



SUB-NATIONAL WATER DIALOGUE KHYBER PAKHTUNKHWA



Copyright © 2018 Civil Society Coalition for Climate Change (CSCCC)

Suggested reference: Civil Society Coalition for Climate Change (2018).
Sub-National Water Dialogue Khyber Pakhtunkhwa

📍 3rd Floor 14 Feroz Center, Block D, Fazl-ul-Haq Road,
Blue Area, Islamabad 44000, Pakistan

🌐 www.cscgcc.org.pk
✉ info@cscgcc.org.pk
f [cscgccpak](#)
🌐 climateinfo.pk



Civil Society Coalition for Climate Change (CSCCC)

CSCCC provides a networking platform for civil society organizations, climate experts, academia, researchers, media, private sector and concerned citizens to exchange ideas and build synergies while preserving and strengthening the autonomy and independence of its members. The coalition approach was adopted to enhance civil society capacity for effective engagement with policy makers to support mitigation and adaptation actions that build resilience and reduce vulnerability at all levels by integrating adaptation into relevant socio-economic and environmental policies for sustainable development. The concept of the coalition is in line with the Lima-Paris Action Agenda (LPAA) and Paris Agreement on Climate Change which recognizes civil society as a key player in framing climate policies to strengthen climate governance. The strategic focus of the coalition also covers Agenda 2030 for Sustainable Development particularly SDG13 (Climate Action). CSCCC works with "A Whole of Government Approach" and follows the guidelines of "Open Government Partnership (OGP)" to achieve its objectives.

The Civil Society Civil Society Coalition for Climate Change (CSCCC) is a licensed Coalition (registered under Section 42 of the Companies Ordinance, 1984) dedicated to highlighting the subject of climate change in Pakistan and influencing policymaking at the regional, national and subnational levels through research, knowledge-sharing, and advocacy.

CSCCC PARTNERS



TABLE OF CONTENTS

EXECUTIVE SUMMARY	01
INTRODUCTION	02
National Water Policy	02
Sub-National Context of the NWP	02
BACKGROUND & CONTEXT	04
Demographic Profile of Khyber Pakhtunkhwa	08
KPK Climate Change Profile	09
Impact of Climate in KPK	10
Agriculture and Livestock	10
Energy	10
Health	10
Environment and Forestry	11
Disaster Risk Reduction	11
Impact of Climate Change on Water available in Khyber Pakhtunkhwa	11
KHYBER PAKHTUNKHWA WATER DIALOGUE	13
Methodology	13
Dialogue Overview	13
Panel Discussion	15
Key Takeaways	16

EXECUTIVE SUMMARY

The National Water Policy (NWP) approved by the Council of Common Interests in April 2018, awards the provinces a significant role in setting the direction for, and the actual implementation of the Policy. Given that irrigation, agriculture, rural and urban water supply, environment and other sub-sectors are provincial subjects, the preamble of NWP states, 'It is a national framework within which the provinces can develop their master plans for sustainable development and management of water resources'. The Policy calls for the setting of major national targets for the water sector on water conservation, water storage, irrigation, water treatment and drinking water, and states that, 'These targets can be firmed up in consultation with the provincial governments and reviewed periodically for inclusion in the 12th and 13th Five Year Plans and future plans.

The Civil Society Coalition for Climate Change undertook the task of convening water dialogues with a whole of government and civil society approach at the sub national level. The dialogues were designed to assemble stakeholders from the relevant government departments, civil society, academia, private sector and the media to develop a set of recommendations for the provincial Master Plan as stipulated in the NWP to achieve the provincial water targets. The high level plenary was followed by focused group work in which broad thematic areas (water storage, water treatment, water conservation, irrigation and drinking water) were addressed by the participants in considerable detail. The key targets, challenges (institutional, technical and practices) and recommendations from each thematic area were compiled to prepare the report.

The sub-national water dialogue in Khyber Pakhtunkhwa, organized by the Civil Society Coalition for Climate Change with the support of the Office of the Chief Secretary, KP, the World Bank and HBS, took place at the Pearl Continental Hotel, KP, on 19th December, 2018. The dialogue, titled 'Sub- National Perspectives on the National Water Policy', featured robust representation from stakeholders from the government, private sector, civil society, academia and the media, as well as active participation of students from the host university.

The plenary session was addressed by Mr. Shahzad Bangash, Additional Chief Secretary, Government of KP, Mr. Masood ul Mulk, CEO Sarhad Rural Support Program, and Aisha Khan, the Chief Executive of CSCCC. The Panel of Experts, who provided insights into the water situation of KP from the legal, technical, management and gender perspectives included Dr. Mahmood Ahmad, Senior Visiting Researcher, Lahore University of Management Sciences, Ms. Ayesha Khan, Country Director, Hashoo Foundation Dr. Asif Khan, Assistant Professor, Department of Civil Engineering, UET, Peshawar.

INTRODUCTION

National Water Policy

The past few decades have witnessed drastic changes in Pakistan's water profile. It has transformed from a water abundant country to a water stressed country. While the total amount of available surface water has remained the same, the population increase has reduced per capita water availability from 5000 cubic meters in 1950 to 865 cubic meters in 2018. This places Pakistan not just under the 'water stressed' category of less than 1,600 cubic meters per inhabitant, but also below the 'water scarce' threshold of 1,000 cubic meters per capita. Rapid population growth, water-intensive farming practices, inefficient use and mismanagement, urbanization, increased industrialization, and the growing impacts of climate change are likely to exacerbate the situation.

On April 23, 2018, Pakistan's Council of Common Interests (CCI) adopted a "Water Package" consisting of a 41-page comprehensive National Water Policy (NWP) addressing the entire range of subjects concerning the integrated development and management of the country's freshwater resources and a shorter document called the National Water Charter. The NWP deals with the particular challenges of Pakistan's water resources such as: dependence on a single river basin whose major tributaries originate outside its national borders; the drastic decline in the supply per capita and deterioration in the quality of freshwater; consequent need for all out efforts to enhance water use efficiency and reduce the demands of the main user sectors, especially agriculture which draws upon over 93 percent of the water stock; resolution of inter-provincial disputes over the upper and lower riparian regions; the modernization of water infrastructure; and , above all, mitigation of the negative impacts of climate change most of which relate to the supply of freshwater.

