

## 9.2 ARUNACHAL PRADESH

### 9.2.1 Introduction

Arunachal Pradesh is the largest state in the North-Eastern region of the country, sharing international boundaries with Bhutan, China, Tibet and Myanmar. It lies between the latitudes of 26°28'N - 29°30'N and the longitudes of 91°30'E-97°30' E. Its geographical area is 83,743 km<sup>2</sup> which constitutes 2.54% of the total area of the country. Major rivers of the state are Kameng, Subansiri, Siang, Lohit, and Tirap. The state has temperate climate in the northern part and warm-humid in the southern part. The average

annual rainfall ranges from 2,000 mm to 8,000 mm and the temperature ranges from sub-zero to 31°C.

The total population of the state is 1.38 million (*Census 2011*) which constitutes 0.11% of the country's population. Proportion of rural and urban population is 77.33% and 22.67% respectively. The population density is 17 persons per km<sup>2</sup>. The livestock population is 1.41 million (*Livestock Census 2007*).

Land use pattern of the state is given in Table 9.2.1.

**Table 9.2.1: Land Use Pattern**

Land Use	Area in '000 ha	Percentage
Total geographical area	8,374	
Reporting area for land utilization	5,659	100.00
Forests	5,154	91.07
Not available for cultivation	64	1.13
Permanent pastures and other grazing lands	19	0.33
Land under misc. tree crops and groves	37	0.65
Culturable wasteland	65	1.15
Fallow lands other than current fallows	70	1.23
Current fallows	40	0.71
Net area sown	211	3.73

Source: Land Use Statistics, Ministry of Agriculture, GOI, 2008-09.

### 9.2.2 Recorded Forest Area

The recorded forest area in the state is 51,540 km<sup>2</sup> which works out to be 61.55% of its geographical area. Reserved Forests, Protected Forests and Unclassed Forests constitute 20.46%, 18.49% and 61.05% of recorded forest area respectively. Of the total forest area, 5.138 million ha is state-owned and only 15,500 ha is under private ownership.

### 9.2.3 Protected Areas

There are two National Parks and eleven Wildlife Sanctuaries in the state covering 0.23 million ha and 0.75 million ha respectively. The protected areas constitute 11.68% of the geographical area of the state. Arunachal Pradesh has two Tiger Reserves, namely Namdapha and Pakhui covering 2,847 km<sup>2</sup>. The Dehang-Dibang valley, with an area of 5,112 km<sup>2</sup> has been declared a Biosphere Reserve.

### 9.2.4 Forest Cover

On the basis of interpretation of the satellite data of Nov-Dec 2008, the forest cover in the state is 67,410 km<sup>2</sup> which works out as 80.50% of the state's geographical area. In terms of

the forest canopy density classes, the area covered by very dense forests is 20,868 km<sup>2</sup>, that with moderately dense forests is 31,519 km<sup>2</sup> and open forests are 15,023 km<sup>2</sup>. The density class-wise distribution of the forest cover of the state is shown in Fig.9.2.

