

Ashan Nur Hidayat. 200311100054. Identifikasi Penggunaan Lahan Menggunakan *Google Earth Engine* dengan Pemrograman Algoritma *Supervised* dan *Unsupervised*. Di bawah bimbingan Fahmi Arief Rahman, S.P., M.Si dan Ir. Slamet Supriyadi, M.Si

ABSTRAK

Pesatnya pengembangan infrastruktur dan peningkatan aktivitas yang melibatkan penggunaan lahan di Kabupaten Bangkalan, penting untuk melakukan pemetaan penggunaan lahan secara periodik. Algoritma *supervised* dan *unsupervised* menawarkan solusi efektif untuk memantau penggunaan lahan secara berkala dengan menggunakan data citra satelit. Serta, menjadi pendekatan yang tepat untuk mengidentifikasi dan mengelola penggunaan lahan di Kabupaten Bangkalan. Penelitian ini bertujuan untuk mengevaluasi kemampuan masing-masing algoritma pada kondisi penggunaan lahan di lapangan, khususnya di Kabupaten Bangkalan. Penelitian ini dilakukan di Kabupaten Bangkalan dari September hingga Desember 2024 dengan tahapan *mosaic dan cloud masking*, klasifikasi *supervised* dan *unsupervised*, *accuracy assessment*, validasi lapang dan analisis data serta laporan hasil. Klasifikasi penggunaan lahan dilakukan dengan mengkombinasikan band RGB 652 pada citra satelit melalui platform *google earth engine*. Hasil data klasifikasi menunjukkan bahwa algoritma dengan performa sangat baik dan tepat untuk digunakan di Kabupaten Bangkalan yaitu *K-Means*, *Random Forest*, *Cascade K-Means*, dan *Minimum Distance* dengan koefisien kappa 100%, 92%, 92%, dan 83%. Sedangkan, algoritma dengan performa kurang baik hingga cukup dan belum tepat digunakan di Kabupaten Bangkalan yaitu *Classification and Regression Trees*, *Learning Vector Quantization*, *X-Means*, dan *Support Vector Machine* dengan koefisien kappa 65%, 58% dan 47%, dan 27%.

Kata Kunci: *Google Earth Engine*, *Supervised*, *Unsupervised*, Penggunaan lahan

Ashan Nur Hidayat. 200311100054. Land Use Identification Using Google Earth Engine with Supervised and Unsupervised Algorithm Programming. Supervised by Fahmi Arief Rahman, S.P., M.Si and Ir. Slamet Supriyadi, M.Si

ABSTRACT

As infrastructure development and economic changes vary in the geographic characteristics of Bangkalan Regency, it is important to conduct periodic land use mapping. Supervised and unsupervised algorithms offer an effective solution to monitor these changes on a regular basis using satellite imagery data. The combination of these two algorithms can be an appropriate approach to identify and manage land use change in Bangkalan Regency. This research aims to evaluate the ability of each algorithm on the condition of land use in the field, especially in Bangkalan Regency. This research was conducted in Bangkalan Regency from September to December 2024 with the stages of mosaic and cloud masking, supervised and unsupervised classification, accuracy assessment, field validation and data analysis and results report. Land use classification is carried out by combining RGB band 652 in satellite images through the Google Earth engine platform. The classification results show that the algorithms with very good performance and appropriate for use in Bangkalan Regency are K-Means, Random Forest, Cascade K-Means, and Minimum Distance with a kappa coefficient of 100%, 92%, 92%, 83%. Meanwhile, algorithms with poor performance and not appropriate for Bangkalan Regency were Classification and Regression Trees, Learning Vector Quantization, X-Means, and Support Vector Machines with kappa coefficients of 65%, 58% and 47%, and 27%.

Keywords: Google Earth Engine, Supervised, Unsupervised, Land Use