Sub-National Context of the NWP

From the outset the NWP awards the provinces a significant role in setting the direction for, and the actual implementation of the policy. In its preamble, the policy states that 'it is a national framework within which the provinces can develop their Master Plans for sustainable

development and management of water resources', given that irrigation, agriculture, rural and urban water supply, environment and other sub sectors are provincial subjects.

Under policy objectives, the document once again highlights that it is a broad framework, and a set of principles for water security on the basis of which provincial governments can formulate their respective Master Plans and projects for **water conservation, water development and water management**. In the same section, the NWP calls for the setting of major national targets for the water sector on **water conservation, water storage, irrigation, water treatment and drinking water**, and states that, 'These targets can be firmed up in consultation with the provincial governments and reviewed periodically for inclusion in the 12th and 13th Five Year Plans and future plans '(2.29). The NWP also calls for the provincial governments to formulate detailed policies and guidelines on subjects such as **water pricing, drinking water, water quality and water treatment**, within the broad parameters of **water security** as identified by the Policy, and keeping in view the National Environment Policy 2005, the National Sanitation Policy 2006, and the National Drinking Water Policy of 2009. The Policy also suggests that the provincial governments can formulate their own targets for watershed management, aquifer recharge, ground water extraction and drainage as part of their respective Master Plan for Water (28.6).

The NWP can be lauded for recognizing and systematically identifying the role of the provinces in the implementation of the Policy, consistent with the 18th Amendment to the Constitution of Pakistan which devolved water related sub sectors to the provinces. While the formulation of the NWP itself was a much-needed first step towards ensuring water security for Pakistan, there is an urgent need to initiate the provincial level actions for its implementation. The NWP calls for the formation of a National Water Council (NWC) headed by the Prime Minister of Pakistan, as well as Federal Ministers for Water Resources, Power, Finance, Planning, Development and Reform, Provincial Chief Ministers, Private Sector members from water related disciplines and the

Secretary, Ministry of Water Resources, that will meet annually. One of the functions of the NWC will be to review interprovincial water related projects and activities, and to partake in coordination and planning. The NWC will be supported by a Steering Committee, that will meet bi-annually, to ensure inter provincial coordination, among other functions. In light of this structure, it is crucial for provinces, including government and civil society, to initiate the process of developing targets and activities in line with provincial development agendas.

BACKGROUND & CONTEXT

Increasing stresses on water quality and availability, such as population increase, industrialization, macroeconomic conditions, socioeconomics, pricing etc are being felt throughout the world. The most notable stressor however, is climate change, described by economists as one of the greatest externalities that the world has ever seen. Climate change is not only observed to have impacted the availability of water, but has also led to extreme events that impact the hydrology and life on the planet in increasingly adverse ways. Signatories to the UNFCCC Paris Agreement in 2015 have agreed to work together to limit global warming to up to 2 degrees Celsius compared to pre industrial levels- however, research indicates that a rise in temperature of 1.5 degrees will have extreme consequences, most notably on water. The Intergovernmental Panel on Climate Change (IPCC) Special report (2018) notes that 'climate related risks to health, livelihoods, food security, water supply, human security and economic growth are projected to increase with global

warming of 1.5 degrees and increase further with 2 degrees'¹. The study also notes that limiting global warming to 1.5 degrees may reduce the proportion of the world's population exposed to water stress by up to 50% (with variability between regions). The study reinforces that idea that countries must aim for higher ambitions to reduce greenhouse gas emissions to further limit warming below 2 degrees to 1.5 degrees. Presently the current commitments as submitted in the Nationally Determined Contributions lag far behind.

The IPCC report also notes robust synergies between 1.5 degree Celsius pathways and the Sustainable Development Goals (SDGs)², including Goal 6: 'Ensure access to water and sanitation for all'. The targets aim for increased investment in the management of freshwater ecosystems and sanitation facilities on a local level in several developing countries including South Asia. The targets are shown in Figure 1 below.

- 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- 6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- 6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- 6.4** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- 6.5** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- 6.6** By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- 6.A** By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- 6.B** Support and strengthen the participation of local communities in improving water and sanitation management

Figure 1: United Nations Sustainable Development Goal 6, 'Ensure access to water and sanitation for all'

¹IPCC, 2018: Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

²ibid

The SDGs note that 3 in 10 people lack access to safely managed drinking water services while 6 in ten people lack access to safely managed sanitation facilities. Approximately 70% of all water abstracted from rivers, lakes and aquifers is used for irrigation- and that floods and other water related disasters account for 70% of all deaths related to natural disasters; an alarming figure given that research indicates an increase in the frequency and intensity of such disasters. The SDGs also note the inequalities that are exacerbated by lack of water; women and girls are responsible for water collection in 80% of households without access to water on premises. Both the IPCC Special Report and the SDGs draw strong correlations between access to water and poverty.

In the case of Pakistan, poverty reduction has been coupled with an increase in access to WASH infrastructure. Access to improved water within dwelling increased substantially over the past decade and a half, largely through privately bored hand and mechanized pumps. The percentage of households with latrine facilities also rose significantly, again largely through self-provision- and as a result, the national rate of open defecation plummeted from 29% in 2004/5 to 13% in 2014/15, according to the World Bank³.

However, the study also finds that access to even basic levels of improved water and sanitation varies widely. Access is much higher in urban areas- the capitals and other major cities in each province. There are also regional disparities in the functionality of piped water supply systems- 58% of connected households have more than 6 hours of water a day in Punjab, while the figure is just 7% in Sindh and 2% in Balochistan⁴.

Average annual temperatures throughout South Asia have increased significantly in recent decades, albeit unevenly. Western Afghanistan and South Western Pakistan have experienced the largest increases with annual average temperatures rising by 1 to 1.5 degrees Celsius between 1950 and 2010. Not only will this impact agriculture, livelihoods and living standards but also health, migration and other factors that affect economic growth and poverty reduction. There is evidence that precipitation patterns in Pakistan will either become more extreme, causing damage and economic losses, and/or result in the increase of arid areas, resulting in less overall water availability and reduce agricultural yields and water security in some areas. Figure 2 outlines the major climate hotspots within Pakistan and the impact on water availability in vulnerable districts.

