

The background features abstract, overlapping green geometric shapes in various shades of green, ranging from light to dark, creating a modern and organic feel. The shapes are primarily located on the right side of the page, with some extending towards the center.

# **Unit 1**

## **Introduction to Forest, Forestry and Silviculture**

# Learning Objectives

After completing this unit you shall be able to:

- ▶ Define forest, forestry and silviculture
  - ▶ Know the classification of forests and forestry
  - ▶ Appreciate Forests in India and
  - ▶ Describe the history of development of forestry in India
- Learning Objectives

# What is Forest?

**Forest:** Derived from Latin word 'Foris' = 'outside' means simply wild or uncultivated land regardless of cover

## Definitions of Forest

*"A plant association predominantly of trees or other woody vegetation occupying an extensive area of land"*

*(American Society of Foresters)*

*"An area set aside for the production of timber and other forest produce, or maintained under woody vegetation for certain indirect benefits which it provides, e.g., climatic or protective"*

Simply it is *"A plant community predominantly of trees and other woody vegetation, usually with a closed canopy"*.

Or

*"An area of land proclaimed to be a forest under a forest law"*

Our country has redefined forests *"A forest is a land area of at least 0.05 ha, with a minimum tree crown cover of 15%, and tree height of at least 2 m"*.

*"Forest Cover" includes "all lands with more than 1 ha area with more than 10% tree canopy density irrespective of their legal status and species composition"*

India State of Forest Report 2011

**"Forest"** as the Land having trees of more than 5 meters spread in over 0.5 hectares and with more than 10 per cent canopy cover, or trees able to reach these thresholds *in situ*

Food and Agriculture Organization (FAO)

# What is Forestry?

## Definitions

*“The science, art and practice of managing trees and forests and their associated resources for human benefit.*

Canadian Forest Service

*“Forestry is the theory and practice of all that constitutes the creation, conservation and scientific management of forests and the utilization of their resources to provide for the continuous production of the required goods and services”*

*The science, art and business of creating, managing, and conserving forests and associated resources in a sustainable manner to meet desired goals, needs, and values – note the broad field of forestry consists of those biological, quantitative, managerial, and social sciences that are applied to forest management and conservation; it includes specialized fields such as agroforestry, urban forestry, industrial forestry and international forestry*

*(Adopted by IUFRO 2000).*

# Branches of forestry

Forestry has five different branches:

1. **Silviculture** (Deals with theory and practice of raising forests crops i.e., the methods of raising tree crops, their growth and after care up to the time of final harvesting).
2. **Forest Mensuration** (Deals with the determination of dimensions, form, volume, age and increments of the logs, single trees, stands or whole woods)
3. **Silviculture system** (A set of procedures by which the forest crops are tended, removed and replaced by new crop of the same or other species)
4. **Management** (Practical application of sequence technique and economics to forest estate for the production of certain desired results)
5. **Utilization** (Branch of forestry which deals with harvesting, marketing conservation and applying the forest produce to a variety of uses eg. Timber, fuel, charcoal, pulp wood, ply wood).

## Branches Based on the objectives

1. **Protection of Environmental Forestry** (Protection of land, regulation of water cycle, Wild life conservation Modernization of climate conditions, combination of above)
2. **Commercial or Production Forestry** (Timber and other raw materials)
3. **Social Forestry** (Raising forests outside the traditional forest with the involvement of society)
  - i) **Community Forestry** (The practice of forestry on lands outside the conventional forest area for the benefit of local population and involvement of community in the creation and management of such forests)
  - ii) **Farm Forestry** (Raising forest trees on farms lands)
  - iii) **Extension Forestry** (includes the activity of raising trees on farm lands/ villages wastelands/ community forest areas/ road side areas, canal banks and railway lines (Anon., 1976).
  - iv) **Agro-Forestry** (a sustainable land management system which increases the yield of the land by combining agriculture crops and forestry crops together on the same piece of land)
  - v) **Recreational Forestry** (Enhancing scenic beauty near towns and cities)

# Classification of Forest

## A) Classification according to origin of forest

- i) **High forest** (Forest originated from seeds)
- ii) **Coppice forests** (Forest originated vegetative from suckers or sprouts from stump)

## B) Based on species composition

- i) **Pure forests** (a forest composed of almost entirely of one species (not less than 80%))
- ii) **Mixed forests** (a forest composed of trees of two or more species under the same canopy)

## C) National Forest Policy of 1952

- i) **Protection Forests** (forests which must be preserved or created for physical and climatic considerations)
- ii) **National Forests** (maintained and managed for meeting needs of defense, communications, industry, and other general purposes of public importance)
- iii) **Village Forests:** Those forests which have to be - maintained to provide firewood to re-lease cow-dung for manure, and to yield small timber for agricultural implements and other forest produce for local requirements, and to provide grazing for cattle;
- iv) **Tree Lands:** Those areas which though outside the scope of the ordinary forest management are essential for the amelioration of the physical conditions of the country.

