



# *The State of Forest Report 1991*



Government of India  
Forest Survey of India  
(Ministry of Environment & Forest)  
25, Subhash Road, Dehra Dun







# **THE STATE OF FOREST REPORT 1991**



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1. Classified imagery of Kalagarh Area (UP)  
*Produced in FSI Computer (VAX 11/780)*
2. Unclassified imagery of Kalagarh Area (UP)  
*Produced in FSI Computer (VAX 11/780)*
3. Classified imagery of Dehra Dun Area (UP)  
*Produced in FSI Computer*
4. Classified Map of Dehra Dun Area (UP)  
*Produced by Visual interpretation.*
5. Unclassified imagery of Dehra Dun Area (UP)  
*Produced in FSI Computer.*

**Cover Photo:**

Shola Forest of Tamil Nadu *Courtesy : Amit Asthana*

**Inside Cover Photos**

Forest of Tamil Nadu *Courtesy : Amit Asthana*



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CLASSIFIED SSC

RC046394

PATH-146

ROW-039

QUAD-4

ACQ. DATE-18. 10. 1989

LEGEND

-  WATER-BODIES
-  NON-FOREST
-  SCRUB
-  OPEN FOREST
-  MEDIUM FOREST
-  DENSE FOREST
-  CLOUDS

21. 2. 1992







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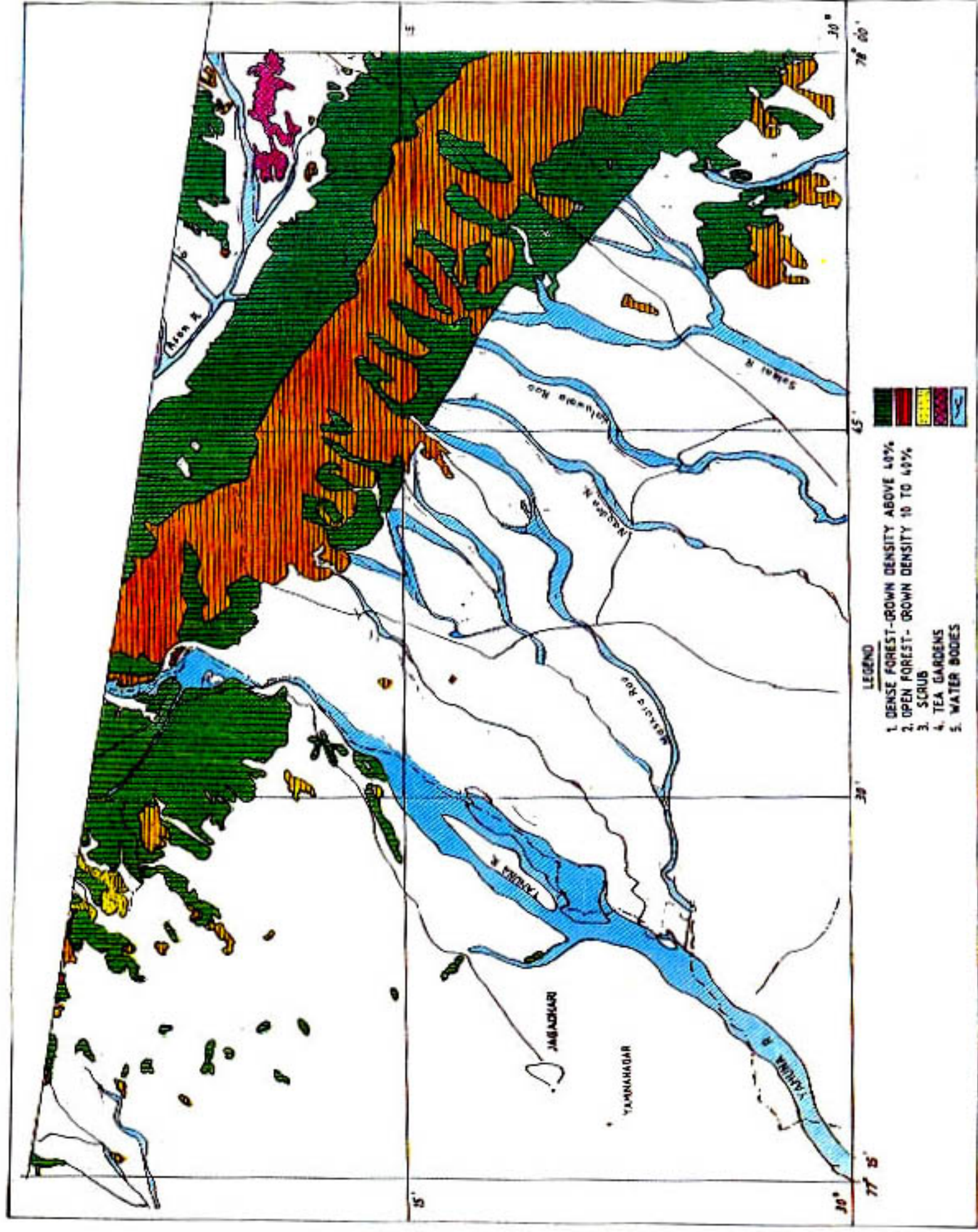


# FOREST SURVEY OF INDIA FOREST COVER MAP

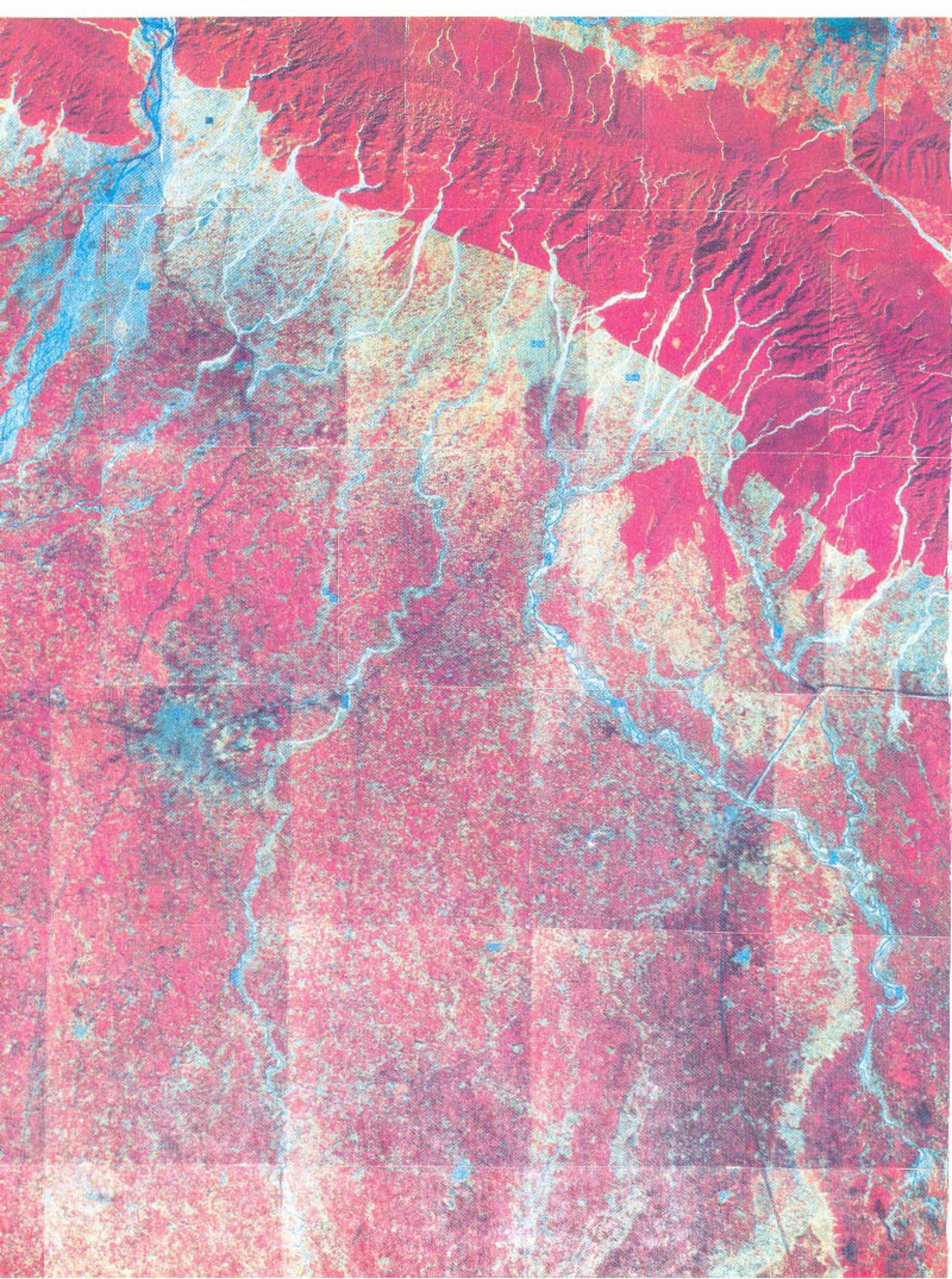
(BASED ON VISUAL INTERPRETATION OF TM SATELLITE IMAGERY)

SCALE - 1 : 250,000

PART SHEET 53 F  
(PART OF U. P. SHIVALIK, HIMACHAL AND HARYANA STATES)









## **STATE OF FOREST REPORT - 1991**

*The State of Forest Report - 1991 is the third assessment of the forest cover of the country based on visual interpretation of Landsat imagery pertaining to the period 1987-89 on a scale of 1:250,000. According to this latest assessment, the forest cover in the country is 6,39,182 sq.kms. (excluding tea gardens) which is 19.44% of the total geographical area of the country.*

*The significant feature of the third assessment has been that the area under tea gardens included in the 2nd assessment is excluded and there has been refinement of the area statement of the States as per the Survey of India's information received in August, 1991. There has been a marginal decline of forest cover in Arunachal Pradesh, Assam, Gujarat, Meghalaya, Nagaland, Orissa, Punjab and Uttar Pradesh totalling 1026 sq.kms. Similarly, there has a marginal increase of forest cover in the forest areas of Karnataka, Meghalaya, Mizoram, Nagaland, Orissa, Punjab and Rajasthan on account of regeneration and conservation measures. As a result, there has been a net increase of 560 sq.kms. in the forest cover of the country.*

*The new feature of this report is the districtwise estimation of forest cover of the country. Out of total available district maps of 413 districts in the country, 105 districts have 33% of their geographical area under forest cover, 52 districts are having forest cover ranging between 19% to 33% while 217 districts are having forest cover between .1% to 19%. 39 districts do not have any discernible forest cover.*

*Ground inventory for North Eastern States and certain parts of Karnataka, Dadra and Nagar Haveli was also done by Forest Survey of India during 1990-91 and detailed reports pertaining to these States are being published separately.*

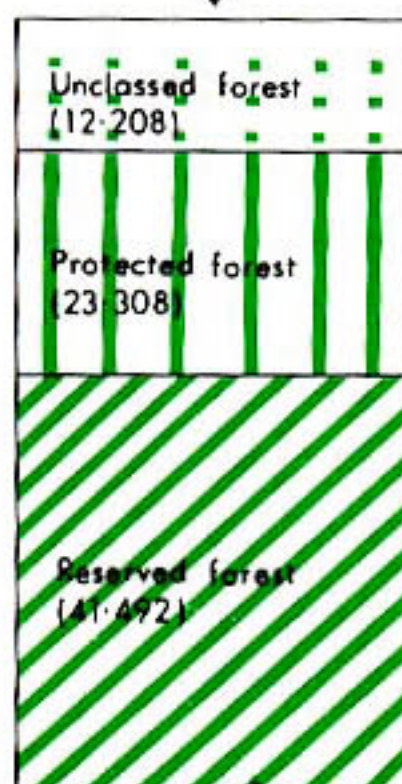
**(Jagir Singh)**  
Director



## STATUS OF FOREST IN INDIA 1991

**RECORDED FOREST**  
(77.008 million ha.)

**ACTUAL FOREST COVER**  
(63.918 million ha.)



(in % age)  
100



Mangrove forest  
0.424

\* Based on the interpretation of the LANDSAT imagery (1987-89)



## CHAPTER-I

### FOREST COVER - COMPARATIVE SITUATION

#### 1. Introduction

1.1 The Forest Survey of India (FSI) initiated reporting of forest cover of the country for the first time in its State of Forest Report (SFR) 1987. The estimate of forest cover was based on the interpretation of MSS (Landsat) imagery pertaining to the year 1981-83. This report was followed by SFR-1989. In case of SFR-1989 the satellite data used was mainly TM which has higher spatial and radiometric resolution than the MSS data used in SFR-1987 and the scale of the map was 1:250,000 instead of 1:1 million.

1.2 FSI is ever active in improving and refining the technology in its successive assessments. More intensive ground checking of the interpreted data is being done in the areas where the change of forest cover is observed. In the 3rd assessment introduction of refined mapping techniques like:

- (1) Better satellite products,
- (2) Intensive ground truthing were adopted.

1.3 The comparison of assessments of forest cover in the 1st and the 2nd cycle indicated an annual loss of forest cover to the tune of 47,500 ha. whereas in case of 3rd cycle, there is an annual increase in the forest cover of the country to the tune of 28,000 ha.

1.4 The forest cover reported in this Chapter is based on interpretation of false colour composite of TM scenes.

#### 2. 1991 Assessment of Forest Cover

2.1 FSI made 3rd assessment of the forest cover of the country by visual interpretation of TM data of Landsat imagery on 1:250,000 scale pertaining to the period 1987-89. The

visual interpretation and field checking was completed in 1990-91. The results of this assessment are summarised as under:

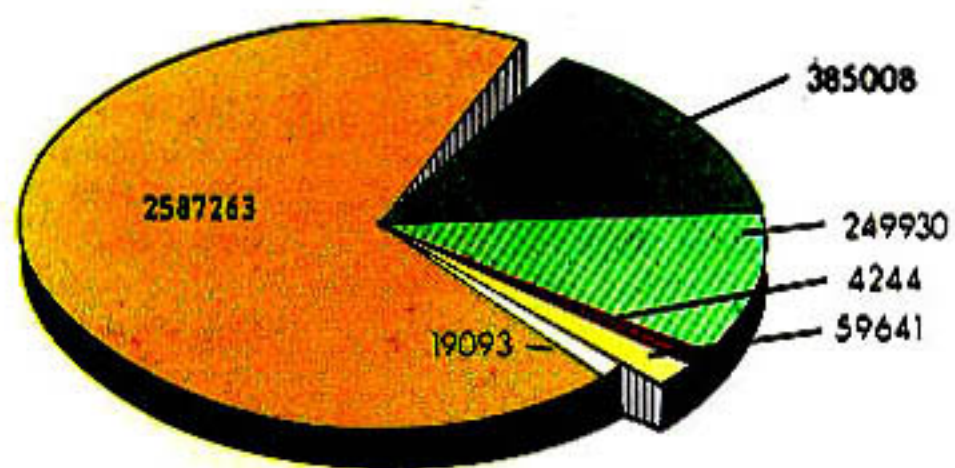
Category	Area in sq.kms.	% of the total Geographical area of the country
<b>A. Forest Cover</b>		
1. Dense forest (Crown density 40% and above)	385008	11.71
2. Open forest (Crown density 10% to less than 40%)	249930	7.60
3. Mangrove forest	4244	0.13
Total:	<u>639182</u>	<u>19.44</u>
B. Scrub area (Tree lands with less than 10% crown density)	59641	1.82
C. Un-interpreted area (Under clouds & shadows)	19093	0.58
D. Non-forest (also includes tea gardens)	2569347	78.16
Grand Total:	3287263	100.00

2.2 The above density classification does not include tea gardens, geographical area corrections and interpretational corrections. Therefore for the purpose of comparison with the 1989 assessment these corrections will



## LAND COVER IN INDIA (1991)

(Area in sq. km.)





have to be applied to the 1991 assessment (for details, see para 3). Consequently the revised situation of the 1991 assessment of the forest cover comes as under:

Category	Area in sq.kms.	% of the total Geographical area of the country
<b>A. Forest Cover</b>		
1. Dense forest (crown density 40% and above)	385610	11.73
2. Open forest (crown density 10% to less than 40%)	250842	7.63
3. Mangrove forest	4242	0.13
<hr/>		
Total	640694	19.49

### 3. Change in Forest Cover

3.1 In order to have identical base for comparison between forest cover assessment 1991 with that of 1989, it is of vital significance that an area of 1704 sq.kms. of tea gardens which was included in 1989 report and interpreted as a part of the forest cover should be added to 1991 assessment for the sake of comparison only.

3.2 The other important development which has been taken into consideration in 1991 report is the latest and final area statement of the country as intimated by Survey of India in August, 1991. According to this information, the total geographical area of the country is 3287263 sq.kms. as against earlier recorded area of 3287797 sq.kms. This has also a bearing on the computation of net forest cover when it is compared with 1989 assessment.

3.3 It is also pointed out that 1991 assessment of forest cover is based on improved satellite products. This has facilitated identification of an area of 218 sq.kms. as non-forest area which was earlier interpreted as forest cover. The above details are given in table 1.1. A perusal of table 1.1 and its comparison with forest cover figures of 1989 assessment (640134 sq.kms.) indicate that there has been an increase of 560 sq.kms. of the forest cover during the last 2 years. The annual increase in forest cover works out to be 28,000 ha. The comparative situation of 1989 and 1991 forest cover assessment is given in the following table.

S. No.	Category	1989 assessment (sq.kms.)	1991 assessment (sq.kms.)	Difference (sq.kms.)
1.	Dense forest (Crown density 40% & over)	378,470	385,610	+ 7140
2.	Open forest (Crown density 10% to less than 40%)	257,409	250,842	- 6567
3.	Mangrove forest	4,255	4,242	- 13
<hr/>				
	Total	640,134	640,694	+ 560

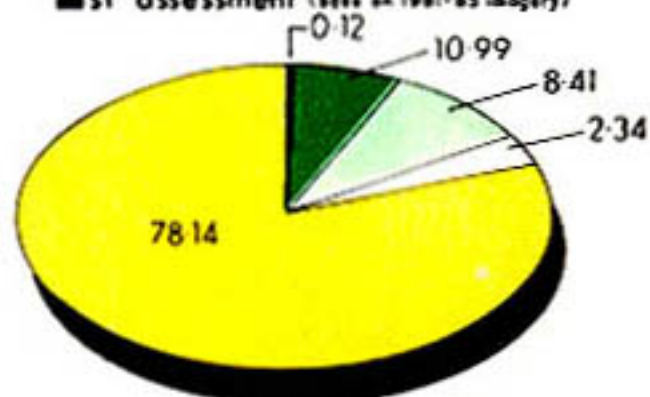
### 4. Limitation of Technology in Assessing Forest Cover

4.1 The 1991 assessment is based on visual interpretation of Landsat imagery of 1:250,000 scale. The minimum size that could be mapped is 2 mm x 2 mm, which corresponds to 25 ha. on ground. As the interpretation is done visually, the cartographic constraints in delineation of forest area are always there, which may cause slight changes in the extent of area under

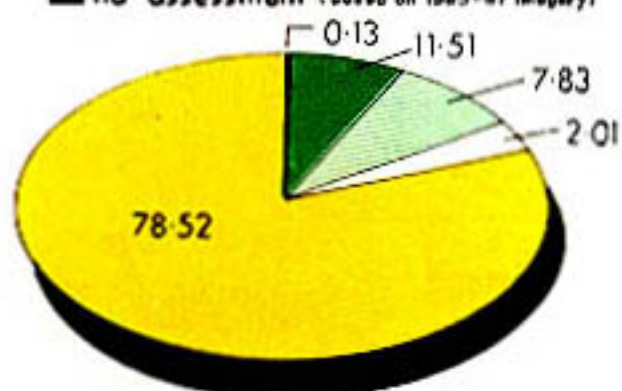


# FOREST COVER SITUATION IN INDIA (in %age)

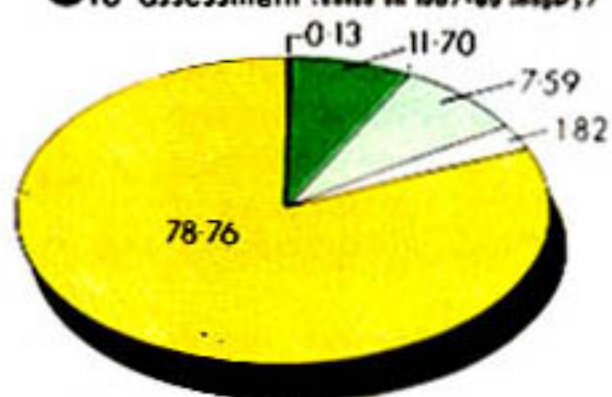
**1st assessment** (based on 1981-83 imagery)



**2nd assessment** (based on 1985-87 imagery)



**3rd assessment** (based on 1987-89 imagery)



## KEY

-  Dense forest  
(Crown density 40% or more)
-  Open forest  
(Crown density less than 40% but more than 10%)
-  Mangrove forest
-  Scrub  
(Tree lands with crown density less than 10%)
-  Other lands



forest cover. As the resolution of TM sensor is 30 m x 30 m, the linear features such as roadside, canal side and railway track side plantations neither could be recorded nor delineated. Similarly young plantations where significant crown development has not yet taken place also could not be recorded. Considerable details on ground are also obscured by clouds and shadows and areas under it are difficult to interpret. As the western aspect of hills is under shadow in the morning when the satellite passes over it, the interpretation of such areas is difficult and help of collateral data is required.

**4.2** Satellite imageries pertaining to the leafless period poses problem for accurate delineation due to variation in spectral reflectance and its recording by sensor. Similarly the processing of satellite data and its generation in the form of paper print also causes tonal variation in hue which corresponds to vegetation. This may result in misinterpretation of some areas.

**4.3** The extensive ground truth verification by Forest Survey of India staff and experience gained so far has resulted in minimising such discrepancies resulting due to technical reasons to a great extent and it can be said that the assessment is much nearer the reality.

## **5. Statewise Changes in 1991 Forest Cover Assessment for Comparison with 1989 Assessment**

In the forest cover assessment of 1991 as given in this report, certain changes in figures were required to be made to make it comparable with the 1989 forest cover assessment. The reasons for changes have already been highlighted in para 3 of this chapter. The changes are mainly due to the correction in the geographical area, exclusion of tea gardens and availability of better satellite products for 1991 assessment. Wherever there is a decrease in the forest cover in 1991 assessment due to any of the above reasons, it has to be added to 1991 assessment and similarly wherever there is any increase in the forest cover due to any above

reasons, it has to be subtracted from the 1991 assessment, in order to make it comparable with 1989 assessment. The Statewise changes made in 1991 assessment are given in table 1.1 and are discussed as under:

### **5.1 Andhra Pradesh**

There has been a decrease of forest cover of 303 sq.kms. due to correction in geographical area and a decrease of 318 sq.kms. due to interpretation of better satellite products in 1991 assessment. The area of 318 sq.kms. which was earlier assessed as forest cover in 1989 assessment was actually a non-forest area on the ground and it was confirmed by intensive ground truthing.

### **5.2 Arunachal Pradesh**

There is an increase of 239 sq.kms. of forest cover due to interpretation from good quality imagery in 1991 assessment. This area was interpreted as non-forest in 1989 assessment.

### **5.3 Assam**

There has been a decrease of 1226 sq.kms. in the forest cover in 1991 assessment due to exclusion of 1199 sq.kms. of tea gardens and 27 sq.kms. due to geographical area reduction.

