MAPPING FLOOD PRONE AREAS IN JEMBER CITY USING K-MEANS CLUSTERING METHOD AS A DISASTER MITIGATION EFFORT

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ABSTRACT

Jember City has a high potential for flood vulnerability due to its geographical conditions and meteorological factors. This study aims to map flood-prone areas in Jember at the village level to provide more accurate mitigation information. The method used is the K-Means Clustering algorithm to group regions based on parameters such as temperature, humidity, wind direction, cloud cover, land cover, and weather conditions. The clustering process produces three levels of vulnerability, namely Cluster 0 (low), Cluster 1 (medium), and Cluster 2 (high). The results show that out of 22 observed areas, 16 areas (72,7%) are categorized as medium risk, 5 areas (22.7%) as low risk, and 1 areas (4.3%) as high risk, with a Silhouette Score of 0.4665 indicating a fairly good clustering quality. The spatial analysis results are integrated into a web-based geographic information system using Leaflet.js with GeoJSON data to generate interactive map visualizations. This visualization is expected to support decision-making for local government and the Regional Disaster Management Agency of Jember in developing more effective mitigation strategies.

Keywords: *Flood, K-Means Clustering, Disaster Mitigation, Leaflet.js, GeoJSON.*