



SUB-NATIONAL WATER DIALOGUE GILGIT BALTISTAN



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Sub-National Water Dialogue Gilgit Baltistan

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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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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 Gilgit Baltistan	07
GB Climate Profile	09
Impact of Climate in GB	09
Agriculture and Livestock	09
Energy	09
Health	10
Environment and Forestry	10
Disaster Risk Reduction	11
Impact of Climate Change on Water availability in Gilgit Baltistan	12
PROVINCIAL WATER DIALOGUE	13
Methodology	13
Dialogue Overview	13
Plenary	14
Key Takeaways	15

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 Gilgit Baltistan, organized by the Civil Society Coalition for Climate Change with the support of the Department of Planning and Development, Government of GB, and the World Bank, took place at the Serena Hotel, Gilgit on the 30th of November 2018. The dialogue, titled 'Sub-National Perspectives on the National Water Policy- GB', 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. Irshad Hussain, Deputy Secretary, Ministry of Tourism, Government of GB, and Mr. Ahsan Mir, Program Coordinator, ETI-GB and Aisha Khan, the Chief Executive of CSCCC, while Dr. Mahmood Ahmad, Senior Visiting Researcher, Lahore University of Management Sciences provided an overview of Water Management in Pakistan.

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

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 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

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

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 Gilgit Baltistan

Gilgit Baltistan is spread over an area of 72,971 sq km, nearly half of which contains mountain peaks, glaciers, lakes and highlands. It borders Afghanistan to the north, the Xinjiang province of China to the northeast, the Pakistani administered state of Azad Jammu and Kashmir to the south and the Indian administered state of Jammu and Kashmir to the southeast. In the absence of census data, the population of GB is estimated to be between 1.5 to 2 million persons, GB is administratively divided into three divisions: Gilgit, Baltistan and Diamer. The Gilgit division constitutes four districts of Gilgit, Ghizer, Hunza and Nagar; the Baltistan division consists of four districts including Skardu, Ghanche, Shigar and Kharmangh and Diamer division consists of Diamer and Astore districts.

Gilgit Baltistan became a single administrative unit in 1970, under the name Northern Areas and was formed by the amalgamation of the Gilgit Agency, Baltistan district of the Ladakh Wazarat and the states of Hunza and Nagar. On 29th August 2009, the GB empowerment and Self Governance Order 2009 was passed by the Pakistani cabinet and later signed by the country's president, granting self-rule to the people of the Northern areas (renamed Gilgit Baltistan) through an elected legislative assembly among other measures..

DIVISION	DISTRICT	AREA (KM2)	CAPITAL	POPULATION (2013)	DIVISIONAL CAPITAL
BALISTAN	Ghanche	4052	Khaplu	108,000	Skardu
	Shigar	8500	Shigar	-	
	Kharmang	5500	Kharmang	-	
	Skardu	8700	Skardu	305,000	
GILGIT	Gilgit	14,672	Gilgit	222,000	Gilgit
	Ghizer	9635	Gahkuch	190,000	
	Hunza	7900	Aliabad	70,000 *2015)	
	Nagar	5000	Nagar	51,387 (1998)	
DIAMER	Diamer	10,936	Chilas	214,000	Chilas
	Astore	5092	Eidghah	114,000	

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Governance Order 2009 was passed by the Pakistani cabinet and later signed by the country's president, granting self-rule to the people of the Northern areas (renamed Gilgit Baltistan) through an elected legislative assembly among other measures.



The region is home to the Karakoram and the Western Himalayan mountain ranges, among the highest mountain ranges in the world. The Pamir Mountain's lie towards the north and the Hindu Kush lies towards the west. Amongst the highest mountains are K2 and Nanga Parbat, the latter being one of the most challenging peaks in the world. Three of the world's longest glaciers outside the polar regions, i.e. Biafo, Baltoro and

BAtura are found in GB, as well as several high altitude lakes. Overall, GB has 5 of 14 of the worlds 'eight thousanders'- peaks that are above 8000 m in height. More than 50 peaks above 7000 m stand in a radius of 500 km in the region. A vast glacial area spread over 15000 sq. km. comprises of at least 5000 big and small glaciers, while there are 3000 big and small glaciers.

