TROPICAL FOREST PLANTATIONS

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Contents

1. Introduction

Providing a brief description of plantation forestry in the tropics is complicated due the large diversity of site conditions, traditions, experiences and needs regarding tree planting. With the exception of a small number of countries of the Americas, Africa and, principally, Asia, where commercial plantations of a few species have expanding very quickly, in most countries reforestation is at very low scale, mainly at the social and agroforestry level. At the commercial level, plantation establishment is supported mainly by private enterprises that are able to use intensive techniques to assure a high productivity of the plantations. At the 'social' level there are still many important limitations, both political and technical, that block the development of small scale forest plantations.

Reforestation activities have been dominated by a small number of exotic taxa, e.g. *Pinus, Eucalyptus*, *Gmelina arborea* and *Tectona grandis.* The number of native species used in reforestation projects has been low, although there is interest in the

identification of native species with potential for reforestation. In this field it is important to include work in genetic improvement, and *in-situ* and *ex–situ* gene conservation. Additionally, more work is needed on silvicultural techniques for 'social' plantations and on the processing and marketing of the products, in order to increase the economic benefits and, concomitantly, farmers' motivation to plant more trees.

2. Reforestation in the tropics

2.1 Negative effects of deforestation

The high biodiversity of the tropical region has been widely recognized. Nevertheless, recent decades have seen a rapid decline in this richness, due mainly to expansion of the agricultural frontier. It is estimated that about 30% of the world's terrestrial area is forest, of which 50% is found in the tropics and subtropics. These subtropical and tropical forests are home to around 95% of the world's trees species. It is estimated that at least 97% of this forest cover is the product of natural regeneration and only 3% is composed of plantations. In most tropical developing countries, reforestation is not considered as a productive or remunerative activity.

The negative impact of the loss of this forest cover is alarming and includes: destruction and degradation of many species of plants and animals, degradation of the soil, damage to water sources, desertification, and climatic changes are all producing a strong negative impact in all sectors of society. Also, in rural areas where natural forests have been eliminated, communities are experiencing increasing difficulties in providing fuelwood and poles for agriculture, fences and rural constructions.

2.2 Direct benefits of reforestation

In tropical regions, small, medium and large forest plantations are established mainly for the purpose of supplying community fuelwood and poles for rural construction and industry. These are some of the more important direct benefits that landowners can obtain from tree planting.

Large industrial plantations have been established mainly in tropical countries where there are economic incentives for reforestation by private enterprises interested in the production of timber, plywood and paper, as in Colombia, Brazil, Mexico and some Asian and African countries. All of these represent some of the more common direct benefits from forest plantations.

2.3 Indirect benefits of reforestation

Reforestation has many important indirect benefits in rural and urban communities, Unfortunately, the main interest usually is concentrated in the direct rather than in the indirect benifits. Among indirect benefits are: 1. The protection and improvement of the soil conditions. This is a particularly important point in tropical regions with high rainfall during the year and hilly lands where soil erosion may reach more than 60 tons ha^{-1} yr^{-1}. The reforestation of such degraded sites is increasingly recognized as an important benefit of reforestation. Such plantations need to be scientifically managed,

in order both to protect the ground cover and generate some economic resources for the local communities; 2. The use of plantations both for grazing and as a source of fodder from tree foliage in areas having long dry periods; 3. The use of forest species as shelterbelts in coffee and cacao plantations and as windbreaks; 4. Planting trees improves water infiltration, reducing the risks of floods and increasing the availability of water, a vital consideration in many tropical countries; and, 5. Mixed species plantations, including native species, is an important means of increasing habitat availability for flora and fauna.

Urban reforestation also has high potential to improve microclimate and reduce the impact of health risks such as smoke and noise transmission. The greenhouse effect produced by the rapid increase in the atmospheric concentrations of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (NO_2), is likely to continue increasing. The use of plantations to sequester CO_2 is an important indirect benefit of reforestation particularly when used as a short-term solution. In addition, such plantations meliorate the local climate, lower temperatures and increase humidity. Apart of these indirect benefits, farmers obtain direct benefits when they harvest the trees.

2.4 Reforestation is a priority in the tropics

In tropical countries, the conversion of the remaining areas of natural forest to agriculture and pasturelands continues. Apart from the strong negative effects on the climate and biodiversity, it is becoming increasingly difficult to satisfy demands for wood products. For this reason, reforestation must be considered in most of the tropical countries as a high priority for protection and restoration of soil and water and for industrial and smallholder wood production.

In the 10th World Forestry Congress one of the recommendations was that "A large increase in the area of plantations is an absolute necessity to satisfy the growing demand for wood products, to reduce the stress on natural forest ecosystems and to sequester atmospheric carbon". However, in spite of this recognition that reforestation helps meet the basic needs of industry, improves rural incomes and improves the critical situation of the environment, current activity is insufficient to counter the negative consequences of deforestation. It is clear that the reforestation must take a wide variety of forms, from large-scale plantations for wood industry to small-scale diversified tree-planting activities of farmers.

Another important point is that implementation of reforestation strategies requires policy decisions at several levels including national and international. These policy initiatives should be directed at forestry institutions and be related to the real situation of the communities and the countries, with the backing of national governments and international organizations and the support of forest services, voluntary organizations and local people. In most countries, promotion of reforestation faces serious problems. These include the lack of government interest and support, the perception of reforestation as a non-productive activity, the lack of reproductive material of high genetic quality, and the lack of the technical knowledge and experience necessary for rational silviculture, processing and marketing.

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