Predicted Change in Living Standards and Characteristics of Provinces in Pakistan under the Carbon-Intensive Scenario in 2050

Province	Share of households (%)	Change in living standards (%)	Average length of road in (km/10km ²)	Average population density (per km ²)	Travel time to market (hours)	Water availability	Female household head (%)	Agriculture head (%)	Years of education	Electricity (%)
Sindh	25.2	-4.6	0.7	205.1	3.1	0.9	3.9	19.0	6.6	8.0
Punjab	59.0	-2.6	1.7	464.3	2.4	0.9	11.9	26.6	4.9	17.4
Khyber Pakhtunkhwa	12.9	-1.7	0.1	455.6	9.1	0.2	16.5	21.4	4.3	9.2
Balochistan	2.8	-1.3	0.1	79.5	7.1	0.0	0.7	25.2	4.5	5.6
Overall	100	-2.9	1.4	387.0	3.6	0.8	10.2	24.0	5.3	13.6

³Water availability refers to the ratio of surface water use to groundwater use. A large value is good because it indicates that water use is more likely to be sustainable.

Predicted Change in Living Standards and Characteristics of the Top 10 District Hotspots in Pakistan under the Carbon-Intensive Scenario in 2050

District	Province	Share of households (%)	Change in living standards (%)	Average length of road in (km/10km ²)	Average population density (per km ²)	Travel time to market (hours)	Water availability	Female household head (%)	Agriculture head (%)	Years of education	Electricity (%)
Hyderabad	Sindh	4.3	-6.0	0.0	175.5	3.9	0.4	1.3	31.1	4.5	2.8
Mirpur Khas	Sindh	2.3	-5.7	0.0	151.2	4.6	0.0	2.2	41.8	3.9	1.8
Sukkur	Sindh	6.9	-4.1	0.1	183.0	3.7	0.9	2.7	20.2	6.7	5.8
Larkana	Sindh	11.8	-4.0	1.5	239.2	2.2	1.4	6.0	9.5	7.9	12.3
Bahawapur	Punjab	5.4	-3.2	0.1	187.8	4.3	0.6	7.8	49.6	2.6	2.6
Faisalabad	Punjab	8.2	-2.8	2.7	581.6	1.6	0.1	11.4	30.4	5.2	7.8
Lahore	Punjab	4.3	-2.7	2.5	1,088.2	1.4	0.4	9.0	21.2	4.5	3.1
Multan	Punjab	8.1	-2.6	0.9	506.7	1.6	0.0	8.4	39.7	3.7	28.6
Dera Ghazi Khan	Punjab	4.9	-2.6	0.5	197.5	3.9	2.3	10.6	35.0	3.2	36.7
Sargodha	Punjab	9.0	-2.5	2.5	232.9	2.4	4.0	10.9	17.8	5.1	15.4
Overall		100	-2.9	1.4	387.0	3.6	0.8	10.2	24.0	5.3	13.6

⁴Water availability refers to the ratio of surface water use to groundwater use. A large value is good because it indicates that water use is more likely to be sustainable.

Figure 2: World Bank, 2018

³Mansuri, Ghazala; Sami, Mohammad Farhanullah; Ali, Muhammad; Doan, Hang Thi Thu; Javed, Bilal; Pandey, Priyanka. 2018. *When Water Becomes a Hazard : A Diagnostic Report on The State of Water Supply, Sanitation and Poverty in Pakistan and Its Impact on Child Stunting (English)*. WASH Poverty Diagnostic Series. Washington, D.C. : World Bank Group.

⁴ibid

In April 2018, the Council of Common Interests approved the country's first National Water Policy. Given the importance of the policy, the Civil Society Coalition for Climate Change in collaboration with the Hashoo Foundation, organized a roundtable discussion to engage in a

comprehensive stakeholder review of the policy, convening stakeholders from government, academia, civil society, and the media. Key messages and recommendations from each interactive panel discussion are shown in Figure 3 below.



Figure 3

Transboundary water issues and future concerns

- Reaffirmation of the Indus Water Treaty. Engage India in a dialogue under the Treaty to address the role of the Permanent Indus Commission and the dispute avoidance and settlement mechanism as well as the Treaty's provisions regarding exchange of information and data and future cooperation.
- All issues of common concern which were not addressed by the IWT such as ensuring the sustainability of the entire Indus Basin through improved watershed management; the protection and preservation of the sustainability of the trans-boundary aquifers; joint studies on the effects of construction of cascades of hydropower projects on the western rivers on the ecology, economy and livelihoods in the lower catchment , and, above all, measures to adapt to the multiple negative effects of climate change on the water resources of the Indus Basin, should be discussed.
- Pakistan should enter into a dialogue with Afghanistan on the joint, cooperative development and management of the waters of the Kabul River Basin in collaboration with friendly third countries and international organizations for benefit sharing.

General Recommendations

- The civil society should have been taken on board during its development phase. The development of the Action Plans and Implementation Plans for the NWP now must engage civil society and other stakeholders in a meaningful and structured manner.
- While the NWP has been successful in bringing consensus among the federal and provincial governments, there are concerns about gaps and lack of clarity. Water problems, solutions, targets and priorities have not come out clearly and require more explicit formulations.
- While the second chapter of the NWP lists priorities, the nature of the priorities and clarity on the prioritization of one aspect of water over the other is necessary.
- Pakistan is a signatory to the SDGs that also address water issues in Goal no.6. The targets of SDG 6 can be mapped on to the NWP and synergies built between the two frameworks.
- There is a great deal of emphasis in the NWP on coordination; however, there is a need for analysis of why coordination in the past was unsuccessful, between institutions mandated with specific responsibilities.
- Farmers associations need to be restructured to ensure that representation is broad based, inclusive, participatory and empowered with legal safeguards to prevent intimidation and building capacity of stakeholders for playing a meaningful role.
- There is a strong need for regulating groundwater use, protecting it, providing stewardship and monitoring it to ensure that it is used in an efficient, sustainable and equitable manner.
- The NWP needs to establish precise targets for the priority areas of water uses identified in the policy.

