



## India State of Forest Report, 2019

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### Volume I

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- It is the 16<sup>th</sup> biennial assessment of **India's forests by Forest Survey of India**, an organisation under the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.
- FSI undertakes National Forest Inventory to assess the growing stock in forests and TOF (Tree Outside Forest), bamboo resource, carbon stock and to assess the dependence of the people living in Forest Fringe Villages for fuelwood, fodder, small timber and bamboo.
- In the current ISFR, a new chapter '**Forest Types and Biodiversity**' has been added which presents findings of the forest type mapping based on Champion & Seth classification (1968) and the results of the first ever rapid biodiversity assessment of plant species in the 16 Forest Type Groups.

### Key Findings

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- The **Total Forest and Tree cover** is **24.56%** of the geographical area of the country.
  - The **Total Forest cover** is 7,12,249 sq km which is **21.67%** of the geographical area of the country.
  - The **Tree cover** is **2.89%** of the geographical area of the country.
- As compared to ISFR 2017 the current assessment shows an increase of
  - 0.65% of forest and tree cover put together, at the national level
  - 0.56% of forest cover
  - 1.29% of tree cover
- Change in Recorded forest Area/Green Wash (**RFA/GW**) as compared to previous assessment of 2017.
  - Forest cover within the RFA/GW: a slight decrease of 330 sq km (0.05%)
  - Forest cover outside the RFA/GW: there is an increase of 4,306 sq km.
- The top five States (UT) in terms of increase in forest cover: **Karnataka>Andhra Pradesh>Kerala>Jammu & Kashmir>Himachal Pradesh**.
- Forest cover in the **hill districts** is 40.30% of the total geographical area of these districts. An increase of 544 sq km (0.19%) in 140 hill districts of the country.
- The total forest cover in the **tribal districts** is 37.54% of the geographical area of these districts.

- Total forest cover in the **North Eastern region** is 65.05% of its geographical area. The current assessment shows a decrease of forest cover to the extent of 765 sq km (0.45%) in the region. Except Assam and Tripura, all the States in the region show decrease in forest cover.
- **Mangrove cover** in the country has increased by 1.10% as compared to the previous assessment.
- **Wetlands** cover 3.83% of the area within the RFA/GW of the country. Amongst the States, Gujarat has the largest area of wetlands within RFA in the country followed by West Bengal.
- Dependence of fuelwood on forests is highest in the State of Maharashtra, whereas, for fodder, small timber and bamboo, dependence is highest in Madhya Pradesh.
- It has been assessed that the annual removal of the small timber by the people living in forest fringe villages is nearly 7% of the average annual yield of forests in the country.

## Introduction

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- **Forest Cover:** The forest canopy area covered on the ground irrespective of the legal status of land. It includes all tree patches which have canopy density more than 10% and area of 1 ha or more in size.
- **Canopy Density:** It is defined as the proportion of an area in the field/ground, that is covered by the crown of trees.
- **Recorded Forest Area (RFA):**
  - Forest Area (or recorded forest area) refers to all the geographic areas recorded as forest in government records.
  - Recorded forest areas comprises Reserved Forests (RF) and Protected Forests (PF), which have been constituted under the provisions of Indian Forest Act, 1927.
  - Besides RFs and PFs, the recorded forest area may include all such areas, which have been recorded as forests under any State Act or local laws or any revenue records.
- **TOF (Trees Outside Forest):** Trees found outside the recorded forest areas. TOF refers to all trees growing outside RFA irrespective of patch size which could also be larger than 1 ha.
- **Tree cover:** All patches of trees occurring outside RFA which are of size less than 1 ha including the scattered trees. Tree cover forms an important part of the trees outside forests (TOF). Therefore, tree cover can be considered as a subset of TOF.
- According to the Global Forest Resource Assessment (FRA) done by Food and Agriculture Organisation (FAO) once every five years, **India has 2% of the Global forest area, standing at 10<sup>th</sup> position among the top ten countries in respect of forest area.** Russia Federation tops the list with 20% of the global forest cover.

