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“Bridging the gap between increasing knowledge and decreasing resources”

Analysis of Biomass Production of Tamarind Trees and their Role in Local Communities of South-Western Madagascar

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Abstract

The tamarind (*Tamarindus indica* L.) is a multipurpose tree in many countries of Asia, Africa and South America. On the Mahafaly Plateau of south-western Madagascar, tamarind is one of the most important species used for charcoal production and its overuse during the past years threatens the natural stock and regeneration. For nature conservation and land management planning, information on the traditional use of this species, the species distribution, biomass and regeneration potential is needed.

Semi structured interviews (n=61) were conducted in several villages of the study region to obtain information about the traditional and actual utilisation of tamarind trees. During field surveys, the diameter at breast height (dbh), height, exploitable wood volume and stem biomass were measured for already logged tamarind trees (n= 22). Additionally, standing tamarinds trees (n = 513) were inventoried in four villages within a 16 km² sample area and the dbh, height and GPS locations were measured. Using high resolution Pléiades satellite images from 2012 and Google Earth satellite images from 2004 the crown area of all tamarind trees was identified and calculated. Based on regression analysis the relationships between dbh, crown surface, wood volume and biomass were calculated.

Tamarind trees are used mainly for charcoal production (wood), but also as food (fruit) and medicinal plant (leaves) and for traditional ceremonies (sacred tamarind). There is a high correlation between wood volume, stem biomass and dbh. Regression analysis revealed high coefficients of determination for the relationship of crown area and dbh ($r^2 = 0.72$) and crown area and stem biomass ($r^2 = 0.71$). Altogether, 0.07–0.43 tamarind trees ha⁻¹ were observed, but young trees were scarce. From 2004 to 2012, many tamarind trees were logged resulting in 10–25 % stem biomass losses. Charcoal production activities and a low regeneration rate are major threats for stands of tamarind trees on the Mahafaly Plateau.

Keywords: Mahafaly Plateau, stem biomass, *Tamarindus indica*