Figure 3

Demographic profile of Khyber Pakhtunkhwa

Khyber Pakhtunkhwa (abbreviated as KP) is located in the northwestern region of the country. Previously known as the North West Frontier Province (NWFP) until 2010 when it was changed to KP by the 18th Amendment to Pakistan's constitution, is the third largest province of Pakistan by size of both population and economy, though it is geographically the smallest of the four. KP is home to 17.9% of Pakistan's total population, with a total population of 40,525,047 persons

(2017) and a population density of 400/km². 52% of the population is male, and 48% female. Between 1998 and 2011, the population increased by 51.6%, and continues to do so. While most of the population in KP is rural, there is a steady trend of urbanization: in 1951 the urban population was 11.07% of the total population, while the 2017 census noted this figure as 17.67%. In addition to the 40 million people, largely of Pashtun ethnicity living in KP, there are over 1.5 million Afghan refugees living in the province.



Figure 4: Map of Khyber Pakhtunkhwa (prior to the FATA merged) (Source: Government of Pakistan)

KP is divided into seven divisions, plus seven agencies of the Federally Administered Tribal Areas which, as per the KP-FATA merger bill of 2018 are now part of KP. The seven Divisions include Bannu, Dera Ismail Khan, Hazara, Kohat, Malakand, Mardan and Peshawar- each under an appointed commissioner. The Divisions are subdivided into twenty six districts, out of which 21 are 'Settled Area Districts' and 5 are 'Provincially Administered Tribal Area (PATA) Districts'. Previously, the administration of the PATA districts lay with the President of Pakistan and Governor of KP, however, following the FATA-

KP Merger, the administration of both PATA and FATA is transferred to the KP government. The Province is divided into 5 Agro Ecological Zones- The Northern Dry Mountains, Eastern Wet Mountains, Central Valley Plains, Southern Piedmont Plains and the Western Dry Mountains (shown in Figure 5).

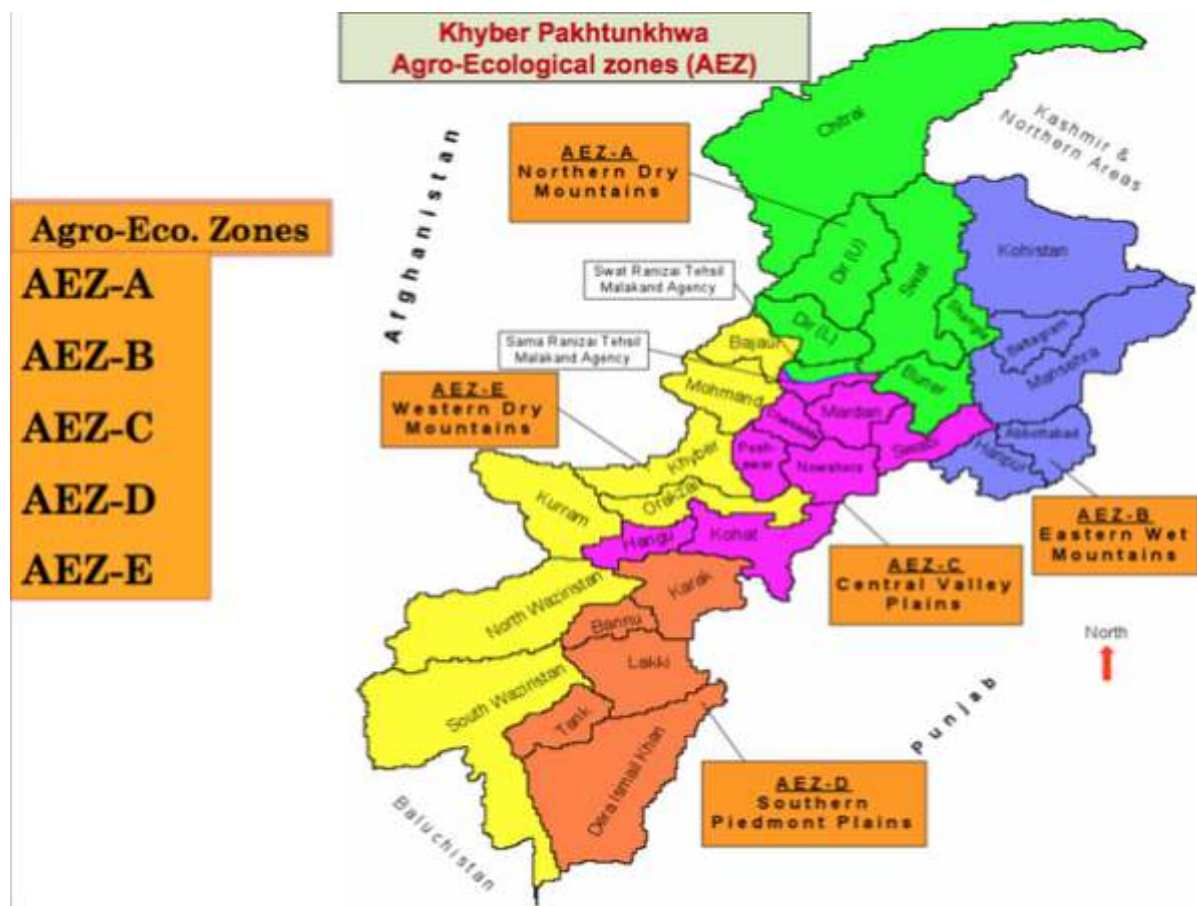


Figure 5: Map Showing Pre-Dominant Land Use in KP Province (Source: Agriculture Department, KP)

While most of the 27.5 million people living in KP identify as ethnic 'Pashtun', there are also significant populations of Tajiks, Hazaras and other smaller groups. For a relatively small province, the climate of KP varies immensely, encompassing many of the climate types found in Pakistan- due to the mountainous regions. While the mountains to the north of the province have mild summer and intensely cold winters, Dera Ismail Khan is one of the hottest places in South Asia. Due to this, and generally very dry air, the daily and annual range of temperature is very large. This is also true of rainfall- which varies widely from area to area.

In terms of the national economy, KP contributes 10% of Pakistan's GDP, although the province accounts for over 11% of the total population. The area of the economy in which KP dominates is forestry, where its share has ranged from 34.9% to 81%, meaning an average of 61.56%. The province is also a significant contributor to other sectors, such as mining, to which it contributes 20%. The province also accounts for over 75% of marble production in Pakistan. Like the other provinces of

Pakistan, agriculture is an important area of the economy with wheat, maize, tobacco, rice, sugar beets and fruit being some of the main cash crops. The major rivers that criss cross the province are the Kabul, Swat, Chitral, Kunar, Siran, Panjkora, Bara, Kurram, Dor, Haroo, Gomal and Zhob rivers, which contribute to the agricultural activity in the region through its irrigation canal networks.

