

11.25

TAMIL NADU

11.25.1 Introduction

Tamil Nadu, the Southernmost State of the country has a geographical area of 1,30,060 sq km which is 3.96% of the total geographical area of India. The State lies between 8°05'N to 13°35'N latitude and 76°15'E to 80°20'E longitude and is borders with Kerala in the west, Karnataka in the northwest, Andhra Pradesh in the north, Bay of Bengal in the east and the Indian Ocean in the south. Physiographically, the State can be divided into four major regions viz Coastal Plains, Eastern Ghats, Central Plateau and Western Ghats. The main rivers of the State are Cauvery, Bhavani, Palar, Vaigai etc. which drain into the Bay of Bengal. Tamil Nadu has a Humid Tropical Climate and the annual rainfall ranges between 900 mm to 1,200 mm and the annual temperature varies from 19°C to 37°C. The State has 32 districts out of which five are hill districts and six are tribal districts. As per the 2011 Census, Tamil Nadu has a population of 72.15 million which is 5.96% of India's population. The rural and urban population constitute 37.23 million and 34.92 million respectively. The Tribal population is 1.10%. The population density of the State is 555 per sq km which is higher than the national average. The 19th Livestock Census 2012 has reported a total livestock population of 22.72 million which is about 4.43% of the total livestock population of the country.

TABLE 11.25.1 Land Use Pattern

Land Use Types	Area (in 000' ha)	Percentage
Geographical Area	13,006	
Reporting area for land utilization	13,033	100.00
Forests	2,125	16.31
Not available for land cultivation	2,688	20.62
Permanent pastures and other grazing lands	108	0.83
Land under misc. tree crops and groves	236	1.80
Culturable wasteland	325	2.50
Fallow land other than current fallows	1,734	13.30
Current fallows	998	7.66
Net area sown	4,819	36.98

Source: Land Use Statistics, Ministry of Agriculture, GOI, (2014-15)



11.25.1.1 A Brief Overview of Forestry Scenario

The State is endowed with rich biodiversity, from marine coastal systems in the Gulf of Munnar to the terrestrial evergreen forests in the Western Ghats and temperate forests in the hilly regions. As per the Champion & Seth Classification of Forest Types (1968), the forests in Tamil Nadu belong to nine Forest Type Groups, which are further divided into 39 Forest Types. The Nilgiri Biosphere Reserve represents a unique and threatened ecosystem in the tropics inside the Western Ghats Mountain system and is one of the biodiversity hotspots. Tamil Nadu has been a pioneer State in the biodiversity conservation, particularly in Protected Area management, including conservation of marine fauna. Tamil Nadu is famous for its Teak and Sandalwood forests. Plantations of Sandalwood, conservation and management of mangroves and wetlands are a priority area of the SFD.

Recorded Forest Area (RFA) in the State is 22,877 sq km of which 20,293 sq km is Reserved Forest, 1,782 sq km is Protected Forest and 802 sq km is Unclassed Forests. In Tamil Nadu, during the period 1st January 2015 to 5th February 2019, a total of 542.40 hectares of forest land was diverted for non-forestry purposes under the Forest Conservation Act, 1980 (MoEF & CC, 2019). As per the information received from the State during the last two years, 74,030 ha of plantations were raised in the State.

Five National Parks, 29 Wildlife Sanctuaries and two Conservation Reserves constitute the Protected Area network of the State covering 4.97% of its geographical area. Mukurthi National Park, is famous for Nilgiri Thar.

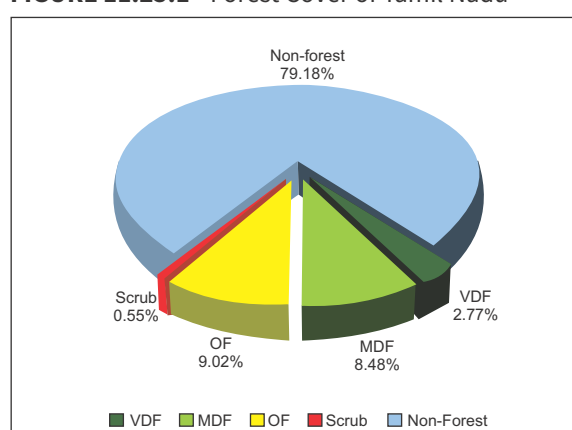
11.25.2 Forest Cover

Based on the interpretation of IRS Resourcesat-2 LISS III satellite data of the period Oct 2017 to Aug 2018, the Forest Cover in the State is 26,364.02 sq km which is 20.27 % of the State's geographical area. In terms of forest canopy density classes, the State has 3,605.49 sq km under Very Dense Forest (VDF), 11,029.55 sq km under Moderately Dense Forest (MDF) and 11,728.98 sq km under Open Forest (OF). Forest Cover in the State has increased by 83.02 sq km as compared to the previous assessment reported in ISFR 2017.

