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Analisis Spasial Tingkat Kerawanan Longsor dan Arahan Mitigasi di Daerah Tangkapan Air Waduk Sermo
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ANALISIS SPASIAL TINGKAT KERAWANAN LONGSOR DAN ARAHAN MITIGASI DI DAERAH TANGKAPAN AIR WADUK SERMO

Julius Aryo Bimo[1], Ambar Kusumandari[2]

Intisari

Tanah longsor merupakan salah satu bencana yang sering terjadi pada wilayah dengan topografi berbukit hingga bergunung dan berpotensi menimbulkan kerusakan lingkungan maupun kerugian sosial ekonomi. Daerah Tangkapan Air (DTA) Waduk Sermo memiliki karakteristik lereng yang bervariasi serta penggunaan lahan yang dinamis sehingga berpotensi mengalami longsor. Penelitian ini bertujuan membandingkan hasil pemetaan antara metode skoring Paimin dan metode skoring hasil penyesuaian, menganalisis tingkat kerawanan longsor, serta menyusun arahan mitigasi berbasis unit lahan di DTA Waduk Sermo. Penelitian dilakukan menggunakan metode skoring Paimin yang disesuaikan melalui penambahan parameter tekstur tanah dan permeabilitas tanah berdasarkan kajian literatur. Analisis dilakukan menggunakan Sistem Informasi Geografis melalui proses skoring, pembobotan, dan overlay parameter. Kinerja metode dievaluasi menggunakan nilai *Area Under the Curve* (AUC), sedangkan arahan mitigasi disusun berdasarkan karakteristik unit lahan pada setiap tingkat kerawanan.

Hasil penelitian menunjukkan bahwa metode hasil penyesuaian memiliki kinerja yang lebih baik dibandingkan metode skoring Paimin dengan nilai AUC sebesar 0,7783, lebih tinggi dibandingkan metode Paimin sebesar 0,6754. Hasil pemetaan menunjukkan bahwa DTA Waduk Sermo didominasi oleh kelas agak rawan seluas 963,120 ha (48,74%), diikuti kelas rawan seluas 908,530 ha (45,97%), kelas sangat rawan seluas 97,640 ha (4,94%), dan kelas sedikit rawan seluas 6,870 ha (0,35%). Arahan mitigasi disusun berdasarkan karakteristik unit lahan melalui pendekatan vegetatif berupa pengayaan vegetasi, revegetasi, dan penerapan agroforestri, serta pendekatan sipil teknis melalui pengelolaan sistem drainase dan pembangunan dinding penahan tanah yang terintegrasi dengan sistem pembuangan air.

Kata Kunci : DTA Waduk Sermo, kerawanan longsor, longsor, mitigasi longsor

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SPATIAL ANALYSIS OF LANDSLIDE SUSCEPTIBILITY AND MITIGATION STRATEGIES IN THE SERMO RESERVOIR CATCHMENT AREA

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Abstract

Landslides are among the most common natural hazards occurring in hilly and mountainous regions, causing significant environmental damage as well as socio-economic losses. The Sermo Reservoir Catchment Area is characterized by diverse slope conditions and dynamic land use, making it highly susceptible to landslides. This study aimed to compare the mapping results between the Paimin scoring method and the adjusted scoring method, analyze the level of landslide susceptibility, and develop land unit-based mitigation strategies for the Sermo Reservoir Catchment Area. The study employed the Paimin scoring method, which was adjusted by incorporating soil texture and soil permeability parameters based on a comprehensive literature review. The analysis was conducted using a Geographic Information System (GIS) through scoring, weighting, and parameter overlay processes. The performance of the adjusted method was evaluated using the Area Under the Curve (AUC), while mitigation strategies were formulated based on the characteristics of each land unit at different susceptibility levels.

The results showed that the adjusted scoring method outperformed the original Paimin scoring method, achieving an AUC value of 0.7783, compared with 0.6754 for the original method. Landslide susceptibility mapping indicated that the Sermo Reservoir Catchment Area was dominated by the moderately susceptible class, covering 963.120 ha (48.74%), followed by the highly susceptible class with 908.530 ha (45.97%), the very highly susceptible class with 97.640 ha (4.94%), and the slightly susceptible class with 6.870 ha (0.35%). The proposed mitigation strategies were developed based on land unit characteristics through vegetative approaches, including vegetation enrichment, revegetation, and agroforestry implementation, as well as civil engineering approaches involving drainage system management and the construction of retaining walls integrated with drainage facilities.

Keywords : Landslide, landslide mitigation, landslide susceptibility, Sermo Reservoir Catchment Area

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