**According to National Commission on Agriculture (NCA)** (1976) Three major categories. These are as follows:

1. **Protection Forests:** (Maintaining forest with a view to conserve flora, fauna, soil and water, increasing water yields, reducing floods and droughts, amelioration of climatic conditions. The practice forestry for these purposes is called Protection Forestry).ields, reducing floods and droughts, amelioration of climatic conditions, etc. is called Protection Forestry.
2. **Production Forests:** The practice of forestry with object of producing maximum quantity of timber, fuel wood and other forest produce is called Production Forestry. The production forestry can be further classified into:
  - (i) **Commercial Forestry:** Commercial forestry aims to get maximum production of timber, fuel wood and other forest products as a business enterprise.
3. **Social Forests:** Social Forestry is the practice of forestry which aims at meeting the requirement of rural and urban population. The object of social forestry is to meet the basic needs of community aiming at bettering the conditions of living through:
  - Meeting the fuel wood, fodder and small timber requirements
  - Protection of agricultural fields against wind
  - Meeting recreational needs and
  - Maximizing production and increasing farm returns

# Advantages of Forests

## A) Direct benefits

- ▶ **Timber uses** (commercial use as well as non-commercially. The timber uses in construction houses, manufacture of windows, doors and furniture etc. Wood-based panel and paper/paperboard)
- ▶ Uses as fuelwood and charcoal
- ▶ Fodder for domesticated animals
- ▶ Non-timber forest products (NTFP) such as wild edibles, latex, wild cocoa, honey, gums, nuts, fruits and flowers / seeds, spices, condiments, medicinal plants, rattan, fodder, fungi, berries and also includes animals and their products

## B) Indirect Benefits

- ▶ Conservation of Biological Diversity
- ▶ Watershed protection
- ▶ Arresting landslides and erosion
- ▶ Control of floods
- ▶ Recharging of natural springs
- ▶ Carbon storage and sequestration
- ▶ Tourism and recreation values
- ▶ Amenity values
- ▶ Option and existence values

# National Forest Policy -1894

- ▶ The purpose of this policy was to lay down general principles for forest management in India. Forest Policy of India triggered the development of forest policies in various other countries under the British Empire of that time. The basic principles of this policy were:
- ▶ The main objective of management of State forests is public benefit. In general, the constitution and preservation of a forest involve the regulation of rights and the restriction of privileges of the user of the forest by the neighbouring population
- ▶ Forests situated in hill slopes should be maintained as protection forests to preserve the climatic and physical conditions of the country, and to protect the cultivated plains that lie below them from the devastating action of hill torrents
- ▶ Forests which are the store-house of valuable timbers should be managed on commercial lines as a source of revenue to the State
- ▶ Ordinarily, if a demand for agricultural land arises and can be met from a forest alone, it should be conceded without hesitation, subject to the following conditions:
  - ▶ - honeycombing of a valuable forest by patches of cultivation should not be allowed;
  - ▶ - cultivation must be permanent and must not be allowed so to extend as to encroach upon the minimum area of forest that is needed to meet the reasonable forest requirements, present and prospective;
  - ▶ - forests that yield only inferior timber, fuel wood or fodder, or are used for grazing, should be managed mainly in the interest of the local population, care should be taken to see that the user does not defeat its subject and the people are protected against their own carelessness.

# National Forest Policy-1952

This national policy stressed on the following points:

- ▶ persuading the people to give up the harmful practice of shifting cultivation;
- ▶ increase of the efficiency of forest administration by having adequate forest laws;
- ▶ giving requisite training to the staff of all ranks;
- ▶ providing adequate facilities for the management of forests and for conducting research in forestry and forest products utilization;
- ▶ controlling grazing in the forest; and
- ▶ promoting welfare of the people.

# National Forest Policy-1988

Basic objectives of the policy were:

- ▶ Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country
- ▶ Conserving the natural heritage of the country by preserving the remaining natural forests with the vast diversity of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country
- ▶ Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.
- ▶ Checking the extension of sand-dunes in the desert areas of Rajasthan and along the coastal tracts
- ▶ Increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.
- ▶ Meeting the requirements of fuelwood, fodder, minor forest produce and small timber of the rural and tribal populations.
- ▶ Increasing the productivity of forests to meet essential national needs.
- ▶ Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- ▶ Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests

# Forests of World and India

The total forest and tree cover of the country is 8,07,276 sq kms (which is 24.56 per cent of the geographical area of the country) compared to 8,02,088 sq kms (24.39 per cent) as reported in 2017 (ISFR 2017). The report marked an increase of 5,188 sq kms of forest and tree cover combined, at the national level as compared to the previous assessment

| Region                          | Forest area, 2005<br>(mill. ha) |
|---------------------------------|---------------------------------|
| Africa                          | 63,5412                         |
| Asia                            | 571,577                         |
| Europe + all Russian Federation | 1001,394                        |
| North and Central America       | 705,849                         |
| Oceania                         | 206,254                         |
| South America                   | 831,540                         |
| World                           | 3,952,026                       |

Source: FAO, 2006a

# What is Silviculture?

## Definition

“The theory and practice of controlling establishment, composition and growth of the forest”. In other words, Silviculture is that branch of forestry which deals with the establishment, development, care, and reproduction of stands of timber or forests. In general, Silviculture may be defined as art and science of growing and reproducing timber stands on permanent or regular basis.

# Aims and objectives of silvicultural practices

- ▶ The objectives of silviculture may be one or more of the following:
- ▶ To yield produce of a definite description, for instance trees and shrubs of special beauty, or trees giving a certain kind of timber, or other produce fit for particular purposes, such as grass, turpentine, etc.
- ▶ To produce greatest quantity of wood or other produce per acre and per year.
- ▶ To produce the highest possible money return on the invested capital.
- ▶ To produce certain indirect effects, for instance, influence on climate, to regulate the 'drainage of the country, to prevent landslips or avalanches, to arrest shifting sands

# Source of silvicultural knowhow and scope of silviculture

- ▶ Knowhow of fundamental plant physiology, which helps in understanding the basic relations of plants to the factors that influence their growth and development
- ▶ Forest ecology which helps in understanding the relationship of forest crop with surrounding biotic and abiotic factors
- ▶ Silvicultural systems which helps which system will be appropriate under given set of conditions to achieve the objectives
- ▶ Forest itself gives much information to the observer
- ▶ Existing literature on the silviculture of object crop species

# Further Readings

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