

June 2022

# Briefing Paper

Integrating pandemic, tsunami, and other multi-hazard preparedness into urban planning in Sri Lanka

*Authors:*

Professor Ranjith Dissanayake  
Ministry of Rural Roads and other Infrastructure, Sri Lanka |  
Green Building Council of Sri Lanka

Ms Chandula De Zoysa  
University of Peradeniya, Sri Lanka

Ms Sonali Abeysinghe  
University of Peradeniya, Sri Lanka

Professor Dilanthi Amaratunga  
Global Disaster Resilience Centre, University of Huddersfield, UK

Professor Richard Haigh  
Global Disaster Resilience Centre, University of Huddersfield, UK

Mr Thisara Perera  
Global Disaster Resilience Centre, University of Huddersfield, UK

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## Suggested citation

Dissanayake, R., De Zoysa, C., Abeysinghe, S., Amaratunga, D., High, R. & Perera, T. (2022), Briefing Paper: Integrating pandemic, tsunami, and other multi-hazard preparedness into urban planning in Sri Lanka: Ministry of Rural Roads and other Infrastructure, Sri Lanka

## Acknowledgement

This project is funded by the UK Research and Innovation through the UK Government's Global Challenges Research Fund (GCRF) and the Newton Fund [grant number EP/V026038/1]. UK Research and Innovation accept no liability, financial or otherwise, for expenditure or liability arising from the research funded by the grant, except as set out in the Terms and Conditions or otherwise agreed in writing.

## Key Findings

- Hard engineering measures and nature-based solutions to improve pandemic, tsunami and multi-hazard preparedness are moderately well integrated into existing urban planning frameworks in Sri Lanka.
- Other important aspects of pandemic, tsunami and multi-hazard preparedness, including a multi-hazard perspective, spatial planning, communities and key stakeholder groups, resilience thinking, and soft engineering measures, are not well integrated into existing urban planning frameworks.
- Constraints to mainstreaming disaster risk reduction into urban planning at the national to local levels include the capacity of local authorities, political influence on law enforcement, a lack of enforcement mechanisms, the attitudes and mindset of the general public, and a lack of single code or framework that comprises all disaster risk reduction elements.

## Context to the study

Coastal cities often suffer from extreme natural hazards such as sea level rise, coastal storms, and heavy rains. Among them, tsunamis occur infrequently, but are one of the most potentially devastating hazards faced by coastal communities. This is due to their unpredictable nature and the high impact caused by a single event. For example, the 2004 Indian Ocean Tsunami affected 15 countries and Sri Lanka was greatly affected by it. In Sri Lanka, the 2004 tsunami accounted for 35,399 fatalities, 114,069 damaged or destroyed houses and 480,000 human displacements. It is currently ranked sixth globally in terms of damages from tsunamis. Moreover, the event accounts for the greatest percentage (nearly 0.2% from its population) of loss of lives and the greatest economic damage from a disaster in Sri Lanka's recent history. In response, Sri Lanka was compelled to build back better from the lessons learnt. Tsunamis, along with heavy winds and other coastal hazards, have proven to cause cascading impacts to coastal communities in Sri Lanka.

Despite the ongoing threat posed by such hazards, Sri Lankan legal frameworks and urban planning guidelines appear to lack the necessary regulations to address tsunami and other multi-hazard threats. They also fail to adequately support resilience building efforts and to reduce disaster risk. Also, with the recent COVID-19 pandemic, which affected all communities in the country, guidelines for coastal urban planning need to deepen the integration of pandemic and multi-hazard aspects. In this context, a review of existing guidelines and identification of gaps are vital to plan for the development of more resilient coastal cities in Sri Lanka.

This brief presents some key findings of an investigation carried out to identify the current status of tsunami and multi-hazard preparedness in the context of urban planning within Sri Lanka.

## Research Overview

This research work has been conducted as part of the global study funded by the Global Challenges Research Fund (GCRF) and the University of Huddersfield, UK. This broader study is based on two specific objectives.

1. The integration of COVID-19, pandemic and biological hazard preparedness as part of multi-hazard early warning
2. Mainstreaming tsunami, biological and multi-hazard preparedness into urban planning for coastal regions

The partners of the project include: University of Huddersfield, UK (Lead); Disaster Management Centre, Sri Lanka; Ministry of Health; University of Colombo; University of Peradeniya; University of Moratuwa; State Ministry of Urban Development, Sri Lanka; Federation of Local Government Authorities, Sri Lanka; Intergovernmental Oceanographic Commission (IOC) of UNESCO, Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS); Chamber of Commerce, Sri Lanka; Bandung Institute of Technology, Indonesia; Asian Disaster Preparedness Centre (ADPC), Thailand; United Nations Office for Disaster Risk Reduction (UNDRR).

