

## 9.4 BIHAR

### 9.4.1 Introduction

Bihar, situated in the eastern part of India bordering Nepal, has a geographical area of 94,163 km<sup>2</sup> which constitutes 2.86% of the country's total area. The state is situated between 24° 16' N - 27° 45' N latitude and 83° 16' E - 88° 30' E longitude. Bihar is a part of Gangetic Plains and is drained by two major rivers, viz. the Ganga and the Gandak. Annual rainfall in the state varies from 1,000 mm to 2,000 mm and the mean annual temperature ranges between 20°C to 28°C.

As per census 2011, the population of Bihar is 103.80 million (8.58% of the country's population) of which 88.70% is rural and 11.30% is urban. The state is the third most populous state of the country with population density 1102 persons per km<sup>2</sup>. The livestock population of the state is 30.34 million (*Livestock Census 2007*).

Land use pattern of the state is given in Table 9.4.1.

**Table 9.4.1: Land Use Pattern**

Land Use	Area in '000 ha	Percentage
Total geographical area	9416	
Reporting area for land utilisation	9360	100.00
Forests	622	6.65
Not available for cultivation	2085	22.28
Permanent pasture and other grazing lands	16	0.17
Land under misc. tree crops and groves	241	2.57
Culturable wasteland	46	0.49
Fallow lands other than current fallows	119	1.27
Current fallows	569	6.08
Net area sown	5662	60.49

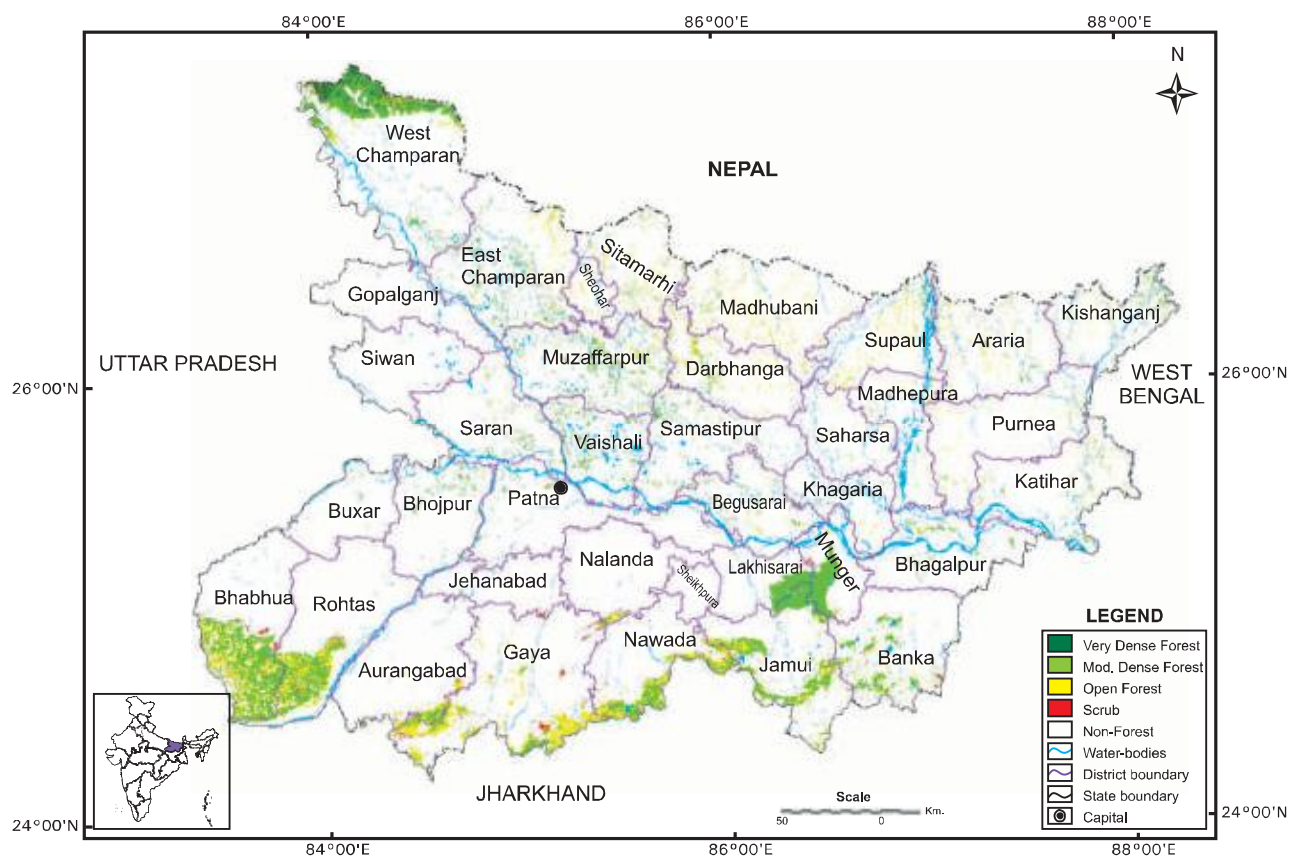
Source: Land Use Statistics, Ministry of Agriculture, GOI, 2008-09

