

mixed nature of classes to some extent on the ground. In the present assessment, considerable use of high resolution collateral data has been made and time series Google

Earth Images for minimizing the interpretational errors and ascertaining the ground features in doubtful areas. Extensive field visits by the field teams along with

Table 2.4: Change in Forest Cover of States/UTs between 2011 and 2013 (Area in km²)

States/UTs	Geographical Area	2011 Assessment				2013 Assessment				Change			
		VDF	MDF	OF	Total	VDF	MDF	OF	Total	VDF	MDF	OF	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Andhra Pradesh	275,069	850	26,242	19,297	46,389	850	26,079	19,187	46,116	0	-163	-110	-273
Arunachal Pradesh	83,743	20,868	31,519	15,023	67,410	20,828	31,414	15,079	67,321	-40	-105	56	-89
Assam	78,438	1,444	11,404	14,825	27,673	1,444	11,345	14,882	27,671	0	-59	57	-2
Bihar	94,163	231	3,280	3,334	6,845	247	3,380	3,664	7,291	16	100	330	446
Chhattisgarh	135,191	4,163	34,911	16,600	55,674	4,153	34,865	16,603	55,621	-10	-46	3	-53
Delhi	1,483	6.76	49.48	119.96	176.2	6.76	49.38	123.67	180	0.00	-0.10	3.71	3.61
Goa	3,702	543	585	1,091	2,219	543	585	1,091	2,219	0.00	0.00	0.00	0.00
Gujarat	196,022	376	5,231	9,012	14,619	376	5,220	9,057	14,653	0	-11	45	34
Haryana	44,212	27	457	1,124	1,608	27	453	1,106	1,586	0	-4	-18	-22
Himachal Pradesh	55,673	3,224	6,381	5,074	14,679	3,224	6,381	5,078	14,683	0	0	4	4
Jammu & Kashmir*	222,236	4,140	8,760	9,639	22,539	4,140	8,760	9,638	22,538	0	0	-1	-1
Jharkhand	79,714	2,590	9,917	10,470	22,977	2,587	9,667	11,219	23,473	-3	-250	749	496
Karnataka	191,791	1,777	20,179	14,238	36,194	1,777	20,179	14,176	36,132	0	0	-62	-62
Kerala	38,863	1,442	9,394	6,464	17,300	1,529	9,401	6,992	17,922	87	7	528	622
Madhya Pradesh	308,245	6,640	34,986	36,074	77,700	6,632	34,921	35,969	77,522	-8	-65	-105	-178
Maharashtra	307,713	8,736	20,815	21,095	50,646	8,720	20,770	21,142	50,632	-16	-45	47	-14
Manipur	22,327	730	6,151	10,209	17,090	728	6,094	10,168	16,990	-2	-57	-41	-100
Meghalaya	22,429	433	9,775	7,067	17,275	449	9,689	7,150	17,288	16	-86	83	13
Mizoram	21,081	134	6,086	12,897	19,117	138	5,900	13,016	19,054	4	-186	119	-63
Nagaland	16,579	1,293	4,931	7,094	13,318	1,298	4,736	7,010	13,044	5	-195	-84	-274
Odisha	155,707	7,060	21,366	20,477	48,903	7,042	21,298	22,007	50,347	-18	-68	1,530	1,444
Punjab	50,362	0	736	1,028	1,764	0	736	1,036	1,772	0	0	8	8
Rajasthan	342,239	72	4,448	11,567	16,087	72	4,424	11,590	16,086	0	-24	23	-1
Sikkim	7,096	500	2,161	698	3,359	500	2,161	697	3,358	0	0	-1	-1
Tamil Nadu	130,058	2,948	10,321	10,356	23,625	2,948	10,199	10,697	23,844	0	-122	341	219
Tripura	10,486	109	4,686	3,182	7,977	109	4,641	3,116	7,866	0	-45	-66	-111
Uttar Pradesh	240,928	1,626	4,559	8,153	14,338	1,623	4,550	8,176	14,349	-3	-9	23	11
Uttarakhand	53,483	4,762	14,167	5,567	24,496	4,785	14,111	5,612	24,508	23	-56	45	12
West Bengal	88,752	2,984	4,646	5,365	12,995	2,971	4,146	9,688	16,805	-13	-500	4,323	3,810
A&N Islands	8,249	3761	2,416	547	6,724	3,754	2,413	544	6,711	-7	-3	-3	-13
Chandigarh	114	1	10	6	17	1.36	9.66	6.24	17.26	0.36	-0.34	0.24	0.26
Dadra & Nagar Haveli	491	0	114	97	211	0	114	99	213	0	0	2	2
Daman & Diu	112	0	0.62	5.53	6.15	0	1.87	7.4	9.27	0	1.25	1.82	3.12
Lakshadweep	32	0	17.18	9.88	27.06	0	17.18	9.88	27.06	0	0	0	0
Puducherry	480	0	35.37	14.69	50.06	0	35.23	14.83	50.06	0	-0.14	0.14	0
Grand Total	3,287,263	83,471	320,736	287,820	692,027	83,502	318,745	295,651	697,898	31	-1,991	7,831	5,871