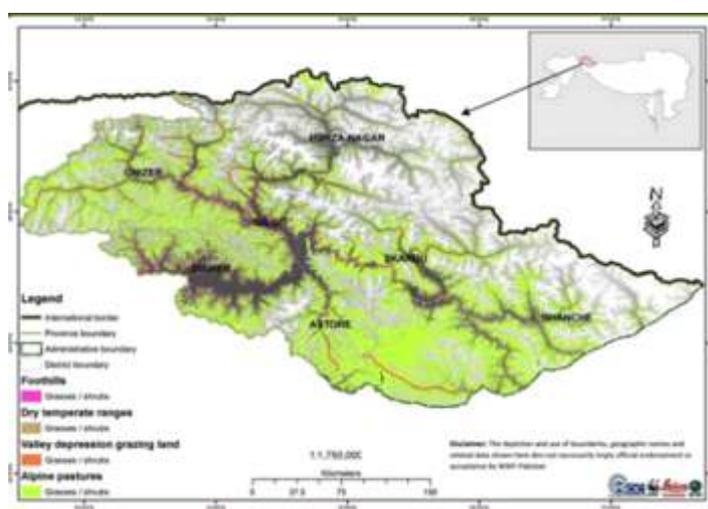


Figure 3: Source: WWF Pakistan

Of the total population, the majority of the population is rural, with the urban:rural ratio at 14:86. There are 103 males for every 100 females in the province, and the annual growth rate is 2.4%. The overall literacy rate is 50%, while the literacy rate for males is 64% and for females is 36% (Demographic and Health Survey of GB, 2008). Most of the region relies directly on nature for its sustenance, with many communities practicing subsistence agriculture. The main agricultural products are wheat, corn, barley and fruit. Tourism contributes to the economy, and its share is growing with increased trekking and mountaineering. However, the economy is primarily based on the historic silk road, and the establishment of a chamber of commerce and the Sost dry Port in Gojal Hunza, are milestones. There is also an agreement with the People's Republic of China for a major energy project in GB, which includes the construction of a 7000 megawatt dam at Bunji in the Astore District.

GB Climate Change Profile

GB is one of the most highly glaciated areas in the world, making it particularly vulnerable to the impacts of climate change. There have been notable retreats in the glaciers in several regions of Asia since 1950, including GB. Empirical evidence indicates that 30 to 50% of existing mountain glacier mass could disappear by 2100 if global warming of 2 to 4 degrees Celsius occurs. For every 1 degree increase in temperature, the snowline on mountains shrinks by approximately 150 m. Smaller glaciers will respond faster to the changes in climate- and overall shrinking glacial mass will lead to drastic changes in hydrology of mountain regions. This will lead to increased water for the downstream users in the present, but to diminished flows in future. For the communities in GB, climate change will impact social and economic systems due to the changes in quality and quantity of water- and as the region is one of the key water resource banks for the country, the population of Pakistan as a whole will be severely impacted.

According to the GB Climate Change Strategy and Action Plan (2017), data for 30 years from GB show that the glaciers in the HKH ranges have absorbed more heat compared to the plains in the last half century. An increase of 0.15 degrees Celsius per decade in average temperature of five weather stations was recorded from 1984 to 2013, while a decrease of -4.3mm per decade in the

average precipitation was recorded.

The expected changes in the mountain systems of GB include increased hydrometeorological disasters, variations in water flows in streams and rivers, increased temperatures and shift in precipitation levels. These changes may cause damages to infrastructure, impacts on food security, loss of lives and livestock, incidences of diseases and shift in spatial and temporal distribution of dominant vegetation in alpine pastures.

Impact of climate change in GB

The changes in the climate of GB manifest in some of its most vital sectors, and have far reaching impacts. A region that is far behind the rest of Pakistan in terms of socio economic development, the impacts of climate change will exacerbate existing vulnerabilities, especially among the poor and marginalized.

Agriculture and Livestock

Climate Change will have severe impacts on the agriculture and livestock in GB. Of the 72,971 km² of total land in GB, 2% is cultivable. More than 80% of the population relies on subsistence farming, growing cereal crops, fruits, vegetables and fodder for livestock.

Livestock account for nearly 40% of the household farm income as well as providing fertilizer for traditional farming. According to 2013 estimates, there are more than 1.6 million reared animals in the region. Both agriculture and livestock are heavily reliant on natural water flows in the region, which vary greatly from season to season, as well as due to changes in climate such as temperature and precipitation changes. Irrigation channels are based on indigenous management systems, which are vulnerable to even small changes in climate. The region is not amenable to large scale, intensive infrastructure, and there is a need to invest in more efficient cropping methodologies and crop rotation to secure the livelihoods of GB's population.

