

## 9.10 HIMACHAL PRADESH

### 9.10.1 Introduction

Himachal Pradesh, predominantly a mountainous state in the Western Himalayas, has a geographical area of 55,673 km<sup>2</sup>. The altitude of the state varies from 350 m to 6,975 m above the mean sea level. It is located between latitude 30°22' to 33°12' N and longitude 75°45' to 79°04' E.

The state has three distinct regions, viz. the Shiwaliks with altitudes upto 1,500m, Middle Himalayan region between 1,500m to 3,000m and the Himadris higher than 3,000m. About one third of the state is permanently under snow, glaciers and cold deserts which do not

support tree growth. The average annual rainfall is about 1,800mm. The temperature varies from sub-zero to 35° c.

The population of the state is 6.86 million (*Census 2011*) which constitutes 0.57% of the country's population. Of this, rural population is 89.96% and urban 10.04%. The population density is 123 persons per km<sup>2</sup>. The scheduled tribes constituting 4.02% of the population are mainly distributed in three districts. The livestock population is 5.23 million (*Livestock Census 2007*).

Land use pattern of the state is given in Table 9.10.1.

**Table 9.10.1: Land Use Pattern**

Land Use	Area in '000 ha	Percentage
Total geographical area	5,567	
Reporting area for land utilization	4,549	100.00
Forests	1,101	24.21
Not available for cultivation	1,129	24.82
Permanent pastures and other grazing lands	1,496	32.89
Land under misc. tree crops and groves	65	1.43
Culturable wasteland	138	3.03
Fallow lands other than current fallows	15	0.33
Current fallows	64	1.41
Net area sown	541	11.90

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

### 9.10.2 Recorded Forest Area

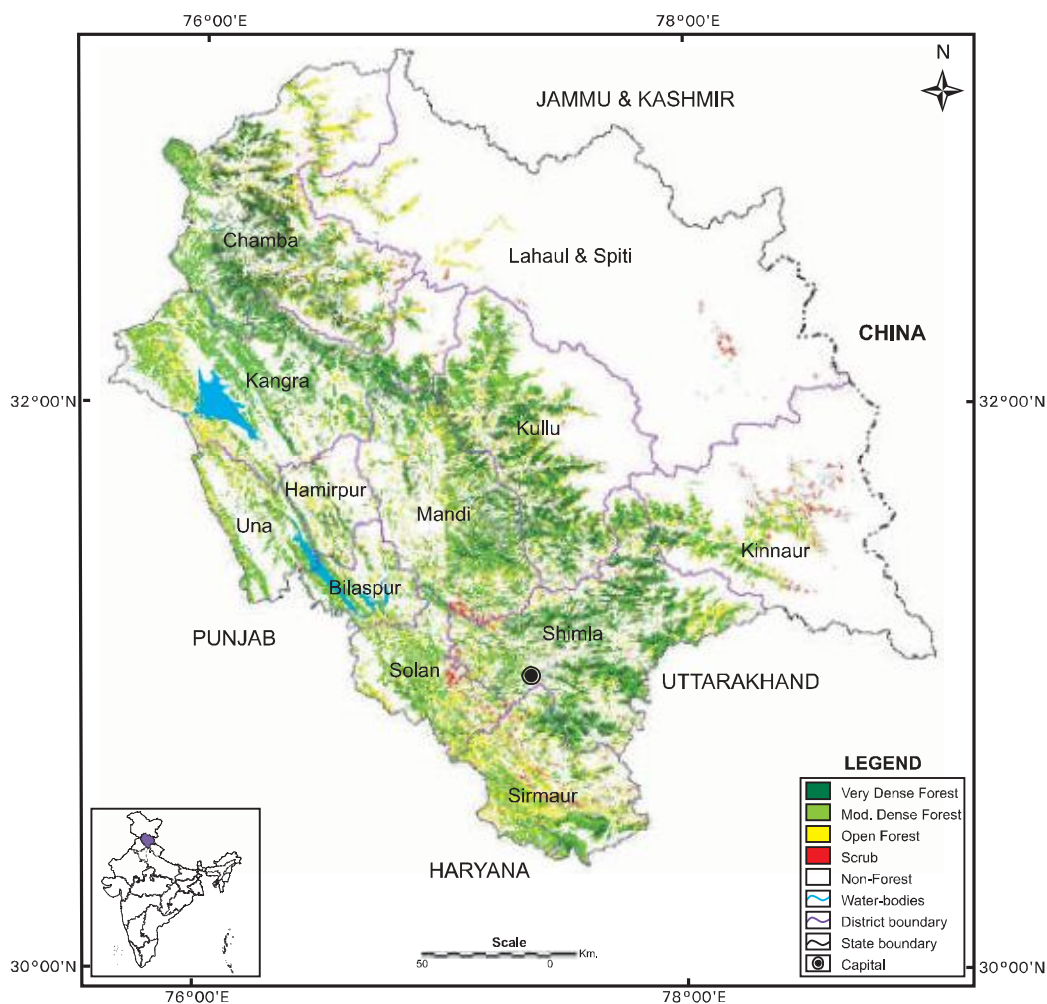
The recorded forest area of the state is 37,033 km<sup>2</sup> which is 66.52% of its geographical area. Reserved Forests constitute 5.13%, Protected Forests 89.46% and Unclassed

