an effective instrument for sustainable urbanisation.

b. **Economic Instruments:** The policy includes some economic instruments in the form of subsidies and pricing to address the poverty driver. Although I analyse national level instruments in this section, some instruments also address drivers at subnational level. For example, to enhance the access to water and sanitation services (WSS) for a growing population (provincial level direct driver), provision of subsidies for low-income groups makes freshwater

[109] Interviewee 2, 17.
[110] SC summons owners of 11 mineral water companies on Nov 20: https://www.dawn.com/news/1446565.

affordable. The improved access to WSS directly addresses the indirect driver of poverty reduction (by reducing health related costs) and improved health conditions especially for women and children. Water is generally considered as a free and infinite resource by most users which results in inefficient and wasteful usage in a number of sectors. Water pricing for productive sectors can enhance economic and financial sustainability of water services provision and improve sustainable water use practices at the local level. Revenue generation from large productive sectors not only helps in regulating water usage quantities but can be invested in improving water resources. Provision of subsidies for groundwater abstraction can enhance access to WSS, but subsidies for solar pumping can also reduce water levels when these are used for commercial purpose (i.e., large scale agriculture and industries). Moreover, promotion of tube wells through subsidised electricity and technology can result in unsustainable water use due to weak monitoring and governance mechanisms at the local levels. Although subsidies can be effective economic instruments, there are some contradictions in terms of subsidies that can directly affect the objectives of water conservation. The current water charges are minimal and cover a fraction of operation and maintenance costs of irrigation system. Moreover, the recovery of water charges (Abiana) is highly inefficient. Policy documents recommend improving the water charges recovery system but without any enforceable instruments (National Water Policy of Pakistan 2018).

c. **Suasive instruments** also form an important part of the water policy document in the form of awareness raising and research promotion. Public awareness creation has a separate section within the document for sustainable domestic water use. This is implemented through media and inclusion in the curriculum at primary, secondary and tertiary levels of education. It is envisaged that the respective departments of Irrigation and Water Management will develop awareness campaigns within their regular activities. Agriculture is the largest user of freshwater resources with large inefficiencies due to flood irrigation. Improved farming practices in terms of water efficiency and pollution prevention are mentioned as target areas of the policy. Research within the agriculture universities as well as a national research agenda on sustainable water resource use is envisaged with budget allocation for research activities. Although the prescribed suasive instruments can address behaviour change through information dissemination to the general public and curriculum development, they need to be supported by other regulatory and economic instruments for enforcement. In the present form the prescribed suasive instruments resemble normative principles due to lack of effective enforcement measures.

d. **Management Instruments:** The participatory irrigation management system promotion forms a core part of the management instruments for inclusion of all irrigation stakeholders in decision-making processes to address agriculture. Stakeholder participation has a separate section in the 2018 NWP for decision making in the areas of irrigation, drainage, domestic water supply, flood protection and drought mitigation and pollution prevention. Inclusion of women is also a stated objective of NWP, but it does not spell out the specific mechanisms and forums for ensuring participation. Water User Associations (WUAs) are one of the specific measures for involvement of farmers and water users in decision making processes at the local level for

equitable water distribution and operation and maintenance of irrigation infrastructure. However, their effectiveness in terms of equitable distribution of water and representation of disadvantaged groups and small famers has been questioned in the Punjab and Sindh provinces especially in the tail end of canals (Qureshi, 2011). Moreover, these participatory organisations lack legitimacy to enforce penalties, fines and punishments due to administrative issues.

Table 8.5: Instruments addressing drivers in Pakistan‘s national water policy

Direct Drivers	**Instruments**			
	Regulatory	**Economic**	**Suasive**	**Management**
Agriculture development (e.g., commercial agriculture including animal husbandry, the extractive sector & water use in energy)	Fines & licences for regulated use, pollution prevention	-	Awareness raising	WUAs for O & M, collection of charges
Industry (including services and infrastructure)	Fines & licences for regulated use, pollution prevention	-	-	-
Municipal water supply & sanitation services e.g., household uses (drinking water, sanitation, & hygiene) & subsistence agriculture	Metering for WSS for increasing demand /population	Subsidies for WSS access	-	-
Demographic shifts (i.e., migration, population growth, increase in population density, urbanisation, population growth)	Mapping and zoning for safe & resilient cities	-	-	-
Indirect Drivers				
Political dynamics between/within states	-	-	-	-
Culture & ethnic (attitudes for access & allocation, wasteful use of resources, etc.)	-	-	Awareness raising	-
Non-water-related policies (agriculture & food security, land use, land tenure, economic development)	-	-	-	-
Economy (economic growth)	-	Water pricing productive sector	-	-
Poverty	Metering for WSS Subsidy for groundwater abstraction	Subsidies for access to WSS	Awareness raising	-
Technological advances (agriculture intensification)	-	Subsidy for groundwater abstraction	-	-
International trade (e.g. _globalisation‘ or trade in virtual water)	-	-	-	-
Natural change and variability in weather, Droughts; Floods; Landslides, Tectonic movement.	Mapping and zoning	-	Awareness raising & research promotion	-

