

BUILDING *Back* BETTER

Disaster Resilient Sanitation
in South Asia

South Asia is **prone** to an array of seismic as well as hydro-met risks, which are accelerated due to **rapid urbanization and unplanned development**.



More than half of all South Asians or **750 MILLION** people have been affected by one or more **climate-related disasters** in the **last two decades**.

Cities across India, Sri Lanka, Nepal, and Bangladesh, among others, have been considered **high-risk cities** due to their vulnerability to **climate change**. Extreme weather events and climatic conditions, including **earthquakes, floods, cyclones, and heatwaves** adversely impact the **country's sanitation services and infrastructure**. This **disproportionately affects the region's marginalized communities** such as **women and transgender people**.



People living in **slums or informal settlements**, South Asia is particularly vulnerable to the amplified effects of climatic conditions and disasters on access to sanitation services and infrastructure.

Access to **safe and inclusive sanitation services** has emerged as a **priority**, particularly in light of the disaster risks and vulnerabilities in South Asia. There is a need for increased **emphasis on preparedness and planning** to ensure access to sanitation services to all. To ensure that sanitation services and facilities are accessible to marginalized and vulnerable communities in disaster prone regions, a systematic approach consisting of **vulnerability assessment, infrastructure risk assessment, integrated urban-rural planning** with a **climate lens**, and **convergent policies for sanitation and climate change** are pivotal. In South Asia, although there are significant national commitments for disaster resilient sanitation services, there is greater need for **local or provincial level participation**. Similarly, it is crucial that **community voices** are amplified and represented. Therefore, a **participatory planning** process involving **marginalized communities** and local government representatives will provide a bottom-up approach for holistic sanitation solutions and interventions.

Given the **low adaptive capacities of the region**, urban and rural communities find it **difficult to adapt to and safeguard against natural disasters**, leaving them vulnerable to negative impacts such as loss of life, well-being and livelihoods. This is evident in the **disruption of critical public services** such as water, electricity, and transport. However, among these several disruptions, sanitation is often under-recognized.

HOW DO SANITATION AND DISASTERS INTERSECT?



The provision of sufficient sanitation becomes challenging in relation to disaster situations. Natural disasters pose a significant threat to **sanitation infrastructure and services**, jeopardizing **public health** and increasing the **risk of disease outbreaks**. **Power outages** triggered by storms or earthquakes **disrupt critical water treatment and sewage pumping operations**, leaving communities without access to clean water and proper wastewater management. Additionally, **infrastructure damage** from floods and strong winds compromises sanitation systems. **Broken pipes** create pathways for raw sewage to **contaminate clean water** supplies, while flooded **treatment plants become inoperable**. **Floodwaters** further exacerbate the problem by carrying debris and pollutants that contaminate water sources. This breakdown in sanitation forces people to resort to **unsafe water sources** and **contend with overflowing toilets**, creating a perfect breeding ground for **waterborne illnesses** like cholera and diarrhoea, particularly in regions with limited access to clean water and hygiene

facilities. **Displaced people living in camps**, shelters and other temporary housing are particularly vulnerable to the spread of disease as they often live in close proximity with one another. It is essential to provide them with sanitation facilities that are accessible and safe to use in order to curb disease outbreaks.

