

# 11.19

## MIZORAM

### 11.19.1 Introduction

Situated in the North Eastern part of India, Mizoram covers geographical area of 21,081 sq km, which is 0.64% of the geographical area of the country. The State lies between 21°56'N to 24°31'N latitude and 92°16'E to 93°26'E longitude and shares borders with Tripura in the west, Assam and Manipur in the north. Mizoram also shares international border with Myanmar on the east and Bangladesh in the south and west. Physiographically, the State is comprised of rugged, steep hill ranges and interspersed valleys. The State has a climate ranging from moist tropical to moist sub-tropical. The annual rainfall ranges between 2,100 mm to 3,500 mm and the annual temperature during winter, 11°C to 24°C and in summer between 18°C to 29°C. It rains heavily from May to September. The State has 8 districts, all of which are tribal and hill districts. As per the 2011 census, Mizoram has a population of 1.09 million which is 0.09% of India's population. The rural and urban population constitute 47.89% and 52.11% respectively. The tribal population of the State is 94.43%. The population density of the State is 52 per sq km which is much lower than the national average. The 19th Livestock census 2012 has reported a total livestock population of 0.31 million.

**TABLE 11.19.1** Land Use Pattern

Land Use Types	Area (in 000' ha)	Percentage
Geographical Area	2,108	
Reporting area for land utilization	2,039	100.00
Forests	1,585	77.75
Not available for land cultivation	75	3.69
Permanent pastures and other grazing lands	11	0.54
Land under misc. tree crops and groves	41	2.03
Culturable wasteland	8	0.37
Fallow land other than current fallows	127	6.24
Current fallows	47	2.28
Net area sown	145	7.10

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



### 11.19.1.1 A Brief Overview of Forestry Scenario

The State has rich flora and fauna including many rare and endemic species of plants and animals. Amongst all the States, Mizoram has the highest area under forest cover in terms of percentage of geographical area. The forests of the State are under a three tier management viz those owned and controlled by the State, district councils and village councils.

As per the Champion & Seth Classification of Forest Types (1968), the forests in Mizoram belong to four Type Groups, which are further divided into six Forest Types. 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. Bamboos occur abundantly in the middle and lower stories in the evergreen forest type, Canes are also present in this type of forest. 27 species of bamboo are reported from the State.

The eastern fringes of the State bordering Chin Hills of Myanmar are higher in elevation and fall under Montane subtropical pine forests. This area is relatively cooler and experiences less annual precipitation. The common species of montane sub-tropical pine forests include *Pinus kesiya*, *Quercus* spp, *Castanopsis* spp, *Schima wallichii*, *Rhododendron arboreum*, *Rhus semialata* etc. Mizoram is one of the leading producers of bamboo in India supplying 14% of the country's commercial bamboo.

Recorded Forest Area (RFA) in the State is 5,641 sq km of which 4,483 sq km is Reserved Forest and 1,158 sq km is Unclassed Forests. In Mizoram, during the period 1st January 2015 to 5th February 2019, a total of 0.24 hectares of forest land was diverted for non-forestry purposes under the Forest Conservation Act, 1980 (MoEF & CC, 2019).

Two National Parks and eight Wildlife Sanctuaries constitute the Protected Area network of the State covering 5.89% of its geographical area.

