

DAYA DUKUNG LINGKUNGAN KAWASAN RAWAN BENCANA DALAM PERENCANAAN TATA RUANG UNTUK MENGURANGI RISIKO BENCANA BANJIR KOTA MALANG

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INTISARI

Kota Malang merupakan wilayah perkotaan yang secara geomorfologis terletak di dataran tinggi, namun sering mengalami bencana banjir. Fenomena ini disebabkan oleh intensitas curah hujan tinggi, konversi lahan yang tidak terkendali, penurunan kapasitas ruang terbuka hijau, dan sistem drainase yang tidak memadai. Kondisi tersebut menyebabkan banyak wilayah permukiman berada dalam zona rawan banjir, mengancam keselamatan dan kesejahteraan masyarakat.

Penelitian ini bertujuan untuk : (1) memetakan bahaya banjir di Kota Malang; (2) menilai daya dukung permukiman di kawasan rawan banjir; dan (3) merumuskan arahan penataan ruang yang dapat meningkatkan daya dukung dan mengurangi risiko bencana banjir. Kajian ini dilakukan melalui pemetaan bahaya banjir berdasarkan faktor-faktor seperti topografi, curah hujan, penggunaan lahan, dan jaringan drainase, serta perhitungan daya dukung permukiman dengan mempertimbangkan jumlah penduduk, luas kawasan lindung, dan luas kawasan bencana.

Penelitian ini menggunakan pendekatan kuantitatif dan spasial melalui analisis Sistem Informasi Geografis (SIG), analisis *Information Value* (IV), analisis Gumbel, metode *Soil Conservation Service – Curve Number* (SCS-CN), serta perhitungan daya dukung permukiman. Penelitian ini juga meninjau relevansi dan efektivitas kebijakan tata ruang yang berlaku dalam merespon kondisi aktual kerawanan banjir, termasuk RDTR Kota Malang.

Hasil kajian menunjukkan bahwa beberapa kawasan permukiman di Kota Malang telah melampaui kapasitas daya dukungnya. Beberapa daerah berada dalam zona rawan banjir dengan kepadatan permukiman tinggi dan minim ruang resapan air. Evaluasi RTRW dan RDTR menunjukkan ketidaksesuaian fungsi ruang di kawasan rawan banjir. Arahan penataan ruang yang diusulkan mencakup peningkatan RTH, penguatan drainase kawasan, serta pengembangan permukiman berkelanjutan. Dengan pendekatan ini, diharapkan Kota Malang dapat menuju perencanaan tata ruang yang lebih adaptif, tangguh, dan berkelanjutan dalam menghadapi risiko bencana banjir di masa depan.

Kata kunci: *bahaya banjir, daya dukung permukiman, penataan ruang, Kota Malang, SIG, Information Value, SCS-CN, Gumbel*

ENVIRONMENTAL CARRYING CAPACITY OF DISASTER-PRONE AREAS IN SPATIAL PLANNING TO REDUCE FLOOD DISASTER RISK IN MALANG CITY

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ABSTRACK

Malang City is an urban area that is geomorphologically located in a highland region, yet it frequently experiences flood disasters. This phenomenon is caused by high rainfall intensity, uncontrolled land conversion, reduced green open space capacity, and inadequate drainage systems. These conditions have resulted in many residential areas being located within flood-prone zones, threatening the safety and well-being of the population.

This study aims to: (1) map flood hazards in Malang City; (2) assess the carrying capacity of residential areas in flood-prone zones; and (3) formulate spatial planning directions to enhance carrying capacity and reduce flood disaster risk. The study involves flood hazard mapping based on factors such as topography, rainfall, land use, and drainage networks, as well as calculating the carrying capacity of settlements by considering population size, the extent of protected areas, and disaster-prone zones.

The research employs a quantitative and spatial approach using Geographic Information System (GIS) analysis, Information Value (IV) analysis, Gumbel analysis, the Soil Conservation Service – Curve Number (SCS-CN) method, and settlement carrying capacity calculations. It also reviews the relevance and effectiveness of existing spatial planning policies in responding to the current flood vulnerability conditions, including the Detailed Spatial Plan (RDTR) of Malang City.

The results indicate that several residential areas in Malang City have exceeded their carrying capacity. Some areas are located in flood-prone zones with high settlement density and limited water infiltration space. An evaluation of the RTRW and RDTR reveals spatial function mismatches in flood-prone zones. The proposed spatial planning directions include increasing green open space (GOS), strengthening local drainage systems, and developing sustainable housing. Through this approach, Malang City is expected to move towards more adaptive, resilient, and sustainable spatial planning in facing future flood risks.

Keywords: *flood hazard, settlement carrying capacity, spatial planning, Malang City, GIS, Information Value, SCS-CN, Gumbel*