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GOVERNMENT OF INDIA
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REPORT
ON
INVENTORY OF NON FOREST AREAS
OF
CHHINDWARA DISTRICT
(MADHYA PRADESH)



FOREST SURVEY OF INDIA, CENTRAL ZONE
NAGPUR
2001



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PREFACE

Forest Survey of India, for the first time took up Inventory of non forest areas in 1991 to estimate the growing stock of Trees existing in non-forest land as these growing stock plays very important role in meeting the demand of local population for timber and fuel wood. During the year of 1992 the Central Zone unit of Forest Survey of India, Nagpur conducted a pilot survey in Madhya Pradesh (Geographical area 443446 sq.km.) in entire non-forest area (288032 sq.km.) by taking 19 representative villages from all 12 agro-climatic zones where in the no. of trees were counted in order to work out the sample size for the regular survey to be undertaken in the non-forest area of the State.

Accordingly, 199 sample villages were worked out to be taken for sampling in non-forest area of the State. Further, the no. of sample villages were calculated for each district based on its geographical areas to the whole of the State. In this way for Chhindwara district (Geographical area 11824 km sq.km.), 8 sample villages were randomly selected taking one from each Tahsil, from where detail enumeration of trees were carried out.

The result of survey reveals that the non-forest area (7264 sq.km) of Chhindwara district has over 60 lakhs, trees of various species and diameter classes which corresponds to over 70 lakh cum. Of volume out of which about 66% is contributed from village wood lot and about 17% by farm forestry.

The data analysis was done at Machine Data Management Unit of Forest Survey of India, Dehradun under the guidance of Shri S.K.Chakraborty, Dy.Director. Shri M.D.Singh, STA, prepared the draft report under the guidance of Shri F.S.Jafry, Joint Director and Shri T.S.K.Reddy, Deputy Director, Forest Survey of India, Central Zone, Nagpur. The report was typed by Smt. Gresamma Varghese, Steno. The effort made in bringing out the report by concerned officials is appreciated.

I trust that the report gives ample details about the trees vegetation existing in non-forest area of Chhindwara district which will be quite useful to the user agencies and the planners.

Dr.J.K.Rawat
Director.
Forest Survey of India,
Dehradun.

Acknowledgment

On behalf of Forest Survey of India, Central Zone, Nagpur, the undersigned expresses the deepest gratitude and sincere thanks to the office bearers of the village panchayats and special thanks to the villagers for extending all possible help, co-operation and hospitality to the field staff of this zone, making their stay comfortable and without which the survey work could not be done.

The organization is also thankful to The Collector, Chhindwara and other revenue officials for providing information required for the inventory work and the valuable co-operation extended to the staff during the field work. The organisation expresses its thanks to the Conservator of Forests, Chhindwara Circle, the Deputy conservator of Forests, Chhindwara Forest Division and their field staff who extended their valuable co-operation to the field parties of this office without which it would not have been possible for us to complete the survey work in the stipulated time.

F.S.Jafry I.F.S.
Regional Director
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CHAPTER I