Energy

The current demand for energy in GB is more than 500 MW. While there are more than 100 operational hydropower stations in GB and several thermal stations, they supply total energy of 150 MW, with suppressed load to 65% of the population. The generation potential for

Major Agro-ecological Zones of Gilgit-Baltistan	
Zones	Characteristics
Double Cropping Zone	Elevation ≥ 1900 m: Double cropping zone with typically wheat as a winter crop and maize in summer
Marginal Double Cropping Zone	Elevation 1900 - 2300m Marginal double cropping zone which can be converted into double cropping zone with use of short season crops and early maturing varieties. (Potato, Wheat, Barley, Buckwheat & vegetables are main crops)
Single Cropping Zone	Elevations 2300m - 3000m Single cropping zone Potato, Wheat, Barley, Peas, and faba bean and vegetables). <i>Above 3000 m are the alpine pastures with no cultivation.</i>

hydropower in GB is more than 40000 MW on the Indus River, tributaries, sub tributaries and streams, which has not yet been explored. As mountain glaciers and snow melt are the main sources of water in GB, and that hydropower is the main source of energy, the hydrology of the region is extremely sensitive to the impacts of climate change. Changing temperature and precipitation patterns will impact the flow of water to the hydropower stations, and potentially deprive communities of vital sources of energy, which will also impact the economy. There is a strong need for the effective management and conservation of water resources, as well as the exploration of further hydropower potential in GB, both to generate energy and to mitigate the impacts of climate change.

Health

GB has a total of 5 District headquarter hospitals, 27 civil hospitals, 2 Rural Health Centres, 15 Basic Health Unites, 190 Government rural dispensaries, 93 MCH centres and 154 Sub Health Centres (TRF- Health Facility Assessment, GB, 2012). Health indicators in the region are weak, with 600 women deaths out of 100 000 live births, widespread stunting and occurrence of diseases.

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

Environment and Forestry

Total natural forest cover in GB is 4% of the total area, spread across the southwestern part of the region in Diamer district, the upper valleys of Astore, southern Gilgit, Punial district Ghizer, Chaprote and Bar valley in district Nagar and some pockets in Baltistan. Agroforestry including the plants in arable areas constitute nearly 6% of the area spread across the region. The forests are not only carbon sinks, preventing soil degradation and erosion, and protecting the watershed of Pakistan, but are also supportive of rich biodiversity. In Pakistan, 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). The scenic landscapes of GB make it a tourist attraction, and the tourism sector contributes significantly to the

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 GB, climate change manifested in extreme events and disasters is increasingly evident.

Hazard Type	Events/Loss	Vulnerable Areas/Groups
Landslides	<p>Frequent landslides in deep valleys: Frequent landslide occur due to heavy rain in deep valleys of the region.</p> <p>2016 landslides on KKH: KKH and different roads in Gilgit Baltistan were closed at 175 points due to landsliding</p> <p>January 2010, Attabad landslide disaster: A cracked mountain at Attabad Slid down into Hunza river creating 25km</p>	<p>Remote villages across the region: Frequent landslides cause damage to the lands and property of communities living in remote villages of all districts across the region</p> <p>Protected blockade of KKH: Causes severe social problems including shortage of food and essential medicines in GB</p>
	long lake taking 20 lives and thousands displaced.	Upper Hunza: Attabad village was completely devastated with debris whereas six of small villages and 25km of KKH was totally submerged into newly formed lake.
Avalanches	April 2012, Gyari sector: Near Siachen Glacier: 70 feet of snow engulfed a military base taking the lives of 129 soldiers and 11 civilians.	All areas situated near the seasonal snow cover areas are vulnerable to avalanche phenomena.
Flash Floods	<p>August 2010, Pluvial and Flash Floods: Due to heavy rain in different areas of GB; 122 people dead; 60 injured; 1,230 houses damaged; 12,300 displaced in the region.</p> <p>Ghizer: Dozens of villages devastated in the Tehsils of Yasin, Punial and Ishkoman; Heavy casualties in Diamir; and Skardu and Skardu and Ghanche districts of Baltistan</p> <p>July 2015, Khplu, Ghanche, Baltistan: The area was hit by devastating floods caused by the heavy melting of glaciers in the summer season. Score of people died and loss of property and land. Damage to 42 power stations across the region</p>	All groups and population adjacent to natural streams and along the rivers banks are vulnerable to floods. Roads and infrastructure, power generating stations; and irrigation channels and drinking water supply systems have frequently being hit by flash floods.
GLOF	<p>2014 & 2015 Bogrote Valley, Gilgit: The area was hit by multiple GLOF events in 2014 and 2015 that caused huge damage to livelihood and infrastructure.</p> <p>Khanday, Baltistan: GLOF events devastated the Khanday village in Baltistan causing huge damage to the area</p> <p>Gojal, Hunza: Three glacial lake outburst floods (GLOFs) have hit three villages Passu, Ghullan and Hussaini in Gojal Tehsil, upper Hunza damaging properties, livestock, orchards and disrupting trade and traffic on Karakoram Highway almost every year.</p>	<p>Bagrote Valley, Gilgit: Bagrote valley has witnessed various GLOF events in the current decade and many glacial lakes are reported in the area thus making the valley vulnerable to the GLOF Phenomena.</p> <p>Khanday, Baltistan: Most of the area along Khanday Nallah is vulnerable to GLOF.</p> <p>Gojal, Upper Hunza: The area has highest destiny of glacial lakes, some of which are at the verge of burst. The vulnerability is high due to the fact that KKH is passing through the glacial area and villages are very close to the glaciers.</p>

