LANDSLIDE RISK ASSESSEMENT IN HULU LANGAT, SELANGOR USING WEIGHTED OVERLAY METHOD

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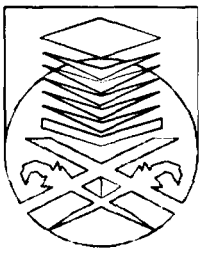

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ABSTRACT

Landslide susceptibility mapping is a crucial component in disaster risk management and urban planning, especially in regions prone to such natural disasters. This research employs the weight overlay method to construct an intricate Landslide Susceptibility Map (LSM) for Hulu Langat, Selangor, by integrating various topographical and environmental factors. The study area, characterized by its hilly terrain and frequent landslide occurrences, presents an ideal setting for the application of Light Detection and Ranging (LiDAR) technology. This study aims to utilize DEM data to advance the precision of current landslide risk assessments significantly. The research methodology encompasses the collection of high-resolution DEM data, analysis of landslide conditioning factors such as slope, aspect, curvature, distance from streams, and roads and the development of a detailed LSM. The study area's topography, hydrology, vegetation, land use, and climatic conditions are methodically examined to identify areas at risk of landslides. In addition, the study leverages Geographic Information System (GIS) tools for data processing and analysis, with ArcMap 10.8 being the primary software used. Findings from this research are anticipated to enrich the accuracy of landslide hazard mapping, providing valuable insights for emergency response planning, and informing mitigation efforts. The LSM offers a nuanced understanding of landslide dynamics, informing more resilient and sustainable management of the natural landscape in Hulu Langat. The results highlight the need for continuous monitoring and updating of the LSM to account for environmental changes and anthropogenic activities.

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CHAPTER 1

INTRODUCTION

1.1 Background Study

Landslides imperil lives and create significant economical devastation across the globe. Significant amounts are invested internationally to minimise the impacts of landslides (Kjekstad & Highland, 2009). Landslide-related losses are predicted to increase as the population and urban land usage develop. In Potential landslide sites must be identified and reported in order to limit economic and human losses. Smithson, 2024 characterised landslide susceptibility mapping (LSM) as a vital component in disaster management and mitigation. LSM approaches have advanced significantly over the preceding several decades, with various strategies presented and used by numerous researchers. Each strategy has its own set of benefits and cons. Landslides are triggered by a multiplicity of reasons, making them difficult to evaluate and forecast.

Some of the most critical aspects to consider for LSM are topography, geomorphology, geology, and hydrological conditions. However, the data-sets indicating particular conditioning elements (e.g., slope, geology, aspect, terrain ruggedness, vegetation index, distance to rivers, distance to highways, and so on) included in the LSM analysis are usually discordant among research. The source and quality of the data might also vary substantially.

High-resolution digital elevation models (DEMs) have been more significant in landslide investigations with the development of Lidar technology (Kasai et al. 2009 as quoted in Mahalingam et al., 2016). Jaboyedoff, Choffet, et al. (2012) have shown the utility of lidar digital elevation models in landslide research and estimate that the utilisation of lidar data for landslide studies will expand dramatically over the next