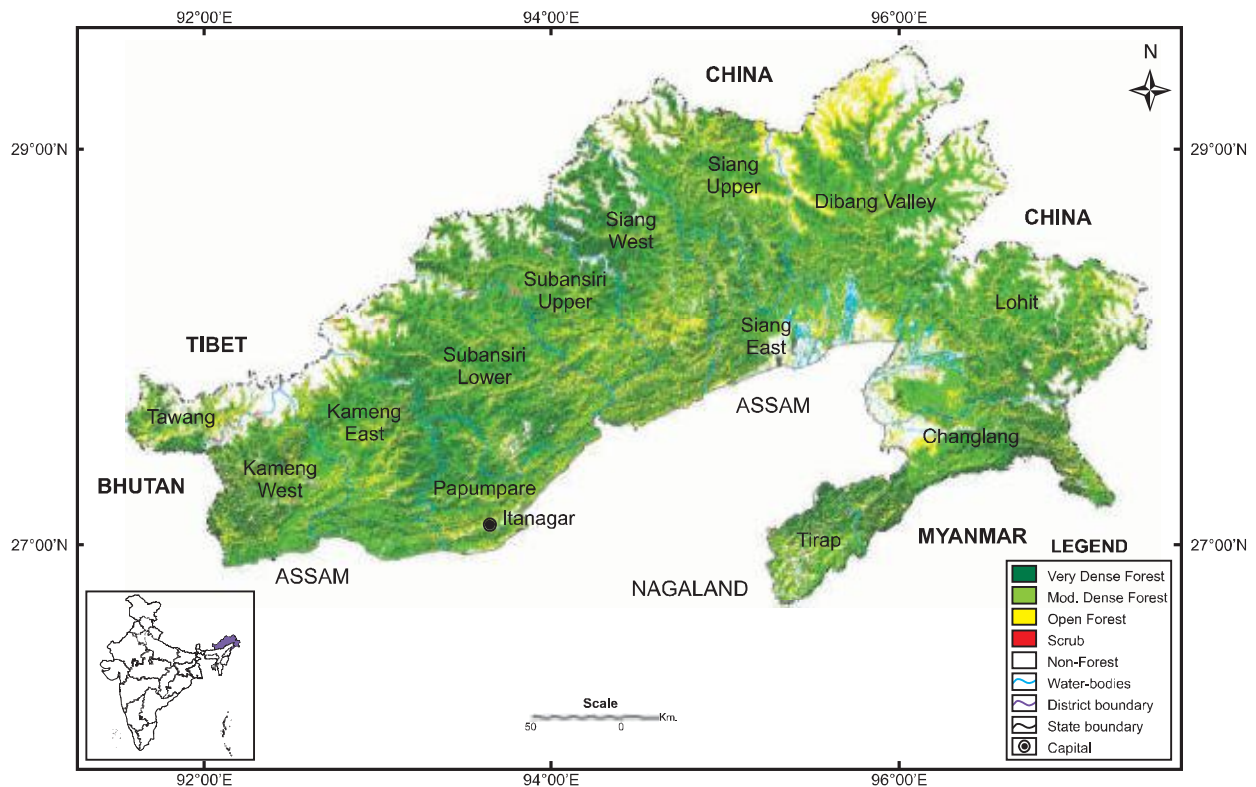
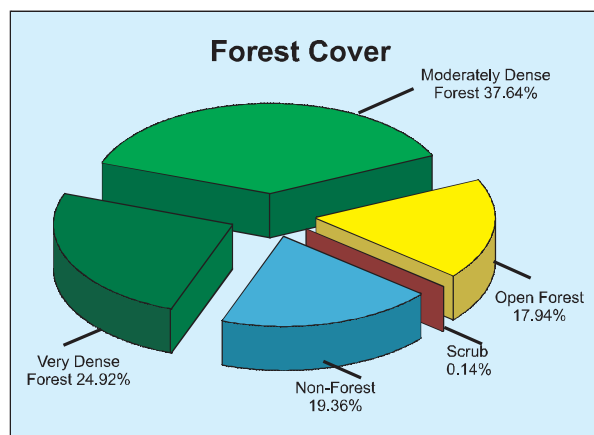


Fig 9.2 Forest cover map of Arunachal Pradesh



Proportion of different forest cover classes is depicted in the pie diagram in percentage terms.

District-wise forest cover in different canopy density classes, scrub and change in forest cover in comparison to 2009 assessment are given in Table 9.2.2.

Table 9.2.2: District-wise Forest Cover

 (Area in km<sup>2</sup>)

District	Geographical Area	2011 Assessment				Percent of GA	Change*	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Changlang <sup>TH</sup>	4,662	1,864	1,455	922	4,241	90.97	-14	2
Dibang Valley <sup>TH</sup>	13,029	1,696	4,981	2,644	9,321	71.54	-4	5
Kameng East <sup>TH</sup> & Kameng West <sup>TH</sup>	11,556	3,432	4,681	2,146	10,259	88.78	-3	35
Lohit <sup>TH</sup>	11,402	1,965	4,033	1,609	7,607	66.72	-22	8
Popumpare <sup>TH</sup>	3,462	991	1,555	701	3,247	93.79	-1	0
Siang East <sup>TH</sup>	3,655	883	1,269	669	2,821	77.18	6	0
Siang Upper <sup>TH</sup>	7,050	1,638	2,630	1,359	5,627	79.82	0	2
Siang West <sup>TH</sup>	7,813	2,476	2,726	1,582	6,784	86.83	-2	0
Subansiri Lower <sup>TH</sup>	9,548	3,004	4,248	1,421	8,673	90.84	-3	28
Subansiri Upper <sup>TH</sup>	7,032	1,876	2,753	1,192	5,821	82.78	-1	25
Tawang <sup>TH</sup>	2,172	366	486	374	1,226	56.45	0	17
Tirap <sup>TH</sup>	2,362	677	702	404	1,783	75.49	-30	0
<b>Grand Total</b>	<b>83,743</b>	<b>20,868</b>	<b>31,519</b>	<b>15,023</b>	<b>67,410</b>	<b>80.50</b>	<b>-74</b>	<b>122</b>

\* Change figures are based on comparison of 2011 assessment with that of 2009 after incorporating interpretational changes.

### 9.2.5 Forest Cover Change

There is a net increase of 57 km<sup>2</sup> in the forest cover of the state from previous ISFR 2009. However, present satellite imageries and high resolution collateral data shows that 131 km<sup>2</sup> forest cover went undetected in last assessment mainly due to snow cover and poor quality of satellite data which was classified as non-forest. After making adjustment for the previously left out forest cover, it emerges that there is an actual decrease of 74 km<sup>2</sup> in forest cover of the state with 5 km<sup>2</sup> decrease in VDF, 55 km<sup>2</sup> in MDF and 14 km<sup>2</sup> in open forest class. A quantitative

account of the class-wise change as well as the flux of change among various forest cover classes is given in the forest cover change matrix in Table 9.2.3

#### Reasons for change detected in 2011 assessment

Reasons for the negative change in forest cover as detected during interpretation of satellite data as also of points visited in field during ground truthing mainly include shifting cultivation practices and biotic pressure.

