

9.15 MADHYA PRADESH

9.15.1 Introduction

Madhya Pradesh is the second largest state of the country with an area of 3,08,245 km² constituting 9.38% of the geographical area of the country. It lies between latitudes of 21°17' N and 26°52' N and the longitudes of 74°08' E and 82°49' E. Physiographically, the state can be divided into four regions, viz. the low lying areas in north and north-west of Gwalior, Malwa Plateau, Satpura and Vindhyan Ranges. Chambal, Betwa, Sone and Narmada are four important rivers of the State. The rainfall decreases from south-east and east to north-west and west. The average

annual rainfall varies from 800 mm to about 1,800 mm. The annual temperature ranges from 22.5°C to 25°C.

The total population of the state is 72.60 million (*Census 2011*) which constitutes 6% of the country's population. Of this, rural population is 72.37% and urban population is 27.63%. The population density is 236 persons per km². The livestock population is 40.70 million (*Livestock Census 2007*).

Land use pattern of the state is given in Table 9.15.1

Table 9.15.1: Land Use Pattern

Land Use	Area in '000 ha	Percentage
Total geographical area	30,825	
Reporting area for land utilization	30,757	100.00
Forests	8,696	28.27
Not available for land cultivation	3,401	11.06
Permanent pastures and other grazing lands	1,337	4.35
Land under misc. tree crops and groves	19	0.06
Culturable wasteland	1,160	3.77
Fallow lands other than current fallows	621	2.02
Current fallows	582	1.89
Net area sown	14,941	48.58

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

9.15.2 Recorded Forest Area

The recorded forest area of the state is 94,689 km² which is 30.72% of its geographical area. The Reserved Forests constitute 65.36%, Protected Forests 32.84% and Unclassed Forests 1.80%.

9.15.3 Protected Areas

Madhya Pradesh has 9 National Parks and 25 Wildlife Sanctuaries covering an area of 10367.84 km² which constitute 3.36% of the state's geographical area. There are 5 Tiger Reserves in the state, namely, Kanha, Panna, Bandhavgarh, Pench and Satpura. The

Pachmarhi Biosphere Reserve covers parts of Hoshangabad, Betul and Chhindwara districts with a total area of about 0.5 million ha and includes Bori Wildlife Sanctuary, Satpura National Park and Pachmarhi Wildlife Sanctuary.

9.15.4 Forest Cover

The forest cover in the state, based on interpretation of satellite data of Oct - Dec

2008, is 77,700 km² which is 25.21% of the state's geographical area. In terms of forest canopy density classes, the state has 6,640 km² area under very dense forest, 34,986 km² area under moderately dense forest and 36,074 km² area under open forest. The forest cover of the state is shown in Fig.9.15.

Comparison of the current forest cover assessment with the previous assessment (satellite data of Oct-Dec 2006) shows that there is no change in forest cover.