LET'S HAVE A CLOSER LOOK AT THE TRANSFORMATIVE POTENTIAL OF MOBILE TREATMENT UNITS

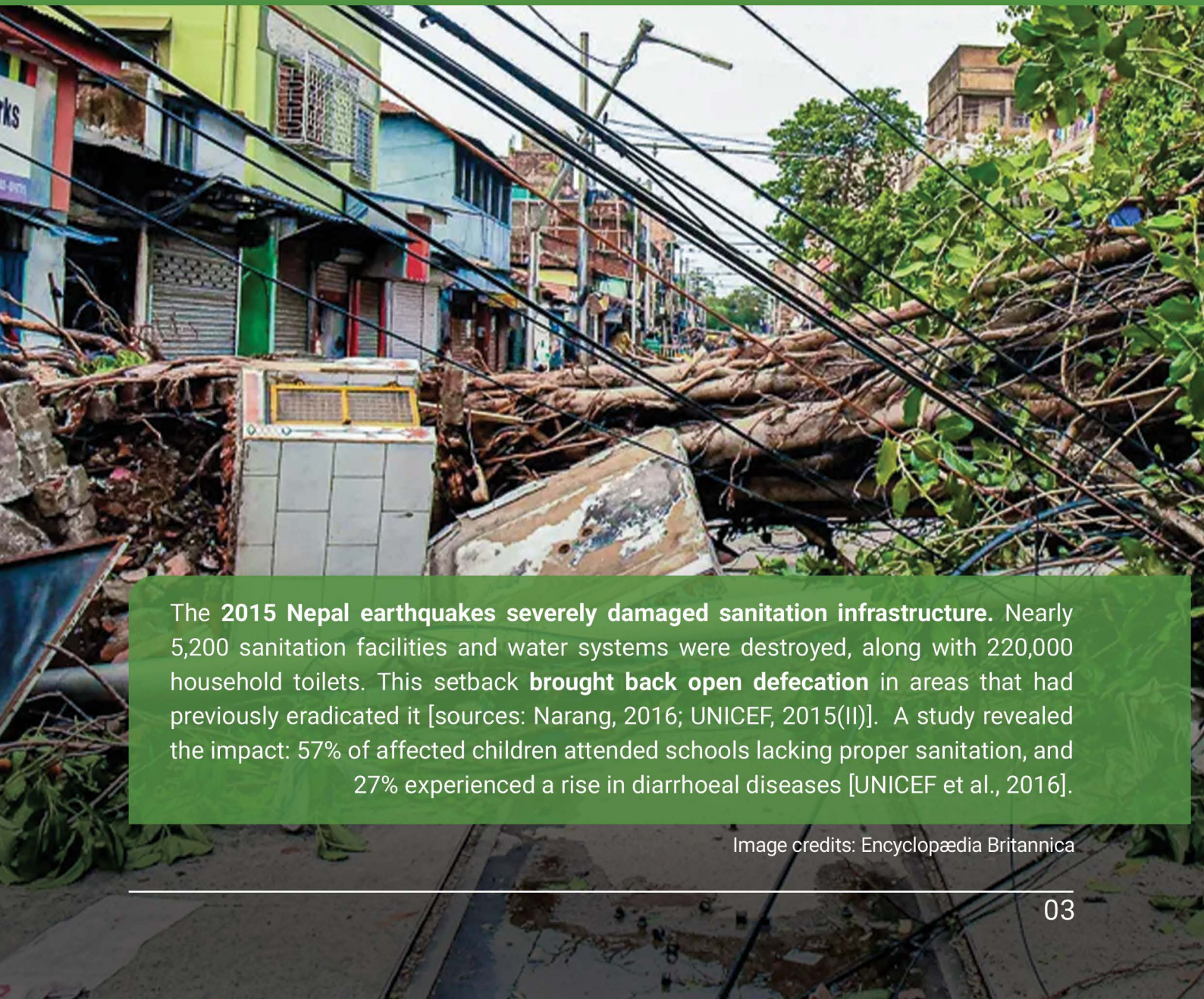


In the event of natural disasters wherein sanitation service delivery is severely disrupted, Mobile Treatment Unit (MTU) functions as an **on-site faecal sludge treatment unit** that can ensure safe and inclusive access to sanitation. The on-site Mobile septage Treatment Unit works with the concept of solid-liquid separation, sludge thickening and effluent treatment processes. With lower operational and maintenance costs, MTUs are effective in safeguarding community health and integrating WASH practices during disaster relief and recovery.

A study published by the International Water Association highlights the devastating impact of the tropical **supercyclone Amphan** on WASH (Water, Sanitation, and Hygiene) facilities in **affected coastal areas of Bangladesh**.

The cyclone severely damaged critical WASH infrastructure, only **20% OF THE RESPONDENTS** of the study were **able to access WASH facilities after**.

This situation led to an increase in the use of unsafe water sources and open defecation, creating a favourable environment for the spread of WASH-related diseases. The urgent need for adequate and sustainable WASH facilities in the affected areas is critical to prevent further health risks.



