

KAJIAN DINAMIKA DAN KERAWANAN LONGSORLAHAN DI LERENG SELATAN GUNUNGAPI SLAMET

Oleh Dini Fadhilah Utami

21/480886/GE/09692

INTISARI

Data dari Badan Nasional Penanggulangan Bencana (BNPB) menunjukkan bencana longsorlahan di Jawa Tengah termasuk ke dalam kerawanan yang tinggi. Secara umum, kejadian longsorlahan sering dijumpai pada lahan yang telah mengalami intervensi antropogenik seperti perubahan tata guna lahan, pembangunan infrastruktur, atau aktivitas pertanian intensif. Dari data BNPB tersebut melalui studi ini akan mengidentifikasi area yang sudah mengalami intervensi dalam kaitannya dengan kejadian longsorlahan serta menilai kerawanan longsorlahan di Lereng Selatan Gunungapi Slamet berbasis dinamika longsorlahan.

Penelitian ini mengkaji dinamika longsorlahan melalui pengamatan lapangan dengan menilai tipologi, ukuran material, aktivitas, dan kondisi lahan, serta menganalisis kerawanan longsorlahan menggunakan metode *Frequency Ratio* (FR), *Spatial Multi Criteria Evaluation* (SMCE), dan uji akurasi ROC–AUC. Sembilan parameter yang digunakan meliputi kemiringan lereng, arah lereng, elevasi, bentuk lereng, curah hujan, TWI, jarak ke jalan, jarak ke sungai, dan penggunaan lahan. Data spasial diolah dengan QGIS untuk menghasilkan peta kerawanan longsorlahan yang selanjutnya diuji akurasinya menggunakan RStudio.

Penelitian ini menunjukkan bahwa di Lereng Selatan Gunungapi Slamet terjadi 11 kejadian longsorlahan pada musim kemarau (September 2024) dan meningkat menjadi 16 kejadian pada musim penghujan (Maret 2025), yang dipicu oleh curah hujan tinggi serta intervensi manusia berupa pemotongan lereng untuk pembangunan jalan. Hasil analisis kerawanan longsorlahan berupa sedang (9.100 ha). Hasil penelitian menegaskan bahwa faktor pengontrol paling dominan terhadap kerawanan longsorlahan di wilayah kajian adalah kemiringan lereng (*slope*).

Kata kunci: dinamika longsorlahan, FR, kerawanan longsorlahan, ROC–AUC, SMCE

*STUDY OF LANDSLIDE DYNAMICS AND SUSCEPTIBILITY
ON THE SOUTHERN SLOPES OF SLAMET VOLCANO*

By Dini Fadhilah Utami

21/480886/GE/09692

ABSTRACT

Data from the National Disaster Management Agency (BNPB) indicate that landslide hazards in Central Java fall into the high-risk category. In general, landslides frequently occur in areas that have undergone anthropogenic interventions, such as land-use change, infrastructure development, and intensive agricultural activities. Based on BNPB data, this study aims to identify areas affected by such interventions in relation to landslide occurrences and to assess landslide susceptibility in the southern slopes of Slamet Volcano through a landslide dynamics approach.

This research examines landslide dynamics through field observations by evaluating typology, material size, activity, and land conditions. Landslide susceptibility was analyzed using the Frequency Ratio (FR) method, Spatial Multi-Criteria Evaluation (SMCE), and validation with (ROC–AUC). Nine parameters were employed in the analysis, including slope gradient, slope aspect, elevation, slope form, rainfall, (TWI), distance to roads, distance to rivers, and land use. Spatial data were processed using QGIS to generate a landslide susceptibility map, which was subsequently validated for accuracy in RStudio.

This study reveals that in the Southern Slopes of Slamet Volcano, 11 landslide events occurred during the dry season (September 2024), increasing to 16 events in the rainy season (March 2025), triggered by high rainfall and anthropogenic interventions such as slope excavation for road construction. The landslide susceptibility analysis indicates that the majority of the area falls within the moderate susceptibility zone (9,100 ha). The findings confirm that slope gradient is the most dominant controlling factor influencing landslide susceptibility in the study area.

Keywords: landslide dynamics, FR, landslide susceptibility, ROC–AUC, SMCE