Figure 4: Source: GB climate Change Strategy and Action Plan 2017

For GB 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 Gilgit Baltistan

With 80% of its population employed in agriculture, and as one of the most highly glaciated areas in the world, GB is particularly sensitive to changes in climate such as erratic temperatures, precipitation changes and extreme events, which impact the availability of water. The glaciers and snow of GB are a major source of water for the Indus River and its tributaries, and water needs for agriculture are met through a combination of irrigation canals and glacial and snow melt. Therefore, even minor changes in temperature and precipitation patterns have direct impacts on food security. 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. In terms of access to drinking water by sub national variations, 78% of GBs population has access to safely managed

and basic sources, 0.5% has access to limited sources, 4.7% has access to unimproved sources while 16.7% rely on surface water. In terms of sanitation, 0% has access to safely managed sanitation, 82.1% to basic, 0.8% to limited, 9.5% to unimproved and 7.6% engage in open defecation practices. In terms of hygiene coverage, 20.3% has access to basic sources, 68.6% to limited sources and 11.1% has no facilities available(WATERAID). The study also indicates correlations between wealth and access to sanitation, with those in a higher wealth quintile having greater access to sanitation.

Climate projections note that there will be increased variability of river flows due to the increasingly erratic temperature and precipitation patterns. 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.

As the temperatures and rainfall patterns in GB 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 region, notably GLOF, and with a growing population, adequate strategies to address the anticipated water shortages are necessary.

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 Gilgit Baltistan, organized by the Civil Society Coalition for Climate Change with the support of the Department of Planning and Development, Government of GB, and the World Bank, took place at the Serena Hotel, Gilgit on the 30th of November 2018. The dialogue, titled 'Sub-National Perspectives on the National Water Policy- GB', 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. Irshad Hussain, Deputy Secretary, Ministry of Tourism, Government of GB, and Mr. Ahsan Mir, Program Coordinator, ETI-GB and Aisha Khan, the Chief Executive of CSCCC, while Dr. Mahmood Ahmad, Senior Visiting Researcher, Lahore University of Management Sciences provided an overview of Water Management in Pakistan.

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 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. Irshad Hussain, *Deputy Secretary, Department of Tourism, Government of GB*, in his special remarks, noted the importance of water for the economy of GB, particularly for the tourism sector. 'In the whole world, water bodies such as lakes, rivers, streams are tourist attractions, and most countries in the world are successfully able to utilize these natural

resources for tourism purposes, which in turn contribute to the economy' he noted, 'and while Pakistan is lucky to have an abundance of water policies, the lack of a comprehensive policy to conserve and protect these bodies from a tourism perspective has meant that as a country, we have been unable to capitalize on our tourism potential'. He appreciated the steps that the Government has taken to pass the National Water Policy, and urged the regional representatives of GB present at the workshop to take up the implementation of the policy on an urgent basis. 'If GB is to progress, economically and socially, Tourism is the key sector through which this will happen' he said, 'And tourism is inextricably linked with water'. He expressed his appreciation for the role of CSCCC in bringing stakeholders together, and his confidence that the deliberations of the day would result in meaningful recommendations.

Mr. Ahsan Mir, Project Coordinator, ETI-GB, commended CSCCC for initiating dialogue on the NWP in GB. Mr. Mir elaborated on the importance of water, stating that human settlements are always made near sources of water, since the beginning of time and this led to the advent of agriculture and civilizations as we know them today. He noted that as water resources are depleting due to the impacts of climate change, there is increasing outmigration by communities in GB in search of clean and safe water for domestic use and agricultural purposes. 'As the third pole, we are home to the biggest glaciers in the world' he said, 'ultimately, if climate change continues to cause the glaciers to melt, communities in GB are likely to migrate downwards. The importance of the sustainable use of water, and its conservation, are key to protecting our water resources and protecting the ecological integrity of the region.'

Expert Presentations

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 GB.

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.

