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## Research on silviculture and management of natural forests in Brazilian Amazonia<sup>1</sup>

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The Brazilian Agriculture Research Agency (EMBRAPA) has produced over eight thousand different technologies for agriculture, husbandry, forestry and agroindustry. It is based in all the Brazilian states with 37 research centres distributed throughout the country. Within this agency, the Centre for Agroforestry Research of Eastern Amazon (CPATU) has, as its main research areas, natural resources and environment, genetics and breeding, annual crops, husbandry, forestry and agroindustry.

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 economic interest. This is presently a major political issue in the Amazon, and one which foresters 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 regional 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.

The Brazilian forest law of 1965 ruled that all logging in natural forests should be based on management plans. Legal requirements have included planning programmes. There is now some experience and understanding of the species and methods successful locally for reforestation, but more trials are needed before detailed planting techniques can be recommended for different situations. The shortage of stored seeds and of reliable reforestation methods remains a barrier to implementing reforestation on anything more than the current token scale. Seed collection and production areas for valuable species are basic to resolving this problem. The CPATU forestry research programme deals with these issues, including the following elements: Ecology - studies of the ecology and dynamics of natural regeneration and of the growth of seedlings and trees, the stocks of seeds and germination in forest gaps of different sizes, and flowering and fruiting periodicity (phenology); Silviculture - studies of the impact of different cutting cycles and silvicultural treatments (thinning, canopy opening, ringing and others, including permanent sampling plots and simulation models); Reproductive biology, phenology and seed dispersal of trees of commercial and conservation importance are under study; Harvesting - economic analysis of existing systems and a trial of alternative methods in natural forests have been carried out, including extraction of logging residues such as branches; Enrichment - trials are in progress dealing with forest regeneration, including technical and economic results; Genetic variability studies using traditional field evaluation as provenance and progenies trials, seed collection and planted areas for ex situ conservation and low to moderate individual selection in some experimental plots to increase the amount of seed available for planting programme; Seed supply - facilities for seed testing and research on dormancy, germination and storage.

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<sup>2</sup> EMBRAPA - CPATU.