



WORLD BANK GROUP



## SUB-NATIONAL WATER DIALOGUE SINDH



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## 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.

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## 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 dialogue was 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 plenaries were followed by breakout sessions in which the give 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 were compiled by a rapporteur to constitute part of the report.

CSCCCC, with the support of the Planning and Development Department, Sindh, and the World Bank, conducted a review of the National Water Policy from the Sindh perspective at the New Sindh Secretariat on the 20th of November 2019. The Provincial consultative dialogue, titled 'Pakistan's National Water Policy, Sindh Perspective' comprised of robust representation from stakeholders from the government, private sector, civil society, academia and the media, and students of the host university.

The opening panel consisted of Aisha Khan, C.E., CSCCCC, who delivered the welcome remarks, followed by Dr. Ishrat Hussain, who delivered the keynote address and is the current Advisor to the PM on Institutional Reforms with the status of a Federal Minister, and Former Governor State Bank. Special remarks were given by Dr. Naeem uz Zafar, Chief Economist, P and D Department. The Plenary consisted of Dr. Mahmood Ahmad, Research Fellow, LUMS, Ms. Sana Baxamoosa, General Manager, Hissaar Foundation, and Mr. Shah Murad Aliani, former Director IUCN. Closing remarks were delivered by Ayesha Khan, Country Director, Hashoo Foundation and Naila Haq, P & D department, Sindh.

# INTRODUCTION

## National Water Policy

Over the past few decades, there has been a drastic change in Pakistan's water profile from being a water abundant country, to one experiencing water stress. 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

The NWP from the outset, 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 the 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 AND 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'<sup>1</sup>. The study also notes that limiting global warming to 1.5 degrees may reduce the proportion of the worlds 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- which the current commitments lag far behind in.

The IPCC report also notes robust synergies between 1.5 degree Celsius pathways and the Sustainable Development Goals (SDGs),<sup>2</sup> including goal 6 i.e. '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'

<sup>1</sup>IPCC, 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.

<sup>2</sup>ibid

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 within dwelling improved water 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 Bank<sup>3</sup>. 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 Balochistan<sup>4</sup>.

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 C between 1950 and 2010. Not only will this affect living standards through the impacts on agriculture, closely linked to water, but also through 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 disruption, but will also decrease in the 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<sup>5</sup>.

#### 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 <sup>2</sup> )	Average population density (per km <sup>2</sup> )	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

"Water 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 <sup>2</sup> )	Average population density (per km <sup>2</sup> )	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
Bahawalpur	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

"Water 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

<sup>3</sup>Mansuri, 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.

<sup>4</sup>ibid

<sup>5</sup>"Mani, Muthukumara; Bandyopadhyay, Sushenjit; Chonabayashi, Shun; Markandya, Anil; Mosier, Thomas. 2018. *South Asia's Hotspots : Impacts of Temperature and Precipitation Changes on Living Standards*. South Asia Development Matters;. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/28723> License: CC BY 3.0 IGO."

As well as a National Climate Change Policy (2012), Disaster Risk Reduction Policy (2014), the Government of Pakistan, Council of Common Interests in April 2018 approved the country's first National Water Policy, to address the looming water challenge. Within a month of the policy's approval, the Civil Society Coalition for Climate

Change, with support from the Hashoo Foundation, conducted a comprehensive stakeholder review of the policy at a national level, convening stakeholders from government, academia, civil society, and the media. Key messages and recommendations from each interactive panel are shown in Figure 3 below.

### Water Governance

- Run of the river projects should also be included alongside large dams to help in regulating and calibrating flows during heavy and low flow periods.
- Allocation of water at trans-boundary levels, between upper and lower riparian provinces need to be addressed explicitly and consensus reached.
- Difficult decisions need to be made around the subjects of allocation of scarce water resources for food, energy security, industrial needs, drinking water supplies, preserving habitats, ecosystems, biodiversity and prevention of sea water intrusion.
- Another difficult decision is the required balance between financial returns per cubic meter of water and the human needs for drinking, and possibly, basic sanitation.
- Over mining and pollution of aquifers is a serious challenge facing Pakistan, particularly in Punjab, which needs to be addressed.
- A plan needs to be developed to address fundamental issues: (i) Reduction in population growth rate; (ii) Change in cropping patterns; (iii) Reduction and elimination of water intensive industries; and (iv) Prevention mechanism for water losses.
- Based on experience of water management to date, replicate successful actions, avoid failed approaches and incorporate best practices.
- The proposed system needs to be decentralized to an extent that allows for decisions to be made in a timely manner.
- The roles and responsibilities of formal Institutions and organizations must be clearly defined to eliminate rivalries and unnecessary competition.
- Water governance must be depoliticized and influence of the powerful reduced to remove enabling conditions for elite capture of resources and allow for equitable sharing of resources

### Water Management

- The NWP must take into consideration current research, particularly the work of CSOs.
- Policy decisions should be based on available research and concomitant efforts made to collect more info on issues where insufficient data impedes informed decision making.
- Since water is a provincial subject, the NWP, developed at the federal level must ensure harmonization in implementation with a high level of inter provincial coordination.
- The unsustainable population growth rate is the true determinant of ever decreasing per capita availability of water, and needs to be highlighted as a key factor in the NWP.
- For effective implementation, the NWP needs to clearly set out the 'when, where and how' of achieving its goals, as well as identifying the institutions that need to do this.
- Avoid delays in decision making to prevent cost escalations.
- The NWP Implementation plan must identify the 10 most vulnerable districts and begin work on implementation immediately, in consultation with the stakeholders.
- In order to create water provision for the China Pakistan Economic Corridor projects, the NWP must budget an appropriate percentage of domestic water for energy projects.
- Quality and access to water must be prioritized as key concerns in the NWP.
- A regulatory framework for abstraction and use of water for domestic as well as agriculture and industry, particularly for energy generation from coal and solar sources should be put in place.
- There is a need to shift from the approach of treating water as a commodity to making it – at least for drinking and basic sanitation - a human rights concern.