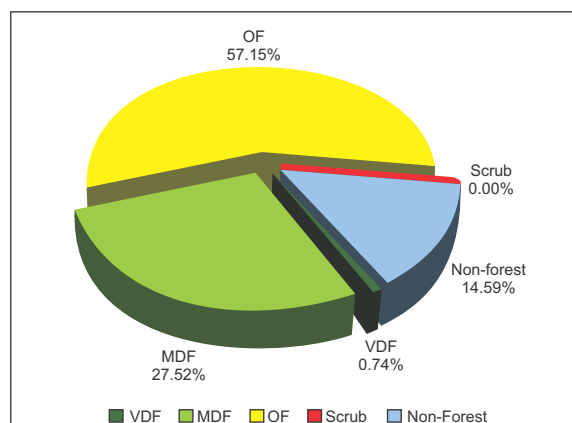
### 11.19.2 Forest Cover

Based on the interpretation of IRS Resourcesat-2 LISS III satellite data of the period Dec 2017 to February 2018, the Forest Cover in the State is 18,005.51 sq km which is 85.41% of the State's geographical area. In terms of forest canopy density classes, the State has 157.05 sq km under Very Dense Forest (VDF), 5,800.75 sq km under Moderately Dense Forest (MDF) and 12,047.71 sq km under Open Forest (OF). Forest Cover in the State has decreased by 180.49 sq km as compared to the previous assessment reported in ISFR 2017.

**TABLE 11.19.2** Forest Cover of Mizoram  
(in sq. km)

Class	Area	% of GA
VDF	157.05	0.74
MDF	5,800.75	27.52
OF	12,047.71	57.15
<b>Total</b>	<b>18,005.51</b>	<b>85.41</b>
Scrub	0.90	0.00

**FIGURE 11.19.1** Forest Cover of Mizoram



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

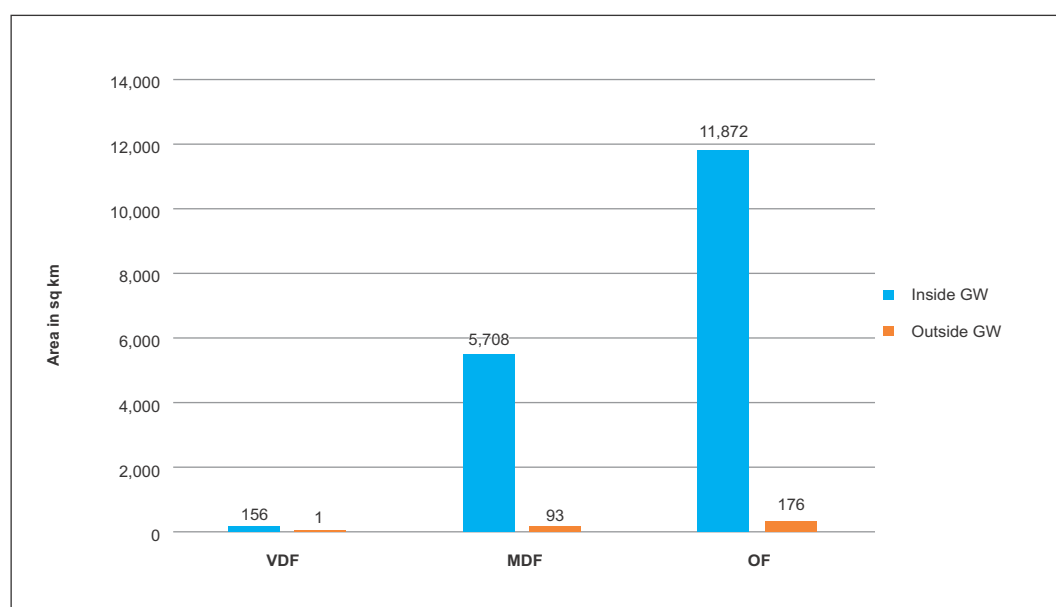
The State has reported extent of recorded forest area (RFA) 5,641 sq km which is 26.76% of its geographical area. The reserved and unclassified forests are 79.47% and 20.53 % of the recorded forest area in the State respectively. Due to non-availability of digitized boundary of recorded forest areas from the State, the updated Green Wash from Sol toposheets which is 20,662.83 sq km has been used as proxy to the RFA boundary and the analysis of forest cover inside and outside this area is given below.