## Chapter 2- Forest Cover

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- National Forest Policy of India, 1988 envisages a goal of **achieving 33% of geographical area of the country under forest and tree cover.**

- The main objectives:
  - to monitor forest cover and changes therein at the National, State and District levels.
  - to generate information on forest cover in different density classes and changes therein.
  - to produce forest cover and other thematic maps derived from it for the whole country.
  - to provide a primary base layer for assessment of different parameters including growing stock, forest carbon etc.
  - to provide information for international reporting.
- **Forest cover:** Includes all lands having trees more than one hectare in area with tree canopy density of more than 10%, irrespective of ownership, legal status of the land and species composition of trees.
  - **Very Dense Forest:** All lands with tree canopy density of 70% and above. The relative composition of forest cover under this category is **3.02%**
  - **Moderately Dense Forest:** All lands with tree canopy density of 40% and more but less than 70%. Forest cover under this category is **9.39%**
  - **Open Forest:** All lands with tree canopy density of 10% and more but less than 40 %. Forest cover of **9.26%** falls under this category.
  - **Scrub Forest:** Lands with canopy density less than 10%. Geographical area under this category is **1.41%**.
  - **Non-forest:** Lands not included in any of the above classes (includes water). Geographical area under the non-forest category is **76.92%**.
- **Largest forest cover in India:** Madhya Pradesh > Arunachal Pradesh > Chhattisgarh > Odisha > Maharashtra
- **Forest cover as percentage of total geographical area:** Mizoram (85.41%) > Arunachal Pradesh (79.63%) > Meghalaya (76.33%) > Manipur (75.46%) > Nagaland (75.31%).
- There is an **overall gain of 3,976 sq km** of forest cover in the country as compared with the ISFR 2017 report.
- **States/UTs showing significant gain in forest cover:** Karnataka > Andhra Pradesh > Kerala > J&K
- **States showing loss in forest cover:** Manipur > Arunachal Pradesh > Mizoram
- There is an overall increase in forest cover in the tribal districts by 1,181 sq km.
- There are 218 tribal districts in 27 States/UTs as identified by the Government of India under the **Integrated Tribal Development Programme**.
- Gujarat has the largest area of the **wetlands** within RFA/GW in the country followed by West Bengal. Wetlands within forest areas form important ecosystems.
- Among the smaller States/UTs, Puducherry followed by A&N Islands have large areas of wetlands within RFA/GW.
- In the country as a whole there are 62,466 wetlands covering 3.83% of the area within the RFA/GW areas of the country.

## Chapter 3- Mangrove Cover

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- **Mangroves** are a diverse group of salt-tolerant plant communities of tropical and subtropical regions of the world which can survive the limiting factors imposed by lack of oxygen, high salinity and diurnal tidal inundation.
- According to Champion & Seth Classification (1968) Mangroves are included in **Type Group-4 Littoral & Swamp Forests**

- **IMPORTANCE OF MANGROVES**

- Mangroves have a complex root system which is very efficient in dissipating the sea wave energy thus protecting the coastal areas from tsunamis, storm surge and soil erosion. Their protective role has been widely recognized especially after the devastating Tsunami of 2004.
- Mangrove roots slow down water flows and enhance sediment deposition. Therefore, they act as a zone of land accretion due to trapping of fine sediments including heavy metal contaminants. They also arrest coastal erosion and sea water pollution.
- They act as a fertile breeding ground for many fish species and other marine fauna.
- They act as an important source of livelihood for the coastal communities dependent on collection of honey, tannins, wax and fishing.
- Mangroves are important carbon sink.
- About 40% of the world's Mangrove Cover is found in South East Asia and South Asia.
- The mangrove cover in India is 4,975 sq km, which is **0.15% of the country's total geographical area.**
- Increase in the mangrove cover as compared to 2017 assessment: 54 sq km
- **Among the states and UTs, West Bengal has the highest percentage of area under total Mangrove cover followed by Gujarat and Andaman Nicobar Islands.**
- Top three states showing Mangrove cover increase: Gujarat > Maharashtra > Odisha

## **Forest Types & Biodiversity**

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- A total of 16 types have been identified by Champion and Seth to classify the range of forest
  - Moist Tropical Forest:
    - Tropical Wet Evergreen Forest
    - Tropical Semi-Evergreen Forest
    - Tropical Moist Deciduous Forest
    - Littoral and Swamp Forest
  - Dry Tropical Forest
    - Tropical Dry Deciduous Forest
    - Tropical Thorn Forest
    - Tropical Dry Evergreen Forest
  - Montane Subtropical Forest
    - Subtropical Broadleaved Hill Forest
    - Subtropical Pine Forest
    - Subtropical Dry Evergreen Forest
  - Montane Temperate Forest
    - Montane Wet Temperate Forest
    - Himalayan Moist Temperate Forest
    - Himalayan Dry Temperate Forest
  - Subalpine Forest
    - Subalpine Forest
  - Alpine Scrub
    - Moist Alpine Scrub
    - Dry Alpine Scrub
- States and UTs with maximum species diversity of;
  - **Trees:** Karnataka,
  - **Shrubs:** Arunachal Pradesh,
  - **Herbs:** Jammu & Kashmir.
- State with maximum species richness for Maximum richness of species taking all the three types of plants:  
Arunachal Pradesh > Tamil Nadu > Karnataka

## Forest Fire & Monitoring

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### National Action Plan on Forest Fires, 2018

- MoEF&CC, has come up with the National Action Plan on Forest Fires, 2018 to revamp forest fire management in the country.
- Main objectives
  - informing,
  - enabling and
  - empowering forest fringe communities and
  - incentivizing them to work in tandem with the State Forest Departments (SFDs).

