STRENGTHENING SRI LANKA'S HEALTH SYSTEM PREPAREDNESS, RESPONSE AND RECOVERY FOR COMPLEX DISASTERS AND CLIMATE IMPACTS

> Health is not merely a recipient of climate and disaster impacts; it must be an active pillar of national resilience

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POST SESSION TECHNICAL BRIEF

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1. Executive Summary

Sri Lanka is increasingly exposed to complex disasters and climate emergencies that threaten the operational capacity of vital sectors, most notably healthcare. During any crisis, maintaining the structural, nonstructural, and functional integrity of the health system is paramount to saving lives. This reality raises a critical question: **Is Sri Lanka's healthcare system truly prepared to transition into a disaster-resilient and climate-adaptive mode of operation?**

Core Position: Sri Lanka must transition its present healthcare model from reactive health emergency response to a climate-adaptive, disaster-resilient structural paradigm. Risk governance transformation, introduction of climate-health risk assessments, focus on structural, nonstructural and functional integrity of the health institutions, permanent multi-sectoral platforms for engagement and sustainable and anticipatory financing are required to protect frontline health operations and safe health facilities during compounding hazards.

2. Introduction & Background

The landfall of Cyclone Ditwah in late 2025 exposed massive, systemic vulnerabilities across Sri Lanka. Over 2.2 million people were affected, hundreds lost their lives, and the national health system faced severe disruption. Flooded hospitals and MOH offices, landslide-blocked access roads, and compromised supply chains deeply hindered acute health emergency responses.

Simultaneously, the disaster triggered secondary health crises, including vector-borne outbreaks. The emergency pushed an already economically strained health infrastructure to its limits. It requires an estimated LKR 21,026.73 million just to restore full operational capacity across the health sector.

2.1 PROBLEM STATEMENT

Sri Lanka's healthcare delivery architecture relies heavily on reactive, post-event response models. This framework often fails to address the escalating frequency of complex, climate-driven compounding hazards. Consequently, critical gaps persist between disaster preparedness planning, operational readiness, and institutional safety during major disasters and climate events.

The central challenge is a systemic lack of adaptive capacity to withstand cascading climate shocks and compounding disasters. This vulnerability stems from rigid public health governance, structurally and geographically exposed infrastructure, and fragmented information coordination. Furthermore, critical sub-systems, including water, sanitation, and hygiene (WASH), electricity, communication, and hazardous waste management, remain completely isolated during major disasters. Failure of waste storage, collection, transport and treatment systems during disasters can directly affect continuity of healthcare services while creating secondary public-health and environmental risks.

This technical brief outlines changes required in governance (in relation to the health-climate-disaster nexus) and structural and operational strategies required to transition Sri Lanka's health system into a climate-adaptive, disaster-resilient model, leveraging both local insights and global best practices.

2.2 PLENARY CONTEXT

This technical brief synthesises the findings, debates, and empirical expert analyses from the Plenary Discussion organised by the Sri Lanka Medical Association (SLMA) and facilitated by the United Nations Development Programme (UNDP) Sri Lanka, held on the 24th of July 2026. Convened under the overarching theme ***'Wellness in the Nation through Local and Global Partnerships'*** at the 139th Anniversary International medical Congress, the session convened health policymakers, disaster risk management (DRM) professionals, international financing agencies, and leading academic institutions to form an operationalised pathway for system transformation.

Plenary Modalities & Panel Composition:

Panellists:

- **Dr Inoka Suraweera** (Consultant Community Physician, Environmental Health Unit, Ministry of Health Sri Lanka);
- **Dr Novil Wijesekara** (Consultant Community Physician and Synergistic Resilience Practitioner, Ministry of Health Sri Lanka);
- **Prof. Dilanthi Amaratunga** (Professor of Disaster Risks and Climate Resilience, Loughborough University, UK);
- **Mr Sampath Ranasinghe** (Programme Management Specialist-Energy and Waste, UNDP Sri Lanka)

Moderator:

- **Dr Lahiru Kodituwakku** (Doctoral Researcher, Global Disaster Resilience Center, University of Huddersfield, UK)

Organised by: Sri Lanka Medical Association (SLMA) & facilitated by the United Nations Development Programme (UNDP) Sri Lanka

3. Strategic Position & Analysis of Plenary Insights

The health sector possesses foundational assets: alignment with the Sendai Framework for Disaster Risk Reduction, the Disaster Management Act No. 13 of 2005, a national network of Health Emergency Operations Centres (HEOCs), and over 100 designated disaster management focal points spread across the country. However, these systems face systemic operational deficiencies across four primary pillars.

