BEST PRACTICES FOR HEALTH & EDUCATION INFRASTRUCTURE RESILIENCE

Submitted To

National Institute of Disaster Management (NIDM)
Ministry of Home Affairs, Government of India

Submitted By
RIKA Institute

RIKA INSTITUTE FOUNDATION

21st Nov, 2024

To,

Mr. Arvind Kumar
National Institute of Disaster Management (NIDM)
New Delhi

Subject: Submission of Entry for the "Call for Best Practices for Knowledge Platform on Urban Resilience"

Dear Mr. Arvind Kumar,

On behalf of RIKA Institute, I am pleased to submit our entry for the "Call for Best Practices for Knowledge Platform on Urban Resilience," as per the format specified in the Annexure-2.

Please find enclosed the completed submission form

Yours sincerely,

Best regards,

Dr Ranit Chatterjee
Co-founder & Director
RIKA Institute Foundation

Table of Contents

Organisation profile:

RIKA Institute (RI) aims to build capacities in the field of Disaster Risk Management (DRM) and resilience. In its name, 'R' signifies 'Research' and 'I' signifies 'Innovation'. RI thrives to imbibe and promote interdisciplinary, multi-sectoral and all-hazards approach to DRM. It works in the sector of disaster education, innovation, research, training, and awareness generation to inspire a culture of resilience in the society. The vision of the institute is to establish disaster risk management as an enticing career option. For doing so, RI offers training and programmes toward DRM sensitization for varied stakeholders. RI promotes higher education, innovation, and research in Disaster Risk Reduction (DRR) which has also been a point of focus in the National Education Policy and Prime Minister's 10-point agenda on DRR. RI strives to strengthen DRR capacities with a balance of science-engineering, social science, and management studies.

RI is a sister concern of Resilience Innovation Knowledge Academy (RIKA) India, a start-up to provide cost-effective and innovative solutions and consultancy services in the field of DRM, climate change action and sustainable development. In the past RIKA has offered its services to the National Disaster Management Authority (NDMA), National Institute of Disaster Management (NIDM), various State Disaster Management Authorities (SDMAs) and State Institute of Disaster Management (SIDMs), Urban Local Bodies (ULBs), different United Nations agencies, World Bank, and ADPC to name a few.

Championing for all-of-society approach, RI lays strong emphasis on multi-sectoral and multi-stakeholder partnerships and collaboration. This has resulted in active engagement and collaboration of RI with varied organizations ranging from government agencies, academia, private sector and media.

RI has experts with academic backgrounds from premier institutes in India and abroad including Tata Institute of Social Sciences (TISS), Mumbai, National Institute of Technology (NIT) Bhopal, University of Twente (Netherlands), Kyoto University (Japan) and Osaka City University (Japan) in disaster management, environmental sciences, urban planning, and geo-informatics with proven scientific rigor, and research in disaster risk management. The team holds vast experience in disaster risk management, disaster education, community-based disaster risk reduction, risk governance, DRR innovation, climate change action, capacity building, nature-based solutions and urban planning. The co-founders, Prof. Rajib Shaw and Dr. Ranit Chatterjee have between them over 35 years of experience in the field.

Prof. Rajib Shaw is a recipient awarded the United Nations Sasakawa Award for Disaster Risk Reduction in 2022; Norio Okada Implementation Science Award from the International Society for the Integrated Disaster Risk Management (IDRIM), 2022 and the Pravasi Bharatiya Samman Award (PBSA) from the President of India in Education Field in 2021, the highest honour conferred on overseas Indians. He has a rich academic background in the field of Environment Sciences (Disaster Management & Climate Change) and has over 25 years of experience of working in over 20 countries. He is also the Coordinating Lead Author (CLA), Asia Chapter, IPCC 6th Assessment Report. He has a keen interest in disaster education, education for sustainable development and climate change education and has closely worked with various governments and nongovernmental organisations on related projects and studies. To name a few, this includes the Climate and Disaster Resilience Initiative with the Ministry of Education (Japan), the School Safety Program with the Government of Maharashtra (India),the UNISDR AIDCO Project in India, Indonesia, Maldives and Sri Lanka, post-disaster education recovery with Ministry of Education (Myanmar) and UNESCO, Vietnam Climate Change Education project with UNESCO, amidst others. Besides, in the aftermath of the devastating East Japan Earthquake and Tsunami of 2011, as an Advisor to the cities of Kamaishi and Kesennuma, he has chaired the committee for school construction and community recovery and worked closely with the board of education for the provision of technical advice on Education for Sustainable Development

(ESD) and DRR, respectively. As a founding chairperson of Kobe-based SEEDS Asia, he has been providing overall guidance and technical support towards the development/designing of innovative tools for disaster education and community-based risk reduction and environmental management practices.

