Climate change and resilient WASH in South Asia

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In the coastal areas affected by salinity, WaterAid Bangladesh has built models of water storage facilities based on the rainwater harvesting and usage of reverse-osmosis technology to provide drinking water to communities. It has also built raised toilets which are more resilient to floods and storms.

Executive summary

Climate-induced melting of glaciers, reduced rainfall and salinity along the coastlines increase the stress on water sources, affecting access to water for drinking, sanitation and hygiene. Extreme weather events such as floods and cyclones compromise the sustainability of the infrastructure of water supply and sewerage, and affect the quality of water. Interruption of water, sanitation and hygiene (WASH) services has huge consequences on the health, nutrition, education and livelihoods of the populations caught in vulnerable situations as well as on eradicating poverty and inequality among them. South Asia, with a large population living in poverty and fragile topography, is going to be most affected by climate change. Climate change has a strong bearing on the commitments made for WASH under targets 6.1 and 6.2 of the Sustainable Development Goals (SDGs).

At the same time, access to safe drinking water and sanitation is the foremost resilience measure for climate change adaptation in the long run as well as an emergency response to get life back on track after an extreme weather event or a disaster. Although WASH is an important reactive strategy for disaster response and a proactive measure for the reduction of disaster risks, it has not got due attention as a key adaptation strategy to climate change. Populations should have resilient basic services of water and sanitation in place as essential building blocks for recovery from loss to livelihoods due to climate change.

In this context WaterAid recommends the following actions:

- Climate change policy to include resilient WASH services as a key adaptation strategy.
- Long-term and decentralised planning for water security and its management at sub-national and local levels.
- Review of existing WASH approaches and programmes by development partners and governments through the lens of climate change.
- Investments in resilient technology, innovations and infrastructure by governments and the private sector.
- Balance between top-down policy and accountability imperatives and bottom-up planning and inputs for climate resilient WASH.
- Increased domestic resource mobilisation and additional climate fund from developed countries for adaptation, to which water, sanitation and hygiene services are essential.

The paper looks into the evidence from four South Asia countries, namely Bangladesh, India, Nepal and Pakistan.

1 Climate vulnerability and risks to WASH services in South Asia

1.1. Dry becomes drier

The 2018 report of Lancet's countdown on health and climate change estimated that the number of people exposed to heat waves in India increased by 40 million in five years from 2012 to 2016. South Asian regions, especially western India and southern and central Pakistan, have been considered perennially drought-prone. Parts of Bangladesh and Nepal also suffer frequent droughts[1]. In Nepal, the National Action Plan on Adaptation identified 22 of the 75 districts as highly vulnerable to drought. In Bangladesh, the north-western region is facing frequent droughts, high temperature and water shortages, leading to more stress on the landless, indigenous and ethnic groups[2].

Severe heat waves and prolonged droughts diminish the quality and availability of water, whether it is surface water or groundwater drawn from wells and hand pumps. Stress on water resources leads to further unsustainable abstraction of groundwater. Reaching deeper groundwater sources also has huge cost implications since water for basic WASH services has to be pumped. Droughts and high temperatures lead to algal blooms and concentration of chemical pollutants due to diminished runoff and flows to rivers and aquifers, thus increasing treatment costs.

Worsening quality of water and the resultant requirement of expensive treatment make clean water less affordable to the people caught in poverty. Water stress makes women and girls wait long hours in queues near water points or walk many hours a day in search of drinking water.

WaterAid/ Sibtain Haider

1.2. Reduced flow in glacier-fed rivers

Water supply in South Asia is largely dependent on glacier-fed rivers, apart from the rainwater. About 1.3 billion people in South Asia rely on fresh water obtained directly or indirectly from the Hindu Kush Himalayan mountain systems[3]. Climate-induced glacier melting will initially increase river flows. Over time, this will be followed by a reduction in flows with the decrease in ice mass. In South Asia, overall river flows are expected to reduce by up to 20% by 2100[4]. In Nepal and the mountains of India, increased temperature and diminished snowfall followed by rapidly receding glaciers have already depleted water reservoirs[5]. Reduction of flow in rivers has dire implications for access to safe drinking water; sewerage and flushing of latrines; and overall hygiene and health.