3.1 PILLAR A: CRITICAL OPERATIONAL GAPS & CHALLENGES

- **Response-Centred Operational Bias:** National institutions treat disaster management as an intermittent emergency response task. They often fail to complete the disaster management continuum, including proactive pre-disaster risk reduction and post-disaster structural, nonstructural and functional adaptations.
- **System Bypassing and Fragmentation:** Validated protocols such as standardized incident management systems and Emergency Medical Team (EMT) deployment protocols—are routinely bypassed during severe events. This creates a fragmented, reactive coordination environment.
- **Information Bottlenecks & Silos:** Multiple agencies gather emergency data using incompatible formats and isolated databases. This prevents decision-makers from creating a timely, unified health command picture.
- **Isolated Resource Landscapes:** The extensive capacities of localized civil society networks, community volunteers, and external sectors (meteorology, irrigation, and roads) are not integrated into formal health planning.

3.2 PILLAR B: POLICY FRAMEWORK FOR RESILIENT HEALTH INFRASTRUCTURE

To safe-guard frontline facilities, Sri Lanka must implement a localized policy framework based on the **Safe Hospitals Initiative and climate resilient hospital designs**, demanding that health infrastructure addresses ten core criteria:

1. **Access Integrity:** Transport links must remain functionally viable for ambulances, medical staff, and emergency logistics during major floods or landslides. Alternative routes should be mapped, included in risk assessments and frequently rehearsed with relevant stakeholders.
2. **Structural Stability:** Load-bearing elements must withstand high-velocity monsoonal hazards, frequent flooding events and soil shifts.
3. **Non-Structural Protection:** Lifelines, including backup electricity, medical oxygen lines, water, telecommunication lines and pharmaceutical cold chains must have multi-layered protection.
4. **Functional Viability:** Clinical services must remain operational during acute disruptions. Necessary staff rotations, call for duty procedures and prioritization of key clinical services must be integrated into risk assessments and routine drills.
5. **Climate Health Risk Assessment:** Integrate new climate related elements into existing risk assessments and preparedness planning. Flood inundation mapping, landslide risk zonation and high wind vulnerability mapping are some of the elements that could be superimposed on existing plans to create a climate sensitive health risk assessment.
6. **Universal Accessibility:** Evacuation paths and emergency clinical settings must remain fully disability-inclusive during active crises.
7. **Evacuation:** Vertical evacuation of staff and critical equipment should be planned, institutionalized and drilled/rehearsed frequently.
8. **Information-Smart Connectivity:** Digital communications must operate independently of the commercial power grid. Back-up battery operated communication systems for institutions in geographically exposed areas or satellite-based systems for major referral centers must be explored.
9. **Anticipatory / buffer finances:** Anticipatory or buffer financing should be accommodated within local or institutional budgets rather than relying on the center for emergency funding during crises.
10. **Low-Carbon Sustainability:** Long-term resilience investments must use green building methods and renewable energy microgrids.

3.3 PILLAR C: COMPARATIVE ADAPTATION MATRIX (UK NATIONAL HEALTH SERVICE VS. SRI LANKA HEALTH SERVICES)

A core component of the plenary focused on adapting the best global practices from the UK National Health Service (NHS) and the UK Health Security Agency (UKHSA) to Sri Lanka's decentralised and resource-constrained context. It was emphasised that adapting the UK's climate- and disaster-resilient healthcare practices to Sri Lanka requires shifting from a high-resource, heating-dominant framework to one tailored for a tropical island facing monsoonal flooding, heat stress, landslides, prolonged dry-zone droughts, and vector-borne disease surges (such as Dengue). While the fundamental principles remain the same in protecting infrastructure, preserving power, and maintaining continuity, the implementation strategies must adjust to Sri Lanka's geography, decentralised health system, and budget realities.

