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“Reconcile land system changes  
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## The adoption of sustainable land management practices in northern ghana: role of land tenure modalities

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### Abstract

Land tenure insecurity remains a fundamental constraint to sustainable agricultural development across sub-Saharan Africa. In Ghana, where land access and tenure modalities are deeply governed by customs, lineage systems, and traditional authorities, smallholder farmers' ability to adopt Sustainable Land Management (SLM) practices hinges not only on economic factors but also on social legitimacy and long-term control over land, in addition to their contextual agroecological conditions. This study investigates the relationship between land tenure arrangements and the adoption of SLM practices: agroforestry, fallowing, crop rotation, and contour ploughing, drawing on survey data from the Sustainable Intensification-Mixed Farming Systems initiative by the International Institute of Tropical Agriculture (IITA) in Northern Ghana. Quantitative analysis reveals that farmers with family-based land tenure modalities are significantly more likely to invest in contour ploughing and fallowing. Ecological factors, including soil fertility and indigenous tree species on plots, also shape agroforestry adoption, revealing how environmental realities intertwine with socio-cultural land attachments. Input choice, particularly seed choices, further influences adoption patterns, with improved seed users favouring immediate-yield practices like contour ploughing over longer-term land investments such as fallowing. Yet, despite growing awareness of soil degradation and environmental implications of pesticides and herbicides, the adoption of organic amendments and soil biological enhancements such as *rhizobium* inoculant, organic manure, and liming materials remains exceptionally low, constrained by barriers of affordability, accessibility, and knowledge. Farmers predominantly rely on adaptive crop residue management practices such as mulching, although trade-offs between soil conservation and livelihood need persist. Focus group discussions and transect walks further uncover the inherent meanings of farmers' decisions. This also points out the gendered dimensions of land access and use. The findings highlight that advancing SLM adoption requires more than technical solutions: it demands integrated interventions that recognise the socio-institutional fabric of land tenure systems, promote and adapt land management practices to patterns of tenure modalities, and expand access to affordable, locally appropriate soil enhancement intensification practices. Without addressing the underlying tenure structures and socio-ecological dynamics in land use and management, efforts to enhance sustainable intensification will keep staggering in Ghanaian smallholder landscapes.

**Keywords:** Land Tenure Modalities, Smallholder Farmers, Sustainable Intensification, sustainable Land Management