9.10

Himachal Pradesh

9.10.1 Introduction

The State of Himachal Pradesh, having a geographical area of 55,673 sq km, constitutes 1.69% of the geographical area of the country. The State has three distinct regions viz the Shiwaliks with altitude upto 1,500 m, middle himalayan region between 1,500 m to 3,000 m and the himadris higher than 3,000m. About one third of the area in the state is permanently under snow, glaciers and cold desert. The tree growth is minimal in this region due to harsh conditions.The average annual rainfall is about 1800 mm. The temprature varies from sub-zero to 35°C. The Satluj, Beas, Ravi, Chenab and Yamuna are the important rivers of the state. The state comprises 12 districts of which all are Hill districts and three in them are Tribal. As per the 2011 census, Himachal Pradesh has a population of 6.86 million accounting for 0.57 percent of India's population. The rural and urban population constitutes 89.97% and 10.03% respectively. The population density of the state is 123 per sq km. The 19th livestock census 2012 has reported a total livestock population of 4.84 million.

Table 9.10.1 Land Use Pattern

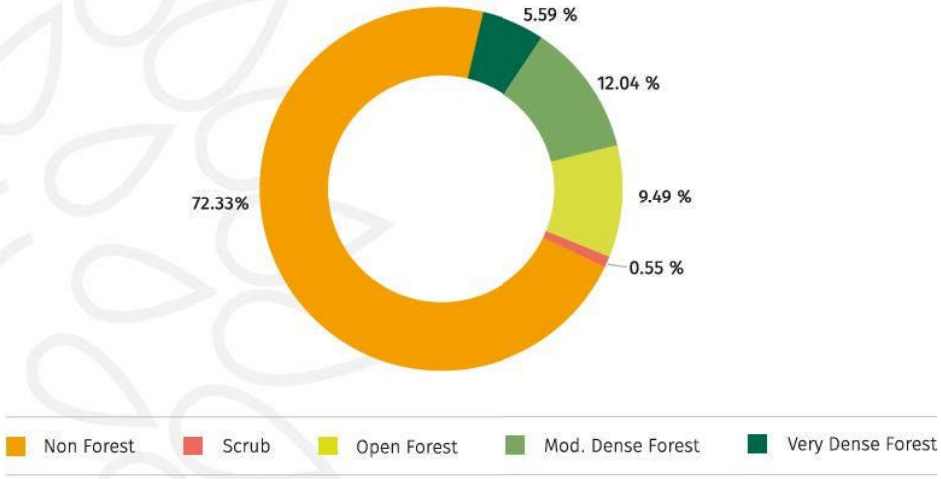
Land Use Types	Area (in 000' ha)	Percentage
Total Geographic Area	5,567	
Reporting area for land utilization	4,576	100
Forests	1,126	24.61
Not available for land cultivation	1,127	24.63
Permanent pastures and other grazing lands	1,510	33.01
Land under misc. tree crops and groves	64	1.40
Culturable wasteland	122	2.67
Fallow land other than current fallows	22	0.48
Current fallows	54	1.18
Net area sown	550	12.02

Source: Land Use Statistics, Ministry of Agriculture, GOI, 2013-14.

9.10.2

Forest Cover

Based on interpretation of satellite data pertaining to Oct-Dec 2015, the forest cover in the state is 15,100 sq km which is 27.12% of the state's geographical area. In terms of forest canopy density classes, the state has 3,110 sq km under very dense forest, 6,705 sq km under moderately dense forest and 5,285 sq km under open forest.



Forest cover of Himachal Pradesh

Pie Chart showing forest cover of Himachal Pradesh

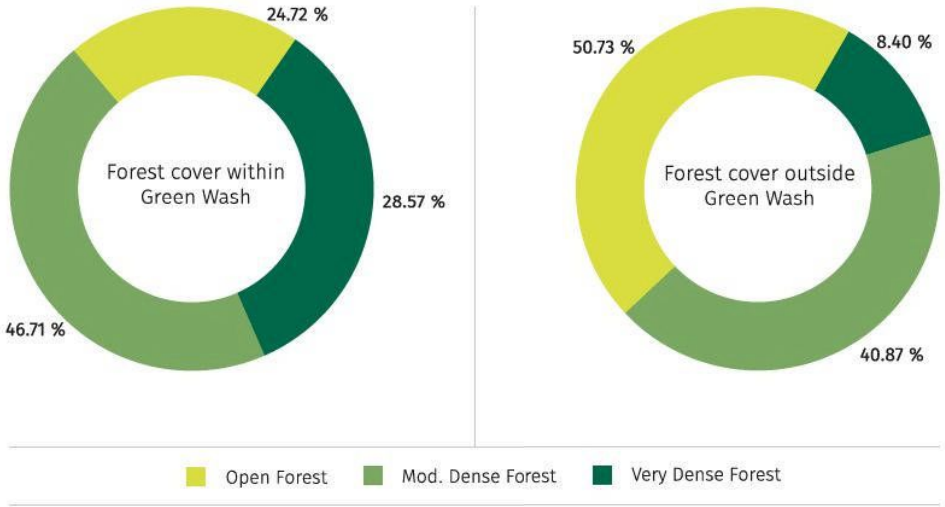
9.10.3

Forest Cover within and outside Green Wash Area

The recorded forest area of the state is 37,033 sq km which is 66.52% of its geographical area. The Reserved, Protected and Unclassed Forests constitute 5.13%, 89.46% and 5.41% respectively of the recorded forest area.Due to non-availability of digitized boundary of recorded forest area from the State, the updated green wash which is 11,863 sq km has been used and the analysis of forest cover within and outside this area is depicted below.