## 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 and Climate profile of Sindh

The third largest province of Pakistan by area, and the second largest by population, Sindh is home to Pakistan's largest city, with Karachi, with the third highest population in the world. The population of Sindh was recorded at around 47

million, and occupies a land area of 14.091 million ha (34.81 million acres), with a population density of around 340/km<sup>2</sup>. The province forms the 'lower indus basin' and covers 1,40,915 square kilometres.



The province is divided into 'Divisions', namely Karachi, Hyderabad, Sukkur, Mirpurkhas and Larkana with their respective districts, while two new divisions namely Banbore and Nawab Shah/Shahheed Benazirabad. These are then further divided into 29 districts, 6 of which are Karachi.

In terms of the GDP and economy, Sindh is the second largest economy in Pakistan, and its coastal ports play a large role in this, as well as its manufacturing industry and agriculture. The province has 2 sea ports, both located in Karachi, and contribute to its economic activity.

	Urban	Rural	Total
<b>Population</b>	24910458	22975593	47886051
<b>Male</b>	13007937	11919109	24927046
<b>Female</b>	11900295	11056183	22956478
<b>Transgender</b>	2226	301	2527
<b>Household</b>	4185828	4399782	8585610

Employed 10+	2007-2008	2010-2011	Change 2007-2008 to 2010-2011 (percentage points)
<b>Agriculture</b>			
Both Sexes	46.13	45.74	-0.39
Males	39.45	39.19	-0.26
Females	84.53	79.92	-4.61
Urban	5.46	3.6	-1.86
Rural	75.47	75.37	-0.1
<b>Industry</b>			
Both Sexes	12.23	12.64	0.41
Males	13.5	14.18	0.68
Females	4.95	4.64	-0.31
Urban	24.55	25.49	0.94
Rural	3.34	3.61	0.27
<b>Services</b>			
Both Sexes	41.54	41.62	0.08
Males	46.95	46.64	-0.31
Females	10.48	15.44	4.96
Urban	69.77	70.91	1.14
Rural	21.18	21.02	-0.16
<b>All Sectors</b>			
Both Sexes	100	100	
Males	100	100	
Females	100	100	
Urban	100	100	
Rural	100	100	

Pakistan Labour Force Survey 2010-2011

Literacy Ratio	1981	1998	2014-2015
<b>Sindh</b>	31.45	45.29	63.0
<b>Male</b>	39.74	54.50	73.9
<b>Female</b>	21.64	34.78	50.7
<b>Urban</b>	50.77	63.72	79.6
<b>Rural</b>	15.56	25.73	45.0

Literacy rates in Sindh, while improving are still low, with the difference between male and female literacy at 13%.

8% of the total area of the province is under the control of the Sindh Forest Department, which makes up 2.782 acres of the total land area, which includes the protected areas of mangroves and rangelands, which are an important ecological resource.

As the province relies heavily on the development of industries, as well as facing a rapid population increase, the electricity demand in the province is extremely high, and relies almost solely on fossil fuel energy to meet its demand.

The long term average precipitation, recorded over a period of 50 years from 1960 to 2010 was noted at 160 mm (Pakistan Meteorological department). The province is a drought prone area with occasional surplus extremes that result in floods. The province lies between two monsoons- the southwest monsoon from the Indian Ocean and the northeast or 'retreating monsoon' deflected toward it by the Himalayan mountains. Sindh is in a subtropical region, meaning it is hot in the summer and cold in the winter, with temperatures frequently rising above 46 degrees between May and August, while a minimum of 2 degrees occurs during December and January.

The Indus is an important source of water for the province- of the total length of 2880 km of the Indus river, one third (about 944 ms ) transverses the province. Agriculture in the province, given the meagre rainfall, relies heavily on the indus for its sustenance. Cotton, rice, wheat and sugarcane are some of the major crops cultivated in the province.

Other than the seaports, the waters around Karachi are highly productive with rich marine biodiversity that contribute to the ocean economy.

### Provincial Climate Profile

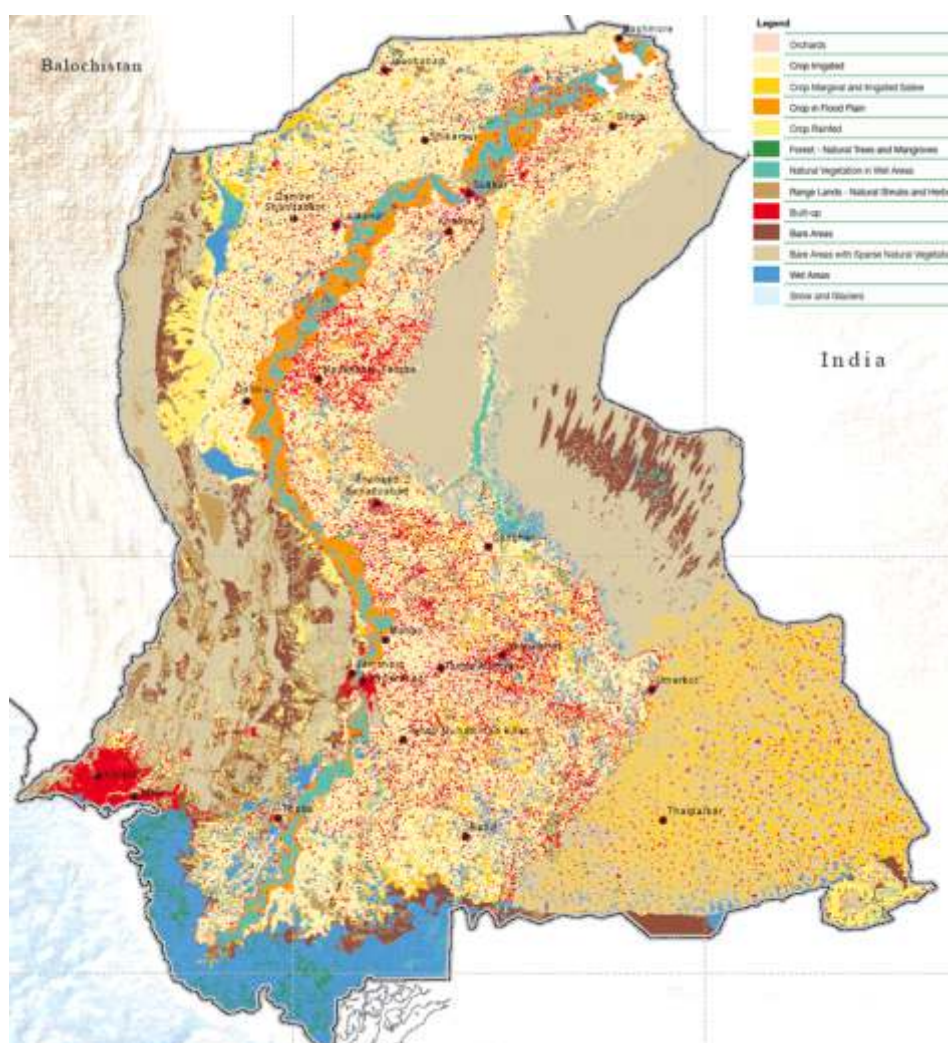
The province of Sindh can be divided into 3 regions

