

# SECTION-I

## FOREST RESOURCE







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Forests constitute an important component of India covering about 23% of its geographic area. They not only provide intangible services like protection of environment, clean air and water but also provide subsistence to dwellers of villages in and around them. They also have a potential of supporting livelihoods and, in the process, participate in poverty alleviation. Apart from this there are some auxiliary resources associated with forests like grazing land, wastelands, etc, which have a potential to provide space for tree cover. Further, not all land belonging to forest departments is under tree cover. India had rich forest resource in the past and was extended over major part of the country. With time, deforestation for cultivation, food, shelter and pasture, diversion for developmental purposes and removal of valuable timber trees affected the forest resources adversely.

The periodic assessment and monitoring the forest and tree cover of the country is mandated to Forest Survey of India. The forest cover is assessed using satellite images and following wall to wall approach on every two years. So far the forest cover has been assessed eleven times. As per the last report of Forest Survey of India published in 2011, the total forest cover of the country has been assessed to be 692027 square km., which constitutes about 21.05 per cent geographic area of the country (Table 1.1). Area managed by the forest department may be classified as reserved, protected and unclassified (Table 1.2).

### Plantation Statistics

Plantations are regularly undertaken by the state forest departments under various schemes, both centrally sponsored and state funded schemes. Data pertaining to plantations raised under various schemes is difficult to obtain from each department as there are many departments involved. Establishment of forest plantations on a considerably large scale in India began during late 1970s early 1980s. Plantations were mostly established outside forest reserves in the wastelands and on private farm lands. Forest Development Corporations of various states also undertake plantations of forest tree species and have contributed to the increase in plantation area of commercially important forest tree species. Tree planting was declared a priority by the Government of India in 1982 in the Twenty-Point Programme, a package of Social Sector Schemes for the development of the country. The planting reached to approximately one million ha per annum during 1980-85. Further impetus to planting activities was given by creation of a National Wasteland Development Board in 1985 and the annual planting rate increased to about 1.78 million ha between 1985 and 1990. Plantation statistics for four year period 2006-2010 is presented state-wise in Table 1.4.

### Wastelands of India

Wastelands constitute an important resource available to carry out tree planting activities. There are nine broad types of wastelands found in India:



- (i) Gullied/Ravenous Land
- (ii) Scrubland
- (iii) Waterlogged and Marshy Land
- (iv) Land affected by salinity and alkalinity
- (v) Shifting Cultivation
- (vi) Scrub Forest (underutilized notified forest land)
- (vii) Sands
- (viii) Mining Industrial Wasteland
- (ix) Others

Data on wastelands are taken from the Wasteland Atlas of India published by the Department of Land Resources, Government of India. The atlas is prepared by Department of Land Resources along with National Remote Sensing Centre and Indian Space Research Organization. The categories of waste land are presented in table 1.5(a) to 1.5(i). In all nine tables give in detailed status of waste land of states of India.

The presented data in this section are taken from the published annual reports of the state/UT forest departments and that available on the website and other sources.



**Table 1.1: Area under forest cover (km<sup>2</sup>)**

States / UTs	Geographic Area	Actual forest cover	Recorded Forest Cover	Recorded Forest Area as percentage of Geographic Area	Per Capita Forest Cover (Ha.)
A & N Islands	8249	6724	7171	86.93	1.7697
Andhra Pradesh	275069	46389	63814	23.20	0.0548
Arunachal Pradesh	83743	67410	51540	61.55	4.8756
Assam	78438	27673	26832	34.21	0.0888
Bihar	94163	6845	6473	6.87	0.0066
Chandigarh	114	17	34	29.82	0.0016
Chhattisgarh	135191	55674	59772	44.21	0.2180
Dadra & Nagar Haveli	491	211	204	41.55	0.0615
Daman & Diu	112	6	8	7.14	0.0025
Delhi	1483	176	85	5.73	0.0011
Goa	3702	2219	1224	33.06	0.1522
Gujarat	196022	14619	18927	9.66	0.0242
Haryana	44212	1608	1559	3.53	0.0063
Himachal Pradesh	55673	14679	37033	66.52	0.2141
Jammu & Kashmir	222236	22539	20230	9.10	0.1796
Jharkhand	79714	22977	23605	29.61	0.0697
Karnataka	191791	36194	38284	19.96	0.0592
Kerala	38863	17300	11265	28.99	0.0518
Lakshadweep	32	27	0	0.00	0.0419
Madhya Pradesh	308245	77700	94689	30.72	0.1070
Maharashtra	307713	50646	61939	20.13	0.0451
Manipur	22327	17090	17418	78.01	0.6279
Meghalaya	22429	17275	9496	42.34	0.5828
Mizoram	21081	19117	16717	79.30	1.7522
Nagaland	16579	13318	9222	55.62	0.6724
Odisha	155707	48903	58136	37.34	0.1166
Puducherry	480	50	13	2.71	0.0040
Punjab	50362	1764	3084	6.12	0.0064
Rajasthan	342239	16087	32639	9.54	0.0234
Sikkim	7096	3359	5841	82.31	0.5528
Tamil Nadu	130058	23625	22877	17.59	0.0327
Tripura	10486	7977	6294	60.02	0.2173
Uttar Pradesh	240928	14338	16583	6.88	0.0072
Uttarakhand	53483	24496	34651	64.79	0.2421
West Bengal	88752	12995	11879	13.38	0.0142
<b>Total</b>	<b>3287263</b>	<b>692027</b>	<b>769538</b>	<b>23.41</b>	<b>0.0572</b>