UK NHS Baseline Standard	Proposed Sri Lankan Adaptation
Structural Passive Cooling: Low-emission building layouts to mitigate regional European heat waves.	High open ceilings, shaded cross-ventilation, radiant roof heat barriers, and central green courtyards to reduce cooling costs and manage tropical humidity.
Infrastructure Redundancy: Standardized flood-safe placement of generators and high-capacity digital servers.	Elevating backup generators and pharmaceutical stocks to upper floors or raised concrete platforms within hospitals located in flood-prone river basins.
Off-Grid Resource Protection: Urban microgrid connectivity and large-scale backup systems.	Rainwater harvesting arrays combined with decentralized solar PV storage to protect cold-chains across dry-zone health institutions.
Early Warning Integration: Automated Met Office alerts linked directly to acute respiratory and heat response systems.	Linking Department of Meteorology forecasts with the relevant units of the MoH (Dengue Control Unit) to trigger community vector-control measures weeks before post-flood Dengue surges.
Operational Continuity: High-bandwidth virtual clinical wards and comprehensive home telehealth networks.	Low-cost mobile text systems (WhatsApp/SMS networks) paired with Public Health Midwives (PHMs) and Public Health Inspectors (PHIs) to monitor chronic patients when landslides block access roads.

3.4 PILLAR D: NEGLECTED SECTORS – HAZARDOUS HEALTHCARE WASTE MANAGEMENT

Complex crises cause dangerous cascading impacts on fragile health infrastructure. Hospital hazardous waste management is often neglected during disasters. When primary services, power grids, and transport networks collapse, standard waste collection fails, creating biological and chemical hazards for hospital and surrounding communities. A resilient response must address three operational dependencies:

During floods and other major disasters, accumulated or inadequately contained healthcare waste and hazardous chemicals can create a secondary contamination crisis through releases to soil and water, occupational exposure of healthcare and waste-management workers, and exposure of surrounding communities. Maintaining continuity of healthcare waste services should therefore form part of health-sector emergency preparedness and business-continuity planning. Healthcare waste and hazardous chemical management should be recognised as an essential component of health-system infrastructure rather than merely as an end-of-pipe environmental service.

- **Vulnerable Site Mapping:** Clinical storage and treatment facilities are frequently located in landslide-or flood-prone areas, making them vulnerable to water contamination.
- **System Dependencies:** Centralized waste management systems rely on a stable power grid and continuous fuel supplies, both of which often fail during disasters. Resilience should therefore reduce single points of failure through distributed or regional treatment capacity, alternative transport arrangements, contingency power and fuel supplies, and surge-capacity arrangements that enable healthcare waste services to continue when individual facilities or transport corridors become unavailable.
- **Information Blackouts:** A lack of real-time monitoring data and fragmented regulatory lines prevents rapid emergency response. An emergency digital tracking protocol should therefore be developed to provide real-time or near-real-time visibility of healthcare waste generation, temporary storage, collection status, transport movements and available treatment capacity. Such information would enable authorities to identify service disruptions and redirect waste to functioning facilities during emergencies.

A resilient healthcare waste-management system should be built around four mutually reinforcing elements: (i) climate-resilient infrastructure and secure storage/treatment facilities; (ii) distributed treatment and logistics networks that provide redundancy during disruptions; (iii) clear governance, emergency protocols and real-time information sharing; and (iv) sustainability through institutional capacity, continuous training, adequate financing and environmentally sound operational practices.

To address these issues, the plenary proposed a **Cross-Sectoral Operational Matrix for further institutionalisation and operationalization** to manage hazardous clinical waste during disasters

Operational Use	Focal Agency/Actors	Core Mandate and Deliverable
Facility Preparation	MoH / Provincial & Local Authorities	Enforce strict sorting, secure containment, and accurate inventory logging at the clinic level.
Regulatory Oversight	Central Environmental Authority (CEA) / MoH	Monitor environmental compliance and prevent chemical leaching into public water systems.
Disaster Coordination	Disaster Management Centre (DMC) / NBRO	Provide early warning alerts, landslide risk zoning, and coordinate alternate transit routes.
Treatment & Transport	Designated Public & Private Operators	Maintain waste transport lanes and keep clinical waste incinerators running via off-grid power.

4. Synergistic Resilience Framework (1 + 1 = 3)

Climate health challenges are closely linked with urbanisation, land-use changes, and economic vulnerabilities. They cannot be solved by the health sector alone. Sri Lanka must explore the principle of **Synergistic Resilience**, which states that when efforts across systems, sectors, and institutional levels are aligned around a shared purpose, their combined impact is greater than the sum of individual actions (1+1=3).

