Susceptibility Assessment of Small, Shallow and Clustered Landslide in Malipo, southwest China

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Introduction

Susceptibility assessment of landslides over a large area depends on the basic spatial unit of mapping, usually using grid cell or slope unit. Both units are used in this study for the assessment of small shallow and clustered landslides in vegetated slopes in Malipo, southwest China. Information value (IV) model was used to generate landslide susceptibility assessment map and improved information value (IIV) model was used to determine whether the mapping unit with or without landslide. Eight factors, including slope angle, slope aspect, elevation, normalized difference vegetation Index (NDVI), Soil Moisture Content (SMC), distance to river and road were used as landslide influence factors. For prediction rate, the area under curve (AUC) values of the slope unit and grid cell were 0.803(IIV), 0.790(IV) and 0.699 respectively. Slope unit is more suitable than grid cell for assessing susceptibility of Small, Shallow and Cluster Landslide. Improved information value model can increase the accuracy of susceptibility assessment model for this characteristic landslide.

Data and Methods

Both Grid cell and Slope unit are used for the assessment of small shallow and clustered landslides in vegetated slopes in Malipo, southwest China.

- Google earth map on February 7, 2019 was used to interpret the position, boundary, and other information of the landslides.

- Field survey was carried out to verify uncertain landslide location and influence factors on the remote sensing images and measure moisture soil content.

- Soil moisture content (SMC) map was obtained by Kriging Interpolation methods based on the field measured soil moisture content of 48 sample points.
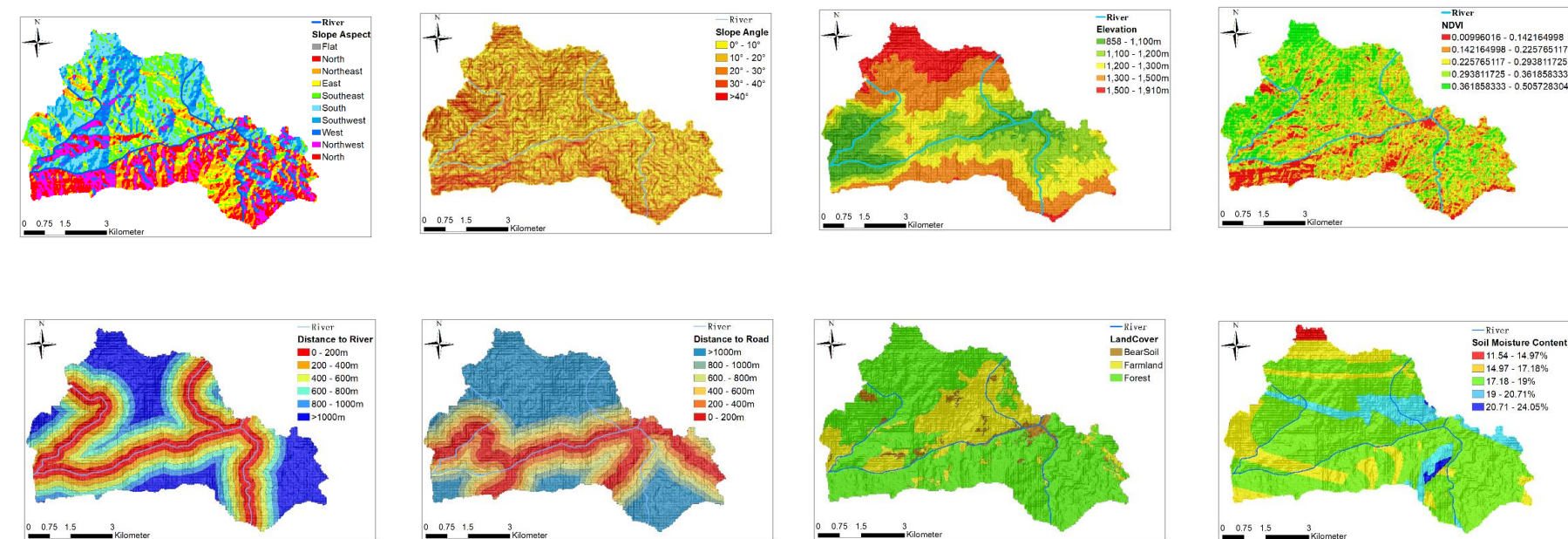
Information Value Model

- To obtain the contribution of each influence factor to the landslide events, information value model is used.

- We use two methods to determine whether the unit is a mapping unit with landslide and compare their accuracy. The first method is that the unit with more than or equal to one landslide events, it is landslide mapping unit (IV). Another method used the information value theory (IIV) to determine the properties of the unit.
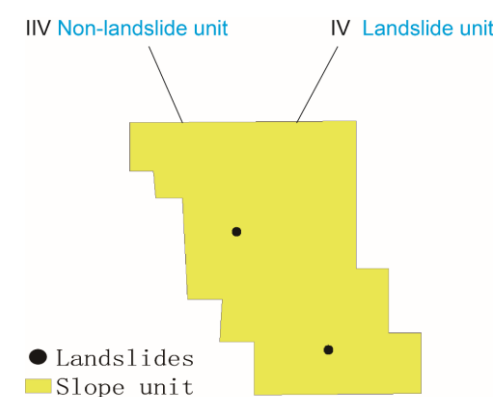
Landslide Influence Factors

Eight influence factors are selected for the landslides: slope angle, slope aspect, elevation, landcover, distance to river, distance to road, normalized difference vegetation Index (NDVI), soil moisture content (SMC)

Conclusions

- The AUC values of the slope unit and grid cell were 0.803(IIV), 0.790(IV) and 0.699 respectively.

- Slope unit is more suitable than grid cell for assessing susceptibility of Small, Shallow and Cluster Landslide. Improved information value model can increase the accuracy of susceptibility assessment model for this characteristic landslide.