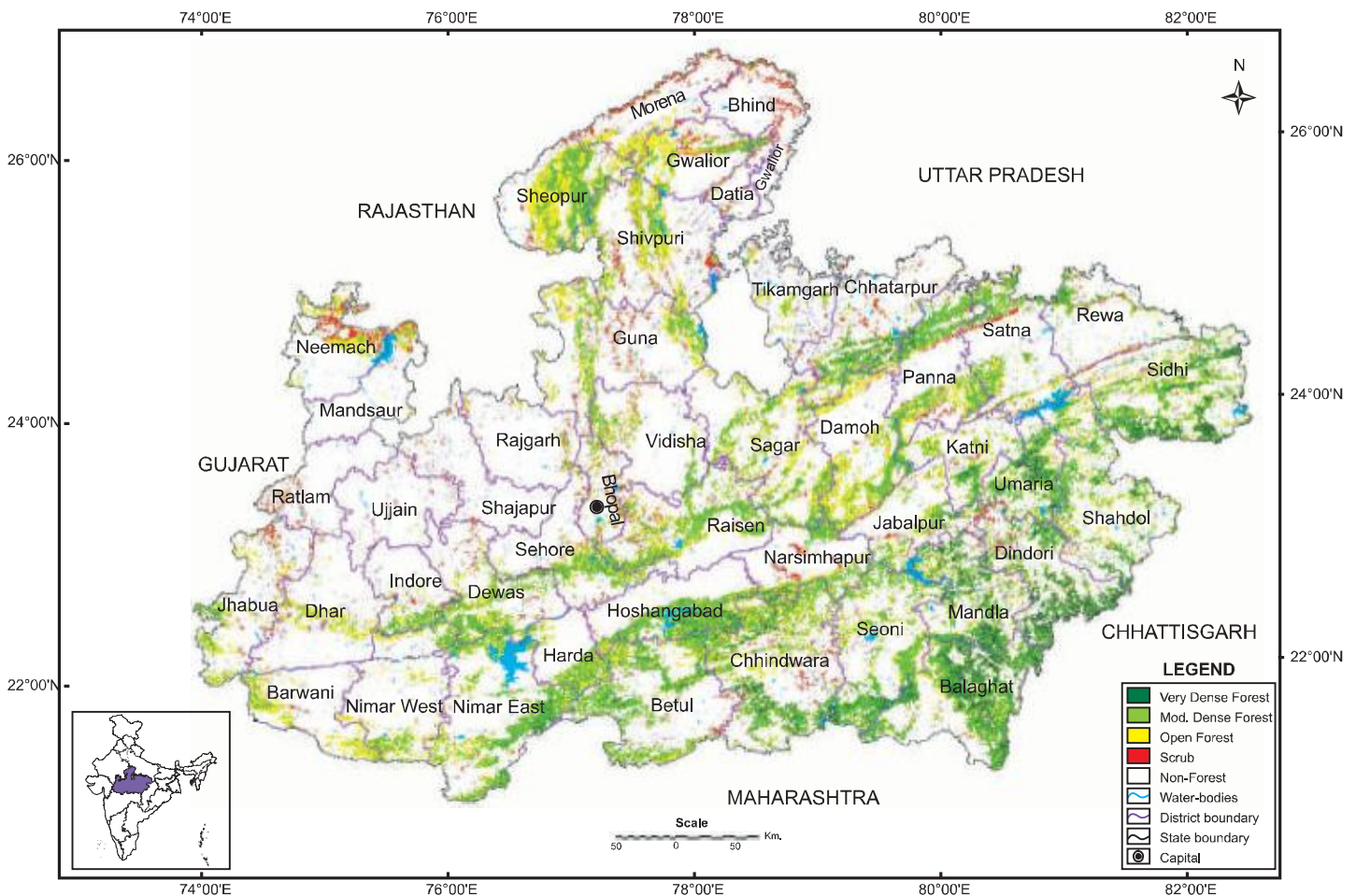
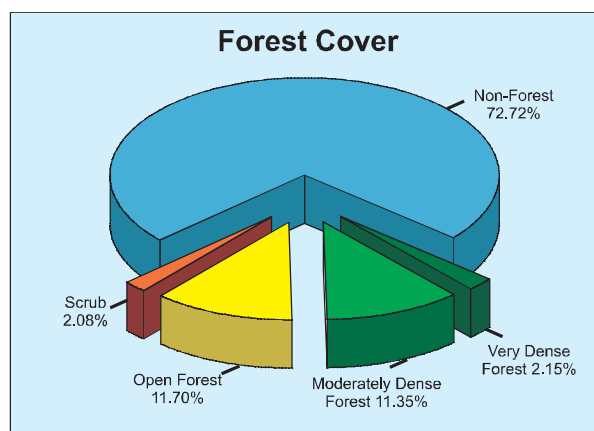


Fig 9.15 Forest cover map of Madhya Pradesh



District-wise forest cover in different canopy density classes along with the changes compared to 2009 assessment and scrub are given in Table 9.15.2.