Stress on water resources can push communities to go back to open defecation. It can thus reverse the gains made by South Asian countries that have implemented several sanitation programmes to become open defecation free.

1.3. Salt water intrusion into surface and groundwater

The coastal zones of Bangladesh, Pakistan and India are extremely vulnerable to climate change-induced sea level rise and salt water intrusion. There are various factors influencing salt water intrusion, including river discharge, tidal range, geological setting, excessive groundwater extraction and land use changes[6]. Climate change-induced sea level rise has been widely recognised as a major contributor to the increasing salinity of coastal water resources[7].The coastal zone in Bangladesh covers around one-third of the country and more than one-fourth of its total population[8]. Due to high salinity in the coastal area, groundwater cannot be used in most places. The coastal population, therefore, relies on rainwater harvesting, tanks and ponds for drinking water. Often this is not sufficient. In the dry season, when pond water becomes saline because of evaporation loss and rainwater is used up, people are inevitably forced to use tube-wells and river water. River salinity in the south west coastal belt of Bangladesh is on the rise and fresh water river area is expected to decrease by half due to climate change by 2050 (from 40.8% at present to 19.7%), further affecting the supply of drinking water[9].

1.4. Impact of extreme events on WASH infrastructure and water quality

Extreme weather events threaten the infrastructure for water and sanitation. The Bay of Bengal region, comprising the coast of Bangladesh and eastern coast of India, has seen a 20% increase in cyclonic events because of the rise in sea levels and sea surface temperature[10]. Low-lying megacities—Karachi, Mumbai, Dhaka and Kolkata—are vulnerable to floods and cyclones because of the climate-induced sea level rise. In Nepal, glacier lake outburst floods are considered one of the many climate change phenomena with the potential to pose extreme risks to populations and infrastructure[11]. Heavy monsoon events can cause landslides, and thus damage the water supply infrastructure in mountainous parts of India, Nepal and Pakistan. Extreme events, such as floods, droughts, landslides and cyclones, over a long period of time, also affect the physical integrity of water systems, river flows and surface water sources, resulting in the loss of WASH services.

Floods also have a direct impact on water quality and public health. They increase contamination due to the intrusion of waste water and storm water into the drinking water supply systems, ponds, wells and shallow aquifers. This leads to increased pathogens and dissolved organic pollutants, resulting in water-borne and water-related diseases.

Due to increased rainfall and flooding, lower socio-economic groups, women and children are more vulnerable to diseases such as cholera, typhoid and diarrhoeal diseases.

Frequent droughts also reduce water quality as contaminants become more concentrated in shrinking surface water and groundwater. Due to water stress, people are forced to use the contaminated water.

1.5. Migration to cities and slums – limited WASH services

Loss of livelihoods due to floods, heat waves, crop failures and stress on water resources is one of the reasons for migration from rural to urban areas. People leave villages and settle in slums and informal settlements in cities. This is leading to congestion, overpopulation and lack of access to basic and limited WASH services in Dhaka, Delhi, Kathmandu and other cities.

Accessibility to water and sanitation services in large formal and informal settlements and slums is a complicated issue in South Asia. Because of the land tenure issues and high population density, the piped water sources and latrines are often shared between families, rendering very limited WASH services.

WASH in South Asia in the context of SDGs

SDG target 6.1 calls for achieving universal and equitable access to safe and affordable drinking water by 2030.

SDG target 6.2 calls for achieving 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.

Equitable access to safe and affordable water is one of the biggest challenges for South Asia. In 2015, the region lagged far behind, with only 56% of the population having access to safely managed drinking water services (drinking water located on premises, available when needed and free of contamination) compared with 71% of the global population. More than 163 million Indians do not have access to safe drinking water. As per the Indian Government's audit report in December 2017, only 44% of rural habitations and 85% of government schools and primary care centres have access to safe drinking water[12]. In Pakistan, only 36% of the population, including 41% urban and 32% rural, is using safe drinking water[13]. A mere 19% of Nepal's population has access to safe water[14].

