

## ASSESSMENT OF THE MANGROVE FOREST CHANGES ALONG THE PAHANG COAST USING REMOTE SENSING AND GIS TECHNOLOGY

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**Abstract:** Mangrove forests provide vital ecosystem services to the surrounding communities. Despite their importance, development in coastal areas impose a direct impact on reducing area cover. It is an important topic to understand the effect of coastal development on the carbon storing capacity of mangroves. This study aimed to examine the rate of erosion and accretion and estimate the amount of carbon stock change along the Cherating - Pekan coastline in Pahang, Malaysia. The rate of erosion and accretion from 2006 to 2014 was determined by using SPOT 5 satellite images. The normalised difference vegetation index (NDVI) was modelled to estimate carbon stock specific to the mangrove forest. Results from the study reveal that mangroves grew at only four locations along the 87 km Cherating–Pekan shoreline. Difference analyses unveil that the coastline had undergone erosion and accretion processes, with Cherating River and Penor River showing the most rapid change of 10.31 and 18.17 m/year, respectively, using the end point rate (EPR) method. Ular River and Kuantan River have been identified as areas prone to moderate erosion. The total carbon stock of mangroves in 2006 and 2014 was estimated at 499.78 and 520.48 t/ha, respectively. This finding provides the baseline information which would be helpful and should be considered when planning the future development as well as in the management of resources along the Pahang coastline.

Keywords: Carbon stock, erosion and accretion, NDVI, climate change, GIS.

### Introduction

Mangroves are valuable, unique in structure, and have a special ecological function while they are also ecologically vulnerable to environmental changes. Mangrove ecosystem is an important natural resource that provides multiple ecosystem services for the local communities. A comprehensive assessment of natural resources can provide important information required for the planning, management, and conservation of mangroves. Amir (2018) asserted that there is a need to improve the weaknesses in the planning, approval, and implementation processes of mangrove-related projects to

ensure the sustainability of their resources. Mangrove forests provide a wide range of products and services such as food sources for the coastal community, nursery habitats, biodiversity conservation, water filtration, shoreline stabilisation, storm protection, flood control, recreation, and tourism (McIvor *et al.*, 2012; Rahman *et al.*, 2013; Spalding *et al.*, 2014; Sandilyan & Kathiresan, 2015; Giri *et al.*, 2015).

Mangrove protection is increasingly believed to be crucial in terms of climate change mitigation and adaptation by virtue of the large amount of carbon available in the above and