While the Government has estimated literacy rate in 2015 in KP to be 88.6%, compared to only 15.5% in 1972, education and literacy rates in the province are low, with a study by an independent INGO determining that over 51% of girls in KP do not attend school.

KPK Climate Change Profile

KP is located in the mid latitude region on the globe, which is, according to the IPCC, prone to extreme weather patterns (KP Climate Change Policy). Coupled with the unique physiology of the province, which encompasses both dry mountainous regions, wet mountainous regions and and plains, the vulnerability of the province to climate change is notable. At elevations above

5000 metres, as much as a third of the snow which feeds the large Karakoram and Hindukush glaciers comes from the monsoon, which is growing more and more erratic in the region. The cold northern zone, which is snow laden in the winter with heavy rainfall and pleasant summer and moderate rainfall is experiencing increasingly erratic summer and winter temperatures, as well as variable rainfall patterns. These erratic trends are also noted in the southern zone, which typically have hot summer, relatively cold winter and scanty rainfall. While the forest ecosystems in KP are highly productive, providing a range of goods and services, the continued impacts of climate change on the region, coupled with deforestation, may impact their productivity and resilience.

Despite having notably moderate or scanty rainfall in its northern and southern zones respectively, the PMD in 2017 noted in 2017 that the whole country, including KP, received well above normal rainfall (47.2%) in the month of November, including Bannu (28mm- an increase of 48% above normal), Cherat (75mm, 60.4% above normal) and Peshawar (69 mm, 55.2% above normal). At the same time, two heatwaves struck the country in the same year, in March and in May, 2017. In the March heatwave, Balakot, Cherat, Chitral, DI Khan, Dir, Kakul, Kalat, Peshawar and Saidu Sharif were particularly impacted.

The province is also prone to flooding, which KP experiencing floods in 2010, 2011, 2012, 2013, 2014 and 2015. According to UNOCHA, 4,725,695 people were affected in the 2010 floods in KP. Similarly, the high mountainous regions in the north, such as Chitral, are prone to Glacial Lake Outburst Floods (GLOF). The GLOF in 2015 affected 321,644 people in Chitral and destroyed 1200 acres of standing crops (PDMA 2015).

Impact of climate change in KPK

The changes in the climate of KP manifest in some of its most vital sectors, and have far reaching impacts. As a province with significant socio economic deficits, climate change is expected to exacerbate existing vulnerabilities.

Agriculture and Livestock

According to the Provincial Climate Change

Policy of KP, the Central Valley Plains and Piedmont Plains in KP are predominantly where most agricultural activity is focused- however, agriculture is the source of income for over 80% of the population of the province, while contributing 20% to provincial GDP and employing 44% of the labor force⁵. Warmer temperatures will also lead to greater incidences of pests and insect infestations in crops and livestock. As the weather patterns in the province shift, and precipitation and temperature patterns become more erratic, food production, choice of crop and quantity and quality of these crops will change. In addition, extreme events such as floods and droughts will also impact agricultural productivity.

Energy

Of the total 6600 MW of hydropower energy in Pakistan, more than half is installed in the province of KP (KP Hydropower Policy, 2016). The total potential for Pakistan for hydropower is 60,000 MW, which is severely underutilized. The power potential for KP is nearly 30,000 MW. The natural resource rich province features 10 of the total 33 oil rigs in the country, as well as producing 50% of the countries crude oil and 10% of natural gas. According to the Pakistan Energy YearBook 2014, per capita consumption of energy in 2014-15 was 312 KWH, compared to the national average of 448 KWH.

As a result of climate change, the ADB (2016) notes that reduction in water availability for hydropower generation, extreme climate events damaging oil, gas and power infrastructure, and warmer temperatures may impact generation of energy. At the same time, hotter temperatures notably increase energy demands.

Health

With only 207 hospitals, 454 dispensaries and 56 MCH centres serving the over 40 million person strong population of Pakistan, healthcare service provision is low. Population per hospital/dispensary bed is 1545, while population per doctor is 7376. In addition, infant mortality rate in the province is 79 per 1000 live births, while the under 5 mortality rate is 116. With already weak health indicators, climate change has the potential to affect both environmental and social determinants of health- safe drinking water, clean air, and sufficient food and secure shelter. This

⁵Ahmad, D. (2012). Khyber Pakhtunkhwa State of the Environment . Peshawar : Environmental Protection Agency, Government of Khyber Pakhtunkhwa.

may be through extreme heat events, natural disasters, variable rainfall patterns and temperature fluctuations (ADB 2017).

Environment and Forestry

Forest area in KP is 1.26 million hectares, according to the Pakistan Economic Survey 2015-16. Compared to the Pakistan wide figure of 4.55 Million Hectares, this is a large number and makes up 27.69% of the total. As a major contributor to the economy of KP, many livelihoods are directly dependent on the forest sector and environmental services. At the same, the province is rich in mammal and bird species. Of the 188 species of mammals in Pakistan, 98 mammal species are found in KP – as well as 4500 species of plants⁶. Sea level rise, changes in temperature and precipitation, increasing frequency and intensity of extreme events, is likely to affect forest and biodiversity, and soil quality (ADB, 2017). While there is limited research on the consequences of climate change on forests in Pakistan, a study on the impact of climate change on forest ecosystems of northern Pakistan showed a decrease in forest cover for a significant number of plant types (ibid). Initiatives such as the Billion Tree Afforestation Program (BTAP) in KP are contributing to adaptation and mitigation efforts in the province, however, better accounting mechanisms, monitoring and evaluation, and awareness raising is key to ensuring the protection of its biodiversity.

Disaster Risk Reduction

Climate change is likely to increase the frequency and intensity of extreme events throughout Asia, in particular the South Asian region. In KP, climate change manifested in extreme events and disasters is increasingly evident. The most notable of these disasters was the flood of 2010, which impacted 4,725,695 persons (OCHA). The floods have recurred for all subsequent years- the PDMA noted in 2017 that KP received well above normal rainfall (47.2%) in the month of November, including Bannu (28mm- an increase of 48% above normal), Cherat (75mm, 60.4% above normal) and Peshawar (69 mm, 55.2% above normal), leading to flash floods. At the same time, two heatwaves struck the country in the same year, in March and in May, 2017. In the March heatwave, Balakot, Cherat, Chitral, DI Khan, Dir, Kakul, Kalat,

Peshawar and Saidu Sharif were particularly impacted in KP. The province is also prone to GLOF events, as experienced in Chitral in 2015. For KP to address the onslaught of disasters, not only is there a need for greater understanding of climate change and data for future projections, but also for a shift from a reactive to a proactive approach to disaster risk reduction.

