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Primary Forest Management in Eastern Amazonia

*Research Underway Carried Out by
Embrapa and Its Partners*

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Research on Primary

Since 1993, Embrapa Amazônia Oriental has been carrying out research and development activities in natural forests of the Amazon, as part of a program of cooperation between the Brazilian and British governments regarding the environment of the Legal Amazon, through their respective cooperation agencies, ABC (Brazilian Cooperation Agency) and DFID (Department for International Development).

Great advances have been obtained regarding functional knowledge about the forest, more specifically with respect to plant structure and natural plant regeneration, as well as reproductive biology of tree species and seed production and collection.

Outstanding research results were obtained in floristic composition, spatial distribution of plants, diversity of tree species, forms of tree growth, ecological groups, the dynamics of clearings, forest growth, reproductive and pollination systems, phenology, seed production and dispersion.



Natural forest management research was continued, mainly in relation to developing a silviculture system to be applied to business management and another system to be applied to forest management on small properties. The "Brazilian Silviculture System for Upland Amazonian Forests SSB", proposed by Embrapa in 1989, has been improved during the research activities through this Contract.

Since 1993, with the support of the Contract, Embrapa Amazônia Oriental has developed various tools to be used in this silviculture system, among which are the software programs: SFC (Continuous Forest Inventory System) designed to assist forester in making technical decisions with respect to forest management; TREMA (Tree Mapping and Utilities) for mapping trees and managing forestry data banks, used mainly in planning forest utilization; and CAFOGROM (Cpatu Forest Growth Model), a forest growth simulation and production model whose development was based on data from 52,000 trees monitored in 135 permanent plots, which allowed for the empirical analysis of long term management options. These tools are available for use by clients.

The research projects determined the value of forest products and services in settlement areas (agricultural frontiers) and the relation between forest subsystems and other systems existing on the agricultural establishment.. Small property management may be a viable alternative for forest resources sustainability in these areas.. A forest management system tailored for small properties is still in the testing phase. The great merit and novelty in this system is that its development, from the very beginning, had the effective participation of producers and their organizations in the communities of Sítio Novo, in the Municipality of Itupiranga, and Josinópolis, in the Municipality of Marabá, both in the State of Pará.

Two research laboratories at Embrapa Amazônia Oriental have been supported by the Embrapa/Dfid Contract: the Forest Seed Laboratory and the Botanical Laboratory. The first was constructed and equipped with resources from the Contract. The second was equipped and, especially, and the IAN Herbarium was computerized.

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In addition to these laboratories, Contract resources permitted the construction of the Moju Training Center which will be extremely important in supporting the NAFA Project (Forestry Support Nucleus of the Amazon), as well as research to be carried out at that Experimental Station.

Results obtained from research projects developed to date, via the Contract, have contributed in a significant manner to the forestry development policy for the Amazon. Recommendations were made to IBAMA (the Brazilian Institute for the Environment) which completely revised management plans effective in the Amazon Region, canceling about 20% of them and suspending another 50%. IBAMA also led a transparent and participatory process of revising forestry legislation for the Amazon.

In addition, Normative Order No. 80/91, published by IBAMA, which for the first time disciplined forestry management in the Brazilian Amazon, incorporated the essence of the Brazilian Silviculture System for Amazonian Upland Forests-SSB, developed by

Embrapa and perfected within the scope of the Contract.

An Evaluation for Future Research Activities

Natural forest research developed in the time frame of 1993-1998, through the Embrapa/DFID Contract, falls within the context that natural forest management in the Amazon should be, in principle, in harmony with the conservation of natural resources. Biotic (especially forest integrity), physical and anthropic elements produced the parameters for generation of knowledge and technology within the scope of the Contract so that research results might give the support necessary for this forestry activity to promote the economic and social benefits desired, but with the maximum of respect for the environment. Sustained timber production alone is not the main focus. A priority on equal standing with good management is that of conserving, as much as possible, intra-and

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inter-specific diversity, as well as the forest ecosystem itself.

