

Identifying land use and land cover (LULC) change from 2000 to 2025 driven by tourism growth: A study case in Bali

ABSTRACT

Bali has been open to tourism since the beginning of the 20th century and is known as the first tourist destination in Indonesia. The Denpasar, Badung, Gianyar, and Tabanan (Sarbagita) areas experience the most rapid growth of tourism activity in Bali. This rapid tourism growth has caused land use and land cover (LULC) to change drastically. This study mapped the land-use change in Bali from 2000 to 2025. The land change modeller (LCM) tool in ArcGIS was employed to conduct this analysis. The images were classified into agricultural land, open area, mangrove, vegetation/forest, and built-up area. Some Landsat images in 2000 and 2015 were exploited in predicting the land use and land cover (LULC) change in 2019 and 2025. To measure the accuracy of prediction, Landsat 8 OLI images for 2019 were classified and tested to verify the LULC model for 2019. The Multi-Layer Perceptron (MLP) neural network was trained with two influencing factors: elevation and road network. The result showed that the built-up growth direction expanded from the Denpasar area to the neighbouring areas, and land was converted from agriculture, open area and vegetation/forest to built-up for all observation years. The built-up was predicted growing up to 43 % from 2015 to 2025. This model could support decision-makers in issuing a policy for monitoring LULC since the Kappa coefficients were more than 80% for all models.