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# **FORESTRY**

**Agriculture & Rural Development  
(ARD) Notes**



**FOR NABARD GRADE A EXAM**

# Forestry

## ARD Notes for NABARD Gr. A Exam

### Basic Concepts of Forest and Forestry

#### Definition:

- Forest, a vast expanse covered by trees in the definition for the existence of trees, The vast land covered by the huge canopies of trees is called a **forest**.
- **Forestry** is defined as the theory and practice of all that constitutes the creation, conservation and scientific management of forests and the utilization of their resources, the science or practise of planting, managing, and caring for forests.

#### Classification of Forests:

##### Forests can be classified on the basis of:

1. Age,
2. Method of regeneration,
3. Composition,
4. Ownership,
5. Object of Management,
6. Growing Stock.

##### 1. Classification of Forest on the Basis of Age: Forest is classified into:

- A) Even Aged Forest:** Even-aged forests, also called regular forests are those consisting of even-aged woods. Even – aged wood means trees of approximately the same age.
- B) Un-Even Aged Forests:** A forest is called uneven-aged or irregular when trees vary widely in age.

##### 2. Classification of Forest on the Basis of Regeneration: Forests are identified into

- A. High Forest:** When regeneration is obtained from the seed.
- B. Coppice Forest:** When regeneration is through coppice or some vegetative part of the tree.
- \* **Natural Forest:** When the regeneration is obtained naturally, the forests are called natural forests.
- \* **Man-Made Forest:** When it is obtained artificially, the forests are called Man-made forests or Plantations.

### 3. Classification of Forest on the Basis of Composition: Forests are classified into:

- A. Pure Forests:** Pure forests are composed almost entirely of species, usually to the extent of not less than 50 percent.
- B. Mixed Forests:** Mixed forests are defined as forests composed of trees of two or more species intermingled in the same canopy.

### 4. Classification of Forest on the Basis of Management: Forests are classified into

- A. Protection Forests:** Protection forests are those which are managed primarily for ameliorating climate, checking soil erosion and floods, conserving soil, and water, regulating stream flow and increasing water yields and exerting other beneficial influences.
- B. Production Forests:** Production forests are those which are managed primarily for their produce.
- C. Social Forests:** Social forests where the product is utilised by neighbouring society.

### 5. Classification of Forest on the Basis of Ownership: Forests can be classified as

- A. Government Forests:** On the basis of Legal status, Government forests are further classified into:
  - a. Reserved Forests:** A Reserved Forest is an area with complete protection, constituted according to chapter II of the Indian Forests Act. 1927.



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- b. **Protected Forests:** A Protected Forest is an area subject to a limited degree of protection constituted under the provisions of chapter IV of the Indian Forest Act. 1927.
- c. **Village Forests:** A Village Forest is a state forest assigned to a village community under the provisions of chapter III of the Indian Forest Act.

#### B. Private Forests

##### C. Forests owned by Corporations, Panchayats, Societies, and other Agencies.

#### 6. Classification of Forest on the Basis of Growing Stock: A forest can be classified into

- A. **Normal Forest:** A Normal Forest is an ideal forest with regard to growing stock, age class distribution and increment and from which the annual or periodic removal of produce equals to the increment and can be continued indefinitely without endangering future yields.
- B. **Abnormal Forest:** Abnormal Forest is one that is not normal, i.e. growing stock, age, class, distribution of stems, increment, etc. are either in excess or more usually in deficit than the normal forest.

### Classification of Forestry

- A. **Protection Forestry** The practice of managing the forests for their protection function is called Protection forestry.
- B. **Production Forestry** The practice of forestry with the object of producing maximum quantity of timber, fuelwood 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, fuelwood, and other forest products as a business enterprise.
- (ii) **Industrial Forestry:** Industrial forestry aims at producing raw materials required for the industry. In Production forestry, there is a greater concern for production and economic returns.
- (iii) **Mixed Quality Forests**
- (iv) **Valuable Forests**
- (v) **Inaccessible Forests**

## Principles of Silviculture, Forest Mensuration, Forest Management and Forest Economics

**Silviculture** is the practice of controlling the growth, composition/structure, and quality of forests to meet values and needs, specifically timber production.

### Branches of Forestry

1. **Silviculture:** It refers to certain aspects of theory and practices of raising forests crops, methods of raising tree crops, their growth and aftercare up to the time of final harvesting.
2. **Mensuration:** It deals with the measurement of forest produce ex. Dimension from the volume, age and increment of individual trees and forest crop.
3. **Silviculture system:** Process by which the crops constituting a forest are tended, removal and replaced by new crops
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 etc.

### Object of Silviculture

1. Control of Crop Composition and Production of Species of More Economic Value
2. Control of Stand Density, for Production of Maximum Volume
3. Afforestation of Blank and Under Stocked Areas

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4. Production of Quality Timber
5. Control on Rotation Period:
6. Facilitate management and use of the forest.

## Concept of Social Forestry Agroforestry Joint Forest Management

**Social forestry** refers to the management and protection of forests and afforestation on barren lands, **social forestry** aims to start new forests or protect existing forests from deforestation.