Source: India State of Forest Report 2011, Forest Survey of India

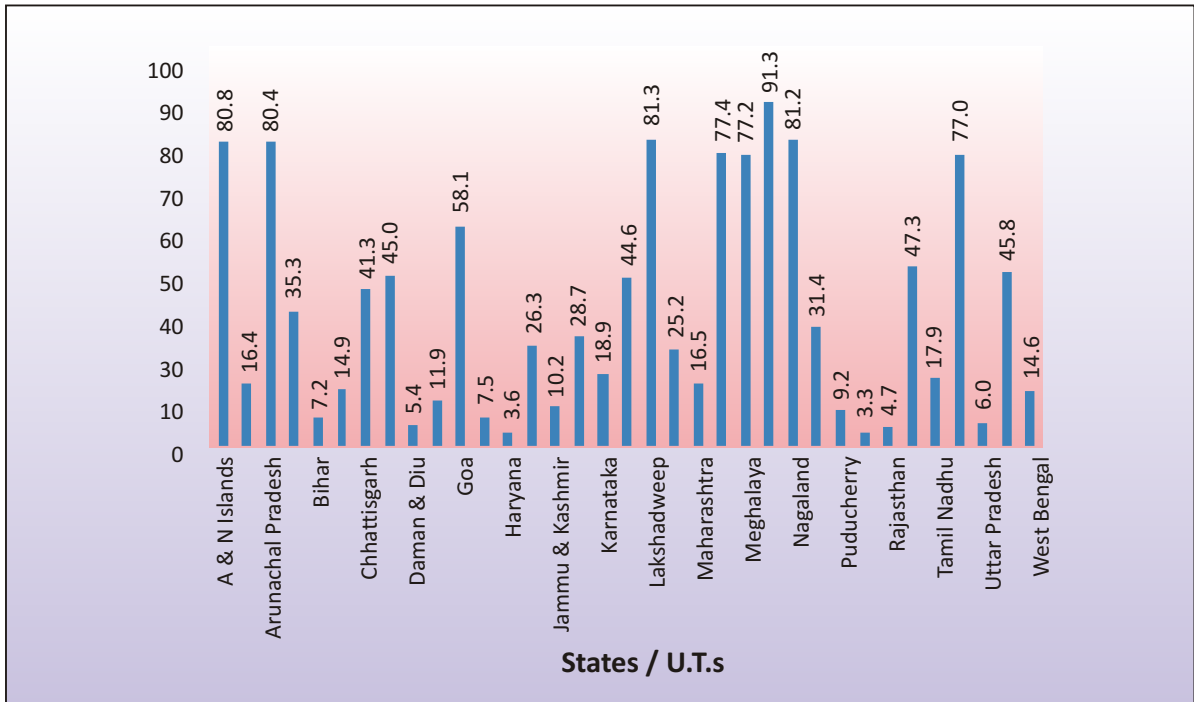


Fig 1.1: Actual Forest Cover as percentage of Geographic Area

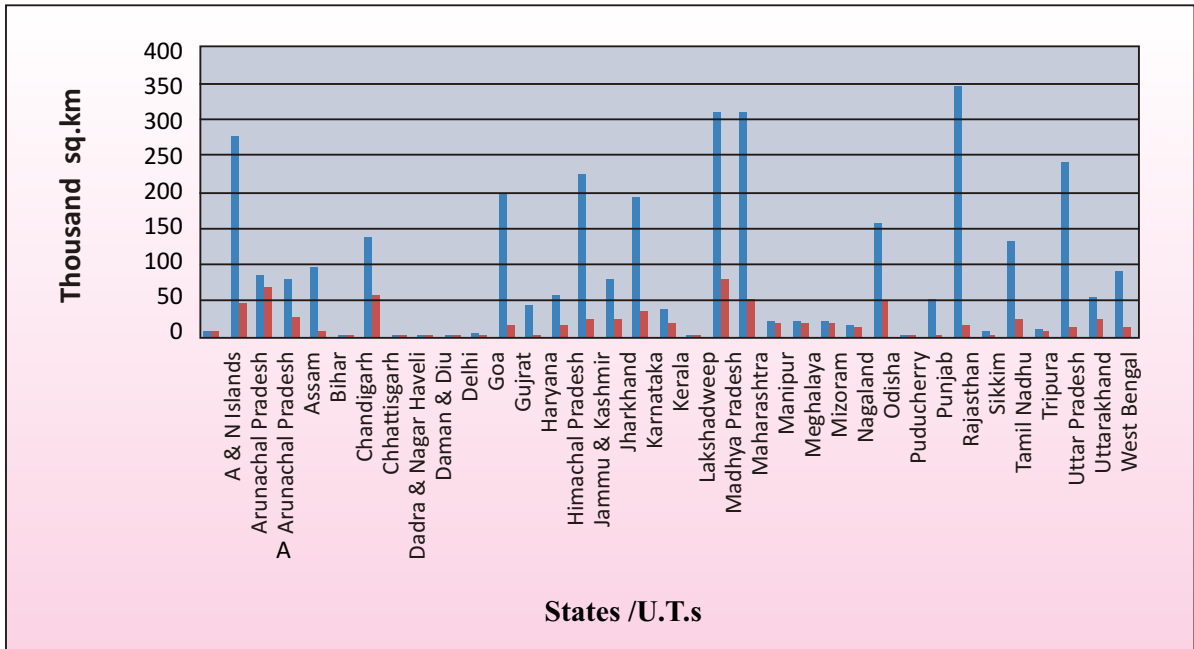


Fig 1.2: Actual Forest Cover and Geographic Area compared



**Table 1.2: Category wise recorded forest area (km<sup>2</sup>)**

States/U.T.s	Reserved	Protected	Unclassed
A & N Islands	5613	1558	0
Andhra Pradesh	50479	12365	970
Arunachal Pradesh	10546	9528	31466
Assam	17864	0	8968
Bihar	693	5779	1
Chandigarh	31	0	3
Chhattisgarh	25782	24036	9954
Dadra & Nagar Haveli	199	5	0
Daman & Diu	0.24	0	8.03
Delhi	78	7	0
Goa	253	845	126
Gujarat	14122	479	4326
Haryana	249	1158	152
Himachal Pradesh	1898	33130	2005
Jammu & Kashmir	17643	2551	36