### **5.4 Bihar**

There has been a total decrease of 266 sq.kms. of forest cover in 1991 assessment. 30 sq.kms. loss is due to geographical area correction and 236 sq.kms. of forest cover due to inclusion of area which was interpreted as forest cover in 1989 assessment.

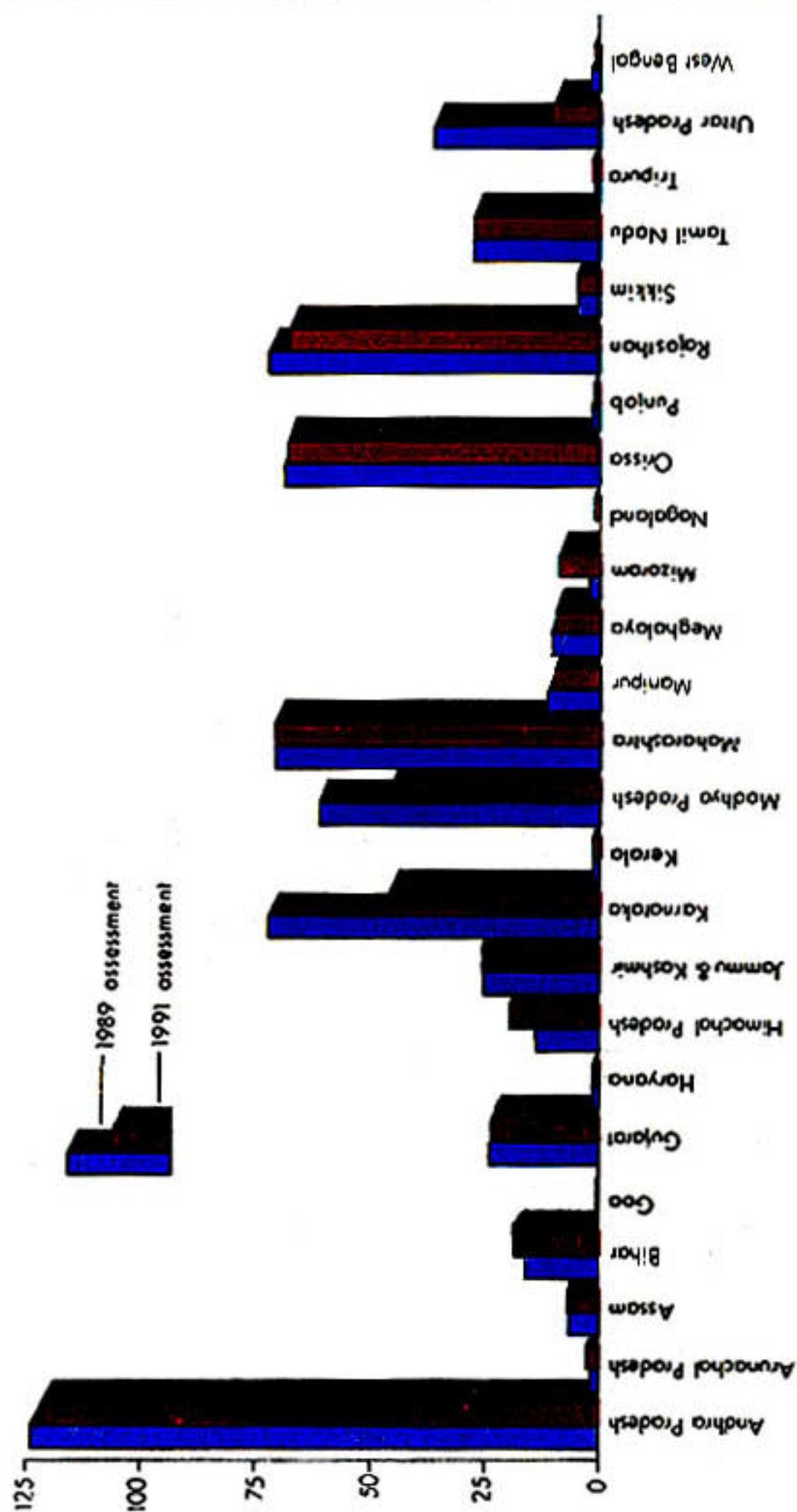
### **5.5 Goa (Including Daman & Diu)**

There is a decrease of 47 sq.kms. of forest cover in 1991 assessment due to interpretation of good quality satellite products as this was assessed as forest cover in 1989 assessment.



# **SCRUB FOREST COVER - COMPARATIVE SITUATION (1989-1991)**

(Area in thousand sq. km.)





## **5.6 Gujarat**

There is an increase of 251 sq.kms. of forest cover due to geographical area correction in 1991 assessment.

## **5.7 Haryana**

There is a decrease of 50 sq.kms. in the forest cover in 1991 assessment due to better satellite products.

## **5.8 Himachal Pradesh**

There is a decrease of 1597 sq.kms. of forest cover in 1991 assessment due to the following reasons:

- (1) 1024 sq.kms. forest cover was reported more in 1989 assessment due to error in computation of forest cover area which has now been corrected.
- (2) 56 sq.kms. decrease is on account of exclusion of tea gardens.
- (3) 517 sq.kms. area of forest cover due to interpretational corrections i.e. the area was actually non-forest but was included as forest cover in 1989 assessment.

## **5.9 Jammu & Kashmir**

360 sq.kms. of the forest cover decreased in 1991 assessment due to interpretation from better satellite products. This area was earlier included as forest cover in 1989 assessment.

## **5.10 Karnataka**

There is an increase of 4 sq.kms. of forest cover in 1991 assessment due to correction in geographical area of the State.

## **5.11 Kerala**

There is a total increase of 143 sq.kms.

in 1991 assessment due to interpretational corrections. 143 sq.kms. of forest cover was earlier interpreted as non-forest cover during 1989 assessment.

## **5.12 Madhya Pradesh**

There is a total increase of 2594 sq. kms. in 1991 assessment out of which 594 sq. kms. increase is due to change in geographical area and the remaining 2,000 sq.kms. increase is on account of interpretational corrections as under:

- (1) 609 sq.kms. un-interpreted area due to cloud cover in 1989 assessment has now been interpreted as forest cover.
- (2) 1391 sq.kms. increase is due to delineation of small patches of forest cover particularly of Teak, Salai, Khair, Bamboo, Eucalyptus, Sal regeneration and Teak area which did not give any tonal signature in the products used in the 1989 assessment.

## **5.13 Maharashtra**

There is a total decrease of 14 sq.kms. in 1991 assessment out of which 10 sq.kms. is due to change in geographical area and 4 sq.kms. due to interpretational corrections.

## **5.14 Manipur**

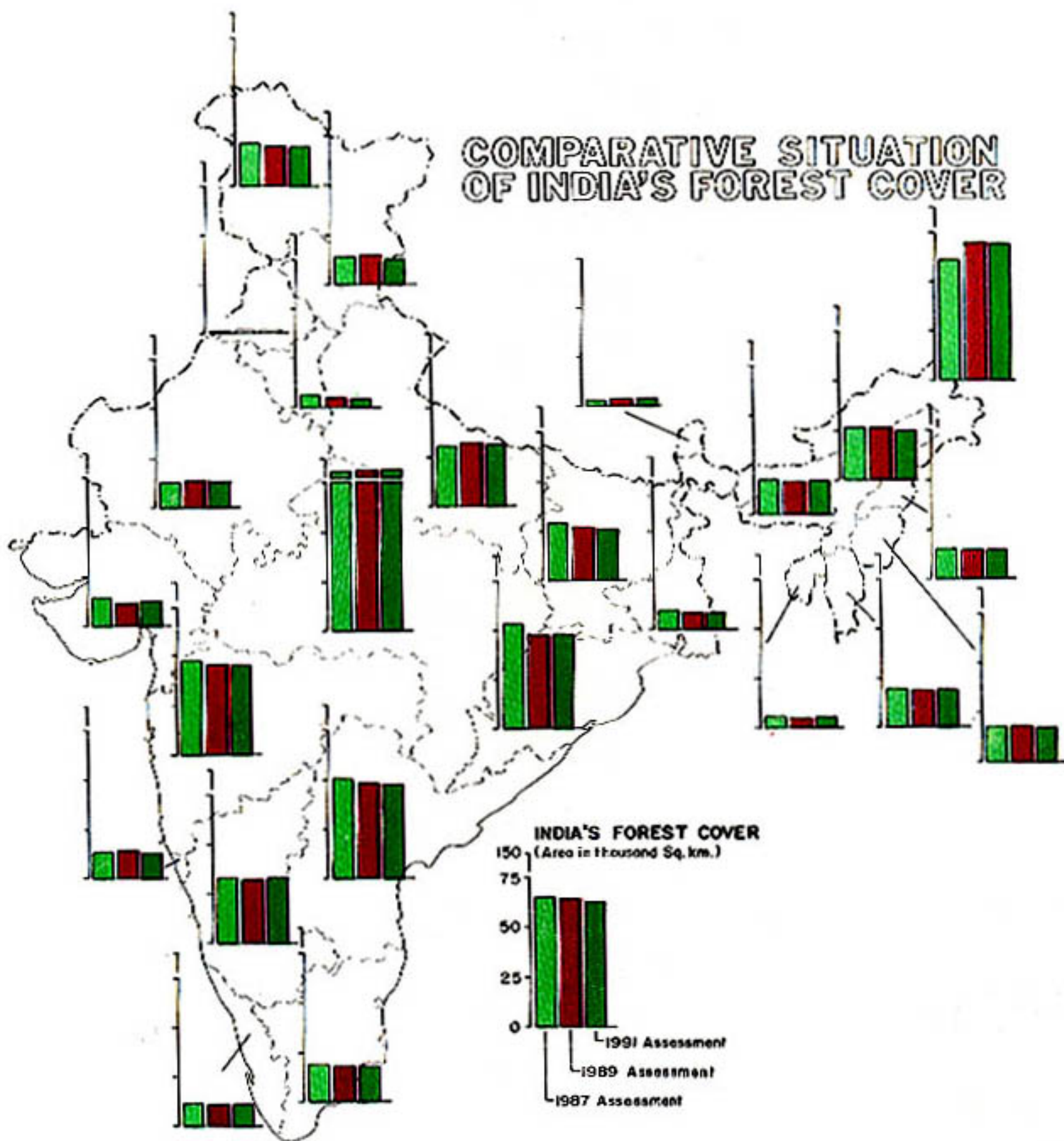
There is total decrease of 200 sq.kms. in 1991 assessment due to interpretational corrections. 200 sq.kms. was earlier interpreted as forest cover during 1989 assessment and because of better satellite products it was found to be a non-forest area after extensive ground truthing.

## **5.15 Meghalaya**

There is a total decrease of 45 sq.kms. in 1991 assessment which is due to the correction in the geographical area.



# COMPARATIVE SITUATION OF INDIA'S FOREST COVER





#### **5.16 Mizoram**

There is a total decrease of 8 sq.kms. in 1991 assessment which is due to the correction in the geographical area.

#### **5.17 Nagaland**

The total increase of 43 sq.kms. of forest cover in 1991 assessment is due to correction in the geographical area.

#### **5.18 Orissa**

The net increase is of 90 sq.kms. in 1991 assessment, out of which 22 sq.kms. area of forest cover has decreased due to correction in geographical area and 112 sq.kms. of forest cover has increased due to interpretational changes after using better satellite products.

#### **5.19 Punjab**

There is a total increase of 177 sq.kms. in forest cover in 1991 assessment due to interpretation of improved satellite products. 177 sq.kms. was shown as non-forest in 1989 assessment.

#### **5.20 Rajasthan**

There is a net decrease of 136 sq.kms. forest cover in 1991 assessment of which 137 sq.kms. decrease is due to interpretational corrections and 1 sq.km. increase in forest cover is due to correction in geographical area.

#### **5.21 Sikkim**

There is a total decrease of 91 sq.kms. of forest cover in 1991 assessment out of which 87 sq.kms. is due to correction in geographical area and 4 sq.kms. of forest cover is due to interpretational corrections.

#### **5.22 Tamil Nadu**

There is a total decrease of 2 sq.kms. in 1991 assessment due to correction in geographical area.

#### **5.23 Tripura**

The total increase in forest cover is 210 sq.kms. in 1991 assessment out of which 3 sq.kms. is due to correction in geographical area and 207 sq.kms. increase is due to interpretational corrections.

#### **5.24 Uttar Pradesh**

There is a decrease of forest cover of 217 sq.kms. in 1991 assessment which is due to interpretational corrections.

#### **5.25 West Bengal**

There is a net decrease of forest cover of 379 sq.kms. in 1991 assessment. There is an increase of 86 sq.kms. due to correction in geographical area and a decrease of 465 sq.kms. the decrease of 449 sq.kms. is due to inclusion of tea gardens and 16 sq.kms. due to interpretational corrections.

#### **5.26 Andaman & Nicobar Islands**

There is a net decrease of forest cover to the tune of 2 sq.kms. in 1991 assessment. 38 sq.kms. of forest cover have decreased due to correction in geographical area and an increase of 36 sq.kms. is due to interpretational corrections.

#### **5.27 Chandigarh**

A total decrease of 3 sq.kms. in 1991 assessment is due to interpretational corrections.

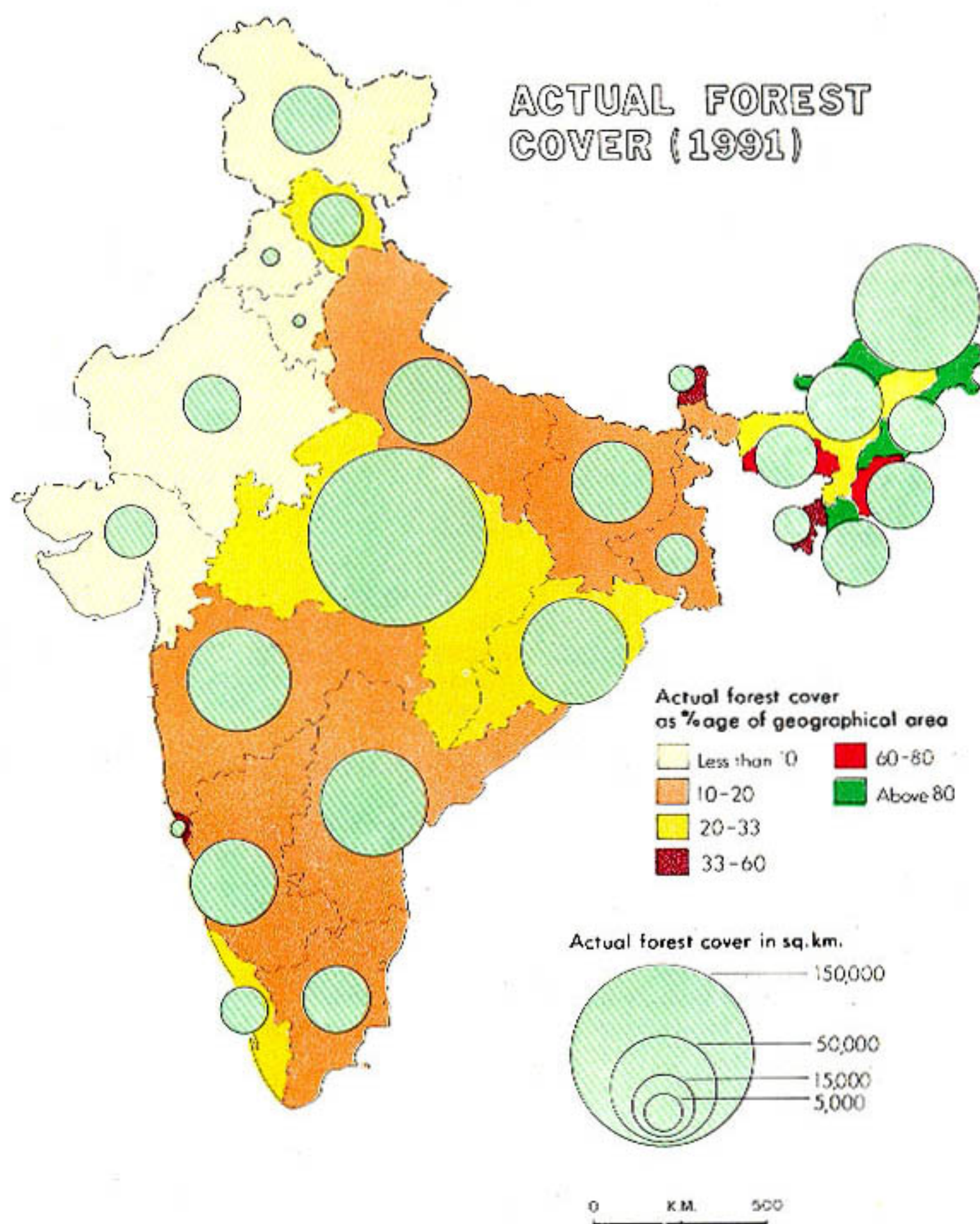
#### **5.28 Dadra & Nagar Haveli**

1 sq.km. of forest cover has increased in 1991 assessment due to interpretational corrections.

5.29 There is no change in Delhi, Lakshadweep and Pondicherry.



# ACTUAL FOREST COVER (1991)





## 6. Loss/Gain in Forest Cover

Comparision of 1989 forest cover assessment with 1991 forest cover assessment shows a net increase of 560 sq.kms. on the ground in the 3rd cycle. Statewise figures of increase or decrease have been given in table 1.2. The reasons for this increase or decrease in the forest cover is explained as under:

### 6.1 Arunachal Pradesh

245 sq.kms. of open forest has changed into non-forest category in the 3rd cycle due to shifting cultivation. Such areas are scattered throughout the State. Some of such areas are around - Bomdila, Kharsa, Devmali and Itanagar.

### 6.2 Assam

81 sq.kms. of dense forest has changed into non-forest category in the 3rd cycle because of severe degradation of dense forest area in Brahmaputa Valley.

### 6.3 Gujarat

14 sq.kms. of mangrove forest has changed into non-forest category in the 3rd cycle. Such areas are around Rann of Kutch and Jam Nagar district (coastal region).

### 6.4 Karnataka

The real increase in forest cover is to the extent of 95 sq.kms. due to Eucalyptus plantations which had not given any tonal signature in the earlier imagery and have now been included in open forest cover category.

### 6.5 Meghalaya

There has been an overall increase of 230 sq.kms. in the actual forest cover in the 3rd cycle. On one hand there is a decrease to the extent of 467 sq.kms. of forest cover due to clearance for shifting cultivation and this area is spread throughout the State in small scattered patches, some such areas are around Western Khasi hills, whereas 697 sq.kms. of non-forest

has come under open forest due to regeneration in abandoned shifting cultivation area in Garo hills. Thus there is a net increase of 230 sq. kms. of forest cover.

### 6.6 Mizoram

There is an increase in forest cover in the 3rd cycle to the extent of 683 sq.kms. This is due to regeneration that has come up in the abandoned shifting cultivation areas. These are scattered throughout the State.

### 6.7 Nagaland

There has been a net decrease of 78 sq.kms. in the forest cover in the 3rd cycle due to shifting cultivation. These areas are scattered throughout the State as shown under:

#### *Non Forest to Forest*

58 sq.kms. area of abandoned shifting cultivation have come under open forest category during 1987-88. These areas are located in map sheet No. 83/J, 83/G, 83/K and 83/N. They are:

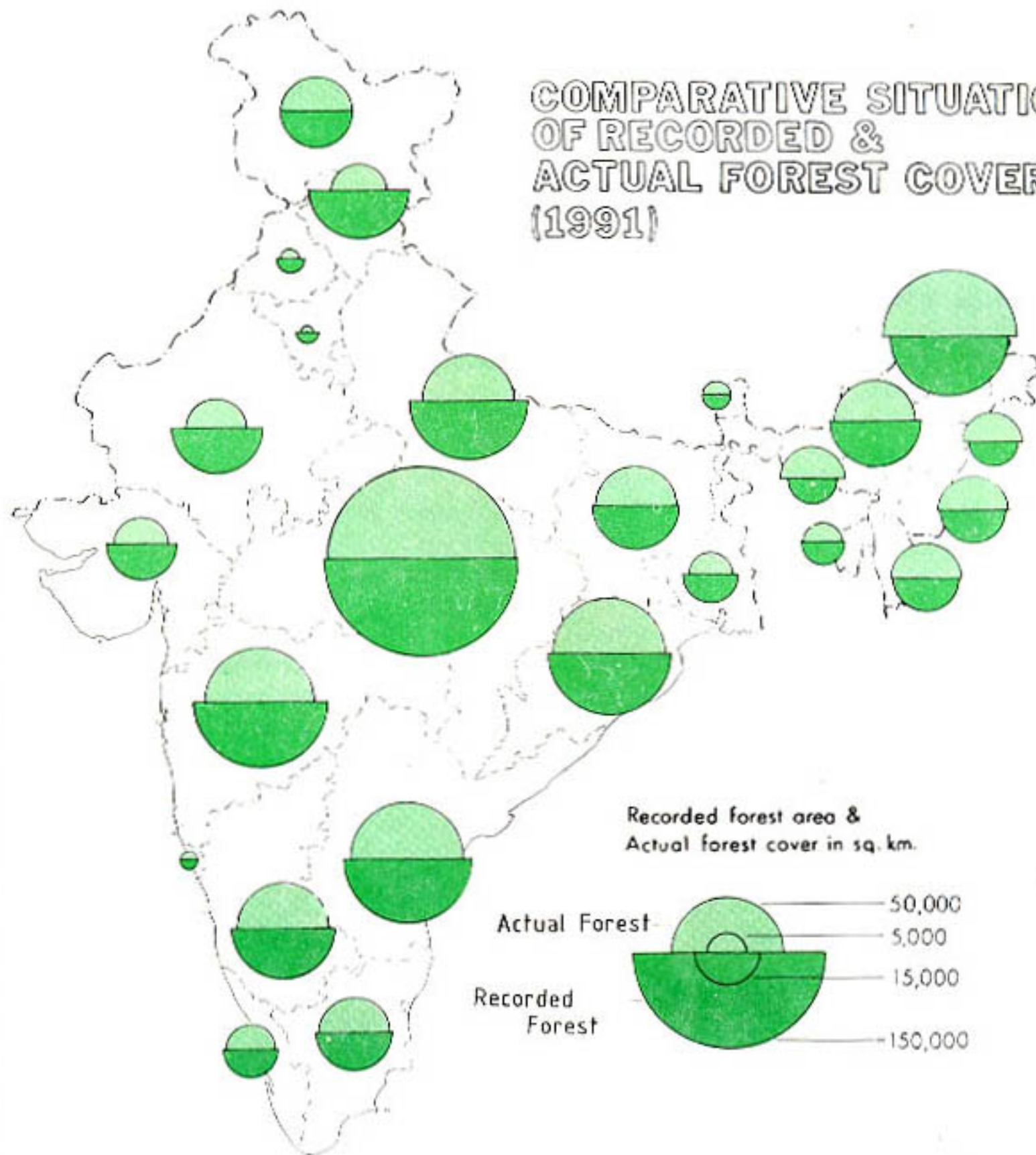
- 83/J - Tuensang
  - Shamatore (Distt. Tuensang)
  - Asangma (Distt. Mokokchug)
- 83/G - Tesen Bambo (Kohima Distt.)
  - Tening --do--
- 83/K - North of Loluri (Distt. Phek)
  - Salumi (Distt. Tuensang)
  - Kiphire --do--
  - Kizare (Distt. Phek)
  - Phugwimi --do--
- 83/N - Longpho (Distt. Mon)
  - Chakchua --do--
  - Mokok --do--
  - Pesao (Distt. Tuensang)

#### *Forest to Non-Forest*

136 sq.kms. of open forest has changed into non-forest category in the 3rd cycle due to



# COMPARATIVE SITUATION OF RECORDED & ACTUAL FOREST COVER (1991)





clearance for shifting cultivation. This area is spread throughout the State in small scattered patches. Some of such areas are in map sheet No. 83/J, 83/G and 83/K. These are:

- 83/J - Mokokchung
  - Tuensang
  - Champang (Distt. Mon)
  - Tuli
  - Wokha
  - Zunheboto
- 83/G - Rangapahara (Distt. Kohima)
  - Tening (Distt. Kohima)
  - Near Pulami --do--
- 83/K - Saptika (Distt. Zunheboto)

## 6.8 Orissa

There has been net decrease of 22 sq. kms. in forest cover in the 3rd cycle. 63 sq. kms. of forest cover has gone from forest to non-forest. 41 sq.kms. has come under forest cover from non-forest category. The examples are as under:

### *Forest to Non-Forest*

A total of 63 sq.kms. of forest cover has changed into non-forest category in the 3rd cycle on account of the following reasons:

- (a) 25 sq.kms. dense forest loss due to Rangoli Dam in Sambhalpur district.
- (b) 13 sq.kms. open forest loss due to high biotic pressure around Keonjhar district.
- (c) 25 sq.kms. dense forest cover loss due to construction of dam in Koraput district.

