

Influence of fallow enrichment with different leguminous tree species and of land preparation methods on following crop production

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Content of Abstract:

One of the technologies utilized by the project SHIFT *Capoeira* to improve the fallow of the shifting cultivation systems of the Eastern Amazon is enrichment plantings with fast growing tree legumes during the fallow period. Together with the faster accumulation of biomass higher nutrient uptake rates out of deep soil layers and net nitrogen input by biological nitrogen fixation are expected. In an experiment conducted with five tree legume species (*Acacia angustissima*, *Acacia mangium*, *Inga edulis*, *Clitoria racemosa*, *Sclerolobium paniculatum*) at three planting densities (10000, 5000, 2500 trees ha⁻¹) the effect on yields of the following crops was studied versus the non enriched control as well as in two types of land preparation (slash-and-burn and slash-and-mulch). Before cropping the fallow vegetation and the enrichment trees were slashed and chopped to form a mulch layer in four of the experimental blocks. The fifth block was submitted to the traditional slashing and burning. Maize was planted shortly after land preparation and cassava was intercropped with the maize after four weeks of maize planting. A moderate fertilizer dose of N, P, and K, at 30, 60, 30 kg ha⁻¹, respectively was applied. With about 3.6 t ha⁻¹ the maize grain yield was three fold the regional average and with about 20 t ha⁻¹ the cassava tuber yield doubled the regional average. Enrichment increased both the maize and the cassava yields under fire-free land preparation and reduced them under slash-and-burn. This might be an indication that enrichment can act adversely, if combined with the traditional slash-and-burn land preparation, which possibly is due to the higher amount of nutrients extracted from the soil by the enrichment trees, lacking afterwards when they are being emitted to the atmosphere by burning.