Jharkhand	4387	19185	33
Karnataka	28690	3931	5663
Kerala	11123	142	0
Lakshadweep	0	0	0
Madhya Pradesh	61886	31098	1705
Maharashtra	49226	8195	4518
Manipur	1467	4171	11780
Meghalaya	1113	12	8371
Mizoram	7909	3568	5240
Nagaland	86	508	8628
Odisha	26329	15525	16282
Puducherry	0	2	11
Punjab	44	1137	1903
Rajasthan	12454	17416	2769
Sikkim	5452	389	0
Tamil Nadu	19388	2183	1306
Tripura	4175	2	2117
Uttar Pradesh	11660	1420	3503
Uttarakhand	24643	9885	123
West Bengal	7054	3772	1053
<b>Total</b>	<b>422536</b>	<b>213982</b>	<b>133020</b>

Source: India State of Forest Report 2011, Forest Survey of India

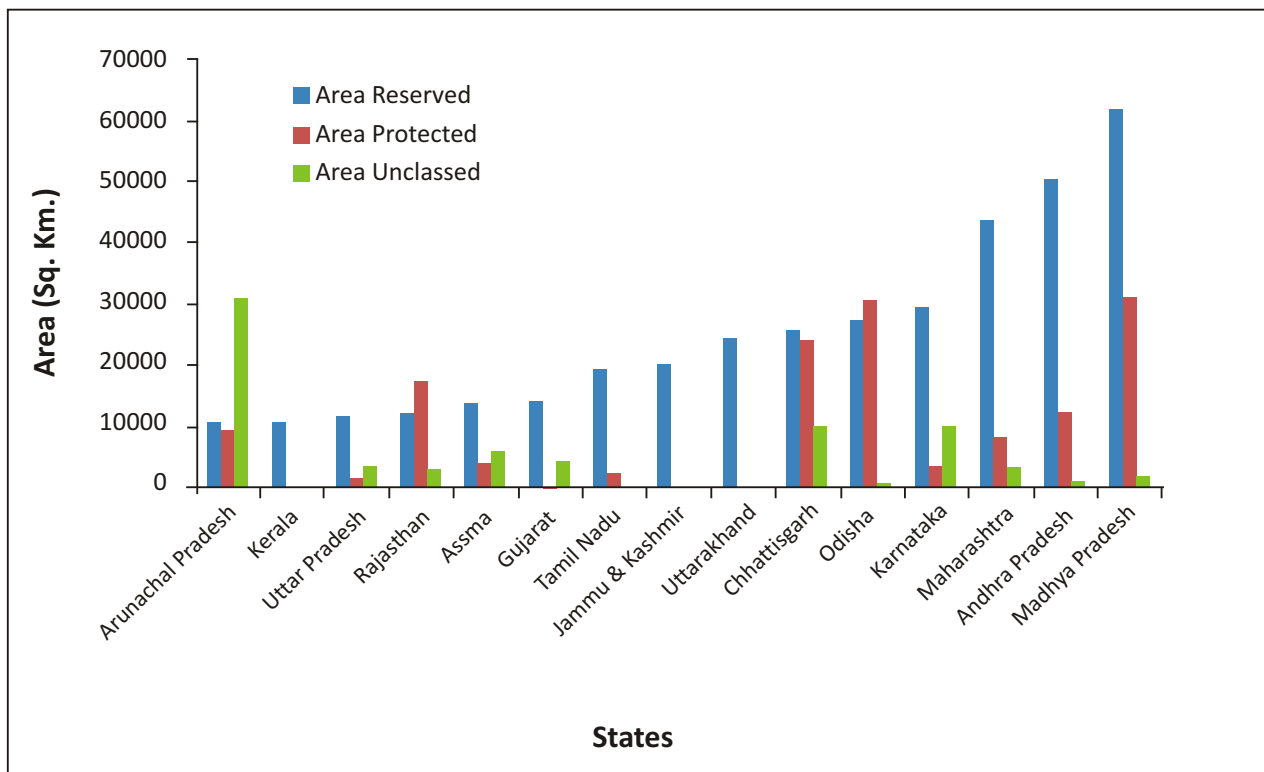


Fig 1.3: Reserved, Protected and Unclassed area compared in states with large forest cover





