

## India State of Forest Report 2023

### Why in News?

Recently, India State of Forest Report 2023 (ISFR 2023) has been released.

### What is ISFR 2023 Report ?

- **ISFR Report** - India State of Forest Report is an in-depth assessment of the forest and tree resources of the country.
- **Author** - Forest Survey of India (FSI)
- **Period** - Biennial basis
- It is the 18<sup>th</sup> cycle of report since 1987.
- **Information Sources** - Remote Sensing satellite data and field based National Forest Inventory (NFI).
  - Satellite data gives forest cover
    - Satellite data period - October 2021 to December 2021
  - NFI provides Growing Stock and Carbon.
    - NFI assessment is 2017-22.

*FSI launched a National Forest Inventory in 2002, with the onset of the 10th five-year plan.*

- **Report Information** - The report contains information on forest cover, tree cover, mangrove cover, growing stock, carbon stock in India's forests, instances of forest fire, Agroforestry, etc.
- For the first time, the trees between 5-10 cm have been included in the analysis for Tree Cover and Growing stock as they are a major contributor to paper and pulp industry.
- **Forest cover degradation** - Analysis on Forest cover degradation between 2011-2021 has been carried out for identifying 93,000 km<sup>2</sup> potential areas for upgradation of density and additionally sequestering 636 Mt of Carbon.
- **Forest fire** - Information on forest fires in 705 Protected areas is given for the first time.
  - Burnt area assessment as part of forest fire assessment has been done for the first time at national level
- **Significance of the report:**
  - Providing vital information for monitoring the country's forest and tree resources
  - Useful source of information for the policy makers, planners, State Forest Departments, and others interested in natural resource conservation and management.

- Digitized forest boundaries of 25 States and UTs have been used in the current ISFR to assess the extent of forest cover within the recorded forest areas.
- Monitoring of NDC targets
- Reporting of GreenHouse Gas (GHG) inventory to UNFCCC for the forest land under the LULUCF sector
- Reporting to FAO for the Global Assessment of Forest Resources.

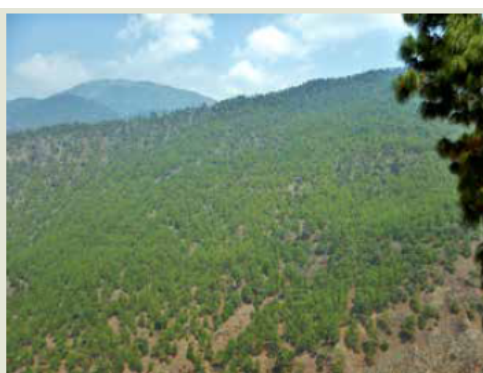
### What is the state of Tree and Forest cover of India in 2023?

- **Forest cover** - All lands, ***more than one hectare*** with a tree ***canopy density*** of more than or equal to ***10% irrespective of ownership***, legal status and land use.
- Such lands may not necessarily be a recorded forest area and It also ***includes orchards, bamboo and palm.***

Classification of forest cover	
Types	Canopy density
Very Dense Forest (VDF)	Equal to or more than 70%
Moderately Dense Forest (MDF)	40-70%
Open Forest (OF)	10-40%