8.8.2 Principles and Instruments Addressing Drivers through National Level Non- Water Policies/Laws

This section analyses how the four types of instruments are reflected in Pakistan‘s non-water related policies and whether these instruments address the identified direct and indirect drivers of freshwater problems at national level (see Table 8.6).

a. **Regulatory Instruments:** Except for Pakistan Penal Code 1860 and Cantonment Ordinance 2002, other policies do not contain any effective regulatory instruments to address direct and indirect drivers. Additionally, the punishment and fines in the Penal Code are insufficient to change behaviour of actors when implemented. Similarly, the Cantonment Ordinance only covers the cantonment areas (mostly in cities) and is not applicable to large water bodies, reservoirs and rivers. It also includes fines for pollution prevention, industrial waste disposal, water contamination, damage to water infrastructure, and water diversion in cantonment to address the direct drivers of agriculture, industry and municipal water supply. The rest of the policies consist of normative principles and recommendations and lack effective instruments to change actors‘ behaviour. For example, mapping and zoning of protected areas is the stated objective of National Wetlands Policy but lacks effective instruments and enforcement measures to address the identified drivers

b. **Economic Instruments:** Except for the Cantonment Ordinance which includes charges, taxes and fees for water supply and drainage but are not applicable to large water bodies including rivers, other policies lack effective economic instruments to address the drivers of freshwater issues. For example, the Drinking Water Policy 2009 mentions water pricing and equitable provision as policy objectives but without proper instruments to support realisation of these policy objectives. Similarly, economic valuation of wetlands and financial incentives for solar water desalination are mentioned as policy measures in the national wetlands and climate change policies respectively, however, these are not backed by proper enforcement mechanisms. Without relevant economic instruments, these goals cannot be achieved.

c. **Suasive Instruments:** Suasive instruments are one of the most common instruments found in all of the analysed non-water policies in my research context. My analysis shows that awareness creation and education are most commonly cited objectives in policy documents covering drinking water, sanitation, wetlands, forestry, environment, biodiversity, climate change and related areas. Many policies also address gender aspects and focus on inclusion of women and disadvantaged groups. These suasive instruments can enhance awareness about water issues linked to a number of drivers, but these instruments alone are insufficient to address the root causes of water governance issues if not supported by regulatory and economic instruments. Some policies recommend removal of subsidies, promotion of clean energy and promotion of water & energy pricing but are not enforceable without supportive instruments to change behaviour of relevant actors. Additionally, the key demographic drivers are difficult to be addressed solely by awareness raising campaigns as envisaged in majority of the policies.

d. Management Instruments: Self-regulation and voluntary management mechanisms have been promoted by a growing number of organisations such as large bilateral and multilateral donor organisations and the UN system and are increasingly adopted by government and non-government organisations for management of natural resources including water. These management instruments are reflected in a number of policies linked to water resources. However, when it comes to implementation, the unsupportive administrative rules and legitimacy of these mechanisms hampers their effective implementation. For example, community-managed forestry promotion or community-based water management without the legal powers to sanction and impose fines renders these instruments ineffective for addressing acute water management and related issues.

Table 8.6: Instruments in non-water policies addressing drivers at national level in Pakistan