**Joint forest management** is a concept of developing relationships between fringe forest groups and forest departments on the basis of mutual trust and jointly defined roles and responsibilities for forest protection and development.

**Social Forestry:** - **Social Forestry** is the practice of forestry which aims at meeting the requirement of the rural and urban populations. **The object of social forestry** is to meet the basic needs of the community aiming at bettering the conditions of living through:

- (i) Meeting the fuelwood, fodder, and small timber requirements
- (ii) Protection of agricultural fields against wind
- (iii) Meeting recreational needs and
- (iv) Maximizing production and increasing farm returns

### Various forms of social forestry are:

- a) **Community Forestry:** The practice of forestry on lands outside the conventional forest area for the benefit of the local population has been called Community forestry.
- b) **Farm Forestry:** Farm Forestry is defined as the practice of forestry in all its aspect on farms of village lands generally integrated with other farm operations.
- c) **Extension Forestry:** Extension forestry includes the activity of raising trees on farmlands, villages wastelands and community forest areas and on lands along the sides of roads, canal banks and railway lines.
- d) **Agro-Forestry:** Agroforestry has been defined as a sustainable land management system that increases the yield of the land, combines the production of crops and forest plants and/or animals.
- e) **Recreational Forestry:** More recently, there has been considerable demand for Recreational forestry, which is defined as the practice of forestry with the object of developing and maintaining forests of high scenic value.

### Social forestry schemes have the main objectives to:

- Improve the environment for protecting agriculture from adverse climatic factors.
- Increase the supply of fuelwood for domestic use, small timber for rural housing, fodder for livestock, and minor forest produce for local industries.
- Increase the natural beauty of the landscape; create recreational forests for the benefit of rural and urban populations.
- Provide jobs for unskilled workers.
- Effect land rehabilitation.
- Raise the standard of living and quality of life of rural and urban people.

The **primary objective of JFM** is to ensure sustainable use of forests to meet local needs equitably while ensuring environmental sustainability. The central premise is that local women and men who are dependent on forests at the village level have the greatest stake in sustainable forest management.

### Forest policy and legislation in India

- A way of addressing society's needs and development goals while balancing various stakeholder interests.
- Strategic guidance for managing and using forests and trees.
- A comprehensive framework setting up adaptive implementation mechanisms for diverse contexts and changing conditions.



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**Aims:**

- Maintenance of environmental stability” through preservation and restoration of ecological balance.
- Conservation of natural heritage.
- Checking soil erosion and denudation in catchment areas of rivers, lakes, and reservoirs.
- Checking extension of sand dunes in desert areas of Rajasthan and along coastal tracts.
- Substantially increasing forest/tree cover through massive afforestation and social forestry programmes.
- Taking steps to meet requirements of fuel, wood, fodder, minor forest produces, soil and timber of rural and tribal populations.
- Increasing productivity of forests to meet the national needs.
- Encouraging efficient utilisation of forest produce and optimum substitution of wood.
- Taking steps to create massive people’s movement with the involvement of women to achieve the objectives and minimise pressure on existing forests.

**India state of forest report 2015**

**State of Forests Report is published by the Forest Survey of India (FSI) on a biennial basis since 1987.** The forest cover of the country is mapped through indigenous RESOURCESAT -2 satellite data with a LISS III sensor.

**Key Definitions**

- **Canopy and Canopy Density** The cover of branches and Foliage formed by the crown of trees is called Canopy, the percentage area of land covered by the canopy of trees is called Canopy density.
- **Forest Cover** All lands which are more than 1 hectare in area and with a Canopy density of more than 10% irrespective of the ownership and legal status is called Forest Cover. The area recorded as “forests” in the Government records is called **Forest Area or Recorded Forest Area**.
- The patches within the forest area which have little, or no trees are called **“Forest Blank”**. The recorded Forest Area denotes the legal status of the land.
- **E-Watch** It is a web-based GIS application developed for monitoring various activities funded under CAMPA (Compensatory Afforestation Fund Management and Planning



Authority) CAMPA is meant to promote afforestation activities in order to compensate for forest land diverted to non-forest uses).

- **Carbon Stock** It is defined as the amount of carbon stored in the ecosystem of the forest especially in living biomass and soil.

### Best Season to get Satellite Data of Forests

- October – December is the best season.
- The reflectance from the forests is dependent on the crown foliage and its chlorophyll content.
- Due to the seasonal variability of the tree phenology over the year, the season of satellite data acquisition is of utmost importance for forest cover assessment.
- Deciduous forests allow more reflectance from the ground surface during the leafless periods thus making their own detection and classification difficult.
- Hence, data of the spring-summer season is not suitable for the interpretation of such forest types.

During the rainy season, the situation is compounded due to the non-availability of cloud-free data and the mixing of agricultural and other green covers with forest cover due to similarity in their spectral reflectance.

- Taking these limitations into consideration, satellite data of the period October to December is considered to be the most suitable for forest cover mapping of the entire country.

