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Simpósio

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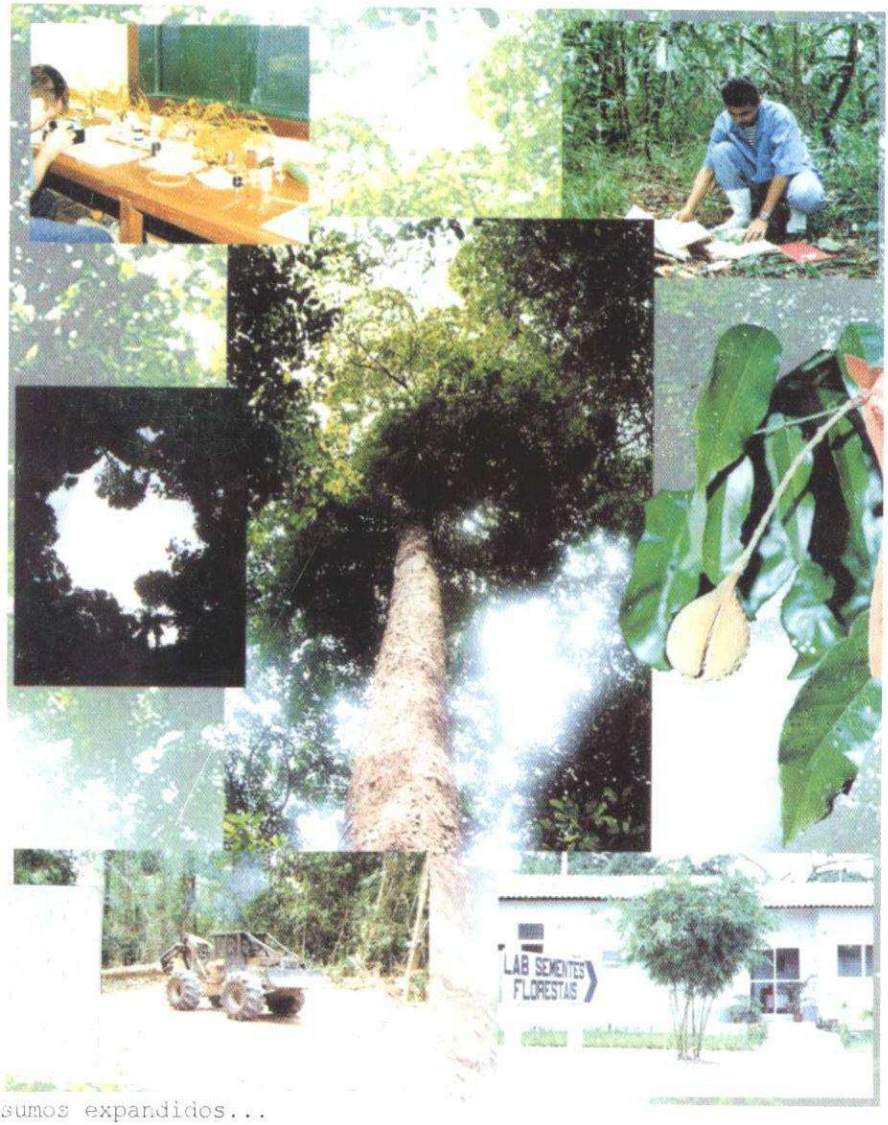

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SILVICULTURA NA AMAZÔNIA ORIENTAL:

Contribuições do Projeto Embrapa/DFID

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Resumos Expandidos

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DENDROGENE - Genetic Conservation within Managed Forests in Amazonia[1]

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The conservation of the Amazonian forest biodiversity depends upon managed forests as well as completely protected areas. The continued utilisation of the forest resource for a wide range of goods and services depends on the adoption of sustainable management practices. Such practices are promoted through legislative measures. Public awareness and interest has been raised and attempts are made to promote sustainable management through consumer-driven measures for which the development of certification schemes are necessary. Both legislative and market-driven approaches rely on practical means to assess the sustainability of given management practices. The manager needs also to be empowered to assess and choose between options based on their sustainability. Central to assessment are appropriate criteria and indicators.

One particular aspect of sustainability which some would argue underpins other aspects, is genetic sustainability which has as a goal the maintenance of life's variation which is the basis for nature's robustness. Despite much improved theoretical knowledge, criteria and indicators which can be applied in practice have not been found.

This poster describes a project proposal, DENDROGENE, which seeks to address this important gap.

Dendrogene aims to develop tools which can be used to assist in the formulation and application of sustainability criteria and indicators by linking theoretical scientific knowledge, simulation modelling, species identification capacity building and parallel developments in forest management software. The development of a simulation model which can be used to scientifically evaluate and certify the genetic sustainability of forest

[1] A concept proposal derived from the existing Rainforest Silviculture Research Project (Embrapa Amazônia Oriental/DFID) and submitted to the Department for International Devlopment-DFID, UK

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management at the species level is of crucial importance. Therefore, a main focus in this project is to work towards the adaptation of ECO-GENE (http:/www.rrz.uni-hamburg.de/OekoGenetik/index.htm) to the tropical rainforest. In order to be able to apply such a model forestry managers must be able to reliably identify species, and be able to assess and alter proposed management decisions based on the model predictions.

