

## **Comparison between prediction capabilities of neural network and fuzzy logic techniques for L and slide susceptibility mapping.**

### **ABSTRACT**

Preparation of L and slide susceptibility maps is important for engineering geologists and geomorphologists. However, due to complex nature of L and slides, producing a reliable susceptibility map is not easy. In recent years, various data mining and soft computing techniques are getting popular for the prediction and classification of L and slide susceptibility and hazard mapping. This paper presents a comparative analysis of the prediction capabilities between the neural network and fuzzy logic model for L and slide susceptibility mapping in a geographic information system (GIS) environment. In the first stage, L and slide-related factors such as altitude, slope angle, slope aspect, distance to drainage, distance to road, lithology and normalized difference vegetation index (ndvi) were extracted from topographic and geology and soil maps. Secondly, L and slide locations were identified from the interpretation of aerial photographs, high resolution satellite imageries and extensive field surveys. Then L and slide-susceptibility maps were produced by the application of neural network and fuzzy logic approach using the aforementioned L and slide related factors. Finally, the results of the analyses were verified using the L and slide location data and compared with the neural network and fuzzy logic models. The validation results showed that the neural network model (accuracy is 88%) is better in prediction than fuzzy logic (accuracy is 84%) models. Results show that "gamma" operator ( $X = 0.9$ ) showed the best accuracy (84%) while "or" operator showed the worst accuracy (66%).

**Keyword:** ANN; Fuzzy; Landslide; Susceptibility; GIS; Remote sensing.