The **2015 Nepal earthquakes** severely damaged sanitation infrastructure. Nearly 5,200 sanitation facilities and water systems were destroyed, along with 220,000 household toilets. This setback **brought back open defecation** in areas that had previously eradicated it [sources: Narang, 2016; UNICEF, 2015(II)]. A study revealed the impact: 57% of affected children attended schools lacking proper sanitation, and 27% experienced a rise in diarrhoeal diseases [UNICEF et al., 2016].

Image credits: Encyclopædia Britannica

This case highlights the critical need for disaster-resilient sanitation systems to protect public health, especially for vulnerable groups like children and women. Communities become highly vulnerable to waterborne diseases, infection outbreaks, physical injuries, and even loss of life. Marginalized groups such as **women, people with disabilities, the urban poor, and sanitation workers** are **disproportionately impacted**.

MARGINALIZED COMMUNITIES BEAR THE BRUNT OF ADVERSE RISKS



It is worthwhile to note that the impact of disasters is not felt equally everywhere; people are impacted differently. The breakdown of sanitation services during disasters disproportionately affects marginalized communities, including women, transgender people, and the urban poor, exacerbating existing vulnerabilities and highlighting the critical need for disaster-resilient sanitation infrastructure.

Natural disasters leave women and gender minorities more vulnerable to health, safety and dignity risks

Anu Kumari, a local senior Auxiliary Nurse Midwife (ANM) from the Government Sadar Hospital in Muzaffarpur, Bihar said that “Due to lack of proper sanitation, women in flood-affected areas are at **high risk of urinary tract infections** or UTIs. Also, **menstruation becomes a big problem for teenage girls** because they have to use the same cloth throughout their cycle. About **150 women** from flood-affected areas come to the **hospital every day** with such complaints.”

During natural disasters like floods, women, girls and gender minorities face heightened risks due to inadequate sanitation facilities. They are forced to defecate in the open, exposing them to not only **health hazards and infections** but also **indignity and gender based violence**. This **lack of privacy and hygiene** is particularly challenging during menstruation, left with little option but to reuse cloth instead of sanitary pads, often washing them with unclean water.

Increased vulnerability for people residing in informal settlements

Informal settlements are residential areas where inhabitants lack security of tenure, urban services, and infrastructure. Their dwellings are unlikely to comply with planning and building regulations and are often situated in geographically and environmentally challenging or hazardous areas. Slums are the most deprived and

excluded informal settlements, characterized by poverty and agglomerations of dilapidated and semi-permanent housing, often located in the least desirable urban areas, with people living in slums exposed to eviction, disease, and violence.

WATER AND SANITATION SERVICES		
FORMAL SETTLEMENTS	VS	INFORMAL SETTLEMENTS
Formal provision by government entities and utilities or registered, designated private service providers		Self-provision or service by informal service providers
Household-level services to house or plot		Shared or communal facilities, e.g. toilets and water points
Piped, treated water		Overused services, sometimes requiring queuing
Licensed service providers		Unregistered or unknown water sources and poor-quality water
Maintained and reliable services		Treated or untreated water supplies
Controlled prices through regulation		Low-quality pits or tanks
Accountability (of utilities to regulators)		Unreliable services of variable quality In some places, there are also: 1. Illegal connections 2. Extortionate control of services and prices

Source: Asian Development Bank.

During natural disasters, these pre-existing conditions are further exacerbated, turning informal urban settlements with poorer service delivery and lower adaptive capacities than richer counterparts of the same cities, into **hotspots of disease outbreak**. Communities residing in informal settlements are more severely hit and are less likely to be able to build back.

Occupational risks for sanitation workers worsen during natural disasters

Natural disasters like floods and earthquakes often exacerbate unsafe working conditions for sanitation workers. Disruptions to sanitation infrastructure like sewage lines and toilets expose them to **more hazardous working conditions than usual**, putting their health in jeopardy. Reportage on Guwahati's Safai Karamcharis sheds light on the working conditions of sanitation workers during the Assam floods. The Safai Karamcharis are **paid per month based on completing their tasks**, and are **forced to report to work even during heavy floods**. **Wage cuts are frequent** when workers do not show up. They live in constant fear of being laid off due to the contractual nature of their jobs. While several places were shut in view of the floods, all of the 30 respondents had to show up at work. The piecework nature of their compensation incentivizes continued work even during **hazardous conditions**. Furthermore, the informal nature of their employment often precludes access to proper **safety equipment and protective gear**, leaving them **exposed to potential infections** while unclogging drains and managing floodwater.

