



Uttarakhand

9.29.1 Introduction

Uttarakhand covers an area of 53,483 sq km which is 1.63% of the geographical area of the country. As the State lies in the Himalaya range, the climate and vegetation vary greatly with elevation, from glaciers at the highest elevations to subtropical forests at the lower elevations. The highest elevations are covered by ice and bare rocks. The average annual rainfall is 1,550mm and the average annual temperature ranges between 0°C to 43°C. Many rivers including Ganga and Yamuna drain the state. The state has 13 districts all of which are hill districts. As per the 2011 census, Uttarakhand has a population of 10.09 million accounting to 0.83 percent of India's population. The rural and urban population of the State constitutes 69.77% and 30.23% respectively. The population density of the State is 189 per sq km, which is lower than the national average of 382 persons per sq km. The state does not have any tribal districts. The 19th Livestock census 2012 has reported a total livestock population of 4.79 million.

Table 9.29.1 Land Use Pattern

Land Use Types	Area (in 000' ha)	Percentage
Total Geographic Area	5,348	
Reporting area for land utilization	5,992	100
Forests	3,800	63.42
Not available for land cultivation	450	7.51
Permanent pastures and other grazing lands	192	3.20
Land under misc. tree crops and groves	389	6.49
Culturable wasteland	317	5.29
Fallow land other than current fallows	86	1.44
Current fallows	57	0.95
Net area sown	701	11.70

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

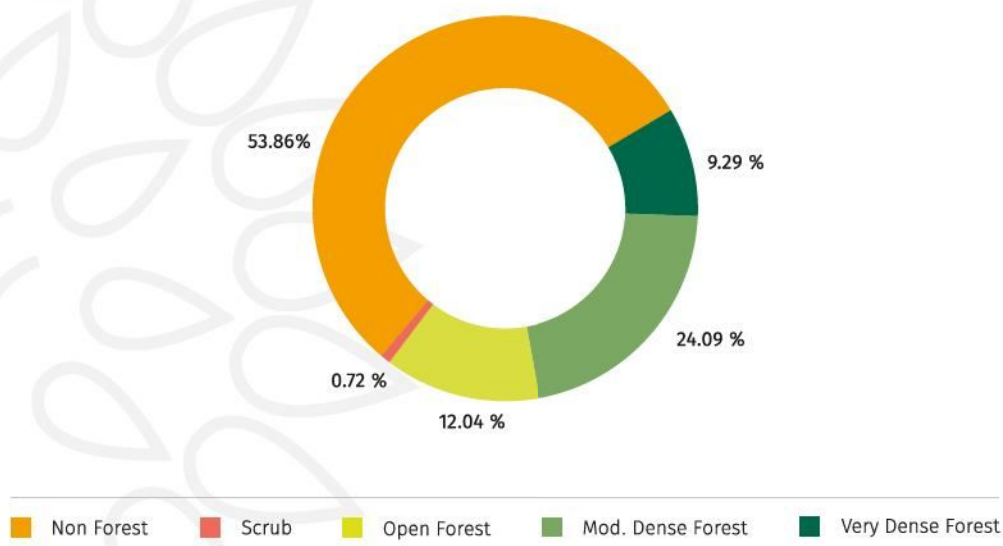
9.29.2

Forest Cover

Based on interpretation of satellite data pertaining to Oct-Dec 2015, the forest cover in the State is 24,295 sq km which is 45.43% of the State's geographical area. In terms of forest canopy density classes, the state has 4,969 sq km under very dense forest, 12,884 sq km under moderately dense forest and 6,442 sq km under open forest.