Table 9.10.2 Forest Cover within and outside Green Wash Area

Forest Cover within Green wash (Area in sq km)	
Very Dense Forest	2,609
Moderately Dense Forest	4,266
Open Forest	**2,258**
Total	**9,133**
Forest Cover outside Green wash	
Very Dense Forest	501
Moderately Dense Forest	2,439
Open Forest	3,027
Total	**5,967**
Total Forest Cover	**15,100**
Tree Cover	**822**
Total Forest & Tree Cover	**15,922**
Of State's Geographical Area	28.60%
Of India's Forest & Tree Cover	1.99%
Per capita Forest & Tree Cover	0.23 ha



Pie Charts showing forest cover within and outside Green Wash area

Table 9.10.3 Altitude-wise Forest Cover (Area in sq km)

Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total
0-500	2,925	13	447	320	780
500-1000	7,625	224	1,653	1,439	3,316
1000-2000	9,628	697	1,696	1,651	4,044
2000-3000	8,101	1,806	2,132	1,142	5,080
3000-4000	6,848	370	774	713	1,857
>4000	20,546	0	3	20	23
Total	**55,673**	**3,110**	**6,705**	**5,285**	**15,100**

(Based on SRTM, Digital Elevation Model)

Table 9.10.4 Forest Cover in different Patch Size Classes

S.No.	Patch Size Range in (sq km)	No. of Patches	Area(sq km)	%age
1.	≥ 0.01 ≤ 1.0	22,082	1,578	10.45
2.	> 1.0 ≤ 10	554	1,482	9.82
3.	> 10 ≤ 100	76	2,276	15.07
4.	> 100 ≤ 500	9	1,635	10.83
5.	> 500 ≤ 1000	4	3,020	20.00
6.	> 1000 ≤ 5000	4	5,109	33.83
	Total	**22,729**	**15,100**	**100**

Table 9.10.5 Growing Stock		
	Growing Stock	% Contribution to country
Growing Stock in Recorded Forest Area	315.580m cum	7.48
Growing Stock in TOF	23.199 m cum	1.45
Potential Production of industrial wood from TOF	1.71 m cum	2.30
Bamboo bearing area within forest area of the state	540 sq km	0.34
Total number of culms	321 millions	1.14
Total green weight equivalent of culms	1,156 (000' tonnes)	0.61

9.10.4

Carbon Stock in forest

The total Carbon stock of forests in the State is 175.782 million tonnes (644.534 million tonnes of CO_2 equivalent) which is 2.48 % of total forest carbon of the country.

9.10.5

Decadal Change in water bodies within Forest

An increase of 53 Sq km has been observed in the water body coverage within forest compared to 2005. The graphical and tabular comparison is depicted below.

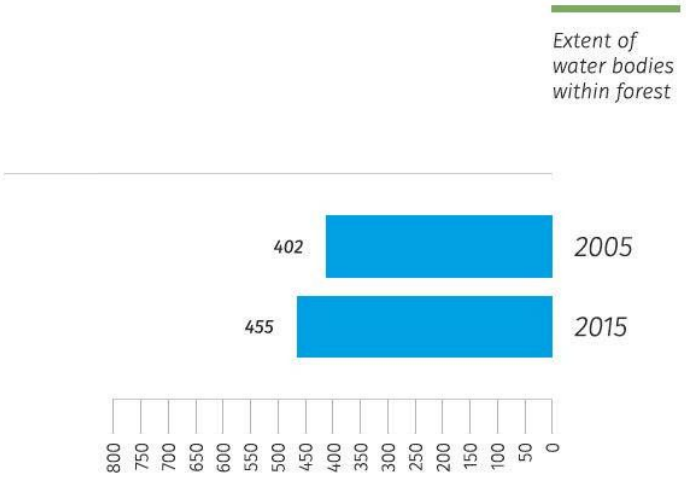


Table 9.10.6 Water bodies within Forest for the years 2005 and 2015		
Area/Coverage	2005	2015
Extent of water bodies (sq km) within Forest	402	455
% of water bodies to Forest Cover	2.74	3.01