**TABLE 11.19.3** Forest Cover inside and outside Recorded Forest Area or (Green Wash) (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
156	5,708	11,872	17,736	1	93	176	270
0.88%	32.18%	66.94%		0.37%	34.39%	65.24%	

\*in case of Mizoram Green Wash boundaries have been used.

**FIGURE 11.19.2** Forest Cover inside and outside Green Wash in Mizoram



**TABLE 11.19.4** District-wise Forest Cover in Mizoram (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			
Aizawl <sup>TH</sup>	3,576	30.30	1,071.37	1,977.24	3,078.91	86.10	-15.09	0.03
Champhai <sup>TH</sup>	3,185	55.62	1,003.68	1,428.49	2,487.79	78.09	-115.21	0.11
Kolasib <sup>TH</sup>	1,382	1.24	168.37	982.94	1,152.55	83.40	-29.45	0.00
Lawngtlai <sup>TH</sup>	2,557	0.00	703.59	1,496.49	2,200.08	86.04	-21.92	0.07
Lunglei <sup>TH</sup>	4,536	0.99	1,190.13	2,831.05	4,022.17	88.67	0.17	0.69
Mamit <sup>TH</sup>	3,025	52.02	757.80	1,907.05	2,716.87	89.81	16.87	0.00
Saiha <sup>TH</sup>	1,399	0.00	545.11	640.38	1,185.49	84.74	-19.51	0.00
Serchhip <sup>TH</sup>	1,421	16.88	360.70	784.07	1,161.65	81.75	3.65	0.00
<b>Grand Total</b>	<b>21,081</b>	<b>157.05</b>	<b>5,800.75</b>	<b>12,047.71</b>	<b>18,005.51</b>	<b>85.41</b>	<b>-180.49</b>	<b>0.90</b>

**TABLE 11.19.5** Forest Cover Change Matrix for Mizoram

(in sq km)

Class	2019 Assessment					Total ISFR 2017
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	130	0	0	0	1	<b>131</b>
Moderately Dense Forest	24	5,784	3	0	50	<b>5,861</b>
Open Forest	3	6	11,768	0	417	<b>12,194</b>
Scrub	0	0	0	0	0	<b>0</b>
Non Forest	0	11	277	1	2,606	<b>2,895</b>
<b>Total ISFR 2019</b>	<b>157</b>	<b>5,801</b>	<b>12,048</b>	<b>1</b>	<b>3,074</b>	<b>21,081</b>
Net Change	26	-60	-146	1	179	

Main reasons for the decrease in forest cover in the State are shifting cultivation and development activities.

**TABLE 11.19.6** Altitude-wise Forest Cover in Mizoram

(in sq km)

Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-500	9,163	8	1,822	6,197	8,027 (44.58 %)	0
500-1000	8,205	55	2,676	4,297	7,028 (39.03 %)	1
1000-2000	3,710	93	1,302	1,554	2,949 (16.38 %)	0
2000-3000	3	1	1	0	2 (0.01 %)	0
<b>Total</b>	<b>21,081</b>	<b>157</b>	<b>5,801</b>	<b>12,048</b>	<b>18,006</b>	<b>1</b>

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

**TABLE 11.19.7** Forest Cover in different slope classes in Mizoram

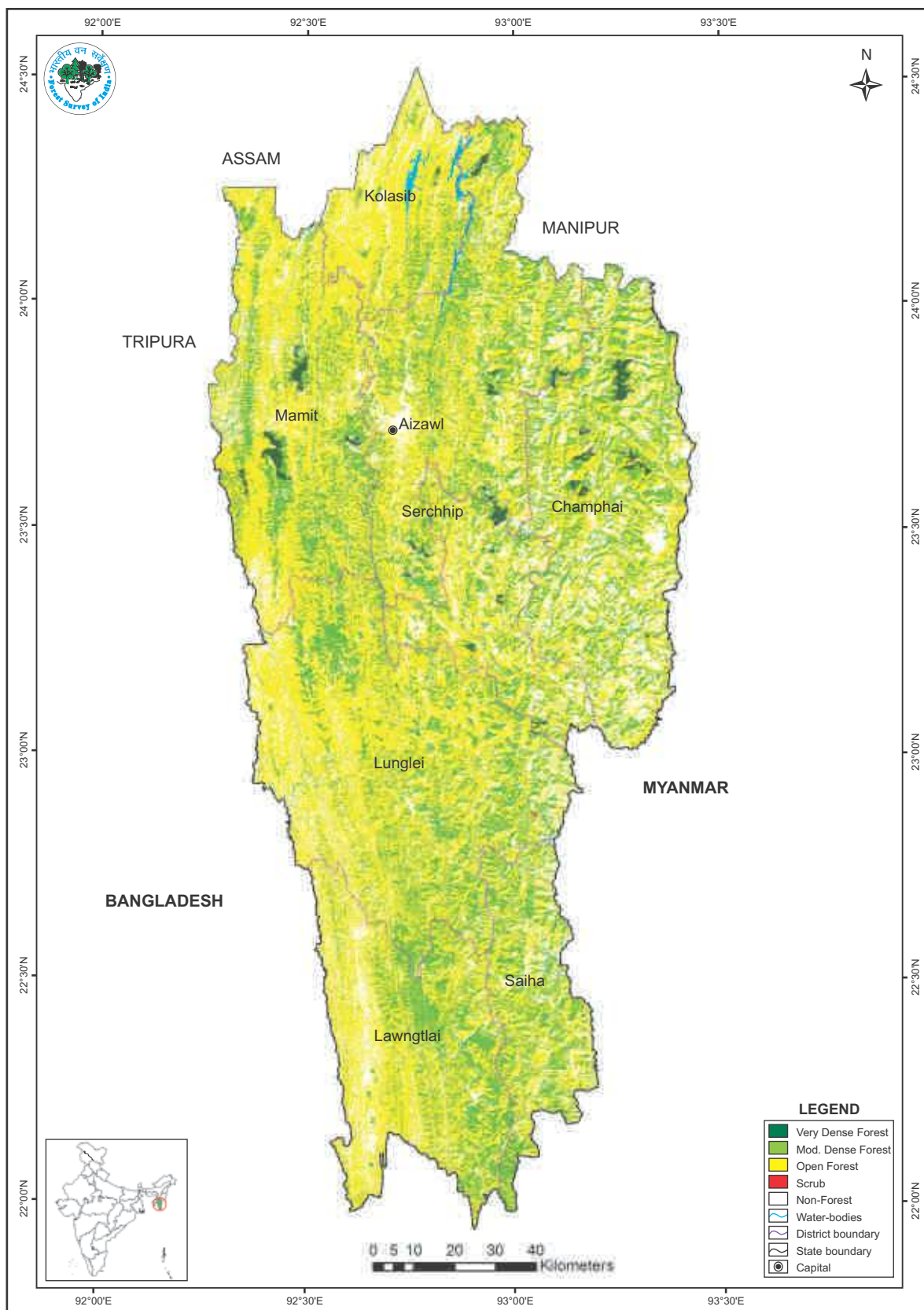
(in sq km)

Slope (in degrees)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-5	1,565	7	238	898	1,143 (6.35%)	0
5-10	2,668	22	568	1,591	2,181 (12.11%)	0
10-15	3,625	34	892	2,134	3,060 (17.00%)	0
15-20	4,058	31	1,108	2,358	3,497 (19.42%)	1
20-25	3,713	23	1,112	2,116	3,251 (18.06%)	0
25-30	2,745	16	887	1,534	2,437 (13.53%)	0
>30	2,707	24	996	1,417	2,437 (13.53%)	0
<b>Total</b>	<b>21,081</b>	<b>157</b>	<b>5,801</b>	<b>12,048</b>	<b>18,006</b>	<b>1</b>

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



**FIGURE 11.19.3** Forest Cover Map of Mizoram



**TABLE 11.19.8** Wetlands inside the Recorded Forest Area (or Green Wash) in Mizoram (in ha)

Wetland Category	No. of Wetlands	Total Wetland Area
Inland Wetlands - Natural		
Lake/Pond	24	188
Ox-bow lake/Cut-off meander	1	3
Waterlogged	15	129
River/Stream	32	11,977
<b>Sub - Total</b>	<b>72</b>	<b>12,297</b>
Inland Wetlands -Man-made		
Reservoir/Barrage	2	27
<b>Sub - Total</b>	<b>2</b>	<b>27</b>
Wetlands (<2.25 ha)	132	132
<b>Total</b>	<b>206</b>	<b>12,456</b>
Total Recorded Forest (or Green Wash) Area (in ha)		20,66,283
<b>% of Wetland area inside Recorded Forest (or Green Wash) Area</b>		<b>0.60%</b>

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

### 11.19.3 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 Mizoram as per the Champion & Seth classification (1968), according to the latest exercise are presented in the following table.

**TABLE 11.19.9** Percentage area under different forest types of Mizoram

Sl. No.	Forest Type	% of Forest cover
1.	2B/2S1 Pioneer Euphorbiaceous Scrub	0.44
2.	2B/C2 Cachar Tropical Semi-Evergreen Forest	30.70
3.	2/2S1 Secondary Moist Bamboo Brakes	37.42
4.	3C/C3b East Himalayan Moist Mixed Deciduous Forest	30.79
5.	8B/C1 East Himalayan Subtropical Wet Hill Forest	0.04
6.	9/C2 Assam Subtropical Pine Forests	0.61
	<b>Total</b>	<b>100.00</b>

#### 11.19.3.1 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 11.19.10 and table 11.19.11 in respect of Mizoram.

**TABLE 11.19.10** No. of species observed during the rapid assessment

Plant Type	Number of Species
Tree	87
Shrub	96
Herb	56

**TABLE 11.19.11** Shannon-Wiener Index of Tree, Shrub and Herb species in different Type Groups of Mizoram

Sl.No.	Forest Type Group	Shannon-Wiener Index		
		Tree	Shrub	Herb
1.	Group 2- Tropical Semi-Evergreen Forests	3.08	3.37	3.15
2.	Group 3- Tropical Moist Deciduous Forests	2.78	3.38	3.26
3.	Group 9- Subtropical Pine Forests	*	2.45	2.19

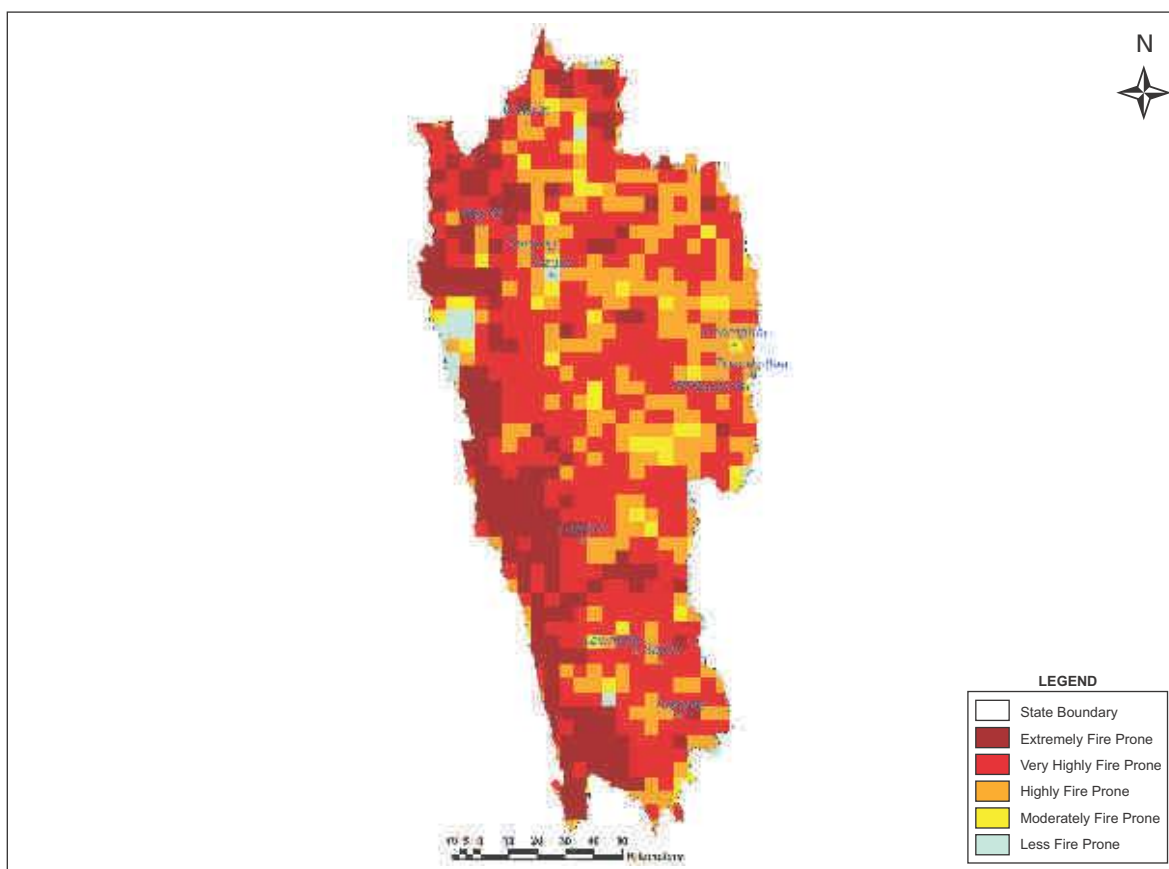
\*adequate number of sample plots were not available

#### 11.19.4 Fire Prone Forest Areas

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

**TABLE 11.19.12** Forest Fire Prone Classes (in sq km)

Sl. No.	Forest Fire Prone Classes	Geographical Area	% of Total forest cover
1	Extremely fire prone	6,270.27	29.91
2	Very highly fire prone	8,104.05	38.46
3	Highly fire prone	5,213.18	24.64
4	Moderately fire prone	1,132.42	5.35
5	Less fire prone	359.86	1.64
	<b>Total</b>	<b>21,079.78</b>	<b>100.00</b>

**FIGURE 11.19.4** Fire prone forest areas under different fire prone classes

### 11.19.5 Tree Cover

Forest cover presented in the section 11.19.2 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 Mizoram has been estimated as given in table 11.19.13.

**TABLE 11.19.13** Tree Cover in Mizoram (in sq km)

Tree Cover	Area
	441

Tree cover of Mizoram has decreased by 26 sq km as compared to the previous assessment reported in ISFR 2017.

### 11.19.6 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 11.19.14** Extent of TOF in Mizoram (in sq km)

Forest Cover outside the RFA/GW	Tree Cover	Extent of TOF
270	441	711

### 11.19.7 Growing Stock in Forest

Growing stock in the recorded forest areas (RFA) in Mizoram is given in the table 11.19.15. Diameter class-wise distribution of top 5 species in numbers derived from the forest inventory data is presented in the table 11.19.16

**TABLE 11.19.15** Growing Stock in Mizoram (in m cum)

Growing Stock (GS)		% of Country's GS
Growing Stock in Recorded Forest Area	21.30	0.50
Growing Stock in TOF	44.11	2.69

