

Landslide Susceptibility Maps to Support Urban Landuse Decision-Making: Case Study of the Langat Sub-Basin, Selangor

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The integration of multi-dimensional information using Geographical Information System (GIS) is useful to support landuse decision-making in urban areas. The development of a landslide susceptibility map using GIS will serve as a powerful tool to support informed decision-making to reduce the risk of landslides through appropriate landuse planning. The effectiveness of such a tool would depend on the scale of the information, which should ideally match the needs of the decision-maker. Built-up areas in the Langat sub-basin have expanded rapidly since the 1990s. Over the past two decades, landslides have been widely reported in such areas. The study employed four main methods. These include compilation of landslide incidences to establish a disaster inventory, content analysis to identify the criteria that contributes to landslide occurrences, expert elicitation to provide weightage of the criteria and GIS overlay analysis to process and derive thematic maps. The landslide inventory reveals that landslides are most common in Mukim Kajang, which has the highest expansion of built-up areas. The contributing

criteria to landslides were categorized as topographic factors, geological structures and geomorphologic features, and then weighted according to expert input. The Landslide Susceptibility Map for Langat sub-basin was derived from the spatial integration of the weighted multi-dimensional input into the GIS environment. Areas with low susceptibility of landslide dominates at 49.3 km² followed by high susceptibility at 212.7 km² which was the highest in the sub-basin. Most of the low susceptibility areas are located in flat areas at the center of sub-basin adjacent to the river. The high susceptibility areas covered almost the entire of Mukim Kajang and most of Mukim Cheras which have large tracts of built-up areas. About 48% of past landslides have occurred within these areas. Spatially explicit data at the relevant scale is essential to provide better information to facilitate and expedite the decision-making process for reducing landslide risks. GIS serves as a useful decision support tool in managing disasters in built-up areas and the method employed in this study can be expanded to other regions.