**Table 1.3: Forest Cover as per Density (km<sup>2</sup>)**

States / UTs	Geographic Area	Very dense Forest	Moderate dense Forest	Open Forest
A & N Islands	8249	3761	2416	547.0
Andhra Pradesh	275069	850	26242	19297.0
Arunachal Pradesh	83743	20868	31519	15023.0
Assam	78438	1444	11404	14825.0
Bihar	94163	231	3280	3334.0
Chandigarh	114	1	10	6.0
Chhattisgarh	135191	4163	34911	16600.0
Dadra & Nagar Haveli	491	0	114	97.0
Daman & Diu	112	0	0.62	5.5
Delhi	1483	7	49	120.0
Goa	3702	543	585	1091.0
Gujarat	196022	376	5231	9012.0
Haryana	44212	27	457	1124.0
Himachal Pradesh	55673	3224	6381	5074.0
Jammu & Kashmir	222236	4140	8760	9639.0
Jharkhand	79714	2590	9917	10470.0
Karnataka	191791	1777	20179	14238.0
Kerala	38863	1442	9394	6464.0
Lakshadweep	32	0	17.18	9.9
Madhya Pradesh	308245	6640	34986	36074.0
Maharashtra	307713	8736	20815	21095.0
Manipur	22327	730	6151	10209.0
Meghalaya	22429	433	9775	7067.0
Mizoram	21081	134	6086	12897.0
Nagaland	16579	1293	4931	7094.0
Odisha	155707	7060	21366	20477.0
Puducherry	480	0	35.37	14.7
Punjab	50362	0	736	1028.0
Rajasthan	342239	72	4448	11567.0
Sikkim	7096	500	2161	698.0
Tamil Nadu	130058	2948	10321	10356.0
Tripura	10486	109	4686	3182.0
Uttar Pradesh	240928	1626	4559	8153.0
Uttarakhand	53483	4762	14167	5567.0
West Bengal	88752	2984	4646	5365.0
<b>Total</b>	<b>3287263</b>	<b>83471</b>	<b>320736</b>	<b>287820</b>

Source: India State of Forest Report 2011, Forest Survey of India



**Table 1.4: Plantation Statistics Area planted (in Ha)**

States / U.T. s	2006-07	2007-08	2008-09	2009-10
A & N Islands	867	-	-	-
Andhra Pradesh	-	-	498031	-
Arunachal Pradesh	7699	7769	9039	4170
Assam	12812	13940	12864	4805
Bihar	11851	10184	10449	6695
Chandigarh	-	-	-	-
Chhattisgarh	12768	17345	18851	14706
Dadra & Nagar Haveli	-	-	-	-
Daman & Diu	-	-	-	-
Delhi	5958	6350	5720	6907
Goa	-	-	-	-
Gujarat	83128	78024	104874	135428
Haryana	17006	14739	28921	9800
Himachal Pradesh	24738	19663	20447	20165
Jammu & Kashmir	26188	28110	5379	24229
Jharkhand	24190	29381	196800	13567
Karnataka	64190	66430	68657	80412
Kerala	2840	1323	1993	2500
Lakshadweep	-	-	-	-
Madhya Pradesh	6446	16467	10052	125623
Maharashtra	41224	46772	69454	57546
Manipur	1178	11002	10213	6399
Meghalaya	5457	6761	5589	4354
Mizoram	4155	6600	8850	5350
Nagaland	14008	3990	3800	3650
Odisha	1175	62614	20482	18067
Puducherry	-	-	-	-
Punjab	3118	3970	5346	5465
Rajasthan	83898	87433	44365	75475
Sikkim	3550	3457	3862	8007
Tamil Nadu	-	-	4760	-
Tripura	7798	10770	11214	13212
Uttar Pradesh	56956	47202	94427	79177
Uttarakhand	28934	28829	25727	20945
West Bengal	15382	13388	18707	15043
<b>Total</b>	<b>567513</b>	<b>642512</b>	<b>1318874</b>	<b>761697</b>