* Includes Jammu & Kashmir area outside LOC that is under illegal occupation of Pakistan and China.

Table 2.5: Forest Cover of States/UTs for 2013 based on Green Wash Area (Area in km²)

States/UTs	2013 Assessment								Change with respect to ISFR 2011							
	Forest Cover within Green wash				Forest Cover outside Green wash				Within Green wash				Outside Green wash			
	VDF	MDF	OF	Total	VDF	MDF	OF	Total	VDF	MDF	OF	Total	VDF	MDF	OF	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Andhra Pradesh	841	24,167	15,862	40,870	9	1,912	3,325	5,246	0	-193	-3	-196	0	30	-107	-77
Arunachal Pradesh	13,182	20,674	9,698	43,554	7,646	10,740	5,381	23,767	-16	-20	12	-24	-24	-85	44	-65
Assam	1,343	9,724	8,771	19,838	101	1,621	6,111	7,833	-3	-50	70	17	3	-9	-13	-19
Bihar	236	2,470	1,997	4,703	11	910	1,667	2,588	19	26	-80	-35	-3	74	410	481
Chhattisgarh	4,054	32,161	13,707	49,922	99	2,704	2,896	5,699	-8	-16	25	1	-2	-30	-22	-54
Delhi	1.49	4.99	1.67	8.15	5.27	44.39	122	171.66	-0.01	0	0.12	0.11	0.01	-0.1	3.59	3.5
Goa	516	405	608	1,529	27	180	483	690	0	0	0	0	0	0	0	0
Gujarat	364	4,258	4,518	9,140	12	962	4,539	5,513	1	-11	56	46	-1	0	-11	-12
Haryana	25	205	216	446	2	248	890	1,140	0	0	-1	-1	0	-4	-17	-21
Himachal Pradesh	2,644	3,776	2,328	8,748	580	2,605	2,750	5,935	0	0	0	0	0	0	4	4
Jammu & Kashmir	3,134	5,549	4,733	13,416	1,006	3,211	4,905	9,122	0	0	0	0	0	0	-1	-1
Jharkhand	2,387	7,830	7,565	17,782	200	1,837	3,654	5,691	-16	-77	296	203	13	-173	453	293
Karnataka	1,677	16,235	9,603	27,515	100	3,944	4,573	8,617	0	4	-6	-2	0	-4	-56	-60
Kerala	1,437	5,590	2,924	9,951	92	3,811	4,068	7,971	134	-384	60	-190	-47	391	468	812
Madhya Pradesh	6,136	30,794	28,303	65,233	496	4,127	7,666	12,289	-2	-59	-126	-187	-6	-6	21	9
Maharashtra	8,369	15,962	13,132	37,463	351	4,808	8,010	13,169	-16	-44	40	-20	0	-1	7	6
Manipur	725	5,583	8,794	15,102	3	511	1,374	1,888	0	-28	18	-10	-2	-29	-59	-90
Meghalaya	416	7,992	6,473	14,881	33	1,697	677	2,407	31	-65	80	46	-15	-21	3	-33
Mizoram	130	5,841	12,690	18,661	8	59	326	393	-2	77	16	91	6	-263	103	-154
Nagaland	1,161	3,337	4,449	8,947	137	1,399	2,561	4,097	-5	-95	-31	-131	10	-100	-53	-143
Odisha	6,780	19,646	17,555	43,981	262	1,652	4,452	6,366	-35	-76	580	469	17	8	950	975
Punjab	0	336	290	626	0	400	746	1,146	0	0	0	0	0	0	8	8
Rajasthan	72	3,974	7,869	11,915	0	450	3,721	4,171	0	2	-3	-1	0	-26	26	0