Impacts of climate change on water availability in Khyber Pakhtunkhwa

With 75% of its population employed in agriculture, and as a key source of hydel/hydro power for Pakistan, KP is particularly sensitive to changes in climate such as erratic temperatures, precipitation changes and extreme events, which impact the availability of water. The Indus River and its tributaries are important sources of water for the province, particularly for the communities reliant on agriculture for their livelihood. Water needs for agriculture are met through a combination of irrigation canals and rainwater. Therefore, even minor changes in temperature and precipitation patterns have direct impacts on food security. Glaciers are an important reservoir for KP, feeding into the Indus River and its tributaries, and provide freshwater for agricultural and domestic use. The climate change projections for the IPCC's fifth assessment report (AR5) show that warming in South Asia as a whole will be above the global mean, and will impact the melting rate of the glaciers and precipitation patterns, particularly affecting the timing and strength of monsoon rainfall (ADB, 2017).

Unsafe drinking water has been shown to cause diseases including cholera, diarrhea, dysentery, hepatitis A, typhoid and polio. Overall, the KP Health Survey 2017 showed that improved sources of water are available to 89% of the population (96.5% in urban areas and 86.5% in rural areas), however, only 22.2% are using piped water. The results of the KP Health survey also indicates that 85% (96% urban and 81% rural) of the population is living in households with improved sanitation facilities. The study also indicates correlations between wealth and access to sanitation, with those in a higher wealth quintile having greater access to sanitation.

⁶KP Climate Change Policy, 2014

Drinking water and sanitation ladders

Percentage of households by drinking water and sanitation ladders, KPHS, 2017

Percentage of household population using:										
	Improved drinking water [1] [a]				Unimproved sanitation				Improved drinking water sources and improved sanitation	Number of households
	Piped into dwelling, plot or yard	Other improved	Unimproved drinking water	Total	Improved sanitation [2]	Unimproved facilities	Open defecation	Total		
Khyber Pakhtunkhwa	22.2	66.8	11.0	100	84.7	6.9	8.4	100	77.1	14,825
Area of residence										
Urban	24.5	72.1	3.5	100	96.2	3.0	0.8	100	93.3	3,702
Rural	21.4	65.0	13.5	100	80.9	8.2	10.9	100	71.7	11,123

Figure 6: Drinking water and sanitation in KP (Source: KP Health Survey 2017)

Climate projections note that there will be increased variability of river flows due to the increase in the variability of monsoon and winter rains. In addition, there will be uncertainty about future river flows and glaciers melting. This will be coupled with an increased demand for irrigation water due to higher evaporation rates at elevated temperatures, coupled with the reduction of per capita availability of water and overall increase in water demand. At the same time, there will be a notable reduction in water storage capacities due to increased sedimentation.

As the temperatures and rainfall patterns in KP continue to vary, combined with unsustainable water management practices, there is evidence that water scarcity will become the foremost challenge to human lives, the economy and the environment. Extreme events are already rampant in the province, and with a growing population, adequate strategies to address the anticipated water shortages are necessary.

KHYBER PAKHTUNKHWA WATER DIALOGUE

Methodology

The overall objective of the consultative dialogue was to convene stakeholders to discuss the sub-national water perspectives looking at the National Water Policy from a provincial lens and co-create recommendations that best reflect the water needs of the province. In order to develop a list of joint stakeholders' recommendations to set the provincial targets aligned with the NWP objectives and the SDGs, CSCCC employed a whole-of-society approach, convening government, civil society, academia, private sector and media to collaborate, engage and consult with each other to broadly agree on key water targets for the province, identify major challenges and come up with a set of realistic and achievable recommendations.

The water dialogue was conducted in two parts. The first was a moderated Plenary that convened experts from the government and civil society to share thoughts on the following elements of the NWP:

- i. Legal perspective
- ii. Water Management
- iii. Gender mainstreaming

The second part consisted of 'Consultative Roundtables' in which the participants convened in roundtables to discuss provincial targets for the Master Plan to be developed for the province under the NWP. The themes included **water conservation, water storage, irrigation, water treatment and drinking water**. The structured roundtables were facilitated by the CSCCC core team, as well as provided with customized datasets and tools to develop the targets. These were aligned with the SDGs, NWP and other relevant policies.

Dialogue Overview

The sub-national water dialogue in Khyber Pakhtunkhwa, organized by the Civil Society Coalition for Climate Change with the support of the Office of the Chief Secretary, KP, the World Bank and HBS, took place at the Pearl Continental Hotel, KP, on 19th December, 2018. The dialogue, titled 'Sub- National Perspectives on the National Water Policy', featured robust representation from stakeholders from the government, private sector, civil society, academia and the media, as

well as active participation of students from the host university.

The plenary session was addressed by Mr. Shahzad Bangash, Additional Chief Secretary, Government of KP, Mr. Masood ul Mulk, CEO Sarhad Rural Support Program, and Aisha Khan, the Chief Executive of CSCCC. The Panel of Experts, who provided insights into the water situation of KP from the legal, technical, management and gender perspectives included Dr. Mahmood Ahmad, Senior Visiting Researcher, Lahore University of Management Sciences, Ms. Ayesha Khan, Country Director, Hashoo Foundation Dr. Asif Khan, Assistant Professor, Department of Civil Engineering, UET, Peshawar.

Aisha Khan, *Chief Executive of the Civil Society Coalition for Climate Change*, delivered the opening remarks. Highlighting the momentum the water discourse has gained in recent years, she said, 'From a provincial perspective it is evident that each province of Pakistan has its own unique water related challenges and therefore must develop policies that best serve its water needs. Water has many uses, ranging from household use to energy and agriculture, and therefore its quantity, quality, availability and storage is very important'. Ms. Khan welcomed the passage of the National Water Policy of Pakistan, and explained the role of Civil Society Coalition for Climate Change in developing sub national perspectives on the National Water Policy. The purpose of the dialogue, she said was to was to generate a dialogue between all the key stakeholders, including government, civil society, private sector, academia and media to co-create recommendations for the consideration of the government as it embarks on the task of developing the provincial Mater Plan. The core value of this exercise, she said, lies in the fact that it has collective ownership and input from all relevant stakeholders and can serve as the basis for the development of the Master Plan.

