

## 9.22 PUNJAB

## 9.22.1 Introduction

Punjab, the grain bowl of India, is situated in the north-western part of the country. It has geographical area of 50,362 km<sup>2</sup> and lies between latitude 29°33' and 32°32' N and longitude 73°53' and 76°56' E. Punjab shares its boundaries with Jammu & Kashmir in the north, Himachal Pradesh in the north-east and Haryana and Rajasthan in the south. The state also shares 300 km long international border with Pakistan on the western side. Physiographically, the state can be divided into three regions, viz. Mountainous Himalayas, Sub-Mountainous Himalayas and Eastern and Western Alluvial Plains. The state has sub-tropical climate with hot summers

and cold winters. The minimum temperature in winter falls to 0°C and the maximum in summer touches 47°C. The average annual rainfall varies from 480 mm in plains to 960 mm in the hilly region.

The population of the state is 27.70 million (*Census 2011*) which constitutes 2.29% of the country's population. Of this, rural population is 62.51% and urban population 37.49%. The population density is 550 persons per km<sup>2</sup>. The livestock population of the state is 7.41 million (*Livestock Census 2007*).

Land use pattern of the state is given in Table 9.22.1.

Table 9.22.1: Land Use Pattern

Land Use	Area in '000 ha	Percentage
Total geographical area	5,036	
Reporting area for land utilization	5,033	100.00
Forests	295	5.86
Not available for cultivation	516	10.25
Permanent pastures and other grazing lands	7	0.14
Land under misc. tree crops and groves	5	0.10
Culturable wasteland	3	0.06
Fallow lands other than current fallows	0	0.00
Current fallows	37	0.74
Net area sown	4,169	82.83

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

## 9.22.2 Recorded Forest Area

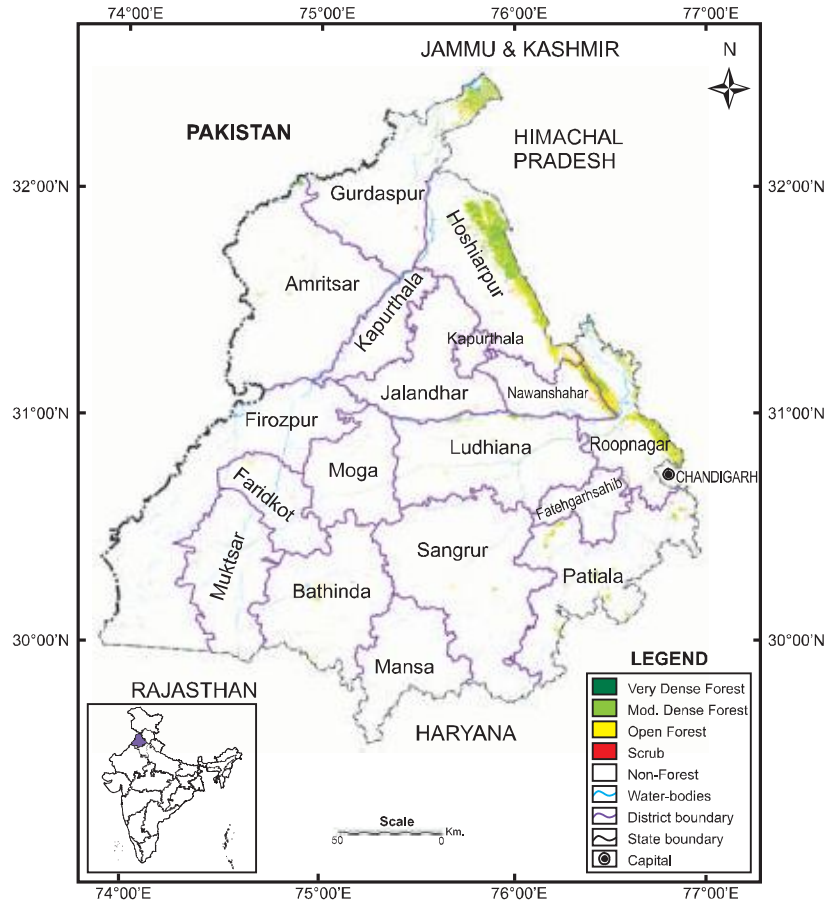
The recorded forest area in the state is 3,058 km<sup>2</sup> which is 6.12% of the geographical area of

the state. Reserved Forests constitute 1.43%, Protected Forests 36.87% and the Unclassed Forests constitute 61.70%.