Very Dense Forest



Moderately Dense Forest



Open Forest

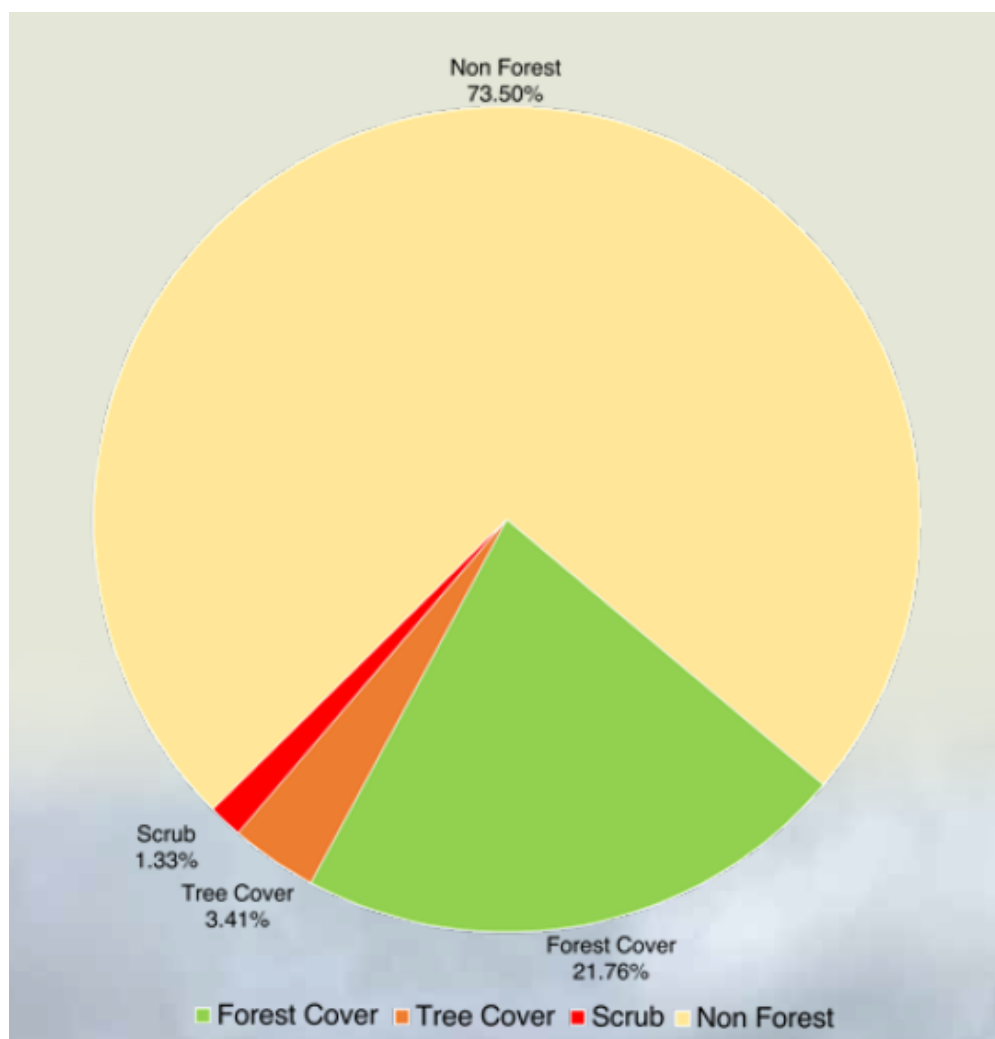


Scrub

- **Total Tree and Forest Cover in 2023** - As per the present assessment, the total Forest and Tree cover is ***8,27,357sq km***, which is ***25.17 %*** of the geographical area of the country.
  - **Forest Cover** - 7,15,343sq km (***21.76%***)
  - **Tree Cover** - 1,12,014 sq km (***3.41%***).

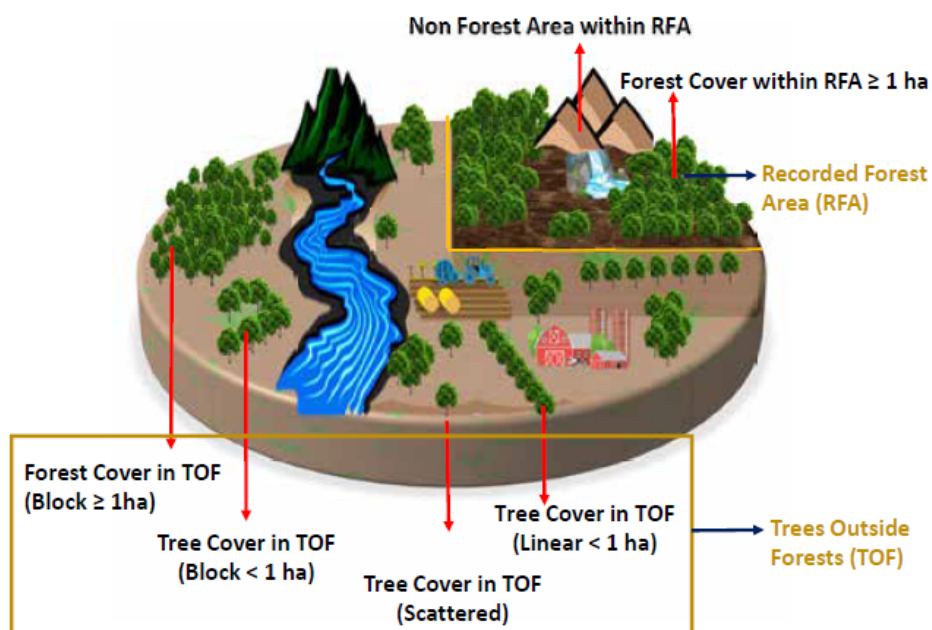
## Forest and Tree Cover of India

in km <sup>2</sup>		
Class	Area	Percentage of GA
Forest Cover	7,15,342.61	21.76
Tree Cover	1,12,014.34	3.41
<b>Total Forest and Tree Cover</b>	<b>8,27,356.95</b>	<b>25.17</b>
Scrub	43,622.64	1.33
Non Forest	24,16,489.29	73.50
<b>Geographical Area of the country</b>	<b>32,87,468.88</b>	<b>100.00</b>