-: Data not available

**Source:** State Forest Departments

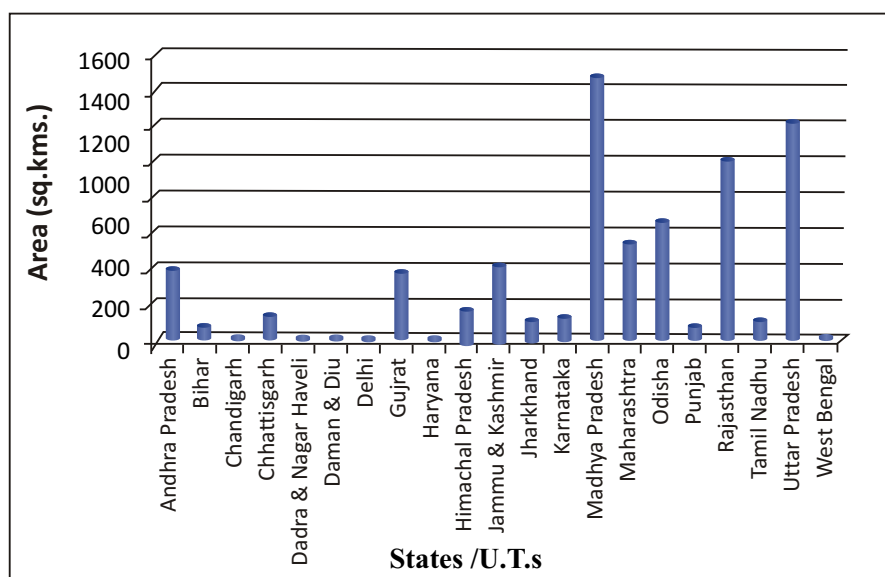


**Table 1.5 (a): Wastelands of India Gullied/Ravinous Land (km<sup>2</sup>)**

States / U.T.	Medium Ravine	Deep/Very deep marine
Andhra Pradesh	405.28	2.89
Bihar	71.83	-
Chandigarh	0.08	6.12
Chhattisgarh	142.9	0
Dadra & Nagar Haveli	0.01	-
Daman & Diu	0.16	-
Delhi	0.72	6.12
Gujarat	392.02	1.73
Haryana	0	0.96
Himachal Pradesh	170.23	4.52
Jammu & Kashmir	423.14	553.24
Jharkhand	106.14	0
Karnataka	127.11	0
Madhya Pradesh	1493.69	8.37
Maharashtra	547.03	-
Odisha	671.19	0
Punjab	82.12	0
Rajasthan	1020.17	864.75
Tamil Nadu	107.97	0.91
Uttar Pradesh	1216.48	264.63
West Bengal	20.56	0.58

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Gullied/Ravenous land for states not listed, does not exist



**Fig 1.4: Distribution of Medium Ravine wastelands**



**Table 1.5 (b): Wastelands of India Scrubland (Land with or without scrub) (km<sup>2</sup>)**

State / U.T.s	Land with dense scrub	Land with Open Scrub
Andhra Pradesh	10323.01	7416.17
Arunachal Pradesh	957.7	2162.04
Assam	1956.8	1626.68
Bihar	954.39	2761.16
Chandigarh	0.21	0.3
Chhattisgarh	1049.85	3052.58
Dadra & Nagar Haveli	1.01	36.13
Daman & Diu	0.05	6.04
Delhi	7.51	56.09
Gujarat	11614.83	6658.03
Haryana	2.98	837.95
Himachal Pradesh	1103.65	2268.19
Jammu & Kashmir	1617.25	2280.7
Jharkhand	2074.06	3600.33
Karnataka	4745.46	1656.56
Kerala	725.62	787.78
Madhya Pradesh	6361.08	16231.47
Maharashtra	11251.44	13242.14
Manipur	3718.87	900.54
Meghalaya	454.43	2640.1
Mizoram	-	36.32
Nagaland	972.55	1011.02
Odisha	5445.08	1383.29
Puducherry	0.83	3.24
Punjab	109.94	95.29
Rajasthan	23661.7	14619.38
Sikkim	-	6.37
Tamil Nadu	2128.14	2027.41
Tripura	229.44	298.41
Uttar Pradesh	1160.19	1835.12
Uttarakhand	211.28	1073.12
West Bengal	497.68	802.46

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Scrubland (Land with or without scrub) for states not listed, does not exist



**Table 1.5 (c): Wastelands of India Waterlogged and Marshy Land (km<sup>2</sup>)**

State / U.T.s	Permanent	Seasonal
Andhra Pradesh	109.07	0
Assam	494.69	1025.46
Bihar	694.65	869.4
Chandigarh	0.37	
Dadra & Nagar Haveli	0.37	0.44
Daman & Diu	0.02	
Delhi	5.29	
Gujarat	0	80.59
Haryana	20.86	51.22
Himachal Pradesh	0	10.45
Jammu & Kashmir	74.67	0.86
Jharkhand	0.36	
Karnataka	13.23	4.63
Kerala	5.06	14.91
Maharashtra	59.03	1.76
Odisha	424.04	35.56
Punjab	78.01	34.39
Rajasthan	64.88	54.94
Tamil Nadu	55.31	68.25
Tripura	0.68	
Uttar Pradesh	376.54	721.12
West Bengal	12.55	7.37

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Waterlogged and Marshy land for states not listed, does not exist

