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Climate change, rural sanitation and hygiene in Bhutan: taking stock

Climate hazards, such as floods, drought, and landslides, impact rural sanitation and hygiene services in Bhutan. As climate change continues to evolve, it is likely that climate hazards will become a greater barrier to equitable and sustainable rural sanitation services. The time is ripe to take stock of what we have learned so far to inform immediate climate action.

This brief describes how climate affects rural sanitation and hygiene services in eight districts in Bhutan, existing response mechanisms, and actions for incrementally addressing climate change within the national Rural Sanitation and Hygiene Programme (RSAHP) in the near future. It draws on experiences of the Beyond the Finish Line – Sustainable Sanitation and Hygiene for All project supported by the Australian Government’s Water for Women Fund. Reflecting on these experiences can help to lay a foundation for more focused climate action in the rural sanitation and hygiene sector in Bhutan.

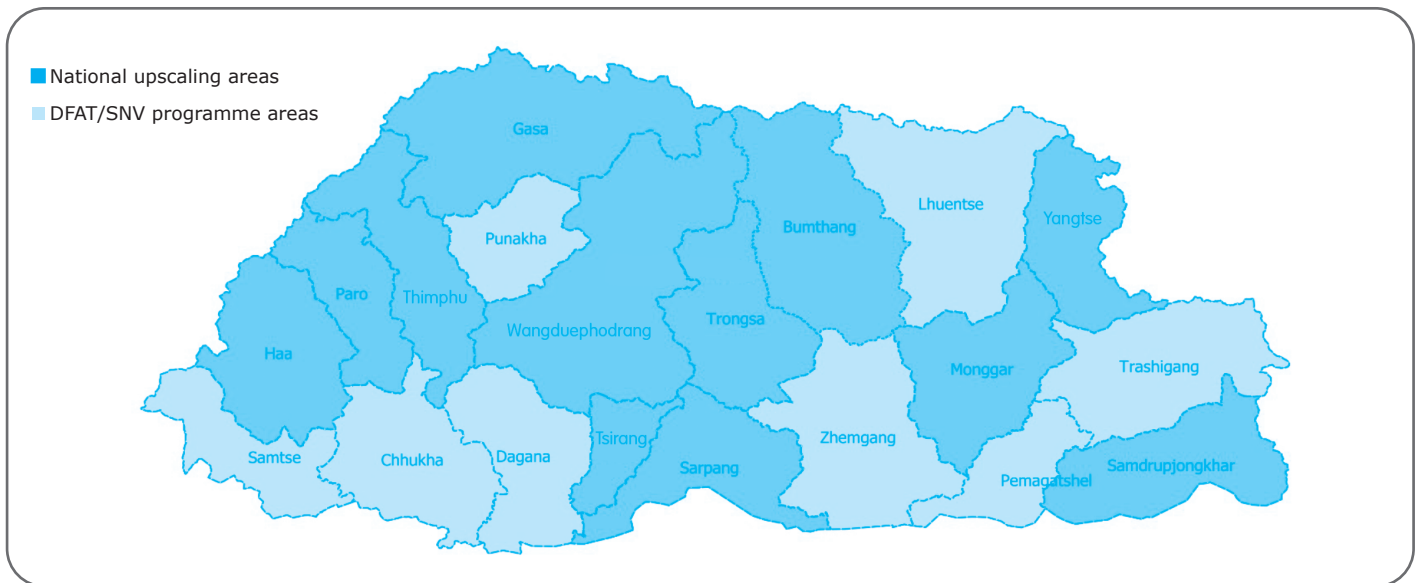
Key messages

Climate hazards are already impacting the functionality of, and access to, rural sanitation. Local governments in Bhutan can take a range of actions to offset the impacts of floods, dry spells, and landslides on sanitation with the resources available to them.

Efforts to address climate impacts on rural sanitation and hygiene services can become more systematic if climate resilience is integrated into existing practice and policy to support sustainable and equitable sanitation for all.

Climate resilience should be seen as integral to sanitation service delivery as part of Bhutan’s National Rural Sanitation and Hygiene Programme.

Figure 1: Focus districts within Bhutan



In May 2021, SNV, the Ministry of Health and the Ministry of Works and Human Settlement of Bhutan discussed climate change impacts on rural sanitation and hygiene, as well as responses in the country. The group focused on their experiences working in Chukha, Punakha, Zhemgang, Dagana, Lhuentse, Pemagatshel, Samtse, and Trashigang districts (Figure 1) and relevant policies at the national level.

Climatic context

The climate in Bhutan is diverse, owing in part to its topography, with high mountains in the north and northwest and rolling plains in the south. Mean annual precipitation is much greater in the subtropical southern region (1,500mm) compared to the temperate central region (1,000mm) and the northern mountain region (40mm).¹ About 72% of all annual precipitation in Bhutan falls during the summer monsoon season (June–September).²

Temperatures range from 15°C to 30°C in the southern region and -4°C to 26°C in the central region.³ However, average temperatures are increasing, particularly in the southern region.⁴

Climate projections for Bhutan suggest a significant increase in temperature, greater mean annual rainfall and greater variation in surface water flow between wet and dry seasons. Under a high global greenhouse gas emissions scenario (RCP8.5), the average annual temperature in Bhutan may increase by 1.9°C over pre-industrial levels in the 2040–2059 period.⁵ Under a lower emissions scenario (RCP4.5), annual average temperature may rise by 0.8°C to 1.6°C in the 2021–2050 period.⁶

Increasing temperatures are driving the retreat of glaciers and the formation of supra-glacial lakes in Bhutan.⁷ Consequently, an increase in Glacial Lake Outburst Floods (GLOFs) is likely,⁸ which exposes Bhutan's settlements located in main drainage basins to flooding.⁹

¹ National Environment Commission, *Third national communication to the United Nations Framework Convention on Climate Change (UNFCCC)*, Thimphu, Royal Government of Bhutan, 2020.

² National Center for Hydrology and Meteorology, *Report on the analysis of historical climate and climate projection for Bhutan*, Thimphu, Royal Government of Bhutan, 2019.

³ National Environment Commission, *Third national communication*, 2020.

⁴ World Bank, 'Bhutan, Current climate', *Climate change knowledge portal*, WA DC, World Bank Group, 2021, <https://climateknowledgeportal.worldbank.org/country/bhutan/climate-data-historical> (accessed 24 June 2021).

⁵ World Bank, 'Bhutan, Current climate', 2021.

⁶ National Center for Hydrology and Meteorology, *Analysis of historical climate*, 2019.

⁷ National Center for Hydrology and Meteorology, 2019.

⁸ National Environment Commission, 2020.

⁹ National Center for Hydrology and Meteorology, 2019.

In both scenarios, most of Bhutan is likely to experience an increase in mean annual precipitation, primarily in the southern region.¹⁰ Most of this increase is predicted to happen in the wet summer months whereas the dry winter months may see a decrease in precipitation.¹¹ In general terms, wet periods are expected to get wetter, and dry periods are expected to get drier.

Rural sanitation and hygiene context

In 2020, 76% of the rural population of Bhutan had access to at least basic sanitation while 67% had access to safely managed sanitation.¹² Pour-flush toilets are increasingly the most common type of facility in rural areas.

The national government has set a goal of 100% of the rural population having access to an improved flush toilet (private or shared) by 2022.¹³ With regards to handwashing, 93% of the rural population has access to a handwashing facility with soap and water on premises.¹⁴

A recent study by the national government of 6,555 water sources used for agricultural and domestic purposes found that 335% (2,317) of all water sources dried up.¹⁵ Hence, future water stress potentially poses a significant obstacle to achieving and sustaining the national goal for improved sanitation for all if the focus remains on flush technology.

An additional consideration relates to the heightened need for proper and hygienic storage of water. As temperatures in Bhutan rise, a decline in available water supply is imminent. Improper water storage could increase mosquito breeding, resulting in greater incidences of malaria and dengue in Bhutan.

Policy context

Several national policies and programmes are relevant to the nexus of climate change, water, and sanitation in Bhutan. These include:

- Bhutan's National Adaptation Programme of Action 2006

- Health National Adaptation Plan 2018–2023
- National Adaptation Plan (under development)
- Climate Change Policy of the Kingdom of Bhutan 2020
- Third National Communication to the UNFCCC 2020
- Bhutan's Nationally Determined Contributions
- 2021 Water Flagship Programme
- Bhutan Water Policy 2007
- National Sanitation and Hygiene Policy 2017

Yet these policies generally have a stronger focus on water than sanitation or hygiene with regard to climate impacts. For example, the Water Flagship Programme, which has a budget of US\$ 71.4 million, will facilitate activities such as watershed management, capacity building for water users, community-based water safety management, and climate resilient water infrastructure. Although the Third National Communication to the UNFCCC and the National Sanitation and Hygiene Policy call for climate resilient household sanitation and disaster resistant sanitation technologies respectively, no dedicated budget has been allocated to these activities.

Climate impacts on sanitation and potential responses

Communities in Bhutan already experience heavy rain and flooding (including GLOFs), extreme heat and dry spells, and landslides. All of these climate events affect rural sanitation, with the impacts likely to worsen as climate change continues. Table 1 summarises the climate impacts and outlines potential actions and mechanisms in response.