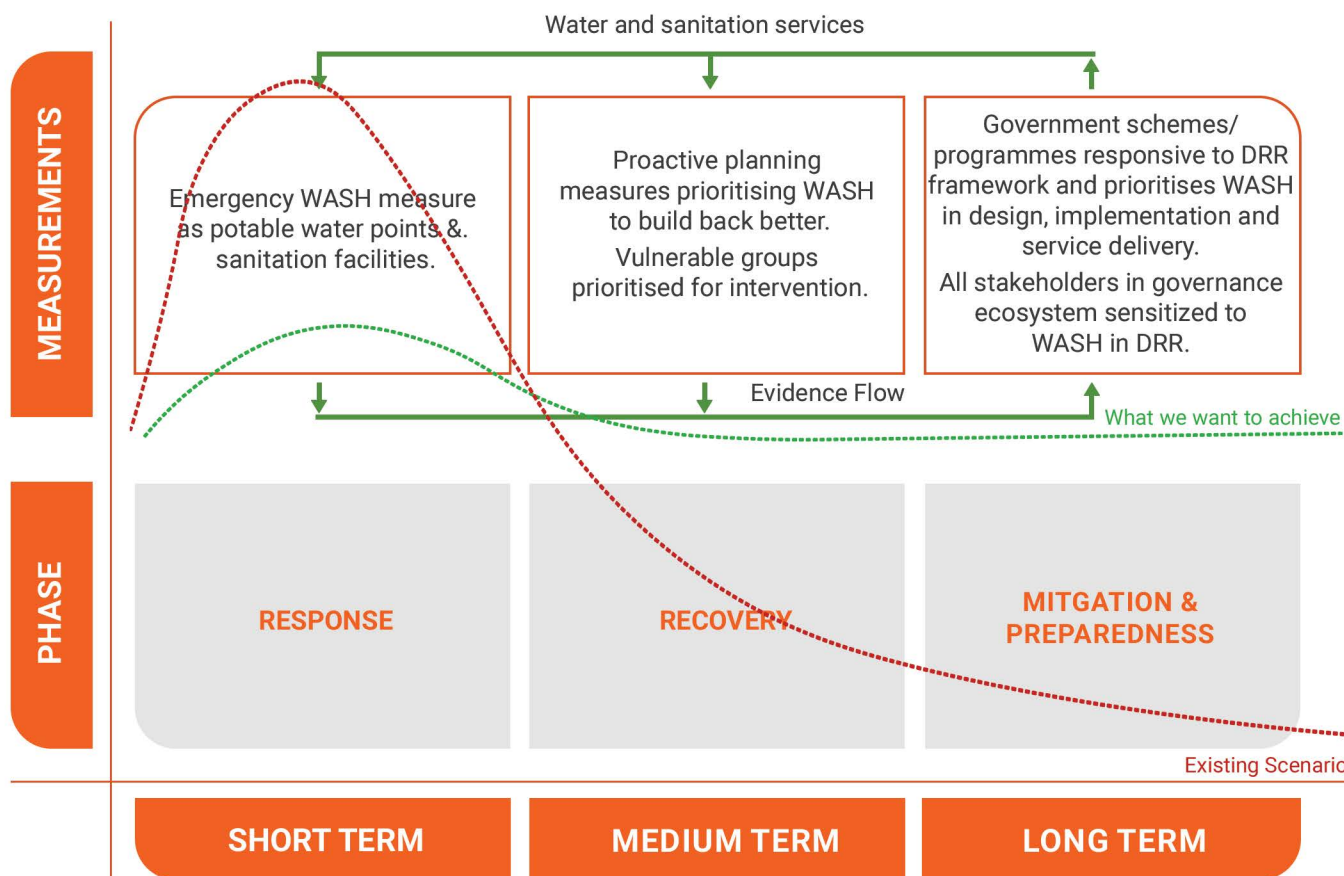
SAFE SANITATION AND DISASTER PREPAREDNESS GO HAND-IN-HAND



Sanitation and disaster planning are **inextricably linked**. Deficiencies in one area negatively impact the effectiveness of the other. Failing to integrate sanitation considerations into disaster planning can leave communities **struggling to safely manage their sanitation needs** during and after emergencies. Conversely, neglecting to build resilience into sanitation infrastructure **exposes the entire service chain to severe disruptions** during disasters, potentially exacerbating disease outbreaks and jeopardizing long-term public health. Therefore, a **critical need exists to actively integrate sanitation into disaster mitigation, preparedness, and recovery efforts**.



UNDERSTANDING POLICY MEASURES FOR DISASTER RISK REDUCTION (DRR)



01

This figure illustrates how different levels of government implement disaster risk reduction policies across various timeframes. These timeframes can be categorized by their primary focus: **Response** (immediate actions during a disaster), **Recovery** (short-term actions to restore normalcy), and **Mitigation & Preparedness** (long-term actions to minimize future impact).

02

The **red dotted line** represents the **current approach**, where policy measures are often **heavily concentrated on the response phase (short-term)** but then **decline significantly in the medium and long term**. This reactive approach leaves communities vulnerable to future disasters.

03

The **green dotted line** depicts the **desired approach**, where policy measures are sustained throughout the entire cycle. This ensures continuous risk reduction efforts and fosters a more **proactive approach** to disaster management.

RECOMMENDATIONS INCLUDE ROLE OF CENTRAL, STATE & LOCAL GOVERNMENTS

MITIGATION (PREVENTION AND RISK REDUCTION)	PREPAREDNESS	RESPONSE	RECOVERY (IMMEDIATE RESTORATION AND BUILD-BACK BETTER)
Institutional Arrangement:	Establishing clear roles and responsibilities for different government bodies		
Capacity Building:	Equipping government officials and communities with the knowledge and skills to manage disaster risks		
Finances:	Securing adequate resources for disaster risk reduction activities		
Inclusivity:	Ensuring the inclusion of vulnerable groups, that are more likely to fall through the cracks during a disaster		
Infrastructure:	Developing and maintaining infrastructure that is resilient to disasters		