- The plan proposes nine strategies to address the issue, including establishment of a “Centre of Excellence on Forest Fire Management” at FSI.
- A joint study report of MoEF&CC and World Bank titled “Strengthening Forest Fire Management in India” released in June 2018 revealed that in the year 2000, 20 districts, representing 3% of India’s land area and 16% of forest cover accounted for 44% of all fire detections.
- The upgraded version of the Forest Fire Alert System version 3.0 (FAST 3.0) was released on 16th January, 2019 with a separate activity of monitoring large forest fires.
- Forest Cover of States & UTs under different fire prone classes:
  - Extremely Fire Prone: Mizoram > Tripura
  - Very Highly Fire Prone: Mizoram > Manipur
  - Highly Fire Prone: Nagaland > Manipur
  - Moderately Fire Prone: Punjab > Nagaland
- It is seen that most of the fire prone forest areas are found in the northeastern region and the central part of the country.

## Tree Cover

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- The **total tree cover** of the country has been estimated to be **95,027 sq km**.
- **There is an increase of 1,212 sq km in the extent of tree cover as compared to the 2017 assessment.**
- State-wise estimates of Tree Cover:
  - **Maximum Tree Cover:** Maharashtra > Madhya Pradesh > Rajasthan > J&K
  - **Maximum Tree Cover as percentage of geographical area:** Chandigarh > Delhi > Kerala > Goa
- State-wise estimates of Tree Outside Forest (TOF)
  - **Maximum extent of TOF:** Maharashtra > Odisha > Karnataka
  - Maximum extent of TOF as percentage of geographical area: Kerala > Goa > Nagaland.

## National Forest Inventory (NFI)

- It is a major forest resource assessment activity carried out by FSI.
- The primary objective is to assess growing stock of trees, number of trees, bamboo, soil carbon, occurrence of NTFP (Non-Timber Forest Products) and invasive species and other parameters depicting growth & health of forest.
- The NFI has three components, Forest Inventory, TOF (Rural) Inventory and TOF (Urban) Inventory.

## Chapter 8- Bamboo Resources of the Country

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- In India, bamboo grows naturally throughout the country except in Kashmir region. India is home to about 125 indigenous and 11 exotic species of bamboo from 23 genera.
- Bamboo contributes significantly to the social, economic & ecological development of any region.
- **Bamboo bearing area of the country:** 16.00 million hectare.
- **Increase in bamboo bearing area:** 0.32 million hectare, as compared ISFR 2017.
- **States with maximum bamboo bearing area:** Madhya Pradesh > Maharashtra > Arunachal Pradesh > Odisha.

- **Maximum occurrence of pure bamboo:** Maharashtra > Madhya Pradesh > Chhattisgarh.

## Chapter 9- Carbon Stock in India's Forest

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- Total carbon stock in the country's forest: estimated to be 7,124.6 million tonnes.
- There is an increase of 42.6 million tonnes in the carbon stock of the country as compared to the last assessment of 2017.
- **State-wise Maximum carbon stock:** Arunachal Pradesh > Madhya Pradesh > Chhattisgarh > Maharashtra
- **State-wise Maximum per hectare carbon stock:** Sikkim > Andaman & Nicobar Islands > Jammu & Kashmir > Himachal Pradesh > Arunachal Pradesh
- Soil organic carbon is the largest pool of forest carbon followed by Above Ground Biomass (AGB), Below Ground Biomass (BGB), Litter and dead wood.

## Chapter 10- People & Forests

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- As per the Census 2011 nearly 1,70,000 villages are located in the proximity of forest areas and are termed **Forest Fringe Villages (FFVs)**.
- The study conducted by FSI assessed the dependence of the people living in proximity to forests in terms of removal of:
  - Quantity of fuelwood
  - Quantity of fodder
  - Quantity of small Timber
  - Quantity of bamboo
- **Top 3 states in dependence on forests for**
  - **Fuelwood:** Maharashtra > Odisha > Rajasthan
  - **Fodder:** Madhya Pradesh > Maharashtra > Gujarat
  - **Small Timber:** Madhya Pradesh > Gujarat > Maharashtra
  - **Bamboo:** Madhya Pradesh > Chhattisgarh > Gujarat

## Volume II

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### Chapter 1- Forest and tree resources in States and UTs

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#### Andhra Pradesh:

- The state has the second largest coastline after Gujarat.
- Main rivers that drain Andhra Pradesh are the Godavari, Krishna and Penna.
- The forests in the State can broadly be divided into four major groups: Deccan Plateau, Central Plateau, Eastern Highland and the East Coastal Plains.
- **Red Sanders (*Pterocarpus santalinus*)** is endemic to Andhra Pradesh and is highly valued for its rich red colour and grain pattern.
- Forest Cover in the State is 17.88 % of the State's geographical area.
- *Solanum nigrum* is the largest NTFP species found in the state with a relative abundance of 98.98%.