TABLE 11.25.2 Forest Cover of Tamil Nadu

(in sq km)		
Class	Area	% of GA
VDF	3,605.49	2.77
MDF	11,029.55	8.48
OF	11,728.98	9.02
Total	26,364.02	20.27
Scrub	714.72	0.55

FIGURE 11.25.1 Forest Cover of Tamil Nadu



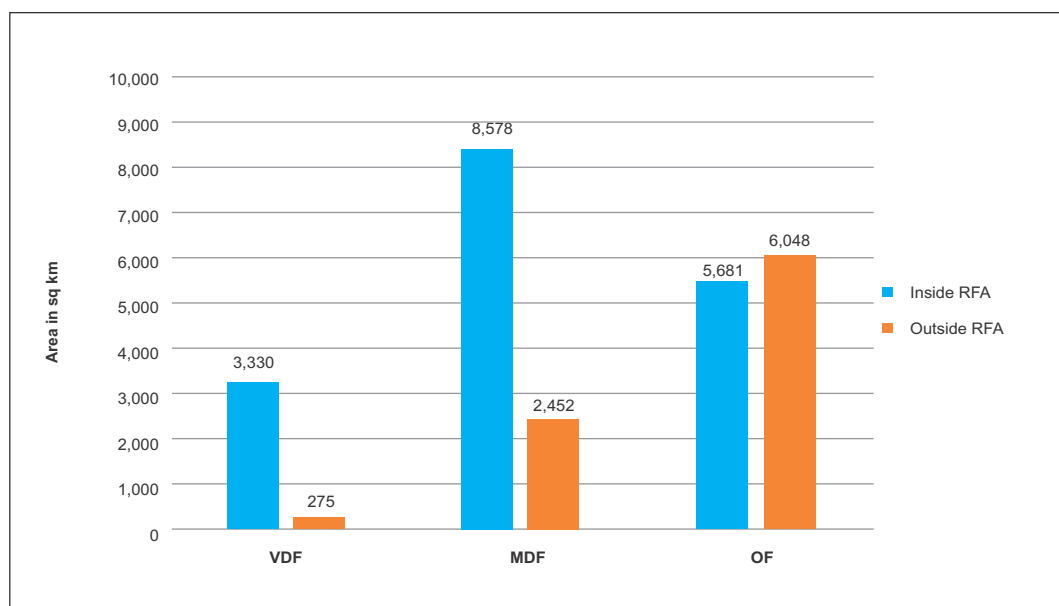
11.25.2.1 Forest Cover inside and outside Recorded Forest Area (or Green Wash)

The State has reported extent of recorded forest area (RFA) 22,877 sq km which is 17.59% of its geographical area. The reserved, protected and unclassified forests are 88.70%, 7.79% and 3.51% of the recorded forest area in the State respectively. However, as the digitized boundary of recorded forest area from the State covers 21,653.95 sq km, the analysis of forest cover inside and outside this area is given below.

TABLE 11.25.3 Forest Cover inside and outside Recorded Forest Area or (Green Wash) in Tamil Nadu (in sq km)

Forest Cover inside the Recorded Forest Area (or Green Wash)				Forest Cover outside the Recorded Forest Area (or Green Wash)			
VDF	MDF	OF	Total	VDF	MDF	OF	Total
3,330	8,578	5,681	17,589	275	2,452	6,048	8,775
18.93%	48.77%	32.30%		3.14%	27.94%	68.92%	

*in case of Tamil Nadu RFA boundaries have been used.