Forests 5.41% of the recorded forest area. About two third of the state's geographical area is under recorded forests but a substantial part of this is not conducive for tree growth, being under permanent snow, glaciers and cold deserts.

## 9.10.3 Protected Areas

Himachal Pradesh has two National Parks and 33 Wildlife Sanctuaries covering 0.76

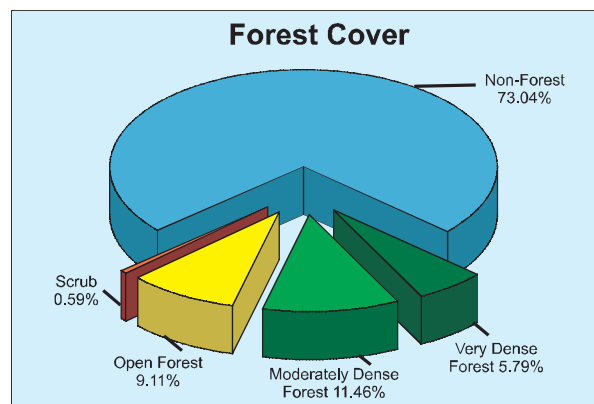
million ha which constitutes 13.65% of the state's geographical area. The Great Himalayan National Park is famous for snow leopard.



**Fig 9.10 Forest cover map of Himachal Pradesh**

## 9.10.4 Forest Cover

The forest cover in the state, based on interpretation of satellite data of October-December 2008, is 14,679 km<sup>2</sup> which is 26.37% of the state's geographical area. In terms of forest canopy density classes, the state has 3,224 km<sup>2</sup> area under very dense forest, 6,381 km<sup>2</sup> area under moderately dense forest and 5,074 km<sup>2</sup> area under open forest. The forest cover of the state is shown in Fig. 9.10.



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District-wise forest cover in different canopy density classes along with the changes

compared to 2009 assessment and scrub are given in Table 9.10.2.

**Table 9.10.2: 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			
Bilaspur <sup>H</sup>	1,167	24	171	167	362	31.02	0	0
Chamba <sup>TH</sup>	6,522	853	773	811	2,437	37.37	1	38
Hamirpur <sup>H</sup>	1,118	39	91	114	244	21.82	-1	0
Kangra <sup>H</sup>	5,739	310	1,221	533	2,064	35.96	2	11
Kinnaur <sup>TH</sup>	6,401	82	262	256	600	9.37	-2	70
Kullu <sup>H</sup>	5,503	586	785	588	1,959	35.60	1	23
Lahaul & Spiti <sup>TH</sup>	13,841	15	32	147	194	1.40	1	31
Mandi <sup>H</sup>	3,950	373	735	567	1,675	42.41	2	29
Shimla <sup>H</sup>	5,131	739	1,037	610	2,386	46.50	2	32
Sirmaur <sup>H</sup>	2,825	130	568	687	1,385	49.03	2	56
Solan <sup>H</sup>	1,936	55	404	391	850	43.90	1	38
Una <sup>H</sup>	1,540	18	302	203	523	33.96	2	0
<b>Grand Total</b>	<b>55,673</b>	<b>3,224</b>	<b>6,381</b>	<b>5,074</b>	<b>14,679</b>	<b>26.37</b>	<b>11</b>	<b>328</b>

Comparison of the current forest cover assessment with the previous assessment shows a gain of 11 km<sup>2</sup> of forest cover.