Advances in knowledge obtained on forest functions, the technology and procedures generated and, especially, the set of software programs developed/adapted, although instrumental, are not sufficient by themselves to promote change in the direction of forestry management activities in the Amazon Region. The central problem is in the management or administration of forest resources. The present scenario must be changed, the role of government clearly defined, on all levels, and that of the private sector, as well. Administration should fall to the governmental sector and, whether on an industrial or a community level, the private sector should be guaranteed the right to use forest resources.

Under the present state of affairs and existing structures, the confrontation between timber supply and demand with regard to forest-industry-market

framework, especially in relation to the foreign market, places management in a handicapped situation. Market demand is for only a few species, while forest supply, within a management regime, should be for the entire community of species in order for good management objectives to be reached.

Linking the forest to industry, according to present policy, has advantages in the aggregate value of the timber, but it also has its disadvantages. Companies may have a hard time forming their stock for commercialization in predefined forestland areas, considering that the species do not occur with the same frequency and spatial distribution in the forest.

The creation of state and municipal forests, for the purpose of management, and the operation of national forests existing today are measures compatible with the principle of managing forest resources, which are public property. Timber stocks available for periodical commercialization, taking the management plan into consideration, would be previously negotiated. In addition, several other aggregate issues would be tackled, especially those which are more critical, such as the economic feasibility of management and land ownership problems which cause investors a certain amount of insecurity. In forests specifically set aside for this end, there would be greater flexibility in elaborating management plans, considering that a greater number of species in one area would be utilized.

One aspect which deserves consideration in the scope of the contract is the transferal of technology. In this first phase, the Contract participated intensely in generating technology, whereas, now, the transferal of this technology to the client must be emphasized. Changing from the propagation of research results, where supply is the main focus, to the development/adaptation of technology in the participatory model will be the great challenge for the future. In this process, the joint efforts of all the actors interested and involved in the practice of good management, although more complex, should certainly give the necessary speed to adopting new technology.

Another component is basic research directed toward





- Genetic systems of the species in a databank DENDROBASE; and
- A tropical version of Eco-Gene, evaluating the effects of management intensity.

This project will substantially contribute to developing indicative criteria for genetic sustainability of forest management operations. Given its thematic complexity, the

project will have the collaboration of various institutional groups (both domestic and international) and on various levels of involvement. The project should last 5 years.

NAFA

Brazilian Government policy is to decentralize many functions, distributing them to state and municipal levels. This fact has pointed to the need for institutional strengthening on a municipal level. The NAFA Project answers this need by establishing a technology transfer program with the Municipality of Moju, in the State of Pará, in order to capacitate it in relation to sustainable management practices and procedures for their forest resources NAFA was conceived based on the challenge to contribute toward sustainable development through a new model of transfer technology focusing on clients or groups which utilize the forest and the land as a means of survival. The experimental and pilot character of the project may furnish important lessons for other initiatives in the Amazon

This project should approach the following aspects:

- Reinforcing municipal capacity to plan, manage and monitor the forests under its control;
- Establishing operational structures, methods, procedures and techniques needed to create a forestry nucleus (commissions, consultative groups, procedures for research, transfer of technology and services); and
- Strengthening of Embrapa Amazônia Oriental and its institutional partners to generate and transfer technology needed to the Municipality of Moju.

knowledge vis à vis reproductive biology and genetic structure of the stands. In spite of the advances obtained to date, this area of research continues to be a critical point. Continuation of these studies should have the support of modern instruments to obtain more rapid results which should be incorporated into the principles of good management.

Future Actions: Dendrogene and Nafa

Presently, Embrapa Amazônia Oriental and DFID are in advanced stages of negotiating two new research projects: the **DENDROGENE** (Genetic Conservation in Managed Forests in the Amazon) and **NAFA** (Amazonian Forestry Support Nucleus).

DENDROGENE

The reproductive system of many tree species is quite complex, involving the interaction of insects, birds and mammals which are extremely susceptible to forestry practices. Consequently, genetic sustainability criteria should orient decisions to determine which trees should be included in the harvest plan.

The objective of the **DENDROGENE** Project is to support decision making in forestry management, based on scientific knowledge. This project will approach four components:

- Improving capacity for identifying species;
- Instruments for selecting trees for harvest to be used by foresters: the TREMA software package;