Dr. Ranit Chatterjee has a rich academic background in disaster management, having a Ph.D. in Environmental Management and Masters in Disaster Management, followed by more than ten years of experience. Previously, he has worked with the Disaster Management Department of the Maharashtra Government as a part of the UNDP's DRR and CRM Project. He has been an IRDR Young Scientist. He is an Advisory Board Member of UNDRR's Stakeholder Engagement Mechanism (SEM) and CEM member of Business and Biodiversity Group, IUCN. He has spearheaded and supported development of various innovative tools on risk estimation and risk communication. These include Risk-Informed School Evaluation (RISE) Tool, UNDRR's Quick Risk Evaluation Tool for Micro Small and Medium Scale Enterprises (MSMEs) for COVID-19 and for multi-hazards, COVID-19 Risk Assessment Tool, COVID-19 Monitor, among others.

Introduction:

Urban resilience is the ability of cities and communities to anticipate, withstand, and recover from various natural and human-induced hazards while maintaining essential functions and adapting to new challenges. As Indian cities face increasing risks from disasters, climate change, rapid urbanization, and socio-economic pressures due to rapid population growth, promoting urban resilience is crucial for sustainable development, reducing vulnerability, and protecting human lives and infrastructure.

Building urban resilience requires a collaborative approach involving governments, academic institutions, private entities, and civil society. Documenting and sharing success stories and best practices from various cities enhances knowledge exchange and inspires replication of impactful initiatives nationwide.

To facilitate knowledge sharing and dissemination, NIDM proposes establishing an online knowledge management portal as a central repository for Disaster Risk Reduction (DRR) and urban resilience related best practices and success stories.

The platform will be hosted on the India University and Institutions network for Disaster Risk Reduction (IUINDRR) established under NIDM, the largest network of universities and institutions engaged in capacity building, research, and teaching in disaster management.

This initiative is a part of the project "Enabling Cities on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) for Sustainable Urban Development in India," a sub-project under SUDSC-II, implemented under a grant agreement between GIZ-NIDM.

Aim

The aim of the knowledge platform is to serve as a repository for sharing of best practices, highlighting successful interventions that have strengthened resilience in diverse urban settings. The platform will foster cross-learning, encourage collaboration, and support evidence-based policy formulation at the national level.

Summary:

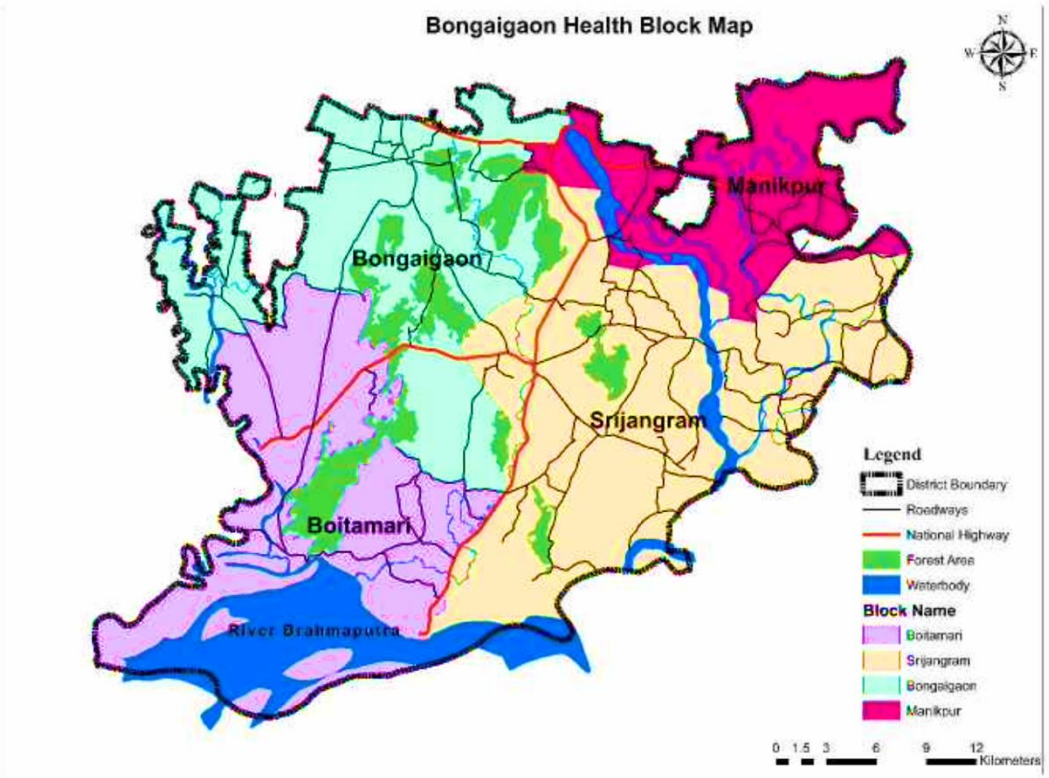
Health infrastructure forms a significant facility for community, aiding them in essential health and well-being especially in crisis situation. Therefore, the resilience of health infrastructures forms a basic aspect for effective delivery. The Sendai Framework for Disaster Risk Reduction (SFDRR) lays down "substantial reduction in disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030" as one of its seven targets. Health system resilience can be denoted as the capability/ capacity of the health actors, institutions, and populations to prepare for and effectively respond to crises; maintain critical functions when a crisis hits; reorganize if conditions require it, as per the key learning (Kruk et al., 2015; Thomas et al., 2020). Health systems are considered resilient if they are able to protect human life and promote good health outcomes pre, post, and during disasters. To advance the implementation of the health aspects of the SFDRR, the Bangkok Principles underscore the need for strong and systematic two-way integration of health and disaster risk management strategies through a whole-of-government and whole-of-society approach. Further, it calls for "enhancing the safety functionality and resilience of critical health infrastructure and facilities by conducting safety assessments, strengthening the implementation of the Safe Hospital Initiative, and applying the principles of "building back better" in recovery and reconstruction, in coordination with communities." The need for the same is being felt all the more now post COVID-19 pandemic where manifestations of complex and systemic nature of risk had overwhelmed the health infrastructure and systems across the globe. Health-EDRM (Emergency Disaster Risk Management) is a paradigm that is actively being developed and evolved since 2009 in collaboration with WHO (World Health Organization). The discipline aims to examine health and disaster risks and applies public health tools to engage in the management of health and disaster risk. In contrast to the traditional medical emergency and disaster approaches that are often response-based, the health-EDRM paradigm targets systematic analysis and management of health risks. It emphasizes on emergency preparedness and DRR by adopting the preventive public health approach that addresses risks to reduce potential adverse impact and harm from all-hazard throughout the emergency cycle (WHO, 2019).

The urban health centers in Bongaigaon district identified for best practices and their interventions include Bhakarivita Sub-Center, Bhawlaguri Urban Health Center, Bongaigaon Block Primary Health Center, MG Model Hospital Boitamari, Bidyapur Community Health Center, MG Model Hospital Manikpur, and Abhayapuri Community Health Center. These centers have been recognized for their contributions to improving healthcare delivery and operational resilience through various initiatives.

Each center exhibits distinct strengths in areas such as infrastructure maintenance, public health outreach, and emergency preparedness. They have implemented practices like vaccination drives, public health awareness campaigns, and community-based health interventions. Additionally, facilities at some centers, such as MG Model Hospitals and CHCs, maintain high standards of cleanliness, well-equipped infrastructure, and routine health services like OPDs and deliveries. However, these centers also face common challenges, including gaps in disaster risk management (DRM), inadequate training for staff, limited budgets for resilience-building activities, and underutilized partnerships with NGOs and private organizations.

Despite these challenges, these health centers serve as examples of how targeted interventions can enhance healthcare service delivery in urban areas, highlighting the potential for scalability and replication of best practices to strengthen healthcare systems across the district.