FIGURE 11.25.2 Forest Cover inside and outside RFA in Tamil Nadu**TABLE 11.25.4** District-wise Forest Cover in Tamil Nadu (in sq km)

District	Geographical Area (GA)	2019 Assessment				% of GA	Change wrt 2017 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Ariyalur	1,940	0.00	40.45	352.69	393.14	20.26	13.14	3.96
Chennai	175	0.00	6.34	6.50	12.84	7.34	-1.16	0.00
Coimbatore ^H	4,732	360.80	680.01	943.83	1,984.64	41.94	9.64	7.01
Cuddalore	3,703	0.00	47.86	343.10	390.96	10.56	8.96	17.71
Dharmapuri ^T	4,497	261.85	835.79	603.50	1,701.14	37.83	3.14	14.31
Dindigul	6,036	253.19	779.85	841.36	1,874.40	31.05	-1.60	30.83
Erode	5,760	402.17	1,128.56	763.73	2,294.46	39.83	-12.54	36.73
Kancheepuram	4,483	0.00	69.95	237.83	307.78	6.87	-2.22	35.75
Kanniyakumari ^H	1,684	137.18	572.65	293.71	1,003.54	59.59	9.54	0.58
Karur	2,904	2.24	43.01	73.21	118.46	4.08	-9.54	7.02
Krishnagiri	5,129	94.87	827.67	694.87	1,617.41	31.53	68.41	31.38
Madurai ^H	3,710	39.51	232.20	283.41	555.12	14.96	-5.88	31.91
Nagapattinam	2,569	0.00	23.53	135.66	159.19	6.20	14.19	0.00
Namakkal ^T	3,420	83.75	283.58	211.72	579.05	16.93	-0.95	20.08

contd.

District	Geographical Area (GA)	2019 Assessment				% of GA	Change wrt 2017 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Perambalur ^T	1,756	10.03	64.81	66.42	141.26	8.04	-2.74	18.35
Pudukkottai	4,644	0.91	96.04	267.84	364.79	7.86	2.79	7.30
Ramanathapuram	4,104	0.00	23.84	233.11	256.95	6.26	-7.05	0.88
Salem ^T	5,237	198.62	756.76	514.46	1,469.84	28.07	-13.16	33.64
Sivaganga	4,233	0.00	42.32	287.34	329.66	7.79	-14.34	5.34
Thanjavur	3,411	0.00	265.06	81.13	346.19	10.15	-9.81	0.33
The Nilgiris ^H	2,565	466.72	629.85	634.44	1,731.01	67.49	12.01	6.85
Theni	2,868	183.06	470.23	522.00	1,175.29	40.98	-1.71	29.36
Thiruvallur	3,394	11.00	45.87	228.80	285.67	8.42	-1.33	49.43
Thiruvarur	2,274	0.46	35.94	31.07	67.47	2.97	-17.53	0.00
Thoothukkudi	4,745	0.00	26.08	230.60	256.68	5.41	-15.32	68.65
Tiruchirappalli ^T	4,509	53.53	228.35	189.48	471.36	10.45	-11.64	30.33
Tirunelveli ^H	6,693	442.45	567.02	290.77	1,300.24	19.43	0.24	24.31
Tiruppur	5,187	48.28	237.68	558.47	844.43	16.28	39.43	8.78
Tiruvannamalai ^T	6,188	233.79	595.83	478.74	1,308.36	21.14	-3.64	67.06
Vellore	6,075	202.86	937.68	678.05	1,818.59	29.94	5.59	72.80
Viluppuram	7,194	79.48	301.56	476.52	857.56	11.92	11.56	46.44
Virudhunagar	4,241	38.74	133.18	174.62	346.54	8.17	16.54	7.60
Grand Total	1,30,060	3,605.49	11,029.55	11,728.98	26,364.02	20.27	83.02	714.72

TABLE 11.25.5 Forest Cover Change Matrix for Tamil Nadu

(in sq km)

Class	2019 Assessment					Total ISFR 2017
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	3,552	101	4	0	15	3,672
Moderately Dense Forest	35	10,661	159	3	121	10,979
Open Forest	2	127	10,567	17	917	11,630
Scrub	0	0	14	611	32	657
Non Forest	16	141	985	84	1,01,896	1,03,122
Total ISFR 2019	3,605	11,030	11,729	715	1,02,981	1,30,060
Net Change	-67	51	99	58	-141	

Main reasons for the increase in forest cover in the State are plantation and conservation activities.

TABLE 11.25.6 Altitude-wise Forest Cover in Tamil Nadu

(in sq km)

Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-500	1,11,060	376	5,121	8,586	14,083 (53.42%)	564
500-100	13,688	1,810	4,398	2,411	8,619 (32.69%)	17
1000-2000	4,437	1,087	1,394	697	3,178 (12.05%)	4
2000-3000	875	332	117	35	484 (1.84%)	130
Total	1,30,060	3,605	11,030	11,729	26,364	715

(based on SRTM, Digital Elevation Model, 30 m, 2016)

TABLE 11.25.7 Forest Cover in different slope classes in Tamil Nadu

(in sq km)

Slope (in degrees)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-5	1,09,583	335	3438	7407	11,180 (42.41%)	432
5-10	5,911	527	1750	1,270	3,547 (13.45%)	71
10-15	3,943	584	1504	875	2,963 (11.24%)	53
15-20	3,364	586	1375	717	2,678 (10.16%)	48
20-25	2,856	557	1,218	601	2,376 (9.01%)	44
25-30	2,208	484	929	460	1,873 (7.10%)	36
>30	2,195	532	816	399	1,747 (6.63%)	31
Total	1,30,060	3,605	11,030	11,729	26,364	715

(based on SRTM, Digital Elevation Model, 30 m, 2016)



FIGURE 11.25.3 Forest Cover Map of Tamil Nadu

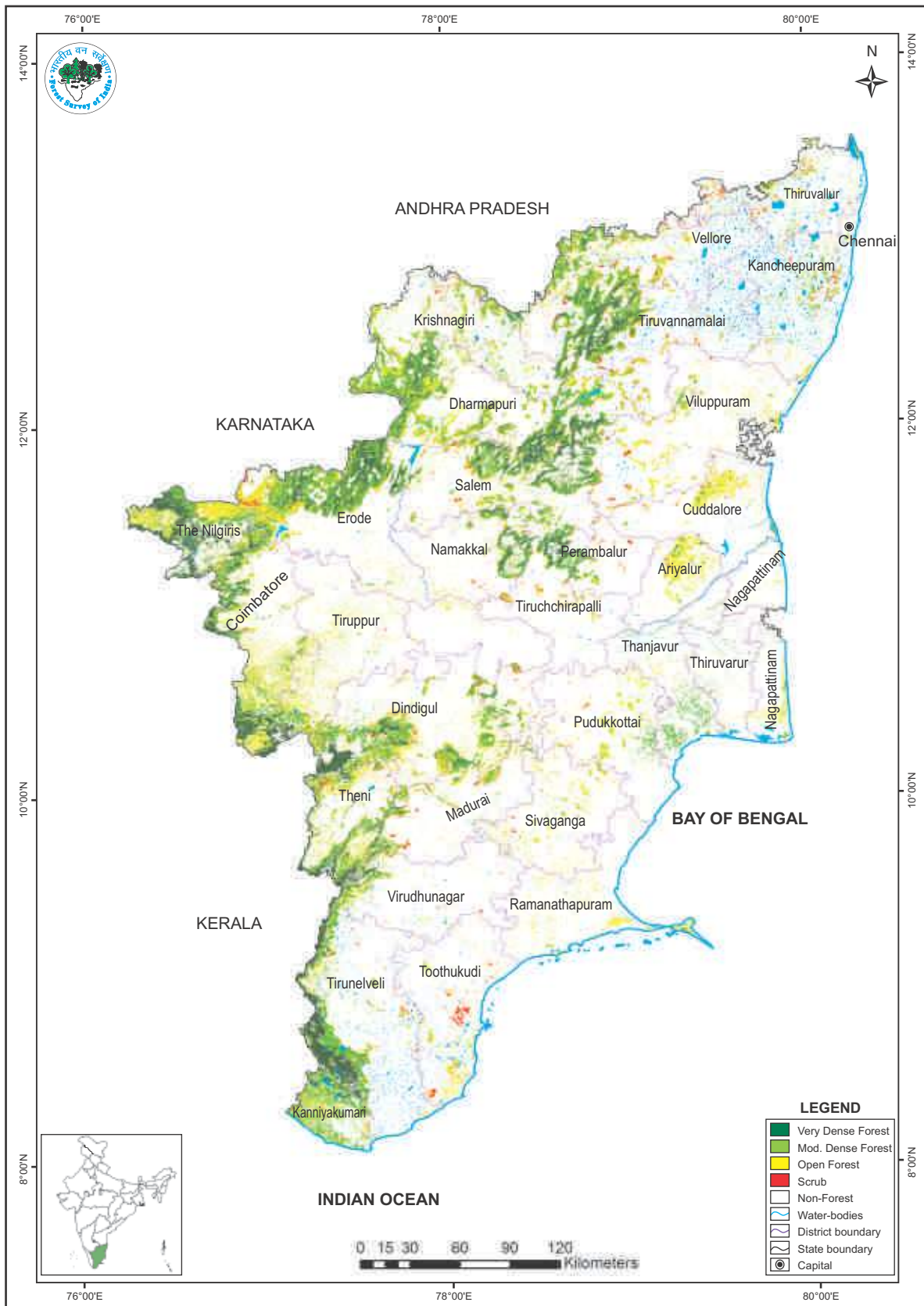


TABLE 11.25.8 Wetlands inside the Recorded Forest Area (or Green Wash) in Tamil Nadu (in ha)

Wetland Category	No. of Wetlands	Total Wetland Area
Inland Wetlands - Natural		
Lake/Pond	198	2,907
Waterlogged	2	16
River/Stream	48	5,571
Sub - Total	248	8,494
Inland Wetlands -Man-made		
Reservoir/Barrage	35	13,900
Tank/Pond	703	3,824
Waterlogged	5	1,708
Sub - Total	743	19,432
Coastal Wetlands – Natural		
Lagoon	4	8,377
Creek	2	393
Sand/Beach	19	572
Intertidal mud flat	20	2,338
Salt Marsh	17	514
Mangrove	27	4,074
Coral Reef	15	597
Sub -Total	104	16,865
Wetlands (<2.25 ha)	428	428
Total	1,523	45,219
Total Recorded Forest (or Green Wash) Area (in ha)		21,65,395
% of Wetland area inside Recorded Forest (or Green Wash) Area		2.09%

(analysis based on the National Wetland Atlas: India, 2011)

11.25.3 Forest Types & Biodiversity

Forest Type Maps of 2011 have been refined in the recently completed exercise by FSI. Percentage area under different forest types of Tamil Nadu as per the Champion & Seth classification (1968), according to the latest exercise are presented in the following table.

TABLE 11.25.9 Percentage area under different forest types of Tamil Nadu

Sl.No.	Forest Type	% of Forest cover
1.	1A/C3 Southern Hilltop Tropical Evergreen Forest	0.39
2.	1A/C4 West Coast Tropical Evergreen Forest	2.48
3.	2A/C2 West Coast Semi-Evergreen Forest	1.31
4.	2A/C3 Tirunelveli Semi-Evergreen Forest	0.42
5.	2/E3 Moist Bamboo Brakes	1.17
6.	3B/C1a Very Moist Teak Forest	0.21
7.	3B/C1b Moist Teak Forest	0.62
8.	3B/C1c Slightly Moist Teak Forest	0.18
9.	3B/C2 Southern Moist Mixed Deciduous Forest	4.40
10.	3B/2S1 Southern Secondary Moist Mixed Deciduous Forest	0.89
11.	4A/L1 Littoral Forest	0.03

Contd.

Sl.No.	Forest Type	% of Forest cover
12.	4B/TS1 Mangrove Scrub	0.01
13.	4B/TS2 Mangrove Forest	0.21
14.	4C/FS2 Submontane Hill-Valley Swamp Forest	0.01
15.	4E/RS1 Riparian Fringing Forest	0.14
16.	5A/C1a Very Dry Teak Forest	0.00
17.	5A/C1b Dry Teak Forest	0.56
18.	5A/C2 Dry Red Sanders-Bearing Forest	0.04
19.	5A/C3 Southern Dry Mixed Deciduous Forest	22.43
20.	5/DS1 Dry Deciduous Scrub	3.40
21.	5/DS2 Dry Savannah Forest	1.41
22.	5/DS3 (Euphorbia Scrub)	0.01
23.	5/DS4 (Dry Grass Land)	1.17
24.	5/E4 Hardwickia Forest	1.57
25.	5/E9 Dry Bamboo Brake	0.56
26.	5/1S1 Dry Tropical Riverain Forest	0.41
27.	5/2S1 Secondary Dry Deciduous Forest	9.91
28.	6A/C1 Southern Thorn Forest	6.85
29.	6A/C2 Karnatak Umbrella Thorn Forest	5.38
30.	6A/DS1 Southern Thorn Scrub	1.75
31.	6A/DS2 Southern Euphorbia Scrub	0.16
32.	7/C1 Tropical Dry Evergreen Forest	1.14
33.	7/DS1 Tropical Dry Evergreen Scrub	0.27
34.	8A/C1 Nilgiri Sub Tropical Hill Forest	0.61
35.	8A/DS1 South Indian Sub-Tropical Hill Savannah (Woodland)	0.06
36.	8A/E1 Reed Brakes (Ochalandra)	0.02
37.	11A/C1 Southern Montane Wet Temperate Forest	0.64
38.	11A/DS1 Southern Montane Wet Scrub	0.01
39.	11A/DS2 Southern Montane Wet Grassland	0.77
40.	Plantation/TOF	28.40
	Total	100.00

11.25.3.1 Assessment of Biodiversity

Findings of the rapid assessment of Biodiversity carried out at the national level for natural forests during September 2018 to May 2019 as part of the forest type mapping exercise is summarized below in table 11.25.10 and table 11.25.11 in respect of Tamil Nadu.

TABLE 11.25.10 No. of species observed during the rapid assessment

Plant Type	Number of Species
Tree	252
Shrub	313
Herb	87

TABLE 11.25.11 Shannon-Wiener Index of Tree, Shrub and Herb species in different Type Groups of Tamil Nadu

Sl.No.	Forest Type Group	Shannon-Wiener Index		
		Tree	Shrub	Herb
1	Group 1- Tropical Wet Evergreen Forests	3.25	3.23	2.03
2	Group 2- Tropical Semi-Evergreen Forests	2.77	2.82	2.30
3	Group 3- Tropical Moist Deciduous Forests	3.39	3.27	2.31
4	Group 4- Littoral and Swamp Forests	*	1.04	1.43
5	Group 5- Tropical Dry Deciduous Forests	3.92	3.91	2.26
6	Group 6- Tropical Thorn Forests	3.09	3.10	1.85
7	Group 7- Tropical Dry Evergreen Forests	2.81	2.82	1.77
8	Group 8- Subtropical Broadleaved Hill Forests	2.94	3.20	0.62
9	Group 11- Montane Wet Temperate Forests	2.18	2.68	2.36

*adequate number of sample plots were not available

11.25.4 Fire Prone Forest Areas

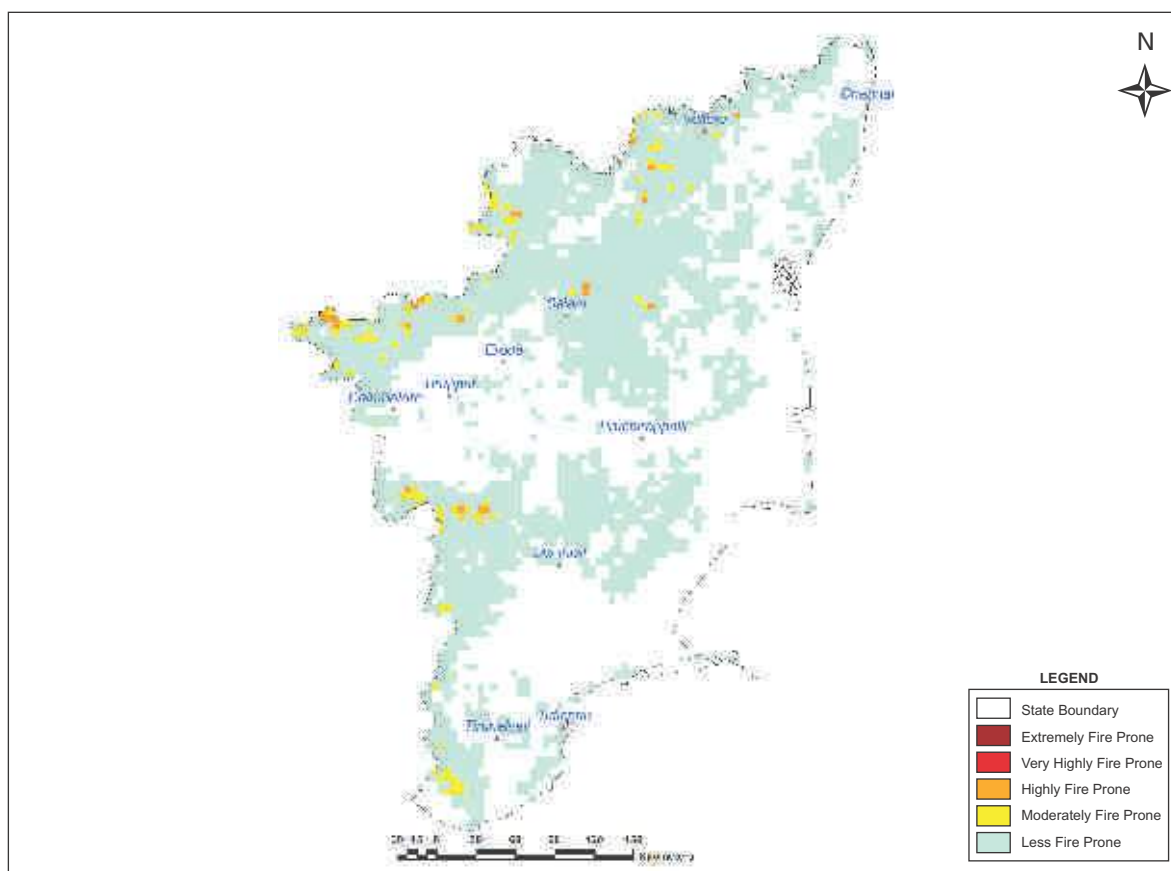
Geographical area under different classes of forest fire proneness are given in the following table.

TABLE 11.25.12 Forest Fire Prone Classes (in sq km)

Sl. No.	Forest Fire Prone Classes	Geographical Area	% of Total forest cover
1.	Extremely fire prone	0.00	0.00
2.	Very highly fire prone	0.00	0.00
3.	Highly fire prone	561.97	2.19
4.	Moderately fire prone	2,306.92	7.92
5.	Less fire prone	60,434.72	89.89
	Total	63,303.61	100.00



FIGURE 11.25.4 Fire prone forest areas under different fire prone classes



11.25.5 Tree Cover

Forest cover presented in the section 11.25.2 accounts for tree patches of size 1 ha and more having canopy density more than 10%. However, trees occurring in patches of size less than 1 ha including scattered trees are assessed through sampling based methodology. Tree cover in Tamil Nadu has been estimated as given table 11.25.13.

TABLE 11.25.13 Tree Cover in Tamil Nadu
(in sq km)

Tree Cover	Area
	4,830

Tree cover of Tamil Nadu has increased by 159 sq km as compared to the previous assessment reported in ISFR2017.

11.25.6 Extent of Trees Outside Forest (TOF)

Trees outside Forests (TOF) refer to tree resources found outside the forests as defined in the Government records. FSI maps forest cover using satellite data and assesses tree cover outside forests using sampling based method. Forest Cover outside the recorded forest area is derived using boundaries of RFA or Green Wash. Extent of TOF therefore may be estimated as the sum of extent of forest cover outside the recorded forest areas (RFA) and tree cover as given in the preceding section.

TABLE 11.25.14 Extent of TOF in Tamil Nadu (in sq km)

Forest Cover outside the RFA/GW	Tree Cover	Extent of TOF
8,775	4,830	13,605

11.25.7 Growing Stock in Forest

Growing stock in the recorded forest areas (RFA) in Tamil Nadu is given in the table 11.25.15. Diameter class-wise distribution of top 5 species in numbers derived from the forest inventory data is presented in the table 11.25.16

TABLE 11.25.15 Growing Stock in Tamil Nadu (in m cum)

Growing Stock (GS)	% of Country's GS	
Growing Stock in Recorded Forest Area	96.97	2.27
Growing Stock in TOF	76.30	4.65

TABLE 11.25.16 Diameter class distribution of top five species inside RFA in Tamil Nadu (in '000)

Sl.No.	Species	Dia class (cm)		
		10-30	30-60	>60
1.	<i>Albizzia amara</i>	68,756	2,218	61
2.	<i>Anogeissus latifolia</i>	31,396	2,787	0
3.	<i>Canthium decocum</i>	16,760	297	0
4.	<i>Commiphora ostdets</i>	15,118	792	61
5.	<i>Eucalyptus species</i>	17,978	991	0

11.25.8 Carbon Stock in Forest

The total Carbon stock of forests in the State including the TOF patches which are more than 1 ha in size is 216.78 million tonnes (794.86 million tonnes of CO₂ equivalent) which is 3.04% of total forest carbon of the country. Pool wise forest carbon in is given in the following table

TABLE 11.25.17 Forest Carbon in Tamil Nadu in different pools (in '000 tonnes)

AGB	BGB	Dead wood	Litter	SOC	Total
62,092	21,433	776	4,107	1,28,374	2,16,782

11.25.9 Growing Stock of Bamboo

Bamboo bearing area and growing stock inside the recorded forest area (RFA)/ Green Wash which include culms of 1 year age and above are given in the table 11.25.18

TABLE 11.25.18 Growing Stock of Bamboo in Tamil Nadu

Growing Stock (GS)	% of Country's GS of Bamboo	
Bamboo bearing area inside RFA/Green Wash (in sq km)	4,357	2.72
Total number of culms (in millions)	946	2.40
Total equivalent green weight (in 000' tonnes)	7,779	2.80

11.25.10 Dominant tree species in Trees Outside Forests (TOF)

Top five species in numbers in Trees Outside Forests in Tamil Nadu in Rural and Urban areas are given in the table 11.25.19 and table 11.25.20 respectively

TABLE 11.25.19 Top five tree species in TOF (Rural) in Tamil Nadu

Sl. No.	Species	Relative Abundance (%)
1.	<i>Cocos nucifera</i>	27.80
2.	<i>Azadirachta indica</i>	12.24
3.	<i>Borassus flabelliformis</i>	11.05
4.	<i>Mangifera indica</i>	5.19
5.	<i>Tectona grandis</i>	4.35

TABLE 11.25.20 Top five tree species in TOF (Urban) in Tamil Nadu

Sl. No.	Species	Relative Abundance (%)
1.	<i>Cocos nucifera</i>	33.82
2.	<i>Azadirachta indica</i>	12.37
3.	<i>Moringa pterygosperma</i>	5.02
4.	<i>Borassus flabelliformis</i>	4.27
5.	<i>Mangifera indica</i>	4.11

11.25.11 Major NTFP and Invasive Species

Major NTFP and invasive species as assessed from forest inventory data are presented in the table 11.25.21 and table 11.25.22 respectively.

TABLE 11.25.21 Major NTFP Species in the State of Tamil Nadu

Sl. No.	Species	Plant Type	Relative Abundance (%)
1.	<i>Albizia amara</i>	Tree	56.60
2.	<i>Solanum nigrum</i>	Herb	26.15
3.	<i>Embilica officinalis</i>	Tree	5.20
4.	<i>Tamarindus indica</i>	Tree	2.15
5.	<i>Anacardium occidentale</i>	Tree	2.10

TABLE 11.25.22 Major invasive species in the State inside the RFA/Green Wash in Tamil Nadu (in sq km)

Sl. No.	Species	Estimated Extent
1.	<i>Lantana camara</i>	2,209
2.	<i>Chromolaena odorata</i>	420
3.	<i>Solanum elaeagnifolium</i>	126
4.	<i>Ageratum conyzoides</i>	83
5.	<i>Cuscuta spp.</i>	61

Major NTFP species are given in terms of relative abundance whereas invasive species are given in terms of their estimated extent

11.25.12 Quantified estimation of Dependence of People living in forest fringe villages on forests in Tamil Nadu

Through a nation-wide study, FSI has done estimation of dependence of people living in the villages close to forest for fuel wood, fodder, small timber and bamboo in quantified terms for each State & UT of the country (Please refer to Chapter 10 in Vol. I for details). The estimated quantities of the four produce for Tamil Nadu is given in the table 11.25.23

TABLE 11.25.23 Estimation of Dependence of People in Forest Fringe Villages on Forests in Tamil Nadu

Fuelwood (tonnes)	Fodder (tonnes)	Bamboo (tonnes)	Small Timber (cum)
17,52,370	2,01,22,937	2,350	1,02,566