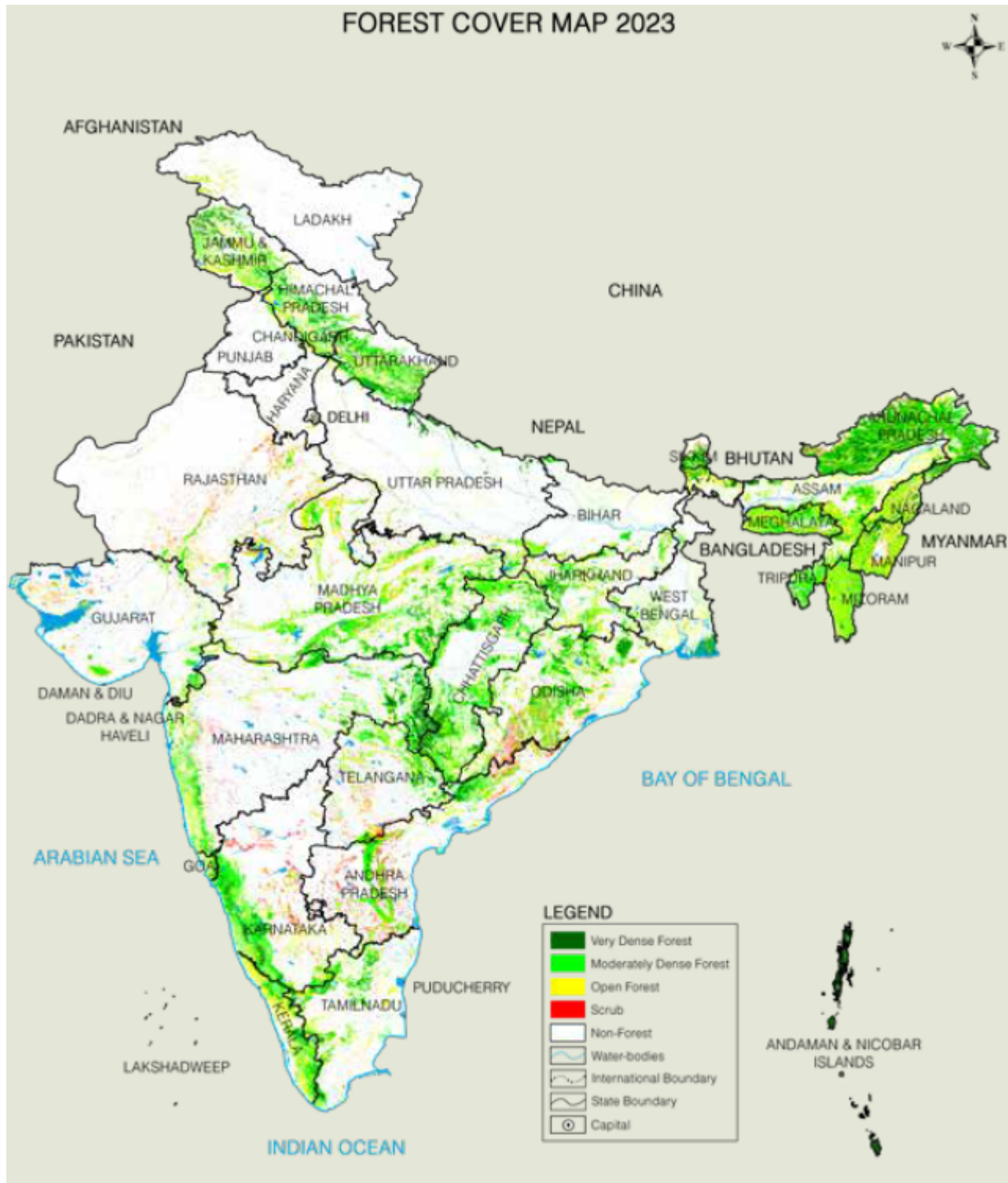
- **The extent of Trees Outside Forest** - 30.70 M ha( 37.11% of the total forest and tree cover)

TOF is the extent of forest cover outside the Recorded Forest Area(RFA) & Green Wash( GW) and tree cover.



