

# Forests in India - 1

## 1. Recorded Forest Area and Forest Cover

### Recorded Forest Area

- Forest Area or Recorded Forest Area generally refers to all the **geographic areas recorded as forest in government records**.
- It largely comprises **Reserved Forests (RF) and Protected Forests (PF)**, which have been constituted **under the provisions of Indian Forest Act, 1927**.
- It may also include all such areas, which have been recorded as forests in the revenue records or have been constituted so under any State Act or local laws.

### Forest Cover

- It refers to all **lands more than one hectare** in area, having a tree **canopy density of more than 10%**.

### Tree cover

- It refers to **patches of trees in an area less than one hectare**, including isolated trees outside recorded forest areas.

### Other areas in Forest Cover Assessment

- **'Forest Area'** denotes the legal status of the land as per the **government records**, whereas the term **'Forest Cover'** indicates **presence of trees over any land**.
- Although the majority of the recorded forest areas have vegetation cover, yet there are blanks and areas with tree density less than 10% within it or even areas without any trees. For example: wetlands, creeks in the mangroves, grasslands of sholas etc.
- On the other hand, there are areas outside the recorded forests with tree patches of one hectare and more with canopy density above 10%. Examples include plantations on the community lands, Eucalyptus, rubber, tea and coffee plantations etc.
- Such areas also constitute forest cover and are included in the forest cover assessment of the Forest Survey of India (FSI).

### Forest Cover Classification

Class	Description
Very Dense Forest (VDF)	All lands with tree canopy density of 70% and above.
Moderately Dense Forest (MDF)	All lands with tree canopy density of 40% and more but less than 70%.
Open Forest (OF)	All lands with tree canopy density of 10% and more but less than 40%.

Scrub	Degraded forest lands with canopy density less than 10%.
Non-forest	Lands not included in any of the above classes.

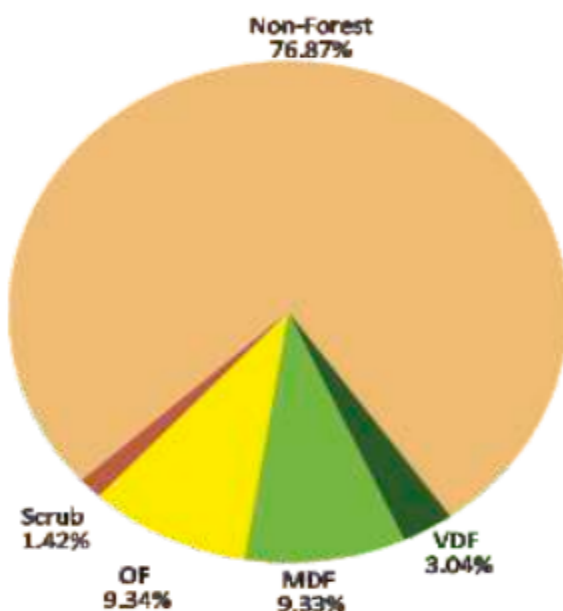


Figure.1. Pie Chart showing Forest Cover of India in 2021

## 2. India State of Forest Report (ISFR) 2021

- The Ministry of Environment, Forest and Climate Change (MoEFCC) released the **biennial** India State of Forest Report (ISFR) 2021 on January 13, 2022.
- **Forest Survey of India (FSI)**, an organization under the MoEFCC, has been carrying out forest and tree cover mapping of the entire country.
- The Forest Cover mapping was **started in the year 1987** and subsequent to this, **17 cycles** of forest cover mapping have been carried out.
- The assessment was based on **interpretation of Linear Imaging Self-Scanning Sensor 3 (LISS-III)** data from Indian Remote Sensing satellite data (Resourcesat-II).
- Satellite data for the entire country was procured from National Remote Sensing Centre (NRSC) for the period October to December 2019.

### 2.1. New Initiatives and Features of the ISFR 2021

- A **new chapter** related to the **assessment of forest cover in the Tiger Reserves, Corridors and Lion conservation area** of India has been included.
- Results of the two special studies namely **Above Ground Biomass Estimation using Synthetic Aperture Radar data** (carried out in collaboration with ISRO) and **Climate**

**hotspots in forest areas studies** (carried out in collaboration with BITS Pilani, Goa campus) are also being presented in this report.