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- However, in cases where cloud-free data is not available for this period, data of January to March is procured.

### **Types of Forest Covers**

- The degraded forest lands which have a Canopy density of less than 10% are called Scrubs.
- The Lands with a Canopy density of 10-40% are called Open Forests.
- The Land with forest cover having a canopy density of 40-70% is called the Moderately Dense Forest (MDF) The Lands with forest cover having a canopy density of 70% and more are called Very Dense Forests (VDF).

### **State of Forests Report 2015: Key Findings**

- Total forest cover in India: 7,01,673 sq km (increase of 3775 sqkm)
- Total forest cover as a percentage of geographical area: 21.34 per cent
- Total tree cover in India: 92,572 sq km (an increase of 1306 sq km)
- Total tree cover as a percentage of geographical area: 2.82 per cent
- State with largest total forest cover: Madhya Pradesh has 77, 462 sq km
- State having highest forest cover as % of its area: Mizoram (88.93 per cent)
- Increase in carbon sink: 103 million tonnes CO<sub>2</sub> equivalent

### **Top Five States with Maximum Forest Cover**

**India's top five states with maximum forest cover (in km<sup>2</sup>) are as follows:**

- Madhya Pradesh (77,462)
- Arunachal Pradesh (67,248)
- Chhattisgarh (55,586)
- Maharashtra (50,628)
- Orissa (50,354)

The top five states / UTs with maximum forest cover as a percentage of their own geographical area are as follows:

- Mizoram (88.93%)
- Lakshadweep (84.56%)
- A&N Islands (81.84%)
- Arunachal Pradesh (80.30%)
- Nagaland (78.21%)

### Mangroves Cover

- In the world's total mangrove vegetation, India's share stands at 3%. Currently Mangrove cover in India is 4740 km<sup>2</sup> which is 0.14 % of the country's geographical area.
- Sundarbans in West Bengal accounts for almost half of the total area. As compared to 2013 there is a net increase of 112 sq km in the mangrove cover.

The top five states with maximum Mangrove cover are as follows:

- West Bengal (2106)
- Gujarat (1107)
- Andaman & Nicobar Island (617)

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- Andhra Pradesh (367)
- Odisha (231)
- Mangroves are also found in Tamil Nadu, Goa, Kerala, Daman & Diu, Karnataka, and Puducherry.

### **Total Carbon Stock**

- The total carbon stock has also increased by 103 million tonnes or an increase of 1.48 in percentage terms compared to previous assessments.
- The total carbon stock in the country's forest is around 7,044 million tonnes.
- The increase in the carbon stock shows the commitment of the country towards achieving the INDC target of an additional carbon sink of 2.5 to 3.0 billion tonnes of CO<sub>2</sub>.

### **Recent Developments under the Ministry of environment**

The Ministry of Environment, Forest, and Climate Change (MoEFCC) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, coordination and overseeing the implementation of India's environmental and forestry policies and programmes.

The **primary concerns of the Ministry are the implementation of policies and programmes** relating to the conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests, and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being.

#### **The broad objectives of the Ministry are:**

- Conservation and survey of flora, fauna, forests, and wildlife
- Prevention and control of pollution
- Afforestation and regeneration of degraded areas
- Protection of the environment and
- Ensuring the welfare of animals

These objectives are well supported by a set of legislative and regulatory measures, aimed at the preservation, conservation, and protection of the environment. Besides the legislative measures, the National Conservation Strategy and Policy Statement on Environment and Development, 1992; National Forest Policy, 1988; Policy Statement on Abatement of Pollution, 1992; and the National Environment Policy, 2006 also guide the Ministry's work.

**SOURCES:**

- Min of Environment Website
- Shankar IAS book
- The Hindu Articles



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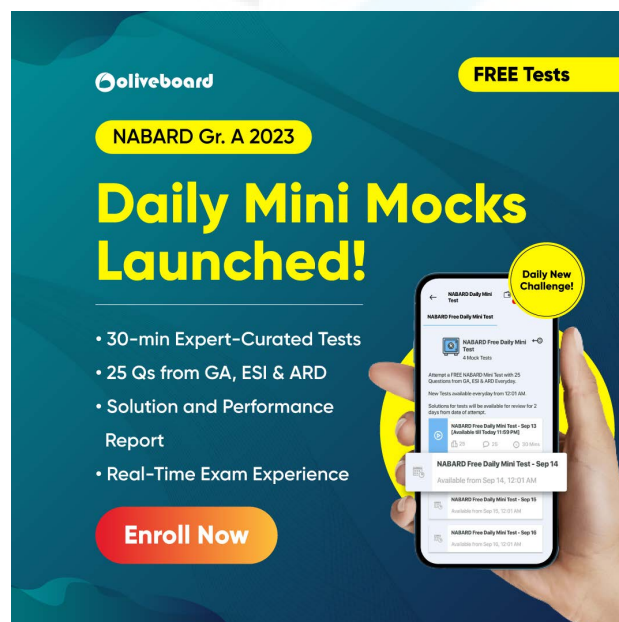
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