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Analisis Kerentanan Bahaya Longsor di Kota Batu Menggunakan Model Spatial Multi Criteria Evaluation (SMCE)
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ANALISIS KERENTANAN BAHAYA LONGSOR DI KOTA BATU MENGGUNAKAN MODEL *SPATIAL MULTI CRITERIA EVALUATION* (SMCE)

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INTISARI

Kota Batu berlokasi di antara tiga gunung diantaranya Gunung Panderman, Gunung Welirang, dan Gunung Arjuno sehingga memiliki karakteristik geomorfologi berbukit dan bergunung. Kondisi tersebut juga memunculkan panorama alam yang indah sehingga terbentuknya atraksi wisata alam. Sektor pariwisata di Kota Batu turut berkontribusi pada pembangunan daerah Kota Batu. Pada tahun 2024, tingkat bahaya longsor di Kota Batu didominasi tingkat bahaya sangat tinggi serta terjadi longsor sebanyak 56 kejadian. Kondisi tersebut memunculkan potensi terpapar bahaya longsor. Untuk mengurangi kondisi keterpaparan oleh bahaya longsor, penelitian ini bertujuan untuk analisis distribusi kerentanan terhadap bahaya longsor di Kota Batu menurut Peraturan Kepala BNPB No.02 Tahun 2012, studi literatur, dan *expert judgement* serta rumusan mitigasi struktural dan non-struktural untuk mengurangi kondisi rentan.

Metode yang digunakan untuk analisis distribusi kerentanan ialah *Spatial Multi Criteria Evaluation* (SMCE) menggunakan perangkat lunak ILWIS 3.8.6 berdasarkan lima skenario diantaranya *equal*, sosial, ekonomi, fisik, dan lingkungan. Sementara itu, rumusan mitigasi menggunakan analisis *Strength, Weakness, Opportunity,* dan *Threats* (SWOT).

Keluaran dari analisis distribusi kerentanan menunjukkan skenario equal didominasi kerentanan sangat tinggi 82,64%, skenario sosial didominasi kerentanan sedang 64,62%, skenario ekonomi didominasi kerentanan rendah 47,47%, skenario fisik didominasi kerentanan sedang 62,21%, skenario lingkungan didominasi kerentanan sedang 61,20%. Wilayah barat daya memiliki tingkat kerentanan sangat tinggi pada seluruh skenario dengan variabel kepadatan penduduk, rumah tangga miskin, dan kepadatan bangunan pemukiman memiliki tingkat keterpaparan dan terdampak terbesar apabila terjadi longsor. Rumusan mitigasi berdasarkan analisis SWOT menghasilkan mitigasi struktural dan non-struktural. Mitigasi struktural diprioritaskan pada pemerataan pemasangan EWS, penetapan standar minimum infrastruktur mitigasi, pemeliharaan infrastruktur eksisting, dan upaya stabilitas lereng. Sementara itu, mitigasi non-struktural diarahkan pada penyusunan RenKon oleh BPBD, penguatan lintas sektor *disaster governance*, penyusunan SOP kebencanaan kawasan wisata, penguatan FPRB, dan analisis Satuan Kemampuan Lahan (SKL).

Kata kunci: Bahaya, Kerentanan, Longsor, Mitigasi, Wisata, SMCE.

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VULNERABILITY ANALYSIS OF LANDSLIDE HAZARD IN BATU CITY USING SPATIAL MULTI CRITERIA EVALUATION (SMCE) MODEL

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ABSTRACT

Batu Regency located between of Mount Panderman, Mount Welirang, and Mount Arjuno. It has hilly and mountainous geomorphologic characteristics to create beautiful natural panoramas. These conditions create beautiful natural scenery and make it popular natural tourist destination. The tourism sector in Batu Regency contributes to development of region. In 2024, the landslide hazard level in Batu Regency was dominant by very high level, 56 landslides are occured. These conditions created potential for exposure to landslide hazards. To reduce exposure landslide hazards, this research aims to analyse distribution of vulnerability to landslide hazards in Batu Regency based on Regulation of the National Disaster Management Agency (NDMA) No. 02 2012, literature study, and expert judgment along structural and non-structural mitigation to reduce vulnerability.

The method used for the vulnerability distribution analysis is Spatial Multi Criteria Evaluation (SMCE) using ILWIS 3.8.6 software based on five scenarios are equal, social, economic, physical, and environment. The analysis of mitigation strategy using Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis.

The results of the vulnerability distribution analysis show that the equal scenario is dominated by very high vulnerability 82.64%, social scenario is dominated by middle vulnerability 64,62%, economic scenario is dominated by low vulnerability 47,47%, physical scenario is dominated by middle vulnerability 62,21%, and environmental scenario is dominated by middle vulnerability 61,20%. The south western region is dominated by very high vulnerability across all scenarios then variables of population density, poor households, and residential building density have the highest levels of exposure and affect in event of landslides. Mitigation strategy based on SWOT analysis resulted in recommendations for both structural and non-structural mitigation. Structural mitigation prioritises the equitable installation of EWS, the establishment of minimum standards for mitigation infrastructure, and the maintenance of existing infrastructure in natural tourist areas, and slope stabilization recommendations. Non-structural mitigation is directed towards the preparation of the RenKon by the BPBD, strengthening cross-sectoral disaster governance, development of disaster management SOPs for tourist areas, strengthening FPRB, and land capability analysis.

***Keywords**: Hazard, Vulnerability, Landslide, Mitigation, Tourism, SMCE.*