The widespread practice of open defecation aggravates climate risks by raising the chances of contamination of flood water with untreated and unstored faecal matter. However, South Asia has achieved considerable success in reducing open defecation. The proportion of people defecating in the open fell from 65% to 34% in the region, with India, Bangladesh, Nepal and Pakistan all achieving more than 30% reduction since 1990[15]. Bangladesh became open defecation free (ODF) in 2015. Nepal and India are closely treading the same path. It is expected that both countries would be declared open defecation free by 2019.

The Swachh Bharat Mission in India has made tremendous progress, with sanitation coverage reaching 93% in September 2018, a big jump from 39% in 2014. Sanitation coverage in Nepal increased from 6% in 1990 to 95.4% by the end of 2017[16]. Pakistan also expedited its journey under Pakistan Approaches to Total Sanitation Campaign. However, 79 million people in Pakistan still lack decent sanitation[17] and it still has to cover more than 10% of its population. With a new

campaign—Clean Green Pakistan—it is hoped that the ODF journey in Pakistan will gain momentum.

Furthermore, the SDG target 6.2 aspires to go beyond ending open defecation and towards safely managed sanitation (use of improved facilities that are not shared with other households and where excreta is safely disposed of in-situ or transported and treated offsite) including a handwashing facility with soap and water. Although the baseline data is not available for South Asia, it is estimated that more than a billion people in the region are living without access to safely managed sanitation[18].

Access to safe water, sanitation and hygiene in South Asia is dependent on many factors, such as governance, technology, finance, social equality, efficiency of utilities, capacity of local governance bodies and the rate of urbanisation. The journey to achieve SDG targets 6.1 and 6.2 by 2030 in South Asia is not a smooth one and requires political will, vision, planning and financing. Climate change makes it even more daunting to sustain the efforts towards achieving these targets. In addition to the targets on drinking water and sanitation services, SDG 6 also includes targets to improve water quality (6.3), improve water-use efficiency (6.4), implement integrated water resources management (6.5), and restore water ecosystems (6.6). Climate change will affect all of these and, in turn, will influence the resilience of drinking water and sanitation services.

SDG 6 on clean water and sanitation and SDG 13 on climate action are intractably linked because climate change is mediated through change in water cycle, and stopping climate change is important to achieve SDG 6. Strengthening sustainable WASH services helps in adapting to climate change. The Paris Agreement on climate change and the commitments to SDGs made in 2015 by the world leaders require further planning in each country to build the resilience of development pathways, including water and sanitation.

3 WASH in the policies and planning for climate change

Adaptation to climate change is still an evolving area. At the national level, climate change strategies run in silos, not always in coordination with sectoral policies on health, water, agriculture, sanitation, infrastructure, education, etc. There is also a perpetual debate and attempt to clarify what constitutes adaptation and what is part of sustainable development trajectory[19]. Adaptation strategies and policy making have also evolved in the last decade in the South Asian region. A significant barrier to translating climate change strategies into action and their integration with development planning at full scale has been the lack of additional financial resources.

Apart from the national-level initiatives, regional platforms and forums such as the South Asian Association for Regional Cooperation (SAARC) and the South Asia Conference on Sanitation (SACOSAN) have also given attention to climate change. As a feedback and action loop between national and international decision making on climate change, countries also submitted Nationally Determined Contributions (NDCs) in 2015 to the United Nations Framework Convention on Climate Change (UNFCCC). Although the focus of NDCs is to reflect each country's ambition for reducing emissions, some of the countries in the region also highlighted actions and issues related to adaptation.

4.1. At the national level

BANGLADESH

In Bangladesh, the discourse on climate change, and specifically on adaptation, has moved from disaster risk reduction and preparedness for extreme events to mainstreaming in the overall national plans. The three nodes anchoring adaptation strategies are:

a. National Adaptation Programme of Action (NAPA) 2005 and Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009 provide the strategic direction. The adaptation action under BCCSAP is specifically focussed on food security, health, infrastructure and disaster management.

b. Coordinated institutional mechanisms for finances—Bangladesh Climate Change Trust Fund (BCCTF) for the national government financing, and the Bangladesh Climate Change Resilience Fund (BCCRF) for the contributions from international donors to support the implementation of BCCSAP from 2009-2018.

c. Mainstreaming of adaptation in development planning and inter-linkages between sectors by including adaptation in the annual development plans (6th and 7th Five Year Plans).