Direct Drivers	**Instruments**			
	Regulatory	**Economic**	**Suasive**	**Management**
Agriculture development (e.g., commercial agriculture including animal husbandry, the extractive sector and water use in energy)	Fine & punishment for pollution prevention	-	-	-
Industry (including services and infrastructure)	Fine & punishment for pollution prevention, industrial waste disposal, water diversion, infrastructure damage	-	-	-
Municipal water supply and sanitation services e.g., household uses (drinking water, sanitation, and hygiene) and subsistence agriculture	Fines for pollution from subsistence practices	Charges for supply/drainage	-	-
Demographic shifts (i.e., migration, population growth, increase in population density, urbanisation, population growth)	-	-	-	-
Indirect Drivers				
Political dynamics between/within states	-	-	-	-
Culture and ethnic (attitudes on access/allocation, waste, etc.)	-	-	Awareness raising	-
Non-water-related policies (agriculture & food security, land use, land tenure, economic development)	-	-	-	-
Economy (economic growth)	-	-	-	-
Poverty	-	-	-	-
Technological advances (agriculture intensification)	-	-	-	-
International trade (e.g. _globalisation‘ or trade in virtual water)	-	-	-	-
Natural change and variability in weather, Droughts; Floods; Earthquakes; Landslides, tectonic movement.	Mapping and zonning	-	-	-

8.8.3 Principles and Instruments Addressing Drivers at Provincial Level in Pakistan

This section analyses how the four types of instruments are reflected in Pakistan‘s provincial level policies and whether these instruments address the identified direct and indirect drivers of water problems at the provincial level (see Table 8.7).

a. **Regulatory Instrument:** The Indus Water Apportionment Accord is a policy instrument for water distribution among the provinces and does not address any direct drivers of freshwater problems in Pakistan. The Accord permits a minimum water flow of 10 MAF into the sea below Kotri Barage and distributing the remaining among the four provinces based on historical water usage including priorities for industrial and urban usage[111]. In this way, the Accord permits unpredictable water flow in the Indus, and ensures that all provinces gain from surplusses or losswa in supply. The IRSA Accord introduced a telemetry system for monitoring discharge for sharing allocations among the provinces and formed rules for inter-provincial share in water quantities. It set up the Indus Rivers System Authority (IRSA) with administrative powers for inter-provincial dispute resolution mechanisms over water sharing and addresses the indirect driver of political dynamics between and within states. However, it does not contain any penalties for violation of rules. There have been some substantial inter-provincial differences over water despite the IRSA Accord, particularly with Punjab, which is perceived as the larger, upstream province that controls the water infrastructure, by the smaller and downstream provinces.

The Sindh province in particular is worried that the current water flow is inadequate to meet the minimum requirements for inflow into the sea and, therefore, seawater now has reached up to 100 km inland. This saltwater intrusion has caused damages to the agricultural lands in lower Sindh. It has negatively affected ecosystems, the quality of soil, as well as both water quantity and quality for the District Thatta and in lower Sindh, which has resulted in increased diseases and health issues for local people (Mahmood et al. 2014; Qureshi 2011). These political differences and water allocation issues are likely to increase as water shortages in other areas of Pakistan are affecting urban and rural areas. The idea of minimum ecological flows had origins in the inter-provincial water accord where the minimum required flow downstream of Kotri Barrage was agreed at 10 MAF. However, this minimum flow has rarely been the case in practice. There are serious inter-provincial differences about the construction of Kalabagh Dam, which is supported by Punjab and Khyber Pakhtunkhwa (formerly called the North-West-Frontier-Province or NWFP) and opposed by Balochistan and Sindh.

Issues over freshwater resources among the provinces in Pakistan are very similar. For example, the Province of Khyber Pakhtunkhwa (KP) is anxious about the communities‘ displacement and land

[111] Apportionment of the waters of the Indus River System between the provinces of Pakistan: http://pakirsa.gov.pk/WAA.aspx

loss in Peshawar, Nowshera, and Charsadda due to flooding in the case of earthquakes. Balochistan is worried about the available freshwater supplies as the dam might strengthen Punjab‘s position to control the water resources. Sindh as the tailender is worried about the decreasing water quantity reaching the province. In April 2006, the foundation stone for the Diamer-Bhasha dam was laid by the then President General Pervez Musharraf in Northern Pakistan to divert people‘s attention away from the controversial Kalabagh Dam. It is said that the Diamer-Bhasha reservoir will not affect the KP Province but can have consequences for the Chilas valley in the Northern Areas which might be affected. Furthermore, it is not likely to affect the water shares of other provinces since water rights are clearly safeguarded in the Indus Water Accord-1991. For the improvement of the Accord, it has been suggested that: i) water audits prepared by IRSA should be made publicly available, ii) the terminology should be properly defined to avoid differing interpretations, iii) financial penalties for violation of the Principles of Accord should be adopted, and iv) a third party independent water auditor should be engaged to audit the national water resources, with the broader objective of increasing trust and credibility in the data and information released by IRSA to stakeholders (Anwar and Bhatti 2017).