<b>Largest forest and tree cover states( Area wise)</b>	<ul style="list-style-type: none"> <li>- Madhya Pradesh (85,724 sq km)</li> <li>- Arunachal Pradesh (67,083 sq km)</li> <li>- Maharashtra (65,383 sq km)</li> </ul>
<b>Largest forest cover states (Area wise)</b>	<ul style="list-style-type: none"> <li>- Madhya Pradesh (77,073 sq km)</li> <li>- Arunachal Pradesh (65,882 sq km)</li> <li>- Chhattisgarh (55,812 sq km)</li> </ul>
<b>Largest tree cover states (Area wise)</b>	<ul style="list-style-type: none"> <li>- Maharashtra (14,524.88 sq km)</li> <li>- Rajasthan (10,841.12 sq km)</li> <li>- Uttar Pradesh (8,950.92 sq km)</li> </ul>
<b>Largest forest cover states (percentage wise)</b>	<ul style="list-style-type: none"> <li>- Lakshadweep (91.33 %)</li> <li>- Mizoram (85.34 %)</li> <li>- Andaman &amp; Nicobar Island (81.62 %)</li> </ul>

*21 States and UTs have shown an increasing trend in tree cover, which indicates that agroforestry, is being promoted in these States.*



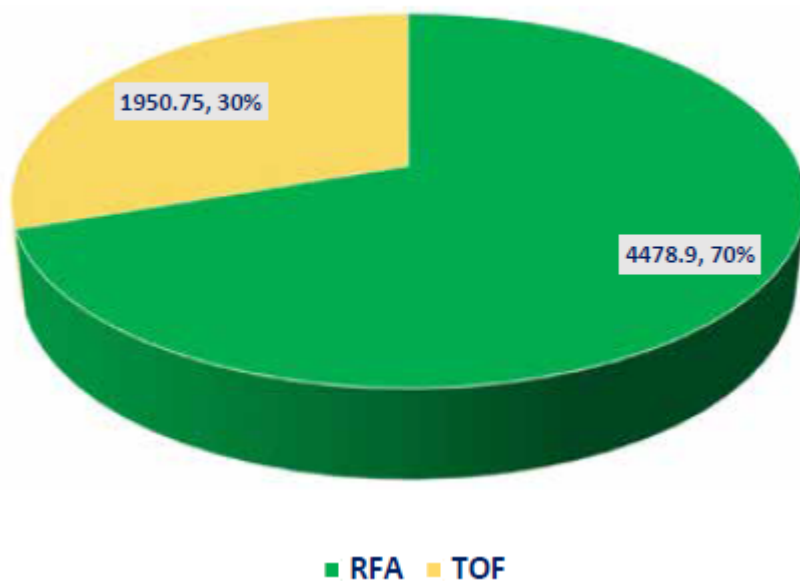
- **Number of States/UTs having above 33 % of forest cover** - 19.
- **States with more than 75% forest cover**
  - Lakshadweep, Mizoram, A & N Island, Arunachal Pradesh, Nagaland, Meghalaya, Tripura, Manipur.
- **Total growing stock of forests** - 6430 million cum(cubic meter).
  - Inside the forests - 4479 million cum (cubic meter)
  - Outside the forest - 1951 million cum

*Arunachal Pradesh has maximum growing stock ( $457.83 \text{ M m}^3$ ) in forests, followed by Uttarakhand ( $400.02 \text{ M m}^3$ ), Chhattisgarh ( $398.54 \text{ M m}^3$ ) and Madhya*