1) **Thematic area: Infrastructure resilience**
2) **Sub thematic area:** Health & education infrastructure resilience



BEFORE SITUTION:

Before implementing resilience measures in Bongaigaon's healthcare system, the district faced significant challenges across multiple dimensions that affected its ability to respond effectively to disasters. These gaps underscored systemic vulnerabilities and stressed the urgent need for improvement.

One of the key issues was the inadequacy of physical infrastructure in healthcare facilities. Although many buildings were structurally sound and resistant to minor disasters, maintenance was often neglected, leading to deteriorating conditions. For instance, several healthcare centers lacked basic features like emergency evacuation routes, functional fire extinguishers, and backup power systems. In addition, facilities like drinking water supply, sanitation, and proper drainage systems were either absent or poorly maintained. Connectivity to some centers was hindered by damaged or narrow access roads, which became impassable during floods or heavy rainfall, further complicating emergency responses.

Human resources were another critical area of concern. The staff working in these centers had minimal or no formal training in disaster risk management (DRM). This lack of preparedness extended to both technical knowledge and practical skills, such as conducting mock drills or managing mass casualty events. Awareness of hazards and disaster-related risks was generally low among healthcare workers, which limited their ability to contribute effectively during emergencies. Moreover, many centers reported severe staff shortages, with critical roles like auxiliary nurse midwives (ANMs) and cleaning staff often unfilled. The existing workforce faced additional challenges, including inadequate incentives and recognition for their efforts during disaster-related duties, such as extended shifts during floods or vaccination drives during pandemics.

Institutionally, the district's healthcare system lacked a coherent framework for disaster preparedness. There was no integration of DRM plans into routine healthcare management. Essential elements such as disaster-specific standard operating procedures (SOPs), contingency plans, and early warning mechanisms were missing. The absence of budgetary provisions for DRM activities further compounded the problem. Funds allocated to these centers were primarily used for routine operations and maintenance, leaving little to no resources for disaster-related initiatives like purchasing safety equipment or conducting community awareness campaigns.

Social relationships between healthcare centers and their surrounding communities were weak. While some centers engaged with communities for general public health awareness, there was little collaboration in disaster preparedness and resilience-building activities. Many centers were heavily dependent on government funding, with limited attempts to mobilize support from private organizations, NGOs, or local self-help groups. This overreliance on a single source of funding restricted the flexibility and scope of disaster preparedness efforts. Community participation in decision-making processes was minimal, and the potential for leveraging local resources remained untapped.

Natural conditions in Bongaigaon posed an emerging threat to the healthcare system. While the district had historically experienced low disaster severity, the risk of flooding, river erosion, and landslides was rising due to climate change and environmental degradation. Healthcare centers located in vulnerable zones lacked proactive measures to address these risks, such as flood-proofing buildings or

implementing erosion control measures. Although no major disasters had severely affected the centers recently, this lack of preparedness left the system exposed to significant future challenges.

Implemented Measure:

The Health Disaster Resilience Assessment (HDRA) is a detailed framework developed to evaluate the disaster resilience of healthcare facilities. It aims to provide a structured understanding of the vulnerabilities and strengths of health systems, guiding improvements in resilience and disaster risk reduction. The tool assesses healthcare facilities across five key dimensions, each addressing critical aspects of disaster preparedness and response.

The first dimension, **Physical Conditions**, focuses on the state of infrastructure, facilities, and environmental conditions of healthcare buildings. This includes evaluating maintenance and retrofitting of buildings, the availability of emergency equipment, sanitation services, and waste management systems. The goal is to determine how well the infrastructure can withstand and recover from disaster impacts.

The second dimension, **Human Resources**, examines the capacity, training, and preparedness of healthcare staff. It assesses the awareness of disaster risks among doctors, nurses, and support staff, the adequacy of manpower, and their involvement in community-based disaster risk management (DRM) activities. This dimension highlights gaps in workforce readiness, which is critical during crises.

The third dimension, **Institutional Conditions**, evaluates the governance, planning, and resource allocation for DRM. It includes assessing the integration of disaster management strategies into healthcare planning, the efficiency of early warning systems, and the allocation of budgets for emergency preparedness and resilience-building. This dimension reflects the systemic readiness of healthcare institutions to manage disaster risks effectively.