## Arunachal Pradesh:

- Major rivers viz Kameng, Subansiri, Siang, Lohit and Tirap, these divide the State into five major valleys.
- Cane and bamboo are found in abundance.
- The **population density** of the State is 17 persons per sq km, **lowest in the country**.
- **Protected Area network of the State:** 2 National Parks (Mouling and Namdapha) and 11 Wildlife Sanctuaries covering 11.68% of its geographical area.
- Total Forest cover: 79.63%

## Assam:

- Situated along the Brahmaputra and Barak river valleys.
- The State can be divided into 3 physiographic domains: Brahmaputra valley, Central Assam Hills (Mikir Hills in Karbi Anglong and North Cachar Hill districts) and Barak valley.
- **Kaziranga National Park** is home to  $\frac{2}{3}$  of the world's population of one-horned Rhinoceros.
- **Endangered and Rare species:** pygmy hog, hispid hare, and great Indian hornbill etc.
- Total Forest cover: 36.11%
- **Protected Area:** 5 National Parks (Dibru-Saikhowa, Kaziranga, Manas, Nameri and Orang) and 18 Wildlife Sanctuaries covering 4.87% of its geographical area.

## Bihar:

- Ganga is the main river which flows from west to east through the State.
- Bihar is a forest deficient State with Total Forest cover: 7.76%
- **Sal** (*Shorea robusta*) forests are found throughout the state.
- Major Forest Types: Tropical Dry Deciduous and Tropical moist deciduous.
- *Mangifera indica* and *Litchi sinensis* are the major tree species in numbers found in TOF(rural) and TOF(urban) respectively.

## Chhattisgarh:

- The State can be divided into three agro-climatic zones: the Chhattisgarh Plains, the Northern Hills of Chhattisgarh and the Bastar Plateau.
- Major rivers: Rihand, Hasdo (a tributary of Mahanadi) and Indravati.
- Major Forest Types: Tropical Dry Deciduous and Tropical moist deciduous.
- Major tree species: Sal (*Shorea robusta*) and Teak (*Tectona grandis*).
- Other Major species: Bija (*Pterocarpus marsupium*), Saja (*Terminalia tomentosa*), Dhavdha (*Anogeissus latifolia*), Mahua (*Madhuca indica*), Tendu (*Diospyros melanoxylon*) and bamboo (*Dendrocalamus strictus*)
- The pressure on forests is high as the state is mostly inhabited by tribal people or non-tribal landless people.
- **Protected Area network of the State:** 3 National Parks (Guru Ghasidas, Indravati, Kanger Valley) and 11 Wildlife Sanctuaries

## Delhi:

- The landscape of Delhi can geographically be divided into three major regions: the low-lying Yamuna flood plains, the Aravalli Ridge and the great Gangetic plains that cover most part of the city.
- Major Forest Types: Tropical Dry Deciduous Forest and Tropical Thorn Forests.
- Total Forest cover: 13.18%.
- The Protected Area network: 1 Wildlife Sanctuary (Asola Bhatti) which covers 1.96% of the geographical area of the State.
- *Prosopis juliflora*, an invasive species, is the most abundant tree species found in Delhi.

### Goa:

- The State has two distinct physiographic regions, namely Western Ghats and coastal plains.
- Major rivers: Mandovi and Zuari.
- The Tribal population is 10.23% of the total population.
- Goa has 16 mangrove species including *Rhizophora* spp, *Bruguiera* spp, *Ceriops tagal*, *Kandelia* spp, *Avicennia* spp, *Sonneratia* spp, etc
- Total Forest cover: 60.44%
- Various schemes implemented by Goa Forest Department: Rehabilitation of Degraded Forests, Western Ghats Development Programme, Development of Gardens, Parks and Fountains, Social and Urban Forestry etc.
- **Protected Area network: 1 National Park (Mollem) and 6 Wildlife Sanctuaries.**