Genetically sustainable forest management is a complex issue and requires attention at various levels. For example, there are still significant gaps in our knowledge regarding the reproduction and genetics of commercially important forest species which hamper attempts to draw meaningful conclusions about how they should be managed to promote genetic sustainability. Furthermore, tools to test hypotheses regarding the impact of management on genetic structure have only recently been developed for temperate forests (e.g. ECOGENE) and are as yet not adapted to the complexities of tropical ecosystems. New developments in forest management support tools (e.g. TREMA) offer the opportunity to incorporate existing species knowledge and assessment procedures and apply them to field operational decisions, such as the selection of trees to be logged in polycyclic management systems. Developing and applying accurate species-specific information requires improved species identification both at research and field management levels, a major challenge in the diverse forests of Amazonia.

DENDROGENE will develop tools which can be used to assist in the formulation of genetically sustainable criteria and indicators in the following way: taxonomic research and development of field identification procedures; species information (population density and distribution, reproductive ecology and genetic data) will be entered within a databank or 'expert system'; the databank will form the basis for the adaptation of a genetic management simulation model, ECO-GENE (tropical version), which will be used to estimate the impact of different types and intensities of management on the genetic structure and dynamics of tropical tree populations under management regimes; initially outputs of the databank, and finally this model, should be incorporated within the forest management decision making support tool TREMA for transfer and adoption by forest resource managers at all levels. Figure 1 attempts to show an integrated view of the concept at different levels. At one level elements such as criteria, indicators and impacts are considered; and at another level considerations such as ecosystems, populations and different models integrated through the Dendrogene concept are outlined (adapted from Scholz, pers. comm.).

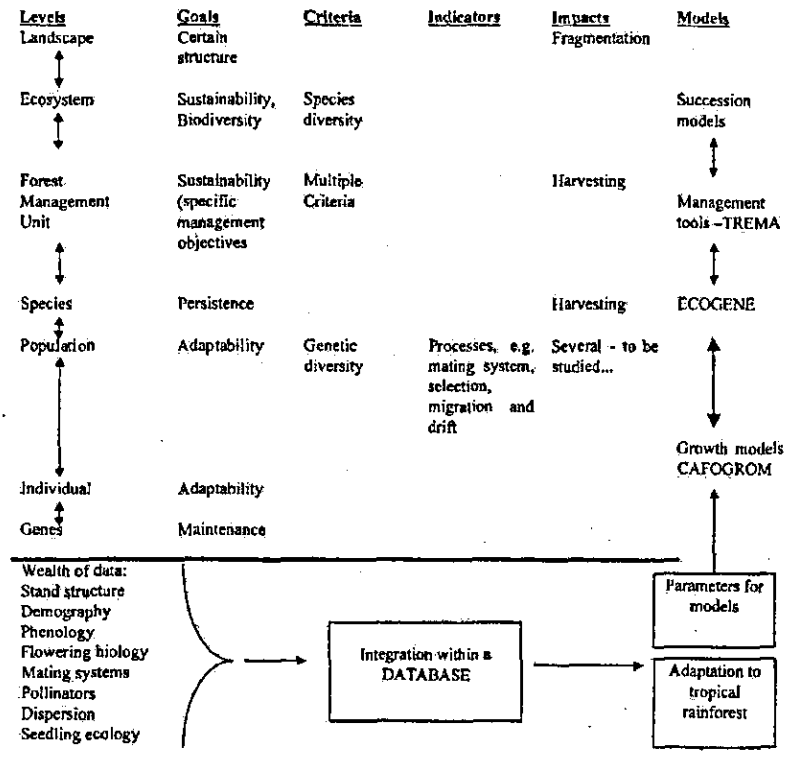

Figure 1. Flow diagram of Dendrogene concept (adapted from Scholz, pers. comm.).

Along with many other Brazilian and international institutions, Embrapa Amazônia Oriental has conducted research on Amazonian forests, in areas such as species composition, phenology, breeding system, genetic structure, pollen vectors, seed dispersal, seedling demography, regeneration dynamics, growth and stand structure. An important concern, however, is that the results of such research have had little impact either in terms of creating criteria and indicators for improved genetically sustainable forest management or in influencing operational management decisions.

Aware of the complexity of these issues, the Dendrogene proposal is

seeking to address several relevant concerns in an integrated fashion. It acknowledges the fact that Embrapa Amazônia Oriental alone will be unable to address all these issues and has therefore sought to draw together a partnership of like-minded institutions. The Dendrogene workshop (held May 11-13, 1998 Belém-Pa, Brazil), was the first concrete example of this partnership. It aimed to draw upon international experience within partner institutions to determine the technical feasibility of adapting existing technologies and, where appropriate, developing new technologies to meet the proposed objectives. It also aimed to address the institutional capacities and resources of potential collaborators, intellectual property issues, and project management and funding structures. Several national and international researchers have been identified as potential collaborators and each situation will be dealt with specifically during the process of developing the full proposal, or even some collaborators may become involved later on a specific subject.

The general consensus among participants at the DENDROGENE workshop (experienced national and international scientists), was that it is worthwhile proceeding with the approach outlined above. This approach could bridge the gap between theoretical genetic knowledge and practical forestry management decisions and develop indirect measures by which criteria and indicators of sustainability could be produced. The analysis of the efficiency of increasingly scientific approaches to genetic sustainability assessment within forest management will have important implications for forest policy. This effort will also have strategic implications for other areas of the tropics.

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