Mr. Shahzad Bangash, *Additional Chief Secretary, Government of KP*, in his keynote address, highlighted the importance of the issue of water for Pakistan and the need for dialogue to steer the way for the development of

provincial master plans. He noted that while the National Water Policy provides a broad framework, implementation plans and operationalization is the task of the provinces. 'The Government of KP is taking the issue of water management very seriously, and is already in the process of developing an Integrated Water Management Strategy for the province with support from the donor community,' he shared, 'and this strategy is being developed through a consultative process taking all stakeholders on board.' He noted that the NWP places particular emphasis on the conservation of water, development of new water resources and most importantly, the management of water. 'The Government spends a huge proportion of its annual budget on water- through development schemes with irrigation department, PHE department etc' he said, 'however, the planning aspects of these projects needs to be improved and be made more research based and consultative'. He appreciated the platform that CSCCC provided to the water stakeholders of KP to deliberate over the National Water Policy and bring everyone to the same table.

Mr. Masood ul Mulk, CEO of SRSP in his special remarks noted that the issue of water is a complex problem, termed by economists as a wicked problem. 'Starting from the glaciers, to rivers, to aquifers, to canals, to farms, to storage, to crops, to interprovincial issues and transboundary issues- there are many stakeholders with their own set of priorities and issues, making the management of water a complex problem' he noted. There are no simple solutions to complex problems, he emphasized, and even global best practices are unlikely to have impact unless they are indigenized and tailored to local contexts, and implemented incrementally and based on learning- elements that should be included in any policy on water. Emphasizing the discord between policies and their actual implementation, he noted that Uganda has the worlds best anti- corruption laws, yet it is ranked as the top country in the world in terms of corruption. 'The mistake Pakistan makes is that we implement best practices, and engage in mimicry rather than presenting local solutions to issues' he noted. Sharing experiences from Chitral, where hydropower has significantly

contributed to reducing deforestation through providing communities with energy which curbed the use of firewood for fuel, he shared that while policy level solutions are required to tackle the larger issues, it is equally important to implement small actions at the community level, which have a large impact on entire communities. 'Pakistan is unique in that it has strong societies, but weak states, leading to mistrust between the community and the state administration, which can sometimes become an impediment to the implementation of development projects' he noted.

Miss Ayesha Khan, Country Director, Hashoo Foundation discussed the importance of the inclusion of gender into policies and development planning, and emphasized the role of the private sector as a key stakeholder in mitigating and adapting to climate change. She noted that gender is excluded from discussions on water. 'Gender considerations are conspicuous by their absence. Article 25 of the constitution calls for nondiscrimination on the basis of gender or sex- and that policies, laws and all ordinances, acts must keep this as a foundation' she said. 'It is equally unfortunate that when the topic of gender inclusion does come up, it is treated either as a foreign agenda or as an issue to be dealt with by the NGOs' she added.

In explaining the importance of the inclusion of gender, Ms. Khan stated that 'Women and girls are disproportionately impacted by climate change or extreme disasters, usually due to socio economic conditions that make them more vulnerable. They are less empowered socially, economically, politically'. She lamented that discourse on water and women usually is limited to the domestic use of water, discarding the fact that water is also treated as an economic good, and women are on the periphery in decision making and involvement on how the water is to be used. She pointed out that there is a lack of primary data on water in Pakistan as a whole, even less so on women and their relationships with water; a trend reflected throughout the world. Emphasizing the need for a holistic approach, Ms. Khan stated that 'Political and governance structures and frameworks, beyond policies, are required to truly represent women and their concerns into the management of water'.

Panel Discussion

Dr. Mahmood Ahmad, *Senior Visiting Researcher at LUMS Water Centre* in his overview of water management in Pakistan, iterated the importance of water policies in addressing scarcity of water. 'Pakistan is not that water scarce, especially when compared to other countries, such as Egypt, Yemen, Syria, Jordan;' he said, 'we are wasting water, and our policies are flawed.'

Dr. Mahmood outlined the requirements for having an intensive national and provincial water policy, one of which is to have proper water accounting and auditing, which is an intensive exercise. 'Data is extremely important- data on accounting and auditing, volume of water, flows, quality, infrastructure, etc. For the auditing aspect important considerations are water management, governance, socioeconomic indicators, and finance' he added.

Discussing the climate change related challenges faced by Pakistan, Dr. Mahmood highlighted the supply and demand dynamics of water in relation to drought and floods. 'On the supply side, we need to make the most of flood water, by developing cost effective spate irrigation schemes. There is considerable policy space to undertake these actions. Create cascades of dams to provide water for irrigation utilizing flood water. There is the need to find the balance between supply and demand side considerations' he said. 'On the demand side we need to reduce water footprints of products that are produced. For groundwater, it is a combination of policy, institutional and market failures, and there is a need to correct all three to overcome the groundwater problems being faced. He suggested that one way to do this would be to move towards full cost pricing, to add operation and management costs. In this case the removal of subsidies is key to moving towards full cost pricing'. He also stressed the need for planners to consider the water footprint of the CPEC projects, particularly those in KP.

Dr. Mahmood made a strong case for a shift from the business as usual scenario wherein agriculture uses 96% of the total water of Pakistan. 'Agriculture must use less water, but also produce more crop per drop. In the current scenario, Pakistan whose economy relies on

agriculture, cannot compete in international markets because of quantity and quality issues and therefore sustainable and competitive agriculture is key' he said.