### *Non-Forest to Forest*

A total of 41 sq.kms. has come under forest cover due to following reasons:

- (a) 10 sq.kms scrub area in Keonjhar has come under open forest category.

(b) 30 sq.kms. scrub area has come under open forest category in district Koraput.

(c) 1 sq.km. mangrove forest has increased near Bamkholi-Chandban.

## 6.9 Punjab

There has been a net increase of 5 sq. kms. in forest cover in the 3rd cycle. 2 sq.kms. of open forest has gone into non-forest category near Ferozpur while 7 sq.kms. scrub area has come under dense forest NE of Nawan-Shahar.

## 6.10 Rajasthan

5 sq.kms. of non-forest area has come under open forest in 3rd cycle around Dungarpur, Chittor Garh and Udaipur.

## 6.11 Uttar Pradesh

A total of 18 sq.kms of open forest has changed into non-forest category in 3rd cycle in areas around Haldwani in Nainital district.

# 7. Improvement in Interpretation

The visual interpretation techniques based on interpretation of 'false colour composites' of satellite data, basically suffer from subjectivity in interpretation, error due to shadow and effect mixing up of non-forest vegetation with forest vegetation. Forest Survey of India has operationalised methodology to overcome these problems by introducing digital image processing. As a result the Lantana thickets and sugercane fields have been successfully separated from forest vegetation. Under visual interpretation technique, Forest Survey of India is able to carry out density classification of crown cover under two classes only i.e. 0.1 to 0.4 and 0.4 and over. With the introduction of digital image processing it will be possible to slice the density class 0.4 and over into two classes, namely 0.4 to 0.7 and 0.7 and over. The density slicing too will be more accurate. This technology will make the future mapping of forest vegetation more accurate.



# STATE-WISE DISTRIBUTION OF ACTUAL FOREST COVER & POPULATION

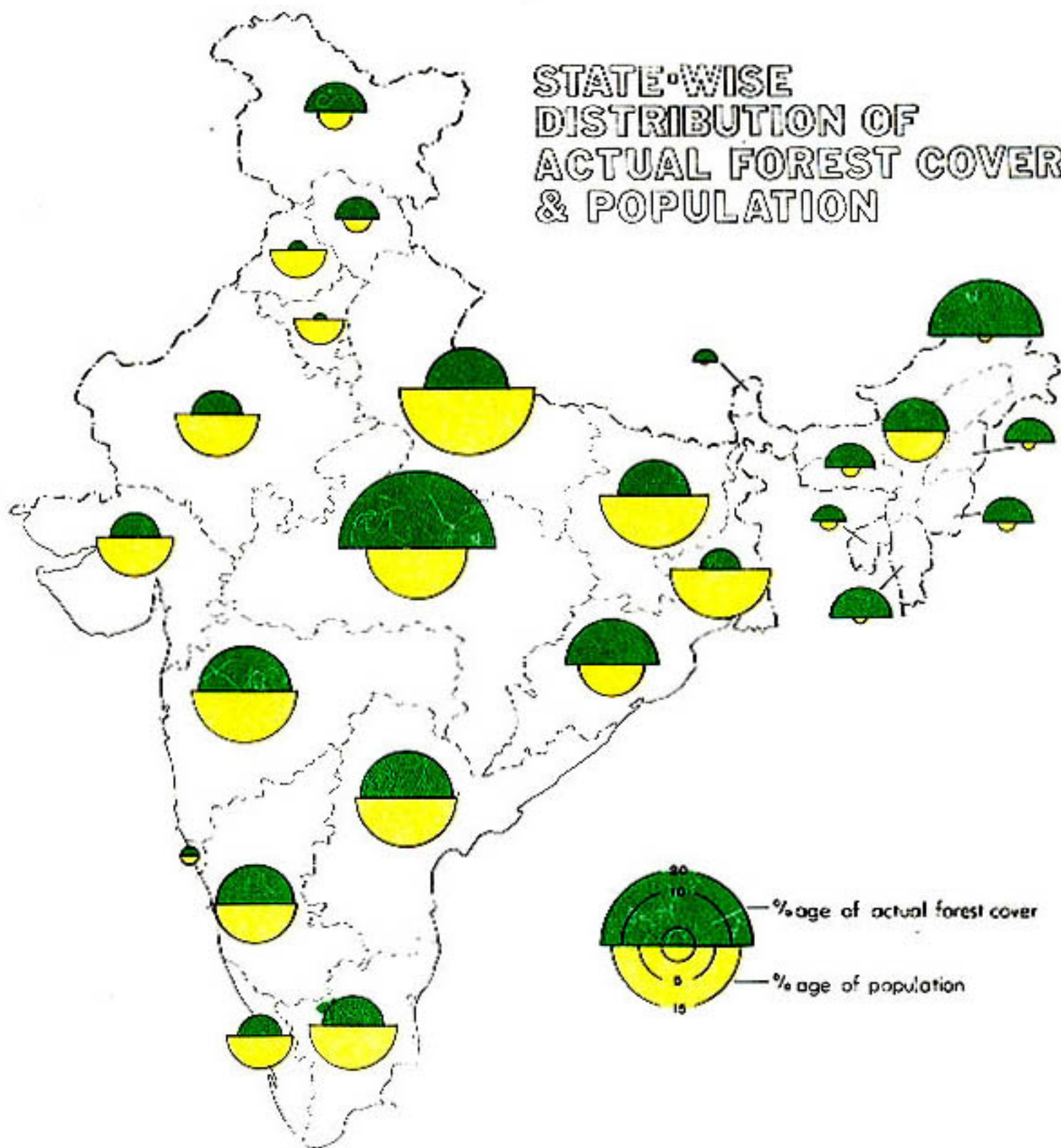




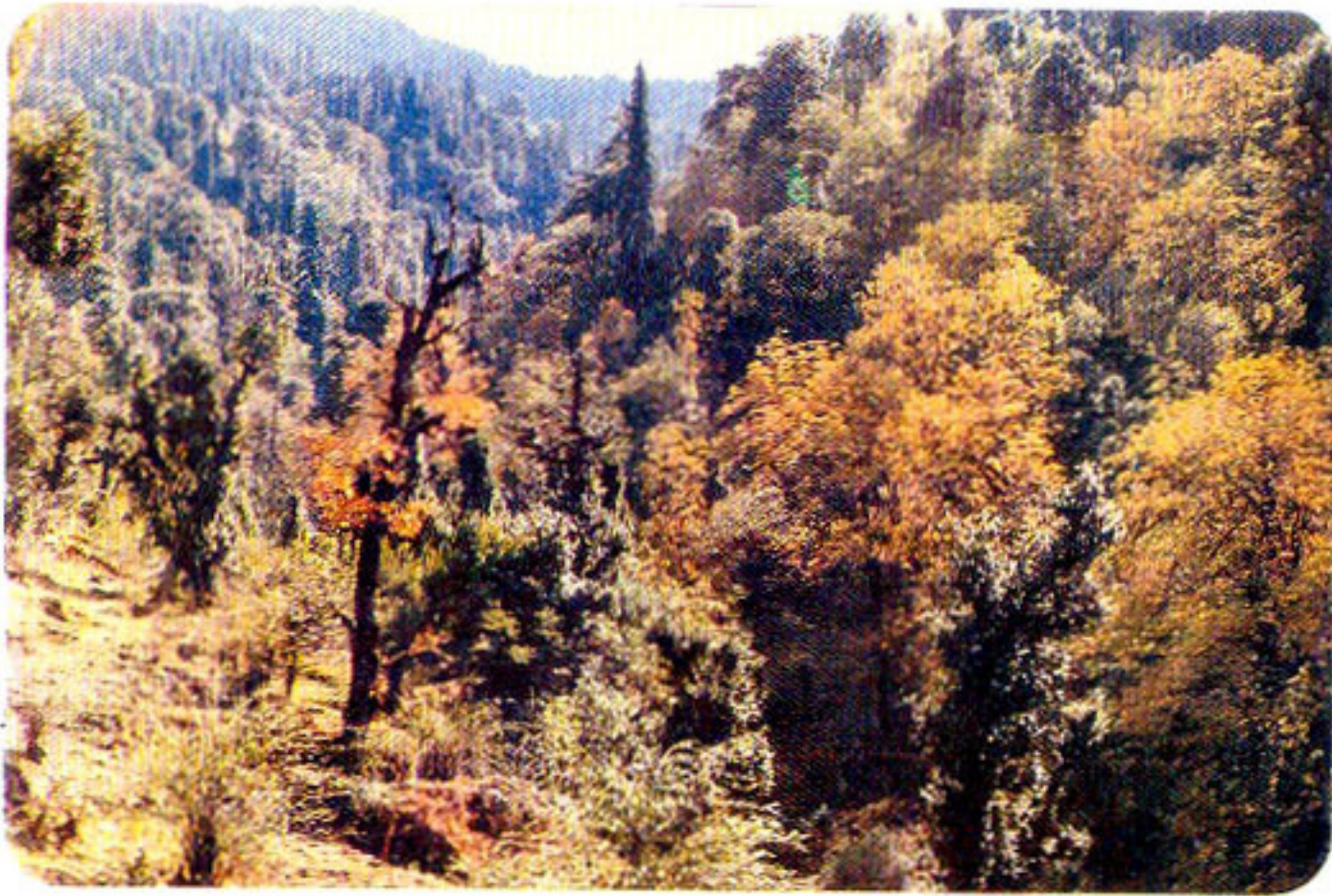
Table 1.1

**REVISION OF 1991 ASSESSMENT FIGURES FOR COMPARISON  
WITH 1989 FOREST COVER ASSESSMENT (based on common parameters)**

(Figures in sq.kms.)

S.No.	State/UTs	1991 Assess- ment	Changes in forest cover on account of				Net figure for comparison
			Geographi- cal area correction	Interpreta- tional correction	Area of tea gardens	Net correction	
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	47,290	+ 303	+ 318	-	+ 621	47,911
2.	Arunachal Pradesh	68,757	-	- 239	-	- 239	68,518
3.	Assam	24,751	+ 27	-	+ 1199	+ 1226	25,977
4.	Bihar	26,668	+ 30	+ 236	-	+ 266	26,934
5.	Goa (Including Daman & Diu)	1,255	-	+ 47	-	+ 47	1,302
6.	Gujarat	11,907	- 251	-	-	- 251	11,656
7.	Haryana	513	-	+ 50	-	+ 50	563
8.	Himachal Pradesh	11,780	-	+ 56	+ 56	+ 1597	13,377
9.	Jammu & Kashmir	20,064	-	+ 360	-	+ 360	20,424
10.	Karnataka	32,199	- 4	-	-	- 4	32,195
11.	Kerala	10,292	-	- 143	-	- 143	10,149
12.	Madhya Pradesh	135,785	- 594	- 2000	-	- 2594	133,191
13.	Maharashtra	44,044	+ 10	+ 4	-	+ 14	44,058
14.	Manipur	17,685	-	+ 200	-	+ 200	17,885
15.	Meghalaya	15,875	+ 45	-	-	+ 45	15,920
16.	Mizoram	18,853	+ 8	-	-	+ 8	18,861
17.	Nagaland	14,321	- 43	-	-	- 43	14,278
18.	Orissa	47,205	+ 22	- 112	-	- 90	47,115
19.	Punjab	1,343	-	- 177	-	- 177	1,166
20.	Rajasthan	12,835	- 1	+ 137	-	+ 136	12,971
21.	Sikkim	3,033	+ 87	+ 4	-	+ 91	3,124
22.	Tamilnadu	17,713	+ 2	-	-	+ 2	17,715
23.	Tripura	5,535	- 3	- 207	-	- 210	5,325
24.	Uttar Pradesh	33,609	-	+ 217	-	+ 217	33,826
25.	West Bengal	8,015	- 86	+ 16	+ 449	+ 379	8,394
26.	Andaman and Nicobar Islands	7,622	+ 38	- 36	-	+ 2	7,624
27.	Chandigarh	5	-	+ 3	-	+ 3	8
28.	Dadra & Nagar Haveli	206	-	- 1	-	- 1	205
29.	Delhi	22	-	-	-	-	22
30.	Lakshadweep	-	-	-	-	-	-
31.	Pondicherry	-	-	-	-	-	-
Total		639,182	- 410	+ 218	+ 1704	+ 1512	640,694





Forest of U.P. Hills : Photo by M.M. Harbola



Agro Forest in Tarai U.P. : Photo by M.M. Harbola



**Table 1.2**  
**COMPARATIVE SITUATION OF FOREST COVER - SECOND & THIRD CYCLE**

(Sq.kms.)

S.No.	State/UTs	1989 Assessment	Revised 1991 Assessment	Difference
1	2	3	4	5
1.	Andhra Pradesh	47,911	47,911	-
2.	Arunachal Pradesh	68,763	68,518	- 245
3.	Assam	26,058	25,977	- 81
4.	Bihar	26,934	26,934	-
5.	Goa (Including Daman & Diu)	1,302	1,302	-
6.	Gujarat	11,670	11,656	- 14
7.	Haryana	563	563	-
8.	Himachal Pradesh	13,377	13,377	-
9.	Jammu & Kashmir	20,424	20,424	-
10.	Karnataka	32,100	32,195	+ 95
11.	Kerala	10,149	10,149	-
12.	Madhya Pradesh	133,191	133,191	-
13.	Maharashtra	44,058	44,058	-
14.	Manipur	17,885	17,885	-
15.	Meghalaya	15,690	15,920	+ 230
16.	Mizoram	18,178	18,861	+ 683
17.	Nagaland	14,356	14,278	- 78
18.	Orissa	47,137	47,115	- 22
19.	Punjab	1,161	1,166	+ 5
20.	Rajasthan	12,966	12,971	+ 5
21.	Sikkim	3,124	3,124	-
22.	Tamilnadu	17,715	17,715	-
23.	Tripura	5,325	5,325	-
24.	Uttar Pradesh	33,844	33,826	- 18
25.	West Bengal	8,394	8,394	-
26.	Andaman and Nicobar Islands	7,624	7,624	-
27.	Chandigarh	8	8	-
28.	Dadra & Nagar Haveli	205	205	-
29.	Delhi	22	22	-
30.	Lakshadweep	-	-	-
31.	Pondicherry	-	-	-
Total		640,134	640,694	+ 560



**Table 1.2 (a)**  
**GEOGRAPHICAL AREA CONSIDERED FOR FOREST COVER ASSESSMENT**  
**IN SFR - 1989 AND 1991**

(Sq.kms.)

S.No.	State/UT	Geographical area reported in	
		SFR-1989*	SFR-1991* *
1	2	3	4
1.	Andhra Pradesh	2,76,820	2,75,068
2.	Arunachal Pradesh	83,580	83,743
3.	Assam	78,520	78,438
4.	Bihar	1,73,880	1,73,877
5.	Goa (Including Daman & Diu)	3,810	3,814
6.	Gujarat	1,95,980	1,96,024
7.	Haryana	44,220	44,212
8.	Himachal Pradesh	55,670	55,673
9.	Jammu & Kashmir	2,22,240	2,22,235
10.	Karnataka	1,91,770	19,1791
11.	Kerala	38,870	38,863
12.	Madhya Pradesh	4,42,840	4,43,446
13.	Maharashtra	3,07,760	3,07,690
14.	Manipur	22,360	22,327
15.	Meghalaya	22,490	22,429
16.	Mizoram	21,090	21,081
17.	Nagaland	16,530	16,579
18.	Orissa	1,55,780	1,55,707
19.	Punjab	50,360	50,362
20.	Rajasthan	3,42,210	3,42,239
21.	Sikkim	7,300	7,096
22.	Tamilnadu	1,30,070	1,30,058
23.	Tripura	10,480	10,486
24.	Uttar Pradesh	2,94,411	2,94,411
25.	West Bengal	87,850	88,752
26.	Andaman and Nicobar Island	8,290	8,249
27.	Chandigarh	114	114
28.	Dadra & Nagar Haveli	490	491
29.	Delhi	1,490	1,483
30.	Lakshadweep	30	32
31.	Pondicherry	492	493
Total		32,87,797	32,87,263

Source-India 1985

Supplied by Survey of India in August, 1991



**Table 1.3**  
**ACTUAL FOREST COVER BY DENSITY CLASSES (1991)**

(Area in sq.kms.)

S.No.	State/UTs	Dense Forest (Crown density above 40%)	Open Forest (Crown density 10% to 40%)	Mangrove	Total Forest covered area
1	2	3	4	5	6
1.	Andhra Pradesh	25,017	21,874	399	47,290
2.	Arunachal Pradesh	54,542	14,215	-	68,757
3.	Assam	15,842	8,909	-	24,751
4.	Bihar	13,285	13,383	-	26,668
5.	Goa	996	254	3	1,253
6.	Gujarat	6,224	5,286	397	11,907
7.	Haryana	329	184	-	513
8.	Himachal Pradesh	8,911	2,869	-	11,780
9.	Jammu & Kashmir	10,986	9,078	-	20,064
10.	Karnataka	24,856	7,343	-	32,199
11.	Kerala	8,421	1,871	-	10,292
12.	Madhya Pradesh	95,385	40,400	-	1,35,785
13.	Maharashtra	26,172	17,759	113	44,044
14.	Manipur	5,309	12,376	-	17,685
15.	Meghalaya	3,305	12,570	-	15,875
16.	Mizoram	4,279	14,574	-	18,853
17.	Nagaland	3,531	10,790	-	14,321
18.	Orissa	27,349	19,661	195	47,205
19.	Punjab	481	862	-	1,343
20.	Rajasthan	3,027	9,808	-	12,835
21.	Sikkim	2,403	630	-	3,033
22.	Tamilnadu	9,757	7,909	47	17,713
23.	Tripura	1,825	3,710	-	5,535
24.	Uttar Pradesh	22,649	10,960	-	33,609
25.	West Bengal	3,381	2,515	2,119	8,015
26.	Andaman and Nicobar	6,583	68	971	7,622
27.	Chandigarh	4	1	-	5
28.	Dadra & Nagar Haveli	159	47	-	206
29.	Daman & Diu	-	2	-	2
30.	Delhi	-	22	-	22
31.	Lakshadweep	-	-	-	-
32.	Pondicherry	-	-	-	-
Total		3,85,008	2,49,930	4,244	6,39,182



**Table 1.4**  
**SCRUB, NON FOREST & UNINTERPRETED AREAS IN STATES**

(Sq.kms.)

S.No.	State/UTs	Scrub	Non forest	Uninterpreted
1	2	3	4	5
1.	Andhra Pradesh	12,188	2,15,580	-
2.	Arunachal Pradesh	216	14,770	-
3.	Assam	688	52,999	-
4.	Bihar	1,881	1,45,328	-
5.	Goa (Including Daman & Diu)	16	2543	-
6.	Gujarat	2,327	1,81,790	-
7.	Haryana	123	43,576	-
8.	Himachal Pradesh	1,918	23,008	18,967
9.	Jammu & Kashmir	2,540	1,99,631	-
10.	Karnataka	4,645	1,54,947	-
11.	Kerala	109	2,8462	-
12.	Madhya Pradesh	4,825	3,02,836	-
13.	Marharashtra	7,096	2,56,452	98
14.	Manipur	1,450	3,192	-
15.	Meghalaya	923	5,631	-
16.	Mizoram	866	1,362	-
17.	Nagaland	78	2,180	-
18.	Orissa	6,295	1,02,207	-
19.	Punjab	93	48,926	-
20.	Rajasthan	6,872	3,22,532	-
21.	Sikkim	463	3,600	-
22.	Tamilnadu	2,792	1,09,553	-
23.	Tripura	109	4,842	-
24.	Uttar Pradesh	1,001	2,59,773	28
25.	West Bengal	112	80,625	-
26.	Andaman and Nicobar	4	623	-
27.	Chandigarh	-	109	-
28.	Dadra & Nagar Haveli	11	274	-
29.	Delhi	-	1,461	-
30.	Lakshadweep	-	32	-
31.	Pondicherry	-	493	-
Total		59,641	25,69,347	19,093



**Table 1.5**  
**RECORDED FOREST AREA**

S No.	State/UTs	Geographical area (sq.km.)	Recorded forest area (sq.km.)	% of forest area to geo-graphical area	Population	Per capita forest area in ha.
1	2	3	4	5	6	7
1.	Andhra Pradesh	2,75,068	63,726	23.2	6,63,04,664	0.10
2.	Arunachal Pradesh	83,743	51,540	61.5	8,58,392	6.00
3.	Assam	78,438	30,708	39.1	2,22,94,562	0.14
4.	Bihar	1,73,877	29,226	16.3	8,63,38,853	0.03
5.	Goa (Including Daman & Diu)	3,814	1,256	32.9	12,70,061	0.10
6.	Gujarat	1,96,024	19,388	9.9	4,11,74,060	0.05
7.	Haryana	44,212	1,687	3.9	1,63,17,715	0.51
8.	Himachal Pradesh	55,673	37,591	67.7	5,11,079	0.74
9.	Jammu & Kashmir	2,22,235	20,174	9.1	77,18,700	0.26
10.	Karnataka	1,91,791	38,646	20.2	4,48,17,396	0.09
11.	Kerala	38,863	11,222	28.9	2,90,11,237	0.04
12.	Madhya Pradesh	4,43,446	1,55,414	35.0	6,61,35,862	0.23
13.	Maharashtra	3,07,690	63,861	20.3	7,87,06,719	0.08
14.	Manipur	22,327	15,154	67.9	18,26,714	0.03
15.	Meghalaya	22,429	9,496	42.3	17,60,626	0.54
16.	Mizoram	21,081	15,935	75.6	6,86,217	2.32
17.	Nagaland	16,579	8,625	52.0	12,15,573	0.71
18.	Orissa	1,55,707	59,555	38.2	3,15,12,070	0.19
19.	Punjab	58,362	2,842	5.5	2,01,90,795	0.01
20.	Rajasthan	3,42,239	31,539	9.2	4,39,80,640	0.07
21.	Sikkim	7,096	2,650	37.3	4,03,612	0.66
22.	Tamilnadu	1,30,058	22,599	17.5	5,56,38,318	0.04
23.	Tripura	10,486	6,292	60.0	27,44,827	0.23
24.	Uttar Pradesh	2,94,411	51,502	17.5	13,87,60,417	0.04
25.	West Bengal	88,752	11,379	13.4	6,79,82,732	0.02
26.	Andaman and Nicobar	8,249	7,171	86.9	2,77,989	2.58
27.	Chandigarh	114	31	27.2	6,40,725	0.005
28.	Dadra & Nagar Haveli	491	207	42.2	1,38,542	0.15
29.	Delhi	1,493	42	2.8	93,70,475	-
30.	Lakshadweep	32	-	-	51,681	-
31.	Pondicherry	493	-	-	7,89,416	-
Total		32,87,263	7,70,078	23.4	84,39,30,861	0.09

Note: 1. Geographical area supplied by Survey of India in August 1991.  
2. Recorded forest area pertains to period 1989.



