FROM SUNDARBANS TO THE WORLD: EVALUATING CLIMATE CHANGE ON THE GROUND

Webinar Recap: Responses to unanswered questions

1. ***Like to know from panellists whether existing healthcare systems facilities in Sundarbans areas are sufficient to face/manage regular occurrence of flood/tsunami? If not, your suggestions particularly in post-event period?***

I believe that the current health system in the Sundarbans is not sufficient to handle recurring floods or future tsunamis. As discussed during the session, different components like inadequate infrastructure, poor disease surveillance/ forecasting and lack of community sensitization are some key components that need to be addressed. It requires a climate-resilient, decentralized, and community-supported response model, especially in the post-event period. This includes infrastructure upgrades (making health facilities and WASH services flood resilient), emergency preparedness, trained community-based health responders, and integrated surveillance and outreach systems among others.

2. ***Is the mangrove named Sundari falling in endanger?***

Yes, research reports indicate that the Sundari tree (*Heritiera fomes*), the dominant mangrove species after which the Sundarbans are named, is facing increasing threats and is considered vulnerable. Its population is declining due to a combination of factors including rising salinity in water and soil, frequent cyclones, and sea-level rise. As a freshwater mangrove, its coverage is under threat, whereas other salinity tolerant mangrove varieties such as Avicennia Alba are spreading fast, causing a change in the composition of mangrove forest.

3. ***Given the Sundarbans' unique vulnerability to rising sea levels and extreme weather, what methodologies have proven most effective in evaluating the real-time impacts of climate change on both ecosystems and local livelihoods?***

Participatory community-based approaches: Community mapping exercises consider the experience and expertise of the community to map environmental degradation, hotspots (based on high exposure to frequent hazards); which have been proven to be extremely helpful since it unlocks localised knowledge systems. Additionally, in the immediate aftermath of a calamity, training and collaborating with local community to undertake rapid needs assessment has been extremely effective for timely knowledge creation and response planning.

Drone Surveys: At a finer scale, drones can be deployed for targeted monitoring. Drones can capture centimetre-level detail, revealing micro-scale impacts. In the Sundarbans delta, humanitarian and research projects have used drones to map shoreline erosion, embankment breaches, and vegetation changes after extreme events[1].

Use of secondary data: Historical climate, ecological, and socio-economic data combined with machine learning models can be used to draw predictive trends[2]. These models help forecast risks such as salinity intrusion, crop failure, and livelihood disruptions with increasing accuracy, enabling proactive interventions[2].

Indexing: The development of composite vulnerability indexes has also proven to be crucial. These indexes integrate diverse indicators—ranging from climate hazards and ecological degradation to socio-economic vulnerabilities—and allow for risk stratification within the same geographic region. Tdh adopted this stratification in its landscape analysis of Sundarbans. By identifying high-, medium-, and low-risk zones, they offer a spatially nuanced understanding of vulnerability and help prioritize resources and

[1] Strategies for climate resilience – drone application, mangrove plantation, and community mobilisation in the Sundarbans delta | Humanitarian Practice Network

[2] Coastal vulnerability assessment for the Sundarbans mangrove ecosystem using InVEST and machine learning-based empirical models | Environment, Development and Sustainability

actions accordingly.

4. ***How can lessons learned from community-based climate adaptation and resilience in the Sundarbans inform global climate policy and localized evaluation frameworks in other vulnerable regions?***

Community-Centric Models Are Essential: At the core of the Sundarbans' resilience strategies lies deep community engagement—from participatory risk mapping and mangrove restoration to disaster preparedness through Village Disaster Management Committees. These approaches center local knowledge, foster ownership, and enhance last-mile delivery of adaptation. Globally, this reinforces the policy direction toward locally led adaptation (LLA), now widely endorsed in forums like COP. The Sundarbans demonstrates that when communities co-design interventions, outcomes are more durable and equitable, thus necessitating for climate policies to decentralize power and finance to the grassroots.

