TROPICAL HARDWOODS

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Summary

Tropical trees generally found around the equator exhibit great diversity in form and species richness. They form forests that may be lush green rainforests, dry deciduous or scrub and thorny forests. Bamboos and rattans are a unique and valuable component of tropical hardwoods. Trees in the tropics are the source of a number of products such as timber, medicine, food, rubber, etc. in addition to maintaining the quality of the environment. Unfortunately, these trees are a dwindling resource, being put under tremendous pressure by tree cutting, logging and over-exploitation, owing to a burgeoning population and their demands. In order to conserve them, some strategies have been suggested, but in any case the involvement of the people is a must.

1. Introduction

Tropical hardwoods are predominantly found around the equator between the Tropic of Cancer and the Tropic of Capricorn forming a belt of green-life. They are diverse and vary from lush green rainforest to dry savannas. Thousands of species of plants and animals exhibiting unique diversity and richness are found here. They provide shelter to a variety of life forms. Geographically, tropical forests are found along the southeast coast of Brazil, the Guinea coast, the Zaire basin and eastern Madagascar in Africa. In Asia, they are found in the Himalayas (north and south slope), southeastern parts of India, Malaysia, Indonesia, Thailand and New Guinea. They can also be seen in Australia as a narrow discontinuous strip along the eastern coast. For instance, in Amazonian Ecuador, tree richness (with dbh > 10 cm) was found to be 473 per hectare. A single tree is known to harbor many hundreds of species, particularly of insects, e.g., 1 200 species of beetle were found to take shelter in a tree in Panama. Another distinctive feature of these forests is the presence of high degrees of endemism. Out of

18 areas with very high endemism in the world, 14 are found only in the tropics. In these areas, about 15% of all species are endemic. . Here, tall trees, shrubs, herbs, epiphytes, cacti, climbing palms and herbs represent plant life. . Due to the high richness of species, invaders find it difficult to invade these forests.

2. Types of Tropical Forests

Tropical Rain Forests

These forests occur in three main areas of the world (a) Amazon and Orinoco basin of South America, and the Central American Isthmus, (b) regions in central and western Africa and Madagascar, and (c) in the region of Indo-Malaya-Borneo-New Guinea. In these regions, general ecological features are the same, yet the composition varies. Some of the characteristic features of these forests include high temperature, humidity and annual rainfall (200-500cm), rapid growth of plants with low risk of fire, mineral poor soil (due to heavy leaching) and quick rate of litter decomposition. These forests are very productive as the mineral nutrients are tied up in the vegetation. Four variants of the tropical rain forests can be recognized e.g., heath forests, cloud forests, riverine or galley forests and mangroves. *Heath forests* found in South America develop on coarse siliceous sands characterized by free draining; the leaves are microphyllous, on low statured trees. Trees are adapted to mineral deficiency and water-stress. *Cloud forests* found in Africa have small trees with a low and dense canopy; whilst those in New Guinea and South America have a thick crown of small leathery leaves. . Epiphytes, ferns, bryophytes and flowering plants are very common. *Mangroves* are found in muddy shores of estuaries and deltas that are exposed to tides. Trees are evergreen with thick leaves that are well adapted to saline conditions. Vivipary (Vivipary is the condition where the embryo [the young plant within the seed] starts growing while still attached to the parent plant) is common in Mangroves. Various aerial roots develop for aeration. *Riverine or Galley forests* are found along the banks or flood plains of rivers.

Tropical Deciduous Forests

These are common in places where there are deserts and savannas (open grassland with scattered trees) on one side and rain forests on the other. These forests are characterized by irregular distributions of rainfall. Wet and dry seasons are almost of the same duration. In areas where rainfall is regular (e.g., monsoon forests found in tropical Asia), these forests are very well developed.

Tropical Scrub or Thorn Forests

Found in the arid areas of Africa, Australia, Brazil and parts of Asia, these are represented by short stunted trees or shrubs. Trees are thorny with small leaves that are lost during the summer season.

Bamboos and Rattans

Both bamboos and rattans constitute a valuable genetic resource in the tropics. Bamboos are perennial fast growing tall woody grasses whereas rattans are climbing palms. These

are highly sought after these days because of their multiple uses. They are used for making furniture, mats, chair seats, handbags, walking sticks, etc. Bamboos on the other hand are also a source of delicious foods and medicines. Bamboos are distributed widely in the tropics whereas the rattans are restricted to the rainforests.

3. Economic and Environmental Evaluation

Tropical hardwoods are the source of a number of valuable products (rubber, fruits, nuts, rattan and bamboo products, medicines, wood, fodder, charcoal etc.) and hence play an important role in the global economy. They provide a livelihood for millions of people throughout the world. Some of the commercially important timbers are mahogany, teak and Gmelina. Tribes often seek shelter in such forests and their lifestyle has been relatively unchanged over the centuries. Some of the best-known drugs are derived from Tropical Hardwoods, such as quinine which is derived from the bark of *Cinchona* trees. These forests also support tourism because of their recreational and scenic beauty. They are also a source of water for domestic use and hydroelectric power. Because of their rich diversity, particularly the moist tropical forests often fascinate explorers, naturalists and timber merchants resulting in high logging activity in these forests.

Tropical hardwoods have a great influence, particularly on the local climate. Through excessive transpiration, a large amount of water is returned to the atmosphere by these hardwoods, leading to increased humidity, rainfall and a cooling effect. Apart from preventing floods and erosion, they counteract the greenhouse effect by fixing atmospheric carbon dioxide.

Unfortunately, tropical forests are under intense land-use pressure. They are being rapidly converted into agricultural lands or pastures. Industrialization, deforestation, changes in cultivation practices and several other human activities have further enhanced the rates of loss of tropical hardwoods. They are being overexploited for wood and non-wood products. Rates of deforestation, however, are greatly influenced by continent type and habitat, and they are very difficult to estimate from fragmentary satellite data and ground level evaluations. According to an FAO study, 110.5 million hectares of closed tropical forests are being destroyed every year; unless some strict measures are adopted, this will affect biodiversity at both local and landscape scales. Southeast Asia is the worst affected. Due to overexploitation, habitat fragmentation, poaching and hunting, several tropical species have become vulnerable and some are on the verge of extinction. This may also be attributed to their narrow range of tolerance and very high degree of endemism. Deforestation is also dramatically changing the tropical forest landscape and waterscape, which may affect the local climate. Further, changing agricultural practices coupled with deforestation are increasing soil erosion and the pollution levels of streams and rivers that pass through these forests. This has further affected the complexity, diversity and trophic levels of these unique forests. Modern machinery like saws and tractors that enhance logging are also responsible for fast disappearing species diversity in these forests. Thousand of species of birds and animals e.g., Orangutan, Mountain Gorilla, and Puerto Rican Parrot that find food and shelter in tropical hardwoods are also threatened. Clearing of trees for fuel-wood, fodder, wood products and agriculture is an age-old practice. With burgeoning

populations, these practices have multiplied. Slash-and-burn agriculture, where local people clear small patches of forest for farming has also added to the agony. This practice is very common in northeast India. Historically, in this practice the older patches of land were restored into forests. But more recently, because of population pressure and degradation of land, instead of forests only small bushes, invasive weeds or savannas develop on such patches. In rural areas in dry tropical forests of some developing countries, fuel-wood and fodder pose acute problems. Here, tropical hardwoods are being converted into savannas and grasslands. This also reduces the commercial value of the trees. Therefore, we need to protect and conserve this valuable resource throughout the world.

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