### Gujarat:

- The unique features of the State of Gujarat:
  - largest coastline in the country
  - the saline deserts of Rann
  - Grasslands
  - wetlands
- **Physiographically the State can be divided into three distinct regions:**
  - The peninsula (Saurashtra): hilly tract with low hills
  - Kachchh on the north-west: it is barren and contains the famous Rann of Kachchh
  - The mainland: from the Rann of Kachchh and the Aravalli hills to the river Damanganga, consists of plains with alluvial soil.
- Gujarat has the last reserve of the Asiatic lion in the forests of Gir and Wild Ass in the Little Rann of Kachchh.
- Total Forest cover: 7.57%
- Wetland area inside RFA/GW: 39.88%, largest in the country
- **Protected Area network of the State:** 4 National Parks (Vansda, Velavadar, Gir, Marine- Gulf of Kachchh) 23 Wildlife Sanctuaries and 1 Conservation Reserve
- Dominant tree species in the state is neem (*Azadirachta indica*)

### Haryana:

- Major rivers of the state: Yamuna and the Ghaggar
- Over 500 bird species recorded in the State i.e. 40% of total bird species in the country.

- **Major Forest Type Groups:** Tropical Dry Deciduous Forest, Tropical Thorn Forest and Subtropical Pine Forests.
- Total forest cover is very low: 3.62%
- Major agroforestry species: Poplar and Eucalyptus trees
- **Protected Area network of the State:** 2 National Parks (Kalesar and Sultanpur), 8 Wildlife Sanctuaries and 2 Conservation Reserves.

### **Himachal Pradesh:**

- **The State has three distinct regions:**
  - The Shiwaliks: altitude upto 1,500 m
  - Middle Himalayan region: 1,500 m to 3,000 m
  - The Himadris: higher than 3,000 m.
- Important rivers of the State: Satluj, Beas, Ravi, Chenab and Yamuna.
- The forests in the State can be broadly classified into coniferous forests and broad-leaved forests.
- Total Forest cover: 27.72%
- It is a forest fire sensitive State.
- **The Protected Area network in the State:** 5 National Parks (Great Himalayan, Inderkilla, Khirganga, Khirganga, Simbalbara) , 28 Wildlife Sanctuaries and 3 Conservation Reserves.
- Dominant tree species in the state are: Deodar (*Cedrus deodara*), Pinus wallichiana and Chir (*Pinus roxburghii*)

### **Jammu & Kashmir:**

- Situated in the northernmost part of the country.
- Major rivers: Jhelum, Chenab, Indus, Ravi, Tawi etc.
- All the 22 districts of UT of Jammu & Kashmir and two districts of UT of Ladakh are hill districts and both UT's do not have any tribal district.
- Dominant tree species in TOF: *Grewia oppositifolia*
- Major Invasive species: *Lantana camara*
- National Parks: Salim Ali, Dachigam, Hemis, Kishtwar

### **Jharkhand:**

- Jharkhand is rich in forests and mineral wealth.
- Physiographically, the State has four major plateaus, the Chhota Nagpur plateau is the most prominent.
- Important rivers of the State; Ganga, Son, South Koel, Baitarani and Damodar.
- Various ethnic groups such as Munda, Oraon, Ho, Santhal, Paharia, Chero, Birjea, Asura and others live in the State and follow varying practices of agro-pastoralism.
- Total Forest cover: 29.62%

### **Karnataka:**

- Physiographically the State can be divided into two distinct regions:
  - Hilly region (The Malnad): comprising Western Ghats
  - Plain region (the Maidan): comprising the inland plateau.
- Major rivers:
  - East flowing (drain into Bay of Bengal): Cauvery and Krishna
  - West flowing (drain into Arabian sea): Sharavathi and Kali.
- **The evergreen forests of the Western Ghats cover about 60% of the forest area of the State and are recognized as one of the four Biodiversity Hotspots of India.**
- Total Forest cover: 20.11%
- **Protected Area network of the State:** 5 National Parks (Anshi, Bandipur, Bannerghatta, Kudremukh, Nagarhole ) 30 Wildlife Sanctuaries, 15 Conservation Reserves.
- Karnataka supports about 10% of the total tiger population and 25% of the elephant population of the country.
- Major species: *Tectona grandis*, *Terminalia spp*, *Dalbergia latifolia*, *Pterocarpus spp*, etc. In the Scrub and Thorny Forests, *Acacia spp*, *Capparis spp.*, *Prosopis spp.*, etc

### Kerala:

- Physiographically, the State can be divided into coastal, midland and highland zones.
- Major rivers of the State: Periyar, Kaloda and Attingok.
- **Protected Area network of the State:** 6 National Parks (Anamudi Shola, Eravikulam, Mathikettan Shola, Pambadum Shola, Periyar, Silent Valley), 17 Wildlife Sanctuaries and 1 Community Reserve covering 6.40% of its geographical area.
- Total Forest cover: 54.42%
- Dominant tree species in TOF (rural): *Hevea brasiliensis*
- Dominant tree species in TOF (urban): *Cocos nucifera*

