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ScienceDirect

Procedia Engineering 212 (2018) 683–690

Procedia Engineering

www.elsevier.com/locate/procedia

7th International Conference on Building Resilience; Using scientific knowledge to inform policy and practice in disaster risk reduction, ICBR2017, 27 – 29 November 2017, Bangkok, Thailand

Coastal community resilience level of Tsunami prone area : a case study in Sri Lanka.

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Abstract

In the history of Sri Lanka, the Indian Ocean Tsunami which occurred on 26th December 2004 could be considered a major natural disaster with catastrophic consequences. The damage from Tsunami in Sri Lanka was so widespread unlike for many other countries. The main objective of the study is to investigate the current Tsunami resilience level and address the resilience gap by providing feasible recommendations thus building a resilient community to Tsunami. The study was carried out among hundred Tsunami affected families across five highly affected *Grama Niladhari* divisions in Panadura Divisional Secretariat division. These were selected based on convenience sampling technique. Data was collected from both primary and secondary information sources using a questionnaire survey with a scale of 0-5 where five represents "excellent" and zero is "condition absent". The data was quantitatively analyzed under a framework which combines eight significant resilience elements; governance, society and economy, resource management, land use and structural design, risk knowledge, warning and evacuation, emergency response and disaster recovery. The results highlighted that coastal community resilience to Tsunami was around medium level (2.5) in most dimensions. The highest (2.4) and lowest (1.3) scores were recorded by risk knowledge and society and economy respectively, out of all resilience elements. Further the current resilience level of the community was recognized as 40% and there exists a 60% gap to achieve the ideal condition. Therefore, this should be taken into consideration to improve resilience for all dimensions of the resilience framework by the relevant authorities of the government.

Peer-review under responsibility of the scientific committee of the 7th International Conference on Building Resilience.

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Peer-review under responsibility of the scientific committee of the 7th International Conference on Building Resilience
10.1016/j.proeng.2018.01.088

Keywords: Resilience; Resilience Elements; Resilience Gap; Tsunami

1. Introduction

On 26th December 2004, Sri Lanka was devastated by a Tsunami triggered by a 9.2 magnitude earthquake off the coast of Sumatra. Sri Lanka which had no previous Tsunami experience was completely unprepared for the disaster. No warning was given, no mitigation measures were in place, and the Tsunami caused huge loss of life and extensive damage to coastal infrastructure and the environment. Many coastal areas, especially along the South and Eastern coasts of Sri Lanka, were heavily affected by 2004 Indian Ocean Tsunami, which killed between 35,000 and 40,000 people. The direct economic losses to physical infrastructures, such as houses, roads or railway, in Sri Lanka alone, were estimated to be 700 million United States Dollars (USD) [1].The sea water intrusion by the Tsunami caused damage to coastal vegetation, extensive soil erosion and contaminated inland water bodies. The total damage due to the Tsunami has been estimated to be more than US $ 900 million, with a large percentage of damage concentrated in the housing, tourist, fisheries and transport sectors [2].

Today, millions of people rely on proximity to the coast for their livelihoods [3]. One reason for this attractiveness includes the provision of favourable opportunities for livelihoods, economic activities, and trade. The population in the near-coast zone has increased from 0.4 billion (26% of total population) in 1900 to 1.9 billion (28%) in 2010. It is projected that by 2050 this zone will be inhabited by over 2.4 billion people (26%), of which around 80% will live in cities [4]. Coastal communities around the world are facing increasing threats from coastal hazards, due partly to global climate change and partly to the increase in anthropologic activities along the coasts [5].

Resilience, especially the concept of community resilience is becoming the de facto framework for enhancing community-level disaster preparedness, response, and recovery in the short term, and climate change adaptation in the longer term [6].Economic conditions and social capital within a community prior to sudden disruptions dictate the ability of community residents and local decision makers to garner necessary intergovernmental resources and foster leadership to coordinate effective rapid response. Such community capacity has been shown to be central to minimizing disaster losses [7].The capacity of coastal ecosystems to regenerate after disasters and to continue to produce resources and services for human livelihoods can no longer be taken for granted. Rather, socio-ecological resilience must be understood at broader scales and actively managed and nurtured [8].Building strong, healthy and resilient communities capable of withstanding and recovering from natural disasters is the most effective way to safeguard a community's future. To do so requires an understanding of the resilient characteristics of a community, and to identify areas of strength and weaknesses to facilitate communities as they prepare to cope and respond to natural disasters [9].

Coastal Community Resilience (CCR) is the capacity of a community to adapt to and influence the course of environmental, social, and economic change. CCR assessment studies can be useful to characterize the resilience status and trends at the community level and can identify strengths, weakness, and gaps in resilience capacity, raise awareness and broadly assess community capacity and vulnerability to coastal hazards and develop adaptive preparedness and mitigation measures [10].

The coastal lifestyle of people in Sri Lanka contributed to the high death tolls. Therefore this study was carried out with the objectives of investigating the current Tsunami resilience level, to identify the gap between the prevailing and the ideal resilient community, to recognize resilience elements further need to be developed and also to find out practical solutions to improve community resilience in coastal areas for Tsunami in future.

The coastal community resilience (CCR) framework developed as part of the U.S. Indian Ocean Tsunami Warning System (US IOTWS) Program can serve as a unifying framework to evaluate status of resilience and to identify actions to enhance resilience in coastal communities [11].This paper applies the approach to measure community resilience to coastal hazards where eight elements of resilience were assessed. Those were considered essential to