¹⁰ National Center for Hydrology and Meteorology, 2019.

¹¹ National Environment Commission, 2020.

¹² WHO/UNICEF Joint Monitoring Programme (JMP), 'Data: households', *WHO UNICEF JMP*, Geneva, World Health Organization and United Nations Children's Fund, 2021, <https://washdata.org/data/household#!/> (accessed 21 July 2021).

¹³ UNICEF Bhutan, 'Bhutan to achieve 100% improved sanitation by 2022', *press release*, New York, UNICEF, 2020, <https://www.unicef.org/bhutan/press-releases/bhutan-achieve-100-improved-sanitation-2022>, (accessed 21 July 2021).

¹⁴ WHO/UNICEF JMP, 'Data: households', 2021.

¹⁵ Kuensel, 'Springs are drying up, say experts', *Kuensel Online*, 6 February 2021, <https://kuenselonline.com/springs-are-drying-up-say-experts/> (accessed 21 July 2021).

Table 1: Climate change impacts on sanitation and potential response actions and mechanisms

Heavy rainfall and flooding	
<p>Impacts on sanitation</p> <p>Direct impacts</p> <ol style="list-style-type: none"> Physical damage to infrastructure <ul style="list-style-type: none"> Force of flooding damages latrine superstructures and pits and tanks collapse Flooding disrupts functionality or access to water supply used for flushing toilets Higher water table, especially in the southern parts of Bhutan, results in blockages and rapid filling of pits <p>Indirect impacts</p> <ol style="list-style-type: none"> Disruption to access to services and markets Increased work burden and stress especially for female household members (e.g., the need to travel greater distances to collect water for flushing toilets) Decrease in income generation due to more time used for unproductive activities in the household (e.g., water collection and caring for sick family members due to consumption of contaminated water) 	<p>Actions or mechanisms to address impacts</p> <ul style="list-style-type: none"> Improve informed choice processes around the different technology options so that households can assess the benefits of alternative technologies (e.g., ecological sanitation for high water table areas) Ensure quality toilet construction by masons trained in climate risk management and monitoring in communities by Health Assistants and local leaders Ensure government-led technical support and training for communities on maintaining flood-resistant latrines Implement Water Safety Planning processes to assess and manage flood risks Train water caretakers to ensure overflow pits do not affect water sources Develop Water, Sanitation and Hygiene (WASH) in Emergency Standard Operating Procedures (SOPs) and contingency plans for flooding Pre-position WASH essentials in districts for rapid recovery after flooding
Extreme heat and dry spells	
<p>Impacts on sanitation</p> <p>Direct impacts</p> <ol style="list-style-type: none"> Insufficient water for flushing, hygiene, and cleaning Children and women face increased burden to fetch and transport water from greater distances and under extreme heat Competing demand for water between sanitation use and irrigation, productive uses, and drinking <p>Indirect impacts</p> <ol style="list-style-type: none"> Populations gradually revert to open defecation or using (unsafe) pit toilets that pose public and environmental health risks Water rationing, which leads to poor livelihoods and less income for sanitation Heat causes mosquitoes to breed in stored water and spread disease in new locations 	<p>Actions or mechanisms to address impacts</p> <ul style="list-style-type: none"> Develop alternate water sources such as rainwater harvesting, fog water harvesting, and deep groundwater Promote low water-use toilet options (e.g., ecological sanitation, ventilated improved double bit, and low-flow toilet pans) Raise awareness of government and civil society on the impacts of heat and dry spells on sanitation Conduct hygiene promotion activities to encourage good hygiene practices when water is scarce and to reduce mosquito breeding Encourage and support the safe reuse and recycling of greywater
Landslides	
<p>Impacts on sanitation and hygiene</p> <p>Direct impacts</p> <ol style="list-style-type: none"> Destruction/damage of toilet facilities, water supply lines, and water storage Contamination of water, resulting in poor quality water for hygiene Disruption to sanitation supply chains due to road access being cut off <p>Indirect impacts</p> <ol style="list-style-type: none"> Damage to people's homes and livelihoods takes priority over addressing impacts on sanitation and hygiene Support to the sanitation sector is disrupted to meet other needs Psychosocial impacts causes stress and anxiety for people 	<p>Actions or mechanisms to address impacts</p> <ul style="list-style-type: none"> Implement Water Safety Planning processes to assess risks and carry out landslide prevention activities in areas prone to landslides Ensure good WASH coverage to provide alternative toilets in areas unaffected by landslides Put in place WASH in Emergency SOP and Strategy for landslide recovery Encourage community participation in recovery planning and implementation Identify private-sector supply chains that can be used for rapid provision of sanitation products and services to affected areas

Figure 2: Bhutan National Rural Sanitation and Hygiene Programme framework¹⁶



Incrementally addressing climate impacts on sanitation and hygiene

The local governments in Bhutan and their partners can take many actions in the near-term to incrementally address the present and future climate impacts on rural sanitation and hygiene services.

