

Assessment of 2004 Tsunami Damage on Coastal Habitats in the Galle District

Wijeratne, S.

Department of Geography, University of Ruhuna, Matara

Introduction

The coastline of Galle district from Weligama to Unawatuna is a very important area both socio economically and environmentally. Its natural environment is the result of different kinds of coastal habitats such as, coral reefs, lagoons, estuaries, mangroves, sea grass beds etc. These were originated by the influence of marine, fluvial and fluvio marine processes. Not only is there an esthetic value of the area, but influenced the establishment of specific socio economic activities. They also support the control of natural disasters to some extent, i.e. floods, storm waves etc. However, after the 2004 tsunami disaster, coastal habitats in the area were drastically damaged leading to the imbalance of the coastal systems. So, this research will be useful to provide information for disaster management planning or management strategies and to give a basic understanding into the benefits of maintaining natural coastal habitats for protective functions.

Research Problem

The tsunami disaster that occurred on December 26, 2004, in the Indian Ocean was a grave natural disaster that affected coastal habitats in the study area. The coastal habitats have a decisive role in sustaining the natural resources and existing coastal environment but most of these coastal habitats were highly damaged or changed by the tsunami disaster. Therefore, this study aims to examine how the tsunami waves impacted the coastal habitats.

Objectives of the Study

The goal of this study was to examine how the tsunami waves impacted the coastal habitats in the Galle District. Therefore, the specific objectives of this research are as follows:

- to identify and map the coastal habitats which were affected by the tsunami waves.

- to assess damages and changes of tsunami affected coastal habitats.
- to analyze physical and human factors that affected the spatial changes caused by the tsunami disaster.

Methodology

This study was carried out on the basis of the analysis of satellite images of 2004 and 2005. The magnitude of affected habitats and their changes were identified through the comparison of satellite images before 2004 and after the tsunami in 2005. Arc view GIS software was used for hazardous mapping that can be used to determine the damages and changes of coastal habitats. In addition, questionnaire survey, target group discussions and field observations were used for data collection.

Key Findings

The coastal area of Galle district consists of various kinds of habitats originated by marine, fluvial and fluvio-marine processes. They are coral reefs, mangroves, sea grass beds, lagoons and estuaries. Most of these habitats were considerably damaged or changed by the 2004 tsunami disaster. Damaged coral reefs were observed at Mirissa, Weligama, Kapparatota, Unawatuna and Rumassala. 75 percent of coral reefs were damaged by rubble or debris movement scoring the reefs and sediment deposits from the land. Extensive damages of mangroves are reported at river mouths and estuaries in specific areas of Polwatumodara, Gin Ganga, Koggala Oya and Ratgama Lagoon. 70 percent of mangroves were severely damaged. 80 percent of the lagoons and estuaries of Polwatumodara, Kapparatota, and Koggala was also damaged by sea water encroachment and debris depositions. Patches of important sea grass beds have also been damaged with debris and 75 percent of them washed out by tsunami waves. In addition, more than 80 percent of these habitats were changed by shrinking and spreading estuaries, eroding the coast and blocking the estuaries.

Conclusion

According to this study, very extensive damage has occurred on coastal vegetation, river and lagoon outfalls. Mangroves are highly damaged at some places on river mouths and estuaries. But, some places are moderate or low. The spatial changes of damage of the area can be different from place to

place, influenced by various geographical factors such as, coastal location, shape, relief, soil, drainage, coastal engineering structures and vegetation. Accordingly, Galle bay beach was the highest impacted area in the study.

The coastal habitats which will be affected in future tsunami disasters can be protected by special attention from planners and policy makers to minimize the future tsunami impacts by implementing coastal resource management plans. Starting integrated community based management planning for conservation of coastal habitats is recommended. Conservation of habitats that are high risk and construction of coastal engineering structures in the high risky areas of coastal erosion and growing of greenbelt parallel to the coastline is also suggested.

Keywords: Changes; Damages; Habitats; Magnitudes; Tsunami

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The post Tsunami Rapid Environment Assessment proceed in Sri Lanka. Ministry of environment and Natural Resources, united Nations Environment program.