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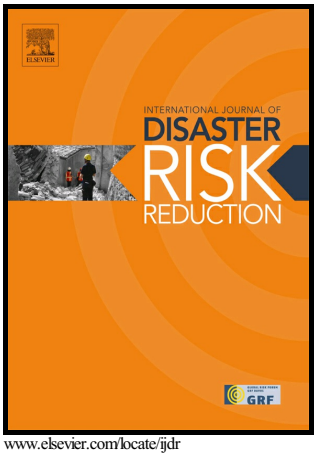


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# Assessment of the Co-Benefits of Structures in Coastal Areas for Tsunami Mitigation and Improving Community Resilience in Sri Lanka

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## Abstract

A quantitative analysis of the co-benefits that structures in coastal communities can have to enhance tsunami disaster resilience is essential to identify the most economical disaster mitigation measures. This research assesses the contribution of a revetment and a coastal railway embankment for enhancing the resilience against tsunamis of two coastal villages (Dimbuldooa and Wenamulla) along the southwestern coast of Sri Lanka. The tsunami mitigation co-benefit of those structures has been presented in monetary terms by equating it to the expected amount of damage that they could prevent from happening. This assessment was carried out through numerical simulations of possible tsunamis which can result from tsunamigenic earthquakes with return periods of between 100 and 1500 years originating in the Andaman zone of the Sunda subduction zone. The results reveal that both types of existing structures have a tsunami mitigation co-beneficial function. However, they might require slight upgrading in order to ensure that they do not suffer significant damage and collapse during the successive waves that form part of a tsunami.

*Keywords: Co-benefits, Tsunamis, Structures in coastal areas, Sri Lanka*

## 1. Introduction

Many coastal areas, especially along the South and Eastern coasts of Sri Lanka, were heavily affected by 2004 Indian Ocean Tsunami (IOT), which killed between 35,000 and 40,000 people [1,2]. 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]. After this event, countries bordering the Indian Ocean (including Sri Lanka) decided to establish a tsunami warning system under The United Nations Educational,