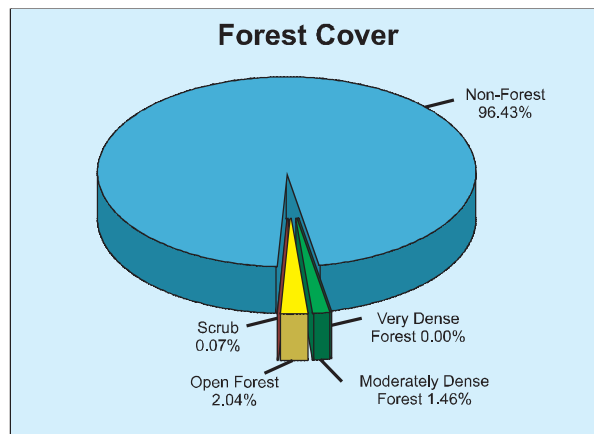
**9.22.3 Protected Areas**

An area of 340 km<sup>2</sup> is being managed as protected area under 12 Wildlife Sanctuaries and 2 Conservation Reserves. This constitutes 0.68% of the state's geographical

area. The natural and man-made wetlands constitute about 0.31% of the state's geographical area. The state has three internationally recognized wetlands at Harike, Kanjli and Ropar which have been declared as Ramsar sites.



**Fig 9.22 Forest cover map of Punjab**



### 9.22.4 Forest Cover

The forest cover in the state, based on interpretation of satellite data of November 2008, is 1,764 km<sup>2</sup> which is 3.50% of the state's geographical area. In terms of forest canopy density classes, the state has 736 km<sup>2</sup> moderately dense forest and 1,028 km<sup>2</sup> open

forest. The forest cover of the state is shown in Fig. 9.22.

District-wise forest cover in different canopy density classes along with the changes compared to 2009 Assessment and scrub are given in Table 9.22.2.

**Table 9.22.2: 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			
Amritsar	5,088	0	15	30	45	0.88	16	2
Bathinda	3,353	0	13	33	46	1.37	8	6
Faridkot	1,458	0	4	18	22	1.51	10	1
Fatehgarh Sahib	1,180	0	3	0	3	0.25	2	0
Firozpur	5,874	0	5	24	29	0.49	11	1
Gurdaspur	3,551	0	94	92	186	5.24	8	11
Hoshiarpur	3,386	0	343	344	687	20.29	4	4
Jalandhar	2,624	0	1	9	10	0.38	6	0
Kapurthala	1,633	0	2	9	11	0.67	7	0
Ludhiana	3,578	0	33	31	64	1.79	1	0
Mansa	2,198	0	1	5	6	0.27	3	0
Moga	1,689	0	0	11	11	0.65	4	0
Muktsar	2,593	0	7	14	21	0.81	4	0
Nawanshahar	1,282	0	25	85	110	8.58	0	6
Patiala	3,654	0	38	53	91	2.49	5	2
Roopnagar	2,113	0	146	244	390	18.46	3	4
Sangrur	5,108	0	6	26	32	0.63	8	0
<b>Grand Total</b>	<b>50,362</b>	<b>0</b>	<b>736</b>	<b>1,028</b>	<b>1,764</b>	<b>3.50</b>	<b>100</b>	<b>37</b>

Comparison of current assessment with the previous assessment shows a gain of 100 km<sup>2</sup> of forest cover.

#### Reasons for Change detected in 2011 Assessment

Changes reported in current assessment which have been validated through ground

truthing of selected sample points in the field are mainly due to enhanced plantation activities undertaken in recent past by the

State Forest Department and spurt in agro-forestry practices in the state.