- India's progress towards achieving the **Nationally Determined Contribution commitments** are included as part of the chapter on Forest carbon assessment.

## 2.2. Key Findings from the ISFR-2021

### Total forest and tree cover

- The total forest and tree cover of the country is **80.9 million hectares** which is **24.62 percent** of the geographical area of the country.
- There is an **increase of 2261 sq km** in the total forest and tree cover of the country.
- Increase in forest cover has been observed in open forest followed by very dense forest.
- Top five states showing **increase in forest cover** are:
  - Andhra Pradesh (647 sq km) > Telangana (632 sq km) > Odisha (537 sq km) > Karnataka (155 sq km) > Jharkhand (110 sq km).
- **Area-wise, Madhya Pradesh** has the **largest forest cover** in the country followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
- In terms of forest cover as percentage of total geographical area, the top five States are:
  - **Mizoram (84.53 per cent)** > Arunachal Pradesh (79.33 per cent) > Meghalaya (76.00 per cent) > Manipur (74.34 per cent) > Nagaland (73.90 per cent).
- The **tree cover** of the country is estimated to be **95,748 sq km** which is **2.91 percent** of the geographical area.
- There is an **increase of 721 sq km** in the tree cover of the country.

### Trees Outside Forests (TOF)

- The **total growing stock of wood** in the country is estimated as **6167.50 million cubic metres**
  - Out of which 4388.15 million cubic metres is inside forest areas and 1,779.35 million cubic metres is outside recorded forest areas (TOF).

### Bamboo Stock

- The total number of **bamboo culms has increased by 13,882 million**.
- The total estimated green weight of bamboo culms at national level is 402 million tonnes.

### Mangrove cover

- Total mangrove cover in the country is **4992 sq km**.
- An **increase of 17 sq km** in mangrove cover has been observed.
- Top three states showing **mangrove cover increase** are:
  - **Odisha (8 sq km)** > Maharashtra (4 sq km) > Karnataka (3 sq km).

### **Total carbon stock**

- Total carbon stock in the country's forest is estimated to be **7204 million tonnes**.
- There is an **increase of 79.4 million tonnes** in the country's carbon stock since 2019.

### **Forest Fire Prone Areas Mapping**

- FSI has been monitoring forest fires **since 2004**.
- Total Fire prone forest area is **35.47 percent** of the forest cover.

