

ABSTRAK

Berdasarkan Badan Nasional Penanggulangan Bencana (BNPB), terjadi peningkatan kejadian gerakan tanah dalam lima tahun terakhir di Kabupaten Banyumas. Salah satu desa terkena tingkat kerentanan gerakan tanah yang tinggi adalah Desa Panusupan dan sekitarnya, Kecamatan Cilongok. Hal ini dapat berdampak pada aktivitas penduduk desa. Namun, belum ada penyelidikan lapangan yang rinci dengan skala lokal di Desa Panusupan, Cilongok, Banyumas, Jawa Tengah. Oleh karena itu, penelitian ini bertujuan untuk memetakan kondisi geologi dan kerentanan gerakan tanah.

Analisis kerentanan gerakan tanah menggunakan metode *Frequency Ratio* (FR) dengan faktor penyebab berupa kemiringan lereng, litologi, jarak dari struktur dan kelurusan geologi, jarak terhadapsungai, tata guna lahan, dan curah hujan. Terdapat 56 titik kejadian gerakan tanah yang dibagi menjadi *training sets* (80%) dan *test sets* (20%). Perhitungan nilai *Frequency Ratio* dengan data *training sets* menghasilkan nilai *Landslide Susceptibility Index*(LSI).

Daerah penelitian didominasi oleh morfologi denudasional dengan kemiringan lereng $>30^\circ$. Litologi penyusun terdiri dari breksi andesit, batupasir tufan, batulempung, batugamping, endapan lempung-berangkal. Struktur geologi berupa sesar geser mengiri berarah Timur Laut-Barat Daya, kekar ekstensi, perlapisan berjurus Barat-Timur dengan intensitas curah hujan >2.500 mm/tahun. Parameter yang paling berpengaruh terhadap gerakan tanah yaitu jarak dari struktur (0-100m). Berdasarkan analisis *Frequency Ratio* (FR), daerah penelitian dibagi menjadi empat zona kerentanan gerakan tanah menggunakan nilai *Landslide Susceptibility Index* (LSI), yaitu zona kerentanan rendah, menengah, tinggi, dan sangat tinggi. Validasi dengan metode *Area Under the Curve* (AUC) menghasilkan tingkat akurasi sebesar 79% (cukup) dan tingkat prediksi sebesar 75% (cukup).

Kata kunci: Kerentanan Gerakan Tanah, Metode *Frequency Ratio*, Desa Panusupan, Banyumas, Pemetaan Geologi

ABSTRACT

According to the National Disaster Management Agency (BNPB), there has been an increase in landslide occurrences in the last five years in Banyumas Regency. One of the villages with a high landslide vulnerability is Panusupan Village and its surroundings in Cilongok District. This situation can impact the activities of the village residents. However, there has been no detailed field investigation at a local scale in Panusupan Village, Cilongok, Banyumas, Central Java. Therefore, this study aims to map geological conditions and landslide vulnerability.

The landslide vulnerability analysis uses the Frequency Ratio (FR) method, considering causative factors such as slope gradient, lithology, distance from geological structures and lineaments, distance to rivers, land use, and rainfall. A total of 56 landslide occurrence points were divided into training sets (80%) and test sets (20%). The Frequency Ratio calculation using the training sets data produces a Landslide Susceptibility Index (LSI) value.

The study area is dominated by denudational morphology with a slope gradient of $>30^\circ$. The lithology of the study area consists of andesite breccia, tuffaceous sandstone, claystone, limestone, and clay-gravel deposits. The geological structures include a left-lateral strike-slip fault trending Northeast-Southwest, extensional joints, and bedding planes trending East-West with a rainfall intensity of $>2,500$ mm/year. The most influential parameter on landslides is the distance from the structure (0-100m). Based on the Frequency Ratio (FR) analysis, the study area is divided into four landslide vulnerability zones using the Landslide Susceptibility Index (LSI) value: low, medium, high, and very high vulnerability zones. Validation using the Area Under the Curve (AUC) method resulted in an accuracy level of 79% (fair) and a prediction level of 75% (fair).

Keywords: *Landslide Vulnerability, Frequency Ratio Method, Panusupan Village, Banyumas, Geological Mapping*