

INTISARI

Kebakaran hutan dan lahan (karhutla) merupakan bencana ekologis yang sering terjadi di Indonesia, terutama pada tahun 2023 di Kabupaten Banjar terjadi kebakaran besar dengan jumlah titik api terbanyak di Provinsi Kalimantan Selatan. Penelitian ini bertujuan untuk mengembangkan model prediksi kerawanan kebakaran dan menganalisis tingkat keparahan dampaknya dengan memanfaatkan teknologi penginderaan jauh dan algoritma *machine learning Random Forest*. Data berasal dari citra satelit Landsat 8 dengan pemanfaatan berbagai indeks spektral, yaitu NDVI, NBR, dNBR, BAI, NDWI, dan MSI, yang merepresentasikan kondisi vegetasi, air, dan stres kelembaban. Model prediksi dibangun berdasarkan kombinasi indeks-indeks tersebut serta data spasial titik kebakaran dari BPBD. Hasil analisis menunjukkan bahwa model *Random Forest* mampu memetakan zona kerawanan kebakaran dengan akurasi tinggi, yang divalidasi melalui uji akurasi dengan akurasi keseluruhan 71,64% dan Kappa 40,82%. Peta keparahan kebakaran juga berhasil dibuat melalui perhitungan *dNBR* menggunakan median komposit pre-fire dan post-fire. Studi ini memberikan kontribusi signifikan dalam penguatan mitigasi kebakaran hutan dan lahan melalui penyediaan informasi spasial yang akurat dan berbasis data historis. Hasil penelitian ini diharapkan dapat mendukung kebijakan respons bencana serta perencanaan restorasi dan rehabilitasi lahan yang lebih tepat sasaran di Kabupaten Banjar.

Kata Kunci: kebakaran hutan dan lahan, penginderaan jauh, *random forest*, indeks spektral, Kabupaten Banjar

ABSTRACT

Forest and land fires (karhutla) are ecological disasters that frequently occur in Indonesia, particularly in 2023 when a major fire broke out in Banjar District, recording the highest number of fire hotspots in South Kalimantan Province. This study aims to develop a fire risk prediction model and analyze the severity of its impacts by utilizing remote sensing technology and the Random Forest machine learning algorithm. Data were obtained from Landsat 8 satellite imagery, utilizing various spectral indices, namely NDVI, NBR, dNBR, BAI, NDWI, and MSI, which represent vegetation, water, and moisture stress conditions. The prediction model was built based on a combination of these indices and spatial data on fire hotspots from the Regional Disaster Management Agency (BPBD). The analysis results show that the Random Forest model is capable of mapping fire hazard zones with high accuracy, validated through an accuracy test with an overall accuracy of 71.64% and a Kappa value of 40.82%. Fire severity maps were also successfully created through dNBR calculations using composite pre-fire and post-fire medians. This study makes a significant contribution to strengthening forest and land fire mitigation by providing accurate spatial information based on historical data. The results of this research are expected to support disaster response policies as well as more targeted land restoration and rehabilitation planning in Banjar Regency.

Keywords: *forest and land fire, remote sensing, random forest, spectral indices, Banjar Regency*