

SIFAT FISIK TANAH RAWAN LONGSOR PADA PEGUNUNGAN MENOREH SISI UTARA DI KECAMATAN BOROBUDUR KABUPATEN MAGELANG

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ABSTRAK

Longsor merupakan fenomena bergeraknya massa tanah ke arah jatuhnya lereng yang dipengaruhi akibat ketidakseimbangan lereng. Pegunungan Menoreh merupakan deretan pegunungan yang memiliki karakteristik geomorfik rawan longsor akibat topografi curam, litologi yang mudah lapuk dan curah hujan tinggi. Penelitian ini bertujuan untuk mengetahui karakteristik sifat fisik tanah rawan longsor serta korelasi nilai aktivitas lempung dan indeks plastisitas dengan tingkat kerawanan longsor di Kecamatan Borobudur, Kabupaten Magelang. Metode penentuan titik pengambilan sampel tanah yaitu secara *purposive* sampling berdasarkan kejadian longsor di Desa Kenalan (LSI 19,46) dan Ngadiharjo (LSI 12,81). Tiap desa ditentukan tiga titik sampel (lereng atas, tengah dan bawah) pada kedalaman 0-30 cm dan 30-60 cm. Parameter yang dianalisis meliputi tekstur, porositas, kadar lengas maksimum, permeabilitas, angka *atterberg*, C-Organik, dan aktivitas lempung. Hasil menunjukkan Desa Kenalan tekstur tanah didominasi fraksi lempung, porositas kurang baik (45,65%), kadar lengas maksimum tinggi, permeabilitas sedang (11,35%), indeks plastisitas sangat tinggi dan aktivitas lempung tidak aktif (0,42). Desa Ngadiharjo tekstur tanah didominasi geluh, kadar lengas maksimum tinggi, porositas buruk (36,56%), permeabilitas cepat (22,25%), indeks plastisitas sedang dan aktivitas lempung tinggi (2,17). Analisis korelasi *Pearson* aktivitas lempung dan indeks plastisitas dengan nilai LSI menunjukkan hubungan kuat. Korelasi aktivitas lempung dengan LSI menunjukkan hasil koefisien (r) sebesar 0,834, sedangkan hasil korelasi indeks plastisitas dengan LSI menunjukkan koefisien korelasi (r) sebesar 0,828.

Kata Kunci: aktivitas lempung, longsor, menoreh, sifat fisik tanah, LSI

PHYSICAL PROPERTIES OF LANDSLIDE-PRONE SOILS IN THE NORTHERN MENOREH MOUNTAINS, BOROBUDUR DISTRICT, MAGELANG REGENCY

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ABSTRACT

Landslides are a form of mass movement in which soil materials move downslope as a result of slope instability. The Menoreh Hills are characterized by geomorphological conditions that are highly susceptible to landslides due to their steep topography, highly weathered lithology, and high rainfall intensity. This study aimed to identify the physical characteristics of landslide-prone soils and to evaluate the relationship between clay activity, plasticity index, and landslide susceptibility levels in Borobudur District, Magelang Regency. Soil sampling locations were selected using a purposive sampling method based on documented landslide occurrences in Kenalan Village (LSI = 19.46) and Ngadiharjo Village (LSI = 12.81). Three sampling points were established in each village at the upper, middle, and lower slope positions, with soil samples collected from depths of 0–30 cm and 30–60 cm. The analyzed parameters included soil texture, porosity, maximum moisture content, permeability, Atterberg limits, organic carbon content, and clay activity. The results showed that the soils in Kenalan Village were dominated by the clay fraction, with poor porosity (45.65%), high maximum moisture content, moderate permeability (11.35 cm h⁻¹), a very high plasticity index, and inactive clay activity (0.42). In contrast, the soils in Ngadiharjo Village were predominantly loamy, characterized by high maximum moisture content, poor porosity (36.56%), rapid permeability (22.25 cm h⁻¹), a moderate plasticity index, and high clay activity (2.17). Pearson correlation analysis revealed a strong relationship between clay activity, plasticity index, and LSI values. The correlation between clay activity and LSI yielded a correlation coefficient (*r*) of 0.834, while the correlation between the plasticity index and LSI produced a correlation coefficient (*r*) of 0.828.

Keywords: clay activity, landslides, Menoreh Hills, soil physical properties, LSI