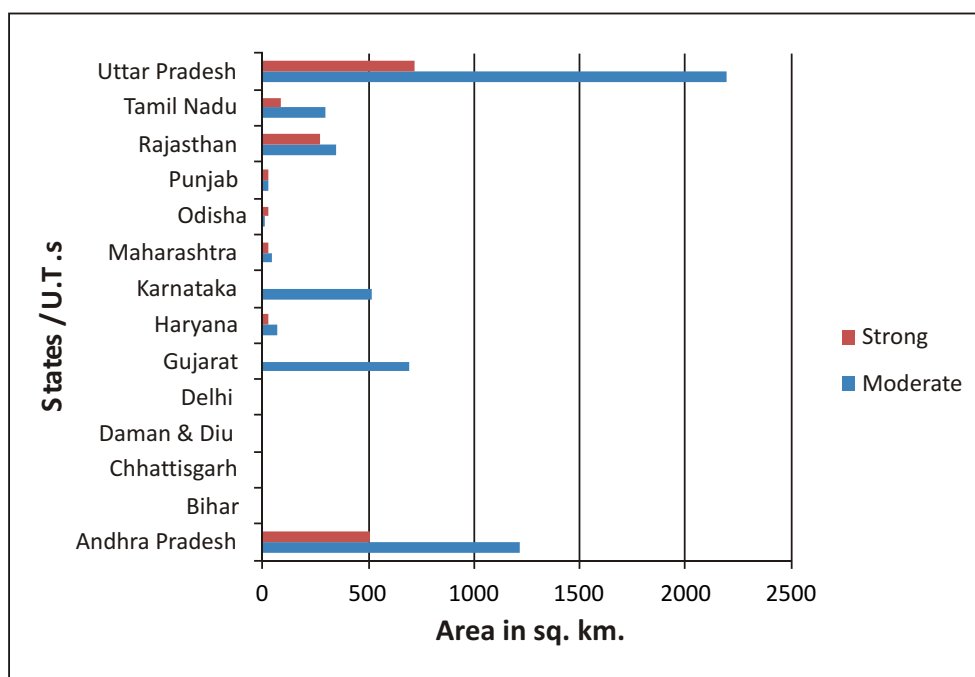


**Table 1.5 (d): Wastelands of India - Land affected by Salinity/alkalinity (km<sup>2</sup>)**

State / U.T.s	Moderate	Strong
Andhra Pradesh	1215.1	504.83
Bihar	0	3.97
Chhattisgarh	0.28	
Daman & Diu	2.5	
Delhi	0.15	
Gujarat	696.55	
Haryana	69.61	23.26
Karnataka	512.97	0.35
Maharashtra	41	26.36
Odisha	8.47	23.09
Punjab	30.14	27.87
Rajasthan	347.12	269.12
Tamil Nadu	296	83.82
Uttar Pradesh	2193.28	718.46

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Land affected by salinity/alkalinity for states not listed, does not exist



**Fig 1.5: Distribution of Strong and Moderate Salinity / Alkalinity affected land**

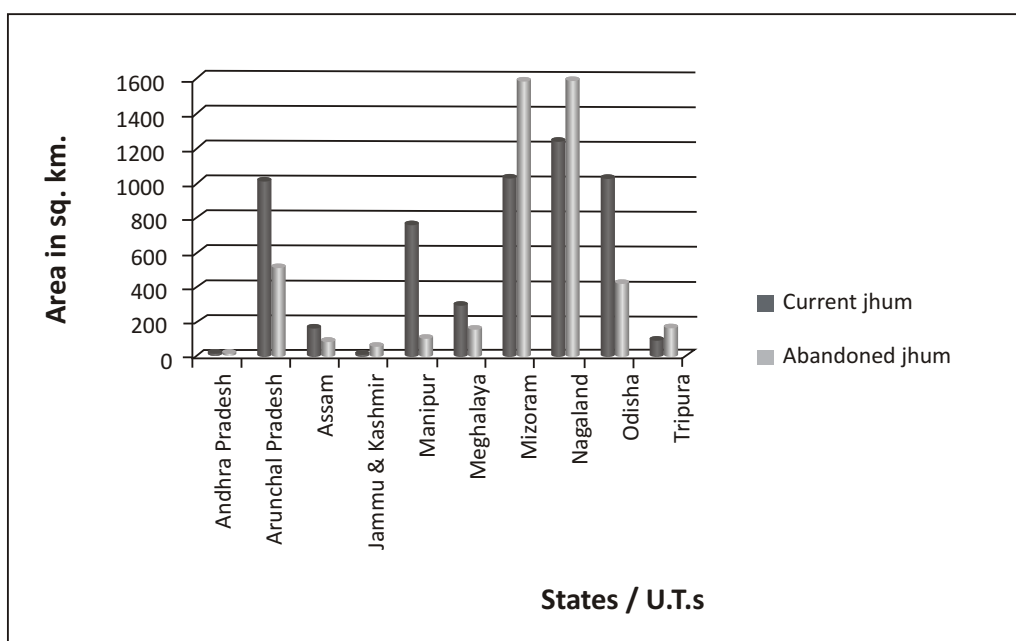


**Table 1.5 (e): Wastelands of India Shifting Cultivation (km<sup>2</sup>)**

State / U.T.s	Current Jhum	Abandoned Jhum
Andhra Pradesh	15.15	1.3
Arunachal Pradesh	1025.07	506.39
Assam	160.15	79.41
Jammu & Kashmir	16.65	56.68
Manipur	752.1	100.1
Meghalaya	291.87	157.12
Mizoram	1028.53	1589.03
Nagaland	1239.09	1588.65
Odisha	1023.83	421.61
Tripura	89.28	164.83

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Shifting Cultivation for states not listed, does not exist



