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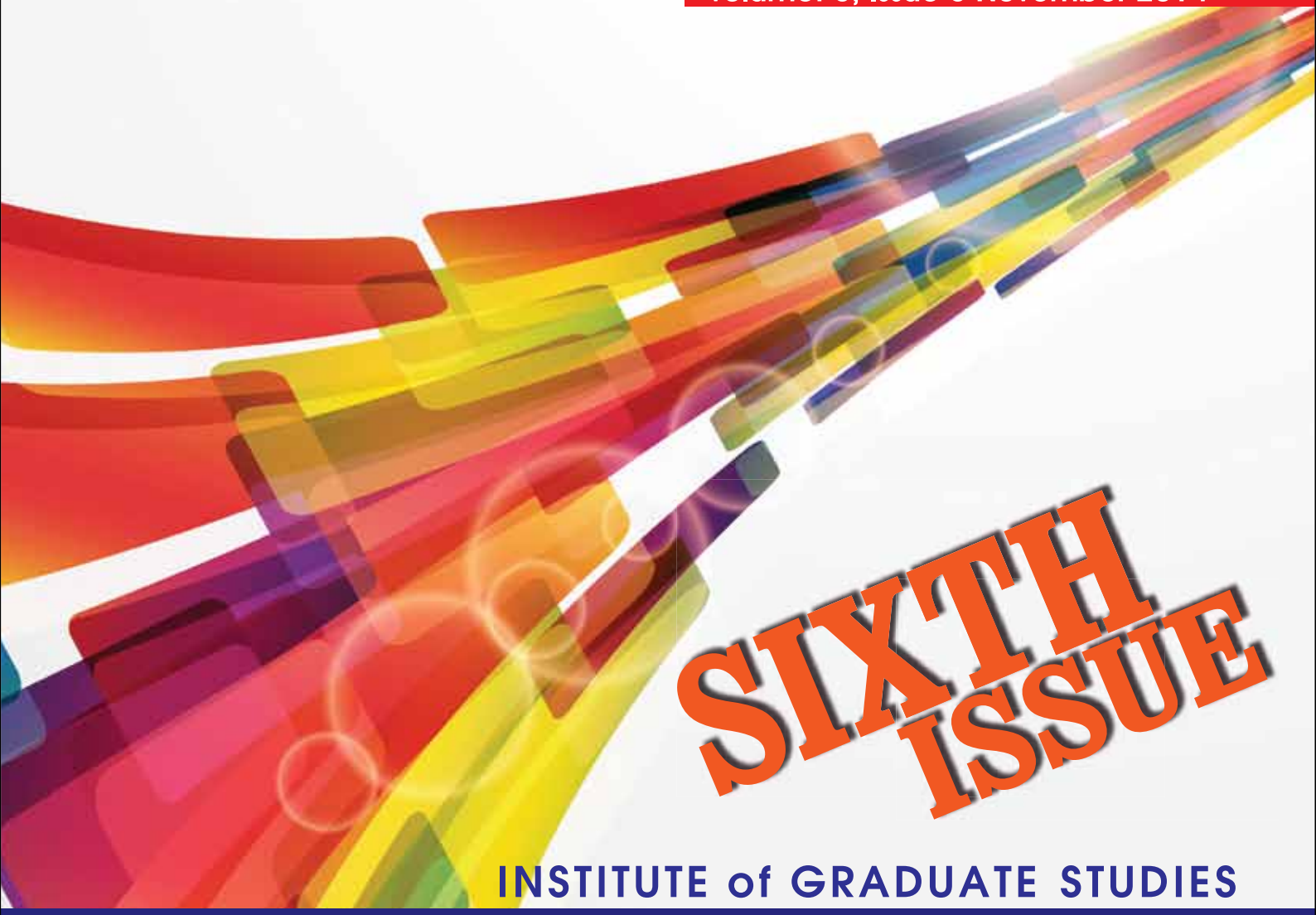

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Title :
Geographical Information System (Gis) Based Multi-Criteria Decision Making (Mcdm) For Landslide Hazard Zonation : A Case Study Of Ampang Jaya Municipal Council

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Malaysia has undergone rapid development in many sectors. As the impact of fast economic growth, there will be an increase in land demand for sectors such as industries and housing area. The limitation of flat ground areas especially in urban areas such as Kuala Lumpur and Selangor has increased the demand for other alternatives such as in hilly areas. Landslides have caused large numbers of damages and losses especially in hilly development areas. Major landslide incidence that took place in Highland Tower, Ampang in 1993 was definitely an eye opener for the federal government and local authorities to properly manage hillslope development especially in high risk areas. Although there are various methods and criteria used to determine landslide hazard zones, it is not clear which criteria and models are appropriate to be used in the Malaysian environment. The aim of this study is to explore the potential integration between Geographical Information System (GIS) and Multi-criteria Decision Making (MCDM) to model landslide hazard zonation. The objectives are: i) to identify the different techniques, models and criteria used to map landslide hazard zones, ii) to propose the best criteria to predict landslides hazard zones, iii) to develop/propose new models to predict landslides hazard zones, iv) to evaluate the accuracy of the developed models, and v) to generate landslide hazard zonation maps of the study areas. This study covers areas under the administration of Ampang Jaya Municipal Council (MPAJ) and

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Hulu Langat. Although there are various other methods such as deterministic, heuristic and statistical methods to map a landslide hazard zone, only heuristic method was considered in this study. Six (6) techniques in MCDM were considered to determine the weights for each of the criteria used. Twelve (12) criteria namely slope, elevation, aspect, drainage density, proximity to river, proximity to the road, lithology, geomorphology, soil type, land use, rainfall and flow accumulation were used in this research. Expert opinions from different agencies were gained to determine the criteria and score for each of the proposed criteria. Finally, nine (9) models were developed based on different criteria and techniques. Accuracies of different models were obtained by comparing the predicted results with the landslide historical data using two (2) methods. Different results were obtained when different methods and different models were used. Using Method 1, result for Model 1 (rank sum), Model 2 (rank reciprocal), Model 4 (rating) and Model 7 (pairwise comparison) were identified to have higher accuracies (i.e. 66.7%, 60.6%, 66.7% and 60% respectively). The accuracies of other developed models which are Model 3 (rank exponential), Model 5 (Analytical Hierarchical Process), Model 6 (pairwise comparison), Model 8 (Analytical Hierarchical Process) and Model 9 (Analytical Hierarchical Process) are 57.6%, 22.9%, 37.1%, 22.9% and 8.6% respectively. Using Method 2, accuracy for Model 1 is 97.1% and Model 2, Model 3 and Model 4 shows the same accuracies (i.e. 94.2%). The accuracies of Model 5, Model 6, Model 8, Model 9 and SINMAP are 94.2%, 80%, 97.1 %, 80%, 57.1% and 42.8% respectively. Relationship between criteria have indicated that there are four (4) important criteria namely slope, lithology, soil properties and geomorphology that need to be considered in mapping landslide hazard zones. Three (3) models (i.e. Models 1, 4 and 7) are used to generate the landslide hazard zones maps of Hulu Langat and the results have shown that the hazard zones match with the landslide scars of the study area. As a conclusion, integration of GIS and MCDM can be an important technique to predict and map landslide hazard zones.