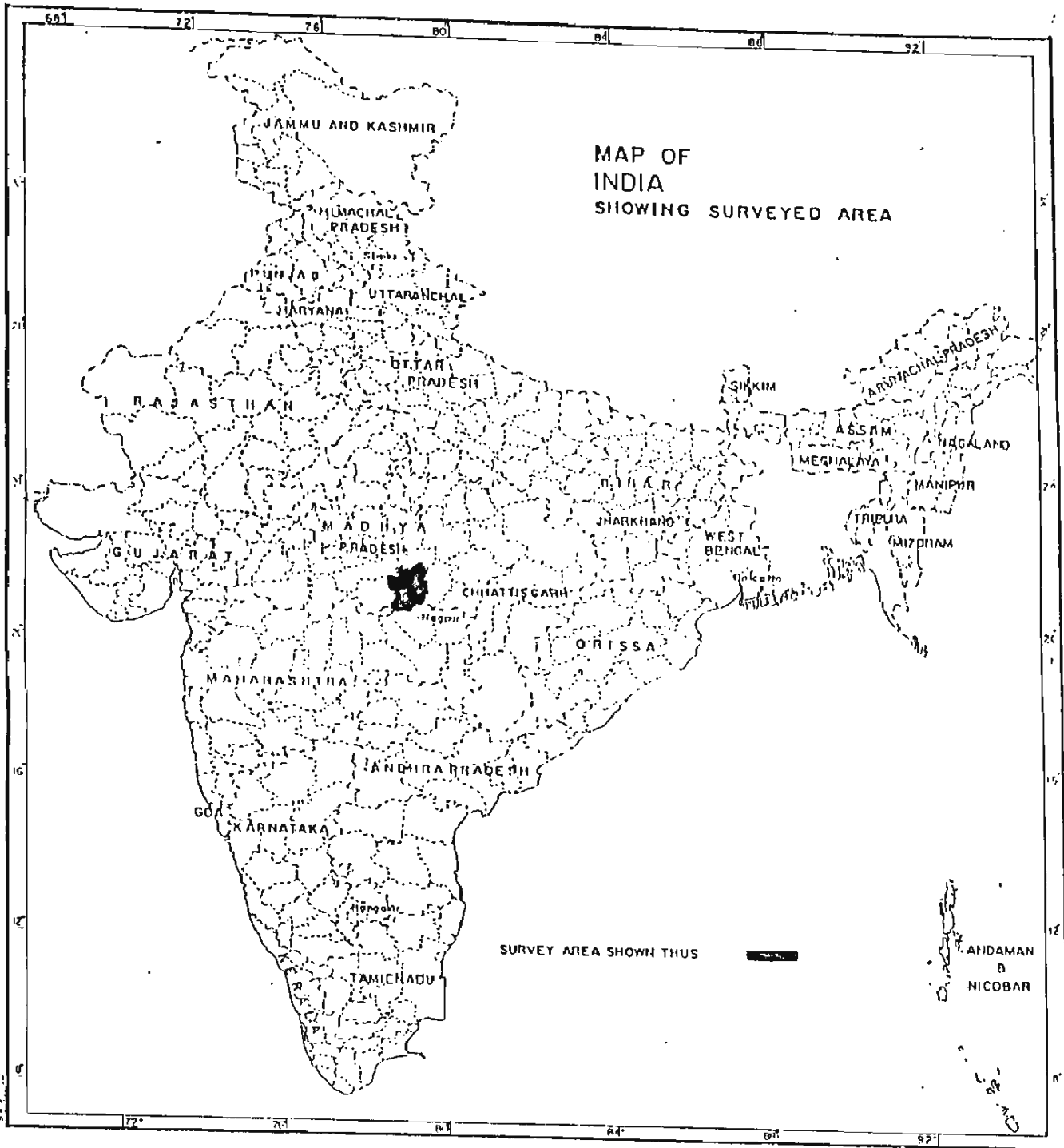
1.0 INTRODUCTION:

The Forest Survey of India has been basically engaged in conducting surveys in forest areas of the country to assess the land uses and growing stock of forest vegetation existing in such land use classes. It also monitors the state of forests, based on satellite data on 2 years cycle, apart from various other special studies like Wood consumption, vegetation mapping, thematic mapping etc. which are undertaken simultaneously. Apart from the forest land, the non-forest areas of the country has also substantial quantity of trees and bamboos in farms and open lands in villages, around ponds and tanks, along roads, canals, and railway lines etc. which contribute significantly towards meeting demands of local people for timber and fuel wood for their building construction furniture, agricultural implements and domestic fuel wood etc. Hence it was decided in 1991 by the organization to undertake inventory of non-forest areas to assess the growing stock of trees and bamboos occurring in different strata of non-forest land such as man made forest under different afforestation programme like social forestry, farm forestry, agro forestry, avenues and canal bank plantation and natural trees growing on open land of villages in the district, This would help in planning a rational strategy for augmenting the local demands of timber and fuel-wood.

The inventory of non-forest area in Chhindwara district was carried out during 1993 along with inventory of forest area.