### **Forest Cover and decadal change in 52 Tiger Reserves and Lion Conservation Area**

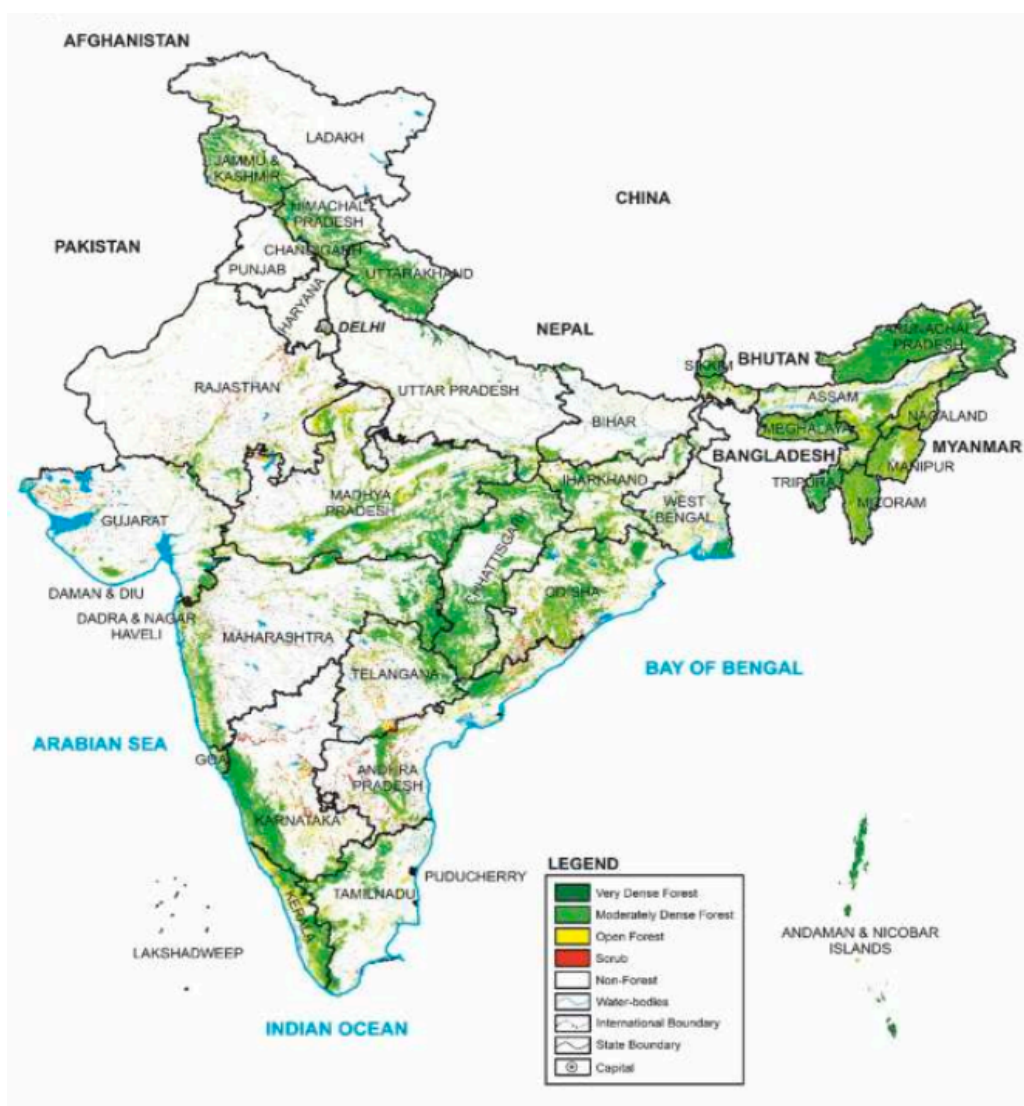
- Forest cover in 52 tiger reserves is 55,666.27 sq km, which is **7.80 percent** of the country's total forest cover and **74.51%** of the total area of tiger reserves.
- In terms of forest cover as a percentage of the area of Tiger reserves, the top five Tiger reserves are:
  - **Pakke in Arunachal Pradesh (96.83%)** > Achanakmar in Madhya Pradesh (95.63%) > Simlipal in Odisha (94.17%) > Kali in Karnataka (92.45%) > Dampa in Mizoram (92.05%).
- Gir Wildlife Sanctuary (excluding National Park), has 177.60 sq km of grassland whereas Gir National Park has 33.58 sq km of grassland, summing up to 211.18 sq km.

### **Mapping of Climate Change Hotspots in Indian Forests**

- Mapping of Climate hotspots over the forest cover in India has been carried out for the **three future time periods i.e., year 2030 (short-term climate action horizon), 2050 (long-term climate action goals) and 2085 (long-term time horizon)**.
- Ladakh, Jammu-Kashmir, Himachal Pradesh and Uttarakhand are projected to witness the highest temperature increase.
- Andaman & Nicobar Islands, West Bengal, Goa, Tamil Nadu and Andhra Pradesh are projected to witness the least temperature rise over these periods.
- The **North-Eastern States and Upper Malabar Coast** of India are projected to experience the **highest increase in rainfall**.

### **Mapping of Forest Cover in Major Mega Cities**

- The total forest cover in the seven major cities is 509.72 sq km which is **10.21%** of the total geographical area of the cities.
- Delhi has the largest forest cover (194.24 sq km) followed by Mumbai (110.77 sq km) and Bengaluru (89.02 sq km.).
- **Hyderabad** has shown a **maximum decadal increase of 48.65 sq km** in Forest cover.



**Figure.2. Forest Cover 2021**

Table: Forest and Tree cover of India in 2021		
Class	Area (sq km)	Percentage of Geographical Area
	Forest Cover	
Very Dense Forest	99,779	3.04
Moderately Dense Forest	3,06,890	9.33
Open Forest	3,07,120	9.34
Total Forest Cover*	7,13,789	21.71
Tree Cover	95,748	2.91

Total Forest and Tree Cover	8,09,537	24.62
Scrub	46,539	1.42
Non-Forest #	25,27,141	76.87
Total Geographic Area	32,87,469	100.00
* Includes 4,992 sq km under Mangrove Cover # Non-forest includes Tree Cover (Percentage rounded off)		

### 3. Forest Policies in India

#### 3.1. Forest Policy 1894

The 1894 forest policy contained the following prescriptions:

- The sole object to which the management of forests is to be directed is to **promote the general well-being** of the country, and
- The maintenance of adequate forests is dictated primarily for the **preservation of the climatic and physical conditions** of the country and, secondly, to fulfill the needs of the people.

Subject to these guidelines, permanent cultivation should come before forestry.

#### 3.2. Forest Policy 1952

- In 1952, a new National Forest Policy was enunciated, which substantially removed the angularities in the earlier policy of 1894.
- This policy, for the first time laid stress on having **at least 33 percent of land area of the country under forest cover**.

#### Key features of Forest Policy 1952

- Introduced a fundamental **concept of self-sustenance** for meeting the local and national needs and advocated extension forestry.
- It provided for control over all remaining forests in private ownership, containment of shifting cultivation, and creation of village forests.
- It **underlined the importance of forest protection, wildlife conservation**, contribution of forests in watershed management and their role in improving soil fertility, and agricultural productivity.
- The prime emphasis, however, remained on **sustainable timber production** which led to conversion of a sizable area of uneven forests into uniform crops.

- National forests should be managed under the principle of progressively increased sustained yield to meet the increasing requirements of defense, communication and industry.

### 3.3. National Forest Policy (NFP) 1988

- The 1988 policy laid prime **emphasis on conservation of forests, and meeting the local needs** of the people and their participation in protection and management thereof.
- This policy has redefined the priorities whereby the supply of wood as raw material from forests for industrial use, has been relegated in priority to the lowest level.
- This policy sets a **national objective of expanding the forest and tree cover of India to 33 percent** of the total area of the country.
  - This expansion of forests is envisaged through afforestation of wastelands (barren, un-utilised) both 'outside forests' and within recorded 'forest lands'.

#### Basic objectives of National Forest Policy 1988

- **Maintenance of environmental stability** through preservation and, where necessary, restoration of the ecological balance.
- **Conserving the natural heritage** of the country by preserving the remaining natural forests with the vast variety of flora and fauna.
- **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.
- **Increasing substantially the forest/tree cover** in the country through massive afforestation and social forestry programmes.
- Meeting the requirements of **fuel-wood, fodder, minor forest produce and small timber** of the rural and tribal populations.
- **Encouraging efficient utilisation** of forest produce and maximising 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.

#### Essentials of forest management under the NFP, 1988

- **Forest and vegetal cover should be increased** rapidly on hill slopes, in catchment areas of rivers, lakes and reservoirs and ocean shores and, on semi-arid, and desert tracts.
- **Diversion** of good and productive agricultural lands to forestry **should be discouraged** in view of the need for increased food production.

- **Provision of sufficient fodder, fuel and pasture**, specially in areas adjoining forest, is necessary in order to prevent depletion of forests beyond the sustainable limit.
- The **programme of afforestation should be intensified** with special emphasis on augmenting fuelwood production to meet the requirement of the rural people.
- Minor forest produce should be protected, improved and their production enhanced with due regard to generation of employment and income of tribal populations and other communities.

### 3.4. Draft National Forest Policy (NFP)

- The Ministry of Environment, Forests and Climate Change released the draft National Forest Policy in the year 2018.
- The draft National Forest Policy (NFP) 2018 aims for **conservation, protection, and management of forests** along with addressing other issues associated with forest and forest management.
- The draft was revised in 2019 but since then there has been no news about the final version of the NFP.