**Fig 1.6: Distribution of Current and Abandoned Jhum Land**



**Table 1.5 (f): Wastelands of India - Scrub Forest (Underutilized notified forest land) (km<sup>2</sup>)**

State / U.T.s	Scrub dominated	Agricultural land inside notified forest land
A & N Islands	247.83	-
Andhra Pradesh	13123.06	1835.48
Arunachal Pradesh	20.46	0
Assam	1300.8	2132.5
Bihar	1198.63	76.85
Chandigarh	0.01	-
Chhattisgarh	2943.76	3616.45
Dadra & Nagar Haveli	15.31	-
Delhi	7.42	-
Gujarat	1413.86	155.35
Haryana	171.02	0
Himachal Pradesh	1290.43	0
Jammu & Kashmir	4019.26	238.29
Jharkhand	4400.59	518.99
Karnataka	5245.32	644.85
Kerala	572.25	-
Madhya Pradesh	12256.23	3136.55
Maharashtra	10026.96	1189.18
Manipur	1555.86	-
Meghalaya	67.11	-
Mizoram	3367.26	-
Odisha	4781.34	1842.28
Punjab	69.47	-
Rajasthan	11365.78	854.34
Sikkim	60.96	-
Tamil Nadu	2600.55	61.13
Tripura	522.52	0
Uttar Pradesh	1857.31	64.61
Uttarakhand	714.54	15.95
West Bengal	534.85	0

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Scrub Forest for states not listed, does not exist



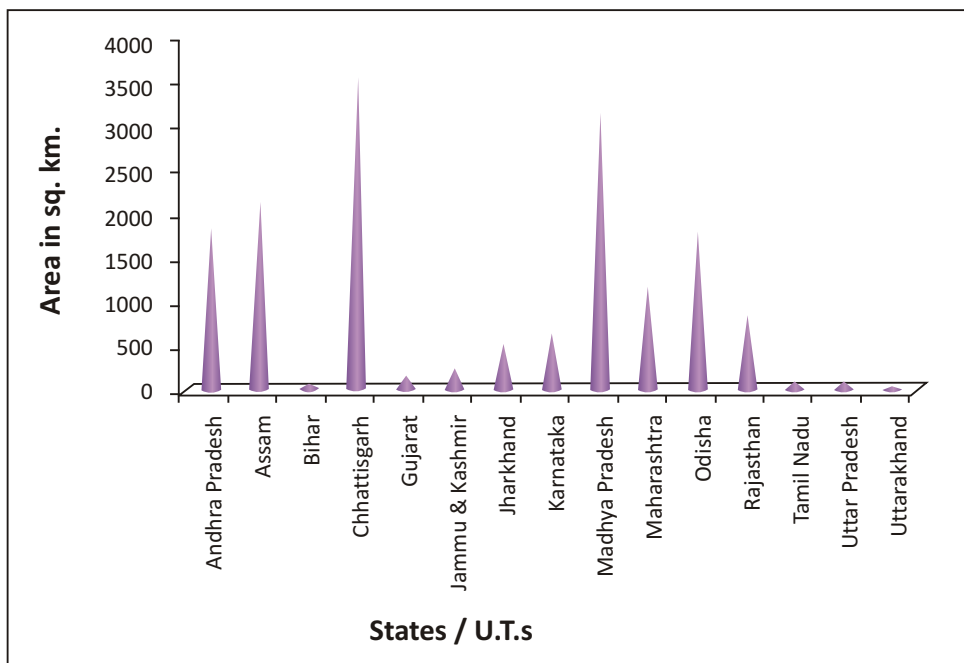


Fig 1.7: Distribution of agricultural land inside notified forests

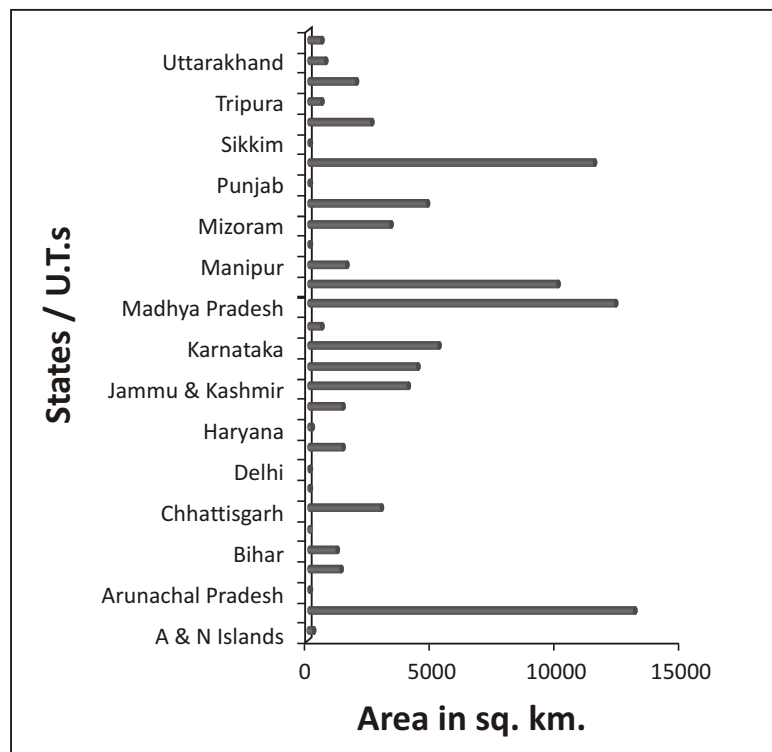


Fig. 1.8: Distribution of scrub dominated land.



