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An innovative, farmer initiative of silvopastoral restoration in a degraded semiarid Caatinga region of Brazil

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Planting and managing native fodder trees and shrubs on degraded lands offers a promising approach to establishing resilient silvopastoral systems (SPS) in the semiarid Caatinga region of Brazil (Pinheiro & Nair, 2018). Although several examples of such successful smallholder initiatives are available, their experience is seldom known or recognized by outsiders. The objective of the present work is to describe such a success story of a progressive smallholder farmer, Eduardo Emídio, in his 24 ha-farm in the municipality of Barreiros, in *Bacia do Jacuípe* region, Bahia state, Brazil, and assess the extent of improvements brought about in land-quality and productivity through his innovation. His initiatives included high-density planting of cactus (*Opuntia ficus-indica*) and enclosing the area to keep off animals, broadcasting seeds of native fodder trees (mainly *Caesalpinia pyramidalis*) and adding a few tree seedlings, and managing the buffelgrass (*Pennisetum ciliare* (L.) Link syn. *Cenchrus ciliaris* (L.)) covers. Manure was applied at the rate of ca. 1kg per m^2 annually. By replicating this SPS model in plots six times on the 24-ha farm, the farmer could maintain a total herd of 110 goats and 40 cows, and substantially increase his profitability, such that it was hailed as a model farm by the local farmers and organizations. We collected some on-farm biophysical productivity data from a non-recovered area, an extensively degraded pasture (DP), and two closed SPS areas, one with 3-year-old trees (SPS 3) and the other with 17-year-old trees. The DP and the SPS were compared in terms of percent soil cover, mulch cover on land, and stand density and species composition of trees; total biomass productivity and the biophysical water storage in SPS 17 were also estimated. The DP, which the farmer described as the least deforested area on the farm, had a shrub/tree density of 462 per ha and a total of 18 tree species, compared with the corresponding values of 1,867 & 2,154 and 20 & 30 tree species for SPS 3 and SPS 17, respectively. The soil cover values in the dry season were 48% for both SPS systems and 12% for DP. The average mulch cover values (g m^{-2}) ranged from less than 100 in DP to 420 in SPS 3 and 1,200 in SPS 17. For SPS 17, the annual dry matter productivity (cactus+grass+trees) was estimated as 40 Mg ha^{-1} and the annual biophysical water storage in cactus (assessed as 85% of fresh weight) was 215 Mg ha^{-1}. Costs and profits associated with this innovative SPS indicated fast (one year) returns on cactus investment. Through a series of interviews, the farmer's views on factors influencing adoption of the system by other producers were evaluated. Main constraints to adoption included pressure from local deforestation and extensive grazing practices. The study clearly indicates the promising potential of innovative SPS for recovery and rehabilitation of degraded areas, which deserves serious consideration by development and research agencies.

Keywords: Agroforestry, Reforestation, Desertification, Biodiversity, Arid regions.

References:

1. Pinheiro & Nair, 2018, Forest Systems, 27: 1-16, doi. org/10.5424/fs/2018271-12267.