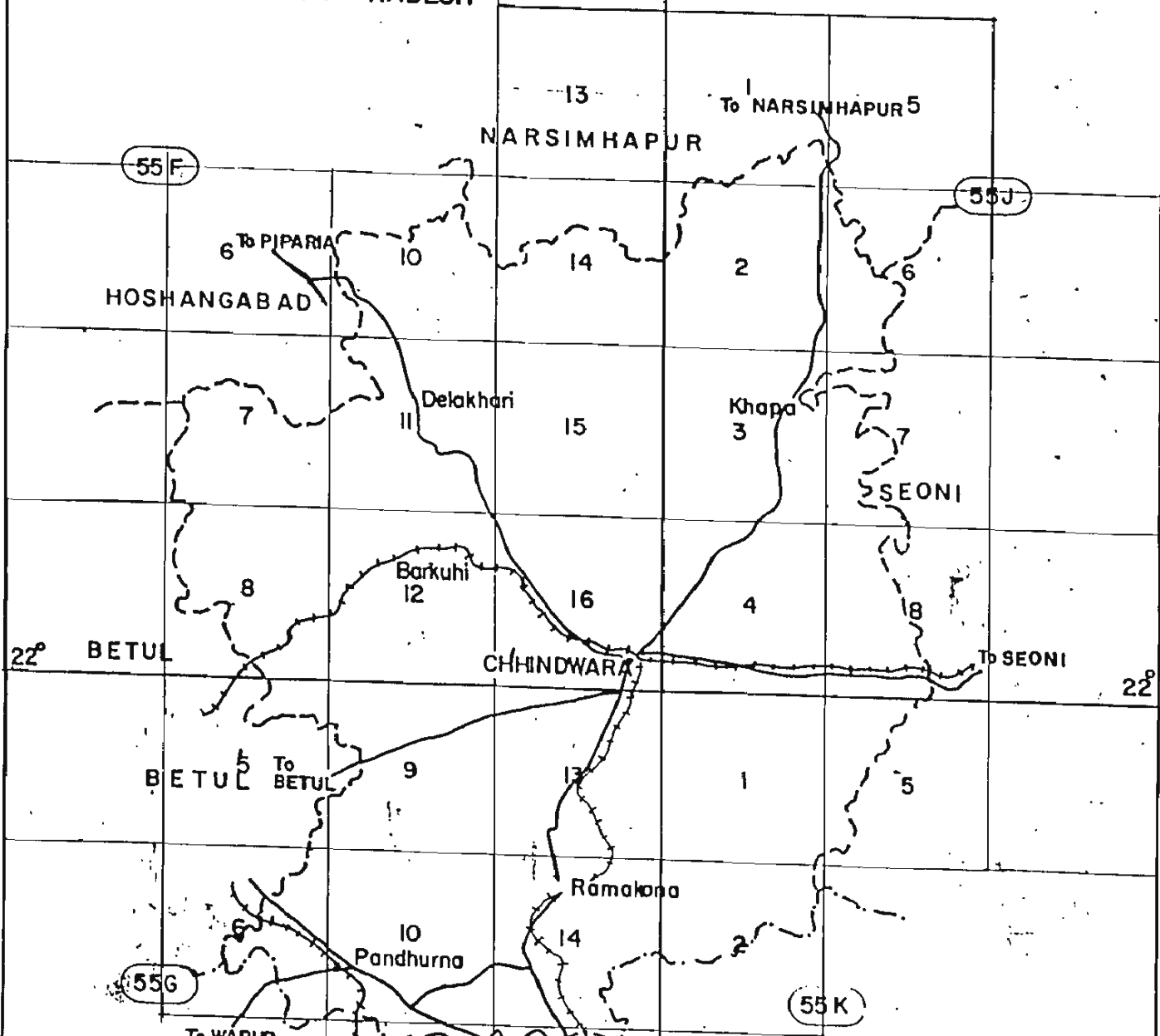
1.1 DESCRIPTION OF THE DISTRICT:

Chhindwara is a backward and tribal dominated district of Madhya Pradesh though various development programmes undertaken by the Government gives rise to development of agriculture and industries. The district was created and constituted in present form in 1956. The district has 9th position in the State with regard to area. It has four Municipal Corporation i.e. Chhindwara, Pandhurna, Jamai and Parasia and 8 Municipalities i.e. The



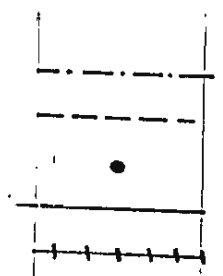
MAP OF
CHHINDWARA DISTRICT
OF MADHYA PRADESH

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INDEX :-

- STATE BOUNDARY
- DISTRICT BOUNDARY
- DISTRICT Hd.Qtr.
- ROAD
- RAILWAY



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district has six revenue Sub divisions and 8 Tahsils with 11 developments blocks. In all there are 22 towns and 1984 villages in the district as per 1991 Census.

1.2 LOCATION OF THE AREA:

Chhindwara district is situated in Southern portion of Madhya Pradesh which lies between 21° 28' and 22° 49' north latitudes and between 78°-10 and 79°-24' east longitudes. The district extends from Nagpur plains in Maharashtra in south to the Narmada valley in the north. On the extreme west it is bounded by Betul and on the east by Seoni district of Madhya Pradesh. The district of Narsingpur and Hoshangabad form its boundary in the north while Nagpur and Amravati districts of Maharashtra forms most of its southern boundary.

1.3 AREA:

As regards area the district has 9th position in the State constituting 2.66% of the State's area. The total geographical area of the district is 11824 sq.km. out of which forest covers 4560 sq.km. and remaining 7264 sq.km. is non-forest area. The geographical area of the district as per 1991 Census is 11815 sq.km.

1.4 TOPOGRAPHY:

The general topography of the district is hilly and undulating. The Principal range of hill is the Satpura which lies from east to west in the north of the district. The general slope is towards south. Height varies from 472.44 m to 1164.34 m above Mean sea level.

The Dudhi, the Kanhan, the Pench, the Jam, the Kulbehra and the Shakhar are the main rivers of the district. The river Dudhi and the Shakhar are drained away towards the Narmada river. Major rivers drain to the Benganga river.

1.5 CLIMATE AND RAINFALL:

The climate of the district is of extreme type. April and May are the hottest months having maximum temperature from 36 to 41°C. December and January are the coldest months of the year having minimum temperature from 7° to 10° C. Due to physiographical division, plains of Saunsar have a hot climate and high altitudinal northern portions have a cooler climate, where as temperature in the Central portion of the district is moderate. Average rainfall is 1000 to 1100 mm.

1.6 POPULATION:

The total population of Chhindwara district as per 1991 Census is 15,68702 in which the ratio of female to male is 953 to 1000. The growth of population from 1981 to 1991 has been 27.21%. The population of Scheduled caste and Scheduled tribes in the district are 191419 and 540708 respectively. The literacy rate of the district is 39.08%.

1.7 LAND USE PATTERN:

The land use pattern in the district is as below:

		Area in ha (lakhs)	Percentage
1	Geographical Area	11.85	
2	Forest Area	4.58	38.48
3	Land used for non-agricultural purposes	0.52	4.39
4	User lands	0.58	4.89
5	Grazing land	0.58	4.90
6	Fallow lands	0.70	5.91
7	Cultivable lands	4.91	41.43

Out of 4.91 lakhs ha of cultivable land 0.62 lakh ha (12.63%) area are irrigated.

1.8 SOCIO ECONOMIC FEATURES:

The district is basically agriculture based. The people mostly depends upon agricultural produce. Forest also contribute significantly to provide employment to the local people in undertaking various developmental programmes. There are few industrial units. Coal industry is the main industry which are running by Western Coal fields Limited as Coal is the main mineral which is extracted from the district. The annual average production of coal is around 40 lakh MT. An other important industry is Raymond Industries which prepares variety of clothes from synthetic and woolen fibers.

1.9 CATTLE POPULATION:

Total cattle population of the district is around 12 lakh heads which includes cows, buffaloes, sheep and goats.