Social Relationships form the fourth dimension, focusing on collaboration with external stakeholders, including NGOs, government agencies, and community groups. It examines how well healthcare facilities engage with the public, mobilize resources, and establish partnerships to strengthen disaster resilience. This dimension highlights the importance of community involvement and external support in building a robust healthcare system.

The fifth dimension, **Natural Conditions**, analyzes the environmental risks that healthcare facilities face, such as floods, earthquakes, and other natural hazards. It considers the severity and frequency of these hazards and the geographical vulnerabilities of the facilities. Understanding these risks is crucial for planning and implementing effective mitigation measures.

Each of these dimensions is assessed through specific parameters and indicators. For instance, the Physical Conditions dimension includes indicators for the quality of building construction, the presence of evacuation routes, and the condition of sanitation facilities. The scoring system uses a scale of 1 to 5, where 1 represents very poor performance and 5 represents excellent performance. The scores are averaged to provide insights into the strengths and weaknesses of each facility across all dimensions.

The HDRA framework was applied in the Bongaigaon district of Assam, covering 137 healthcare facilities across four blocks: Boitamari, Bongaigaon, Manikpur, and Srijangram. The implementation began with training sessions for healthcare staff and officials to introduce them to the tool's structure and purpose. A structured questionnaire was developed to gather quantitative and qualitative data from each facility. Surveys were conducted on-site, involving interviews with healthcare staff and observation of facilities. The collected data were used to generate scores for each dimension and create visual representations like spider charts for better analysis.

The findings revealed significant variations in resilience across the facilities. While the physical and natural conditions showed relatively higher resilience, the dimensions of human resources, institutional conditions, and social relationships scored poorly. For instance, many staff members lacked training in DRM, and there was limited collaboration with NGOs and other external organizations. Additionally, the integration of DRM into institutional planning and budget allocation was found to be inadequate.

The HDRA tool provided valuable insights for targeted interventions. For example, facilities with low scores were identified for prioritized upgrades, such as improving training programs, enhancing infrastructure, and increasing budgetary support. At the block level, the tool enabled a comparative analysis to identify systemic gaps and guide district-level planning for disaster resilience.

HDRA also demonstrated its potential to support localized risk-informed planning. By providing detailed assessments, it allows policymakers to make evidence-based decisions that align with global frameworks like the Sendai Framework for Disaster Risk Reduction (SFDRR). The tool facilitates the localization of resilience-building efforts, emphasizing community involvement and multi-stakeholder collaboration. Ultimately, HDRA supports the development of safer, more resilient healthcare systems capable of effectively responding to future disasters.

Recommendations:

The following give a brief of some of the recommendations generated for short, medium, and long-terms.

Short-term recommendations (0-2 years)

- Strengthening dissemination of early warning through establishment of robust communication platforms/ groups.
- Improving physical and natural resilience of the centres by identification and mapping of current exposure and vulnerability zones associated with varied existing and emerging hazards.
- Interventions and improvement in solid waste management practices should be prioritized at all health centres. Medical/ chemical wastes are foreseeable by-products from a health centre; hence policy guidelines/ SOPs should be in place to address their safe collection, handling, and disposal.

Medium-term recommendations (2-5 years)

- Guided by the global frameworks and principles such as Bangkok Principles, HEDRM, national guidelines on hospital safety, mass casualty management, etc., strong policy actions should be undertaken to ensure a two-way integration of DRM and healthcare planning and strategies.
- Integration of on-going disease surveillance programmes with the Emergency Operation Centre (EOC) and existing early warning systems can be added for early identification and prompt action of multi-hazard risks in a collaborative manner.
- Investments diversification whereby the collaboration by local private sector and philanthropic organisations should be explored and promoted for financing the planned and identified DRM and resilience building measures along with provisioning of better facilities at the centre.

Long-term measures (over 5 years)

- Formulating knowledge management, whereby there should be an established core scientific committee at state/ district level which will keep a track of both the recent advances in medical science field as well as the DRM field.
- Ensuring having in place robust and well-integrated (horizontally and vertically) institutional mechanism for DRM at all levels, which involves identification of nodal officers, laying department specific DRM SOPs, and so on.