**Table 9.22.3: Forest Cover Change Matrix** (Area in km<sup>2</sup>)

2009 Assessment	2011 Assessment					Total 2009
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	0	0	0	0	0	<b>0</b>
Moderately Dense Forest	0	691	32	0	10	<b>733</b>
Open Forest	0	42	861	7	21	<b>931</b>
Scrub	0	1	7	12	0	<b>20</b>
Non Forest	0	2	128	18	48530	<b>48,678</b>
<b>Total 2011</b>	<b>0</b>	<b>736</b>	<b>1,028</b>	<b>37</b>	<b>48,561</b>	<b>50,362</b>
Net Change	0	3	97	17	-117	0

The change matrix given in Table 9.22.3 reveals that there has been an increase of 3 km<sup>2</sup> in the moderately dense forest and 97 km<sup>2</sup> in open forest.

### 9.22.5 Altitude Zone-wise Forest Cover

Forest cover of the state in different altitude zones is given in Table 9.22.4.

**Table 9.22.4: Altitude Zone-wise Forest Cover** (Area in km<sup>2</sup>)

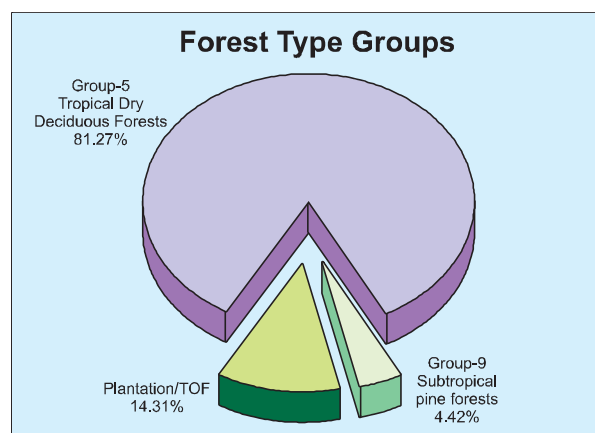
Altitude Zone	VDF	MDF	OF	Total
0-500m	0	479	854	1,333
500-1000m	0	257	174	431
<b>Total</b>	<b>0</b>	<b>736</b>	<b>1,028</b>	<b>1,764</b>

(Based on SRTM, Digital Elevation Model)

### 9.22.6 Forest Cover in Different Forest Types

Forest type mapping using satellite data has been undertaken by Forest Survey of India with reference to Champion & Seth Classification. As per this assessment, the

state has five forest types which belong to two forest type groups, viz. Tropical Dry Deciduous and Sub-Tropical Pine Forests. Percentage-wise distribution of forest cover in different forest type groups found in the state is given in the pie diagram.



### 9.22.7 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 1,699 km<sup>2</sup> which is

3.37% of its geographical area. Six districts of the state (Amritsar, Hoshiarpur, Patiala, Sangrur, Muktasar and Roopnagar) have been inventoried. The forest and tree cover of the state is presented in Table 9.22.5.

**Table 9.22.5: Forest and Tree Cover** (Area in km<sup>2</sup>)

Category	Area	% of Geographical Area
Tree Cover	1,699	3.37
Forest Cover	1,764	3.50
<b>Forest and Tree Cover</b>	<b>3,463</b>	<b>6.87</b>

### 9.22.8 Growing Stock

The growing stock in the recorded forest area has been estimated on the basis of 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 9.22.6.

**Table 9.22.6: Growing Stock** (million cum)

Forest	TOF	Total
15.710	19.305	35.015

### 9.22.9 Bamboo

The extent of bamboo bearing area in the forest of the state is 75 km<sup>2</sup>. Density-wise

occurrence, estimated number of culms by soundness and equivalent green weight are given in Tables 9.22.7 and 9.22.8 respectively.

**Table 9.22.7: 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
3084	0	5	39	31	0	3,009

**Table 9.22.8: 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
3	2	0	5	13	10	23