**TABLE 11.19.16** Diameter class distribution of top five species inside RFA in Mizoram (in '000)

Sl.No.	Species	Dia class (cm)		
		10-30	30-60	>60
1.	<i>Schima wallichii</i>	10,208	949	52
2.	<i>Tectona grandis</i>	4,462	1,189	0
3.	<i>Callicarpa species</i>	9,173	33	0
4.	<i>Castanopsis species</i>	8,185	596	0
5.	<i>Macaranga species</i>	12,704	0	0

### 11.19.8 Carbon Stock in Forest

The total Carbon stock of forest in the State including the TOF patches which are more than 1 ha in size is 156.55 million tonnes (574.02 million tonnes of CO<sub>2</sub> equivalent) which is 2.20% of total forest carbon of the country. Pool wise forest carbon in Mizoram is given in the following table.



**TABLE 11.19.17** Forest Carbon in Mizoram in different pools

(in '000 tonnes)

AGB	BGB	Dead wood	Litter	SOC	Total
44,973	9,925	451	4,516	96,689	1,56,554

**11.19.9 Growing Stock of Bamboo**

Bamboo bearing area and growing stock inside the recorded forest area (RFA)/ Green Wash in the State which include culms of 1 year age and above are given in the table 11.19.18

**TABLE 11.19.18** Growing Stock of Bamboo in Mizoram

Growing Stock (GS)		% of Country's GS of Bamboo
Bamboo bearing area inside RFA/ Green Wash (in sq km)	3,476	2.17
Total number of culms (in millions)	1,074	2.72
Total equivalent green weight (in 000' tonnes)	8,812	3.17

**11.19.10 Dominant tree species in Trees Outside Forests (TOF)**

Top five species in numbers in Trees Outside Forests in Mizoram in Rural and Urban areas are given in the table 11.19.19 and table 11.19.20 respectively

**TABLE 11.19.19** Top five tree species in TOF (Rural) in Mizoram

Sl. No.	Species	Relative Abundance (%)
1.	<i>Schima wallichii</i>	10.66
2.	<i>Castanopsis species</i>	9.43
3.	<i>Tectona grandis</i>	6.21
4.	<i>Macaranga species</i>	4.98
5.	<i>Albizia species</i>	3.85

**TABLE 11.19.20** Top five tree species in TOF (Urban) in Mizoram

Sl. No.	Species	Relative Abundance (%)
1.	<i>Mangifera indica</i>	17.60
2.	<i>Areca catechu</i>	11.32
3.	<i>Artocarpus integrifolia</i>	9.77
4.	<i>Parkia Joyrica</i>	8.14
5.	<i>Schima wallichii</i>	6.01

**11.19.11 Major NTFP and Invasive Species**

Major NTFP and invasive species as assessed from forest inventory data are presented in the table 11.19.21 and table 11.19.22 respectively

**TABLE 11.19.21** Major NTFP species in the State of Mizoram

Sl. No.	Species	Plant Type	Relative Abundance (%)
1.	Thatch Grass	Herb	35.29
2.	<i>Parkia javancia</i>	Tree	23.53
3.	<i>Oroxylum indicum</i>	Tree	11.76
4.	<i>Spondias pinnata</i>	Tree	8.82
5.	<i>Dillenia pentagyna</i>	Tree	5.88

**TABLE 11.19.22** Major invasive species inside the State of Mizoram with RFA/Green Wash

(in sq km)

Sl. No.	Species	Estimated Extent
1.	<i>Chromolaena odorata</i>	31
2.	<i>Mikania micrantha</i>	13
3.	<i>Imperata cylindrica</i>	5

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

#### **11.19.12 Quantified estimation of Dependence of People living in forest fringe villages on forests in Mizoram**

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 Mizoram is given in the table 11.19.23

**TABLE 11.19.23** Estimation of Dependence of People in Forest Fringe Villages on Forests in Mizoram

Fuelwood (tonnes)	Fodder (tonnes)	Bamboo (tonnes)	Small Timber (cum)
17,841	22,628	423	849