Table 9.15.2: District-wise Forest Cover

(Area in km²)

District	Geographical Area	2011 Assessment				Percent of GA	Change	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Balaghat ^T	9,229	1,334	2,705	958	4,997	54.14	1	54
Barwani	5,422	0	189	802	991	18.28	0	42
Betul ^T	10,043	201	1,967	1,404	3,572	35.57	0	114
Bhind	4,459	0	29	69	98	2.20	0	395
Bhopal	2,772	0	128	238	366	13.20	0	129
Chattarpur	8,687	184	822	743	1,749	20.13	1	279
Chhindwara ^T	11,815	575	2,044	1,922	4,541	38.43	2	240
Damoh	7,306	2	862	1,742	2,606	35.67	1	76
Datia	2,691	0	78	79	157	5.83	0	101
Dewas ^T	7,020	13	955	930	1,898	27.04	-1	112
Dhar ^T	8,153	0	137	597	734	9.00	0	120
Dindori ^T	7,470	1,033	1,175	559	2,767	37.04	0	132
East Nimar ^T	10,776	200	1,830	1,381	3,411	31.65	-7	51
Guna	11,064	2	699	1,410	2,111	19.08	1	355
Gwalior	4,560	1	327	865	1,193	26.16	0	208
Harda ^T	3,330	19	546	463	1,028	30.87	0	8

Forest and Tree Resources in States and Union Territories

District	Geographical Area	2011 Assessment				Percent of GA	Change	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Hoshangabad ^T	6,707	274	1,373	777	2,424	36.14	0	35
Indore	3,898	0	370	336	706	18.11	2	27
Jabalpur ^T	5,211	36	514	620	1,170	22.45	1	154
Jhabua ^T	6,778	0	255	682	937	13.82	1	194
Katni	4,950	102	607	573	1,282	25.90	3	52
Mandla ^T	5,800	751	1,204	875	2,830	48.79	-4	55
Mandsaur	5,535	0	40	220	260	4.70	0	108
Morena ^T	4,989	0	98	632	730	14.63	0	409
Narsimhapur	5,133	60	665	632	1,357	26.44	0	135
Neemach	4,256	0	121	706	827	19.42	0	395
Panna	7,135	85	1,501	1,072	2,658	37.25	4	189
Raisen	8,466	22	1,331	1,382	2,735	32.31	-1	183
Rajgarh	6,153	0	39	114	153	2.49	0	101
Ratlam ^T	4,861	0	4	54	58	1.19	0	135
Rewa	6,314	65	398	314	777	12.31	0	115
Sagar	10,252	2	1,178	1,726	2,906	28.35	0	135
Satna	7,502	13	942	794	1,749	23.31	-1	204
Sehore	6,578	25	654	703	1,382	21.01	0	124
Seoni ^T	8,758	240	1,806	1,037	3,083	35.20	-1	62
Shahdol ^T	9,952	245	1,255	1,224	2,724	27.37	0	73
Shajapur	6,195	0	5	24	29	0.47	0	99
Sheopur	6,606	6	1,394	2,121	3,521	53.30	0	127
Shivpuri	10,277	19	786	1,645	2,450	23.84	0	376
Sidhi ^T	10,526	717	1,935	1,447	4,099	38.94	-3	101
Tikamgarh	5,048	1	93	309	403	7.98	0	133
Ujjain	6,091	0	4	26	30	0.49	0	85
Umaria	4,076	411	1,086	537	2,034	49.90	1	29
Vidisha	7,371	1	363	505	869	11.79	0	97
West Nimar ^T	8,030	1	472	825	1,298	16.16	0	48
Grand Total	308,245	6,640	34,986	36,074	77,700	25.21	0	6,396

The change matrix given in Table 9.15.3 reveals that there has been a decrease of 7 km² in the very dense forest, 21 km² in moderately

dense forest whereas an increase of 28 km² in open forest is observed.

Table 9.15.3: Forest Cover Change Matrix (Area in km²)

2009 Assessment	2011 Assessment					Total 2009
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	6,640	0	5	0	2	6,647
Moderately Dense Forest	0	34,985	11	0	11	35,007
Open Forest	0	1	36,030	0	15	36,046
Scrub	0	0	1	6,394	6	6,401
Non-Forest	0	0	27	2	224,115	224,144
Total 2011	6,640	34,986	36,074	6,396	224,149	308,245
Net Change	-7	-21	28	-5	5	

9.15.5 Altitude Zone-wise Forest Cover

Forest cover of the state in different altitude zones is given in Table 9.15.4.

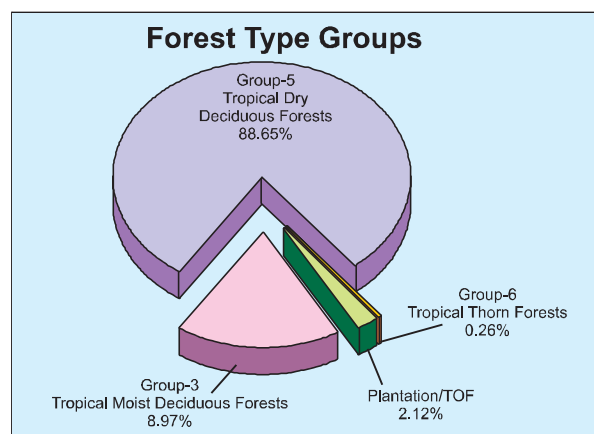
Table 9.15.4: Altitude Zone-wise Forest Cover (Area in km²)

Altitude Zone	VDF	MDF	OF	Total
0-500m	2,031	21,470	25,302	48,803
500-1000m	4,482	13,369	10,687	28,538
1000-2000m	127	147	85	359
Total	6,640	34,986	36,074	77,700

(Based on SRTM, Digital Elevation Model)

9.15.6 Forest Cover in Different Forest Types

As per Champion & Seth Classification, the state has 18 forest types which belong to three forest type groups, viz. Tropical Moist Deciduous, Tropical Dry Deciduous and Tropical Thorn Forests. Percentage-wise distribution of forest cover in different forest type groups found in the state on the basis of the forest cover assessment is given in the pie diagram.



9.15.7 Tree Cover

Tree cover of the state has been estimated using sample data of TOF inventory collected over a period of six years, i.e. 2004-10. The estimated tree cover in the state is 7,090 km² which is 2.30% of its geographical area.

Fourteen districts of the state, (Barwani, Bhopal, Chhindwara, Dhar, Hoshangabad, Jhabua, Katni, Morena, Panna, Rajgarh, Ratlam, Satna, Sehore, and Sidhi) have been inventoried. The forest and tree cover of the state is presented in Table 9.15.5.

Table 9.15.5: Forest and Tree Cover (Area in km²)

Category	Area	% of Geographical Area
Tree Cover	7,090	2.30
Forest Cover	77,700	25.21
Forest & Tree Cover	84,790	27.51

9.15.8 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 9.15.6.

Table 9.15.6: Growing Stock (million cum)

Forest	TOF	Total
249.661	85.106	334.767

9.15.9 Bamboo Resources

The extent of bamboo bearing area in the forests of the state is 13,059 km². Density-wise

details, number of culms by soundness and equivalent green weight by area are given in following tables:

Table 9.15.7: Bamboo bearing area by density in recorded forest area (Area in km²)

Recorded Forest Area	Pure bamboo	Dense bamboo	Scattered bamboo	Clumps hacked	Bamboo regeneration	No bamboo
94,689	76	2,732	5,264	2,284	2,703	81,630

Table 9.15.8: 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
1229	819	222	2270	4497	5671	10168