The Canal and Drainage Act 1997 also refers to the Water Apportionment Accord (1991) for inter-provincial allocations as the basis and aims to ensure equitable and reliable irrigation water distribution, effective drainage and flood control.

a. **Economic Instruments:** The Canal and Drainage Act uses economic instruments where the Farmers‘ Organisations are accountable to control, accomplish and enhance irrigation and drainage infrastructure, collect water charges and other fees to be used for operation and maintenance and institutional sustainability of the FOs. These two economic instruments address the direct driver of agriculture development and the indirect driver of natural changes (flood protection).
b. **Suasive Instruments:** The Act promotes policies and research for tackling the severe issues of water logging and salinity for addressing the most important driver of agriculture development, which is the largest consumer of freshwater resources in Pakistan.
c. **Management Instruments:** The Provincial Act also relies on management instruments by formation of FOs for self-regulation and management of the irrigation systems at the distributary level and addresses the direct driver of agriculture development. The Act aims to improve water use efficiency through formation of the Area Water Boards (AWBs) and the Farmers Organisations (FOs) for management and development of infrastructure related to irrigation, drainage and iflood control. The Act aims to authorise water users by employing regulatory instruments where the AWBs are to articulate and implement policies with a view to accomplish and uninterruptedly enhance effective, economical and well-organized operation of irrigation water at its disposal and promote development, growth and development of FOs including pilot projects for FOs.

Table 8.7: Instruments addressing drivers at provincial level in Pakistan

Direct Drivers	*Instruments*			
	Regulatory	**Economic**	**Suasive**	**Management**
Agriculture development (e.g., commercial agriculture including animal husbandry, the extractive sector and water use in energy)	-	-	Policies & research for addressing salinity/ water logging (CDA 1997)	Area Water Board, FOs for participatory decision making O & M through FOs
Industry (including services and infrastructure)	-	-	-	-
Municipal water supply and sanitation services e.g., household uses (drinking water, sanitation, and hygiene) and subsistence agriculture	-	-	-	-
Demographic shifts (i.e., migration, population growth, increase in population density, urbanisation, population growth)	-	-	-	-
Indirect Drivers				
Political dynamics between/within states	Telemetry systems for water share monitoring Rules formulation for inter-provincial water share Formulation of IRSA for inter-provincial dispute resolution	-	-	-
Culture and ethnic (attitudes for access and allocation, wasteful use of resources, etc.)	-	-	-	-
Non-water-related policies (agriculture & food security, land use, land tenure, economic development)	-	-	-	-
Economy (economic growth)	-	-	-	-
Poverty	-	-	-	-
Technological advances (agriculture intensification)	-	-	-	-
International trade (e.g. „globalisation‘ or trade in virtual water)	-	-	-	-
Natural change and variability in weather, Droughts; Floods; Earthquakes; Landslides, tectonic movement.	-	Maintenance of drainage infrastructure for flood protection; O & M cost recovery for flood protection	-	-

8.8.4 Instruments Contribution in Achieving Inclusive and Sustainable Development

The inclusion of instruments in the governance frameworks through the three periods (i.e., pre-colonial, colonial and modern) are different. Remarkable progress is recorded in the last two decades where many new and diverse frameworks were developed with the inclusion of regulatory, economic, suasive and management instruments to promote inclusive and sustainable development. To protect the environment there are twelve normative environmental and social principles in the governance frameworks but there is no strong regulatory or economic instrument to endorse these normative principles. The analysis of the inclusion and distribution of principles and instruments over three major eras and across all water governance frameworks reveals weak linkages between instruments and dimensions of inclusive and sustainable development.

The inclusion of economic principles in considerable numbers specifies the economic direction of the policy to consider water as an economic good. Similarly, normative environmental principles are adopted in considerable numbers because Pakistan has ratified various Multilateral Environmental Agreements (including Kyoto Protocol, the United Nations Framework Convention on Climate Change, the Ramsar Convention on Wetlands, United Nations Convention on Biological Diversity, etc.),[112] but in terms of addressing environmental issues there is no single instrument to protect and preserve ecosystems by endorsing penalties or developing strict regulations. Pakistan has very obvious environmental challenges including threats to freshwater resources, receding glaciers and low rainfall which can become worse with the growing challenges of climate change. Additionally, industrial activities including large scale mining as well as population growth have degraded water quality and reduced water availability due to weak enforcement mechanisms and low penalties in the Pakistan Penal Code. Addressing these challenges requires strict regulatory instruments such as mapping and zoning which can prevent pollution and may also protect water recharge and discharge zones.[113] These instruments can effectively counter the power politics challenges if it comes in conjunction with an information sharing mechanism among actors and stakeholders involved.