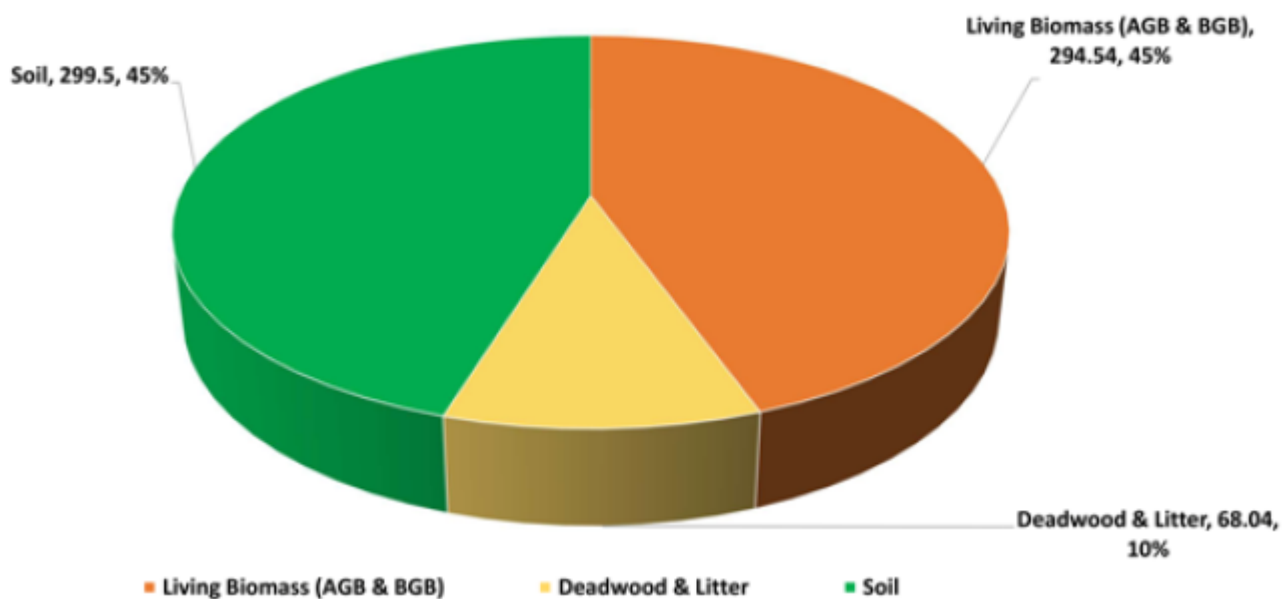
Pradesh (387.18 M m<sup>3</sup>).

### Growing Stock of Forest & TOF (M m<sup>3</sup>)



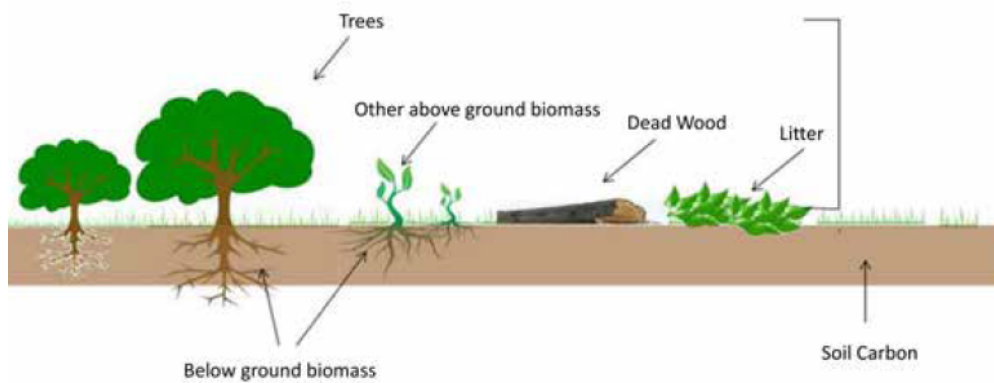
- **Total increase in forest stock** - 262 million cum
  - Increase in inside the forest - 91 million cum
  - Increase in outside the forest - 171 million cum
- **India's total carbon stock** - 30.43 billion tonnes of CO<sub>2</sub> equivalent
- **Total carbon stock in country's forest** - **7.2 Billion tonnes**.
  - Increase in carbon stock - 81.5 million tonnes.

### Global Forest Carbon Stock (Billion Tonnes) in Different Pools



## CARBON POOLS (IPCC GPG)

Above ground biomass, Below ground biomass, Litter, Dead wood, and Soil Organic Carbon



- **States with largest carbon stock**

- Arunachal Pradesh has maximum carbon stock of 1,021 Mt
- Madhya Pradesh (608 Mt)
- Chhattisgarh (505 Mt)
- Maharashtra (465 Mt).

*As compared to the base year of 2005, India has already reached 2.29 billion tonnes of additional carbon sink as against the target of 2.5 to 3.0 billion tonnes by 2030.*

***Soil organic carbon*** is the ***largest pool of forest carbon*** accounting for (55.06%) followed by Above Ground Biomass (AGB) (32.69%), Below Ground Biomass (BGB) (10.09%), Litter (1.48%) and Dead Wood (0.78%).