**Table 1.6**  
**ACTUAL VEGETATION COVER 1991 ASSESSMENT**

(Area in sq.kms.)

S.No.	State/UTs	Geographical area	Actual forest cover assessed based on 1987-89 imagery	Actual forest cover as % of geographical area
1	2	3	4	5
1.	Andhra Pradesh	2,75,068	47,290	17.2
2.	Arunachal Pradesh	83,743	68,757	82.1
3.	Assam	78,438	24,751	31.6
4.	Bihar	1,73,877	26,668	15.3
5.	Goa	3,702	1,253	33.8
6.	Gujarat	1,96,024	11,907	6.1
7.	Haryana	44,212	513	1.2
8.	Himachal Pradesh	55,673	11,780	21.2
9.	Jammu & Kashmir	2,22,235	20,064	9.0
10.	Karnataka	1,91,791	32,199	16.8
11.	Kerala	38,863	10,292	26.5
12.	Madhya Pradesh	4,43,446	1,35,785	30.6
13.	Maharashtra	3,07,690	44,044	14.3
14.	Manipur	22,327	17,685	79.2
15.	Meghalaya	22,429	15,875	70.8
16.	Mizoram	21,081	18,853	89.4
17.	Nagaland	16,579	14,321	86.4
18.	Orissa	1,55,707	47,205	30.3
19.	Punjab	50,362	1,343	2.7
20.	Rajasthan	3,42,239	12,835	3.7
21.	Sikkim	7,096	3,033	42.8
22.	Tamilnadu	1,30,058	17,713	13.6
23.	Tripura	10,486	5,535	52.8
24.	Uttar Pradesh	2,94,411	33,609	11.4
25.	West Bengal	88,752	8,015	9.0
26.	Andaman and Nicobar	8,249	7,622	92.4
27.	Chandigarh	114	5	4.4
28.	Dadra & Nagar Haveli	491	206	42.0
29.	Daman & Diu	112	2	1.8
30.	Delhi	1,493	22	1.5
31.	Lakshadweep	32	-	-
32.	Pondicherry	492	-	-
Total		32,87,263	6,39,182	19.44



**Table 1.7**  
**STATEWISE LEGAL CLASSIFICATION STATEWISE FOREST AREA**

(Sq.kms.)

S.No.	State/UTs	Reserved forests	Protected forests	Others	Total
1	2	3	4	5	6
1.	Andhra Pradesh	50,075.29	11,978.76	1,672.35	63,720.40
2.	Arunachal Pradesh	15,321.35	7.79	36,210.86	51,540.00
3.	Assam	17,927.01	-	12,779.76	30,707.57
4.	Bihar	5,051.00	24,168.00	7.00	29,220.00
5.	Goa (Including Daman & Diu)	651.975	-	604.025	1,256.00
6.	Gujarat	13,763.00	1,021.31	4,602.81	19,388.00
7.	Haryana	229.47	1,072.15	385.64	1,687.26
8.	Himachal Pradesh	1,896.00	33,350.00	2,345.00	37,591.00
9.	Jammu & Kashmir	20,173.74	-	-	20,173.74
10.	Karnataka	28,610.53	3,932.17	6,102.86	38,645.56
11.	Kerala	9,152.11	-	2,070.20	11,222.31
12.	Madhya Pradesh	88,976.01	69,102.51	5,335.86	1,55,414.38
13.	Maharashtra	42,722.00	15,351.00	5,780.00	63,861.00
14.	Manipur	1,463.00	4,171.00	9,520.00	15,154.00
15.	Meghalaya	980.63	12.39	8,503.02	9,496.04
16.	Mizoram	7,127.00	3,568.00	5,240.00	15,935.00
17.	Nagaland	8,625.00	-	-	8,625.00
18.	Orissa	26,107.61	33,427.40	20.39	59,555.40
19.	Punjab	43.36	1,092.78	1,706.22	2,842.36
20.	Rajasthan	12,301.74	18,055.26	3,201.68	31,558.68
21.	Sikkim	2,650.00	-	-	2,650.00
22.	Tamilnadu	18,838.00	3,247.00	614.00	22,699.00
23.	Tripura	3,847.09	2,444.58	-	6,191.67
24.	Uttar Pradesh	36,151.55	1,060.45	14,289.53	51,501.53
25.	West Bengal	7,054.00	3,772.00	1,053.00	11,979.00
26.	Andaman and Nicobar	2,929.00	4,242.00	-	7,171.00
27.	Chandigarh	1.94	-	29.10	31.04
28.	Dadra & Nagar Haveli	203.08	4.40	-	207.48
29.	Delhi	42.00	-	-	42.00
30.	Lakshadweep	-	-	-	-
31.	Pondicherry	-	-	-	-
Total		4,14,916.165	2,33,080.950	1,22,081.305	7,70,078.42



**Table 1.8**  
**RECORDED FOREST AREA AND ACTUAL VEGETATION**  
**COVER COMPARATIVE SITUATION**

(Area in sq.kms.)

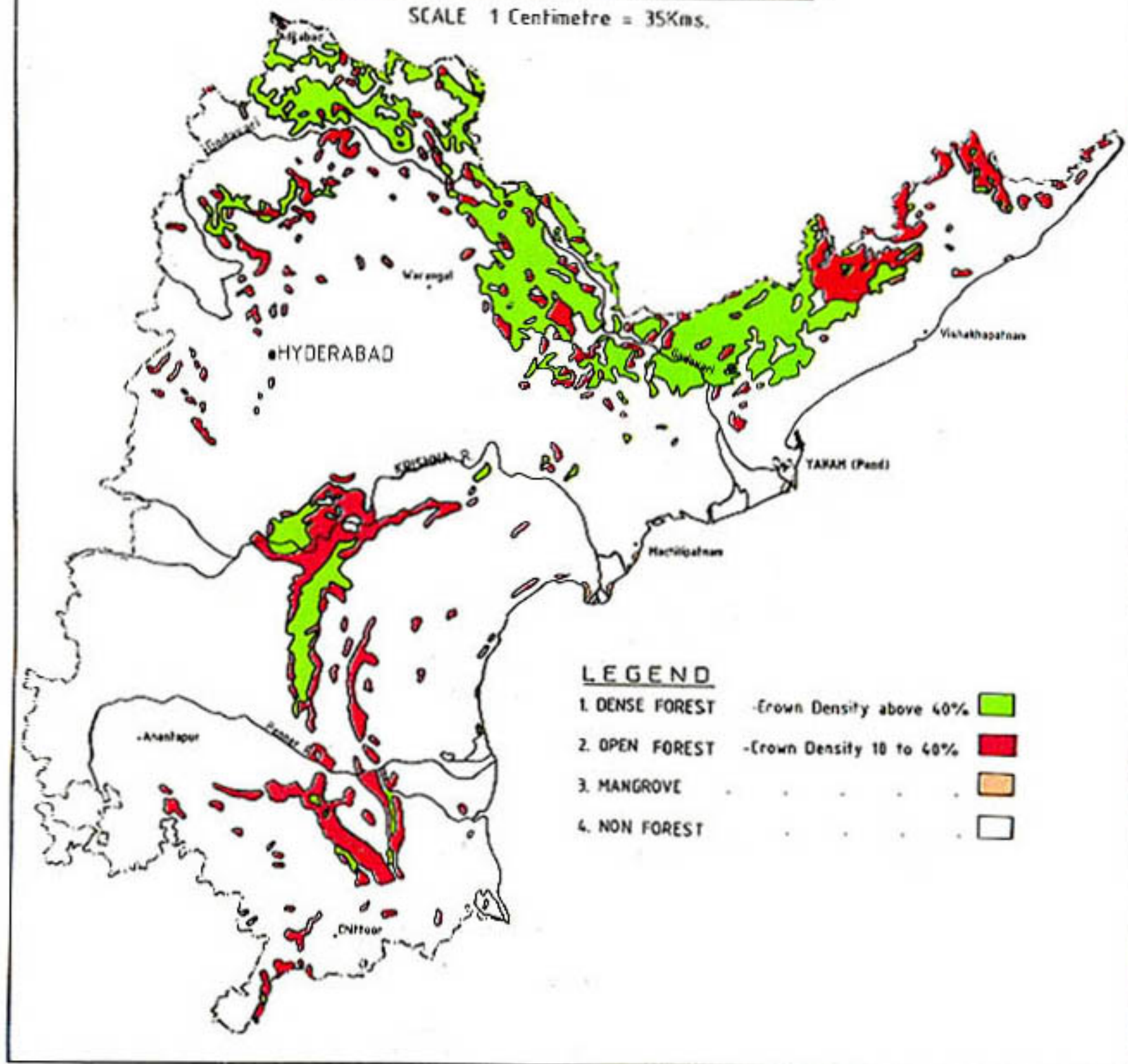
S.No.	State/UTs	Recorded Forest area (sq.kms.)	Actual vegetation cover (sq.kms.) 1991 Assess.	Percentage (4 to 3)
1	2	3	4	5
1.	Andhra Pradesh	63,726	47,290	74.74
2.	Arunachal Pradesh	51,540	68,757	133.41
3.	Assam	30,708	24,751	80.71
4.	Bihar	29,226	26,668	91.35
5.	Goa (Including Daman & Diu)	1,256	1,255	99.76
6.	Gujarat	19,388	11,907	61.40
7.	Haryana	1,687	513	30.41
8.	Himachal Pradesh	37,591	11,780	31.24
9.	Jammu & Kashmir	20,174	20,064	99.45
10.	Karnataka	38,646	32,199	83.31
11.	Kerala	11,222	10,292	90.44
12.	Madhya Pradesh	1,55,414	1,35,785	86.76
13.	Maharashtra	63,861	44,044	88.99
14.	Manipur	15,154	17,685	115.69
15.	Meghalaya	9,496	15,875	167.63
16.	Mizoram	15,935	18,853	118.31
17.	Nagaland	8,625	14,321	165.55
18.	Orissa	59,555	47,205	79.38
19.	Punjab	2,842	1,343	47.26
20.	Rajasthan	31,559	12,835	40.65
21.	Sikkim	2,650	3,033	117.77
22.	Tamilnadu	22,699	17,713	78.04
23.	Tripura	6,292	5,535	87.97
24.	Uttar Pradesh	51,502	33,609	65.26
25.	West Bengal	11,879	8,015	67.60
26.	Andaman and Nicobar	7,171	7,622	106.29
27.	Chandigarh	31	5	16.13
28.	Dadra & Nagar Haveli	207	206	99.52
29.	Delhi	42	22	52.38
30.	Lakshadweep	-	-	-
31.	Pondicherry	-	-	-
Total		7,70,078	6,39,182	82.92



FOREST COVER MAP  
(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

ANDHRA PRADESH & PONDICHERY (Part)

SCALE 1 Centimetre = 35Kms.

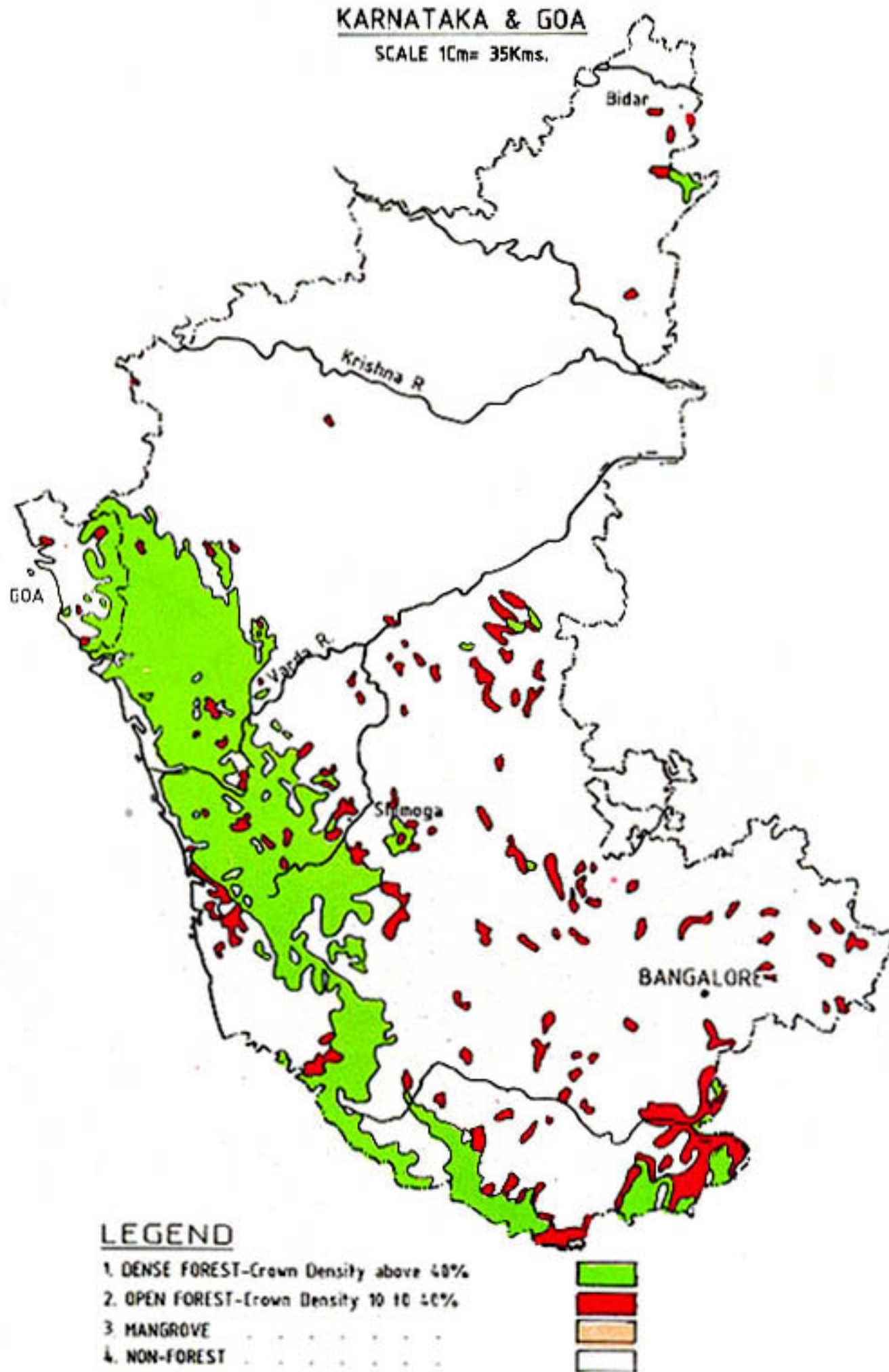




**FOREST COVER MAP**  
(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

**KARNATAKA & GOA**

SCALE 1Cm= 35Kms.



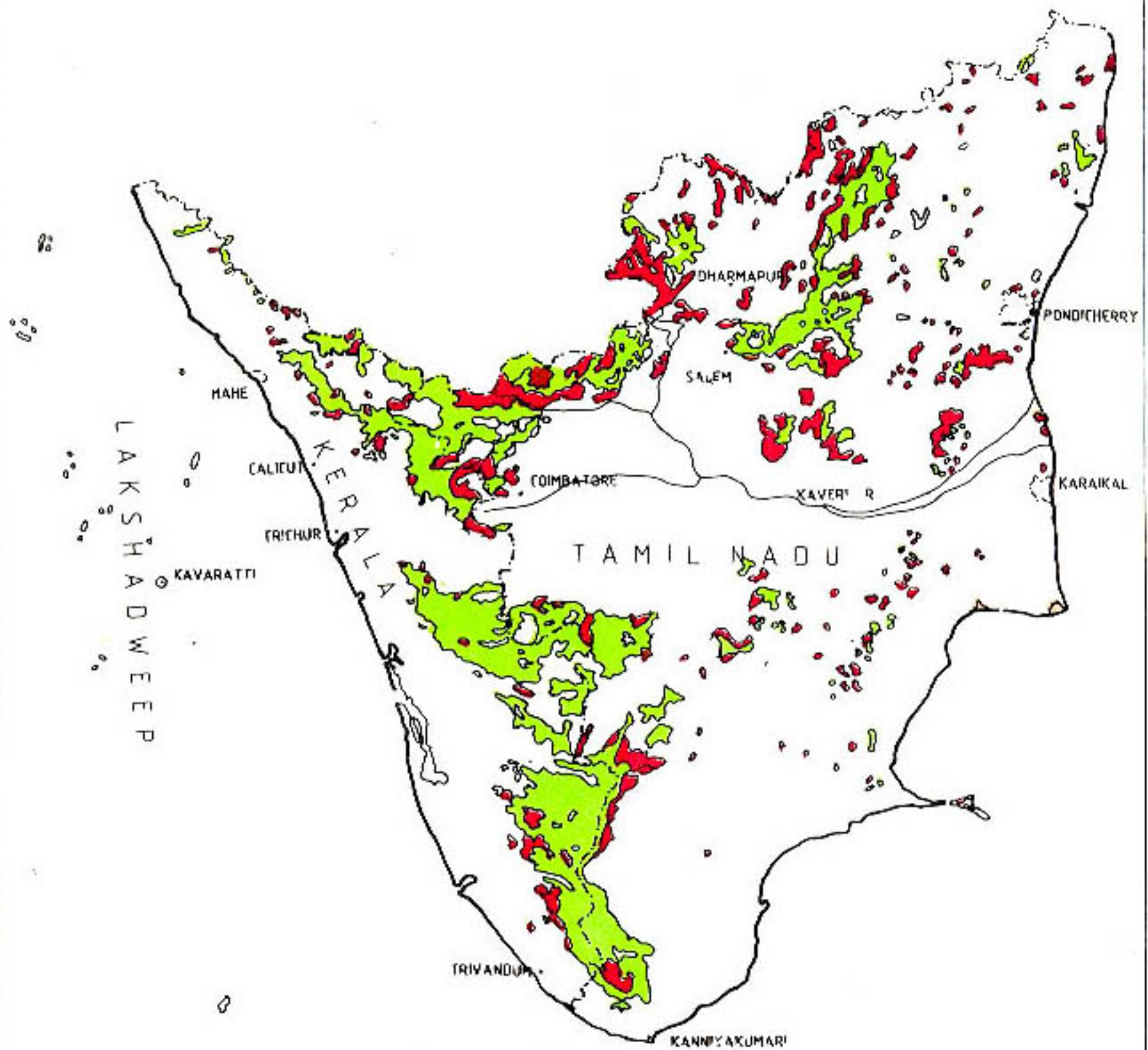


# FOREST COVER MAP

(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

KERALA, TAMIL NADU, LAKSHADWEEP & PONDICHERRY

SCALE - 1 Centimeter = 35 Kms



## LEGEND

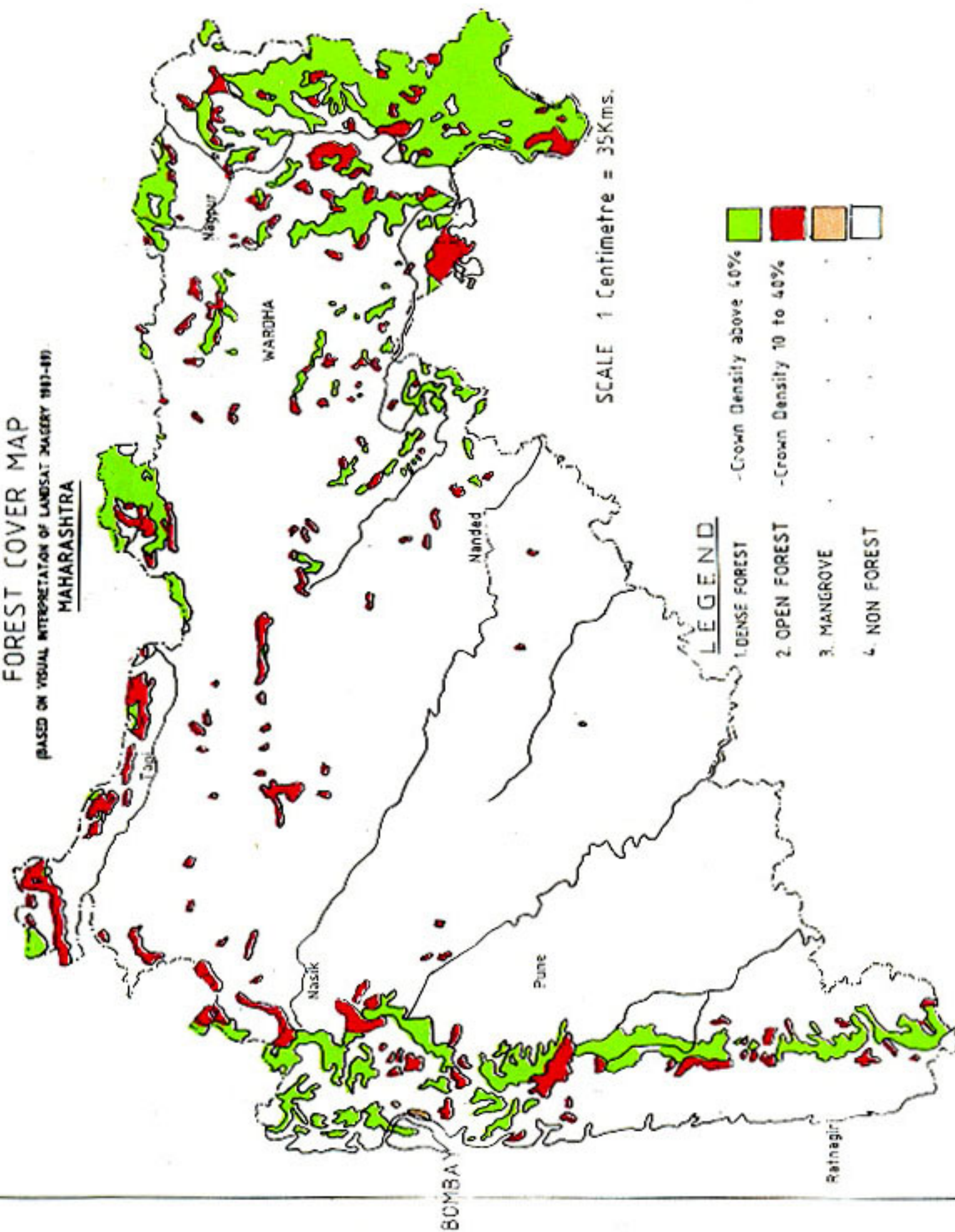
1. DENSE FOREST - Crown Density above 40% ■
2. OPEN FOREST - Crown Density 10 to 40% ■
3. MANGROVE FOREST ■
4. NON FOREST ■