However, planning and investments for adaptation have been mostly top-down. Very little investment and efforts have gone into strengthening local governments in planning for adaptation[20]. Although BCCSAP, 2009, did not focus on water and sanitation, when funds were dispersed through the civil society window under BCCRF, resilient water and sanitation, especially in salinity-prone areas, emerged as a priority. The Seventh Five Year Plan (2016-2020) of Bangladesh incorporated climate change as a specific challenge in the water sector and proposed short, medium and long-term plans and strategies to address the issue. However, threat to sanitation and infrastructure related to water and sanitation does not get much focus in the planning for climate resilience.

SDG target 13.1 calls for strengthening the resilience and adaptive capacity of all countries towards climate-related hazards and natural disasters.

NEPAL

In Nepal, emphasis has been on bottom-up, village-level planning. Adaptation strategies are anchored primarily by (a) the Climate Change Policy (CCP) of 2011, which emphasises that at least 80% of the total funds available for climate change activities flow to the grassroots, and (b) the Local Adaptation Plans of Action (LAPAs) prepared in consultation with local communities.

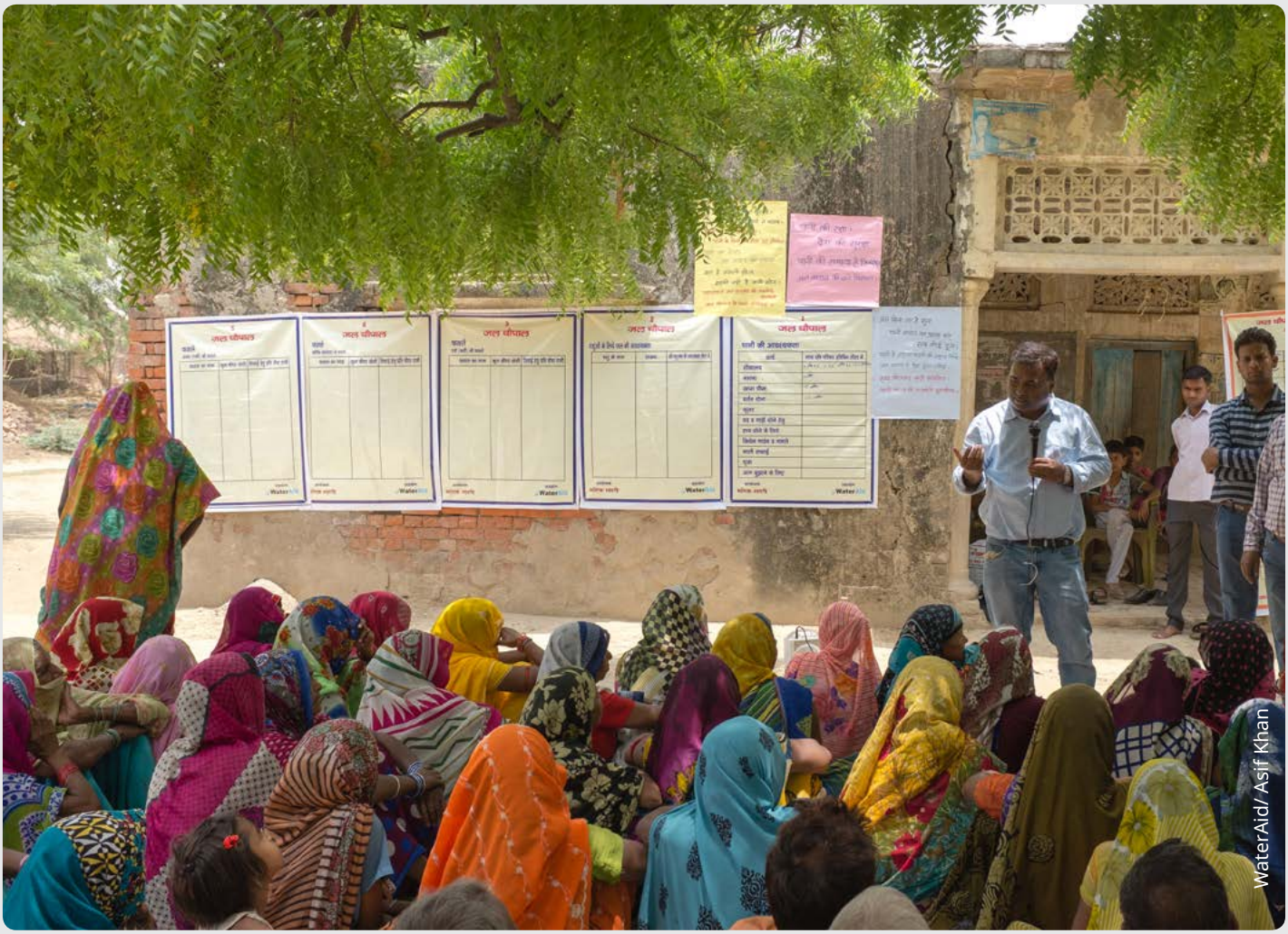
A retrospective study of 100 LAPAs in Nepal established evidence that communities recognise water resource management as a crucial consideration for climate change adaptation[21]. A review of policy documents on WASH in Nepal by the World Health Organisation showed that concerns on climate change are missing in the documents before 2010, and not properly addressed even in the recent policies and acts. Apart from the revision of WASH policy and acts in line with climate change, it advocates separate climate change strategy and working guidelines for the WASH sector and a dedicated environment and climate change unit within the lead department, the Department of Water Supply and Sewage (DWSS)[22].

INDIA

India announced its National Action Plan on Climate Change (NAPCC) in 2008, with eight sectoral national missions under various ministries. This was followed by the State Action Plans on Climate Change (SAPCC), prepared by 32 states and Union Territories in alignment with the missions under NAPCC, and the institutionalisation of the National Adaptation Fund for Climate Change to implement adaptation actions in vulnerable sectors across the country under the climate change division of the Ministry of Environment, Forest and Climate Change[23].

One of the missions is on water: National Water Mission, endorsed by the Ministry in 2011 to improve water efficiency by 20%. However, the mission has not gotten off the ground. During 2012-2015, the Union budgets allocated a total of INR 350 crore for the mission, but only INR 2.16 crore was spent till 2015. This led to slashing of budgets. States are supposed to formulate State Specific Action Plans (SSAPs) for this mission. In the last decade, just 1,237 water bodies were rejuvenated, against a target of 10,000. Similarly, just 36 additional water quality monitoring stations were set up till 2017, compared to the target of 113[24].

The National Water Mission recognises the threats to drinking water, groundwater depletion and declining water quality. But it confines measures on water budgeting more from the perspective of irrigation water supplies. The National Adaptation Fund, which was set up in 2015-16, has since sanctioned projects worth INR 483.76 crore. Of the 23 projects implemented, adaptation in water has been part of one-third of projects, while sanitation and hygiene remain unexplored domains[25]. So far the planning under SAPCCs and SSAPs has been complicated, long and top-down, and not followed by integration of plans by departments and implementation agencies on the ground.



Jal Choupal: A platform generating dialogue on water security at the local level

The idea of Jal Choupal was to provide a democratic platform for discussions on water security using structured tools on gender and water, water budgeting and to include climate change vulnerability issues in water security planning. The Participatory Vulnerability Assessment Tool (PVAT) uses community's experience with long term extreme events, changes in its frequencies and impacts on water usage and governance to derive adaptation plan in their water security plans. With support from WaterAid India, the tool was used in six gram panchayats situated on the bank of river Ganges in six different blocks of Fatehpur and Kanpur District in Uttar Pradesh. The learnings from the tool has been that water security plans that emerged from these gram panchayats has prioritised more investments on groundwater source sustainability and reducing water footprints through changes in agriculture and domestic water usage than construction of new water supply schemes. Household roof top rainwater harvesting water storage and recharge was prioritised under 'Ghar Ghar Aakash Ganga Abhiyaan'. Community groundwater recharge interventions using ponds, nallas and wells were prioritised under different government schemes and local area development programmes.