**Table 9.2.3: Forest cover change matrix** (Area in km<sup>2</sup>)

2009 Assessment	2011 Assessment					Total 2009
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	20,868	0	0	0	5	<b>20,873</b>
Moderately Dense Forest	0	31,516	0	0	58	<b>31,574</b>
Open Forest	0	0	14,952	0	85	<b>15,037</b>
Scrub	0	0	0	122	0	<b>122</b>
Non-Forest	0	3	71	0	16,063	<b>16,137</b>
<b>Total 2011</b>	<b>20,868</b>	<b>31,519</b>	<b>15,023</b>	<b>122</b>	<b>16,211</b>	<b>83,743</b>
Change	-5	-55	-14	0	74	

### 9.2.6 Altitude Zone-wise Forest Cover

Forest cover of the state in different altitude zones is given in Table 9.2.4.

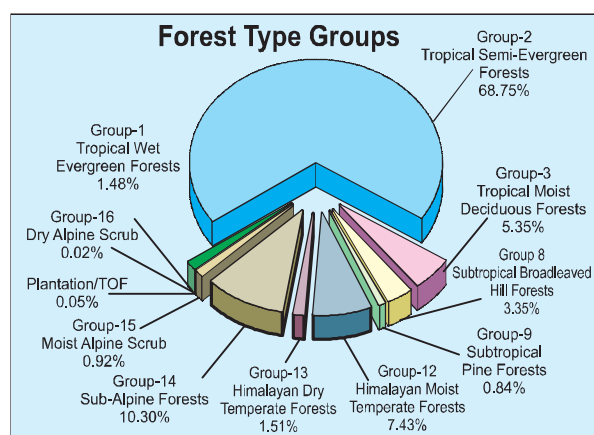
**Table 9.2.4: Altitude Zone-wise Forest Cover** (Area in km<sup>2</sup>)

Altitude Zone	VDF	MDF	OF	Total
<b>0-500m</b>	1487	3705	2203	<b>7395</b>
<b>500-1000m</b>	2771	4214	3302	<b>10287</b>
<b>1000-2000m</b>	7873	10336	4433	<b>22642</b>
<b>2000-3000m</b>	6473	8911	1786	<b>17170</b>
<b>Above 3000m</b>	2264	4353	3299	<b>9916</b>
<b>Total</b>	<b>20,868</b>	<b>31,519</b>	<b>15,023</b>	<b>67,410</b>

(Based on SRTM, Digital Elevation Model)

### 9.2.7 Forest Cover in Different Forest Types

As per Champion & Seth Classification, the state has 16 forest types which are grouped in to form 10 forest type groups, viz. Tropical Wet Evergreen, Tropical Semi Evergreen, Tropical Moist Deciduous, Subtropical Broadleaved Hill, Subtropical Pine, Himalayan Moist Temperate, Himalayan Dry Temperate, Sub Alpine Forests, Moist Alpine Scrub and Dry Alpine Scrub. Distribution of forest cover in different forest type groups on the basis of forest cover assessment is given in the pie diagram.



### 9.2.8 Tree Cover

Tree cover of the state has been estimated using TOF inventory data collected over a period of six years i.e. 2004-10. The estimated tree cover in the state is 549 km<sup>2</sup> which is

0.66% of the geographical area of the state. Five districts of the state, namely, Lower Subansari, Lohit, Dibang Valley, Tawang and Kameng West were inventoried during this period. The forest and tree cover of the state is presented in Table 9.2.5.

**Table 9.2.5: Forest and Tree Cover** (Area in km<sup>2</sup>)

Category	Area	% of Geographical Area
Tree Cover	549	0.66
Forest Cover	67,410	80.50
<b>Forest &amp; Tree Cover</b>	<b>67,959</b>	<b>81.16</b>

### 9.2.9 Growing Stock

The growing stock in the recorded forest area has been estimated on the basis of the current forest cover map, forest type

map and forest inventory data. For trees outside forests (TOF), the same has been estimated using TOF inventory data. It is presented in the Table 9.2.6.

**Table 9.2.6: Growing Stock** (million cum)

Forest	TOF	Total
492.689	74.516	567.205

### 9.2.10 Bamboo Resources

The extent of bamboo bearing area in the forests of the state is 16,083 km<sup>2</sup>. Density-wise

details, estimated number of culms by soundness and equivalent green weight are given in Tables 9.2.7 and 9.2.8 respectively

**Table 9.2.7: Bamboo bearing area by density in recorded forest area** (Area in km<sup>2</sup>)

Recorded Forest Area	Pure bamboo	Dense bamboo	Scattered bamboo	Clumps hacked	Bamboo regeneration	No bamboo
51,540	217	8,681	6,953	144	88	35,457

**Table 9.2.8: Estimated number of bamboo culms and equivalent green weight**

Number of culms (in millions)				Equivalent Green Weight (in 000' tonnes)		
Green	Dry	Decayed	Total	Green	Dry	Total
2666	234	80	2980	12359	2072	14431