A resilient community reduces immediate demand for local emergency measures. Reliable infrastructure keeps transport routes open for critical medical supplies, while early-warning weather data enables proactive public health measures. Resilience planning must be integrated across sectors to ensure that health systems, community groups, and national disaster frameworks support each other effectively during a crisis.

Based on the primary challenges identified and adaptable local and global policy frameworks and best practices, the following comprehensive actionable recommendations are suggested. However, such recommendations require contextualization, resources for sustainability, local acceptance and accountability mechanisms to achieve intended outcomes.

5. Comprehensive Actionable Recommendations

1. **Institutionalise Health in National Climate Governance:** Strengthen health sector representation in national climate policies, National Adaptation Plans (NAPs), and Nationally Determined Contributions (NDCs). Move beyond ad-hoc coordination by creating permanent cross-sectoral platforms. Health is not merely a recipient of climate and disaster impacts; it must be an active pillar of national resilience
2. **Implement Multi-Hazard Early Warning Systems:** Link real-time data from the Department of Meteorology with MoH public health surveillance to create predictive early warning systems for climate-sensitive outbreaks.
3. **Build Climate-Resilient Health Facilities:** Mandatory infrastructure upgrades using Safe Hospital principles. Prioritize decentralized flood protection, backup of off-grid power, and climate-smart clinical delivery models. Utilise the findings of the Safe Hospital Initiative pilot conducted in Sri Lanka and use the evidence to upgrade healthcare institutions. Explore escalation of Safe Hospital Initiative of the WHO to healthcare institutions in identified climate- and disaster-vulnerable areas
4. **Establish Resilient Supply Chains & Regional Buffers:** Decentralise critical emergency stocks to regional hubs to avoid supply shortfalls during transport disruptions. Institutionalise establishing and replenishing buffer stocks in each hospital and MOH.
5. **Mobilise Blended Climate-Health Financing:** Develop joint investment proposals to secure international climate finance, disaster-risk financing, and public-private partnerships, rather than depending solely on constrained domestic health budgets. Explore adapting anticipatory financing at the local/regional level, rather than totally relying on support from the centre during a disaster. For essential environmental health services such as healthcare waste management, financing models should also address long-term service affordability, public-private risk allocation, performance standards and contingency financing required to sustain operations during disasters.
6. **Enact Shared Accountability Indicators:** Implement a unified climate-health resilience indicator framework to track facility readiness, waste safety, water security, and community risk management across all provincial and regional health divisions.
7. **Institutionalise Disaster-Resilient Healthcare Waste Management:** Recognise healthcare waste and hazardous chemical management as essential health infrastructure, supported by climate-risk screening, resilient treatment and transport systems, emergency digital tracking, contingency arrangements, and coordinated action among relevant authorities and service providers.

6. Institutional Barriers & Contextual Realities

Implementing these recommendations requires addressing several key challenges: institutional fragmentation across separate ministries, incompatible data systems, and a shortage of skilled healthcare workers. Climate literacy among healthcare workers both in clinical and preventive health sectors also must be enhanced to meet the challenge. Further, frontline healthcare workers face heavy workloads, and the country operates under tight fiscal constraints following recent economic challenges. Addressing these underlying operational concerns is essential for building a truly resilient health system.

For healthcare waste resilience, capacity development should also extend to sanitary workers, healthcare waste handlers, Local Authority personnel, regulators and relevant public/private service operators, supported by periodic preparedness exercises and clear emergency SOPs.

7. The Next Steps

We need to reform our health system to anticipate, absorb, accommodate and adapt to future disasters and climate shocks, and the action cannot be further delayed. While policies need transformation, they need alignment with ground realities and operational practicalities, backed by strong political will, technical guidance and necessary resources. Hence, it is not merely an action by a ministry, but rather an all-of-government initiative.

The Sri Lanka Medical Association (SLMA) will serve as a vital bridge, connecting government nodal agencies with technical experts, think tanks, and development partners to advance this initiative and deliver tangible on-the-ground results. This facilitation encompasses technical exchanges, advisory support, and the cultivation of local and international collaborations. Leveraging its expert committees, the SLMA will also guide the integration of health considerations into national climate and Disaster Risk Reduction (DRR) frameworks. Drawing on its substantial health sector membership, the association will spearhead capacity-building efforts for frontline healthcare workers, thereby elevating their climate and disaster literacy. As the nation's premier medical professional body, the SLMA will continue to advocate for climate-resilient health infrastructure across high levels of government and among key stakeholders.