

INTISARI

Kecamatan Jogonalan mengalami tekanan alih fungsi lahan yang signifikan akibat pertumbuhan penduduk dan pembangunan Tol Jogja-Solo, yang mengancam keberadaan lahan produktif. Penelitian ini bertujuan menganalisis tren perubahan penggunaan lahan tahun 2016, 2020, dan 2024, serta memprediksi sebaran spasialnya pada tahun 2028 dan 2036. Hasilnya diharapkan menjadi landasan pertimbangan bagi perencanaan tata ruang wilayah yang lebih terkendali.

Penelitian memanfaatkan citra PlanetScope resolusi 3 meter tahun 2016, 2020, dan 2024. Klasifikasi penggunaan lahan dilakukan dengan metode *Object-Based Image Analysis* (OBIA), sedangkan analisis perubahan dan prediksi spasial dilakukan di GeoSOS-FLUS. Model prediksi mengintegrasikan *Artificial Neural Network* (ANN) untuk menghitung probabilitas transisi dan *Cellular Automata* (CA) untuk simulasi spasial dengan mempertimbangkan variabel pendorong serta batasan (*constraint*) sesuai RDTR Kecamatan Jogonalan.

Hasil analisis menunjukkan tren penurunan luas sawah sebesar 92,95 ha dan peningkatan permukiman sebesar 194,76 ha selama periode 2016-2024. Kualitas klasifikasi penggunaan lahan dinilai baik dengan nilai *overall accuracy* di atas 85% untuk ketiga tahun pengamatan. Pemodelan prediksi juga dinyatakan valid dengan nilai *overall accuracy* 81,05% dan *kappa coefficient* 0,68, yang memproyeksikan ekspansi permukiman mencapai 1.046,24 ha serta sektor perdagangan 83,67 ha pada tahun 2036. Transformasi wilayah menunjukkan pergeseran dari corak agraris menuju kawasan perkotaan yang berorientasi pada simpul gerbang tol. Meskipun terjadi pengurangan lahan produktif, dinamika perubahan tersebut secara keseluruhan diprediksi masih berada dalam koridor rencana pola ruang RDTR yang berlaku.

Kata Kunci: Perubahan Penggunaan Lahan, CA-ANN, PlanetScope, OBIA, Jogonalan

ABSTRACT

Jogonalan District is experiencing significant land-use conversion pressure driven by population growth and the construction of the Jogja-Solo Toll Road, which threatens the availability of productive land. This study aims to analyze land-use change trends in 2016, 2020, and 2024, and to predict their spatial distribution for 2028 and 2036. The results are expected to serve as a foundational consideration for more controlled regional spatial planning.

The research utilizes 3-meter resolution PlanetScope imagery from 2016, 2020, and 2024. Land-use classification was performed using the Object-Based Image Analysis (OBIA) method, while change analysis and spatial prediction were conducted using GeoSOS-FLUS. The prediction model integrates an Artificial Neural Network (ANN) to calculate transition probabilities and Cellular Automata (CA) for spatial simulation, incorporating driving variables and constraints based on the Jogonalan District Detailed Spatial Plan (RDTR).

The results indicate a declining trend in paddy field area by 92.95 hectares and an increase in residential areas by 194.76 hectares during the 2016-2024 period. The quality of land-use classification is rated as good, with overall accuracy exceeding 85% for all three observation years. The prediction modeling is also declared valid, with an overall accuracy of 81.05% and a kappa coefficient of 0.68, projecting that residential expansion will reach 1,046.24 hectares and the commercial sector will reach 83.67 hectares by 2036. The regional transformation shows a shift from an agrarian character toward an urbanized area oriented around toll gate nodes. Despite the reduction in productive land, the overall dynamics of change are predicted to remain within the corridors of the prevailing RDTR spatial pattern plan.

Keywords: *Land-Use Change, CA-ANN, PlanetScope, OBIA, Jogonalan*