### 9.4.2 Recorded Forest Area

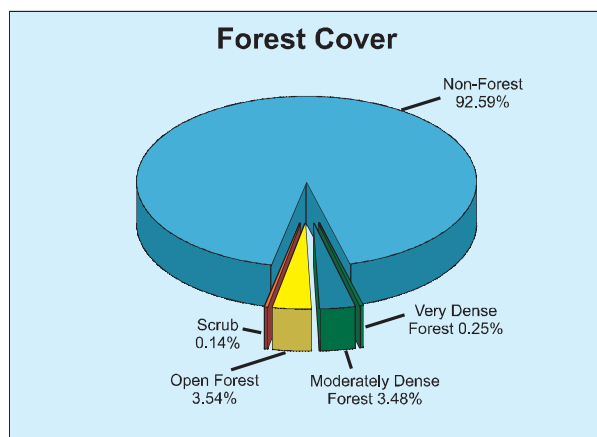
The recorded forest area of the state is 6,473 km<sup>2</sup> which is 6.87% of its geographical area. The Reserved Forests constitute 10.70%, Protected Forests 89.28% and Unclassed Forests 0.02% of the total forest area.

### 9.4.3 Protected Areas

There is one National Park and 12 Wildlife Sanctuaries covering an area of 0.32 million ha, which constitutes 3.38% of the total geographical area of the state. The lone tiger reserve of the state, viz. Valmiki Tiger Reserve covers an area of 84,000 ha. Kabar, situated in Begusarai district with an area of 6,738 ha, is a wetland of national importance.



**Fig. 9.4 Forest Cover Map of Bihar**



#### 9.4.4 Forest Cover

The forest cover in the state, based on interpretation of satellite data of Nov 2008-Jan 2009, is 6,845 km<sup>2</sup> which is 7.27% of the state's geographical area. In terms of forest canopy density classes, the state has 231 km<sup>2</sup> very dense forest, 3,280 km<sup>2</sup> moderately

dense forest, and 3,334 km<sup>2</sup> open forest. The forest cover of the state is shown in Fig.9.4.

District-wise forest cover in different canopy density classes along with the changes compared to 2009 assessment and scrub are given in Table 9.4.2.

**Table 9.4.2: District-wise Forest Cover** (Area in km<sup>2</sup>)

District	Geographical Area	2011 Assessment				Percent of GA	Change	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Araria	2,830	0	12	76	88	3.11	2	0
Aurangabad	3,305	0	54	97	151	4.57	0	13
Banka	3,022	0	111	110	221	7.31	0	12
Begusarai	1,918	0	20	23	43	2.24	0	0
Bhabhua	3,381	0	555	507	1,062	31.41	0	20
Bhagalpur	2,567	0	29	13	42	1.64	0	0
Bhojpur	2,390	0	16	3	19	0.79	0	0
Buxar	1,708	0	2	1	3	0.18	0	0
Darbhanga	2,279	0	41	144	185	8.12	0	0
Gaya	4,976	0	124	506	630	12.66	0	46
Gopalganj	2,033	0	2	2	4	0.20	0	0
Jamui	3,107	0	383	249	632	20.34	0	2
Jehanabad	1,569	0	2	1	3	0.19	0	5
Katihar	3,057	0	18	44	62	2.03	0	0
Khagaria	1,486	0	2	6	8	0.54	0	0
Kishanganj	1,884	0	26	49	75	3.98	0	0
Lakhisarai	1,356	0	180	14	194	14.31	0	2
Madhepura	1,788	0	6	20	26	1.45	0	0
Madhubani	3,501	0	18	118	136	3.88	0	0
Munger	1,347	0	251	14	265	19.67	0	7
Muzaffarpur	3,172	0	102	75	177	5.58	21	0
Nalanda	2,367	0	5	23	28	1.18	0	6
Nawada	2,494	0	187	323	510	20.45	0	10
Pashchimi Champaran	5,228	231	524	166	921	17.62	8	0

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District	Geographical Area	2011 Assessment				Percent of GA	Change	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Patna	3,202	0	13	3	16	0.50	0	0
Purbi Champaran	3,968	0	83	88	171	4.31	7	0
Purnia	3,229	0	6	41	47	1.46	0	0
Rohtas	3,832	0	321	385	706	18.42	0	11
Saharsa	1,680	0	2	9	11	0.65	0	0
Samastipur	2,904	0	39	18	57	1.96	0	0
Saran	2,641	0	38	17	55	2.08	0	0
Sheikhpura	612	0	0	0	0	0.00	0	0
Sheohar	572	0	2	17	19	3.32	0	0
Sitamarhi	2,071	0	23	67	90	4.35	8	0
Siwan	2,219	0	1	1	2	0.09	0	0
Supaul	2,432	0	8	92	100	4.11	1	0
Vaishali	2,036	0	74	12	86	4.22	0	0
<b>Grand Total</b>	<b>94,163</b>	<b>231</b>	<b>3,280</b>	<b>3,334</b>	<b>6,845</b>	<b>7.27</b>	<b>41</b>	<b>134</b>

### Reason for change detected in 2011 assessment:

the state which can be mainly attributed to enhanced plantation activities in and outside forests.

As is evident from the table, there is a marginal increase of 41 km<sup>2</sup> in forest cover of

**Table 9.4.3: Forest Cover Change Matrix** (Area in km<sup>2</sup>)

2009 Assessment	2011 Assessment					Total 2009
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	231	0	0	0	0	<b>231</b>
Moderately Dense Forest	0	3,239	5	0	4	<b>3,248</b>
Open Forest	0	6	3,312	4	3	<b>3,325</b>
Scrub	0	2	2	130	0	<b>134</b>
Non-Forest	0	33	15	0	87,177	<b>87,225</b>
<b>Total 2011</b>	<b>231</b>	<b>3,280</b>	<b>3,334</b>	<b>134</b>	<b>87,184</b>	<b>94,163</b>
Net Change	0	32	9	0	-41	

The change matrix given in Table 9.4.3 reveals that there has been no change in very dense forest whereas there is an increase of 32 km<sup>2</sup> in the moderately dense forest and 9 km<sup>2</sup> in open forest.

#### 9.4.5 Altitude Zone-wise Forest Cover

Forest cover of the state in different altitude zones is given in Table 9.4.4.

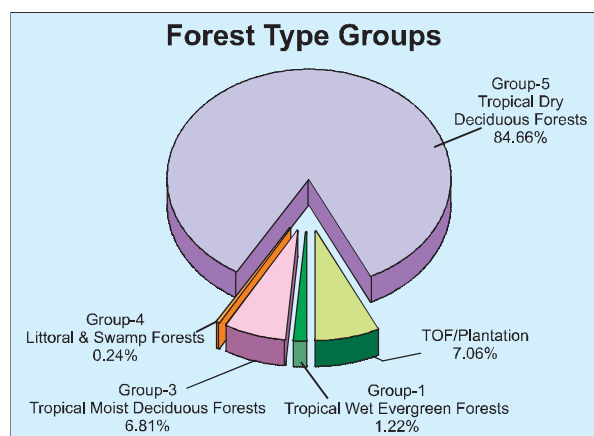
**Table 9.4.4: Altitude Zone-wise Forest Cover** (Area in km<sup>2</sup>)

Altitude Zone	VDF	MDF	OF	Total
0-500m	228	3,140	3,203	6,571
500-1000m	3	140	131	274
<b>Total</b>	<b>231</b>	<b>3,280</b>	<b>3,334</b>	<b>6,845</b>

(Based on SRTM, Digital Elevation Model)

#### 9.4.6 Forest Cover in Different Forest Types

Forest type mapping using satellite data has been undertaken by Forest Survey of India with reference to Champion & Seth Classification. As per this assessment, the state has 10 forest types which belong to four forest type groups, viz. Tropical Wet Evergreen, Tropical Moist Deciduous, Littoral & Swamp Forest and Tropical Dry Deciduous Forests. Percentage-wise distribution of forest cover in different forest type groups found in the state is given in the pie diagram.



#### 9.4.7 Tree Cover

Tree cover in the state has been estimated, using TOF inventory data collected over a period of six years, i.e. 2004-10. The estimated tree cover in the state is 2,369 km<sup>2</sup> which is

2.52% of the geographical area of the state. Seven districts of the state (Banka, Gaya, Gopalganj, Madhepura, Munger, Nalanda and Nawada) have been inventoried during this period. The forest and tree cover of the state is presented in Table 9.4.5.

**Table 9.4.5: Forest and Tree Cover** (Area in km<sup>2</sup>)

Category	Area	% of Geographical Area
Tree Cover	2,369	2.52
Forest Cover	6,845	7.27
<b>Forest &amp; Tree Cover</b>	<b>9,214</b>	<b>9.79</b>

### 9.4.8 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 9.4.6.

**Table 9.4.6: Growing Stock** (million cum)

Forest	TOF	Total
35.186	47.195	82.381

### 9.4.9 Bamboo

The extent of bamboo bearing area in the forests of the state is 739 km<sup>2</sup>. Density-wise

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

**Table 9.4.7: Bamboo bearing area by density in recorded forest area** (Area in km<sup>2</sup>)

Recorded Forest Area	Pure bamboo	Dense bamboo	Scattered bamboo	Clumps hacked	Bamboo regeneration	No bamboo
6,473	1	239	393	75	31	5,734

**Table 9.4.8: Estimated number of culms and equivalent green weight**

Number of culms (in millions)				Equivalent Green Weight (in 000' tonnes)		
Green	Dry	Decayed	Total	Green	Dry	Total
270	38	19	327	1023	394	1417