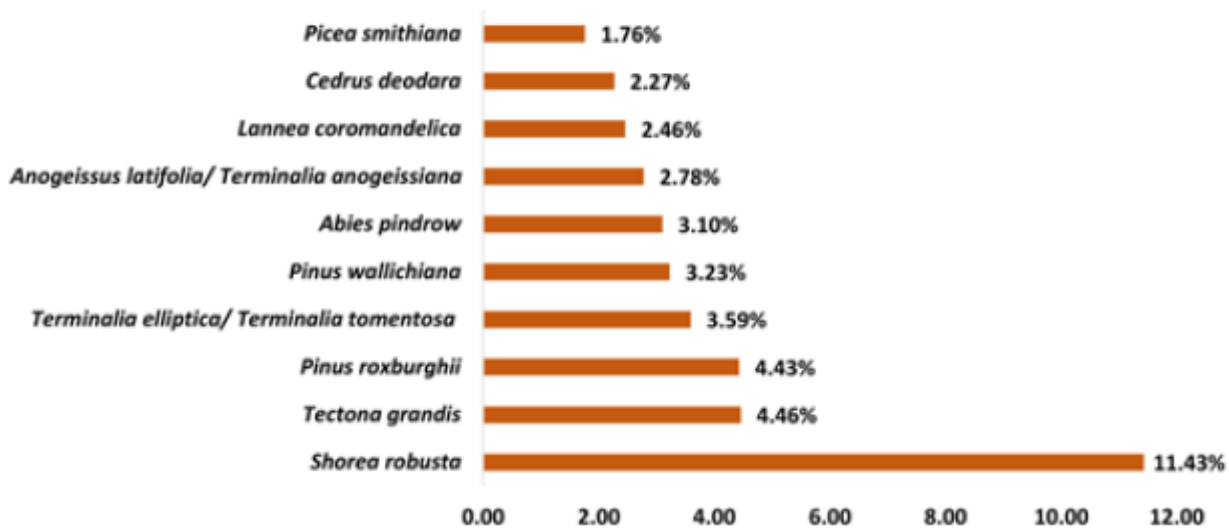
- **Major Trees inside the forest ( Volume wise)**

- Shorea robusta (11.43%)
- Tectona grandis (4.46%)
- Pinus roxburghii (4.43%)
- Terminalia tomentosa (3.59%).