#### Some of the key features of the policy

- To **safeguard the ecological and livelihood security** of people, of present and future generations, based on sustainable management of the forests.
- **Ecologically sensitive catchment areas shall be stabilized** with suitable soil and water conservation measures, and also by planting suitable trees.
- It suggested the setting up of two national-level bodies—**National Community Forest Management Mission (CFM) and National Board of Forestry (NBF)**.
- **Public-private participation** models will be developed for undertaking afforestation and reforestation activities in degraded forest areas.
- It also suggested the strengthening of the participatory forest management approach for which a **National Community Forest Management (CFM) Mission** will be launched.
- The Policy continues with the target of having **33% of India's geographical area under forest and tree cover** and in the hills and mountainous regions, the aim will be to maintain two-thirds of the area under forest and tree cover.

## 4. Indian Forest Act, 1927

- The Indian Forest Act, 1927 was enacted after **repealing the Indian Forest Act, 1878** for the purpose of consolidating the law relating to forests, the transit of forest produce and the duty leviable on timber and other forest produce.



- This Act is an important piece of the Central legislation and various State enactments have made amendments to suit their local requirements and some of the States have enacted their own full-scale forests Acts.
- The Act makes various provisions for the conservation of forests and in the scheme, it provides for a State Government to **constitute any forest lands or wastelands**, which are property of the Government over which the Government have proprietary rights, **a reserved forest**.

#### **4.1. Objectives of Indian Forest Act, 1927**

- To consolidate the laws pertaining to forests.
- To levy duty on timber and other forest produce.
- To define forest offences acts prohibited inside the Reserved Forest, and penalties leviable on the violation.
- To make conservation of forests and wildlife more accountable.
- To spread awareness regarding the importance and critical need to conserve forests.
- To balance the impact of agrarian activities and other forest activities.

#### **4.2. Types of Forests in Indian Forest Act, 1927**

- The Act facilitates three categories of forests, namely reserved forests, village forests and protected forests.

##### **Reserved Forests**

- Most restricted forests. Constituted by the State Government on any forest land or wasteland which is the property of the Government.
- Local people are prohibited, unless specifically allowed by a Forest Officer in the course of the settlement.

##### **Protected Forests**

- The State Government is empowered to constitute any land other than reserved forests as protected forests over which the Government has proprietary rights and the power to issue rules regarding the use of such forests.

##### **Village forests**

- These forests are the one in which the State Government may assign to 'any village community the rights of Government to or over any land which has been constituted a reserved forest'.
- The State Government may make rules for regulating the management of village-forests, prescribing the conditions under which the community to which any such assignment is

made may be provided with timber or other forest-produce or pasture, and their duties for the protection and improvement of such forest.

#### **4.3. Indian Forest (Amendment) Ordinance, 2017**

- The Indian Forest (Amendment) Ordinance, 2017 was promulgated on November 23, 2017. It amended the Indian Forest Act, 1927.
- After amending Section 2(7) of Indian Forest Act, 1927, **bamboo is no longer a tree** and felled bamboo too is not a timber.
- Before, bamboo was categorized as a tree. As a result, felled or extracted bamboo, whether found in or brought from a forest, was considered as “timber”.
- The 2017 amendment provided the opportunity to promote the cultivation and commercial use of bamboo by encouraging farmers, entrepreneurs, and local communities to grow bamboo and use it for various purposes.
- However, the Act still has legal provisions, which prohibits unauthorized extraction of bamboo from the forests and empowers forest departments to prosecute any person or agency found to be doing so.

#### **Bamboo Resources of India**

- In India, bamboo grows naturally throughout the country except in the Kashmir region.
- India has the highest area (13.96 million ha) under bamboo and is the second richest country, after China, in terms of bamboo diversity with 136 species (125 indigenous and 11 exotic).

#### **National Bamboo Mission (NBM)**

- The National Bamboo Mission was initially launched in 2006.
- During 2018-19 (after the amendment of the Indian Forest Act, 1927), the Mission has been restructured to include market, value addition, product development, skill and R&D components and being implemented under the ‘National Mission for Sustainable Agriculture (NMSA)’.
- The restructured NBM is a Centrally Sponsored Scheme with a funding pattern 60:40 between Centre and State Government for all States except NE and Hilly states, where it is 90:10 and 100% in case of Union Territories/ R&D institutes/ Bamboo Technology support Groups (BTSGs) and National Level Agencies.