

# Neotropical Ecosystems



**WAVES**

Water Availability, Vulnerability  
of Ecosystems and Society  
in the Northeast of Brazil

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was also estimated.

A clear seasonal pattern of litterfall was observed for all species and spacing of planting. The greatest intensity of litterfall was registered during the period of lowest precipitation and the lowest litterfall values coincided with the rainy period. Annual accumulated litterfall biomass was dependent of species and spacing. The largest accumulation provided by *I. edulis* planted at the spacing 1m x 1m was 2.3 times larger than the control, whereas the lowest (*C. racemosa* planted at 2m x 1m) production was only 1.15

times more than the control. The litter biomass ratio between planted leguminous trees and the associated fallow vegetation varied from 3:1 for systems with *A. angustissima*, *I. edulis* and *A. mangium*, and 1:1 for *C. racemosa*. Two distinct patterns of litter decomposition could be identified. *A. angustissima* and *I. edulis* showed a decrease of litter decomposition with increase of planting density, whereas *C. racemosa* and *A. mangium* presented an increase of litter decomposition increasing planting density.

### **Fallow Vegetation Enrichment with Leguminous Trees in the Eastern Amazon of Brazil: A Comparative Analysis of Cost with Traditional System**

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In the Eastern Amazon of Brazil the fallow periods after slash-and-burn agriculture are being shortened. As a consequence, there is insufficient time for the fallow vegetation recover. Planting trees as an enrichment of fallow vegetation can improve biomass accumulation and using leguminous trees might be advantageous due to the benefits of nitrogen fixation. But the main points for enrichment of fallow vegetation are: a) what is the cost to small-holders of planting trees? and b) could the wood produced in enriched fallow represent a cash income?

The presented questions were evaluated experimentally when the leguminous trees *Acacia angustissima* Kuntze, *Clitoria racemosa* G. Don, *Inga edulis* Mart. and *Acacia mangium* Willd. were planted during the agricultural period at spacing of 1 m x 1 m, 2 m x 1 m and 2 m x 2 m to enrich the following fallow. The trees were planted after harvesting of maize (June 1995) and four months after cassava had been planted. Trees and cassava grew together for 8 months until the cassava harvest (February 1996). After the last cassava weeding (between October-November 1996) the fallow vegetation started to grow as an enriched fallow. In November 1997, the trees were cut and their biomass and volume estimated.

The economic aspect of fallow vegetation enrichment depends on the production and planting cost of leguminous trees seedlings and the income from the wood produced. A density of 10000 trees ha<sup>-1</sup> produced the largest biomass, but involves the highest planting cost. According to a preliminary estimates, tree seedlings production and planting of 2500 (2 m x 2 m), 5000 (2 m x 1 m) and 10000 trees ha<sup>-1</sup> (1 m x 1 m) would represent additional costs per hectare of approximately US\$ 520, US\$ 980 and US\$ 2090, respectively, compared to the traditional system. The extend to which these costs can be lowered is difficult to envisage. Compensation may be feasible at the end if the produced wood could be sold as firewood or charcoal. *A. mangium*, yielded 34 t ha<sup>-1</sup>, 28 t ha<sup>-1</sup> and 25 t ha<sup>-1</sup> of wood with diameter of more than 5 cm at the densities of 10000, 5000 and 2500 trees ha<sup>-1</sup>, respectively. The thicker fraction of the wood can be utilized as construction material and for poles (fences for passion fruits or pepper). The other hand, the thinner fraction is an excellent material to be transformed to charcoal. Under these cost aspects, one might consider the alternative of choosing even wider spacing of the trees planted.