

PROGRAMA FINAL

# FOREST 96



## 4 SIMPÓSIO INTERNACIONAL SOBRE ECOSISTEMAS FLORESTAIS ( 4<sup>th</sup> INTERNATIONAL SYMPOSIUM ON FOREST ECOSYSTEMS )

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## RAINFOREST SILVICULTURE RESEARCH PROJECT<sup>1</sup>

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The Amazon basin contains over half of the world's tropical rain forests. Over half of the Amazonian forests, about 330 million hectares, are in Brazil. Of these, about 200 million ha are classified as having potential for long-term production of timber, as well as other forest products. However, many of the forest soils are of low fertility, only 10% of Amazonian soils being classified as agricultural fertile. Commercial exploitation of forest products, including timber for national and world markets is a logical option for some Amazonian forests; it takes proper account of pressures to exploit a major resource in the national and regional economic interest. This is presently a major political issue in the Amazonia and one which forests and environmentalists must confront. The formulation of a policy for the rational use of this resource should be based on sound scientific knowledge, to ensure the conservation and sustainable exploitation of the region's forests and their resources. The development of management systems for the humid tropical forests and for the regeneration of commercially valuable species is among the main aims of Amazonian forestry research. In the early years of Amazonian logging, from the 1950s, most industrial timber extraction was in the riverine, seasonally flooded *várzea* forests, harvesting especially *Virola surinamensis*. At that time, the dryland forests, which are the subject of this project, were relatively inaccessible. Since the late 1960s, following major road construction, coinciding with the exhaustion of the *Araucaria* forests in the south, there has been a major expansion in sawmills and logging in the Amazonian dryland forests. The intensity of logging varies greatly. Low intensity logging generally does not cause severe disturbance. However, high intensity logging, using heavy machinery, has a more severe environmental impact, and is usually carried out without planning or technical controls. These harvesting methods, developed empirically, have led to very strong physical impacts on the remaining forests, which could prejudice future harvests.

Silviculture research into dryland forests started in the 1960s, especially in Curuá-Una and Tapajós. It began (and has continued) on a small scale, while logging has expanded rapidly. Continued research is needed to develop harvesting systems to reduce the damage to the remaining forests.

For successful management, it is also essential to understand the growth of tropical forest and to be able to increase its productivity. The basic research methods used for this is continuous inventories of permanent plots set up in several places for different types of study. It is also necessary to develop our knowledge of silvicultural treatments to promote increased growth rates and to reduce the interval between harvests (the cutting cycle). In order to test these results, trials and demonstrations are needed on an operational scale. Investigation of different intensities and methods of logging, and of silvicultural treatments, are required on an experimental scale. This will help to give a scientific basis for operational silvicultural and management systems for Amazonia.

The purpose of the Rainforest Silviculture Research Project 'improved forest management and sustainable exploitation of the forest resources of Legal Amazonia'. The main expected outputs are: 1. Knowledge of ecology and dynamics of natural forests increased; 2. Sustainable production systems for natural forests developed and promoted; 3. The scientific and technical basis for the use and conservation of genetic resources increased; and 4. Capability of CPATU/EMBRAPA to develop and deliver new technology with respect to sustainable forest management strengthened.

The main activities to get output 1 are as follows: studies of the ecology of regeneration in forest gaps; reproductive biology of

Amazonian forest trees of economic interest; and distribution patterns of economically important Amazonian species. Activities for output 2 are: studies of thinning techniques for tropical moist forests including comparison of methods for restocking after commercial logging; growth and yield of *terra firme* forests in Brazilian Amazonia; study of simulation models for the growth and productivity of tropical forests of the Brazilian Amazonia; Techniques and guidelines for management of *terra firme* forests, and recommendations for implementation; study of alternative methods of mechanical extraction of timber and timber residues; economic analysis of experimental forest management and of commercial harvesting in Para State; and establishing the feasibility of sustainable forest management in the agricultural settlement areas in the Marabá region. Activities for output 3 are: basic studies on seed technology and storage; establishment of provenance trials and seed stands for economically important Amazonian tree species; and studies of forest genetics for management and conservation. Activities for output 4 are: development of database systems for handling herbarium specimens, seed and tree mapping information; human resource development of CPATU through training placements and study tours; and development of technology transfer systems to improve promotion and uptake of research results.

The main research areas are located in: Tapajós National Forest, municipality of Santarém, Pará State (silviculture, forest management, growth and yield, logging, thinning, phytosociology, reproductive biology, seedling ecology); Belterra, municipality of Santarém (management of secondary forest, enrichment, genetics and breeding); Revolta, municipality of Santarém (seedling ecology); Paragominas, Pará State (logging); Jari Amapá State (silviculture, management of natural forest, logging, growth and yield); Moju, Para State (logging, silviculture, thinning techniques, enrichment, seedling ecology, reproductive biology); Marabá, Pará State (extraction of logging residues); and Itupiranga, Pará State (non-timber products in colonist areas).

The main results are: pilot silvicultural system, including logging methodology, silvicultural treatments, growth rate and yield, monitoring (permanent sample plot system); four softwares developed (Temporary Inventory System, Pre-harvesting Inventory System, Continuous Forest Inventory System, and CPATU Forest Growth Model); two softwares adopted (Treewizard, for register and mapping, and Brahm's to be used in herbarium); support to reforestation, with some selected species for planting, and a modern Forest Seed Laboratory, involving all research on seed technology and operating as a major tree seed centre.

## COLHEITA DE RESÍDUOS DA EXPLORAÇÃO MADEIREIRA PARA PRODUÇÃO DE CARVÃO VEGETAL EM MARABÁ-PA<sup>1</sup>

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### RESUMO

A crescente demanda de madeira para produção de carvão vegetal usado no processamento de minério de ferro em usinas siderúrgicas, tem aumentado consideravelmente a pressão sobre as florestas, consequentemente causando um impacto negativo no meio ambiente.

Em Marabá, no Estado do Pará a COSIPAR-Companhia Siderúrgica do Pará, opera um alto-forno cuja produção anual é de 15000 toneladas, que equivalem a 120000m<sup>3</sup> de madeira