These actions do not require a separate climate change resilience programme. Instead, they can be integrated into existing efforts to support sanitation for all, with emphasis on the needs of potentially disadvantaged groups or households (Figure 2). Examples of these actions are listed here in reference to the critical areas of sustainability for rural sanitation and hygiene.

WASH governance

- Local government and RSAHP partners continue to take stock and reflect on what is known about climate impacts on sanitation in Bhutan to inform interventions.
- Identify barriers and priorities for climate resilient sanitation in existing stakeholder meetings at national, district and sub-district levels.
- Use evidence of climate risks to sanitation to support decision-making and to allocate resources for climate resilient sanitation.
- Ensure equitable, inclusive, and accessible sanitation and hygiene is integrated into disaster prevention and recovery plans at all levels.
- Reflect on the relevance of climate change for RSAHP policy, planning, and guidelines.
- Review the appropriateness of national targets on pour-flush toilets for areas experiencing water scarcity.
- Monitor the sustainability of pour-flush toilets in areas with water scarcity risks.

¹⁶ PHED-Public Health Engineering Division, *Rural sanitation and hygiene programme manual*, Thimphu, PHED/Ministry of Health and the Hague, SNV, 2013.



Sanitation demand creation

- Raise awareness of community members about climate change and the risks it poses for safe sanitation, hygiene, and water as part of informed choice processes.
- Inform communities about the different types of sanitation options available and their relative advantages against climate risks.

Sanitation supply chains and finance

- Work with service providers to sensitise them to climate risks and develop, stock, and market climate resilient sanitation products (e.g., low-flow toilet pans).
- Consider the use of pro-poor financial mechanisms to enable households to purchase climate-resilient latrines.

Hygiene behavioural change communication

- Conduct formative research to learn about people's hygiene behaviours during extreme dry or wet weather.
- Work with service providers to develop and disseminate targeted, inclusive, and accessible hygiene promotion messaging (e.g., safe disposal of menstrual pads and baby diapers, informed choice on environmentally friendly menstruation products) to encourage safe behaviours in periods of extreme weather.
- Consider potential additional hygiene behaviours for the new context, especially for warmer and wetter conditions.

To drive forward these actions, the national government should develop objectives, strategies, and budgets to build climate resilience for rural sanitation and hygiene. This is as called for in the Third National Communication to the UNFCCC and the National Sanitation and Hygiene Policy and should be informed by projected climate change risks.

Sanitation and hygiene could be considered within the Water Flagship Programme due to the clear links between safe water and safe sanitation and hygiene outlined in this brief. Further reflection and documentation of experiences at local levels can also inform national objectives and strategies. For example, research and discussions between local government, communities and civil society can shed light on the climate-related impacts being experienced by households in Bhutan and appropriate responses, to build better understanding of the challenges that need to be overcome.



Acknowledgements

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Beyond the Finish Line – Sustainable Sanitation and Hygiene for All

BFL – Sustainable Sanitation and Hygiene for All in Bhutan aims to progress equitable and universal access to safely managed sanitation and hygiene for at least 214,596 people across eight districts in Bhutan.

The Beyond the Finish Line programme in Bhutan is funded by the Australian Government's Water for Women Fund.



ISF-UTS and SNV, 'Climate change and rural sanitation in Bhutan: taking stock, *Learning brief*, The Hague, SNV, 2021.

SNV

SNV is a not-for-profit international development organisation that makes a lasting difference in the lives of people living in poverty by helping them raise incomes and access basic services. Focusing on three sectors – Agriculture, Energy and Water, Sanitation and Hygiene (WASH) – SNV has a long-term, local presence in over 25 countries in Asia, Africa and Latin America.

ISF-UTS

The Institute for Sustainable Futures at the University of Technology Sydney (ISF-UTS) works with industry, government and the community to develop sustainable futures through research and consultancy. ISF-UTS seeks to adopt an inter-disciplinary approach to its work and engage partner organisations in a collaborative process emphasising strategic decision-making.

Photos

- P1:** Glacial-lake fed river system at risk of overflowing (Raj Kumar)
- P6:** Water sources drying up (Ugyen Rinzin)
- P7:** Laya school located under mountain glaciers (Raj Kumar)

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