### Madhya Pradesh:

- Madhya Pradesh is a forest rich State and is ranked first among the States in terms of the RFA.
- Major rivers: Narmada, Tapti, Son, Betwa, Shipra and Chambal.
- Madhya Pradesh State Minor Forest Produce (Trading & Development) Co-operative Federation, formed in 1984, collects, processes and markets Tendu leaves, Sal Seed, Kullu Gum and other NTFPs.
- **Protected Area network of the State:** 10 National Parks (Bandhavgarh, Dinosaur Fossils, Fossil, Pench, Kanha, Madhav, Panna, Sanjay, Satpura, Van Vihar).  
25 Wildlife Sanctuaries.
- There are 6 Tiger Reserves in the State.
- The State with a population of 526 Tigers, is recognized as Tiger State of India, as per the 'All India Tiger Estimation 2018'
- Total Forest cover: 25.14%

### Maharashtra:

- It is situated in the western peninsular region of the country.

- Maharashtra is ranked second among the States in terms of the recorded forest area.
- The State has three physiographic zones
  - Deccan Plateau,
  - Western Ghats and
  - West Coast.
- Major rivers: Godavari, Bhima, Narmada, Tapti, Koyna and Krishna.
- A 24-hour toll free helpline number 1926 called 'Hello Forest' has been set up to provide information regarding plantations, protection and mass awareness.
- **Protected Area network of the State:** 6 National Parks (Chandoli, Gugamal, Nawegaon, Pench, Borivilli, Tadoba), 48 Wildlife Sanctuaries, 6 Conservation Reserves.
- Total Forest cover: 16.50%

### Manipur:

- Physiographically, Manipur can be characterized in two distinct physical regions–
  - an outlying area of rugged hills and narrow valleys
  - the inner area of flat plain
- Major rivers: Imphal and Bara
- Total Forest cover: 75.46%
- It is a highly fire prone area.
- Out of 126 species of bamboo reported in India, 53 species are found in Manipur
- Major species of trees: Teak, Pine, Oak, Uningthou (*Phoebe spp.*) Leihao (*Michelia spp.*)
- **Protected Area network of the State:** 1 National Park (Keibul-Lamjao), 2 Wildlife Sanctuaries, 4 Conservation Reserves.
- Loktak Lake is the largest freshwater lake in Eastern India, and has been declared a Ramsar site.
- The Keibul Lamjao National Park situated on the southern shore of the Loktak Lake is home to the endangered *Rucervus eldii* (brow-antlered deer or Sangai) also known as the dancing deer.
- *Lilium mackliniae* or Siroi Lily is a rare species that is only found in Manipur Siroi hill ranges.

### Meghalaya:

- The State has three distinct regions
  - Garo Hills,
  - Khasi Hills and
  - Jaintia hills.
- Major rivers: Sanda, Simsang Umngot and Myntdu.
- Shifting cultivation is still prevalent in the State.
- Unlike other States, forests in Meghalaya are largely under the community and private ownership with only 1,113 sq km of forests under the direct control of the State Forest Department.
- Total Forest cover: 76.32%
- **Protected Area network of the State:** 2 National Parks (Balphakram, Nokrek Ridge), 4 Wildlife Sanctuaries, 65 Community Reserves.
- Dominant tree species : *Pinus kasya*

## Mizoram:

- Amongst the States, Mizoram has the highest area under forest cover in terms of percentage of geographical area covering 85.41%.
- Tropical wet-evergreen forests of the State have valuable species in the top canopy such as *Dipterocarpus turbinatus*, *Artocarpus chaplasha*, *Terminalia myriocarpa*, *Amoora wallichii*, *Michelia champaca*, *Mesua ferrea* etc.
- It has nearly 40% of forest area under Very highly fire prone
- Bamboos occur abundantly in the middle and lower stories in the evergreen forest type
- **Protected Area network of the State:** 2 National Parks (Murlen, Phawngpui Blue Mountain), 8 Wildlife Sanctuaries.