# FOREST COVER MAP

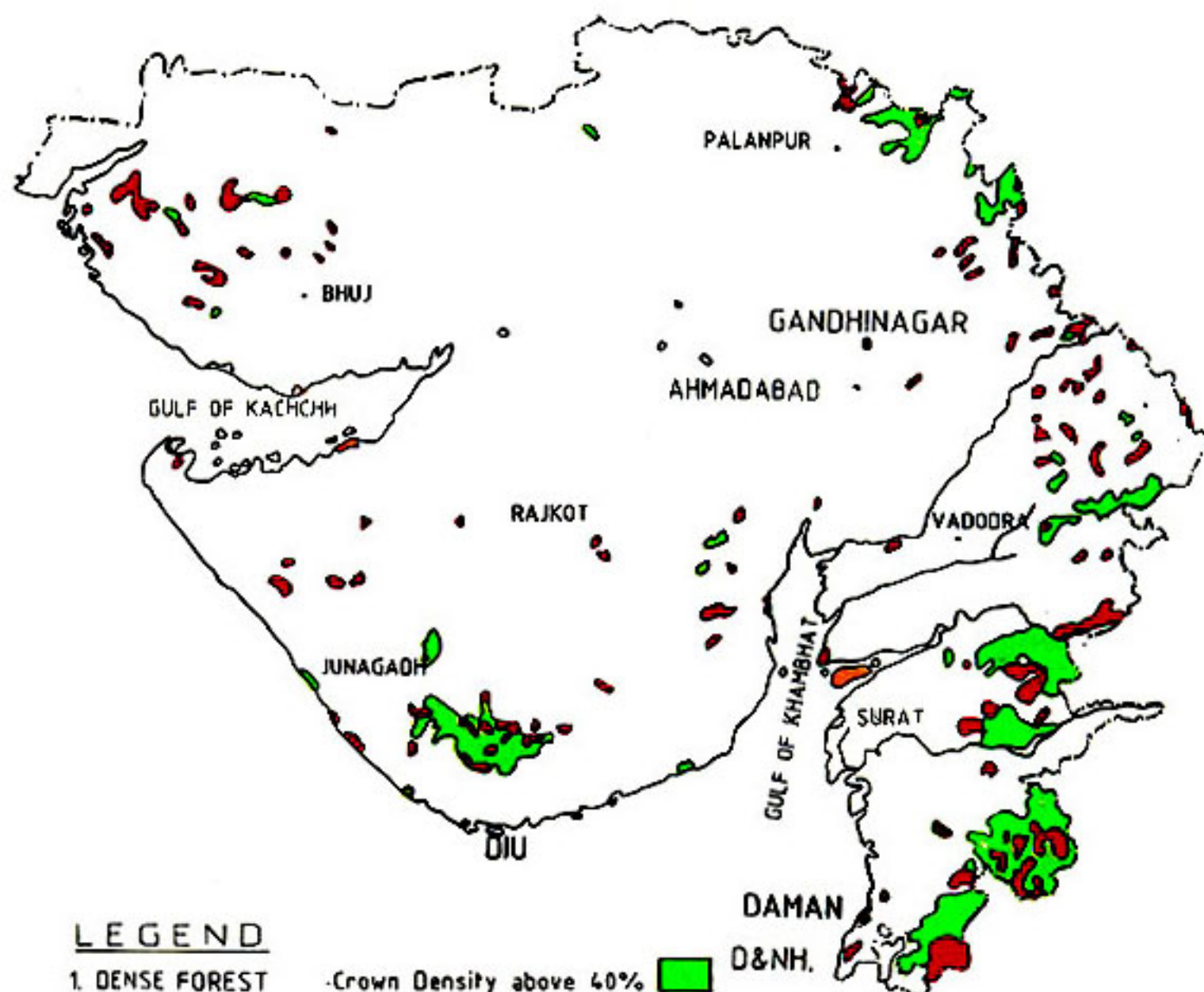
(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1983-85)

MAHARASHTRA





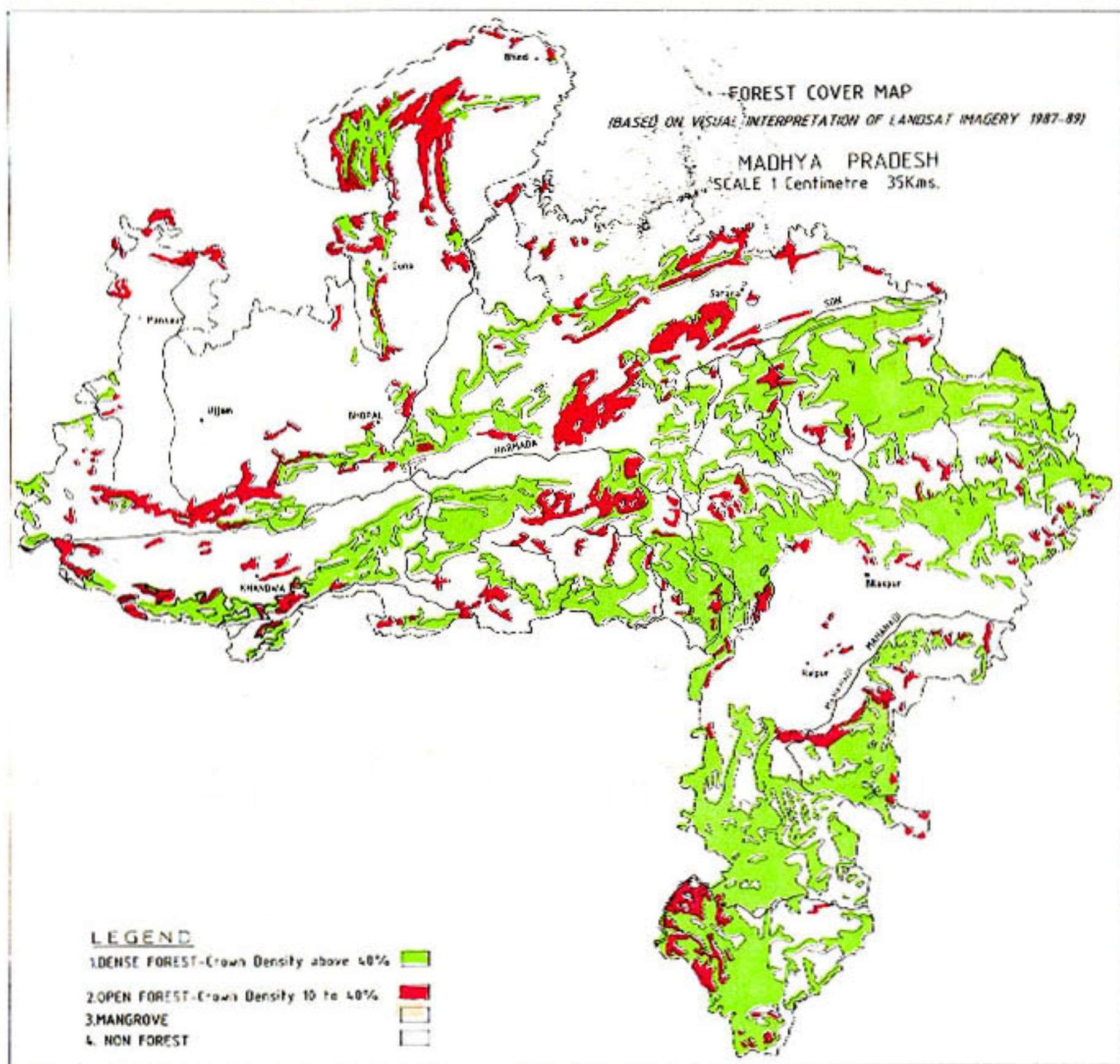
**FOREST COVER MAP**  
*(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)*  
**GUJARAT , DAMAN & DIU AND DADRA & NAGAR HAVELI**  
 SCALE 1 Centimetre = 35Kms.



**LEGEND**

- |                 |                          |  |
|-----------------|--------------------------|--|
| 1. DENSE FOREST | -Crown Density above 40% | <span style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></span>  |
| 2. OPEN FOREST  | -Crown Density 10 to 40% | <span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></span>    |
| 3. MANGROVE     |                          | <span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></span> |
| 4. NON FOREST   |                          | <span style="display: inline-block; width: 15px; height: 15px; background-color: white; border: 1px solid black;"></span>  |





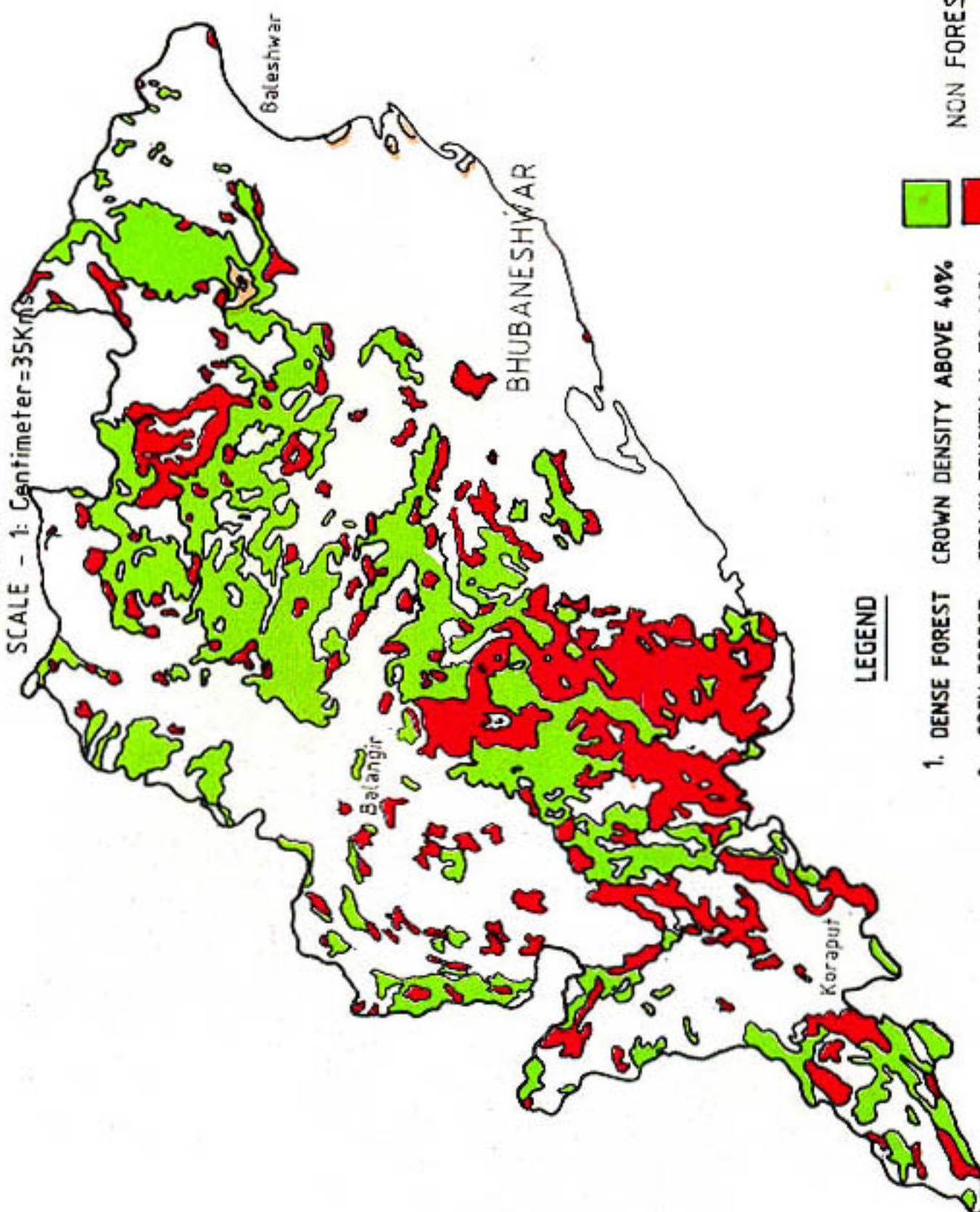


# FOREST COVER MAP

(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

ORISSA

SCALE - 1: Centimeter=35Kms



## LEGEND

1. DENSE FOREST CROWN DENSITY ABOVE 40%
2. OPEN FOREST - CROWN DENSITY 10 TO 40%
3. MANGROVE FOREST



NON FOREST



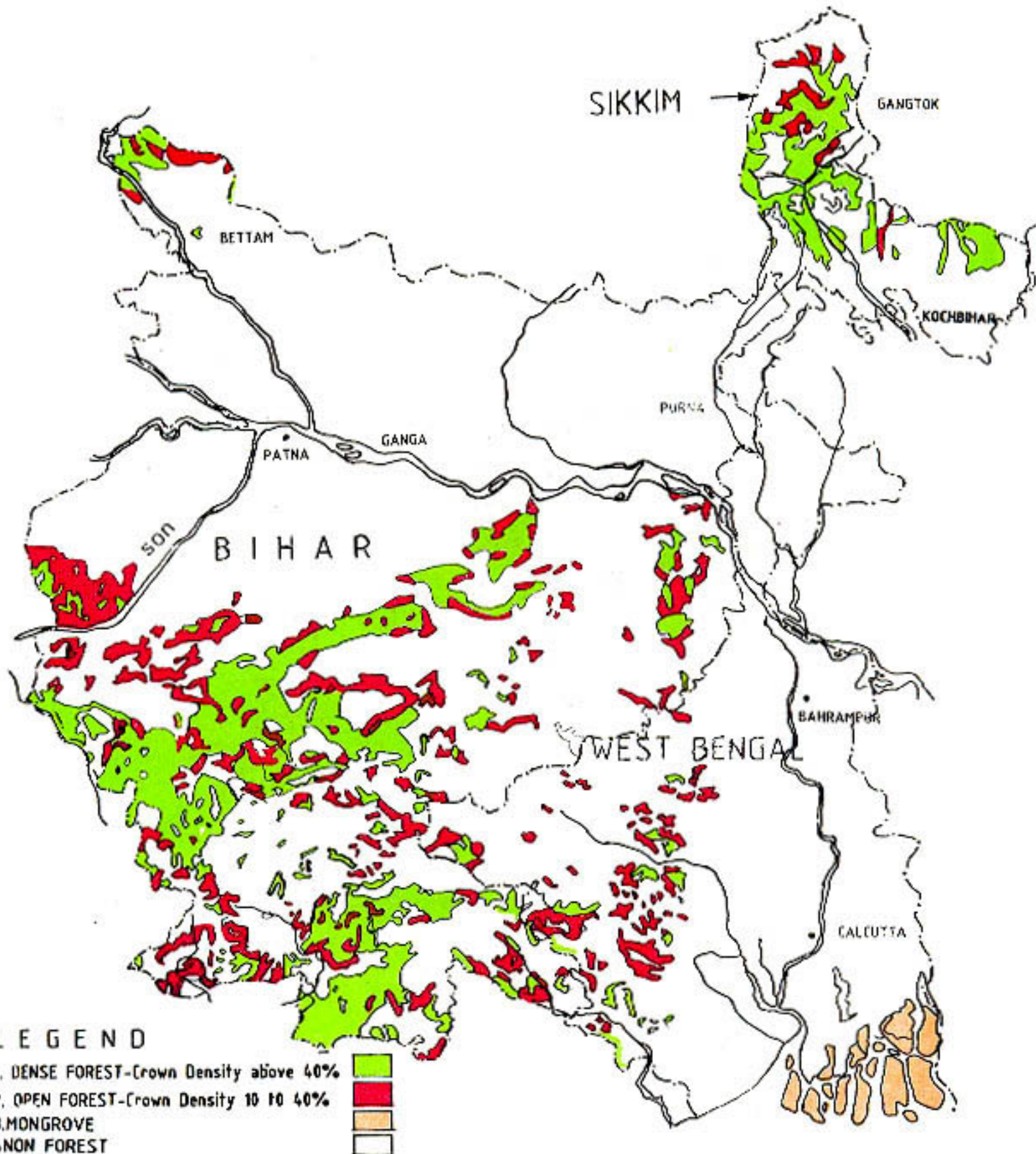


# FOREST COVER MAP

(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

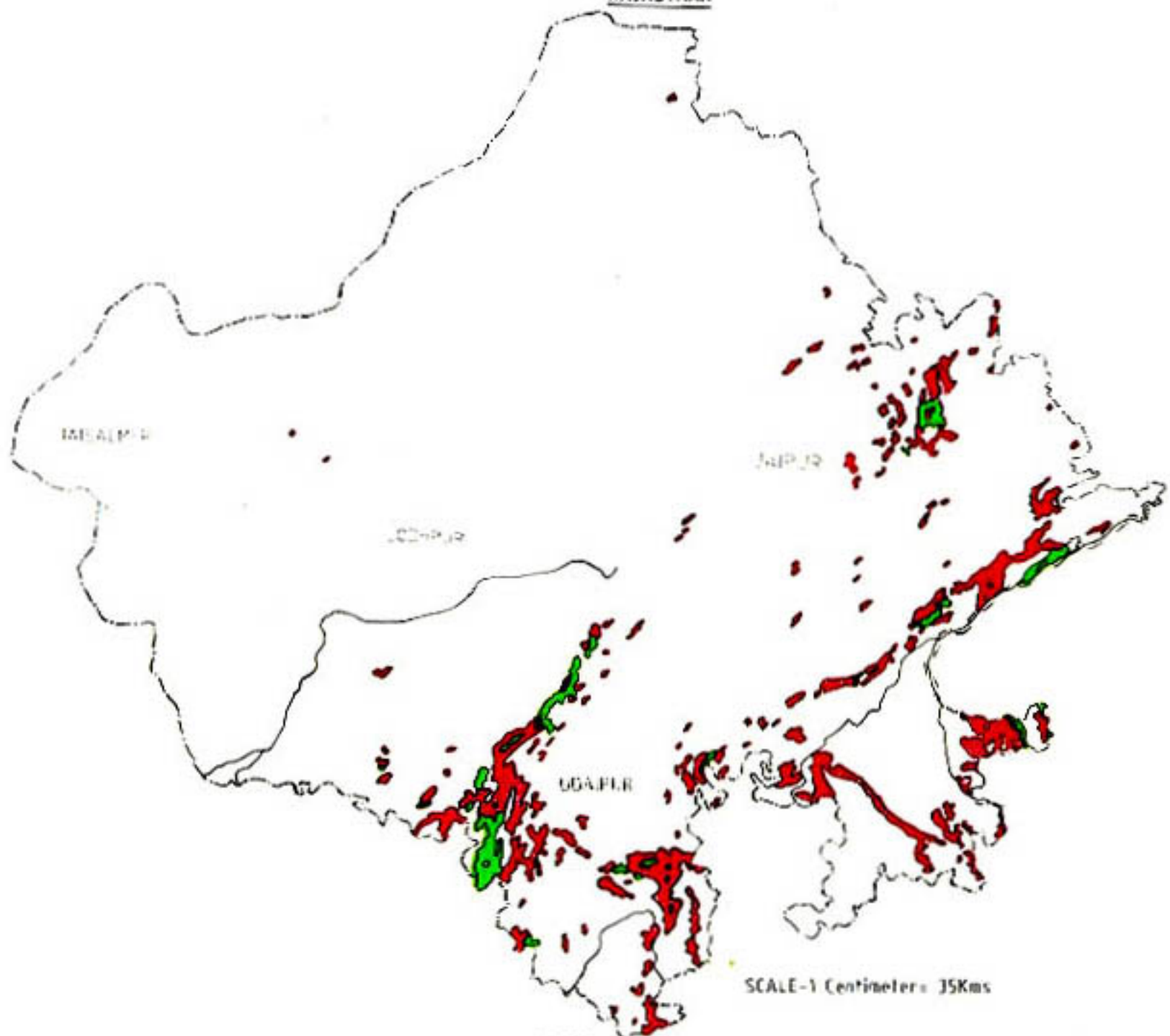
BIHAR, WEST BENGAL AND SIKKIM

SCALE 1 Centimetre = 35Kms





FOREST COVER MAP  
 BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89  
 RAJASTHAN



