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“Reconcile land system changes
with planetary health”

Productivity gains and soil sustainability: insights from sorghum farmers in dodoma, Tanzania

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Abstract

Sorghum plays a vital role in food security across Tanzania’s semi-arid regions, particularly in Dodoma, where it serves as both a staple food and a drought-resilient crop suited to local agroecological conditions. This study investigates how evolving land use practices—specifically land intensification and the adoption of inputs such as improved seeds, fertilisers, and pesticides—affect sorghum productivity and soil fertility. This study used structured interviews with 400 smallholder farmers across three districts in Dodoma: Kongwa, Chamwino, and Mpwapwa. Farmers were asked about their land management practices, crop outputs, and perceptions of soil health. The findings show that while input adoption and intensified land use have generally led to increased yields and enhanced food availability, they also raise concerns about declining soil fertility due to continuous cropping, reduced fallow periods, and poor input management. These findings underscore the growing tension between short-term productivity gains and long-term soil sustainability among smallholder farmers in rural Tanzania. The survey emphasises the need for balanced land management strategies that protect long-term soil productivity while supporting yield gains. It also highlights the role of farmer awareness and training in adopting soil-conserving practices. These findings contribute to ongoing discussions about sustainable agro-ecosystem transformation, especially in dryland areas vulnerable to climate change and resource degradation. Furthermore, the study calls for integrating soil health considerations into local and national agricultural policy in developing countries. This supports broader efforts to reconcile land system change with sustainable food system goals and provides practical evidence for guiding climate-resilient and soil-conscious agricultural development in sub-Saharan Africa.

Keywords: Agro-ecology, Dodoma, productivity, sorghum, sustainability