For the Sri Lankan phase of the study, data collection was carried out by researchers from the Department of Civil Engineering, University of Peradeniya during the period between May 2021 and March 2022. This policy brief describes the findings from this work. The findings will also inform the wider international research project.

The data collection process was carried out in two parts and covered the following:

- Reviewing the state of the art on urban planning for tsunami and multihazard resilience in the Sri Lankan context
- Investigating expert opinion on the current level of adaptation to tsunami and multi hazard resilience concepts in Sri Lankan urban planning

In the first phase, a literature survey was carried out in the form of a systematic review. First, urban planning techniques, potential strategies to reduce tsunami risk and suggested strategies for future urban planning were analysed. Then, six urban planning frameworks in Sri Lanka were reviewed to determine the extent to which they address these techniques and strategies from the literature. The frameworks reviewed by the team were:

1. Urban Development Authority (UDA) Frameworks and Guidelines
2. National Building and Research Organization (NBRO) Guidelines
3. Guidelines of Society of Structural Engineers Sri Lanka
4. Coastal Conservation Act and Coastal Zone Management Plan
5. Guidelines of National Housing Development Authority, Sri Lanka
6. GreenSL Rating Systems

A comparison between the potential strategies and actual frameworks was carried out to highlight the prevailing gaps in coastal city planning in Sri Lanka.

In the second phase, twelve in-depth expert interviews were carried out to identify the actual context in Sri Lanka regarding the integration of tsunami and multi-hazard resilience in urban planning, and to understand the barriers that might be preventing their adoption. The interviews were supported by officials from the relevant authorities of Sri Lanka, including the Disaster Management Centre, Urban Development Authority, and National Building and Research Organization. Respondents also included experts in the fields of disaster management, town and country planning, civil engineering, architecture, green building, and building services.

The key findings from the interviews were validated through a focus group discussion. A final gap analysis was undertaken using research findings and the validated interview findings.

## Results and Recommendations

The state-of-the-art review identified seven key aspects to be investigated through the research. Findings and recommendations under each theme are listed below.

1. Multi-hazard aspect and Covid 19
  - No Sri Lankan framework/law has incorporated pandemic preparedness into planning in the present context but it should be incorporated in future planning.
  - Multi-hazard aspects have not been adequately considered in the present frameworks. Pandemic preparedness measures can be incorporated and existing strategies in the frameworks can be modified to suit multi-hazard scenarios.
2. Spatial Planning
  - The Buffer zone regulation should always be applied. Better law enforcement is needed.
  - Remaining land should be extensively designed with features like public open and green spaces, as well as making use of the existing topographical features.

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3. Communities and Key Stakeholder groups
  - Public consultation is currently hindered by political influence.
  - No knowledge-sharing platforms are available.
  - Local authority officials are not competent / equipped and motivated enough.
  - Attitude development of both Local Authority officials and the public is required.
4. Resilience Thinking
  - A drastic change should happen in the coming years with better resilience thinking.
  - Attitude development is a key aspect to achieving resilience and implementing concepts such as build back better, which is currently limited to main city development projects.
5. Soft Engineering Measures
  - Landscape architecture should be incorporated into city planning, not only building architecture.
  - Coastal erosion control regulations should be strictly monitored.
  - Indigenous knowledge plays a major role and should be incorporated into practices.
6. Hard Engineering Measures
  - Sri Lanka does not have an integrated building code.
  - Several frameworks / guidelines will not serve the purpose.
  - Sri Lanka does not need many coastal protection structures due to cost constraints, but hazard resilient building construction should be given priority.
7. Nature Based Measures
  - Existing nature-based solutions / natural forest and vegetation cover should be protected.
  - Novel nature-based measures can be time consuming and not meet expectations of the public. Hence attitude development should be a first step.
  - Protection of coral reefs / and erosion control measures can be implemented and monitored.

Apart from the above results and recommendations, Sri Lankan Law enforcement was found to be very weak and often influenced by politicians. Therefore, law enforcement is not adequately happening at Local Authority / Unitary Development Authority levels. It is recommended to have a national level organization who forms the regulations and takes control, while also having responsibility for implementing a proper monitoring mechanism.

The following represents a potential pathway to mainstreaming tsunami and multi-hazard preparedness into urban planning in Sri Lanka:

