

13.16

MANIPUR



Geographical Area

22,327 sq km

Geographical Coordinates

Latitude- 23° 50' N to 25°42' N

Longitude- 92° 59' E to 94°46' E

Population (as per Census 2011)

2.86 million

Urban 0.84 million (29.21 %)

Rural 2.02 million (70.79 %)

Tribal 1.17 million (40.88 %)

Average Population Density

115 per sq km

Livestock population

(as per 19th Live Stock Census)

0.70 million

No. of Districts

9

No. of Hill Districts

9

No. of Tribal Districts

9

Table 13.16.1 Land Use Pattern

Land Use Types	Area (in '000 ha)	Percentage
Geographical Area	2,233	
Reporting area for land utilization	2,166	100.00
Forests	1,685	77.79
Not available for land cultivation	27	1.24
Permanent pastures and other grazing lands	1	0.05
Land under misc. tree crops and groves	6	0.28
Culturable wasteland	1	0.05
Fallow land other than current fallows	0	0.00
Current fallows	0	0.00
Net area sown	446	20.59

Source: Land Use Statistics, Ministry of Agriculture, GOI, (2017-18)

13.16.1 Forest Cover

Figure 13.16.1
Forest Cover
of Manipur

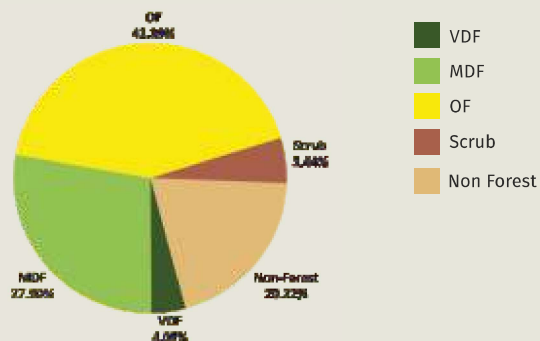


Table 13.16.2 Forest Cover
of Manipur (in sq km)

Class	Area	% of GA
VDF	904.99	4.05
MDF	6,228.49	27.90
OF	9,464.79	42.39
Total	16,598.27	74.34
Scrub	1,214.98	5.44

Table 13.16.3 District- wise Forest Cover in Manipur

(in sq km)

District	Geo-graphical Area (GA)	2021 Assessment				%of GA	Change wrt 2019 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Bishnupur TH	496	0.00	0.78	21.50	22.28	4.49	0.78	2.14
Chandel TH	3,313	11.30	929.21	1,870.56	2,811.07	84.85	-52.28	145.71
Churachandpur TH	4,570	42.19	1,593.15	2,243.70	3,879.04	84.88	-40.47	163.69
Imphal East TH	709	0.00	56.62	207.80	264.42	37.29	-9.84	13.51
Imphal West TH	519	0.00	14.68	37.27	51.95	10.01	0.20	9.40
Senapati TH	3,271	264.74	695.58	1,131.47	2,091.79	63.95	-44.79	317.65
Tamenglong TH	4,391	392.15	1,696.10	1,706.37	3,794.62	86.42	-49.82	194.72
Thoubal TH	514	0.00	1.15	58.20	59.35	11.55	-11.41	11.90
Ukhrul TH	4,544	194.61	1,241.22	2,187.92	3,623.75	79.75	-41.00	356.26
Grand Total	22,327	904.99	6,228.49	9,464.79	16,598.27	74.34	-248.63	1,214.98

13.16.1.1 Forest Cover Inside and Outside Recorded Forest Area (or Green Wash)

The Forest Cover inside and outside Recorded Forest Area (RFA) has been analysed in different categories and presented in Table given below.

Table 13.16.4 Forest Cover Inside and Outside Recorded Forest Area (or Green Wash) in Manipur

(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
895	5,743	8,195	14,833	10	485	1,270	1,765
6.03%	38.72%	55.25%		0.57%	27.48%	71.95%	

*in case of Manipur, Green Wash boundaries have been used.

MANIPUR

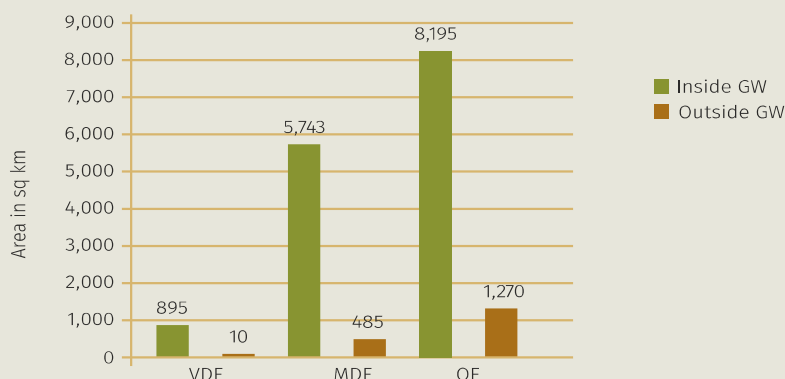


Figure 13.16.2
Forest Cover
Inside and
Outside of Green
Wash in Manipur

Table 13.16.5 Forest Cover Change Matrix for Manipur

(in sq km)

Class	2021 Assessment					Total ISFR 2019
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	899	0	0	0	6	905
Moderately Dense Forest	6	6,177	57	15	131	6,386
Open Forest	0	51	9,221	61	223	9,556
Scrub	0	0	81	1,030	70	1,181
Non Forest	0	0	106	109	4,084	4,299
Total ISFR 2021	905	6,228	9,465	1,215	4,514	22,327
Net Change	0	-158	-91	34	215	

Table 13.16.6 Altitude-wise Forest Cover in Manipur

(in sq km)

Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-500	3,303	11	999	2,011	3,021	60
500-1000	9,066	28	2,079	3,639	5,746	447
1000-2000	9,342	517	3,037	3,741	7,295	655
2000-3000	616	349	113	74	536	53
Total	22,327	905	6,228	9,465	16,598	1,215

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

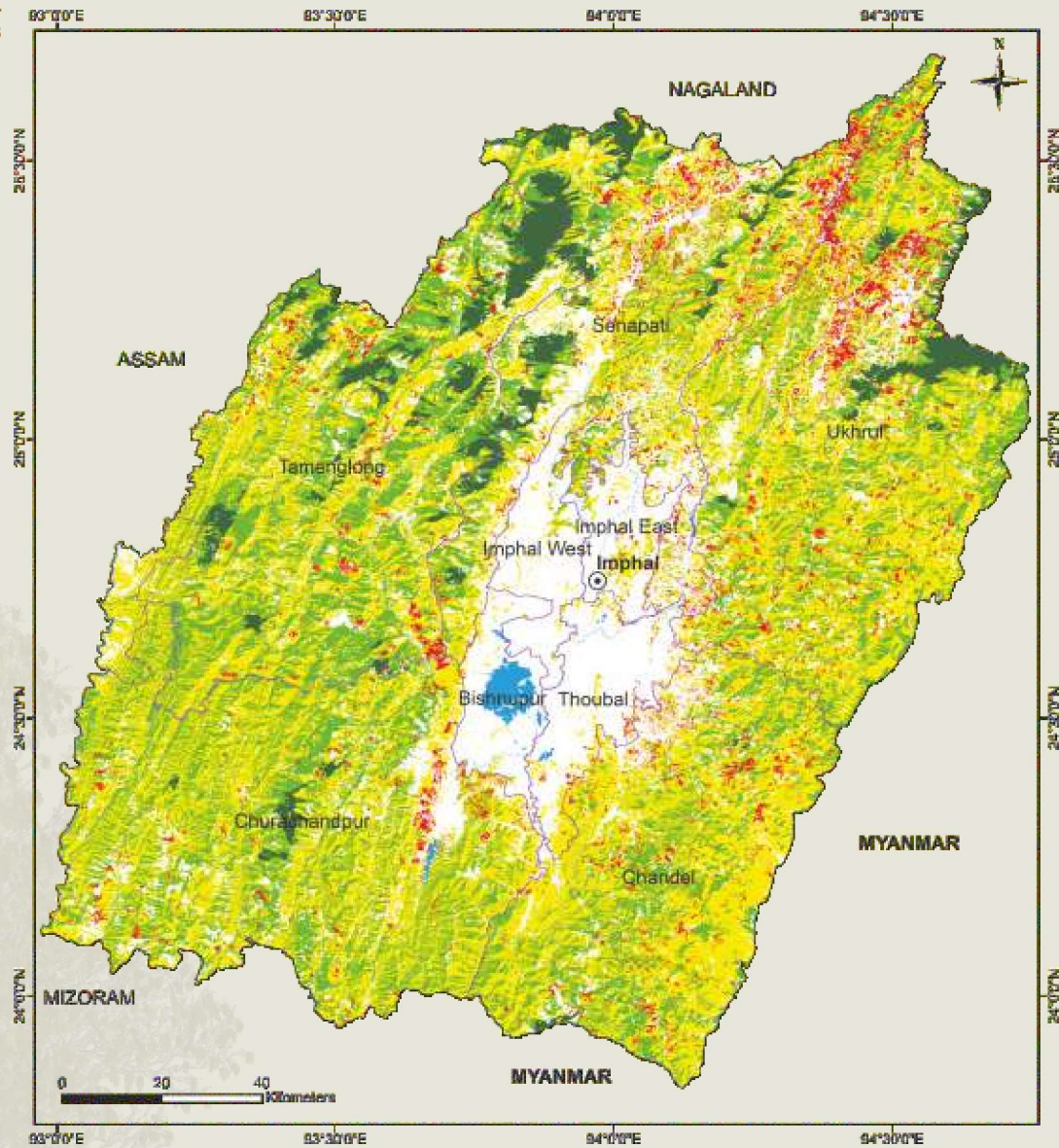
Table 13.16.7 Forest Cover in different slope classes in Manipur