- i. The central alluvial region- this area has a number of water sources, making the area fertile and largely irrigated. The region is home to the riverine forests of Sindh.
- ii. Eastern Sandy Region- this region is

home to the Thar Desert, in the eastern part of the province.

- iii. Western Rocky Region- Home to the Kirthar Range, the area is mostly rocky and barren due to the lack of a water source.

The diverse topography of the province, including its coastline, make it vulnerable to a wide range of climate change impacts. In 2016 alone, the Pakistan Meteorological Department reported that rainfall was 82.76% below normal in the already dry province. At the same time, the frequency of extreme maximum temperature events is increasing in Sindh. A study of the mean temperatures in Pakistan between 1960-2007 showed a warming trend of 0.09 degrees in Sindh over the period (PMD). At the same time, Sindh is vulnerable to Sea Level Rise (SLR) due to its tidal flat topography and higher population concentration in the coastal areas, particularly those where industrial activities are concentrated.



A 2 metre SLR is expected to submerge 7500 sq km in the Indus Delta (ADB 2017).

### Impact of Climate Change in Sindh

Sindh is already experiencing both the fast and slow onset manifestations of climate change, in the form of sea level rise, extreme weather events, and variations in temperature and rainfall patterns. These changes are likely to impact some of its most vital sectors, and due to its high population, particularly in the mega city of Karachi, as well as uneven human development across the province, its vulnerability to climate change is high.

### Agriculture and Livestock

Close to half of Sindh's population is involved in the agriculture sector for its subsistence and livelihood. 14% of the province relies on irrigation for its water needs, while the remainder rely on rainfall (Government of Pakistan, Bureau of Statistics, Agricultural Statistics of Pakistan 2010-2011). 0.551 Mha of the land relies on spate irrigation. Crops in both irrigated areas and those under spate farming systems are sensitive to variations in water and temperature. An estimated rise of temperature between 0.5 degrees and 2 degrees will cause agricultural productivity to decrease by around 8 to 10% by 2040 (ADB, 2017). Similarly, a large proportion of Sindh's population is involved in the livestock sector, with estimated 60% of land used as rangeland throughout Pakistan. Studies suggest that climate change will degrade grazing systems such as pastures and grazing lands due to drought, floods, decrease in fodder quality and quantity, and increase in disease epidemics.

### Energy

Sindh has enormous potential for renewable energy due to the high number of sunlight days leading to potential for solar energy, as well as utilizing wind corridors for power generation. Through the China Pakistan Economic Corridor (CPEC), A 50 mw wind farm is being developed in Gharo, Thatta, as well as a 100 MW wind farm in Jhimpir, Thatta, and another in the same area worth 50 MW. At the same time, investments in coal based energy include the 1320 MW coal fired power plant in Thar, and three more worth 660, 330 and 330 MW Coal and Lignite fired power plant projects in the same area, and 2\* 660 MW coal fired power plant at Port Qasim, Karachi. The energy mix in Sindh consists entirely of fossil

fuel for power generation, to meet the demands of a growing population and industrial sector, the energy demand is expected to rise. While the investments in alternative energy are encouraging, there is a need to pursue these more aggressively rather than the heavy investments in dirty energy.

### Health

Climate change will exacerbate existing inequalities and impact safe drinking water, clean air, sufficient food and secure shelter, the environmental and social determinants of health (ADB 2017). This will play out through extreme heat events, natural disasters and variable rainfall patterns.

Sindh's health sector has already experienced some of these manifestations of climate change. The heat wave in Karachi in June 2015 reportedly led to a death toll of 1200 persons in the city, as well as taking the lives of approximately 200 people in the rest of the province. The total number of primary healthcare facilities in Sindh was noted as being less than 2000, more than 1400 of which are BHUs and dispensaries. Secondary health care facilities are noted as being 90 for serving the entire province.

As the province continues to grow in population, and extreme weather events increase in frequency and intensity the corresponding risks to health and capacity to respond to climate change will be challenged.

### Water

Sindh's climate is generally arid, receiving only 6-7 inches of rainfall per year, with occasional pockets of heavy rainfall that lead to flooding and disasters. The province relies heavily on the monsoon rainfall as a contribution to its hydrology, making it prone to drought with serious implications for its agricultural sector. Water scarcity is already a very real problem in Sindh, with more than 30% of households accessing water from potentially unsafe sources on average, and high drought and extremely water scarce areas, this number goes up to 42% and 41% respectively. As groundwater in downstream Sindh is mostly saline, there is a heavy reliance upon surface water for irrigation and domestic use.