Sikkim	341	1,385	295	2,021	159	776	402	1,337	0	-2	1	-1	0	2	-2	0
Tamil Nadu	2,600	7,777	6,308	16,685	348	2,422	4,389	7,159	-4	-51	62	7	4	-71	279	212
Tripura	96	4,036	2,469	6,601	13	605	647	1,265	-1	-27	-31	-59	1	-18	-35	-52
Uttar Pradesh	1,546	3,487	3,924	8,957	77	1,063	4,252	5,392	-3	-6	5	-4	0	-3	18	15
Uttarakhand	3,997	10,758	3,699	18,454	788	3,353	1,913	6,054	20	-55	47	12	3	-1	-2	0
West Bengal	2,668	2,399	2,135	7,202	303	1,747	7,553	9,603	-23	-548	688	117	10	48	3,635	3,693
A&N Islands	3,717	2,350	512	6,579	37	63	32	132	-7	-3	-3	-13	0	0	0	0
Chandigarh	0.41	0.1	0	0.51	0.95	9.56	6.24	16.75	0	0	0	0	0	0	0	0
Dadra & Nagar Haveli	0	1	46	47	0	113	53	166	0	0	-3	-3	0	0	5	5
Daman & Diu	0	0	0	0	0	1.87	7.4	9.27	0	0	0	0	0	1.25	1.87	3.12
Lakshadweep	0	0	0	0	0	17.18	9.88	27.06	0	0	0	0	0	0	0	0
Puducherry	0	0	0.9	0.9	0	35.23	13.93	49.16	0	0	0	0	0	-0.14	0.14	0.00
Grand Total	70,596	258,707	201,476	530,779	12,906	60,038	94,175	167,119	64	-1,701	1,769	132	-33	-290	6,062	5,739

An analysis of the above table reveals that an increase in OF category in both inside and outside greenwash areas has been observed

at the country level. This may be attributed to the conservation, plantation and promotional initiatives by SFDs and other agencies.



States	Reason
Odisha	Main reason for the change in forest cover is due to conservation initiatives by State Forest Department and through Van Sanrakshan Samiti (VSS) alongwith availability of better quality satellite data.
Punjab	Plantation.
Rajasthan	Biotic pressure and mining.
Sikkim	Earthquake induced landslide leading to loss of forest.
Tamil Nadu	Main reason for increase in forest cover is better protection and conservation of forests leading to increase in MDF and OF areas and inclusion of TOF.
Tripura	Main reason for change in forest cover is shifting cultivation widely practiced across the state.
Uttar Pradesh	Plantation and conservation initiatives.
Uttarakhand	Conservation and afforestation activities.
West Bengal	Increase in the forest cover of the state is mainly due to coppice growth and afforestation inside the forests, growth of commercial plantations and shade trees in tea gardens, inclusion of TOF areas.
A&N Islands	Loss in mangrove vegetation.
Dadra&NagarHaveli	Plantation and conservation initiatives.
Daman and Diu	Conservation of degraded forest area.