Forest cover of Uttarakhand

Pie Chart showing forest cover of Uttarakhand



9.29.3

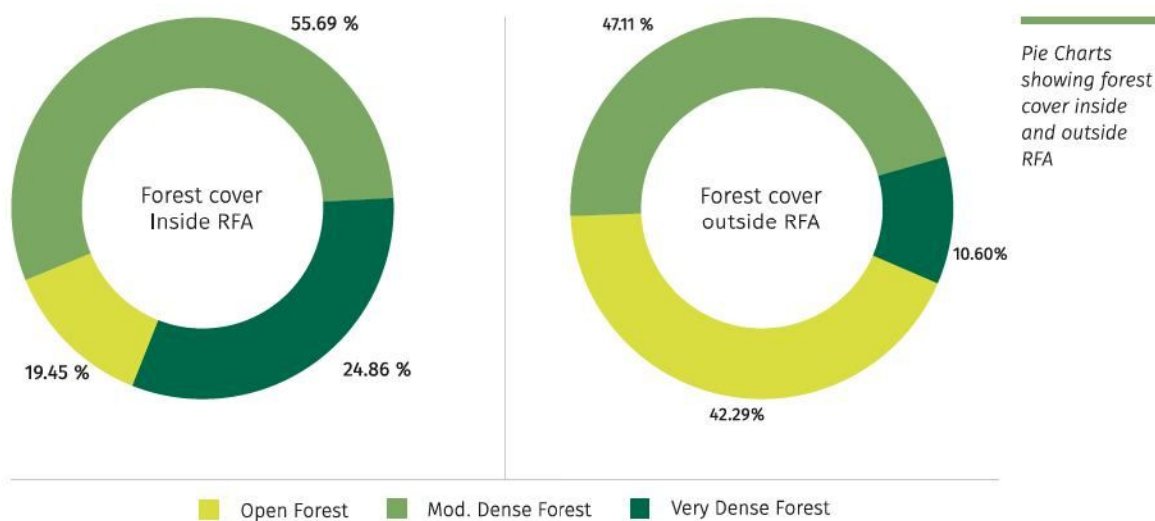
Forest Cover within and outside Recorded Forest Area

The State has reported a recorded forest area of 38,000 sq km which is 71.05% of its geographical area. The Reserved, Protected and Unclassed Forests are 69.86%, 26.01% and 4.13% respectively of the recorded forest area. However as the digitized boundary of recorded forest area from the State covers only 28,186 sq km, the analysis of forest cover within this area is depicted below.

Table 9.29.2 Forest Cover within and outside Recorded Forest Area

Forest Cover within Recorded Forest Area (Area in sq km)

Very Dense Forest (VDF)	4,172
Moderately Dense Forest (MDF)	9,344
Open Forest (OF)	3,264
Total	16,780
Forest Cover outside Recorded Forest Area	
Very Dense Forest	797
Moderately Dense Forest	3,540
Open Forest	3,178
Total	7,515
Total Forest Cover	24,295
Tree Cover	767
Total Forest & Tree Cover	25,062
Of State's Geographical Area	46.86%
Of India's Forest & Tree Cover	3.12%
Per capita Forest & Tree Cover	0.25 ha



9.29.3 Altitude-Wise Forest Cover					(area in sq km)
Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total
0-500	7,937	614	1,661	623	2,898
500-1000	5,703	1,173	1,886	901	3,960
1000-2000	17,560	1,555	5,179	3,294	10,028
2000-3000	7,248	1,522	3,118	1,126	5,766
3000-4000	4,193	105	1,039	493	1,637
>4000	10,842	0	1	5	6
Total	53,483	4,969	12,884	6,442	24,295

(Based on SRTM, Digital Elevation Model)

Table 9.29.4 Forest Cover in different Patch Size Classes				
S. No.	Patch Size Range(sq km)	No. of Patches	Area (sq km)	%age
1.	≥ 0.01 ≤ 1.0	12,017	972	4.00
2.	> 1.0 ≤ 10	322	862	3.55
3.	> 10 ≤ 100	47	1,372	5.65
4.	> 100 ≤ 500	6	1,040	4.28
5.	> 500 ≤ 1000	3	2,017	8.30
6.	> 1000 ≤ 5000	1	1,166	4.80
7.	> 5000 ≤ 10000	1	5,153	21.21
8.	> 10000	1	11,713	48.21
	Total	12,398	24,295	100