LEGEND

1. DENSE FOREST - CROWN DENSITY ABOVE 40%
2. OPEN FOREST - CROWN DENSITY 10 TO 40%
3. MANGROVE FOREST
4. NON FOREST



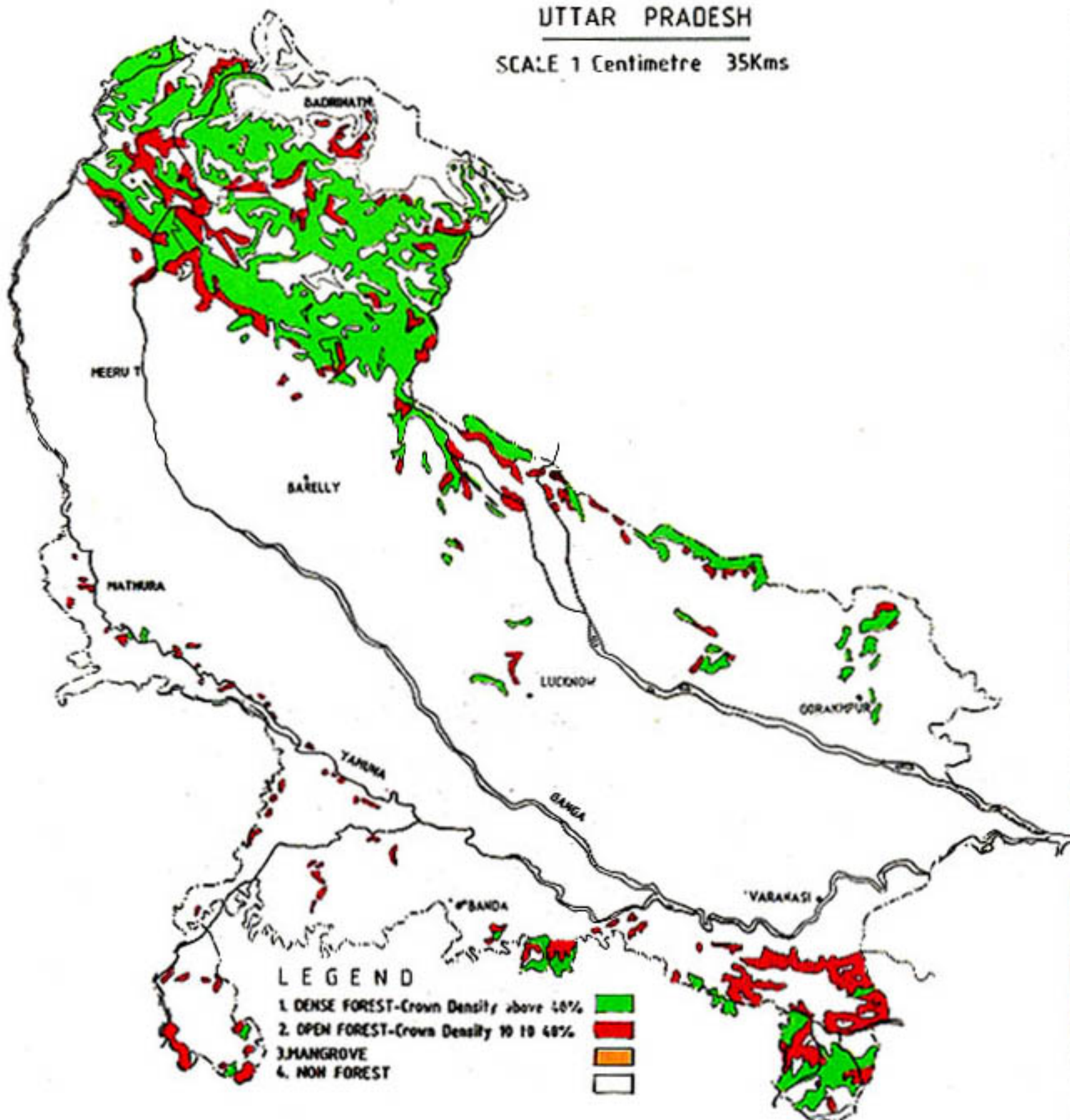


# FOREST COVER MAP

(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

## UTTAR PRADESH

SCALE 1 Centimetre 35Kms



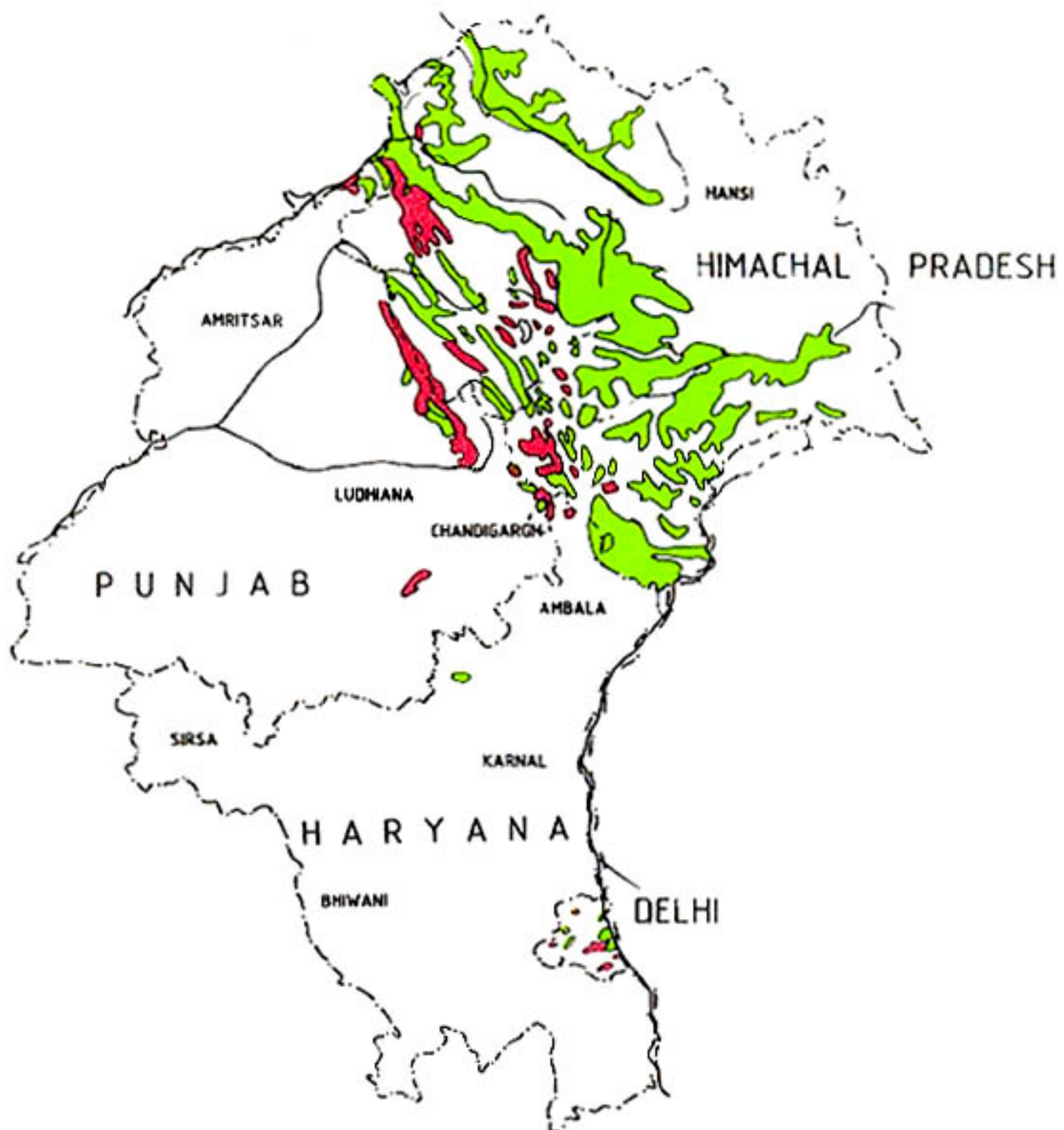


## FOREST COVER MAP





(BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)

PUNJAB, HARYANA, HIMACHAL PRADESH, CHANDIGARH AND DELHI

SCALE 1 Centimetre = 35Kms.

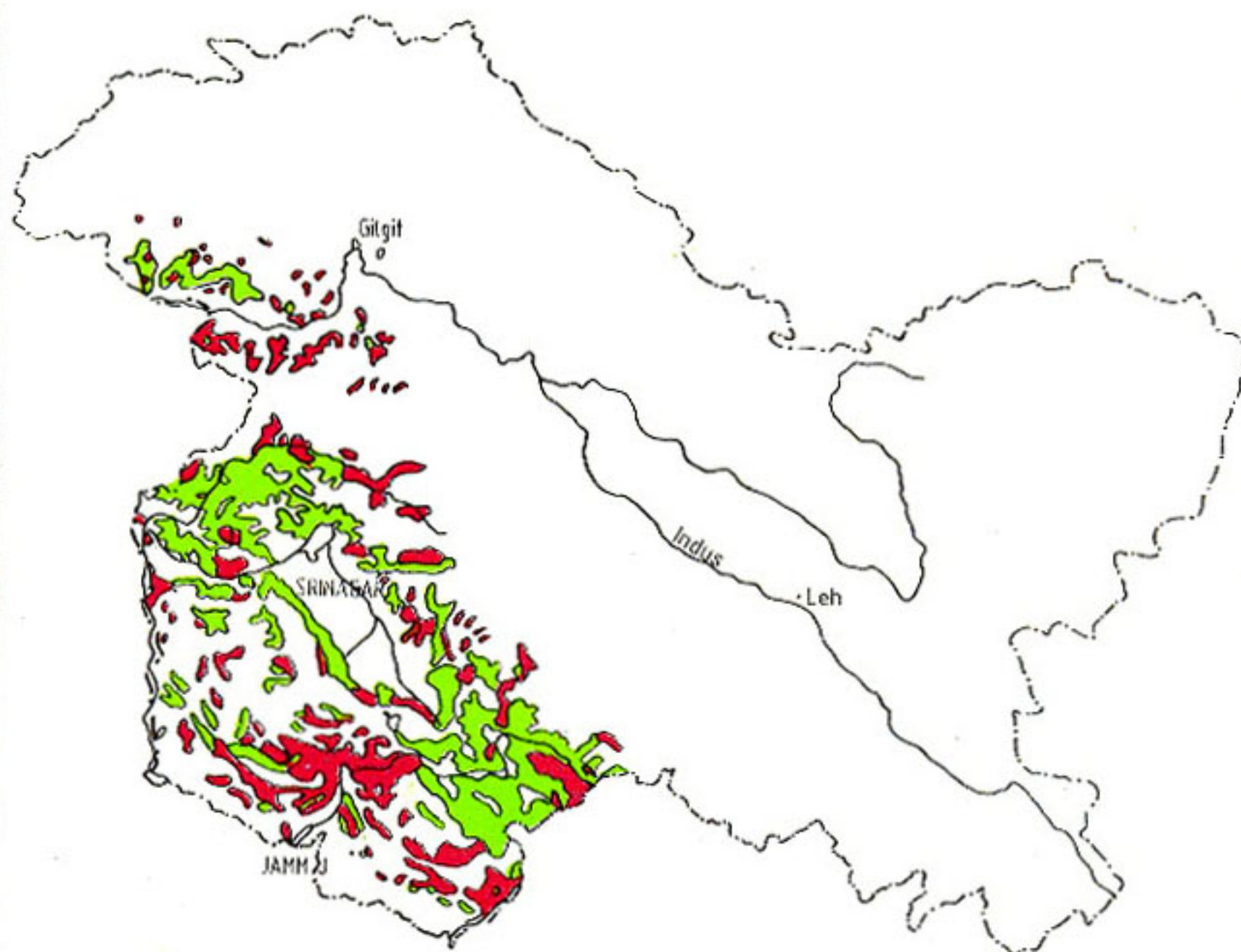


### LEGEND

- |                 |                         |   |
|-----------------|-------------------------|---|
| 1. DENSE FOREST | Crown Density above 40% |  |
| 2. OPEN FOREST  | Crown Density 10 to 40% |  |
| 3. MANGROVE     |                         |  |
| 4. NON FOREST   |                         |  |



FOREST COVER MAP  
 (BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)  
 JAMMU & KASHMIR  
 SCALE 1 Centimetre = 35 Kms.



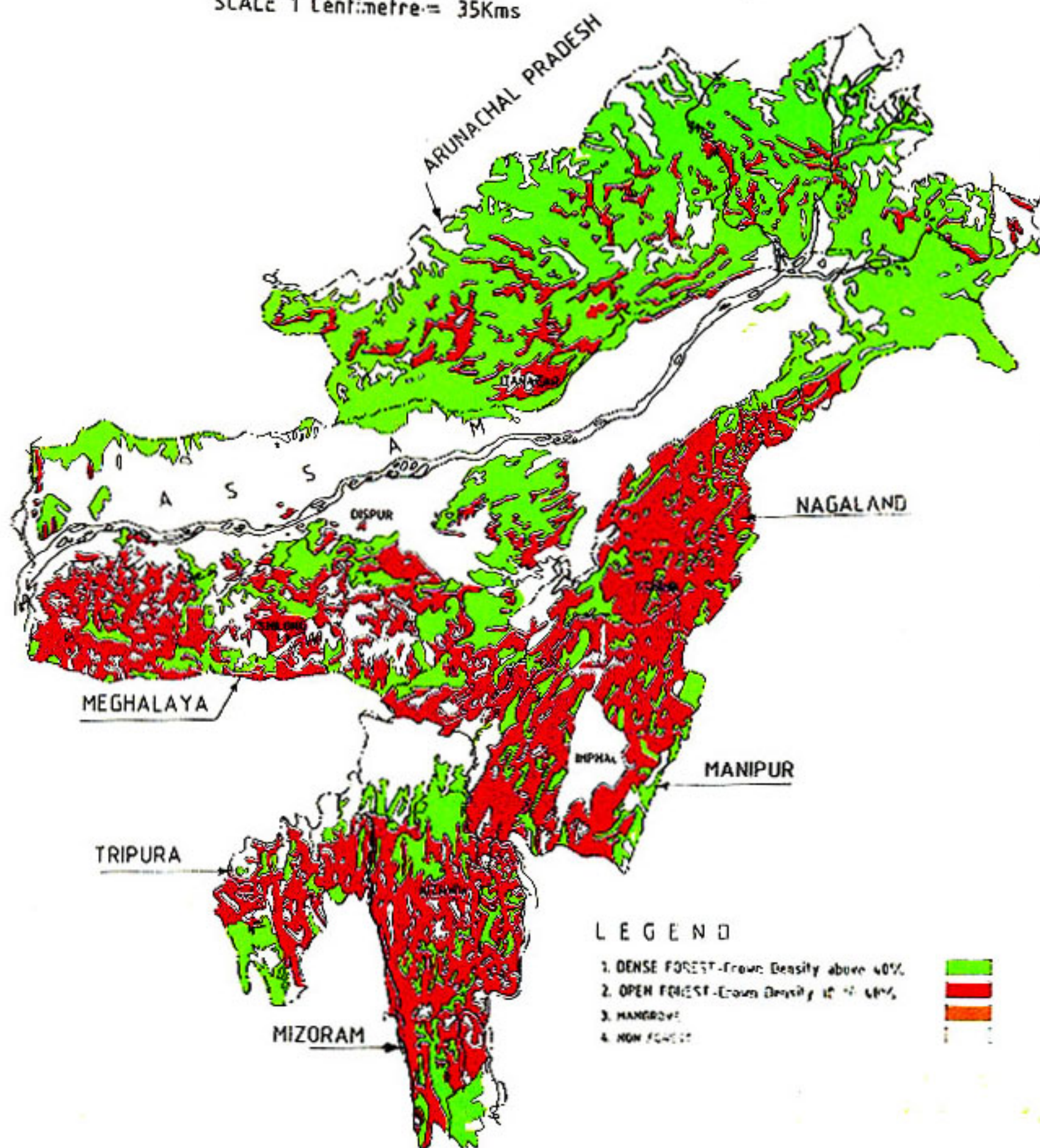
LEGEND

- |                 |                          |
|-----------------|--------------------------|
| 1. DENSE FOREST | -Crown Density above 40% |
| 2. OPEN FOREST  | -Crown Density 10 to 40% |
| 3. MANGROVE     |                          |
| 4. NON FOREST   |                          |





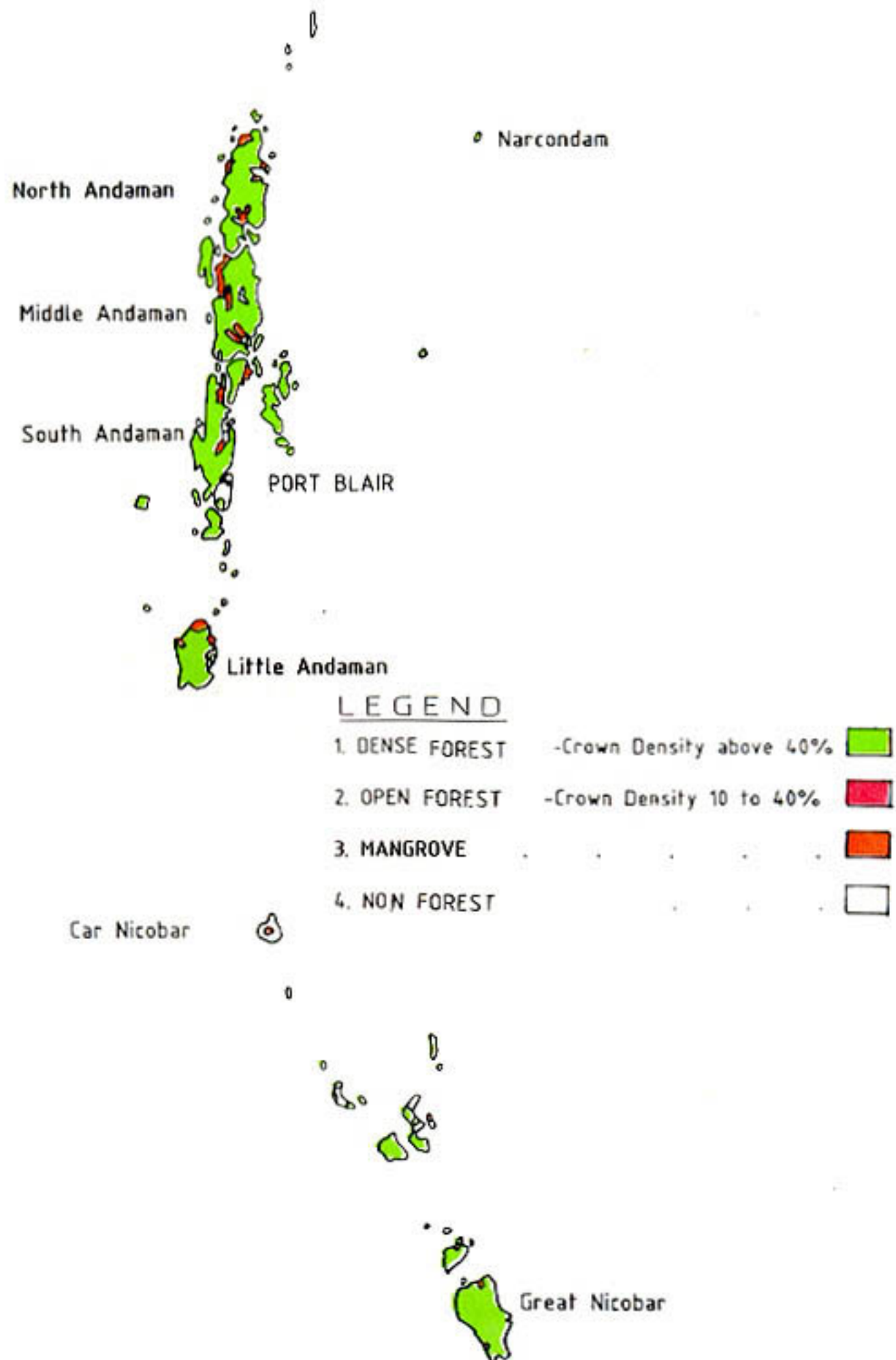
FOREST COVER MAP  
 (BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)  
 NORTH-EASTERN REGION  
 SCALE 1 Centimetre = 35Kms





FOREST COVER MAP  
ANDAMAN & NICOBAR ISLANDS

SCALE 1 Centimetre = 35Kms.





## CHAPTER-II

### DISTRICTWISE FOREST COVER

2.1 An attempt, for the first time, has been made to assess district-wise forest cover of the country. As per available figures from Survey of India, there are 413 districts in the country. The results of assessment of forest cover of these districts are summarised in Table 2.3. Forest cover is classified in three categories viz. Dense Forest (Forest cover above 40%), Open Forest (Forest cover between 40% to 10%) and Mangroves. The identified tea gardens and tree groves/orchards have not been included under forest cover.

2.2 National Forest Policy 1988 recommends that 33% of the geographical area should be under forest/tree cover. The actual

forest cover of the country as assessed is around 19% of the total geographical area. This basis is adopted for grouping of the districts in the country. The summary of this grouping has been given in Table 1.2.

2.3 A perusal of table 2.1 indicates that out of a total of 413 districts for which the forest cover assessment is made, 105 districts of the country are having forest cover more than 33%, 52 districts have forest cover between 19 to 33%, 217 districts have forest cover ranging from 0.1 to 19% and 39 districts do not have any discernible forests. The district which fall below the national forest cover average of 19% are summarised in the following table.

---

State & Name of districts with forest cover  
0.1 to 19%

---

State & Name of districts without any  
discernible forest cover

---

1

2

---

#### Andhra Pradesh

1. Anantapur 2. Chittoor 3. West Godavari  
4. Karimnagar 5. Krishna 6. Nellore 7. Kurnool  
8. Prakasam 9. Guntur 10. Mahboob Nagar 11. Medak  
12. Nizamabad 13. Ranga Reddi 14. Hyderabad

Nil

#### Assam

1. Lakhimpur 2. Sibsagar 3. Dibrugarh

Nil

#### Bihar

1. Bhagalpur 2. Paschim Champaran 3. Dhanbad  
4. Gaya 5. Monger 6. Purnia 7. Santhal Pargana  
8. Nalanda 9. Aurangabad 10. Nawada

1. Darbanga 2. Muzaffarnagar 3. Patna 4. Saharsa  
5. Saran 6. Begusari 7. Bhajpur 8. Gopalganj  
9. Purbe Champaran 10. Siwan 11. Sitamarhi  
12. Vaishali 13. Madhubani 14. Samastipur  
15. Katihar



**Gujarat**

1. Ahmedabad 2. Amreli 3. Banaskantha 4. Bharuch
5. Bhavnagar 6. Gandhinagar 7. Jamnagar 8. Junagadh
9. Kheda 10. Kachchh 11. Mahesana 12. Panchmahal
13. Rajkot 14. Sabar Kantha 15. Surat 16. Surendranagar
17. Vadodara

Nil

**Haryana**

1. Ambala 2. Bhiwani 3. Gurgaon 4. Hissar 5. Karnal
6. Mahender Garh 7. Faridabad 8. Rohtak
9. Kurukshetra 10. Sonapat

1. Jind 2. Sirsa

**Himachal Pradesh**

1. Lahaul Spiti 2. Kinnaur 3. Bilaspur

Nil

**Jammu & Kashmir**

1. Gilgit 2. Gilgitwazarat 3. Chilas

1. Ladakh

**Karnataka**

1. Bangalore 2. Belgaum 3. Bellary 4. Bidar 5. Bijapur
6. Chitradurga 7. Dharwad 8. Gulbarga 9. Hasan 10. Kolar
11. Mandya 12. Tumkur

1. Raichur

**Kerala**

1. Alleppey 2. Cannanore 3. Kozhikode 4. Wyanad
5. Ernakalam 6. Kottayam. 7. Trivandrum

Nil

**Madhya Pradesh**

1. Bhind 2. Chhatarpur 3. Datia 4. Dhar 5. Durg 6. Indore
7. Mandasaur 8. Rajgarh 9. Ratlam 10. Rewa
11. Tikamgarh 12. Vidisha 13. Jhabua 14. Bhopal

1. Shajapur 2. Ujjain

**Maharashtra**

1. Ahmadnagar 2. Akola 3. Aurangabad 4. Beed
5. Bombay City 6. Bombay Suburban 7. Buldana 8. Dhule
9. Jalgaon 10. Nagpur 11. Nanded 12. Osmanabad
13. Parbhani 14. Pune 15. Sangali 16. Satara 17. Sholapur
18. Wardha 19. Yavatmal 20. Nasik

Nil



1	2
<b>Orissa</b>	
1. Baleshwar 2. Balangir 3. Cuttack	Nil
<b>Punjab</b>	
1. Amritsar 2. Bhatinda 3. Ferozpur 4. Gurdaspur 5. Hoshiarpur 6. Ludhiana 7. Patiala 8. Ropar 9. Sangrur 10. Faridkot	1. Jalandhar 2. Kapurthala
<b>Rajasthan</b>	
1. Ajmer 2. Alwar 3. Banswara 4. Barmer 5. Bharatpur 6. Bhilwara 7. Bikaner 8. Bundi 9. Chittorgarh 10. Churu 11. Dungarpur 12. Ganganagar 13. Jaipur 14. Jaisalmer 15. Jalor 16. Jhalwar 17. Jhunjhuna 18. Jodhpur 19. Kota 20. Nagaur 21. Pali 22. Swaimdhapur 23. Sikar 24. Sirohi 25. Tonk 26. Udaipur	Nil
<b>Tamil Nadu</b>	
1. Chongal Pattu 2. Madras 3. Madurai 4. North Arcot 5. Ramnath Puram 6. Salem 7. South Arcot 8. Thanjavur 9. Tiruchurapalli 10. Tirunel vali 11. Pudukkottai	Nil
<b>Uttar Pradesh.</b>	
1. Agra 2. Allahabad 3. Bahraich 4. Banda 5. Barabanki 6. Basti 7. Bijnor 8. Badaun 9. Bulandshahar 10. Deoria 11. Etawah 12. Faizabad 13. Farrukhabad 14. Fatehpur 15. Gonda 16. Gorakhpur 17. Hamirpur 18. Jalaun 19. Jhansi 20. Kanpur 21. Kheri 22. Lucknow 23. Mathura 24. Meerut 25. Mirzapur 26. Moradabad 27. Muzaffarnagar 28. Raebareli 29. Rampur 30. Saharanpur 31. Shahjahanpur 32. Sitapur 33. Sultanpur 34. Varanasi 35. Lalitpur	1. Aligarh 2. Azamgarh 3. Bareilly 4. Ballia 5. Etah 6. Gaziabad 7. Gazipur 8. Hardoi 9. Jaunpur 10. Pratapgarh 11. Unnao
<b>West Bengal</b>	
1. Bankura 2. Birbhum 3. Bardhaman 4. Calcutta 5. Hugli 6. Haora 7. Maldah 8. Medinapur 9. Murshidabad 10. Nadia 11. 24 Parganas 12. West Dinajpur 13. Kooch Bihar 14. Puruliya	Nil
<b>Chandigarh</b>	
1. Chandigarh	Nil



1	2
Lakshadweep	Lakshadweep
Pondicherry	1. Karaikal 2. Mahe 3. Pondicherry 4. Yanam
Delhi	Nil
Daman and Diu	Nil
1. Daman 2. Diu	



**Table 2.1**  
**FOREST COVER DENSITY DISTRICTWISE**

S. No.	State/UTs	No. of districts having more than 33% forest cover	No. of districts having forest cover between 19-33%	No. of districts having forest cover 0.1 to 19%	No. of districts without forest cover	Total No of distt.
1	2	3	4	5	6	7
1.	Andhra Pradesh	3	5	15	-	23
2.	Arunachal Pradesh	9	-	-	-	9
3.	Assam	7	-	3	-	10
4.	Bihar	3	3	10	15	31
5.	Goa (Including Daman & Diu)	1	-	2	-	3
6.	Gujarat	1	1	17	-	19
7.	Haryana	-	-	10	2	12
8.	Himachal Pradesh	3	6	3	-	12
9.	Jammu & Kashmir	4	6	3	1	14
10.	Karnataka	5	1	12	1	19
11.	Kerala	2	3	7	-	12
12.	Madhya Pradesh	16	13	14	2	45
13.	Maharashtra	3	4	20	-	27
14.	Manipur	6	-	-	-	6
15.	Meghalaya*	5	-	-	-	5
16.	Mizoram*	3	-	-	-	3
17.	Nagaland	7	-	-	-	7
18.	Orissa	7	3	3	-	13
19.	Punjab	-	-	10	2	12
20.	Rajasthan	-	-	26	-	26
21.	Sikkim*	4	-	-	-	4
22.	Tamilnadu	1	4	11	-	16
23.	Tripura	3	-	-	-	3
24.	Uttar Pradesh	8	2	35	11	56
25.	West Bengal	1	1	14	-	16
26.	Andaman and Nicobar	2	-	-	-	2
27.	Chandigarh	-	-	1	-	1
28.	Dadra & Nagar Haveli	1	-	-	-	1
29.	Delhi	-	-	1	-	1
30.	Lakshadweep	-	-	-	1	1
31.	Pondicherry	-	-	-	4	4
Total		105	52	217	39	413

\* (Districtwise boundaries not available, but average is above 33%)



Table 2.2

## PERCENTAGE-WISE BREAK UP OF FOREST COVER AREA IN STATE/UTs

(Area in sq.kms.)