With increasing stresses upon its water sector,



which is crucial to the population and economy of the province, water availability per capita in the province is low, and with its growing urban population, this is predicted to increase. All these factors are indicative of a serious situation that can result in a humanitarian crisis and requires urgent planning to meet the immediate and long term needs of a megapolis.

### Forests and Environment

Of a total 34.81 million acres of Sindh's land area, 8% (2.782 million acres) is controlled by the Sindh Forest Department. Forests are divided into productive and protected categories- with riverine forests and irrigated plantations making up the former and covering only 2.29% of the area. The protected forests, which consists of mangrove forests and rangelands, are threatened not only by deforestation, but also by the environmental stressors such as variations in freshwater availability and environmental flows, sea level rise etc.

The Indus Delta alone supports 97% of Pakistans total mangrove forests, and is home to over one million people, 135000 of which depend on mangroves for their livelihoods (ADB 2017). In addition to the direct impacts on those reliant on mangroves and other forests for their livelihood, forests are an important ecological resource, and biome, housing much of the provinces biodiversity, and serving as a carbon sink. The rapid depletion of forests in Sindh will contribute to ecological degradation and associates goods and services that contribute to social and economic wellbeing of communities and ecosystems.

### Coastal Areas

Sindh is vulnerable to Sea Level Rise (SLR) due to its tidal flat topography and higher population concentration in the coastal areas, particularly those where industrial activities are concentrated. A 2 metre SLR is expected to submerge 7500 sq km in the Indus Delta (ADB 2017). Population concentrations in these areas are high due to the industrial activity in the area, and many of the communities rely on the rich aquaculture for their livelihood through fishing and related services.

At the same time, the coastal areas are home to the mangrove forests, an important ecological

resource that is threatened by deforestation and SLR, as well as changes in temperature and rainfall. Cyclones and Typhoons are already threatening the coastal belt of Pakistan, and increasing vulnerability.

**Architecture of Policies governing climate change**  
The Sindh province is particularly vulnerable to the impacts of climate change, particularly given its varied topographical features ranging from coastal areas to deserts, and its high concentration of urban areas, contrasted with rural communities. The province is home to Karachi, one of the largest megacities in the world, with high numbers living on the coastline. Sindh is faced with a unique set of climate related challenges due to these factors, and is taking steps to strengthen its ability to respond to these challenges.

For this purpose, the Government of Sindh established an Environment, Climate Change and Coastal Development Department, which is dedicated to tackling and implementing policies relating to climate and environment. This department is housed within the Environment Protection Agency, and in February 2014, the legislative assembly of Sindh passed a bill to enact the Sindh Environment Protection Act, which 'envisages protection, improvement, conservation and rehabilitation of environment of Sindh with the help of legal action against polluters and green awakening of communities. It equally lays emphasis for the preservation of the natural resources of Sindh and to adopt ways and means for restoring the balance in its eco-system by avoiding all types of environmental hazards'. At the same time, the EPA is in the process of developing its provincial climate change policy.

### Impacts of climate change on water availability in Sindh

In terms of drinking water, overall 30% of the households across Sindh access water from potentially unsafe and 70% from potentially safe water sources. The proportion of households accessing water from potentially unsafe sources is the highest in Tharparkar (68%) followed by 52% in Mirpurkhas and 44% in Thatta<sup>6</sup>.

<sup>6</sup>[https://reliefweb.int/sites/reliefweb.int/files/resources/sdna\\_final\\_report\\_august\\_2016.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/sdna_final_report_august_2016.pdf)

### Main drinking water source by district

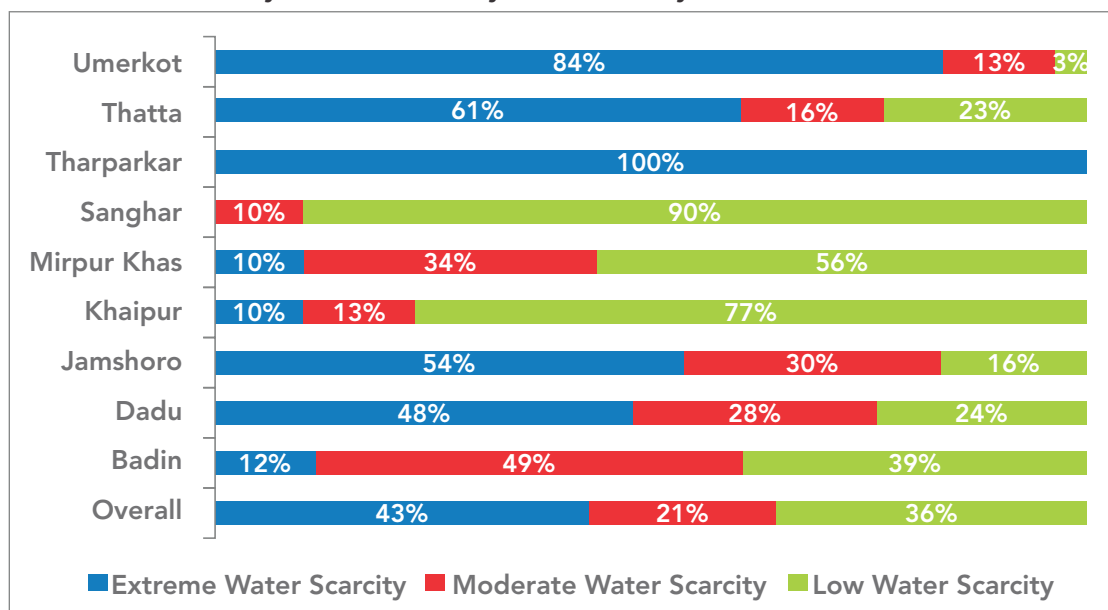
	Overall	Badin	Dadu	Jamshoro	Khairpur	Mirpurkhas	Sanghar	Tharparkar	Thatta	Umerkot
Potentially safe	70%	87%	92%	63%	94%	48%	84%	32%	56%	72%
Potentially unsafe	30%	13%	8%	37%	7%	52%	16%	68%	44%	28%

There are also issues in the water infrastructure in the province that exacerbate the water scarcity in the province. Reportedly, a majority of households (81.1%) are not connected to a drainage system whereas 11% and 8% are connected to underground/covered drains and open drains respectively. Existing inequalities are exacerbated as minority communities are not connected to sanitation systems. The lack of drainage system contributes to the spread of diseases such as diarrhea, especially among children.

