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Enhancing food systems, soil nutrient recycling, and smallholder livelihoods through cowpea clipping management in the nigerian savannah

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Abstract

Cowpea (*Vigna unguiculata* (L.) Walp) is a vital component of smallholder farming systems in the semi-arid savannah of Nigeria, contributing significantly to food security, livestock nutrition, and soil fertility. Its drought tolerance and high biomass production make it particularly suitable for climate-stressed environments. This study evaluated an innovative cowpea clipping management technology aimed at strengthening food systems, enhancing soil nutrient recycling, and improving smallholder livelihoods through efficient biomass utilisation and soil nitrogen enrichment in inherently low-fertility soils. Field data collected over a four-year period (2002–2005) were used to assess fodder yield, soil nitrogen gains, and economic benefits associated with the technology. Results showed that clipped cowpea plots produced substantial quantities of fresh fodder (14–15 t ha ^{1}), which can be used for dry-season livestock feeding or sold to generate additional household income ranging from ₦41,000 to ₦46,000 per hectare. This provides critical liquidity during peak farming periods when financial resources are most constrained. In addition, incorporation of clipped biomass significantly improved soil fertility, with cumulative nitrogen additions of 186–187 kg N ha ^{1} over the study period—representing approximately a 70 % increase compared to non-clipped plots. This corresponds to an estimated fertiliser cost saving of about ₦24,000 per hectare, thereby reducing reliance on external inputs among resource-poor farmers. The findings highlight the potential of integrated crop–livestock systems to advance nutrition-sensitive and climate-smart food systems by simultaneously producing food and fodder while enhancing soil health. The technology promotes resilience, income diversification, and sustainable resource use among low-input smallholders. Its low-cost nature and compatibility with existing farming practices underscore its scalability across similar agro-ecological zones. The study recommends strengthening extension services to support the dissemination and adoption of such innovations as part of broader efforts to transform and sustain food systems in Sub-Saharan Africa.

Keywords: Clipping, cowpea (*Vigna unguiculata*), fodder, income, innovation, keywords, management, Nigerian savannah, resource-poor farmer, soil nutrient, sustainable, technology

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