Communications:	Establishing effective communication channels for disseminating information and warnings before, during, and after disasters		

The framework provides recommendations for national, state, and local governments across all phases (mitigation, preparedness, response, and recovery). These recommendations encompass critical aspects like:

WHAT ARE DISASTER RESILIENT TOILETS?



Natural disasters have the capacity to wreak havoc upon toilet infrastructure, setting us back decades in progress made towards expanding toilet coverage. This necessitates the need to design, develop and implement **Disaster Resilient Toilets** with features that enable toilets to resist the impact of floods, cyclones and other disasters. **Upgraded twin-pit toilets** are able to withstand the hazards of natural disasters like floods due to their **unique design**. With elevated construction, disaster-proof superstructures for toilet roofs, more columns, and deeper foundations, these toilets are safeguarded against uprooting, allowing safe access during disasters. Not only do they have a higher pit capacity, their pits are also plastered to prevent leakages and ensure long-term functionality.

By adopting a comprehensive and sustained approach outlined in the framework, governments can significantly enhance disaster preparedness and foster community resilience.

CONCLUSION

The intersection of disasters and sanitation infrastructure poses significant challenges for South Asia, particularly for marginalized communities. The region's vulnerability to climate-related disasters underscores the urgent need for disaster-resilient sanitation infrastructure. It necessitates a **strategic shift towards long-term resilience** through integration of sanitation into disaster planning across all phases – mitigation, preparedness, and recovery. This focus on sanitation infrastructure strengthens public health outcomes, minimizes service disruptions during disasters, and fosters a more robust disaster response system. Investing in **disaster-resilient sanitation** infrastructure, minimizes damage and ensures **continued service provision**. Additionally, **equipping communities and sanitation workers with the necessary skills** fosters proactive management of sanitation needs during all stages of a disaster. By prioritizing sanitation in disaster preparedness, South Asia can not only weather inevitable disasters but emerge stronger, paving the way for a more sustainable and equitable future for the region.





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