(in sq km)

Slope (in degrees)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-5	2,934	28	225	501	754	47
5-10	2,361	87	547	1,097	1,731	137
10-15	3,630	147	955	1,753	2,855	239
15-20	4,275	172	1,237	2,078	3,487	280
20-25	3,902	158	1,246	1,860	3,264	240
25-30	2,753	126	974	1,246	2,346	158
>30	2,472	187	1,044	930	2,161	114
Total	22,327	905	6,228	9,465	16,598	1,215

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

Figure 13.16.3
Forest Cover
Map of
Manipur



LEGEND

- Very Dense Forest
- Moderately Dense Forest
- Open Forest
- Scrub
- Non-Forest
- Water-bodies
- International Boundary
- State Boundary
- District Boundary
- Capital

13.16.2 Forest Types

The area under different forest types of Manipur as per the Champion & Seth classification (1968), according to the Atlas Forest Types of India 2020 are presented in the following Table.

MANIPUR



Table 13.16.8 Area statistics of the Forest Types found in Manipur

(in sq km)

Sl. No.	Forest Type	Area	% of the total mapped area*
1.	2B/C1/2S1 Pioneer Euphorbiaceous scrub	1,263.20	6.93
2.	2B/C2 Cachar semi-evergreen forest	2,852.67	15.65
3.	2/2S1 Secondary moist bamboo brakes	1,324.51	7.27
4.	3C/C3b East Himalayan moist mixed deciduous forest	4,413.95	24.22
5.	8B/C1 East Himalayan subtropical wet hill forest	6,199.75	34.02
6.	8B/C2 Khasi subtropical wet hill forest	423.94	2.33
7.	9/C2 Assam subtropical pine forest	632.86	3.47
8.	11B/C1b Buk oak forest	530.44	2.91
9.	11B/C2 Naga hills wet temperate forest	243.92	1.34
10.	12/DS1 Montane bamboo brakes	13.49	0.07
Sub Total		17,898.73	98.21
11.	TOF/Plantation	129.64	0.71
Total (Forest Cover & Scrub)		18,028.37	
Grassland forest types (outside forest cover)			
12.	4D/2S2 Eastern wet alluvial grassland	135.48	0.74
13.	9/C2/DS1 Assam subtropical pine savannah	60.15	0.34
Sub Total		195.63	1.08
Grand Total		18,224.00	100.00

*Forest Types have been assigned to the natural forest formations under forest cover and scrub categories shown in forest cover mapping (ISFR, 2019). Grassland forest types outside forest cover have also been mapped. The total mapped area, therefore, is sum of forest cover, scrub and grassland forest types (found in non-forest).

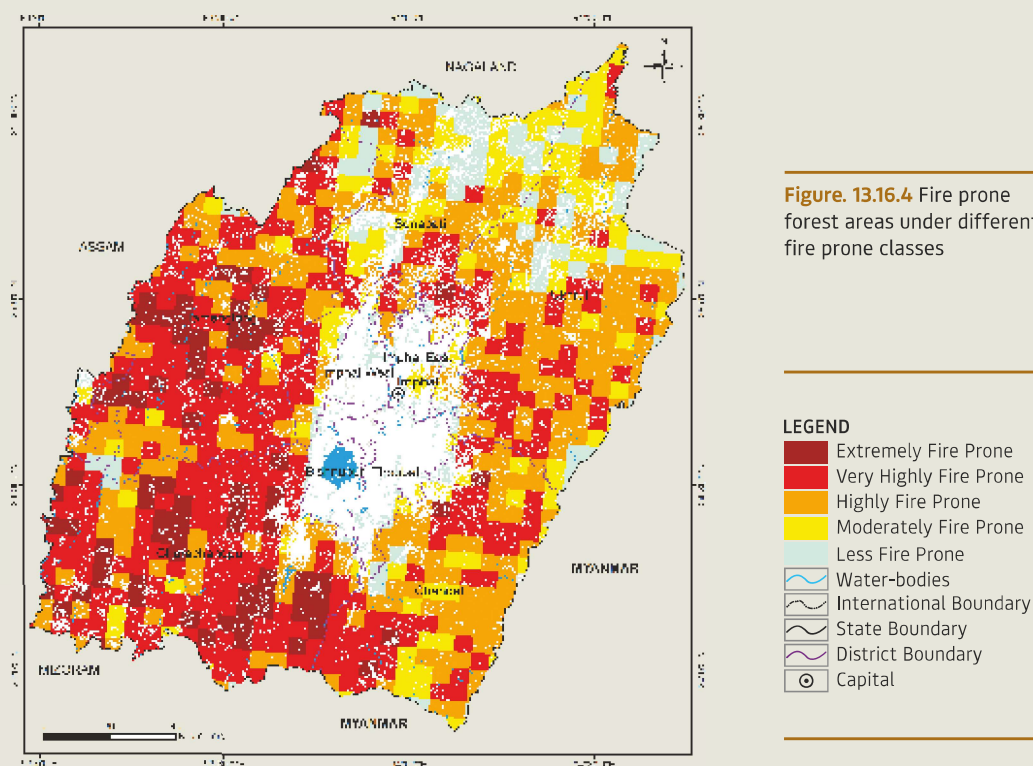
13.16.3 Fire Prone Forest Areas

Forest Cover under different classes of forest fire proneness is given in following table.

Table 13.16.9 Forest Fire Prone Classes

(in sq km)

Sl. No.	Forest Fire Prone Classes	Forest Cover	% of Total Forest Cover
1.	Extremely fire prone	1,636.46	9.86
2.	Very highly fire prone	6,167.06	37.16
3.	Highly fire prone	5,423.48	32.68
4.	Moderately fire prone	2,096.16	12.62
5.	Less fire prone	1,274.84	7.68
Total		16,598.00	100.00



13.16.4 Tree Cover

Tree cover is defined as all tree patches of size less than 1 ha occurring outside the recorded forest area. Tree cover includes trees in all formations including scattered trees. Tree cover in Manipur has been estimated as given in following table.

Table 13.16.10 Tree Cover in Manipur (in sq km)

2019 Assessment	2021 Assessment	Change wrt 2019 Assessment
173	169	-4

13.16.5 Extent of Trees Outside Forest (TOF)

Trees outside Forests (TOF) refer to tree resources found outside the forests as defined in the Government records. 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 following table.

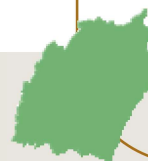
Table 13.16.11 Extent of TOF Manipur (in sq km)

Forest Cover outside the RFA/GW	Tree Cover	Extent of TOF
1,765	169	1,934

13.16.6 Growing Stock in Forest

Growing stock in the recorded forest areas (RFA) in Manipur is given in the Table 13.16.12. Diameter class-wise distribution of top 5 species in numbers derived from the forest inventory data is presented in the table 13.16.13.