Compounded Risks: In Sundarbans, climate risks are not isolated: cyclones, salinity intrusion, river erosion, and migration interact. This highlights the need for evaluation tools that do not assess single shocks but measure systemic vulnerability and resilience across sectors—health, livelihoods, education. It also calls for integrated indicators in global monitoring (e.g., SDGs, Sendai Framework, GEF tracking tools) that reflect interlinked impacts, especially on children and marginalized groups.

Social Capital as an Indicator of Adaptation: From women-led mangrove brigades to adolescent disaster volunteers, the Sundarbans shows how social cohesion and collective agency drive adaptive capacity. Global evaluation systems often miss this. Integrating metrics around trust, cooperation, local leadership, and indigenous knowledge into resilience assessments could better capture true readiness in climate-vulnerable communities.

5. ***As we know that Govt is and would remain the largest health services provider so in that context, what would be a few things you would like to see govt response/preparedness focus on?***

For climate change responses in India, there is a shared financial responsibility between the Central and State Governments, particularly under programs like the State Action Plans on Climate Change and Human Health (SAPCCHH), which fall under the broader National Action Plan on Climate Change (NAPCC) and the National Action Plan on Climate Change and Human Health (NAPCCHH). There is shared budgeting between the Central and State Governments for SAPCCHH. It usually follows a 60:40 cost-sharing pattern, embedded within the National Health Mission or other climate-health linked schemes. However, the effectiveness depends on state-level planning, intersectoral coordination, and capacity for fund utilization. These challenges are particularly evident when translating high-level plans like the NAPCC and SAPCCs into real, localized, and health-sensitive action, especially since health is considered a 'state subject' as per Indian federal system. Developing a strategic plan that includes creation of ring-fenced climate budgets, prioritization of climate vulnerable districts and development of simplified budget and data modelling lines can be potential solutions to explore further for addressing these challenges.

6. ***A quick question - is there a portal/platform/paper or any other medium that has examples of climate affects on children across the world and case studies on what/how different organisations are solving for it?***

Some research reports that can get you started on this: Children's Climate Risk report, Children Displaced in a Changing Climate, Impact of climate change on health, migration and child protection in the Sundarbans region of India,

7. **What are some of the key trade-offs or dilemmas a service delivery organization is faced with when trying to balance climate-related crisis with the needs of the most vulnerable population, especially children and women? What/Who gets left out?**

Sundarbans poses unique challenges, but one which I think is crucial is that it sits as the nexus of humanitarian and development challenges. And that itself brings us to our first dilemma:

Relief vs Rehabilitation: Many organizations focus heavily on emergency response immediately after disasters, such as providing aid at relief shelters. However, long-term investments—like climate-resilient shelter infrastructure and robust early warning systems—are often overlooked. Conversely, organizations that work on long-term resilience often lack clear strategies for immediate relief. While a nexus approach is critical for the Sundarbans, this doesn't mean every organization must span the entire spectrum. Instead, it calls for intentional planning and collaboration to ensure that both relief and rehabilitation receive the attention they require. In the absence of such coordination, the specific needs of women and children often get absorbed under generic household-level interventions. Even within our policy documents like the state's DRR framework fails to mention children entirely. Similarly, persons with disabilities are frequently left out due to gaps in organizational understanding and inclusive planning.

Efficiency Vs Exclusion: A lot of service delivery organisations, in order to make the delivery of services efficient, have adopted the integration of technology and digital solutions. The Covid-19 pandemic has provided a huge impetus to this with the increase in smartphone penetration- we now find that most of the households, have at least one smartphone. However, the gap between availability and access is wide, and often, if not mitigated with an informed do-no-harm strategy, these mediums of service delivery can strengthen existing power hierarchies within the household.

8. **What innovations in climate data mapping or vulnerability indexing are relevant for evaluating impacts on children?**

The link between climate change and impact on children is relatively unexplored, quantitatively. One particularly valuable contribution in this area is UNICEF's Children's Climate Risk Index, which combines two key dimensions: (i) climate-related hazards and exposure, and (ii) child-specific vulnerability indicators. This composite index offers a powerful framework for assessing climate risk to children across countries. Adapting similar GIS-based mapping approaches at national and sub-national levels is essential for informing climate adaptation strategies that incorporate a strong child protection perspective.