Dr. Asif Khan, *Assistant Professor, Department of Civil Engineering, UET, Peshawar* provided an overview of impacts of climate change in the KP province. He noted that population growth is one of the key contributing factors to climate change, and in the case of Pakistan and specifically KP, the population growth rate in rural areas is a key concern. 'More people means increasing demand for shelter, energy, food and water' he said. 'On the other hand, there is a global increase in temperature, which is leading to a depletion in snow and increased glacial melt, as well as increases in extreme events such as drought and floods, which are already being experienced in Pakistan, including Glacial Lake Outburst Flood. There is also reservoir sedimentation, which adds additional stress to the already short 30 day reservoir capacity of the country, which is decreasing day by day due to increased sedimentation in the reservoirs'. He noted that the Paris Agreement calls for limiting temperature rise to 1.5 degrees, however, research indicates the temperature rise in the Northern Areas will be 4 to 5 degrees, with devastating impacts for water resources for the whole country. Dr. Asif noted that while greenhouse gas emissions in Pakistan are set to rise with economic growth in Pakistan, measures such as investing in hydropower plants and renewables for energy may play a key role in providing energy while reducing carbon emissions. 'In terms of the water sector, as well as losses in reservoir capacity due to sedimentation, the country also faces evapotranspiration due to increased temperatures, which leads to loss of water. The demand for water in agricultural use will also rise as the population grows' he noted. By the end of the 21st century he notes that if the current trends continue, Pakistan will have less water capacity than it did in 1967 when Mangla Dam was built.

KEY TAKEAWAYS

Drinking Water

Targets	<ul style="list-style-type: none"> Development of Provincial Water Policy Development of Water and Sanitation Board Water Forecasting studies and research conducted Legislation on Drinking Water developed and implemented Establishment of WQ labs at district level Allocation of budget- at least 100% of ADP for water and 10% for sanitation 	Challenges <p>SOURCES OF WATER SUPPLY</p> <ul style="list-style-type: none"> Groundwater 90% Surface water 10% Depletion of groundwater Contamination of surface water Industrial waste and domestic waste Treatment of Surface water sources issues- institutional, technical and financial <p>QUALITY OF WATER</p> <ul style="list-style-type: none"> Deterioration of pipelines Lack of Water Quality labs High price of Water Quality tests (2500 rs/sample) Unplanned development Water wastage Financial constraints 	Recommendations <ul style="list-style-type: none"> Capacity Building Replacement of rusty/outdated infrastructure Subsidizing water quality tests Master Planning- public health department has initiated Behavioral changes- mass awareness through print and electronic media Water mapping through GIS
---------	---	---	--

Water Storage

Targets	<ul style="list-style-type: none"> Construction of more small dams to store water Water recharge to be made a priority Save water in irrigation sector using modern technology Completion of dams project Construction of canals Delay action dams/storage dams Artificial recharge 	Challenges <ul style="list-style-type: none"> Storage projects face significant delays due to technical/financial/institutional reasons Financing challenges such as declining water sector allocations in federal PDSP since the last 20 years Delays caused due to multiple revisions in project PC1 of large dams KP gets 8 MAF however only 5MAF is utilized and 2.8 MAF is wasted due to lack of storage Transboundary issues on the use of Kabul River 	Recommendations <ul style="list-style-type: none"> Run of the river hydropower generation must include small storages Harness rain water potential in KP (0.3 MAF) More resources for the construction of small dam in KP including in the merged districts Small dam potential assessment in merged districts is recommended CRBS left canals must be completed by the KP/Federal government Groundwater regulations must be drafted/enforced
---------	--	--	---

Irrigation

Targets <ul style="list-style-type: none"> Revision in Abiana/water rates to reduce overutilization Raised bed technology and other innovative irrigation technologies introduced Small dam construction prioritized Establishment of Groundwater regulatory authorities Improvement in irrigation efficiency 	Challenges <ul style="list-style-type: none"> Technical Limited/deficit in infrastructure High water allowance and flood irrigation Flood water rights in canal Institutional Deferred maintenance of irrigation infrastructure Parallel construction of drainage system Training of staff and farmers Practices Flood irrigation Higher water allowances Command area development as per project 	Recommendations <ul style="list-style-type: none"> Ground water regulations through groundwater regulatory authority Gradual increase in irrigation efficiency Capacity building of irrigation staff and farmers Sustainability of irrigation infrastructure
---	--	---

Water Conservation

Targets <ul style="list-style-type: none"> Investment in High value crops Low water intensity crops Investment in small, run of the river Dams Increased efficiency in agriculture Development of water infrastructure Soil water conservation targets and milestones set Baseline studies 	Challenges <ul style="list-style-type: none"> Subsidy on tubewells leading to unprecedented abstraction Widespread use of flood irrigation Current water infrastructure contributing to water losses Lack of monitoring of water Lack of baseline data/research 	Recommendations <ul style="list-style-type: none"> Removal of subsidy on tubewells and enforcement of this removal Ban on flood irrigation particularly in water scarce areas Investment in water infrastructure as a top priority Monitoring systems/technologies in place Partnerships with academia to conduct research/establish baselines of water banks
---	---	---

Water Treatment

Targets	<ul style="list-style-type: none"> Using modern technology/IT in data systems and monitoring Prioritizing the submet of water treatment at policy/strategy level Advocacy on print and electronic media High level advocacy similar to BTAP for afforestation at PM/CM level Including water treatment facilities in town/urban planning projects and city master plans Budgetary allocations by percentage/PSDP Regular inspection and M and E of facilities Ensuring sustainability Using treated water in drought situations Integrating with rainwaterharvesting techniques Developing data ccollection and future projection mechanisms 	Challenges	<ul style="list-style-type: none"> Institutional inadequacies/the subject is not a priority Political will is lacking to tackle the subject Lack of knowledge/awareness Lack of instrastructure/dysfunc tional water treatment plants Investments have taken place but are not effective-operations and maintenance not allocated No technical expertise to hangle infrastructure Availability of land for treatment plants-BRT taken over treatment plant of Hayatbad Housing projects over plant locations Lack of urban planning Lack of baselines/standards and benchmarks Lack of data/record keeping on usewastage Lack of compliance and monitoring 	Recommendations	<ul style="list-style-type: none"> Making mandatory at the time of approcal of projects/plans to include water treatment provisions Decentralizing implementation of plans Penalties on non compliance Awareness raising-building technical competence of public/private sector entities Greater investment towards recycling/treatment and utilizing the by products of treated waste water (e.g power generation) Institutional coordination with related departments (industry, irrigation, agriculture, urban planning, public health) Incentivizing the use of water treatment through tax breaks/recognition/fin ancial and non financial (direct and indirect) measures
---------	---	------------	--	-----------------	---