**Table 1.5 (g): Wastelands of India - Sands (Coastal/desert/riverine) (km<sup>2</sup>)**

States / U.T. s	Coastal	Desert	Semi-stabilized to stabilized dune	Semi-stabilized to stabilized moderately high dune	Riverine
A & N Islands	7.54	-	-	-	
Andhra Pradesh	318.72	3.72	-	-	32.12
Assam	-	-	-	-	0.01
Bihar	-	-	-	-	6.82
Chhattisgarh	-	-	-	-	179.1
Daman & Diu	0	-	-	-	
Gujarat	75.38	-	-	-	
Haryana	-	0	-	41.19	1.79
Himachal Pradesh	-	-	-	-	49.38
Jammu & Kashmir	-	226.07	-	-	1671.02
Karnataka	9.22	-	-	-	11.62
Kerala	0	-	-	-	28.7
Maharashtra	29.48	-	-	-	3.65
Odisha	34.15	-	-	-	2.79
Puducherry	3.25	-	-	-	0
Punjab	-	394.35	-	-	97.92
Rajasthan	-	4655.88	11188.21	15586.44	196.69
Tamil Nadu	200.63	-	-	-	34.15
Tripura	-	-	-	-	10.01
Uttar Pradesh	0	-	-	-	109.92
Uttarakhand	-	-	-	-	0.31
West Bengal	7.94	-	-	-	16.1

**Source: Wasteland Atlas of India - 2010**

Note- The Category of Sands (Coastal/desert/riverine) for states not listed, does not exist

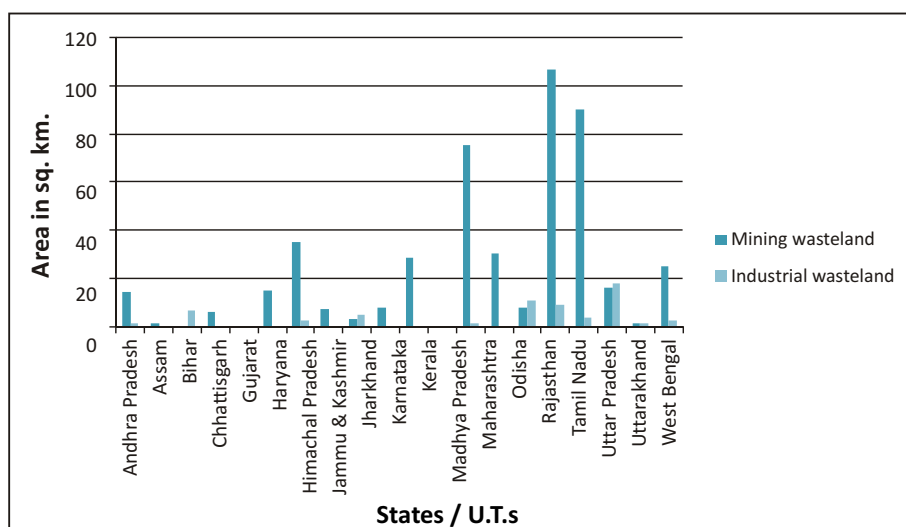


**Table 1.5 (h): Wastelands of India - Mining industrial wasteland (km<sup>2</sup>)**

State / U.T.s	Mining wasteland	Industrial wasteland
Andhra Pradesh	14.39	1.77
Assam	1.51	-
Bihar	0.22	6.66
Chhattisgarh	5.91	-
Delhi	0.04	-
Gujarat	15.29	-
Haryana	35.36	2.51
Himachal Pradesh	7.46	-
Jammu & Kashmir	3.38	4.98
Jharkhand	7.82	0.29
Karnataka	28.36	-
Kerala	0.2	-
Madhya Pradesh	75.72	1.48
Maharashtra	30.45	-
Odisha	7.9	10.67
Rajasthan	106.86	9.06
Tamil Nadu	90.18	3.94
Uttar Pradesh	16.16	18.07
Uttarakhand	1.61	1.48
West Bengal	25.09	2.72

**Source:** Wasteland Atlas of India - 2010

Note- The Category of Mining Industrial Wasteland for states not listed, does not exist



**Fig 1.9: Distribution of mining and industrial wasteland**

Table 1.5 (i): Wastelands of India others (km<sup>2</sup>)

States / U.T. s	Degraded pastures/grazing land	Degraded land under plantation crops	Barren rocky area	Snow cover and/or glacial area
Andhra Pradesh	132.37	37.79	3295.73	735.98
Arunachal Pradesh	186.11	-	150.09	735.98
Bihar	60.63	11.54	124.35	-
Chhattisgarh	-	0	827	-
Gujarat	44.19	53.06	149.49	-
Haryana	914.58	75.63	98.13	-
Himachal Pradesh	164.36	0	5314.17	12087.2
Jammu & Kashmir	125.55	41.61	46379.45	16021.09
Jharkhand	0	-	961.56	-
Karnataka	6.36	9.04	1423.09	-
Kerala	0	16.48	307.68	-
Madhya Pradesh	20.19	0	458.19	-
Maharashtra	149.72	21.25	1643.37	-
Meghalaya	-	-	255.13	-
Nagaland	0	-	3.87	-
Odisha	-	1.88	531.11	-
Puducherry	-	-	0.06	-
Rajasthan	3918.42	0	4905.72	-
Sikkim	-	-	579.9	2633.66
Tamil Nadu	1041.74	41.88	283.56	-
Uttar Pradesh	21.47	3.48	411.75	-
Uttarakhand	410.76	1.98	1142.16	9216.87
West Bengal	0	2.4	64.12	-

**Source: Wasteland Atlas of India - 2010**

Note- The Category of others for states not listed, does not exist