

Executive Summary

Background

Periodic assessment of forest and tree resources of the country is the primary mandate of Forest Survey of India (FSI). Forest assessment was started by FSI way back in 1987. With the advancement in remote sensing technology over the years, FSI is now using latest satellite data for wall to wall mapping of the country's forests on a biennial cycle. Inventory of forests and Trees Outside Forests (TOF) is carried out in 60 randomly selected districts spread over the entire country in a cycle of two years. Robust sampling design is used to carry out the inventory. The biennial report contains the information about the district-wise forest cover assessment of the states, changes with respect to previous assessment under different canopy classes, growing stock at national and state level within forests and outside, carbon stock in India's forests, etc. The present report pertains to the thirteenth cycle of forest cover mapping.

Salient Findings of ISFR 2013

Based on interpretation of satellite data (October 2010 to January 2012) and the inventory of forests and TOFs carried out by FSI, the key results of India State of Forest Report (ISFR) 2013 are as follows:

Forest and Tree Resources

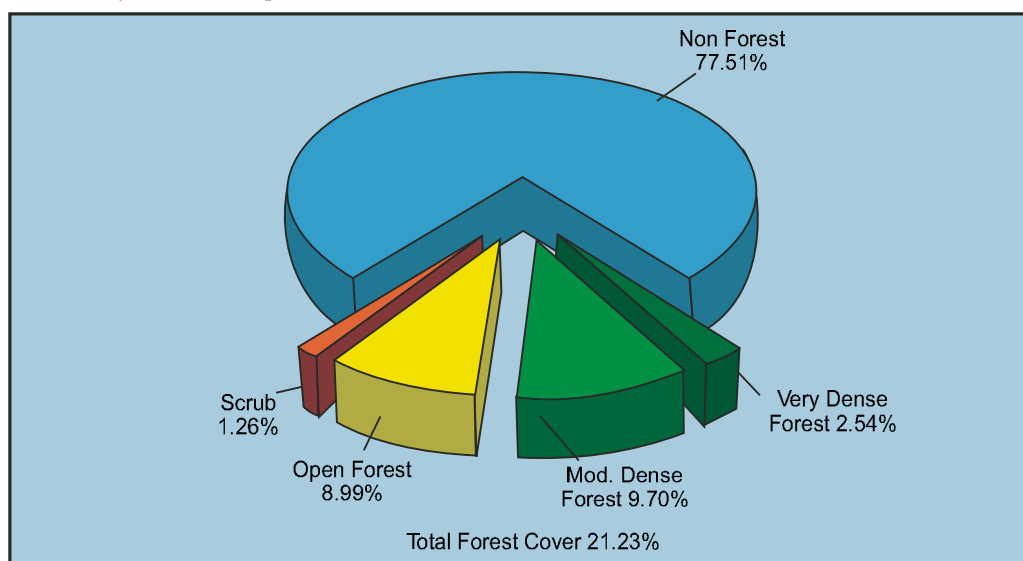
- Forest Cover of the country as per this assessment is 697,898 sq. km. (69.79 million ha) which is 21.23 per cent of the geographical area of the country. The tree cover of the country is estimated to be 91,266 sq. km. (9.13 million ha) which is 2.78 per cent of the geographical area.
- The total Forest and Tree cover of the country as per 2013 assessment is 789,164 sq. km. (78.92 million ha) which is 24.01 per cent of the geographical area of the country.
- There is an increase of 5,871 sq km in the forest cover of the country in comparison to 2011 assessment.
- For the first time, in this report, the forest cover information is being segregated between the areas inside and outside the greenwash of Survey of India (SOI) toposheets. As the green wash areas broadly coincide with the 'forests' of the country, it gives a fair idea about the forest cover inside and outside the forest area.
- In hill and tribal districts of the country, there is an increase of forest cover of 40 sq km and 2,396 sq km respectively as compared to the previous assessment.

- The north eastern states of India account for one-fourth of the country's forest cover. There is a net decline of 627 sq km in forest cover as compared to the previous assessment.
- Mangrove cover has decreased by 34 sq km as compared to the previous assessment.
- The total growing stock of India's forest and trees outside forests is estimated as 5,658.046 million cum which comprises 4,173.362 million cum inside the forests and 1,484.68 million cum (m. cum) outside the forests.
- There is a decrease of 389.11 m.cum in total growing stock of the country between two assessments (ISFR 2011 and ISFR 2013). Out of this, the decrease inside forest is 325.369 m.cm. and that outside the forest is 63.743 m. cum.
- While there is an increase in total forest cover in the country, there is a decrease in the growing stock both inside and outside forest area. The main reason for decline in growing