Table 9.29.5 Growing Stock

	Growing Stock	% Contribution to country
Growing Stock in Recorded Forest Area	418.332 m cum	9.92
Growing Stock in TOF	19.855 m cum	1.24
Potential Production of industrial wood from TOF	0.73 m cum	0.98
Bamboo bearing area within forest area of the state	1,078 sq km	0.69
Total number of culms	267 millions	0.95
Total green weight equivalent of culms	963 (000' tonnes)	0.51

9.29.4

Carbon Stock in forest

The total Carbon stock of forests in the State is 284.664 million tonnes (1043.768 million tonnes of CO₂ equivalent) which is 4.02% of total forest carbon of the country.

9.29.5

Decadal Change in water bodies within Forest Cover

An increase of 45 sq km has been observed in the water body coverage within forest compared to 2005. The graph showing the comparison is depicted below.

Extent of
water bodies
within forest

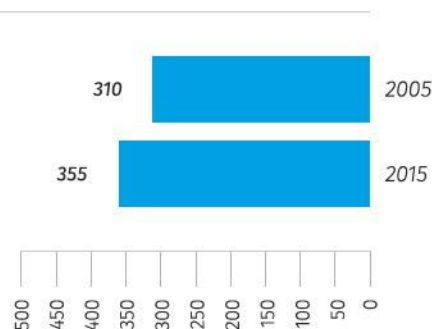


Table 9.29.6 Water bodies within Forest for the years 2005 and 2015

Area/Coverage	2005	2015
Extent of water bodies (sq km) within Forest	310	355
% of water bodies to Forest Cover	1.27	1.46



Figure 9.29:
Forest Cover
Map of
Uttarakhand

Table 9.29.7 District- wise Forest Cover						(area in sq km)		
District	Geo-geographical Area	2017 Assessment				% of GA	Change *	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Almora ^h	3,144	199	837	682	1,718	54.64	17	6
Bageshwar ^h	2,241	162	762	337	1,261	56.27	-10	1
Chamoli ^h	8,030	443	1,580	686	2,709	33.74	-15	1
Champawat ^h	1,766	367	593	264	1,224	69.31	-11	7
Dehradun ^h	3,088	636	626	343	1,605	51.98	5	87
Garhwal ^h	5,329	552	1,925	917	3,394	63.69	76	96
Haridwar ^h	2,360	75	277	236	588	24.92	-3	6
Nainital ^h	4,251	765	1,742	541	3,048	71.70	-35	10
Pithoragarh ^h	7,090	505	965	608	2,078	29.31	-5	39
Rudraprayag ^h	1,984	252	580	309	1,141	57.51	37	9
Tehri Garhwal ^h	3,642	272	1,085	708	2,065	56.70	7	97
Udham Singh Nagar ^h	2,542	150	193	93	436	17.15	-14	3
Uttarkashi ^h	8,016	591	1,719	718	3,028	37.77	-26	21
Grand total	53,483	4,969	12,884	6,442	24,295	45.43	23	383

*Change compared to updated 2015 assessment.

Table 9.29.8 Forest Cover Change Matrix

(area in sq km)

Class	2017 Assessment					Total ISFR 2015 updated
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	4,111	634	36	1	22	4,804
Moderately Dense Forest	816	11,334	998	20	494	13,662
Open Forest	26	664	4,651	63	402	5,806
Scrub	0	5	0	132	159	296
Non Forest	16	247	757	167	27,728	28,915
Total ISFR 2017	4,969	12,884	6,442	383	28,805	53,483
Net Change	165	-778	636	87	-110	0

9.29.6

Reasons for change detected in 2017 assessment

A net increase of 23 sq km has been observed in the State which can be attributed to expansion of tree cover outside forests. However, a net decrease of 49 sq km in forest cover within Recorded Forest Area has been observed due to rotational fellings and developmental activities.