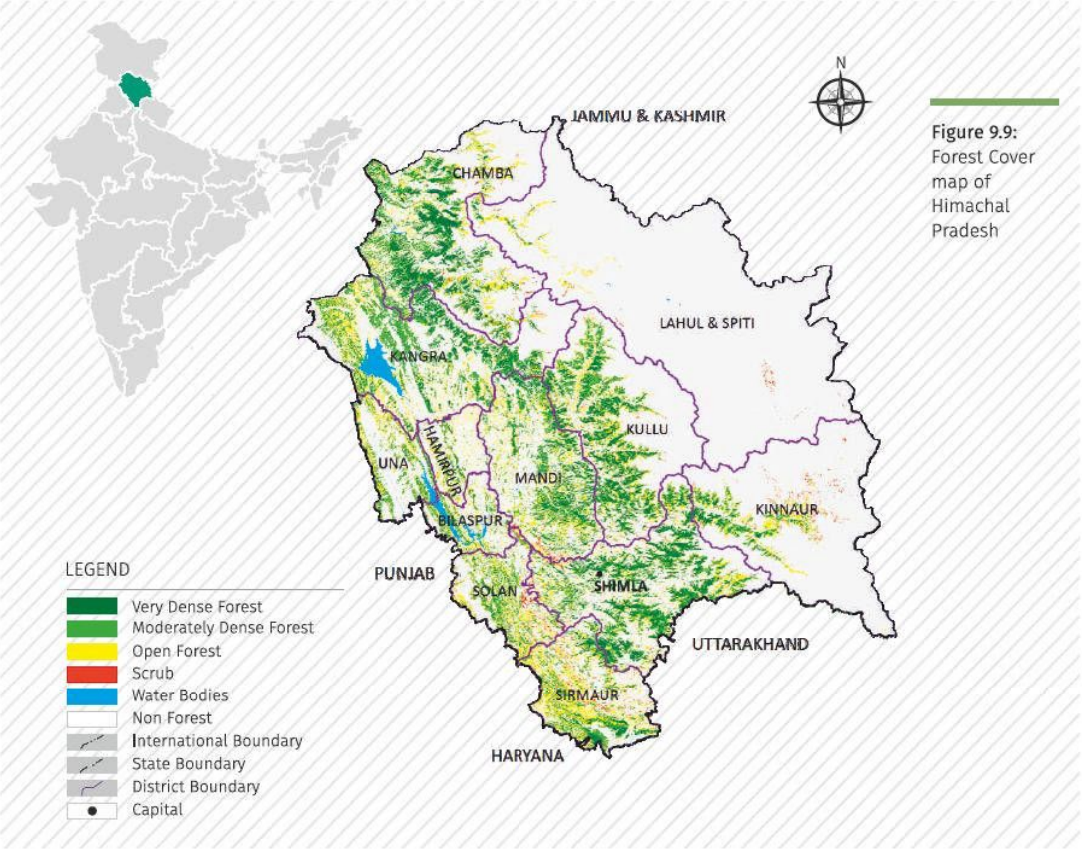


Figure 9.9: Forest Cover map of Himachal Pradesh

Table 9.10.7 District- wise Forest Cover (area in sq km)

District	Geographical Area	2017 Assessment				% of GA	Change *	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Bilaspur[H]	1,167	23	161	191	375	32.13	14	0
Chamba[TH]	6,522	775	986	682	2,443	37.46	1	21
Hamirpur[H]	1,118	39	86	188	313	28.00	71	2
Kangra[H]	5,739	297	1,274	626	2,197	38.28	130	8
Kinnaur[TH]	6,401	79	266	278	623	9.73	14	71
Kullu[H]	5,503	582	843	562	1,987	36.11	22	23
Lahul & Spiti[TH]	13,841	15	31	147	193	1.39	3	24
Mandi[H]	3,950	368	722	671	1,761	44.58	84	28
Shimla[H]	5,131	736	1,039	624	2,399	46.76	9	31
Sirmaur[H]	2,825	131	568	688	1387	49.10	2	56
Solan[H]	1,936	46	426	394	866	44.73	16	44
Una[H]	1,540	19	303	234	556	36.10	27	0
Grand Total	**55,673**	**3,110**	**6,705**	**5,285**	**15,100**	**27.12**	**393**	**308**

*Change compared to updated 2015 assessment.

Table 9.10.8 Forest Cover Change Matrix						(area in sq km)
Class	2017 Assessment					Total ISFR 2015 updated
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	2,956	233	25	0	11	3,225
Moderately Dense Forest	55	6,184	37	1	110	6,387
Open Forest	95	193	4,723	0	84	5,095
Scrub	0	0	3	291	6	300
Non Forest	4	95	497	16	40,054	40,666
Total ISFR 2017	3,110	6,705	5,285	308	40,265	55,673
Net Change	-115	318	190	8	-401	

9.10.6

Reasons for change detected in 2017 assessment

The main reason for net increase of 393 sq km in forest cover in the State can be attributed to plantation and conservation activities both within and outside the Recorded Forest Areas as well as improvement in interpretation due to better radiometric resolution of the recent satellite data from Resourcesat-2.