KEY TAKEAWAYS

Drinking Water

<p>Targets</p> <p>INSTITUTIONAL</p> <ul style="list-style-type: none"> Establishment of unified platform i.e. provincial and district level water management committees and working groups Development of website Allocation of more funds for drinking water in ADPs and national and international donors Develop capacity on drinking water quality, behavioral change and conservation of water quality Establishment of state of the art water quality laboratories Ensure long term sustainability <p>SOCIAL ISSUES</p> <ul style="list-style-type: none"> Legislation on water rights Introduction of public private partnership projects Awareness program on behavioral changes 	<p>Challenges</p> <p>INSTITUTIONAL</p> <ul style="list-style-type: none"> Lack of coordination between water sector stakeholders Lack of information sharing (duplication of services) Lack of resources Weak capacity Deterioration of water quality Behavioural change communication issues Lack of O&M <p>SOCIAL ISSUES</p> <ul style="list-style-type: none"> Water rights and inter-community conflicts Ownership of infrastructure and resources Wastage of water resources Open defecation practices along water resources Waste dumping along water resources Livestock rearing in pastures 	<p>Recommendations</p> <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
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Water Storage

<p>Targets</p> <ul style="list-style-type: none"> Bunds at community level (Ghulk, Phari) Build Check Dams and Reservoirs with sediment release facility (at valley level) Mega reservoirs constructed at regional level Glacier Gradting (water source development) and Ice Stupa 	<p>Challenges</p> <ul style="list-style-type: none"> Financial resources and technical expertise is severely lacking at the regional level Conflicts between and among stakeholders and communities Climate change Availability of land Disputed status of GB 	<p>Recommendations</p> <ul style="list-style-type: none"> Water pricing improvements Projects related to watershed management Promoting efficient water harvesting techniques Efficient use of water (alignment of water channels and courses etc) Integrated Water Policies
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Irrigation

Targets <ul style="list-style-type: none"> ♦ Substantial reduction in water consumption by agriculture (Currently no GB specific data available) ♦ GB Specific Water Policy 	Challenges <ul style="list-style-type: none"> ♦ No GB Water Policy ♦ Non existence of irrigation-WMD ♦ No land use planning ♦ Lack of awareness regarding efficient irrigation water usage ♦ Outdated irrigation infrastructure ♦ Lack of GB specific data available on water/climate/temperature/socioeconomic indicators 	Recommendations <ul style="list-style-type: none"> ♦ Shifting of flood irrigation into HEIS ♦ Improvement of irrigation networks ♦ Construction of hydraulic structures ♦ Construction of x section of channels on required basis ♦ Reactivation of traditional practices for cleaning/rehabilitation of water channels ♦ On farm efficient water utilization ♦ High value cash crops having comparative and competitive advantages and suitable for HIES ♦ Flood to HIES ♦ Proper crop rotation ♦ Improvement of traditional warabandi system
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Water Treatment

Targets <ul style="list-style-type: none"> ♦ Development of Provincial Water Policy ♦ Mass Awareness Campaign ♦ Technical transition ♦ Integration of main stakeholders (Water Department, KIU, Agriculture, EPA, P and D) ♦ Implementation of Policies and Strategies 	Challenges <p>CAUSES OF WATER CONTAMINATION</p> <ul style="list-style-type: none"> ♦ Biological- bacterial, viruses, etc ♦ Physiochemical-turbidity, taste, odor, pH ♦ Chemical-organic/inorganic <p>TREATMENT CHALLENGES</p> <ul style="list-style-type: none"> ♦ Lack of legislative/policy framework ♦ MAss awareness ♦ Research availability ♦ Lack of technical expertise and treatment facilities ♦ Water recycling awareness ♦ Financial constraints 	Recommendations <ul style="list-style-type: none"> ♦ Policy Framework ♦ Enforcement PRiority ♦ Budget utilization and to execute treatment projects ♦ Hiring of technical people/HR ♦ Capacity building of relevant institutions ♦ Water quality standards introduced
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Water Conservation

Targets <p>INVESTMENT IN</p> <ul style="list-style-type: none"> ♦ 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"> ♦ Lack of proper infrastructure ♦ Lack of water management ♦ Lack of technology ♦ Lack of regional policy and strategy ♦ Lack of umbrella structure 	Recommendations <ul style="list-style-type: none"> ♦ Lining of irrigation channels ♦ Pipe and drip irrigation methods ♦ Mini dams and check dams ♦ Aforrestation ♦ Improvement in management systems awareness programmes ♦ Water users associations ♦ Community incentives ♦ Water pricing ♦ Reducing surface evaporation
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