Similarly, subsidies for social uses and solar tube wells are two contradicting instruments which can further reduce access for the poor to WSS. Despite the inclusion of dozens of normative principle, various governance frameworks are still unable to cope with severe pollution-related issues throughout Pakistan.[114] Key drivers, such as water supply for food production and human activities, political dynamics among provinces to share water resources equitably and efficiently and non-water related policies which contradict many water conservation-related efforts play a key role in making the water scarcity situation worse. Further, instruments to deal with social drivers such as mounting poverty and access to clean and potable drinking water and sanitation principles are commonly designed to address the freshwater role in providing supplies in emergencies and dealing with

[112] Interviewee 2.
[113] Interviewee 1, 10.
[114] Interviewee 3.

changing geopolitics, demographic shifts, as well as to support equitable or rights-based allocation. In terms of the scopes of inclusive and sustainable development the lack of interest of the Government of Pakistan towards social-ecological development reveals less investment in empowering communities through providing education. On the other hand, it also indicates that the lack of social-ecological development can lead to lack of coordination among different levels and stakeholders. As such, there is less potential for inclusive development and little prospect for sustainable development.

8.9 HOW DO POWER AND INSTITUTIONS INFLUENCE WATER SHARING IN PAKISTAN?

Similar to Afghanistan, water governance in the pre-colonial era in today‘s Pakistan was also based on local customs and principles of Sharia where the community collectively conserved and managed water resources. With colonialism and the introduction of formal water laws, the institutional architecture in Pakistan has resulted in a legal pluralistic form of governance. The devolution of water governance from federal to provincial level in 2010 and the, contradiction between customs, sharia and modern water laws and policies and the disaggregation of water governance in non-water laws and policies has created an incoherent water governance system that does not address the drivers of water problems and hence is unable to change the behaviour of water users.

Pakistan‘s water laws continue to reflect colonial era priorities (e.g. Canal & Drainage Act 1873) such as market-based principles that promote individual water rights, unilateral control and regulation, which result in income disparities between small and large farmers as well as consolidated centralised water management system. Historically, water infrastructure development including construction of large water reservoirs and dams in the upstream area and water sharing among the provinces continues to be a highly politicised issue despite the 1991 Inter-provincial Water Apportionment Accord, which ensures fixed allocation among provinces through a monitoring mechanism. Due to some ambiguities and room for interpretation in the Accord, it favours the powerful upstream province of Punjab. Inter-provincial water issues have created mistrust and imbalanced power relations among provinces allowing for the inclusion of some groups and the exclusion of others, where socio-economically weak provinces (Khyber Pakhtunkhwa and Balochistan) and the downstream province of Sindh blame the stronger upstream province of Punjab for inequitable water distribution. As a result of the centralised water bureaucracy, colonial legacies and corrupt practices, water governance reforms have been slow where water policies continue to promote conventional irrigation and agricultural practices that favour large farmers as opposed to small land-holders. Similarly, domestic water governance issues are masked by highlighting transboundary water issues with India and Afghanistan (due to security-based foreign policy towards these countries) which further tightens the grip of national government over water policies. The resulting centralised policy orientation – highly influenced by the water security narrative in the context of transboundary issues with Afghanistan and India – promotes construction of large water reservoirs as opposed to addressing traditional water conservation and agricultural practices to tackle inter-provincial water sharing and diffuse power struggles among the provinces.

8.10 INFERENCES

This chapter has described and analysed multilevel freshwater governance in Pakistan. It has done so by looking at (1) how the various characteristics including ESS and drivers of freshwater problems are taken into account at multiple geographic levels in Pakistan; (2) how governance frameworks have evolved at multiple geographic levels in Pakistan; (3) which governance instruments address the drivers of freshwater problems at multiple geographic levels in Pakistan; (4) how legal pluralism can be observed at multiple geographic levels in Pakistan; and (5) how power and institutions influence freshwater governance frameworks at multiple geographic levels in Pakistan. Through these sub-questions, this chapter draws five conclusions.