Based on the analysis of the changes observed across the country, a change matrix has been generated indicating the change in forest cover classes. The change matrix given in Table 2.7 indicates the change in forest cover in the three density classes, scrub and non-forest areas.

Current assessment reveals that there is an improvement of 433 sq km MDF and 4 sq km Open Forest to VDF category. Similarly 820 sq km Open Forest, 3 sq km Scrub and 657 sq km NF has been converted into MDF category. On the other hand 255 sq km VDF has converted to MDF, 45 sq km to Open Forest and 106 sq km to NF.

Table 2.7: Forest Cover Change Matrix for India between ISFR 2011 and ISFR 2013. (Area in km²)

Class	VDF	MDF	OF	Scrub	NF	Total ISFR 2011
Very Dense Forest	83,065	255	45	0	106	83,471
Moderately Dense Forest	433	317,010	1,786	2	1,505	320,736
Open Forest	4	820	285,084	60	1,852	287,820
Scrub	0	3	606	40,871	696	42,176
Non Forest	0	657	8,130	450	2,543,823	2,553,060
Total ISFR 2013	83,502	318,745	295,651	41,383	2,547,982	3,287,263
Net change	31	-1,991	7,831	-793	-5,078	

■ Gain
■ Loss

2.9 Forest Cover in Hill Districts

An attempt has always been made in the previous assessment of ISFR's to report the forest cover of the hill districts as a separate entity keeping in view the topographical characteristics of the region that have a direct or indirect influence on the presence of forest cover and forest types in a region. As such the

hill districts as identified by the Planning Commission for Hill Areas and Western Ghats Development Programme are taken into consideration for forest cover analysis thereof. In all, there are 124 hill districts as marked by superscript 'H' in the district-wise table of forest cover in Chapter 9. Table 2.8 gives a state wise summary of forest cover in the hill districts of the country.

Table 2.8: Forest Cover in Hill Districts (Area in km²)

States	No. of Hill Districts	Geographical Area	Forest Cover 2013				Per cent of G.A.	Change w.r.t. ISFR 2011	Scrub
			VDF	MDF	OF	Total			
Arunachal Pradesh	13	83,743	20,828	31,414	15,079	67,321	80.39	-89	121
Assam	3	19,153	741	5,696	6,587	13,024	68.00	39	33
Himachal Pradesh	12	55,673	3,224	6,381	5,078	14,683	26.37	4	298
Jammu & Kashmir	(a) 14	101,388	2,814	6,288	6,951	16,053	15.83	-3	295
	(b) *	120,848	1,326	2,472	2,687	6,485	5.37	2	1,810
Karnataka	6	48,046	1,492	14,920	6,728	23,140	48.16	-60	508
Kerala	10	29,572	1,178	7,159	5,760	14,097	47.67	410	29
Maharashtra	7	69,905	318	7,234	7,966	15,518	22.20	16	1,384
Manipur	9	22,327	728	6,094	10,168	16,990	76.10	-100	1
Meghalaya	7	22,429	449	9,689	7,150	17,288	77.08	13	372
Mizoram	8	21,081	138	5,900	13,016	19,054	90.38	-63	0
Nagaland	8	16,579	1,298	4,736	7,010	13,044	78.68	-274	2
Sikkim	4	7,096	500	2,161	697	3,358	47.32	-1	311
Tamil Nadu	5	22,789	944	3,387	2,197	6,528	28.65	156	207
Tripura	4	10,486	109	4,641	3,116	7,866	75.01	-111	66
Uttarakhand	13	53,483	4,785	14,111	5,612	24,508	45.82	12	262
West Bengal	1	3,149	724	650	1,004	2,378	75.52	89	5
Grand Total	124	707,747	41,596	132,933	106,806	281,335	39.75	40	5,704

* Refers to area outside LOC that is under illegal occupation of Pakistan and China.

