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Weighted Linear Combination Technique for Landslide Susceptibility Assessment in the Lower Northern Thailand

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Landslides are a serious geological disaster common to almost every mountainous region in the Lower Northern Thailand. Although landslides typically occur without direct warning, comprehensive study on the understanding of their behavior by systematically collecting the statistical data including current information on environmental status is capable of receiving early warning and predicting the further natural disaster phenomenon to minimize landslide hazards and identify where potential landslides can occur. The May 2006 landslide-debris flow at Lablai district, triggered by unusually extremely heavy rain, has seriously damaged both the life and properties. The major aim of this study is to assess the landslide susceptibility for deriving landslide susceptibility map of in Lablai district, Uttaradit province, Lower Northern Thailand using a geographic information system (GIS) based weighted linear combination (WLC) model. The information on the past landslide in May 2006 derives from a landslide inventory map obtained by detailed field surveys and by analysis of SPOT-5 XS images. The degree of land suitability for landslide was determined using a range of geo-pedological, topographical, and climatic factors. The final result of landslide susceptibility map was classified into five classes, i.e., very high, high, moderate, low susceptibility, and area of high slope stability. The mountainous environment of Lablai district was mostly high susceptible area to landslide. Results indicate that topographical factors played the key factor contributing to the landslide phenomenon, whereas, the maximum daily rainfall was the triggering variable influencing landslide. Since landslide behavior is varies from place to place, forecasting landslides are concerning difficult to assess the precision and accuracy of the model. Sufficient information on soil properties, lithology, and land management are needed at micro level. The output susceptibility map can provide significant information for providing an appropriate prevention and mitigation strategies in order to minimize the destructive impact of landslide.

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