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Planting Pit Size and Farmer's Management Practices Explained Survival and Growth of Planted Seedlings in Contrasting Land-Use Systems in Mali

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Abstract

Successful establishment and growth of trees in degraded landscape is an important factor in efforts to land restoration in degraded dryland. In Mali as in most the Sahelian countries, large tree plantations have started after the severe drought of the 70s. The high cost of plantation associated with low survival and low productivity has been the main impediment to large success. Planted trees performance in rural settings are affected not only by seedling related traits and environmental conditions, but also by the management practices of farmers who plant, own, maintain, and expect benefit from these trees. This paper based on multi-environment trials of two planting pit sizes (small size planting hole [30×30 cm] vs. big size planting hole [60×60 cm]), studies the survival and growth of young improved *Ziziphus mauritiana* cultivars planted by 1600 volunteer farmers from three contrasting regions Mopti, Sikasso and Ségou in Mali. We used the so-called planned comparison approach, to explain planted tree success one year after out planting, with regards to the initial characteristics of the trees, the biophysical environment and the farmers specific context. We use a probit model to predict tree survival, and a linear regression model to predict tree growth rate. Our results suggest that biophysical and socio-economic factors are all important in explaining the success (survival and growth) of young planted trees. The following variables are positively related to tree success (survival and/or growth): planting pit depth, median household income, planting location, farmers' motivations and tree planting experience, mulching, and a watering regime. The results from this study though limited in time, highlight the fact that more comprehensive evaluation that combined biophysical environment and social factors related to the farmers are needed to explain success in plantation.

Keywords: Drought resistance, growth, planting material, semi-arid agro-ecosystem, soil moisture, survival

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