### CSCCC Consultative Dialogue in Sindh, 2017

In November 2017, CSCCC conducted a Provincial Climate Change Consultative Dialogue in Sindh, convening stakeholders from government, civil society, academia, private sector and the media to co create a Stakeholder Recommendation

### Distribution of Surveyed Households by Water Scarcity



# PROVINCIAL WATER DIALOGUE

## Methodology

The overall objective of the consultative dialogue was to review the NWP from a sub-national perspective, while developing a list of joint stakeholders' recommended provincial targets for achieving the SDGs and NWP objectives. The 'Stakeholder Review of the National Water Policy in the Province/Regions' employed a whole-of-government approach, convening government, civil society, academia, private sector and media to jointly review the NWP through a moderated Panel Discussion, followed by a Focused Group Discussion on agreed thematic areas to identify key targets for the achievement of water security while dovetailing it with the targets of the National Water Policy and the Sustainable Development Goals (SDGs).

The event comprised of two components. The first was a moderated Plenary that convened experts from the government and civil society to assess various aspects of the NWP i.e.

- i. Legal perspectives of the National Water Policy
- ii. Water Management
- iii. Gender mainstreaming into water policies

The second component consisted of 'Consultative Roundtables' in which the participants convened in roundtables of 6-8 participants, 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

**Aisha Khan**, *Chief Executive of the Civil Society Coalition for Climate Change*, delivered the welcome remarks, and explained the mandate for the Civil Society Coalition for Climate Change, in relation to its role in convening stakeholders across the country to deliberate

over the Water Policy. 'In April this year, the first National Water Policy of Pakistan was approved, which mandates the provinces to develop their own Master Plans, in five different sectors, which the coalition has set as its five themes for soliciting recommendations for provincial targets, whilst identifying the challenges to achieve these targets, from a multi-stakeholder perspective.' She highlighted the role played by CSCCC as a convener of multi stakeholder groups, in light of the fact that Pakistan is a signatory to a number of international agreements, including the Lima-Paris Action Agenda, the Paris Agreement and the Open Government Partnership, all of which enhance and encourage the role of civil society as a critical player in policy development. Ms. Khan explained that it is not the mandate of CSCCC to develop the Master Plans as set out in the NWP, but rather to recommend priority areas that may serve as a reference point for governments when developing the actual water master plans. She urged the participants of the working groups to consider the National Climate Change Policy, its associated framework, the National Water Policy and the SDGs, as well as the IPCC Special Report and the World Bank Report on South Asia's Hotspots, both of which reference new data that will cause unprecedented changes in South Asia and Pakistan in particular.

The keynote address by **Dr. Ishrat Hussain**, *former Governor State Bank and Senior Advisor, Government of Pakistan on Institutional Reforms*, was essentially in two parts. In the first part he underlined the importance of water, especially for the province of Sindh. According to him, irrigation had historically played a critical role in economic growth or increasing poverty in the province, so the water resources had to be used very carefully in order to gain prosperity. It was directly linked to food and energy security as well as to the livelihoods of the people. Sindh, being a lower riparian of the Indus River, faces a peculiar situation, and especially, the health of the Indus Delta was dependent on sufficient water flows to the sea. While asserting their water rights, harmony between the lower and upper riparians had to be maintained. Then

there was the issue within the province itself, between those at the head end – generally, the influential landlords – and the unfortunate tail enders. There was a stark productivity differential between them with those at the head end enjoying a productivity level that was almost twice that of those at the tail end. Pricing of irrigation was a big issue with the current rate of aabiana not even sufficient for 10% of the O&M, whereas only some decades ago, 100% recovery used to be made. He asked the participants to take cognizance of all these issues and start planning now and try to aim high. He maintained that the Planning and Development Department, along with the departments of irrigation and environmental had a key role to play with the help of the various stakeholders from the civil society.

In the latter half of his keynote address, Dr. Ishrat Hussain explained some of the key messages from the national dialogue on NWP earlier hosted by CSCCC in Islamabad, especially those relating to governance that he had himself originally articulated. Underlining the importance of governance, he called for removal of political interference in water management, clearly defining roles of institutions working in the water sector for avoiding duplication and turf wars and coming up with decentralized mechanisms for timely decision making. He also advocated a more inclusive approach asking the government departments responsible for service delivery to consult all stakeholders, especially those from the communities, including women. He also touched upon the World Bank's diagnostic report on water and sanitation in Pakistan and highlighted its key message about the link between stunting and poor sanitation. Finally, he reiterated the importance of the SDG 6 targets, and averred that its various targets provided an excellent, though ambitious, framework for development in the water sector and could serve as a suitable touchstone for gauging progress.

The keynote address was followed by special remarks from **Dr. Naeem uz Zafar**, *Chief Economist, P&D Department, Government of Sindh*. He underlined the need for planning in the light of demographic realities emerging out of the recent census, as well as the new economic structures that have evolved in the

province. The irrigation and water policies of Sindh, according to him, should align with the fact that more than 60% of the economic output comes from the urban areas whereas the bulk of water usage is in agriculture which no longer contributes more than 20% of the GDP.