Significant Effect after implementation

The **Health Disaster Resilience Assessment (HDRA)** tool demonstrates significant potential to support risk-informed planning at the local level by offering a structured methodology to evaluate and improve the disaster resilience of healthcare facilities. Below is a detailed description of how HDRA can aid local-level planning, implement targeted measures, and localize the Sendai Framework for Disaster Risk Reduction (SFDRR):

Supporting Risk-Informed Planning at the Local Level

HDRA provides a comprehensive framework to analyze and address the vulnerabilities of healthcare facilities across multiple dimensions, including physical conditions, human resources, institutional capabilities, social relationships, and natural conditions. By systematically evaluating these dimensions through structured surveys, scoring, and spider charts, HDRA identifies specific strengths and weaknesses of individual facilities and health blocks. This data-driven approach allows policymakers and local administrators to develop detailed, evidence-based plans tailored to the unique challenges of each facility or health block.

For example, in Bongaigaon district, HDRA revealed disparities in resilience levels among the blocks, highlighting the poor performance in human resources, institutional planning, and social engagement. Such granular insights can inform localized action plans that prioritize training, infrastructure improvement, and stakeholder collaboration.

Targeted Measures at Facility and Block Levels

At the facility level, HDRA enables healthcare centers to address gaps in disaster preparedness and resilience. For instance, facilities can implement measures such as:

- Training staff on disaster risk management (DRM) protocols.
- Establishing disaster response teams and conducting mock drills.
- Improving waste management and ensuring the availability of emergency equipment.

At the block level, HDRA facilitates the identification of systemic issues, such as insufficient budget allocation for DRM and inadequate collaboration with NGOs or private organizations. These insights guide the development of strategic interventions, such as creating partnerships for resource mobilization or integrating DRM into routine healthcare planning.

For example, in the Boitamari block, HDRA highlighted the need for better road connectivity to health centers, which can be addressed through collaborative efforts with local governments under schemes like the Gram Sadak Yojana. Similarly, the Bongaigaon block's low scores in institutional resilience can guide targeted investments in capacity-building programs and budgetary provisions for disaster response.

Localization of the Sendai Framework for Disaster Risk Reduction (SFDRR)

HDRA operationalizes the SFDRR's objectives by:

1. **Reducing Disaster Damage to Health Infrastructure**: By evaluating the physical and operational resilience of healthcare facilities, HDRA directly supports SFDRR's goal of minimizing damage to critical infrastructure and ensuring the continuity of basic services during disasters.
2. **Strengthening Multi-Stakeholder Collaboration**: HDRA emphasizes the importance of social relationships, encouraging partnerships between healthcare facilities, community organizations, NGOs, and private stakeholders. This aligns with the SFDRR's call for a whole-of-society approach to disaster risk reduction.
3. **Enhancing Community Resilience**: By promoting community engagement and localized disaster preparedness, HDRA fosters the active participation of local populations in resilience-building, a key principle of SFDRR.
4. **Enabling "Build Back Better" Strategies**: The tool's recommendations for physical upgrades, institutional reforms, and human resource development align with the SFDRR's emphasis on "building back better" during recovery and reconstruction phases.

HDRA score:

Name of centre	Overall	Physical condition	Human Resource	Institutional Condition	Social relationship	National Condition
1) Bhakarivita Sub-Cente	2.58	3.13	1.87	2.07	1.98	3.87
2) Bhawlaguri Urban Health Center	3.43	4.00	2.58	2.60	3.37	4.60
3) Bongaigaon Block Primary Health Center	3.27	3.73	2.55	2.87	2.08	4.13
4) MG Model Hospital Boitamari	2.90	3.13	2.37	2.27	2.55	4.20
5) Bidyapur Community Health Center	3.54	4.13	3.23	3.27	2.87	4.20
6) MG Model Hospital Manikpur	3.24	3.53	2.07	2.73	3.38	4.47
7) Abhayapuri Community	3.71	4.07	3.22	3.60	3.42	4.27

Health Center						

Financial Details:

This study was done by India Japan Laboratory (IJL), Keio University, Japan; Resilience Innovation Knowledge Academy (RIKA), India; Indian Institute of Technology (IIT) Guwahati in collaboration with the National Health Mission (NHM), Assam initiated a mapping and assessment exercise of all health centres in Bongaigaon, Assam to generate short-term, medium, and long-term plans based on their disaster resilience.