## Nagaland:

- Major river: Barak river.
- **Protected Area network of the State:** 1 National Park (Intanki National Park), 3 Wildlife Sanctuaries, 57 Community Reserves.
- Total Forest Cover: 75.31%

## Odisha:

- Physiographically, the State can be divided into four regions
  - Northern Plateau,
  - Eastern Ghats,
  - Central Tableland and
  - Coastal Plains.
- Major rivers: Mahanadi, Brahmani and Baitarani.
- Total Forest Cover: 33.15%
- **Protected Area network of the State:** 2 National Parks (Bhitarkanika and Simlipal), 19 Wildlife Sanctuaries.
- Dominant tree species in TOF is *Mangifera indica*

## Punjab:

- Major rivers: Satluj and Beas.
- **Major forest type Groups:** Tropical Dry Deciduous Forests, Tropical Thorn Forests and Subtropical Pine Forests
- The Community reserves of 'Lalwan' in Hoshiarpur and 'Keshopur-Chamb' in Gurdaspur districts are the first notified community reserves in the country under the Wildlife Protection Act, 1972
- The Forest Cover in the State is 3.67% of the State's geographical area.
- Total wetlands: 119 covering 3.32% of total RFA/GW.
- Major tree species in TOF: *Eucalyptus species*, *Melia azadirachta*

## Rajasthan:

- The State has 4 distinct regions:
  - Western Desert with Barren Hills,
  - Level Rocky and Sandy Plains,
  - The Aravalli Hills
  - South-Eastern Plateau.
- Major rivers: Banas, Chambal, Luni and Mahi.
- Major forest type groups: Tropical Dry Deciduous and Tropical Thorn Forests.
- Protected Area network of the State: 5 National Parks (Desert, Keoladeo, Mukundra Hills, Ranthambhore, Sariska), 25 Wildlife Sanctuaries, 11 Conservation Reserves
- **Project Tiger sites:** 3 (Ranthambhore, Sariska and Mukundra Hills)
- **Ramsar sites:** 2 (Keoladeo Ghana sanctuary and Sambhar lake)
- The Forest Cover in the State is 4.86 % of the State's geographical area. It is a forest deficient State.
- Dominant tree species in Trees Outside Forests (TOF): *Prosopis cineraria*, *Azadirachta indica*

### Sikkim:

- Major rivers: Teesta, Ranjeet, Rangpo and Lachen.
- It is a forest rich State with Total forest cover of 47.11%.
- Sikkim harbors around one third of the flowering plants of India.
- **Protected Area network of the State:** 1 National Park (Khangchendzonga), 7 Wildlife Sanctuaries, 1 Conservation Reserve, covering 30.77% of its geographical area.
- **Khangchendzonga National Park is a UNESCO World Heritage Site.**

### Tamil Nadu:

- Four major physiographic regions:
  - Coastal Plain,
  - Eastern Ghats
  - Central Plateau and
  - Western Ghats.
- Major rivers: Cauvery, Bhavani, Palar, Vaigai.
- Wide range of biodiversity:
  - Marine coastal ecosystem in Gulf of Munnar
  - Terrestrial evergreen forest in Western Ghats
  - Temperate forest in the hills
- **Nilgiri Biosphere Reserve:**
  - A biodiversity Hotspot
  - A threatened ecosystem
- Pioneer state in conservation of marine fauna.
- Famous for Teak and Sandalwood forest.
- **Mukurthi National Park**, famous for Nilgiri Tahr. Other National Parks include- **Guindy, Gulf of Mannar Marine, Annamalai and Mudumalai**
- Around 5% of area comes under Protected Area Network

- Total Forest cover is 20.27% of the total geographical area of the state.

### Telangana:

- Major Rivers: Godavari, Krishna
- Dense Teak forests found on the banks of river Godavari.
- Major forest types:
  - Tropical moist deciduous
  - Tropical dry deciduous
  - Tropical thorn forest
- 'Telangana Ku Haritha Haram': Greening programme to plant and protect 230 crore seedlings over 4 years.
- Nearly 5% of its geographical area constitutes Protected Area Network.
- Total Forest cover in the state is 18.36%.

### Tripura:

- Around one-third of the population belongs to the Scheduled Tribes.
- Major forest types:
  - Tropical Semi-Evergreen
  - Tropical Moist deciduous
- A Sizable area covered under Bamboo and the economy is dependent on it.
- Joint Forest Management Committees (JFMCs) and Eco Development Committees (EDCs) formed to promote people's participation in forest management.
- Total Forest Cover is around 74% of the state's geographical area.
- **National Parks**- Clouded Leopard and Bison (Rajbari)

### Uttar Pradesh:

- Three Physiographic divisions in the state:
  - Shivalik region in the north,
  - Gangetic plains in the central region and
  - Vindhya hills in the south.
- Major rivers: Ganga, Yamuna, Gomti, Ghagra, Betwa, Chambal and Gandak.
- Majorly agrarian state with total forest cover of only 6.15% of total geographical area.
- In 2019 22.5 crores saplings planted under Vriksha Mahakumbh Programme to increase forest and tree cover.
- Most tree species are exempt from felling and transit rules to enhance livelihood and income of farmers.
- Around 12% of the total area constitutes the Protected Area Network.
- **Dudhwa National Park** is known for successful translocation of one horned rhinoceros.

