

GE 2211 Environmental Science and Engineering

Unit – I

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Forest Resources

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Contents

- forest resources: use and over-exploitation, deforestation, case studies. Timber extraction

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Forests

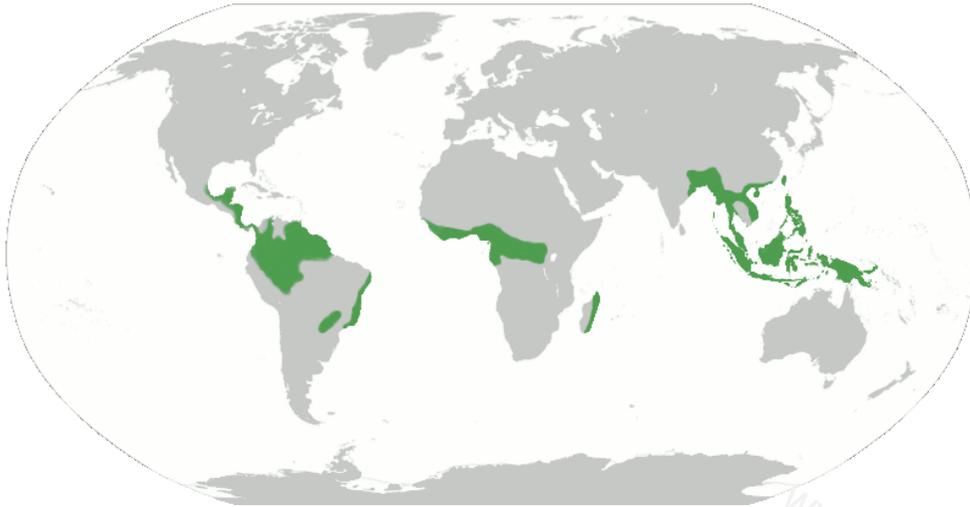
- An area with high density of trees
- Increasing demand for timber, combined with poor management of remaining forest stands, is a major threat to forests worldwide
- Forests cover about 30% of total land area (World)
- Forest area: Tamil Nadu - 17.6% ; India - 20.6%
- Serves as: habitats for organisms, water cycle modulators, and soil conservers
- As a general rule, *broadleaf forests* are more species-rich than those dominated by gymnosperms *needle leaf forests*, although exceptions exist

Rainforests

- Characterized by high rainfall, with minimum annual rainfall of 1750-2000 mm (Tamil Nadu: ~ 1000 mm)
- From 40 to 75% of all species on Earth are indigenous to the rainforests
- Two types of rainforests: tropical and temperate
- Tropical rainforests have been called the "jewels of the Earth", and the "world's largest pharmacy", because of the large number of natural medicines discovered there

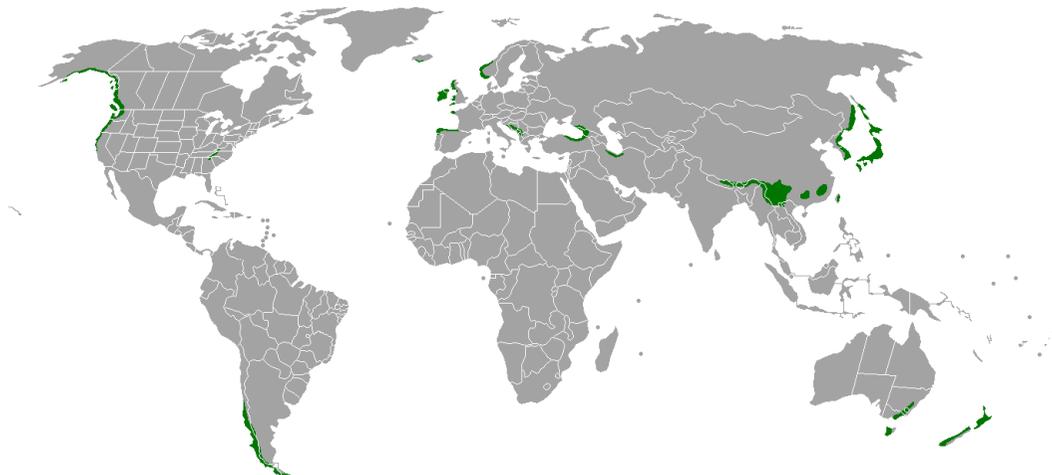
Tropical rainforests

Tropical rainforests are rainforests in the tropics, found near the Equator (between the Tropic of Cancer and Tropic of Capricorn)



Temperate rainforests

Temperate rainforests are rainforests in temperate (free from extremes; mild) climates



Types of Forests



A conifer forest in the Swiss Alps



A broad leaf forest in Valparai
(Tamil Nadu)



Rain forest in Queensland
(Australia)

Forest Resources

- Timber products – lumber, plywood, veneers, pulp woods, charcoal, etc.
- Non-timber products – gums, flowers, fruits, seeds, leaves, root, stem bark, fuel wood, animals, birds, fish, insects, medicinal plants, etc.
- Environmental services – soil and water conservation, flood control, outdoor recreation, aesthetics, biodiversity, wildlife conservation

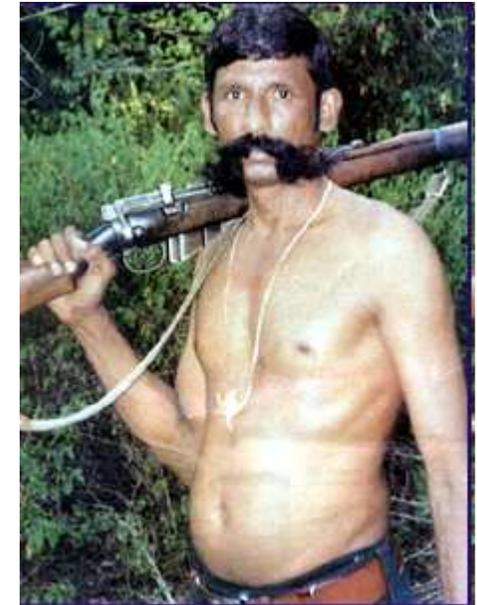
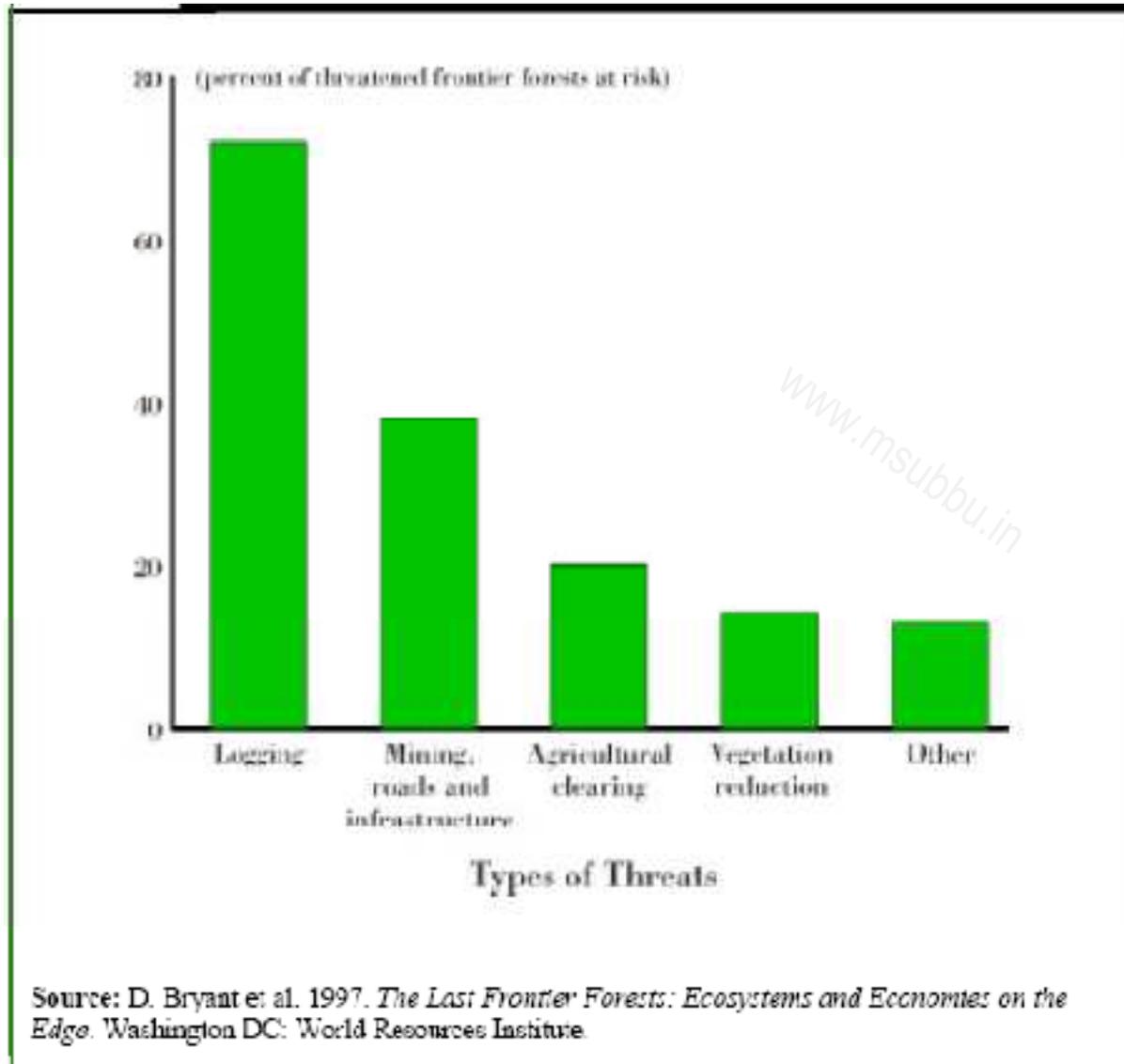
Impacts of Over-exploitation of Forest Resources

- Environmental impacts
 - Loss of biological diversity due to habitat degradation, over-hunting in previously inaccessible areas, and general forest disturbance
 - Damage to rivers and streams with impairment of water quality, and loss of fish stock
 - Increased emissions of CO₂, contributing to global climate change
 - Increased soil erosion following loss of tree cover, leading to silting up of water courses, and loss of agricultural productivity
- Social impacts
 - Loss of cultural diversity as indigenous people are forced from their traditional lands

Growth of Demand for Forest Resources

- Demand for forest products continues to grow.
- United Nations data show that total global roundwood consumption (including fuelwood and charcoal) increased by 40 percent between 1970 and 1996
- Inhabitants of the United States, Japan, and Western Europe consume on average about ten times as much wood per person as the average developing country citizen.
- Per capita consumption in rich countries is now growing slowly, or even declining in some places.
- The most rapid growth is in the poorer countries, such as China, India, Indonesia, and Brazil, where growing affluence, literacy, and populations are projected to lead to a doubling or tripling of demand in the next few decades.

Threats to Frontier Forests



Deforestation





Rio Huaypetue gold mine and associated deforestation as viewed from an airplane
Location: Southeastern Peru; from Cuzco to Boca Manu

Forest Cover of Tamil Nadu

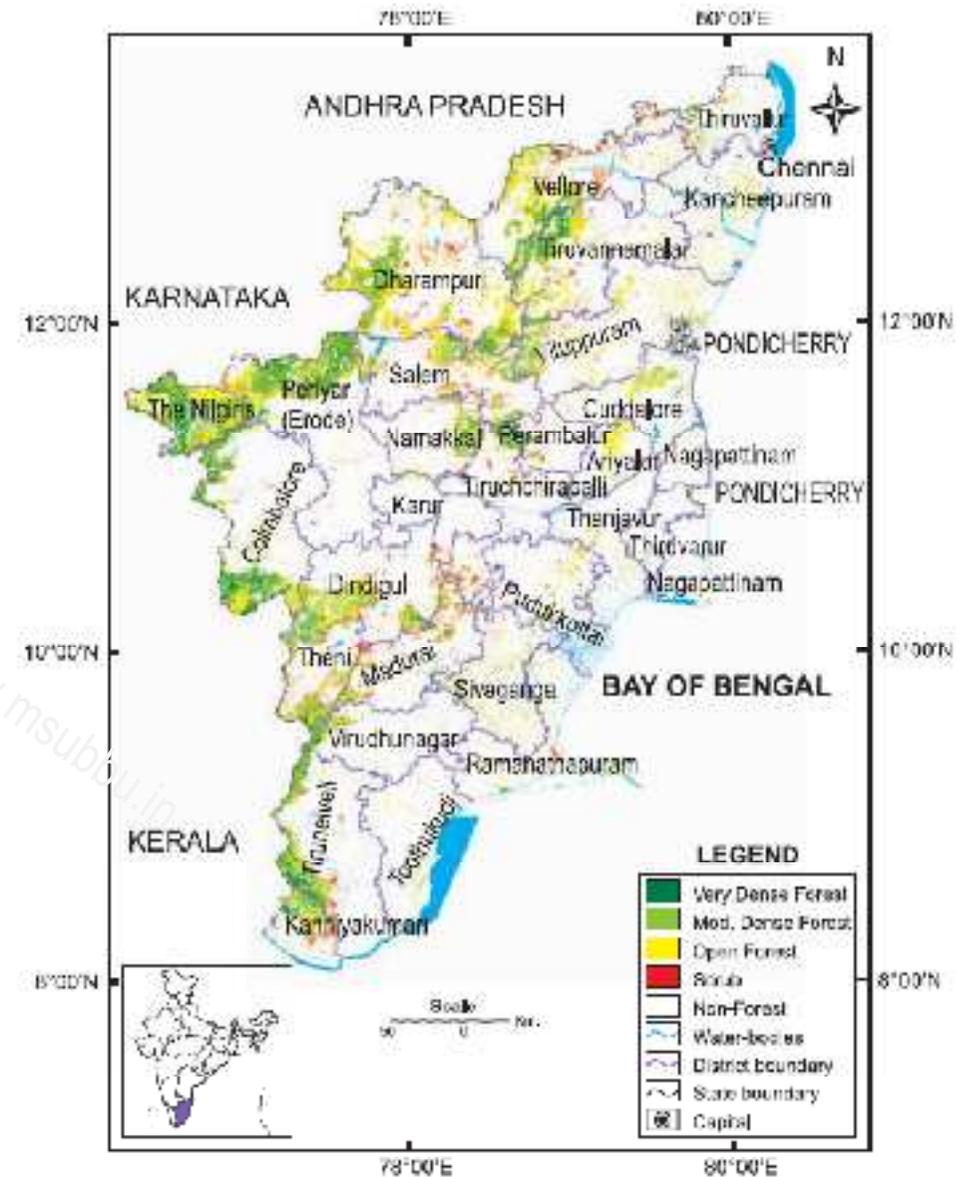


Fig. 8.25 : Forest Cover Map of Tamil Nadu

Forest Survey of India, 2005 (Ministry of Environment and Forest)



Forest Management

- Forests are renewable resources. Although they are renewable, they take a long time to regenerate
- Given the threats to forests, there are many different techniques by which they can be conserved and managed

Forest Management Techniques

- **Reservation of forest areas**
 - demarcation of certain areas as “reserved” is one of the techniques of forest management that has been adopted the world over.
 - Forests that are reserved are generally under state control and people have rarely any right over them
- **Urban forestry** – a relatively new and important area of forest management (city green belts, forested watersheds of municipal reservoirs, small patches in residential and commercial areas)
- **Social forestry and Agroforestry** – afforestation practices
 - *Social forestry* - plantation of indigenous or exotic species on all the available land (community land, road/rail sides, canal ridges and fields) so that people are able to fulfill their fuel and fodder needs.
 - *Agroforestry* is a part of social forestry, albeit with one difference – in that it has been modified to include afforestation on cultivated land, i.e., along with crops

Forest Management Techniques (contd.)

- Joint Forest Management
 - involves forest department and the local communities in partnerships to conserve and manage forest areas
 - The Government retains the ownership rights to the forest areas and the villagers who assist in looking after these are given a share of the profit from the forest regeneration, such as the right to collect some non-timber forest produce like gums, oils, resins, etc.



Forest Acts in India

- The Indian Forest Act, 1927
 - notification of reserved forest areas
- The Forest Conservation Act, 1980
- The Environment Protection Act, 1986