Table 1: Forest and Tree cover of India in 2013

Class	Area (km ²)	% of Geographical Area
Forest Cover		
Very Dense Forest	83,502	2.54
Moderate Dense Forest	318,745	9.70
Open Forest	295,651	8.99
Total Forest Cover*	697,898	21.23
Tree Cover	91,266	2.78
Total Forest and Tree Cover	789,164	24.01
Scrub	41,383	1.26
Non Forest	2,547,982	77.51
Total Geographical Area	3,287,263	100.00

(*Includes 4,628 sq km under mangroves)



stock within forest area is the loss of 1,991 sq. km of Moderately Dense Forest (MDF). The conversion of MDF into Open Forest (OF) therefore results in a forest area that is severely depleted in terms of growing stock. Therefore, a large increase in the forest cover under OF may not completely offset the loss in growing stock due to reduction in MDF. Loss of growing stock outside forest area is attributed to harvesting of mature tree crops.

- In the present assessment total carbon stock in forest is estimated to be 6,941 million tonnes. There is an increase of 278 million tonnes in the carbon stock of country as compared to last assessment reported in ISFR 2011 which corresponds to the year 2004.

New Features of ISFR 2013

The present ISFR contains four new features which are assessment of forest cover within and outside greenwash area, important characteristics of India's Forest, Trees in agroforestry system in India and urban tree resources. The new features are briefly described below:

a. Assessment of Forest Cover within and outside Greenwash area

It is important to mention that in absence of digital boundaries of Recorded Forest Area (RFA) in the country, it is not possible to indicate changes in forest cover within and outside the recorded forest areas. Considering this limitation, FSI has attempted to use green wash areas of Survey of India (SOI) toposheets for this purpose. The green wash areas of SOI toposheets broadly coincide with the recorded forest areas of the country. This has been corroborated on the ground while carrying out the work of forest inventory. However, it also includes private forests, community and other forest areas which are not under ownership of forest department. In addition recorded forest area is also found outside green wash area of SOI toposheets. As per ISFR 2013, the forest cover inside the greenwash area is only 530,779 sq km and that outside the greenwash area is 167,119 sq. km. Out of the total increase of 5,871 sq km. in forest cover of the country, the increase inside the greenwash area is only 132 sq km and that outside the greenwash area is 5, 739 sq km.

b. Important Characteristics of India's Forests

FSI has been conducting National Forest Inventory (NFI) since 2002. Under the NFI, information on various important parameters such as forest area under different land use, intensity of regeneration, incidence of fire, injuries to crops, grazing, presence of weeds and grass, soil information, humus, rockiness, bamboo information, plantation potential, biotic influence etc. Some of the area statistics of these parameters are given as follows:

- About 48 per cent of recorded forest area is having adequate regeneration while about 24 per cent area is having inadequate regeneration. In around 10 per cent of forest area, no regeneration was observed.
- About 73 per cent of the recorded forest area is affected by light to heavy grazing.

- Humus is present in about 54 per cent of recorded forest area out of which 43 per cent area is under shallow category. No humus is observed in 32.73 per cent area.
- About 76 per cent area of RFA is under 'natural forest' out of which 63 per cent is of 'seed origin'. The plantation forests constitutes only 6 per cent area.
- 41.69 per cent area of RFA falls under miscellaneous (mixed) forests, followed by Sal (5.78 per cent), Lowland hardwood (5.69 per cent), Teak (4.68 per cent) and Teak with miscellaneous species (4.23 per cent).
- About 53 per cent recorded forest area has either regeneration or pole or small timber crop. Only 7.62 per cent area has crop under big timber and about 21 per cent area has mixed crop.

c. Trees in Agroforestry System in India

Agroforestry systems are closely associated with and are an integral part of the rural economy. Under this, information on physiographic zones and state wise tree green cover, growing stock and carbon stock under agroforestry has been given in Chapter 7. The important results are as given below:

- The total tree green cover under agroforestry has been estimated to be 111,554 sq km.
- Volume of wood found in the agroforestry system is 1,023 m. cum.
- Total carbon stock estimated in the agroforestry trees is 280 m. tonnes.

d. Urban Tree Resources

Urban trees and forests are contributing immensely to the quality of life in towns and cities. FSI has been assessing the urban tree resources continuously under TOF inventory since 2002. However, separate information on urban tree resources was not included in the previous reports. Considering the growing importance of urban trees, the results of the assessment have been included in a separate chapter in this report. The information on urban area, number of stems and volume according to species and diameter class at national and state level has been detailed in this chapter. The important results are:

- Urban tree cover area has been estimated to be 12,790 sq km which is 16.40 per cent of the urban area.
- The growing stock in urban trees is estimated as 98 m. cum.