### Uttarakhand:

- Climate and vegetation vary greatly with altitude:
  - glaciers at the highest elevations
  - subtropical forests at the lower elevations.

- Major rivers: Ganga, Yamuna, Ramganga & Sharda along with their tributaries.
- Three Physiographic divisions in the state:
  - the Himalayas,
  - the Shiwalik and
  - the Terai region.
- Van Panchayats are present in the state.
- Forest Fires are a major problem.
- 3.24% of its geographical area constitutes the Protected Area network.
  - National Parks:** Corbett, Gangotri, Govind, Nanda Devi, Rajaji and Valley of Flowers
- The total Forest Cover is 45.44%.

### **West Bengal:**

- State has two natural divisions:
  - the North Himalayan and
  - the south Alluvial Gangetic Plains.
- Major rivers: Teesta, Torsa and Jaldhaka are tributaries of river Brahmaputra.
- Sal trees found in the foothills of Himalayas; Oaks, Conifers and Rhododendrons found in the higher altitudes above 1000 and 1,500 metres.
- Total forest cover in the state is 19.04% of the total geographical area.
- **National Parks:** Buxa, Jaldapara, Gorumara, Neora Valley, Singalila and Sunderban

### **Andaman & Nicobar Islands:**

- It is drained by several small rivulets, Kalpong being an important river in Diglipur Island.
- Saddle Peak, is the highest hill in the islands.
- 6 indigenous aboriginal tribal groups viz Jarawa, Sentinelese, Great Andamanese, Onge, Nicobarese and Shompen, found in the islands.
- About 2,200 varieties of plants recorded in the Islands, out of which 200 are endemic, some of them are Anoctochilus narasimhan, Ceropogia andamanica, Codonocarpus andamanicus, Cyrtandromoea nicobarica, Grewia indandamanica, Hippocratea andamanica, Leea grandifolia, Mangifera nicobarica, Memecylon andamanicum, Mesua manii, Miliusa andamanica,
- 9 National Parks (Campbell Bay, Galathea Bay, Marine Wandoor, Middle Button Island, Mount Harriett, North Button Island, Rani Jhansi Marine, Saddle Peak, South Button Island), 96 Wildlife Sanctuaries, 1 biosphere reserve; constituting Protected Area Network of 18.71%.
- Total forest cover is 81.74%.

### **Chandigarh:**

- It falls in the Great Indian Northern Plains near the foothills of the Shivalik Hills.
- Major forest type: Tropical dry deciduous.
- Thrust area for the Forest Department is Urban Forestry.

- 2 Wildlife Sanctuaries viz Sukhna Wildlife Sanctuary and City Bird Wildlife Sanctuary, covering an area of 22.81%.
- Total Forest cover in the state is 19.32%.

### **Dadra & Nagar Haveli:**

- Major river: Daman Ganga and its three tributaries.
- Major forest type: Tropical dry deciduous and Tropical moist deciduous forest.
- High dependence of population on forests for fuel wood, fodder, small timber.
- Major tribes: Dhodia, Kokna and Varli; relatively minor tribes: Koli, Kathodi, Naika and Dubla.
- 1 Wildlife Sanctuary (Dadra & Nagar Haveli) covering 18.77% of the geographical area of UT.
- Total Forest cover is 42.19%.

### **Daman & Diu:**

- Major forest type: Littoral & Swamp forest.
- Total forest cover is 18.46%.
- 1 Wildlife Sanctuary- Fudam Bird Sanctuary, spawning ground for fishes and feeding ground for species of avifauna like Black Winged Stilt and Great White Egret

### **Lakshadweep:**

- The UT of Lakshadweep does not have any notified forests, 82% of the land is covered by privately owned coconut plantations.
- It has a vast lagoon of 4,200 sq km with an abundance of marine fauna.
- Lakshadweep also has coral atolls.
- 1 Wildlife Sanctuary- Pitti (Bird Island) covering 0.03% of the geographical area of the UT.
- Total Forest Cover is 90.33% of geographical area, however there is no RFA.

### **Puducherry:**

- UT of Puducherry does not have any natural forests inside its jurisdiction.
- The farmers of Puducherry cultivate Casuarina spp.
- The Government has constituted the Puducherry Union Territory Wetland Authority for conservation of wetlands of the UT.
- 1 Wildlife Sanctuary- Oussudu Lake covering 0.80 % of the geographical area of the UT.
- Total Forest cover is 10.70% of total geographical area of the UT.

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