CHAPTER II

2.1 DESIGN AND METHODOLOGY OF NON FOREST INVENTORY: PILOT SURVEY:

In order to decide the Sample size i.e. no. of sample villages to be taken for non forest inventory, a pilot survey was conducted in the State taking 19 representative villages from all agro-climatic zones. The entire geographical area of Madhya Pradesh (443446 km²), having 45 districts are comprised of twelve agro-climatic zones. The forest and non-forest area of the State are 155414 and 288032 km² respectively. The total inhabited villages in the State are 76468 (1991 Census). On the basis of pilot survey 199 sample villages were determined and distributed among various districts of Madhya Pradesh according to their geographical area. For Chhindwara district having geographical area of 11824 km², 5 sample villages were required for survey. But few more samples were taken in Chhindwara district in order to have proper representation for each Tehsil.

2.2 SELECTION OF SAMPLE VILLAGE FOR REGULAR SURVEY:

As indicated above only 5 villages were required for data collection for non-forest inventory. However, in order to have adequate representation from each Tahsil few more villages were taken i.e. in all 8 sample villages one from each Tahsil were randomly selected for this purpose as mentioned below:

Name of Tahsil	Area	Sample village	Mapsheet
Tamia	298780	Jonewadi	55J/11
Paracia	250650	Saliwada	55 J/16
Junardeo	205381	Sheradhekni	55 J/8
Panduma	803302	Palaspani	55 K/9
Chhindwara	355659	Sunarimahgaon	55 O/1
Sonsar	231689	Kareli	55 K/14
Amarwada	214598	Kukerpani	55 N/2
Chowrai	222883	C hichgaon	55 N/4

2.3 DEFINITION OF NON FOREST AREA:

For the purpose of this survey all those areas which are outside the forest land shown by green wash on the toposheet or by indicating Reserved Forest, Protected Forest or Unclassed Forest boundaries, have been considered as non-forest. Mostly the revenue land falls under this category which has been taken for this purpose whether it is, under private occupation or under panchayat or any community.

2.4 FIELD METHODOLOGY:

The selected sample villages were allotted to four crews each consisting of one JTA. One Dy.Ranger, two Field Man one Khalasi and two local unskilled labourer to assist the crews in camping arrangement and showing boundaries of the villages during data collection. The sample villages were marked on topo-sheets also to facilitate approach and location of villages by shortest convenient route. On reaching sample village the next job of the crew was to determine the boundary of village. For this purpose they take help of revenue maps taken from Revenue Department and the local people.

The sampling unit was the whole of sample village. To begin the data collection it was necessary to select the starting/reference point preferably some conspicuous objects like well/temple/School etc. It need not necessarily be a geometrical center of the village. The selected starting point/reference point was described in the Village Description Form. This is important to facilitate checking of work by the check crew or Supervising Officer.

After fixing the starting point/reference point , the enumeration work was started from reference point by dividing the entire village into suitable sized angular quadrants with the help of compass in such a way that enumeration with each angular quadrant could be completed easily without missing any tree/bamboo clump. The enumeration of all trees having diam 10 cm

and over with all bamboo clumps were carried out and recorded in the enumeration forms beginning from North direction and proceeding towards clockwise direction. This procedure is important to avoid duplication/ Omission of trees/bamboo clumps. All enumerated trees/bamboo clumps were marked with chalk stick to check any omission/duplication of work.

The data were collected on following field forms.

(1) Village Description Form:

The information regarding the location of village, description of reference point, various measurements taken by field staff date of survey and abstract of enumeration by quadrants/data is collected on this form. Sample is annexed with the report.

(2) District Tree Form:

This form is filled in for each sample village. The information like State, district, total no. of villages in the district, no. of sample villages in the district, area of sample village, category of village is collected together with the abstract of enumeration by various categories. The sample is annexed on the report.

(3) Village Tree Enumeration Form:

All the trees having diam 10 cm and above occurring in non-forest area were enumerated in this form.