PAKISTAN

In Pakistan, the National Climate Change Policy (NCCP) of 2012 and the Framework for Implementation of the Climate Change Policy (2014-2030) are geared towards providing a framework for coordination among different sectors for building resilience as well as for coordinating activities at sub-national and local levels. A number of adaptation measures suggested in NCCP are to ensure national food, energy and water security at different administrative levels[26]. But the scope of resilience does not specifically include making WASH services climate-resilient.

In Pakistan, the mandate for both WASH and climate change action are entrusted with the Ministry of Climate Change, unlike in Nepal, India and Bangladesh, where different ministries are responsible for climate change and WASH. However, like in the other countries of South Asia, even in Pakistan the climate change and WASH communities are working in silos. Pakistan Climate Change Act of 2017[27] and the Technical Need Assessment for Climate Change Adaptation, 2017, further highlight the need for urgent adaptation actions in the water sector. But both the documents did not include any measure for WASH in the water sector adaptation measures.

SDG target 13.2 calls for integrating the climate change measures into national policies, strategies and planning.

In all these countries, in addition to the integration of resilient WASH within climate change instruments and strategies, a revision of the WASH sector plans is required for the development of climate-informed policies and plans at the provincial, district and state levels. Given the roles of local and state governments on the subjects of water, sanitation and hygiene, it is also important that adaptation plans for WASH are formulated with local-level participation. At the same time, financial outlays and planning are required at the national and sub-national levels for adaptation.

The communities in South Asian countries are affected by climate change, even though they are not responsible for causing climate change. In this context, the role of international climate finance from developed countries becomes important for supporting resilient development trajectories in these countries.

4.2 At the South Asia regional and the global level

SAARC, a key regional forum at the South Asia level, acknowledged concerns on climate change through several declarations. In 2005, it agreed to a Comprehensive Framework on Disaster Management (2006–15) aligned with the Hyogo Framework for Action (2005–15). At the 14th SAARC Summit in 2007, heads of state expressed concern over climate change and its impact in the region.

This was followed by a three-year SAARC Action Plan on Climate Change in 2008. In 2010, the Thimphu Statement on Climate Change led to the establishment of an Expert Group on Climate Change to ensure policy direction and guidance for regional cooperation. However, despite a significant number of declarations to combat climate change many policies are still not operational. Moreover, the focus on WASH is missing in its declarations and action plans[28].

SACOSAN is another key platform specifically on sanitation that brings policy makers of SAARC nations together every two years. The first and second SACOSANs, held in 2003 and 2006, respectively, were silent on climate change. However, the third, sixth and seventh conferences took cognisance of climate change and advocated recognition of climate change impacts on sanitation. The SACOSAN declarations are a good place to bring attention to WASH resilience, albeit these declarations are quite broad in nature and without any tracking, monitoring or binding mechanisms at the country level.

At the global level, at the 21st Conference of Parties of the UNFCCC in December 2015, the Paris Agreement agreed on actions to tackle climate change. These included both mitigation and adaptation. Through Article 7 of the Paris Agreement, the countries agreed to a global goal on adaptation. But it needs further articulation. So far resilient WASH has largely been missing in the adaptation discourse at the global level. One of the mechanisms to make it central to the adaptation discussion could be through the Rule Book for measuring elements of the Paris Agreement.

The domestic commitments of South Asian countries under the Paris Agreement—Nationally Determined Contributions (NDCs)—do not reflect a sharp WASH-centric focus. The NDCs of Bangladesh and Pakistan do not explicitly mention WASH, though water is highlighted as a key area for adaptation. While Bangladesh's NDC highlights the country's vulnerabilities to floods and cyclones, adaptation is more from the perspective of disaster management. The NDC of Pakistan emphasises its water-stressed situation but adaptation actions put forward are through the lens of agriculture, rather than WASH. In Nepal's NDC, the impact of climate change on access to water and sanitation is acknowledged. Though it focuses on adaptation actions involving local-level water management techniques, it makes no mention of sanitation adaption measures. India, however, does focus on the impacts of climate change on WASH in its NDC and mentions initiatives to build toilets under Swachh Bharat Mission, waste water treatment and water efficiency.