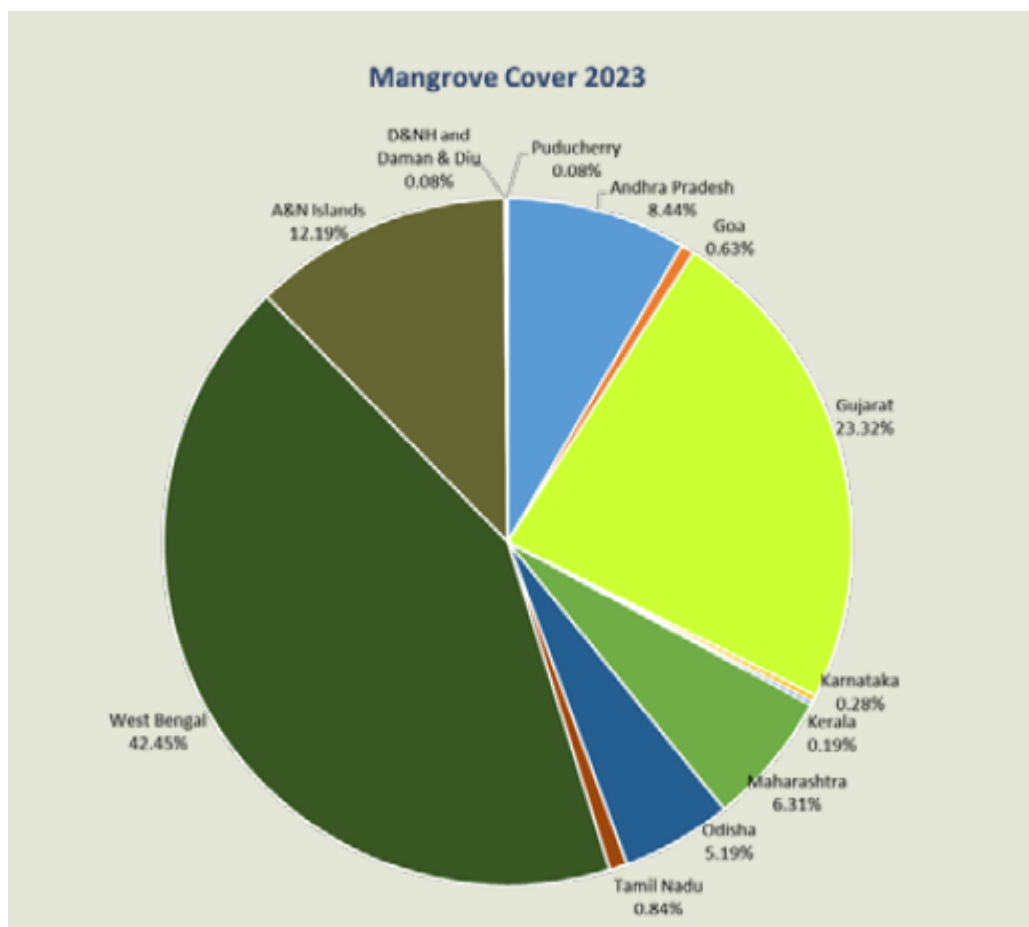
- **Major trees outside the forest**

- Mangifera indica (13.25%)
- Azadirachta indica (7.00%)
- Madhuca latifolia / Madhuca longifolia / Madhuca indica (4.37 %)
- Cocos nucifera (4.16 %).

## Growing Stock wise top ten species in RFA



- **Total mangrove cover - 4,992 sq km (0.15%).**
  - Net **decrease** ( from 2021 ) in mangrove cover - 7.43 km<sup>2</sup>
  - Gujarat has a notable decrease of 36.39 km<sup>2</sup>
  - Notable increase in Andhra Pradesh (13.01 km<sup>2</sup>) and Maharashtra (12.39 km<sup>2</sup>).



- **Total bamboo bearing area - 1,54,670sq km.**
  - Increase in bamboo cover - 5,227 sq km
- **States with largest bamboo cover**

