# Index based assessment of coastal vulnerability along the West Coast of Peninsular Malaysia: Evidence of climate change and anthropogenic impacts

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**Abstract** Coastal areas are increasingly threatened by the combined effects of climate change and human activities. This study investigates coastal vulnerability along the West Coast of Peninsular Malaysia (WCPM) by applying a comprehensive Coastal Vulnerability Index (CVI) that integrates multiple physical and socio-economic variables. A total of



results showed that districts in the northern region exhibit very high vulnerability due to the combination of sensitive environmental features and intense human pressures, particularly rapid infrastructure development. In contrast, southern districts tend to have lower vulnerability, supported by natural buffers and relatively less disturbance. A two-way hierarchical heatmap provided insights into regional groupings and co-occurring vulnerability drivers. The resulting risk map serves as a practical decision-making tool to support adaptive coastal planning. It can help stakeholders and policymakers prioritize areas for intervention, implement zoning regulations and adopt naturebased solutions to enhance resilience against future coastal hazards.

**Keywords** **Author Keywords:** Coastal vulnerability index (CVI); Climate change; Anthropogenic impacts; Peninsular Malaysia; Geospatial analysis

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