4 Way Ahead for resilient WASH

In the light of new climate vulnerabilities, accelerating the agenda to provide safe water, sanitation and hygiene to everyone, everywhere by 2030 requires preparedness and planning. This includes vulnerability assessment of WASH services, including the screening of WASH infrastructure for risk assessment, and the integration of climate adaptation policies and plans in urban and rural planning for WASH. It also requires a long-term thinking aligned with the 2030 Agenda for Sustainable Development; a city- or district-wide planning, entailing a whole-system approach; and micro plans for WASH resilience prepared with people's participation.

Some specific recommendations for resilient WASH services are:

1. Policy integration:

Review of climate change strategies and plans at the national and sub-national levels to include resilient WASH services as a key adaptation strategy. At the same time, a review of policies, plans and schemes on water supply, sanitation, hygiene, public health and gender is required through the climate change lens. Collaboration and action plans at regional platforms, SACOSAN and SAARC, also need to focus on resilient WASH services.

SDG target 6.b calls for supporting and strengthening the participation of local communities in improving water and sanitation management.

2. Long-term and decentralised planning for water security:

There is a considerable data gap in South Asia in downscaling climate projections and climate modelling at the local level for effective decision making. In this context, a key coping strategy is to build and plan for water security at the level of each village or town, based on demand projections for a longer period of 30-50 years, and to develop a monitoring mechanism for surface water flow and groundwater levels for local-level water supply systems. This should be coupled with guidelines for protection and conservation of various water sources as well as incentives for rainwater harvesting as important components of climate-resilient WASH. This also implies a greater focus on the management of a wider portfolio of different water sources rather than relying on a single source.

To reduce net water demand, recycling and reuse of waste water must be part of the water-sewage system planning.

3. Review of WASH approaches through the lens of climate change:

Existing approaches, such as water safety planning and district wide approach, which support the whole-system approach at a local level, can be extended to include the screening for climate change risks and impacts. Impact assessment of WASH programmes and schemes, and joint-sector reviews for the WASH sector should also link it to the sustainability of services in the light of extreme weather events and climate variability. Sector coordination mechanisms should also include integration with stakeholders working on climate change.

4. Balance between top-down policy and accountability imperatives with bottom-up planning and inputs:

In the federal structure of Pakistan, India, Nepal and Bangladesh, there are strong ministries at the central level for climate change; drinking water and sanitation; etc. However, a great deal of responsibility and power rests with the state, provincial or local governments for planning and implementation of WASH schemes and programmes as well as for climate change adaptation plans at the local level. It is important to have a good balance, coordination and clarity on roles for top-down policy making and allocation of budgets to be aligned with local-level planning and inputs. Sub-national and Panchayat-level development plans could be an entry point for decentralised, climate-resilient WASH panning.

5. Resilient technology, innovations and infrastructure:

In flood-prone and water-stressed areas, various innovations have happened in sanitation technologies, such as ‘pit latrines’, ‘low-flush septic systems’, ‘eco-san latrines’ and ‘high-volume septic tanks’. These have been recognised as potentially resilient to climate change. It is important to further build knowledge and research on the resilience of these technologies in specific geographies. For big WASH infrastructure—such as underground sewerage, storm water systems and water supply pipelines—it is important to screen the infrastructure for disaster risk and climate variability, especially in areas prone to disasters. This infrastructure must be constructed with local collaboration and in a way that it is accessible to all.

6. Increased finance:

Governments must mobilise domestic resources for climate change adaptation as well as for achieving universal access to sanitation and hygiene by 2030. Developed countries should keep their promises on climate finance. Additional financing from developed countries should be beyond regular foreign aid and provided as grants only. It should be ensured that this investment is used for adaptation, to which water, sanitation and hygiene services are essential.

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