MANIPUR


Table 13.16.12 Growing Stock in Manipur

(in m cum)

Sl. No.	Growing Stock (GS)	2019 Assessment	2021 Assessment	Change wrt 2019 Assessment	% of Country's GS
1.	Growing Stock in Recorded Forest Area	42.03	54.99	12.96	1.25
2.	Growing Stock in TOF	6.07	5.10	-0.97	0.29

Table 13.16.13 Diameter class distribution of top five tree species inside RFA in Manipur

(in '000)

Sl. No.	Species	Dia class (cm)		
		10-30	30-60	>60
1.	<i>Schima wallichii</i>	30,022	3,002	1,201
2.	<i>Quercus spp.</i>	14,969	1,201	0
3.	<i>Castanopsis spp.</i>	12,609	0	0
4.	<i>Duabanga grandiflora/ sonneratioides</i>	4,804	600	600
5.	<i>Pinus kesiya/insularis</i>	3,575	1,072	0

13.16.7 Dominant tree species in Trees Outside Forests (TOF)

Top five species in numbers in Trees Outside Forests in Manipur in Rural and Urban areas are given in the Table 13.16.14 and Table 13.16.15 respectively.

Table 13.16.14 Top five tree species in TOF (Rural) in Manipur

Sl. No.	Species	Relative Abundance (%)
1.	<i>Quercus spp.</i>	15.45
2.	<i>Castanopsis spp.</i>	12.25
3.	<i>Pinus kesiya</i>	10.89
4.	<i>Schima wallichii</i>	10.25
5.	<i>Albizia spp.</i>	3.09

Table 13.16.15 Top five tree species in TOF (Urban) in Manipur

Sl. No.	Species	Relative Abundance (%)
1.	<i>Mangifera indica</i>	12.25
2.	<i>Eucalyptus spp.</i>	7.78
3.	<i>Areca catechu</i>	5.92
4.	<i>Cedrela toona</i>	5.82
5.	<i>Syzygium cumini</i>	5.46

13.16.8 Carbon Stock in Forest

The total Carbon stock of forest in the State including the TOF patches which are more than 1ha in size is 176.93 million tonnes (648.74 million tonnes of CO₂ equivalent) which is 2.46% of total forest carbon of the country. Pool wise forest carbon in Manipur is given in the following table.

Table 13.16.16 Forest Carbon in Manipur in different pools (in '000 tonnes)

Sl. No.	Carbon Pools	Forest Carbon
1.	AGB	47,590
2.	BGB	14,101
3.	Dead wood	880
4.	Litter	2,652
5.	SOC	1,11,708
Total		1,76,931

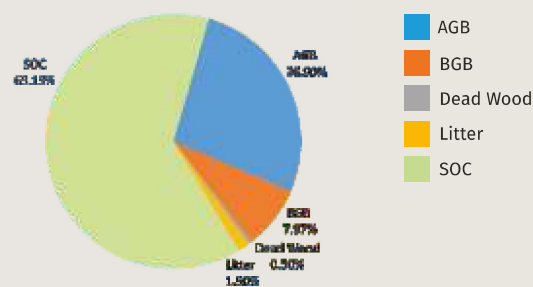


Figure 13.16.5 Forest Carbon in Manipur

13.16.9 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 following table

Table 13.16.17 Growing Stock of Bamboo in Manipur

Growing Stock (GS)		% of Country's GS of Bamboo
Bamboo bearing area inside RFA/Green Wash (in sq km)	8,377	5.61
Total number of culms (in millions)	1,568	2.94
Total equivalent green weight (in '000 tonnes)	11,321	2.82

13.16.10 Major NTFP and Invasive Species

Major NTFP and invasive species as assessed from forest inventory data are presented in the Table 13.16.18 and Table 13.16.19 respectively.

Table 13.16.18 Major NTFP species in Manipur

Sl. No.	Species	Plant Type	Relative Abundance (%)
1.	<i>Embilica officinalis/Phyllanthus</i>	Tree	37.14
2.	<i>Parkia javancia/timoriana</i>	Tree	20.00
3.	<i>Bombax spp./Bombax ceiba</i>	Tree	20.00
4.	<i>Thysanolaena maxima</i>	Herbs	17.14
5.	<i>Acquillaria mallaccensis/Aquilaria agallocha</i>	Tree	5.71

Table 13.16.19 Major invasive species in the State inside the RFA/Green Wash in Manipur

(in sq km)

Sl. No.	Species	Estimated Extent
1.	<i>Chromolaena odorata</i>	49
2.	<i>Mikania micrantha</i>	43
3.	<i>Microcystis aeruginosa</i>	8

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