

Spatial Analysis of Soil Erosion and its Correlation with Landslide Events: Case Study of Cipongkor, West Bandung District

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SUMMARY

There is a high potential for landslide hazards in the study area of Cipongkor, West Bandung District, Indonesia. Landslide occur due to the combination of many factors and various triggering events, one of those factors is extensive soil erosion leading to lower slope stability.

The objective of this study is to estimate annual soil loss and create a soil erosion potential map using Remote Sensing (RS) and Geographic Information Systems (GIS) based on the Revised Universal Soil Loss Equation (RUSLE)

Rainfall Index (R), Soil Erodibility Index (K), Topography Index (LS), and Land Cover Index (CP) are four basic factors used in RUSLE. The data are from various national and international sources, e.g. SRTM (USGS), Landuse (BIG-Geospatial Information Agency of Indonesia) and annual rainfall (The Meteorology, Climatology, and Geophysics). Index values were computed and represented as raster and vector layers for further processing of RUSLE using ArcGIS.

As a result the study area was categorized into five zones of soil erosion potential namely very high-, high-, moderate-, low-, and very low- soil erosion potential. The results showed that 45% (4115 ha) of the study area is facing very high soil erosion risk and 16% (1485 ha) has high soil erosion risk, while 14% (1243 ha) has moderate soil erosion risk. The area of low soil erosion risk is only 2% (168 ha) and very low soil erosion risk is 22% (2032 ha). The very high soil erosion risk zones are mainly located on the northwest, west, and southwest parts of the study area. High soil erosion potential is observed in combination with high LS values (up to 35%).

Dry fields are the major landcover type with very high soil erosion potential in combination with annual rainfall above 2500 mm. This study also compares the soil erosion potential with the

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occurrence of landslides by using the landslide location areas from field survey data. The comparison shows that the area with high soil erosion potential have also higher risk of landslide occurrence.

This research demonstrates that RS and GIS technologies are effective tools in modelling soil erosion potential and creating soil erosion potential maps, thus helping to implement soil conservation, landslide mitigation and watershed management measures in Cipongkor. Further researcher is necessary to characterize and understand the relationship between soil erosion potential and the occurrence of landslides in the study area

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