

AGROFORESTRY SYSTEMS: AN ALTERNATIVE FOR RURAL FARMERS IN TAPAJOS  
REGION, PARA STATE, BRAZIL

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ABSTRACT



Shifting cultivation is the most predominant agricultural practice in the Brazilian Amazon. To start a small-farmer capitalization process, a research program was initiated to introduce fruit species and fast growing and high value forest species in farming areas of which some results are shown. The cowpea mixed with forest species plantations showed satisfactory productions because the legume tolerance to trees shade during the first years of plantation establishment. The agroforestry systems can not be considered as the ideal model for all enviromental conditions but surely is a rational alternative for land use in the Amazon Region due to its moderate ecological effects.

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## INTRODUCTION

Among different land uses, the agroforestry systems are a rational alternative due to their species diversity which consequentially protects erosion and leaching of nutrients from the soil.

Of the research being developed by EMBRAPA through CPATU the modified Taungya and silvi-agriculture systems deserve mention because of their socio economic importance. Both systems have been tested by rural producers in Tapajos Region of Brazil.

### MODIFIED TAUNGYA SYSTEMS

Shifting cultivation is the most common, predominant agricultural practice in the Brazilian Amazon. Normally, a small forest area is cultivated for two or three years and is then abandoned for a time period which varies between five and ten years. This is a typical farming method adapted for the farmers survival.

To start a small-farmer capitalization process, a research program was initiated to introduce fast growing and high value forest species in farming areas. Thus, combinations were tested involving *Zea mays* (corn), *Musa sp* (banana), *Cordia goeldiana* (freijo) and *Swietenia macrophylla* (mogno).

The corn and bananas were planted in accordance with the traditional local practices. The forest species performance was satisfactory because after eight years of age the wood volume was 30.61 m<sup>3</sup> for freijo and 8.25 m<sup>3</sup> for mogno.

The traditional rural farm economy in the Tapajos Region, with income from wood sales makes it clear that the total gross production and net income per hectare per year can respectively increase 6.21% and 1.76%. If these values are confirmed on a large scale basis, they would supply additional income, proportional to the number of hectares planted by the farmers.

### SILVI-AGRICULTURE SYSTEMS FOR RURAL FARMERS



At Tapajos Region, the small farmers are dedicated to cultivating subsistence crops. Thus, in this socio-economic model, there is no possibilities for capitalization in the long term.

In January, 1986, an experiment was initiated using a farming area of 1.5 hectares, with the objective to study a productive agroforestry model adapted for small farmer conditions and which could function like a capitalization mechanism. The species involved were *Dypterix odorata* (cumaru), freijo, *Vochisia maxima* (quaruba), mogno, *Carapa guianensis* (andiroba), *Bertholletia excelsa* (castanha-do-brasil), banana, *Theobroma grandiflorum* (cupuaçu), *Inga* sp (inga), corn and *Vigna unguiculata* (cowpea).

At the present moment the forestry species and bananas are having a respectively good survival rate 90% and 100%. The average production of corn was 1,470 Kg/ha in 70% of one hectare (MARQUES, 1987).

## THE COWPEA TEMPORARY MIXED WITH NATIVE FORESTRY SPECIES

The good reception to food crop introduction with forestry species is due a reduction of forestry plantation costs, as well the decreased frequency of crop tratements through the introduction of crops in forestry plantation.

In an experiment held in Belterra (Para State) freijo, *Bagassa guianensis* (tatajuba) and *Jacaranda copaia* (parapara) was mixed with cowpea. In the 3rd year the forestry species friejo, tatajuba and parapara showed continous height increment of 1.20 m, 1.50 m and 1.60 m respectively.

The cowpea production was satisfactory only in the third year because the climate conditions were adverse in plantatios during the first two years. From an agronomic point of view the cowpea is a real option for mixture with forest species because bisesdes affording a good production per hectare (645 Kg/ha for these spspecies, averaging 82.40% of each hectare) will also be able to permit partial amortization of the mixture if it had been possible to plant since the begining. This crop also showed satisfactory results with others mixtures in the Brazilian Amazon. In agreement with UEPAE-MANAUS (1980) the cowpea income when mixed with *Hevea sp* (rubber tree) and *Paullinea cupana* (guarana) was 780 Kg/ha and 900 Kg/ha respectively. Besides this, the cowpea yeld when mixed with freijo was 805 Kg/ha (UEPAE-MANAUS, 1981). By the other side these results are showing that cowpea production is a real option for mixing with forestry species because it offers a good yeld and doesn't seem to suffer from the presence of trees during the first plantation years or in the plantation establishment.

## FINAL CONSIDERATIONS

The agroforestry systems mustn't be considered as the ideal model for all Amazon Region conditions. Meanwhile there is literature agreement that these systems do offer a rational alternative for land use because they moderate harmful effects in their surroundings because they are multi-stratified as native forest.

For the small farmer it would be interesting if the Government would encourage an incentive program for agroforestry systems creating conditions for gradual capitalization, considering that to begin these systems it is necessary to create the infrastructure for the production of seeds and seedlings on large scale.