Analyse land use land cover (LULC) dynamics in a cocoa landscape context (Côte d'Ivoire)

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Abstract

Over the past three decades, cocoa production and deforested areas have increased in the country due to the intensification and expansion of cocoa production. Cocoa production systems face numerous challenges, including environmental degradation, climate change impact, and socioeconomic pressures. Understanding the dynamics of these systems is crucial for developing sustainable and resilient cocoa production practices. This study examines how various drivers: land tenure, demographics, deforestation rates, diversification strategies, and adoption of agroforestry systems influence LULC patterns over time. This study identifies the dominant land use types, examines transformative trends of change land use transitions for the period 2002–2023, and as well as the intensity analysis of land use transitions for the same period. Advanced remote sensing approaches such as Random Forest classification are used to assess land use changes across the cocoa landscape. By analysing the relationships between these factors and LULC changes over time, the Random Forest model identifies key drivers of landscape transformation within cocoa production areas. Indeed, Landsat satellite data were used, along with data from the description, location, and photography of the sites visited. In addition, data on farmers' demographic characteristics, land-use practices, and land-change factors were collected using interview methods. Statistical models to identify relationships between factors and land use dynamics are used. This study contributes to comprehensible interactions that shape cocoa landscapes. It helps to design policies that promote sustainable land management practices and highlights as well the indicators that can alert the various stakeholders to the future of the cocoa sector, especially governments, and the chocolate industry.

Keywords: Cocoa production, drivers, dynamic, land use land cover

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