Forest cover in the hill districts of the country is 281,335 sq km, which is 39.75 percent of the total geographic area of these districts. All districts of the States of Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Uttarakhand are hill districts.

The percentage of forest cover in these nine states is 62.86 percent of their geographical area. The current assessment shows a net increase of 40 sq km in hill districts of the country out of which -177 sq km is found inside forest area and 217 sq km outside forest areas.

2.10 Forest Cover in Tribal Districts

Tribal and their communities have been a part of the forest ecosystem and their means and methods of livelihood have been deeply influenced by the forest. Forests play a very significant role in tribal economy and all their socio-cultural practices are woven around forests. The ISFR also provides the forest cover in the tribal regions keeping in view the fact that changes in the forest cover in such

region has an influence on the tribal community. In this section, an overview of forest cover in the tribal districts of the country has been presented. In all, there are 189 tribal districts in 26 States/UTs as identified by the Government of India under the Integrated Tribal Development Programme (marked with superscript 'T') in the district-wise table of forest cover in Chapter 9. Table 2.9 presents a summary of forest cover in tribal districts of the country.

Table 2.9: Forest Cover in Tribal Districts (Area in km²)

States	No. of Hill Districts	Geographical Area	Forest Cover 2013				Per cent of G.A.	Change w.r.t. ISFR 2011	Scrub
			VDF	MDF	OF	Total			
Andhra Pradesh	8	87,090	239	16,465	8,359	25,063	28.78	-238	2,364
Arunachal Pradesh	13	83,743	20,828	31,414	15,079	67,321	80.39	-89	121
Assam	16	50,137	648	4,570	6,730	11,948	23.83	-48	93
Chhattisgarh	9	92,656	3,605	24,437	11,975	40,017	43.19	-40	87
Gujarat	8	48,409	322	2,937	3,512	6,771	13.99	5	395
Himachal Pradesh	3	26,764	950	1,067	1,218	3,235	12.09	4	118
Jharkhand	8	44,413	1,705	6,006	6,590	14,301	32.20	339	320
Karnataka	5	26,597	1,248	7,642	4,249	13,139	49.40	0	55
Kerala	9	27,228	1,147	6,846	5,414	13,407	49.24	311	29
Madhya Pradesh	18	139,448	5,631	20,235	16,362	42,228	30.28	-73	2,097
Maharashtra	12	144,233	7,261	11,775	11,665	30,701	21.29	-25	2,157
Manipur	9	22,327	728	6,094	10,168	16,990	76.10	-100	1
Meghalaya	7	22,429	449	9,689	7,150	17,288	77.08	13	372
Mizoram	8	21,081	138	5,900	13,016	19,054	90.38	-63	0
Nagaland	8	16,579	1,298	4,736	7,010	13,044	78.68	-274	2
Odisha	12	86,124	5,249	14,356	14,237	33,842	39.29	544	2,472
Rajasthan	5	38,218	0	2,442	3,897	6,339	16.59	-10	903
Sikkim	4	7,096	500	2,161	697	3,358	47.32	-1	311
Tamil Nadu	6	30,720	715	2,359	3,693	6,767	22.03	25	458
Tripura	4	10,486	109	4,641	3,116	7,866	75.01	-111	66
Uttar Pradesh	1	7,680	409	475	427	1,311	17.07	-8	1
West Bengal	11	69,403	2,957	3,709	7,880	14,546	20.96	2,246	111
A&N Islands	2	8,249	3,754	2,413	544	6,711	81.36	-13	57
Dadra & Nagar Haveli	1	491	0	114	99	213	43.38	2	1
Daman & Diu	1	72	0	1	3	4	5.01	-0.01	0
Lakshadweep	1	32	0	17	10	27	84.56	0	0
Grand Total	189	1,111,705	59,890	192,501	163,100	415,491	37.37	2,396	12,591