### Reasons for Change detected in 2011 Assessment

Changes reported in current assessment which has been validated through ground truthing of selected sample points in the field are mainly caused due to plantation activities and enhanced protection measures.

**Table 9.10.3: Forest Cover Change Matrix** (Area in km<sup>2</sup>)

2009 Assessment	2011 Assessment					Total 2009
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	3,224	0	0	0	0	<b>3,224</b>
Moderately Dense Forest	0	6,377	2	0	4	<b>6,383</b>
Open Forest	0	4	5,051	1	5	<b>5,061</b>
Scrub	0	0	0	327	0	<b>327</b>
Non-Forest	0	0	21	0	40,657	<b>40,678</b>
<b>Total 2011</b>	<b>3,224</b>	<b>6,381</b>	<b>5,074</b>	<b>328</b>	<b>40,666</b>	<b>55,673</b>
Net Change	0	-2	13	1	-12	

The change matrix given in Table 9.10.3 reveals that there has been a decrease of 2 km<sup>2</sup> in the moderately dense forest, whereas there is an increase of 13 km<sup>2</sup> in open forest.

### 9.10.5 Altitude Zone-wise Forest Cover

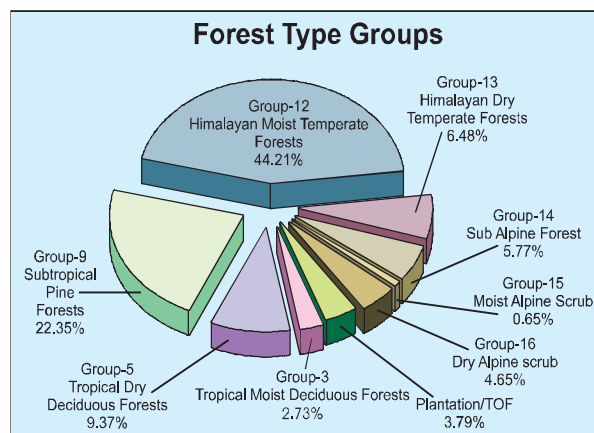
Forest cover of the state in different altitude zones is given in Table 9.10.4.

Table 9.10.4: Altitude Zone-wise Forest Cover				(Area in km <sup>2</sup> )
Altitude Zone	VDF	MDF	OF	Total
0-500m	14	434	247	695
500-1000m	236	1,549	993	2,778
1000-2000m	574	1,422	1,504	3,500
2000-3000m	1,846	2,006	1,228	5,080
>3000m	554	970	1,102	2,626
<b>Total</b>	<b>3,224</b>	<b>6,381</b>	<b>5,074</b>	<b>14,679</b>

(Based on SRTM, Digital Elevation Model)

### 9.10.6 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's Classification. As per this assessment, the state has 38 forest types which belong to 8 forest type groups, viz. Tropical Moist Deciduous, Tropical Dry Deciduous, Subtropical Pine, Himalayan Moist Temperate, Himalayan Dry Temperate, Sub Alpine Forests, Moist Alpine Scrub and Dry Alpine Scrub. Percentage-wise distribution of forest cover in different forest type groups found in the state is given in the pie diagram.



### 9.10.7 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 623 km<sup>2</sup> which is

1.12% of its geographical area. Six districts of the state, namely, Bilaspur, Chamba, Shimla, Sirmaur, Solan and Una have been inventoried. The forest and tree cover of the state is presented in Table 9.10.5.

**Table 9.10.5: Forest and Tree Cover** (Area in km<sup>2</sup>)

Category	Area	% of Geographical Area
Tree Cover	623	1.12
Forest Cover	14,679	26.37
<b>Forest &amp; Tree Cover</b>	<b>15,302</b>	<b>27.49</b>

### 9.10.8 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 9.10.6.

**Table 9.10.6: Growing Stock** (million cum)

Forest	TOF	Total
321.314	21.146	342.460

### 9.10.9 Bamboo

The extent of bamboo bearing area in the recorded forest area of the state is estimated

to be 508 km<sup>2</sup>. Their density-wise occurrence, estimated number of culms by soundness and equivalent green weight are given in following tables.

**Table 9.10.7: 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
37,033	0	37	422	24	25	36,525

**Table 9.10.8: 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
161	103	27	291	773	567	1340