

The impact of expert knowledge on natural hazard susceptibility assessment using spatial multi-criteria analysis

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Road and railway networks are one of the key factors to a country's economic growth. Inadequate infrastructural networks could be detrimental to a society if the transport between locations are hindered or delayed. Logistical hindrances can often be avoided whereas natural hindrances are more difficult to control. One natural hindrance that can have a severe adverse effect on both infrastructure and society is flooding. Intense and heavy rainfall events can trigger other natural hazards such as landslides and debris flow. Disruptions caused by landslides are similar to that of floods and increase the maintenance cost considerably. The effect on society by natural disasters is likely to increase due to a changed climate with increasing precipitation. Therefore, there is a need for risk prevention and mitigation of natural hazards. Determining susceptible areas and incorporating them in the decision process may reduce the infrastructural harm.

Spatial multi-criteria analysis (SMCA) is a part of decision analysis, which provides a set of procedures for analysing complex decision problems through a Geographic Information System (GIS). The objective and aim of this study was to evaluate the usefulness of expert judgements for inundation, landslide and debris flow susceptibility assessments through a SMCA approach using hydrological, geological and land use factors. The sensitivity of the SMCA model was tested in relation to each perspective and impact on the resulting susceptibility. A least cost path function was used to compare new alternative road lines with the existing ones. This comparison was undertaken to identify the resulting differences in the susceptibility assessments using expert judgements as well as historic incidences of flooding and landslides in order to discuss the usefulness of the model in road planning.