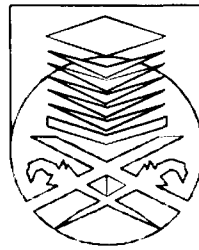


**MULTI-CRITERIA EVALUATION APPROACH TO
COASTAL VULNERABILITY INDEX DEVELOPMENT
AT PENANG COAST**

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ABSTRACT

Most coastal regions throughout the world are suffering because of climate change. Sea Level Rise (SLR) has exposed coastal regions to a variety of risks, including inundation and erosion, which have a negative impact on coastal areas. The main objective of this research is to analyze the Coastal Vulnerability Index (CVI) approaches from Tanjung Tokong, Tanjung Bungah, Batu Ferringhi, Teluk Bahang, and Monkey Beach on the Penang coast. This CVI includes six parameter that is coastal geomorphology, coastal slope, rate of erosion and accretion, rate of sea level rise, mean tidal range, and land use land cover (LULC). Based on the rating values of the following parameter, the vulnerability levels for five management units along the Penang coast are grouped into five vulnerability rankings: very low, low, moderate, high, and very high. According to the findings, Batu Ferringhi and Tanjung Tokong was classified as having a very high and high vulnerability rating of 90% and 70%, respectively. Meanwhile, the Monkey Beach and Teluk Bahang coastline is only 10% and 30% which is very low and low vulnerable, respectively. Other than that, CVI values of 50% signify the moderate vulnerability rate category for Tanjung Bungah. Finally, this study presents a CVI map of Penang shoreline that decision makers and relevant authorities may use to implement mitigation and adaptation policies to address the implications of climate change on coastal regions.

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CHAPTER 1

INTRODUCTION

1.1 Background Study

Sea-level rise is a major consequence of climate change, it has become a significant concern for coastal communities around the world. The physical, chemical, biological, and human components of coastal environments are diverse and complex, making them susceptible to a variety of changes. There are many issues happened in coastal area such as climate change and coastal development. As a result of climate change, such as harsh weather and sea level rise, coastal communities are particularly vulnerable (Rumahorbo,2022). The destruction of the coastal infrastructure already in place has an impact on the socioeconomic factor and livelihood in coastal communities.

Coastal vulnerability assessments are crucial tools for identifying regions at risk from the effects of sea level rise and for developing adaptive risk management solutions. Assessments of vulnerability sometimes entail determining how exposed, sensitive, and adaptable a coastal system or community is to sea-level rise. Sea levels are predicted to rise between 18 to 66 cm in the 21st century, according to research published in the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) in 2014 (Mohd et al., 2019).

Surveying technique such remote sensing had the capability of obtaining observation or monitoring with the high precision for large area especially in dangerous or hazardous area. The research methodology for this study includes remote sensing heavily. To gather information on coastal geomorphology, such as the structure and shape of the coastal landforms, remote sensing will be used in the context of this study