## Plenary

The plenary discussion then commenced, presided over by Dr. Ishrat Hussain. The first presentation was by Dr. Mahmood Ahmad, Visiting Professor at the LUMS, Water Informatics and Technology Centre. He made a comprehensive presentation beginning with providing background to the provincial consultative process on NWP. Defining a framework for water security based on proper water accounting and auditing, he stressed the need to understand water accounting analysis such as: 1) necessity to distinguish storages and fluxes; 2) avoiding the endless possibilities of double counts as the same water should not be counted twice (upstream and downstream, or aboveground and underground). He then presented an overview of the Sindh's water profile which was marked by the Indus River being the main source, with shortage of water coupled with drought conditions and pervasive water quality issues being its other important features. He delineated the linkages of water security with energy and food security as well as adaptation to the hydrological impacts of Climate Change. Touching upon the supply side issues and their possible solutions, he then explained the challenges of demand management as exacerbated by Climate Change and the key problems of governance and institutional weakness. He cited examples of best practices from North Africa – Egypt and Morocco – and from the Middle East – Israel – for efficient use of water as well as its optimal value addition; and went on to describe the situation of domestic water supply, especially to the mega-city of Karachi and suggested solutions to overcome the crisis-like situation. Underlining the need for both allocative and end-use efficiency, as a final word, he made a strong statement in that water solutions largely lie outside of the water sector – by reforming agriculture policy, developing climate smart agriculture, desalinization and waste water use. A copy of his presentation is attached as annex 2.



The Chair then allowed a special intervention by Mr. Idris Rajput, a veteran water expert from Sindh. Based on the recent book by Dr. Ijaz Hussain on the Indus Water Treaty (IWT), he averred that the annual volume of water in the three Western rivers of the Indus Basin - which have been essentially reserved for Pakistan under the Treaty – has not changed on average since 1922. To him this was an evidence that the glaciers feeding the Indus River were not melting and also cited some scientific studies to back his claim. On the other hand, the storage capacity of Tarbela which is used by Sindh during the rabi season has been reduced by more than 37% necessitating another reservoir to make up for this shortfall. He advocated for building the Bhasha-Diamer dam which would fit the bill. Citing some scientific studies he also proposed a continuous flow of 5000 cusecs, plus an aggregate of 25 MAF of water for every five years down the Kotri Barrage to save the Indus Delta. Finally, he advocated for rationalizing the per acre irrigation water rates – aabiana - to 10% of the average revenue generated and also called for a more just distribution of this water.

**Ms. Sanaa Baxamoosa**, *General Manager, Hisaar Foundation* was the next panelist who made an extensive presentation. She asserted that water was a catalyst for solving Pakistan's myriad problems and went on to list the major water challenges faced by the country. Highlighting the fact that Pakistan was essentially a water economy, she underlined the sorry fact of low productivity of water in Pakistan compared with major countries of the world like USA, China and India; and also graphically displayed the declining per-capita availability of water in the country since its independence. She then presented salient features of the Citizens' Water Policy formulated under the aegis of the Hisaar Foundation as a set of recommendations for the then impending NWP. This included the five focus areas of the Policy and ten national goals. It was followed by a depiction of the water situation in Sindh with its challenges as well as opportunities and solutions. She described the specific roles and responsibilities of the various tiers of government - federal, provincial, city, and local – for handling different levels of water governance, management and service delivery. Finally, she made a critical reflection on the lack of stipulated women's role in NWP and made a strong case for mainstreaming women in the

implementation of water policies and plans. A copy of her presentation is attached as annex 3.

The next panelist was **Mr. Shah Murad Aliani**, *former Director, IUCN*, who focused his remarks on the issues of water conservation and re-use of waste water. He advocated for a mass awareness campaign for water conservation at all levels as well as to introduce it in the education curriculum. Highlighting the importance of involving women in water conservation he suggested issuing a list of simple do's and don'ts that people could easily follow. He also highlighted the need for waste water treatment so that it could be re-used on a large scale, and advocated for making it mandatory for every new colony and housing scheme, even exploring the provision of retro-fitting for existing colonies. To this end he recommended decentralized governance mechanisms, involving the business sector – possibly through public-private partnerships – and the use of new and innovative technologies that were cost effective.

Before allowing another intervention by **Mr. Khalid Haider Memon**, *former Secretary Irrigation, Government of Sindh*, the Chair made two important remarks. He said that according to his estimates, the losses in water, electricity and gas for the country add up to a whopping rupee one trillion annually. He also stressed the importance of O&M which was badly neglected resulting in the unfortunate scenario of BNR (Build Neglect and Rebuild) as highlighted by Dr. Mahmood Ahmad. Mr. Memon stressed the importance of correct and accurate data for joint management of the Indus Basin by the upper and lower riparian provinces. He thought that the data which formed the basis of implementing the Water Apportionment Accord of 1991 between provinces was manipulated and fake figures were released. He also called for declaring the Indus Delta as a national resource with all provinces being made responsible for its health, management and the welfare of its inhabitants.

Before the breakout session into the five thematic groups listed earlier, **Ms. Anam Zeb** of CSCCC made a brief presentation on the climate change web portal that the Coalition had created in partnership with the Heinrich Boll Stiftung. She showed its various sections and