S. No.	State/UTs	Area with Forest cover			Total forest cover of the State/UT
		above 33%	between 19-33%	between 0.1-19%	
1	2	3	4	5	6
1.	Andhra Pradesh	17366	14510	15414	47290
2.	Arunachal Pradesh	68757	-	-	68757
3.	Assam	22337	-	2414	24751
4.	Bihar	14237	7622	4809	26668
5.	Goa (Including Daman & Diu)	1253	-	2	1255
6.	Gujarat	1514	1271	9122	11907
7.	Haryana	-	-	512.85	512.85
8.	Himachal Pradesh	5187	5777	816	11780
9.	Jammu & Kashmir	7322	11775	967	20064
10.	Karnataka	22996	3465	5738	32199
11.	Kerala	4801	3049	2442	10292
12.	Madhya Pradesh	93177	33586	9022	135785
13.	Maharashtra	21193	9764	13087.25	44044.25
14.	Manipur	17685	-	-	17685
15.	Meghalaya	15875	-	-	15875
16.	Mizoram	18853	-	-	18853
17.	Nagaland	14321	-	-	14321
18.	Orissa	32300	12407	2498	47205
19.	Punjab	-	-	1343	1343
20.	Rajasthan	-	-	12835	12835
21.	Sikkim	3033	-	-	3033
22.	Tamilnadu	2099	6227	9387	17713
23.	Tripura	5535	-	-	5535
24.	Uttar Pradesh	22536	3937	7136	33609
25.	West Bengal	1435	1537	5043	8015
26.	Andaman and Nicobar Islands	7622	-	-	7622
27.	Chandigarh	-	-	5	5
28.	Dadra & Nagar Haveli	206	-	-	206
29.	Delhi	-	-	22	22
30.	Lakshadweep	-	-	-	-
31.	Pondicherry	-	-	-	-
Total		421640	114927	102615.10	639182.10



Table 2.3

## DISTRICT-WISE FOREST COVER ASSESSMENT FIGURES - 1991

(Area in sq.kms.)

S.No.	Districts	Geographical area	Forest cover : 1991 assessment			Total	% of forest cover to geographical area
			Dense	Open	Mangrove		
1	2	3	4	5	6	7	
<b>Andhra Pradesh</b>							
1.	Adilabad	16128	4886	1597	-	6483	40.2
2.	Anantpur	19130	-	389	-	389	2.0
3.	Chittoor	15152	154	1161	-	1315	8.7
4.	Cuddapah	15359	686	2766	-	3452	22.5
5.	East Godavari	10807	2719	645	237	3601	33.3
6.	West Godavari	7742	617	226	-	843	10.9
7.	Rangareddi	7493	-	275	-	275	3.6
8.	Hyderabad	217	-	-	-	-	-
9.	Karimnagar	11823	848	1120	-	1968	16.6
10.	Khammam	16029	5136	2146	-	7282	45.4
11.	Krishna	8727	62	110	109	281	3.2
12.	Kurnool	17658	-	-	-	-	-
13.	Nellore	13076	2608	3722	53	6383	10.7
14.	Parkasam	17626	-	-	-	-	-
15.	Guntur	11391	-	-	-	-	-
16.	Mahbub Nagar	18432	810	1181	-	1991	10.8
17.	Medak	9699	18	390	-	408	4.2
18.	Nalgonda	14240	-	155	-	155	1.1
19.	Nizamabad	7956	704	702	-	1406	17.7
20.	Srikakulam	5837	-	-	-	-	-
21.	Visakhapatnam	11161	3127	4644	-	7591	32.3
22.	Vizianagaram	6539	-	-	-	-	-
23.	Warangal	12846	2642	825	-	3467	27.0
Total		275068	25017	21874	399	47290	17.2
<b>Arunachal Pradesh</b>							
1.	East Kameng	4134	54542	14215	-	68757	82.1
2.	West Kameng	9594					
3.	Lohit	11402					
4.	Dibang Valley	13029					
5.	East Siang	6512					
6.	West Siang	12006					
7.	Upper Subansiri	7032					
8.	Lower Subansiri	13010					
9.	Tirap	7024					
Total		83743	54542	14215	-	68757	82.1



1	2	3	4	5	6	7
<b>Assam</b>						
1. Cachar	6923	14028	8309	-	22337	39.4
2. Darrang	8805					
3. Goalpara	10301					
4. Kamrup	9847					
5. Nagaon	5535					
6. North Cachar	4888	278	84	-	362	6.6
7. Karbi Anglong	10434					
8. Lakhimpur	5514					
9. Sibsagar	9021					
10. Dibrugarh	7170					
Total	78438	15842	8909	-	24751	31.5
<b>Bihar</b>						
1. Bhagalpur	5589	39	172	-	211	3.78
2. Paschim Champaran	5228	482	322	-	804	15.38
3. Darbhanga	2279	-	-	-	-	-
4. Dhanbad	2996	7	88	-	95	3.17
5. Gaya	6545	292	345	-	637	9.73
6. Hazaribagh	11165	2456	2349	-	4805	43.04
7. Munger	7908	523	444	-	967	12.23
8. Muzaffarpur	3172	-	-	-	-	-
9. Palamu	12749	2686	2147	-	4833	37.91
10. Patna	3202	-	-	-	-	-
11. Purnia	7943	5	14	-	19	0.24
12. Ranchi	18266	2004	2550	-	4554	24.93
13. Saharsa	5900	-	-	-	-	-
14. Santhal Pargana	14206	282	1171	-	1453	10.23
15. Saran	2641	-	-	-	-	-
16. Begusarai	1918	-	-	-	-	-
17. Singhbhum	13440	3095	1504	-	4599	34.22
18. Bhojpur	4098	-	-	-	-	-
19. Gopalganj	2033	-	-	-	-	-
20. Purbe Champaran	3968	-	-	-	-	-
21. Rotas	7213	585	1043	-	1628	22.57
22. Siwan	2219	-	-	-	-	-
23. Sitamarhi	2643	-	-	-	-	-
24. Vaishali	2036	-	-	-	-	-
25. Madhubani	3501	-	-	-	-	-
26. Samastipur	2904	-	-	-	-	-
27. Katihar	3057	-	-	-	-	-
28. Nalanda	2367	14	14	-	28	1.18
29. Aurangabad	3305	50	77	-	127	3.84
30. Nawada	2494	259	209	-	468	18.77
31. Giridih	6892	506	934	-	1440	20.89
Total	173877	13285	13383	-	26668	15.33



1	2	3	4	5	6	7
<b>Goa (Daman &amp; Diu)</b>						
1. Daman	72	-	1	-	1	1.39
2. Diu	40	-	1	-	1	2.50
3. Goa	3702	996	254	3	1253	33.80
Total	3814	996	256	3	1255	
<b>Gujarat</b>						
1. Ahmedabad	8707	8	46	-	54	0.62
2. Amreli	6760	57	134	-	191	2.82
3. Banaskantha	12703	433	306	-	739	5.81
4. Bharuch	9038	750	470	7	1227	13.58
5. Bhavnagar	11155	29	94	16	139	1.25
6. Gandhinagar	649	3	4	-	7	1.08
7. Jamnagar	14125	21	118	118	257	1.82
8. Junagadh	10607	993	615	-	1608	15.16
9. Kheda	7194	-	45	-	45	0.63
10. Kachchh	45652	187	823	239	1249	2.74
11. Mehsana	9027	3	21	-	24	0.27
12. Panchmahals	8866	412	538	-	950	10.72
13. Rajkot	11203	4	76	-	80	0.71
14. Sabar Kantha	7390	373	298	-	671	9.08
15. Surat	7657	917	400	14	1331	17.38
16. Surrendernagar	10489	10	61	-	71	0.68
17. The Dangs	1764	1022	492	-	1514	85.83
18. Vadodara	7794	206	273	-	479	6.15
19. Valsad	5244	796	472	3	1271	24.24
Total	196024	6224	5286	397	11907	6.07
<b>Haryana</b>						
1. Ambala	3832	264.61	155.62	-	380.23	9.92
2. Bhiwani	5099	1.76	4.55	-	6.31	0.12
3. Gurgaon	2716	10.22	9.28	-	19.50	0.72
4. Hisar	6315	4.54	4.79	-	9.33	0.15
5. Jind	3306	-	-	-	-	-
6. Karnal	3721	4.79	2.78	-	7.57	0.20
7. Mahender Garh	3009	9.48	24.40	-	33.88	1.13
8. Faridabad	2150	3.29	5.81	-	9.10	0.42
9. Rohtak	3841	6.22	8.96	-	15.18	0.39
10. Kurukshetra	3740	23.43	6.80	-	30.23	0.81
11. Sirsa	4276	-	-	-	-	-
12. Sonipat	2207	0.25	1.27	-	1.52	0.07
Total	44212	328.59	184.26	-	512.85	1.16



1	2	3	4	5	6	7
<b>Himachal Pradesh</b>						
1. Kullu	5503	1817	131	-	1948	35.39
2. Lahaul Spiti	13835	-	17	-	17	0.12
3. Solan	1936	164	251	-	415	21.46
4. Mandi	3950	839	462	-	1301	32.95
5. Bilaspur	1167	101	65	-	166	14.22
6. Chamba	6528	1625	392	-	2017	30.90
7. Kangra	5739	808	625	-	1433	24.98
8. Kinnaur	6401	565	68	-	633	9.88
9. Shimla	5132	1921	299	-	2220	43.26
10. Sirmaur	2825	740	279	-	1019	36.06
11. Una	1540	175	220	-	395	25.66
12. Hamirpur	1118	156	60	-	216	19.30
<hr/>						
Total	55673	8911	2869	-	11780	21.16

<b>Jammu &amp; Kashmir</b>						
1. Gilgit	34896	10	136	-	146	0.41
2. Gilgitwazart	4376	16	91	-	107	2.45
3. Ladakh	120827	-	-	-	-	-
4. Anantnag	7201	1462	683	-	2145	29.79
5. Baramula	9319	1670	803	-	2473	26.54
6. Jammu	2972	298	446	-	744	25.03
7. Udhampur	13713	2864	1606	-	4470	32.60
8. Kathua	2651	413	661	-	1074	40.51
9. Riasi	4635	922	1307	-	2229	48.09
10. Punch	4231	694	637	-	1331	31.46
11. Muzaffarabad	6245	1655	915	-	2570	41.15
12. Mirpur	4212	565	884	-	1449	34.40
13. Chilas	4266	129	585	-	714	16.89
14. Tribal Territory	2731	288	324	-	612	22.41
<hr/>						
Total	222235	10986	9078	-	20064	9.03

<b>Karnataka</b>						
1. Bangalore	8005	168	492	-	660	8.24
2. Belgaum	13415	918	160	-	1078	8.04
3. Bellary	9885	123	575	-	698	7.06
4. Bidar	5448	5	36	-	41	0.75
5. Bijapur	17069	-	35	-	35	0.21
6. Chikmagalur	7201	2943	352	-	3295	45.76
7. Chitradurga	10852	38	288	-	326	3.00
8. Dakshin Kannada	8441	2776	862	-	3638	43.10
9. Dharwad	13738	400	315	-	715	5.20
10. Gulbarga	16224	94	93	-	187	1.15
11. Hasan	6814	853	157	-	1010	14.82
12. Kolar	8223	12	352	-	364	4.43



1	2	3	4	5	6	7	
13.	Mandya	4961	6	235	-	241	4.86
14.	Mysore	11954	1819	1646	-	3465	28.99
15.	Kodagu	4102	3276	63	-	3339	81.40
16.	Raichur	14017	-	-	-	-	-
17.	Shimoga	10553	4036	885	-	4921	46.63
18.	Uttar Kannada	10291	7372	431	-	7803	75.82
19.	Tumkur	10598	17	366	-	383	3.61
Total		191791	24856	7343	-	32199	16.79

#### Kerala

1.	Alleppey	1883	7	-	-	7	0.37
2.	Cannanore	5706	-	-	-	-	-
3.	Kozhikode	9398	1332	356	-	1688	17.96
4.	Wyanad	-	-	-	-	-	-
5.	Ernakulam	2408	251	21	-	272	11.29
6.	Kottayam	2204	57	24	-	81	3.67
7.	Malappuram	3674	724	103	-	827	22.50
8.	Palghat	4392	945	428	-	1373	31.26
9.	Quillon	4620	1755	510	-	2265	49.02
10.	Trichur	3031	807	42	-	849	28.00
11.	Trivandrum	2192	317	77	-	394	17.97
12.	Idukki	5061	2226	310	-	2536	50.10
Total		38363	8421	1871	-	10292	26.48

#### Madhya Pradesh

1.	Balaghat	9229	4590	328	-	4918	53.29
2.	Bastar	39114	18893	3501	-	22394	57.25
3.	Betul	10043	2906	654	-	3560	35.45
4.	Bhind	4459	13	60	-	73	1.64
5.	Bilaspur	19897	5825	1114	-	6939	34.87
6.	Chhatarpur	8687	1414	200	-	1614	18.58
7.	Chhindwara	11815	3029	1390	-	4419	37.40
8.	Damoh	7306	945	2196	-	3141	42.99
9.	Batia	2038	14	41	-	55	2.70
10.	Dewas	7020	1232	591	-	1823	25.97
11.	Dhar	8153	96	720	-	816	10.01
12.	Durg	8537	579	143	-	722	8.46
13.	East Nimar	10779	2670	1433	-	4103	38.06
14.	Guna	11065	1039	1593	-	2632	23.79
15.	Gwalior	5214	363	774	-	1137	21.81
16.	Hoshangabad	10037	2590	760	-	3350	33.38
17.	Indore	3898	253	263	-	516	13.24
18.	Jabalpur	10160	1498	637	-	2135	21.01
19.	Mandsaur	9791	398	828	-	1226	12.52



1	2	3	4	5	6	7	
20.	Mandla	13269	4750	614	-	5364	40.42
21.	Marena	11594	1887	2678	-	4565	39.37
22.	Narsimhapur	5133	664	574	-	1238	24.12
23.	Panna	7135	743	2187	-	2930	41.07
24.	Raigarh	12924	3320	1175	-	4495	34.78
25.	Raipur	21258	5115	1744	-	6859	32.27
26.	Raisen	8466	1568	979	-	2547	30.08
27.	Rajgarh	6154	296	225	-	521	8.47
28.	Ratlam	4861	70	283	-	353	7.26
29.	Rewa	6314	383	171	-	554	8.77
30.	Sagar	10252	1552	803	-	2355	22.91
31.	Satna	7502	359	1337	-	1696	22.61
32.	Sehore	6578	584	753	-	1337	20.33
33.	Seoni	8758	2346	652	-	2998	34.23
34.	Shahdol	14028	3052	1336	-	4388	31.28
35.	Shajapur	6196	-	-	-	-	-
36.	Shivpuri	10278	921	1582	-	2503	24.35
37.	Sidhi	10526	3217	698	-	3915	37.19
38.	Surguja	22337	10488	1618	-	12106	54.20
39.	Tikamgarh	5048	76	187	-	263	5.21
40.	Ujjain	6091	-	-	-	-	-
41.	Vidisha	7371	533	437	-	970	13.16
42.	West Nimar	13450	1245	1691	-	2936	21.83
43.	Jhabua	6782	577	525	-	1102	16.25
44.	Rajnandgaon	11127	3245	735	-	3980	35.77
45.	Bhopal	2772	47	190	-	237	8.55
Total		443446	95385	40400		135785	30.62

#### Maharashtra

1.	Ahmednagar	17048	27	140	-	167	0.98
2.	Akola	10575	169	196	-	365	3.45
3.	Amravati	12212	2132	653	-	2785	22.80
4.	Aurangabad	16305	6	296	-	302	1.85
5.	Bhandra	9213	1939	854	-	2793	30.32
6.	Beed	11085	-	30	-	30	0.27
7.	Bombay City	157	-	0.25	-	0.25	0.16
8.	Bombay suburban	446	32	20	26	78	17.49
9.	Buldana	9661	182	419	-	601	6.22
10.	Chandrapur	25923	10698	3349	-	14047	54.19
11.	Dhule	13150	455	1752	-	2207	16.78
12.	Jalgaon	11765	224	1051	-	1275	10.94
13.	Kolaba	7148	811	914	49	1774	24.82
14.	Kolhapur	8047	1033	431	-	1464	48.19
15.	Nagpur	9931	1134	602	-	1736	17.48
16.	Nanded	10502	519	394	-	913	8.69
17.	Nasik	15530	283	415	-	698	4.49



1	2	3	4	5	6	7	
18.	Osmanabad	14210	-	12	-	12	0.08
19.	Parbhani	12561	-	51	-	51	0.41
20.	Pune	15642	412	499	-	911	5.82
21.	Ratnagiri	13054	2157	3512	13	5682	43.53
22.	Sangli	8572	99	5	-	104	1.21
23.	Satara	10484	569	132	-	701	6.69
24.	Sholapur	15017	-	30	-	30	0.20
25.	Thane	9558	1587	800	25	2412	25.23
26.	Wardha	6310	383	351	-	734	11.63
27.	Yavatmal	13584	1321	851	-	2172	15.99
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Total		307690	26172	17759.25	113	44044.25	14.31

#### Manipur

1.	Manipur Central	2238	2365	4921	-	7286	72.1
	Tengnong Pal	3313					
2.	Manipur East	4544	655	1643	-	2298	70.2
3.	Manipur North	3271					
4.	Manipur South	4570					
5.	Manipur West	4391					
Total		22327	5309	12376	-	17685	79.2

#### Meghalaya

1.	East Garo Hills	2603	3305	12570	-	15875	70.8
2.	West Garo Hills	5564					
3.	East Khasi Hills	5196					
4.	West Khasi Hills	5247					
5.	Jaintia Hills	3819					
Total		22429	3305	12570	-	15875	70.8

#### Mizoram

1.	Aizwal	12588	4279	14574	-	18853	89.4
2.	Chhimtuipui	3957					
3.	Lunglei	4536					
Total		21081	4279	14574	-	18853	89.4



1	2	3	4	5	6	7
<b>Nagaland</b>						
1. Kohima	4041	1488	1851	-	3339	82.63
2. Mon	1786	368	1152	-	1520	85.11
3. Mokokchung	1615	155	1265	-	1420	87.92
4. Phek	2026	313	1491	-	1804	89.04
5. Tuensang	4228	808	2852	-	3660	86.56
6. Wokha	1628	329	1150	-	1479	90.85
7. Zomhebot	1255	70	1029	-	1099	87.57
Total	16579	3531	10790	-	14321	86.38

<b>Orissa</b>						
1. Baleshwar	6311	258	92	21	371	5.9
2. Phulbani	11094	2973	2984	-	5957	53.7
3. Balangir	8913	534	534	-	1068	12.0
4. Cuttack	1142	506	379	174	1059	9.5
5. Dhenkanal	10827	2392	1274	-	3666	33.9
6. Ganjam	12556	1891	2807	-	4698	37.4
7. Kalahandi	11772	1392	1374	-	2766	23.5
8. Keonjhar	8303	2033	1697	-	3730	44.9
9. Koraput	26961	3119	4195	-	7314	27.1
10. Mayurbhanj	10418	3325	737	-	4062	39.0
11. Puri	10182	1567	760	-	2327	22.8
12. Sambalpur	17516	4635	1539	-	6174	35.2
13. Sundergarh	9712	2724	1289	-	4013	41.3
Total	155707	27349	19661	195	47205	30.3

<b>Punjab</b>						
1. Amritsar	5087	-	8	-	8	0.15
2. Bhatinda	5551	-	4	-	4	0.07
3. Ferozpur	5874	-	1	-	1	0.01
4. Gurdaspur	3562	75	96	-	171	4.80
5. Hoshiarpur	3881	288	431	-	719	18.52
6. Jalandhar	3401	-	-	-	-	-
7. Kapurthala	1633	-	-	-	-	-
8. Ludhiana	3857	-	21	-	21	0.54
9. Patiala	4584	21	42	-	63	1.37
10. Rupnagar (Ropar)	2085	97	247	-	344	16.49
11. Sangrur	5107	-	6	-	6	0.11
12. Faridkot	5740	-	6	-	6	0.10
Total	50362	481	862	-	1343	2.67



1	2	3	4	5	6	7
Rajasthan						
1.	Ajmer	8481	47	75	-	1.44
2.	Alwar	8380	308	813	-	13.38
3.	Banswara	5037	34	296	-	6.55
4.	Barmer	28387	-	29	-	0.10
5.	Bharatpur	8100	122	490	-	7.55
6.	Bhilwara	10455	4	130	-	1.28
7.	Bikaner	27244	1	50	-	0.19
8.	Bundi	5550	61	307	-	6.63
9.	Chittorgarh	10856	337	1191	-	14.07
10.	Churu	16830	-	4	-	0.02
11.	Dungarpur	3770	85	125	-	5.57
12.	Ganganagar	20634	-	26	-	0.13
13.	Jaipur	14068	33	365	-	2.83
14.	Jaisalmer	38401	-	23	-	0.06
15.	Jalor	10640	13	75	-	0.83
16.	Jhalawar	6219	14	284	-	4.79
17.	Jhunjhunum	5928	-	52	-	0.88
18.	Jodhpur	22850	-	11	-	0.05
19.	Kota	12436	243	1298	-	12.39
20.	Nagaur	17718	1	24	-	0.14
21.	Pali	12387	152	355	-	4.09
22.	Swaimadhopur	10527	236	1014	-	11.87
23.	Sikar	7732	-	77	-	0.99
24.	Sirohi	5136	255	540	-	15.48
25.	Tonk	7194	9	58	-	0.93
26.	Udaipur	17279	1072	2096	-	18.33
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Total		342239	3027	9808	-	3.75
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Sikkim						
1.	North Sikkim	4226	2403	630	-	42.76
2.	South Sikkim	750				
3.	East Sikkim	954				
4.	West Sikkim	1166				
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Total		7096	2403	630	-	42.76