First, water sharing among provinces in Pakistan is a highly politicised issue and is often employed as an instrument to promote the political interests of different national and local actors. The devolution of power from the federal government to the provinces after the 18th Constitutional Amendment has complicated the governance of natural resources including cases where small provinces (e.g. KP and Balochistan) blame large provinces (Punjab and Sindh) for water theft. This has created mistrust among the provinces despite the 1991 Interprovincial Water Apportionment Accord among the provinces. Historical water infrastructure development and controversies surrounding the construction of large dams contribute to further tensions between local and national actors. Furthermore, with the disclosure of CPEC‘s Master Plan, the Chinese objectives and concerns in Pakistan are very obvious where, for example, there are plans to lease out thousands of acres of productive agricultural land to a number of Chinese enterprises which may cause displacement and exclusion of small local farmers leading to social and political unrest and further water allocation issues.

Second, since a large population directly and indirectly depends on freshwater related BESS, the severity of water scarcity, poor water governance and climatic changes and variability can directly affect food security, livelihoods and the economy of the country. The diverse climate zones of Pakistan can be significantly altered affecting its flora and fauna. Human development, industrialisation and urbanisation in Pakistan has led to the extinction of many species that were still common at the turn of the century. The Indus River System is vital for Pakistan's water and food security since more than three quarters of Pakistan‘s population lives in the Kabul-Indus basin. Furthermore, water from the Kabul-Indus Basin irrigates more than 80% of the nation's cropland. Pakistan has recently hit the _water scarce mark‘ (with current annual per capita water availability of 1017 m3) and according to some estimates Pakistan could _run dry‘ by 2025.

Third, identification of key direct and indirect drivers of freshwater challenges is the first step towards addressing water challenges in the country. Key direct drivers include: a) increasing water demand for agriculture and industrial practices including commercial agriculture, manufacturing and mining, as well as other water-intensive activities under the China-Pakistan-Economic-Corridor (CPEC); b) water and sanitation needs of the growing population (2% growth rate in 2018) and unsustainable rapid urbanisation. Key indirect drivers of the water problems are related to political

dynamics within states, including mistrust and unbalanced power relations among provinces, despite the 1991 Interprovincial Water Apportionment Accord which ensures fixed allocation with a monitoring mechanism among provinces. Transboundary water issues with India (in addition to building dams in Afghanistan) are considered key issues in the national and water security context, which often mask domestic water governance issues. Negligence about the domestic water crisis including climatic and environmental changes and legacies of the colonial laws which are still in practice, support conventional irrigation and water management practices. Demographic, socioeconomic changes, and the impacts of climate change in the Kabul-Indus Basin over the next 25 years are likely to place the Interprovincial Accord under increased scrutiny.

Fourth, the institutional architecture is characterised by legal pluralism because of the continued application of colonial laws, local customs and Sharia, as well as three levels of often different water governance frameworks (national, provincial and local). This has reduced the effectiveness of water policies and their implementation in Pakistan. Moreover, Pakistan‘s water governance frameworks are influenced by the national water security narratives that are often linked to the national security paradigm promoted by the security establishment. Due to the contradictions and lack of coherence in these plural governance frameworks various direct and indirect drivers are unlikely to influence important actors‘ behaviour towards achieving the goal of equitable water allocations among provinces and key sectors. Water governance in the pre-colonial era in today‘s Pakistan was based on local customs and principles of Sharia where the community collectively conserved and managed water resources. Subsequently, some of the principles of local customs (such as ‗Warabandi‘) were codified by the colonial administration. In local customs, access to water resources is attached to ownership and size of irrigated land as well as to contributions in the construction and maintenance of infrastructure. The British Colonial Administration introduced market-based principles and instruments based on individual rights for natural resource utilisation including water, which resulted in income disparities between rural and urban populations as well as between small and large farmers. Water laws and other policies created during the colonial administration were mainly to control and regulate water unilaterally and do not serve the needs of current day Pakistan. In addition, the security establishment is a key player in shaping foreign policy development especially with India and Afghanistan, both of which have transboundary water sharing mechanisms with Pakistan.

Fifth and finally, the analysis of the inclusion and distribution of principles and instruments over three major eras and across all water governance frameworks reveals weak linkages between instruments and dimensions of inclusive and sustainable development. The inclusion of economic principles in national water policies in considerable numbers specifies that water should be treated as an economic good. Similarly, normative environmental principles have been adopted in considerable numbers because Pakistan has ratified various Multilateral Environmental Agreements (including the Kyoto Protocol, the United Nations Framework Convention on Climate Change, the Ramsar Convention on Wetlands, the United Nations Convention on Biological Diversity, etc.). However, in terms of addressing environmental issues there is hardly any effective instrument for

preservation of ecosystems by endorsing penalties or developing strict regulations or adopting subsides.