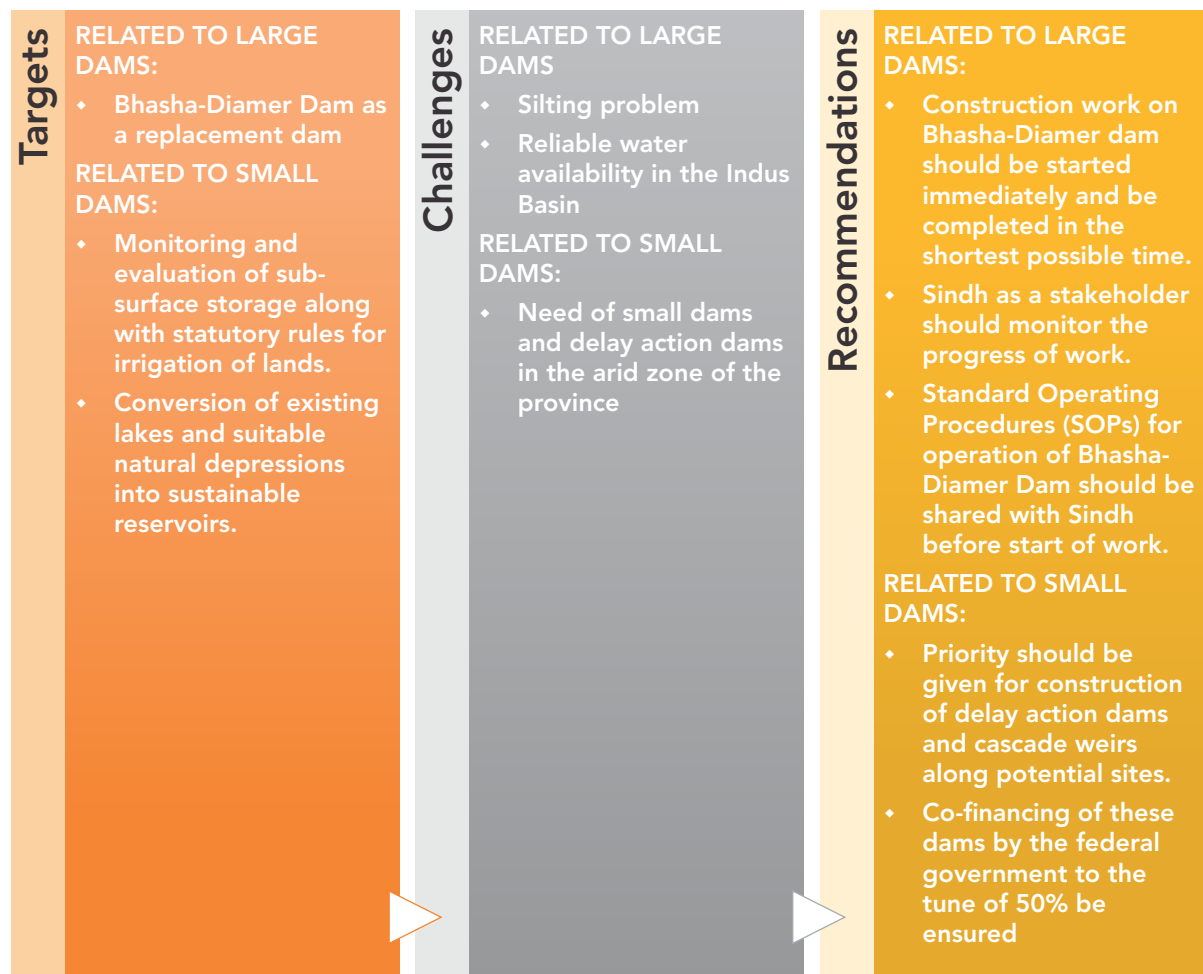
how to use it as an information and research tool.

The participants reconvened after carrying out their group work. The output of the group work – appearing in section 7.4 – was presented in this final plenary of the Dialogue. Dr. Ishrat Hussain in his concluding remarks appreciated the recommendations saying that they marked a good beginning and could meaningfully

contribute to the final Master Plans. But he also emphasized that they constituted only what needed to be done; how to do it, however, presented a more formidable challenge to be addressed by the Government of Sindh, and especially its P&D Department. The event concluded with a vote of thanks by Ms. Ayesha Khan, Country Director, Hashoo Foundation and by Ms. Naila Haq on behalf of the P&D Department, the two co-sponsors of the event.

## KEY TAKEAWAYS

### Water Storage



## Irrigation

Targets	<ul style="list-style-type: none"> <li>♦ Rehabilitation and modernization of infrastructure with a one-time cost of about Rs. 200 billion</li> <li>♦ Revival of natural wetlands and water bodies like the Manchhar Lake</li> <li>♦ True valuation of water (rationalization of aabiana rates)</li> <li>♦ Promotion of high efficiency irrigation system</li> <li>♦ Capacity building at all levels</li> </ul>		Challenges		Recommendations
			<ul style="list-style-type: none"> <li>♦ Ageing infrastructure</li> <li>♦ Governance issues (political interference, elite capture of water resources, not following merit, tampering of outlets)</li> <li>♦ Problems in management and service delivery institutions (Irrigation Department, Sindh Irrigation and Drainage Authority (SIDA), Area Water Boards (AWBs), Farmers Organizations (FOs)</li> <li>♦ Havoc caused by poorly designed drainage systems like Right Bank Outfall Drain (RBOD).</li> <li>♦ Insufficient environmental flows for the Indus Delta</li> </ul>		<ul style="list-style-type: none"> <li>♦ One-time rehabilitation and modernization of infrastructure be carefully planned and implemented.</li> <li>♦ Reforms be carried out in the water institutions, mentioned above.</li> <li>♦ Plans for revival of natural wetlands, especially the Manchhar Lake, should be chalked out.</li> <li>♦ Study to rationalize the aabiana rates on an urgent basis.</li> <li>♦ High efficiency irrigation systems be introduced.</li> <li>♦ Trees be planted along canals.</li> <li>♦ Canals should be lined only in saline areas.</li> <li>♦ Proper budgeting and accounting of water allocations be carried out on a realistic basis.</li> <li>♦ Drainage should be given the importance it deserves and drainage outlets should be designed so as not to contaminate fresh water systems.</li> <li>♦ Trainings should be carried out on a regular basis to build the capacity of staff in the service delivery institutions.</li> <li>♦ Fresh ground water budgeting to control its over-exploitation.</li> <li>♦ Control contamination of irrigation water by strict implementation of laws.</li> <li>♦ Revive the katcha areas and natural waterways.</li> <li>♦ Preserve the delta by ensuring continuous supply of water below Kotri Barrage.</li> </ul>