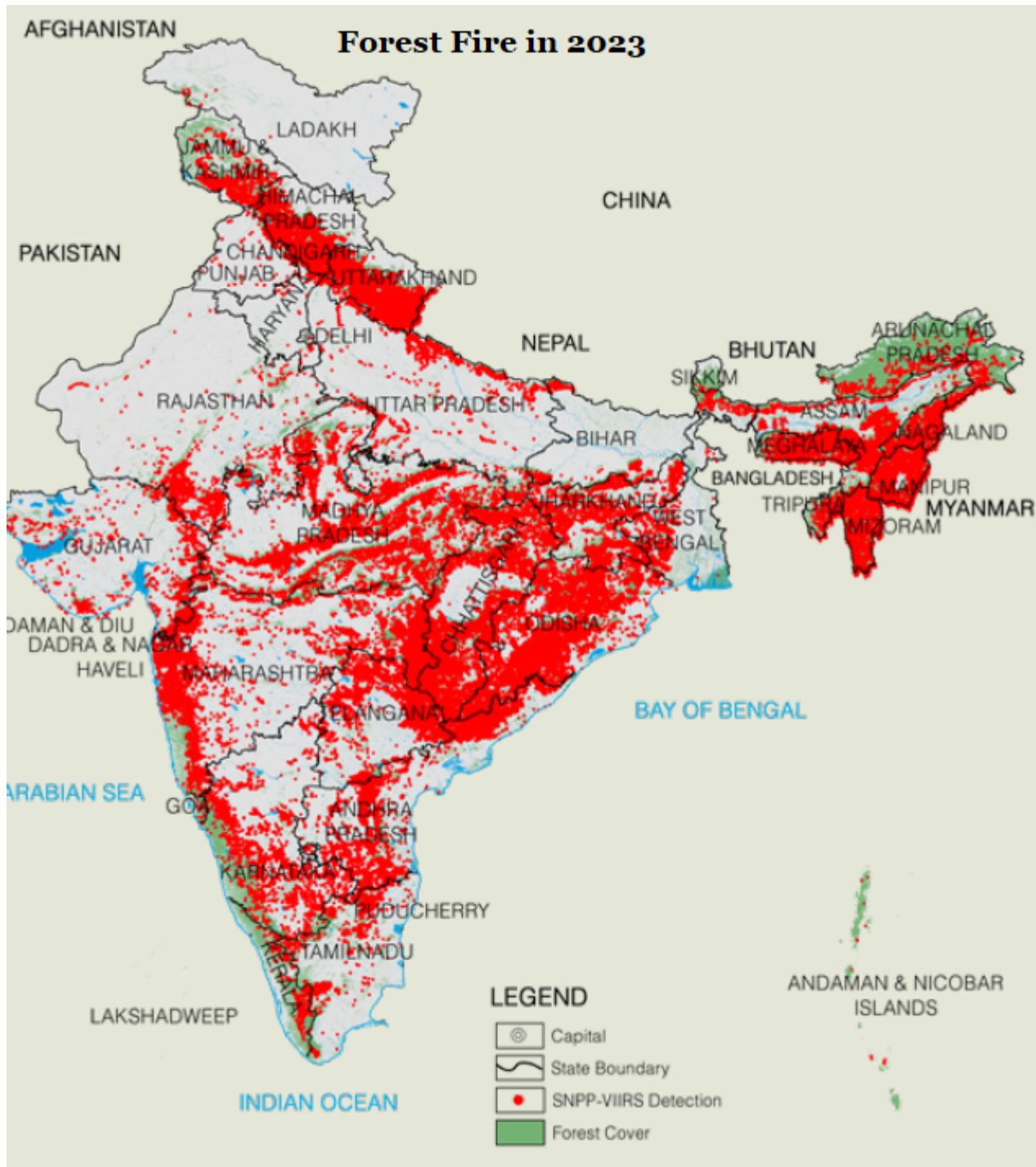


- Madhya Pradesh - 20,421 km<sup>2</sup>
- Arunachal Pradesh - 18,424 km<sup>2</sup>
- Odisha - 12,328 km<sup>2</sup>

*Bamboo cover has been estimated for the first time and included in Tree cover.*

- The total annual potential production of timber from trees outside forest - 91.51 million cum.
- **Agroforestry** - It accounts for 1,27,590 km<sup>2</sup> of tree cover and 1,292 Million m<sup>3</sup> of Growing stock.
- **Area of Western Ghats Eco-Sensitive Areas (WGESA)** - 60,285.61 km<sup>2</sup>.
  - Forest cover in all districts under WGESA - 44,043.99 km<sup>2</sup> (73%).
  - Loss of forest cover in WGESA - 58.22 km<sup>2</sup>( During the last 10 years)
  - Very Dense forest increased by 3,465.12 km<sup>2</sup>
  - Moderately Dense Forest and Open Forest decreased by 1,043.23 km<sup>2</sup> and 2,480.11 km<sup>2</sup>.
- **The total forest and tree cover in the North Eastern** - 1,74,394.70 km<sup>2</sup> which is 67% of geographical area of these states.
  - Decrease of forest cover in the region - 327.30 km<sup>2</sup>.
- **Forest fire** - Top three States with fire incidences 2023-24 season - Uttrarakhand, Odisha and Chhattisgarh.

*In 2019, National Disaster Management Plan (NDMP) by National Disaster Management Authority (NDMA) recognised forest fires as one of the national disasters.*



### How much has the forest and tree ecosystem changed?

- **Increase total forest and tree cover** - There is an increase of **1445 sq km** from 2021.
  - Increase in forest cover - 156 sq km .
  - Increase in tree cover - 1289 sq km.
- **Maximum increase in forest and tree cover**
  - Chhattisgarh (684 sq km)
  - Uttar Pradesh (559 sq km)
  - Odisha (559 sq km)
  - Rajasthan (394 sq km).
- **The maximum decrease in forest and tree cover**

- Madhya Pradesh (612.41 km<sup>2</sup>)
- Karnataka (459.36 km<sup>2</sup>)
- Ladakh (159.26 km<sup>2</sup>)
- Nagaland (125.22 km<sup>2</sup>).
- **Changes in last decade( 2013-2023)**
  - Increase in forest cover - 16,630.25 km<sup>2</sup>
  - Increase in tree cover - 20,747.34 km<sup>2</sup>.
  - Increase in mangrove cover - 296.33 km<sup>2</sup>
  - Increase in agroforestry tree green cover - 21,286.57 km<sup>2</sup>
- **Improvement in soil health**
  - Changes in shallow to deep soil - 87.16% (as against 83.53% in 2013)
  - Improvement in medium to deep humus - 18.04% (as against 11.43% in 2013)
  - Improvement in grass cover - 17.21% (15.64% in 2013)
  - Increase in soil organic carbon - 56.08 tonnes per hectare ( 55.85 in 2013)

## References

1. [PIB | India State of Forest Report 2023](#)
2. [FSI | ISFR 2023 Report](#)

