

## Land-Use Transitions and Its Implications on Food Production Systems in Rural Landscape of Southwestern Ghana

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**Abstract :** Smallholder-dominated mosaic landscapes in rural Africa are relevant for food production, biodiversity conservation, and climate regulation. Land-use transitions threaten the multifunctionality of such landscapes, especially the production capacity of arable lands resulting in food security challenges. Using land-cover maps derived from maximum likelihood classification of Landsat satellite images for the years 2002, 2015, and 2020, post-classification change detection, landscape metrics, and key informant interviews, the study assessed the implications of rubber plantation expansion and oil business development on the food production capacity of Ahanta West District, Ghana. The analysis reveals that settlement and rubber areas expanded by 5.82% and 10.33% of the landscape area, respectively, between 2002 and 2020. This increase translates into over twice their initial sizes (144% in settlement change and 101% in rubber change). Rubber plantation spread dominates the north and southwestern areas, whereas settlement is widespread in the eastern parts of the landscape. Rubber and settlement expanded at the expense of cropland, palm, and shrublands. Land-use transitions between cropland, palm, and shrubland were targeting each other, but the net loss in shrubland was higher (-17.27%). Isolation, subdivision, connectedness, and patch adjacency indices showed patch consolidation in the landscape configuration from 2002 to 2015 and patch fragmentation from 2015 to 2020. The study also found patches with consistent increasing connectivity in settlement areas indicating the influence of oil discovery developments and fragmentation tendencies in rubber, shrubland, cropland, and palm, indicating springing up of smaller rubber farms, the disappearance of shrubland, and splitting up of cropland and palm areas respectively. The results revealed a trend in land-use transitions in favor of smallholder rubber plantation expansion and oil discovery developments, which suggest serious implications on food production systems and poses a risk for food security and landscape multifunctional characteristics. To ensure sustainability in land uses, this paper recommends the enforcement of legislative instruments governing spatial planning and land use in Ghana as embedded in the 2016 land-use and spatial planning act.

**Keywords :** food production systems, food security, Ghana's west coast, land-use transitions, multifunctional rural landscapes

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