1	2	3	4	5	6	7
<b>Tamil Nadu</b>						
1. Chengal Pattu	7863	54	250	1	305	3.88
2. Coimbatore	7469	1066	421	-	1487	19.90
3. Dharmapuri	9622	1058	1178	-	2236	23.24
4. Kanniyakimari	1684	349	121	-	470	27.90
5. Madras	170	-	5	-	5	2.94
6. Madurai	12624	1550	592	-	2142	16.16
7. Nilgiri	2549	1504	595	-	2099	82.49
8. North Arcot	12268	1078	941	-	2019	16.46
9. Ramanathapuram	12590	157	284	-	441	3.50
10. Salem	8650	662	667	-	1329	15.36
11. South Arcot	10895	268	933	9	1210	11.11
12. Thanjavur	8280	22	94	36	152	1.84
13. Tiruchirappalli	11095	160	512	1	673	6.07
14. Tirunelveli	11429	815	165	-	980	8.57
15. Periyar	8209	969	1065	-	2034	24.78
16. Pudukkottai	4661	45	86	-	131	2.81
Total	130058	9757	7909	47	17713	13.02

<b>Tripura</b>						
1. North Tripura	3872	1825	3710	-	5535	60.0
2. South Tripura	3581					
3. West Tripura	3033					
Total	10486	1825	3710	-	5535	60.0

<b>Uttar Pradesh</b>						
1. Agra	4805	25	105	-	130	2.71
2. Aligarh	5019	-	-	-	-	-
3. Allahabad	7261	17	35	-	52	0.72
4. Almora	5385	2095	456	-	2551	47.37
5. Azamgarh	5740	-	-	-	-	-
6. Bahraich	6877	575	229	-	804	11.69
7. Ballia	3189	-	-	-	-	-
8. Banda	7624	331	268	-	599	7.86
9. Barabanki	4401	-	8	-	8	0.18
10. Bareilly	4120	-	-	-	-	-
11. Basti	7228	-	4	-	4	0.15
12. Bijnor	4848	275	282	-	557	11.49
13. Budaut	5168	-	6	-	6	0.12
14. Bulandshahr	4352	-	6	-	6	0.14



1	2	3	4	5	6	7	
15.	Chamoli	9125	2519	632	-	3151	34.53
16.	Dehra Dun	3088	1243	327	-	1570	50.84
17.	Deoria	5445	-	3	-	3	0.06
18.	Etah	4446	-	-	-	-	-
19.	Etawah	4326	1	135	-	136	3.14
20.	Faizabad	4511	-	3	-	3	0.07
21.	Farrukhabad	4274	-	3	-	3	0.07
22.	Fatehpur	4152	-	3	-	3	0.07
23.	Garhwal	5440	2156	993	-	3149	57.89
24.	Ghazipur	3377	-	-	-	-	-
25.	Gonda	7352	490	125	-	615	8.37
26.	Gorakhpur	6272	353	88	-	441	7.03
27.	Hamirpur	7165	-	177	-	177	2.47
28.	Hardoi	5986	-	1	-	1	-
29.	Jalaun	4565	-	127	-	127	2.78
30.	Jaunpur	4038	-	-	-	-	-
31.	Jhansi	5024	-	129	-	129	2.57
32.	Kanpur	6176	-	5	-	5	0.08
33.	Kheri	7680	909	403	-	1312	17.08
34.	Lucknow	2528	2	15	-	17	0.67
35.	Mainpuri	4343	-	7	-	7	0.16
36.	Mathura	3811	-	13	-	13	0.34
37.	Meerut	3911	-	21	-	21	0.54
38.	Mirzapur	11310	1140	2049	-	3189	28.20
39.	Moradabad	5967	-	9	-	9	0.15
40.	Muzaffarnagar	4176	-	26	-	26	0.62
41.	Nainital	6794	2946	657	-	3603	53.03
42.	Pilibhit	3499	478	270	-	748	21.38
43.	Pithoragarh	8856	2178	805	-	2983	33.68
44.	Partappgarh	3717	-	-	-	-	-
45.	Raibareli	4609	-	2	-	2	0.04
46.	Ram Pur	2367	-	39	-	39	1.65
47.	Saharanpur	5595	255	452	-	707	12.64
48.	Shahjahanpur	4575	92	8	-	100	2.19
49.	Sita Pur	5743	3	6	-	9	0.16
50.	Sultan Pur	4436	-	8	-	8	0.18
51.	Tehri Garhwal	4421	1734	748	-	2482	56.14
52.	Uttarkashi	8016	2586	461	-	3047	38.01
53.	Unnao	4558	-	-	-	-	-
54.	Varanasi	5091	31	490	-	521	10.23
55.	Lalitpur	5039	215	321	-	536	10.64
56.	Ghaziabad	2590	-	-	-	-	-
Total		294411	22649	10960	-	33609	11.42



1	2	3	4	5	6	7
<b>West Bengal</b>						
1. Bankura	6,882	153	600	-	753	10.94
2. Birbhum	4,545					
3. Bardhaman	7,024					
4. Calcutta	104					
5. Hugli	3,149					
6. Haora	1,467					
7. Maldah	3,733	514	1048	2119	3681	5.86
8. Medinipur	14,081					
9. Murshidabad	5,324					
10. Nadia	3,927					
11. 24 Parganas	14,136					
12. West Dinajpur	5,358					
13. Cooch Behar	3,387	6	27	-	33	0.97
14. Darjiling	3,149	1109	326	-	1435	45.57
15. Jalpaiguri	6,227	1405	132	-	1537	24.68
16. Puruliya	6,259	194	382	-	576	9.20
Total	88752	3381	2515	2119	8015	9.03
<b>Andaman &amp; Nicobar Islands</b>						
1. Andamans	6408	6583	68	971	7622	92.4
2. Nicobars	1841					
Total	8249	6583	68	971	7622	92.4
<b>Chandigarh</b>						
1. Chandigarh	114	4	1	-	5	-
Total	114	4	1	-	5	-
<b>Dadra &amp; Nagar Haveli</b>						
1. Dadra & Nagar Haveli	491	159	47	-	206	41.95
Total	491	159	47	-	206	41.95
<b>Lakshadweep</b>						
1. Lakshadweep	32	-	-	-	-	-
Total	32	-	-	-	-	-



1	2	3	4	5	6	7
<b>Pondicherry</b>						
1.	Karaikal	161	-	-	-	-
2.	Mahe	9	-	-	-	-
3.	Pondicherry	293	-	-	-	-
4.	Yanam	30	-	-	-	-
<hr/>						
	Total	493	-	-	-	-
<hr/>						
<b>Delhi</b>						
1.	Delhi	1483	-	22	-	22
<hr/>						
	Total	1483	-	22	-	22
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Forest of Foot Hill of U.P. : Photo by M.M. Harbola



Mangrove Forest of Tamil Nadu : Photo by Arul Prakasham



## CHAPTER-III

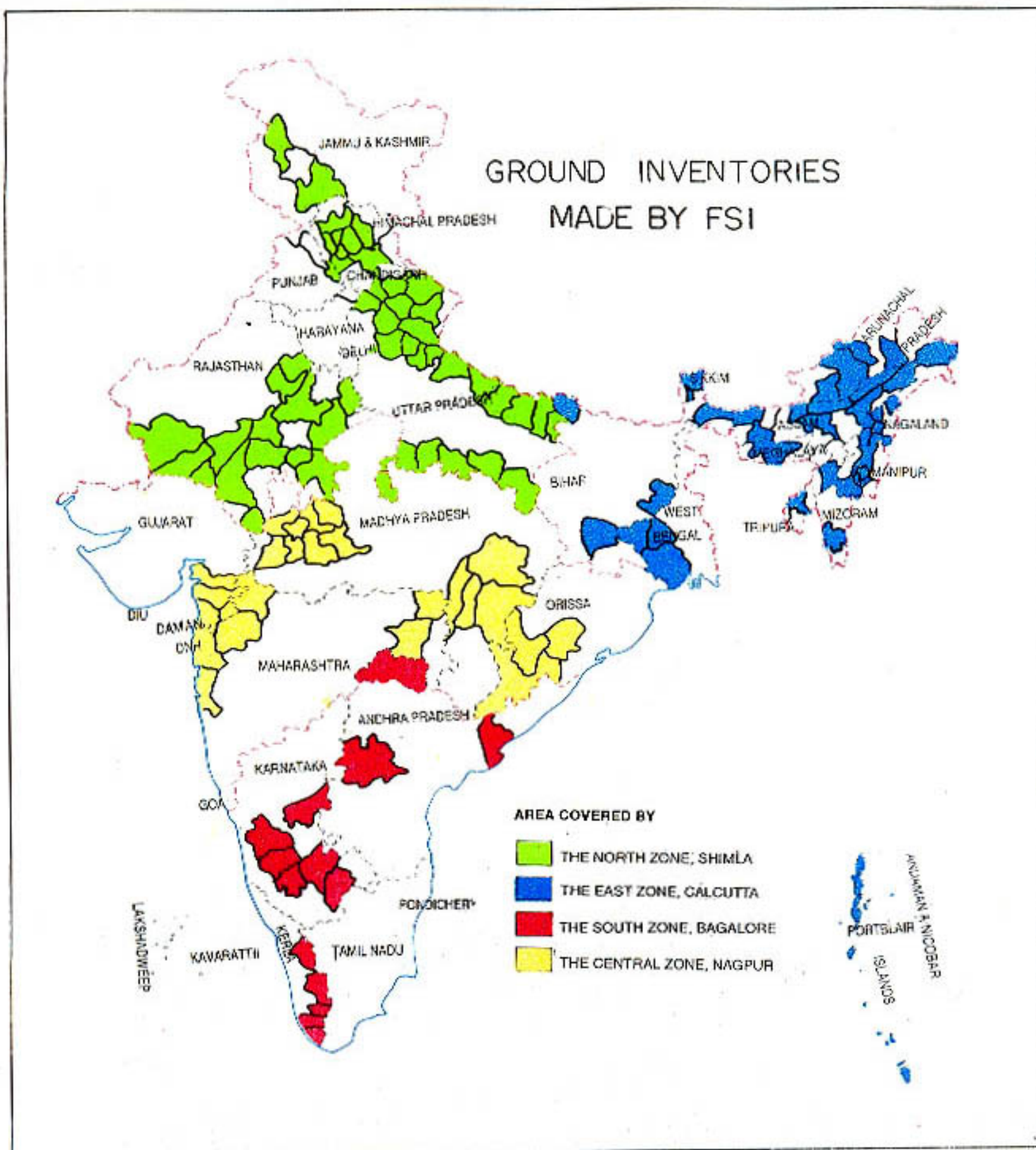
### GROUND INVENTORY

3.1 The Forest Survey of India (FSI) came into existence in 1981 as a successor to the Pre-investment Survey of Forest Resources (PISFR) which was established in 1965 with a limited objective of assessing wood and bamboo availability in certain selected industrial catchments. In the sixteen years of its existence, PISFR had made ground inventories over a forest area of 2.28 lakh sq.km. in India and over a forest area of 0.38 lakh sq.km in Nepal & Bhutan. In the 10 years since its formation, the

FSI has carried out field inventories over an additional forest area of about 3.21 lakh sq.km. After the reorganisation of FSI in 1986 its field inventory work was largely confined to North-Eastern Hill states. The inventories in Nagaland, Meghalaya, Mizoram, Manipur, Assam, Arunachal Pradesh and Tripura have been completed. The details of inventories carried out by FSI in North Eastern Hill states since 1986 are given in the following table:

State	Districts/Forest Divisions Circles/Catchments	Survey period	Forest inventoried area (sq.kms.)
1	2	3	4
Arunachal Pradesh	1. East and West Siang districts	1986-87 1989-91	15610.00
	2. Upper Subansiri district	1989-90	4358.00
	3. Tirap district	1990-91	4471.00
	4. Dibang Valley district	1990-91	8615.30
	5. Lohit district	1989-91	4147.16
Assam	Nowgong, Karbi anglong, Dhubri Goalpara, Kokrajhar, Barpeta, Kamrup, Darrang, Sonitpur, Lakhimpur, Dibrugarh, N.C. Hills, Golaghat, Jorhat, Sibsagar districts	1987-90	23789.36
Manipur	Manipur	1986-88	15154.00
Meghalaya	Meghalaya	1986-88	15125.25
Mizoram	1. Aizwal district	1987-88	12019.00
	2. Lunglei district	1988-89	4151.35
	3. Chhimtuipui district	1988-89	3814.15
Nagaland	Nagaland	1984-87	14955.00
Tripura	Tripura	1989-90	6395.76







3.2 The reports on the inventory of Nagaland, Meghalaya, Manipur, Aizwal district of Mizoram, Upper Subansiri and Lower Subansiri districts of Arunachal Pradesh have been brought out, whereas the reports of Lunglei & Chhimitpui districts of Mizoram, are under preparation. The inventory data of Assam, Tripura, East Siang, West Siang, Tirap, Dibang Valley and Lohit districts of Arunachal Pradesh are under processing.

3.3 The ground inventories have given some valuable basic information about our forests. The growing stock in the country varies from about 7 cu.m. per hectare in districts of Chitradurga, Tumkur, Bellary, Bangalore and Kolar of Karnataka State to as high as 277 cu.m. per hectare in the coniferous forests of Kulu Valley of Himachal Pradesh. The average growing stock is about 79 cu.m. per hectare which compares poorly with the world average of 110 cu.m. per hectare. The average productivity of our forests is only 0.5 cu.m. per hectare per annum against the world average of 2.1 cu.m.

#### **New Inventories**

3.4 During the last 5 years, apart from inventories in the North-Eastern Hill states, field inventories have been carried out in the following areas:

(i) Chitradurga, Tumkur, Bellary, Kolar and Bangalore districts of Karnataka

(ii) Dadra and Nagar Haveli

The data of these field inventories has been processed and the preparation of reports is under progress. In five districts of Karnataka the tree forest area is assessed as 2789.33 sq.kms. The total growing stock is estimated as

2041.31 thousand cu.m. It comes to 7.318 cu.m. per ha. In Dadra & Nagar Haveli the tree forest area is assessed as 186.49 sq.kms. out of the total inventoried forest area of 200 sq.kms. The total growing stock is estimated as 988.333 thousand cu.m. which comes to 53 cu.m. per hectare.

#### **Inventories in the North-Eastern Region**

##### **Upper Subansiri district of Arunachal Pradesh**

3.5 Out of 4358.11 sq.kms. of forest area taken up for forest inventory survey, 3050.36 sq.kms. (69.99%) is under the category of 'assessed forest area'\*. Out of the remaining 1307.76 sq.kms. (30.01%), 92.89 sq.kms. (2.13%) stands permanently diverted for non-forestry uses and 1214.87 sq.kms. (27.88%) is inaccessible. Even out of 3050.36 sq.kms. of assessed forest area, an area of 478.99 sq.kms. is under current and last year's shifting cultivation and 34.83 sq.kms. is under scrub only, 2536.53 sq.kms. is under assessed tree forest and bamboo brakes. The assessed tree forest area is 2484.20 sq.kms. and assessed area under bamboo forest/brakes is 52.33 sq.km.

3.6 The total growing stock, in accessible tree forest area is assessed as 45.40 million cu.m. corresponding to 65.07 million stems.

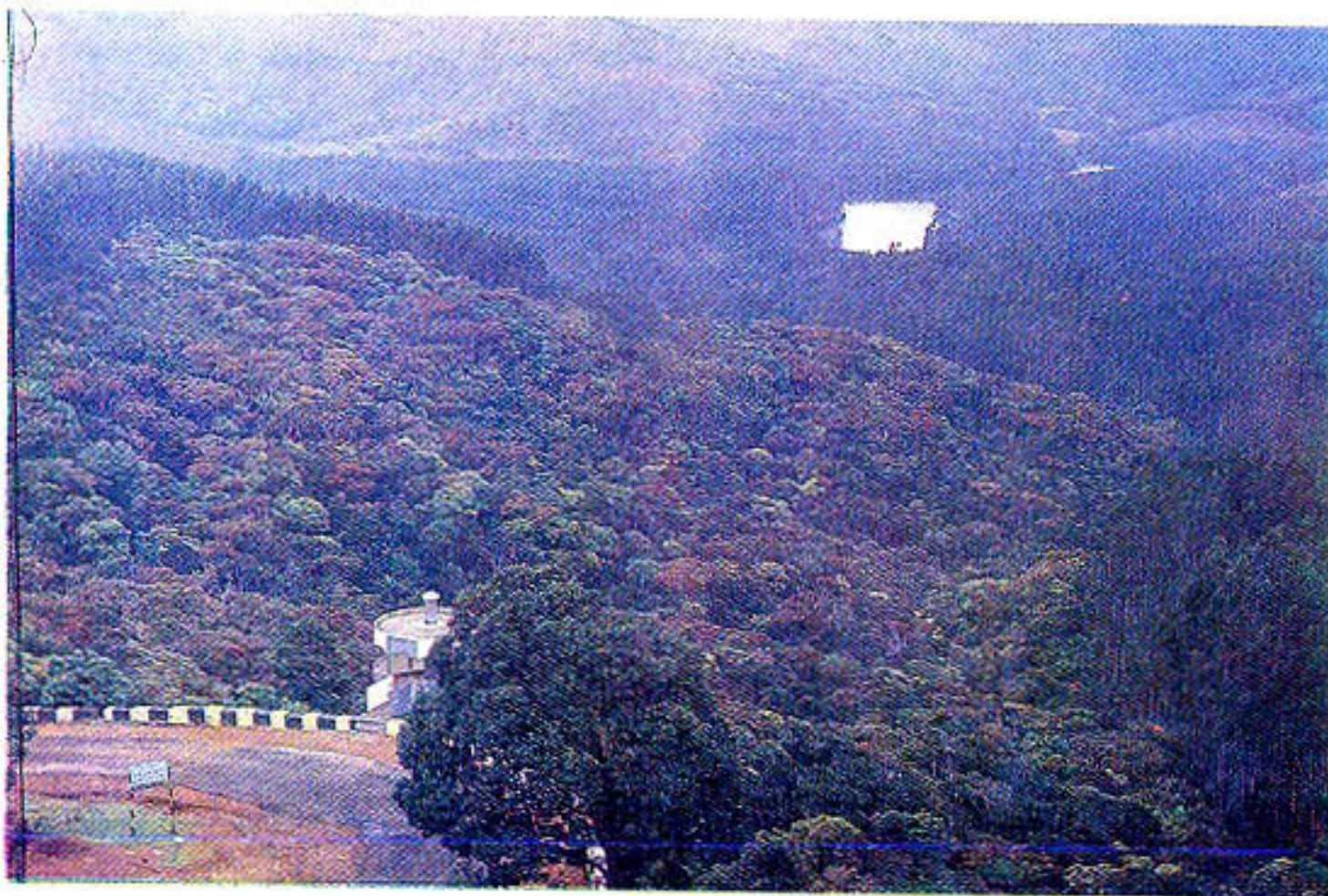
##### **Lower Subansiri district of Arunachal Pradesh**

3.7 The effective forest area for resources estimation was estimated as 6556.70 sq.kms. Three altitudinal strata i.e. (i) upto 900 metre, (ii) 901-1800 metre and (iii) 1801 metre and above were identified. The forest area for resource estimation, timber volume and no. of stems per hectare in three stratum are given below:

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\* The assessed forest area includes all those areas which were surveyed and described and also those areas which could not be visited but were identified on the basis of vicinity visited.





Forest of Tamil Nadu : Photo by Amit Asthana



Forest of Tamil Nadu : Photo by Amit Asthana



Altitudinal Stratum (m)	Forest area for resource estimation (ha)	No. of stems per hectare	Timber volume in M <sup>3</sup> per ha
1	2	3	4
Upto 900	130806	127.777	96.954
901-1800	313082	212.205	140.248
1801 & above	211782	215.433	184.163
Total distt.	655670	196.404	145.795

3.8 No different bamboo strata have been found in this district because of its scattered distribution and sporadic occurrence of bamboos. Bamboo is found to occur alongwith the tree species. Bamboo area was estimated as 1680.26 sq.kms. with growing stock of 27.374 lakh tons.

#### Manipur

3.9 The forest area for resource estimation is assessed as 11264 sq.kms. and bamboo area 3192 sq.kms. The growing stock is estimated as 45.814 cu.m. per hectare. The growing stock of bamboo is assessed as 35.935 tons per hectare.

#### Aizwal district of Mizoram

3.10 According to inventory results the tree forest area in Aizwal district of Mizoram is estimated as 12019 sq.kms. The growing stock of wood and bamboo is estimated as 31197.96 thousand cu.m. and 11837.10 thousand tons respectively.

#### Chitradurga, Tumkur, Bellary, Bangalore and Kolar districts of Karnataka

3.11 The report of these districts is under preparation. In these districts tree forest area is assessed as 2789.33 sq.kms. with growing stock of 2041.310 thousand cu.m. It comes about 7 cu.m. per hectare.

#### Dadra & Nagar Haveli

3.12 The report of field inventory carried out in Dadra & Nagar Haveli is under preparation. According to processed results 186.49 sq.km. is estimated as tree forest area in this Union Territory. The growing stock is assessed as 988.333 thousand cu.m.

#### Assam

3.13 The field inventory in Assam has been carried out in an area of about 23790 sq.km. The tree forest area is assessed at 12390 sq.kms. with growing stock of 202649.4 thousand cu.m. which comes to 163.51 cu.m. per hectare. The data of bamboo are under processing.

3.14 The growing stock and volume of wood/bamboo for different states/union territories based on ground inventories results brought out by FSI since 1989 are given in table 3.1



**Table 3.1**

**GROWING STOCK AND VOLUME**

(Based on results of the ground inventories processed by FSI, 1989 onwards)

S. No.	Name of District/ Region/State	Total forest area		Growing stock		Average per ha	
		Wood ( <sup>000</sup> ha)	Bamboo ( <sup>000</sup> ha)	Wood ( <sup>000</sup> cu.m.)	Bamboo ( <sup>000</sup> tons)	Wood (cu.m.)	Bamboo (tons)
1	2	3	4	5	6	7	8
1.	Arunachal Pradesh						
	(i) Upper Subansiri	205.428	50.302	45395.63	572.183	220.98	11.375
	(ii) Lower Subansiri	655.670	168.026	95593.675	2737.400	145.795	16.296
2.	Manipur	1126.390	319.201	51604.730	11470.484	45.814	35.935
3.	Meghalaya	814.011	3057.28	81978.233	969.468	100.709	3.171
4.	Mizoram (Aizwal distt)	1201.900	-	31197.960	11837.100	25.957	-
5.	Chitradurga, Tumkur, Bellary, Bangalore & Kolar districts of Karnataka	278.933	-	2041.310	-	7.318	-
6.	Dadra & Nagar Haveli	18.649	-	988.333	-	52.996	-
7.	Assam Survey	1239.347	*	202649.400	*	163.510	*

\* The data of bamboo are under processing.







