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How Climate-Smart Is Farmer Managed Natural Regeneration? Co-Benefits Leading to Food Security in Niger

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Abstract

Farmer managed natural regeneration (FMNR) is a practice used on agricultural land to support native trees growth. Although preliminary evidence indicates that FMNR is beneficial for crop-livestock production, additional research is needed to quantify its climate change mitigation (CCM) potential. This study estimated FMNR effects on food security, land productivity and CCM potential, all ingredients of climate-smart agriculture. Field research was conducted in Niger, where we evaluated farm household performance, and estimated their food security status, associated with time since FMNR practice. We tested the hypotheses that i) farmers who practice FMNR achieve higher food security and self-sufficiency than farmers who do not practice; and ii) that these effects are explained through a positive effect of FMNR on farm productivity and income. Analysis of soil C revealed that the implementation of FMNR leads to modest increase in soil organic matter (SOM) limited to the topsoil layers (0–20 cm) compared to sites under normal practice. The positive effect of FMNR on SOM levels decreases with distance from the stem, which is indicative of the positive effect that tree canopy has on SOM storage. Synthetic regression models combining farm, household and FMNR variables show that the FMNR is associated with food security either directly through the total area under wood canopy cover. Our analyses show positive association between FMNR and income, and FMNR and food security and self-sufficiency, which qualifies FMNR as a CSA practice. These associations are direct and indirect, which suggest that a number of positive correlated benefits are derived from FMNR practice.

Keywords: Dryland agroforestry, income, mitigation co-benefits, resilience, semi-arid environments, West Africa

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