## Water Conservation

<b>Targets</b> <ul style="list-style-type: none"> <li>♦ Setting up conservation zones</li> <li>♦ Promoting appropriate technologies in fragile eco-zones</li> <li>♦ Involving local people in water conservation initiatives</li> <li>♦ Seed improvement for low water usage crops</li> <li>♦ Promotion of high efficiency irrigation systems</li> </ul>	<b>Challenges</b> <ul style="list-style-type: none"> <li>♦ Transformation from pastoral to semi-industrial mode</li> <li>♦ Switching from appropriate to extractive technologies</li> <li>♦ Water 'entitlement' to the influential</li> <li>♦ Pricing to the disadvantage of the poor</li> </ul>	<b>Recommendations</b> <ul style="list-style-type: none"> <li>♦ Conservation be made a strategic policy imperative in all water related policies and plans. To save ground water appropriate frameworks, such as:</li> <li>♦ Regulatory framework; and</li> <li>♦ Land use frameworks, be introduced.</li> <li>♦ Appropriate disposal mechanisms be formulated to save ground water.</li> <li>♦ Small dams be constructed for conservation – through better regulation - of natural reservoirs like Karoonjhar and Khirthar.</li> <li>♦ Better protection be given to natural water reservoirs like Manchhar, Keenjhar and Haleji. They should be optimally managed with a view to water conservation.</li> <li>♦ Innovative water saving technologies, especially high efficiency irrigation systems be promoted.</li> <li>♦ Low delta new and varieties of existing crops be introduced.</li> <li>♦ Rain water harvesting be promoted both at the collective and household levels.</li> </ul>
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## Drinking Water

<b>Targets</b> <ul style="list-style-type: none"> <li>♦ Appropriate budget allocation</li> <li>♦ Integrated framework/plan for drinking water management</li> <li>♦ Robust water measurement and pricing mechanism</li> <li>♦ Strengthening local governments to manage drinking water</li> </ul>	<b>Challenges</b> <ul style="list-style-type: none"> <li>♦ Lack of access</li> <li>♦ Water quality</li> <li>♦ High rate of population growth</li> <li>♦ Ailing distribution system</li> <li>♦ Lack of planning – missing plans</li> <li>♦ Dwindling institutional capacity</li> <li>♦ Non-existing political will</li> <li>♦ Water measurement and pricing</li> <li>♦ Lack of coordination between public sector institutions and other stakeholders (the users and beneficiaries)</li> <li>♦ Non-uniform legal instruments</li> <li>♦ Huge system losses</li> <li>♦ Weak and unstable local government system</li> <li>♦ Water mafias</li> <li>♦ Inefficient use of water</li> <li>♦ Lack of awareness and water specific education</li> <li>♦ Absence of an effective O &amp; M system</li> </ul>	<b>Recommendations</b> <ul style="list-style-type: none"> <li>♦ Treat clean drinking water as first priority and develop an integrated framework/plan for augmentation (currently supplied quantities being insufficient), distribution and quality management on an urgent basis.</li> <li>♦ Make a more diverse professional induction in relevant institutions, especially those with expertise in social sciences and not just engineers and technicians as is the current norm.</li> <li>♦ A more formal and strategic coordination is required among the institutions and stakeholders involved with drinking water.</li> <li>♦ Public private partnership be promoted for service delivery and resolving issues of drinking water.</li> <li>♦ Strengthen the local government system for water management with grass roots involvement.</li> <li>♦ Advocacy with political parties to include the provision of clean drinking water in their manifestoes.</li> <li>♦ Establish a robust water measurement and pricing mechanism.</li> <li>♦ Learn from other countries – India, South East Asia, and Latin America - and emulate their good practices.</li> <li>♦ Drinking water being a fundamental human right, its availability should be ensured to the poorest preferably at no cost or a nominal cost that they can easily afford.</li> <li>♦ Introduction of behavioural education on water and launch of mass awareness campaigns.</li> <li>♦ Using decentralized systems – with the involvement of local government – leading to increased piped water delivery to both urban and rural areas.</li> </ul>
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## Water Treatment

<b>Targets</b>	<ul style="list-style-type: none"> <li>♦ Sufficient budgetary allocation</li> <li>♦ More effective enforcement of National Environment Quality Standards (NEQS) by Environment Protection Agency (EPA) of the province</li> <li>♦ Introduction of Integrated Water Resources Management (IWRM)</li> </ul>	<b>Challenges</b>	<ul style="list-style-type: none"> <li>♦ Contamination of municipal and Indus water (already contaminated upstream and further contamination occurs in the province)</li> <li>♦ Lack of enforcement of environmental quality standards</li> <li>♦ Agriculture run-off with Persistent Organic Pollutants (POPs)</li> <li>♦ Lack of necessary technical knowledge and capacity, especially in the rural areas</li> <li>♦ Decision makers focused on demand (quantity) rather than quality</li> <li>♦ Inadequate resource allocation</li> <li>♦ Absence of credible baseline</li> <li>♦ CSOs, women and even private sector not considered as important stakeholders</li> </ul>	<b>Recommendations</b>	<ul style="list-style-type: none"> <li>♦ IWRM should be practiced in the province as well as across the country.</li> <li>♦ A more effective enforcement of NEQS be ensured from EPA, Sindh.</li> <li>♦ Organic farming be promoted, and the use of harmful pesticides, especially POPs be curtailed.</li> <li>♦ Methods of natural treatment of water be promoted.</li> <li>♦ Decision makers be sensitized on the issues of water quality.</li> <li>♦ Ensure appropriate and sufficient budgetary allocation for water treatment.</li> <li>♦ Carry out a comprehensive survey to establish a credible baseline.</li> <li>♦ Mobilize communities, CSOs and private sector organizations to address this issue and ensure adequate participation of women in all such initiatives.</li> </ul>
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