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Drivers of land use land cover change and intensity analysis of land transformation in the moist semi-deciduous forest zone of Ghana: Case of Bobiri Forest Reserve and its environs

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Understanding land cover transformation over time and space is crucial for comprehending ecological challenges, particularly in environmentally vulnerable areas. In Sub-Saharan Africa, the demand for fuel, food, and fibre is expected to significantly expand croplands, resulting in the degradation of natural ecosystems. This research presents a spatiotemporal analysis of land-cover change in the Bobiri forest and its surrounding areas in Ghana's moist semi-deciduous forest zone. The study's main objectives were to identify the drivers of land-cover change, and to analyse the intensity of land transformation from 1986 to 2022 in the study area. The methodology used measured land-cover changes at different levels, including intervals, categories, and transitions. The findings indicate that the annual rate of land change was higher from 1986 to 2007 (1.64%) compared to the period from 2007 to 2022 (1.04%). Additionally, the analysis at the category level reveals that the increase in cropland and non-vegetated areas during both time intervals was higher than the uniform intensity. The analysis at the transition level suggests that most of the cropland gains originated from non-vegetated areas during both periods. There is also evidence of localized increases in closed forests, likely due to afforestation policies implemented by the Ghanaian government. However, overall, there has been a decline in closed forests over the entire timeframe, with an annual rate of change of -1.25%. This study contributes valuable data for enhancing our understanding of the scale and direction of land-cover change, which is essential for developing policies aimed at mitigating the impact on local livelihoods and the environment at national and sub-national levels.

Keywords: remote sensing, GIS, landsat, land use, land cover, land intensity analysis, forest degradation, agriculture expansion

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