(4) Village Bamboo Enumeration Form:

The enumeration of bamboo clump occurring in non forest area of sample village was done in this form by recording its diam at base of the clump. The sample is annexed in the report.

(5) Village Sample Bamboo Enumeration and clump Analysis Form:

The enumerated clumps bearing S.No. 1,9,17,25 (1st clump and every 8th clump there after) of each species occurring in sample village will be analysed in detail and recorded in this report.

(6) Village Bamboo Weight Form:

The length and weight of two Green representative bamboo for each species is recorded in this form. The sample is annexed in the report.

While carrying out the survey, the trees were enumerated by its category. The category of each tree was indicated in the form against the enumerated trees. For this purpose the following categories of trees were identified:

- (1) Farm Forestry: Trees along the farm bunds and in small patches upto 0.1 ha in area.
- (2) Road side Plantation: Trees planted along road side.
- (3) Village wood lot: Naturally growing trees on community/private land.
- (4) Block Plantation: Plantation patches covering an area of more than 0.1 ha and not falling in any of above categories.
- (5) Ponds : Trees planted in and around ponds
- (6) Railway Lines : Trees planted along railway lines
- (7) Canals: Trees planted along canals.
- (8) Rest : Trees not falling in any of the above categories.

2.5 DATA COLLECTION FROM SAMPLE VILLAGES:

The selected villages were allotted to field parties who had collected data from these sample villages on various field forms designed for this purpose as explained in above paragraph.

The field forms were checked in zonal office and sent to Data Processing Unit of head quarter Dehradun (F.S.I.) where the data was processed and various stand and stock tables prepared. The abstract of data collected from 8 sample villages of Chhindwara district is mentioned below:

S.No.	Name of sample villages selected	Tahsil	Area in sq.km	Total trees enumerated	Total Bamboo clump
1	Jonawadi	Tamia	626	8293	70
2	Saliwada	Paracia	251	2439	12
3	Sheradhekni	Junardeo	205	6007	34
4	Palaspani	Pandhurna	803	9360	18
5	Sunari mohgaon	Chhindwara	356	2100	7
6	Karli	Sonsar	674	2613	1
7	Kukerpani	Amarwada	804	2699	0
8	Chichgaon	Chawrai	1220	8381	18
9	8 villages	8 Tahsils	4939	41892	160

CHAPTER III

DATA PROCESSING

3.1 PROCESSING OF DATA:

After completion of field work, the field forms of the sample villages were consolidated and checked for inconsistencies and coding mistakes (if any). The data from each village was entered in personal computer and the distribution of trees in each diameter class for each category of tree was obtained species-wise. For this purpose, the software package D base IV was used by suitably developed programme. This frequency distribution was entered in another package MS EXCEL and data was analyzed by using ratio method of estimation to arrive at final estimate.

Since many of the species in the district occurred in small numbers, they were clubbed together under Miscellaneous species. For Chhindwara district of Mahdya Pradesh 17 main species were selected for calculating the number of stems, on the basis of their numerical occurrence, commercial importance and regional importance.

3.2 AREA COMPUTATION:

Rural area of the district was calculated by adding up the areas of the villages given in the Census Book of 1981 of that district. The non forest area of Chhindwara district is 7264 km².

3.3 VOLUME ESTIMATION:

Collection of felled tree data has been discontinued for developing volume equations. Instead, it was decided to prepare local volume table of Chhindwara district by using the local volume equations developed during the forest inventory of the district. In the absence volume equations of any species LVE of that species for adjacent area were taken into consideration. By superimposing the local volume table on the stem distribution the volume was estimated. The volume table so prepared and used in estimation of growing stock of non-forest area of Chhindwara district is annexed as Table no. 3.3T in the report.

3.4 ESTIMATION PROCEDURE:

The estimation procedure is given below:

Let x_i = area of the i th village

y_i = Volume/no. of trees for the i th village

n = no. of sample villages in the district/State

N = total no. of villages in the district/State

$$\bar{x} = \sum_1^n \frac{x_i}{n} = \text{average area per village in the sample}$$

$$\bar{X} = \sum_1^N \frac{X_i}{N} = \text{average area per village in the population}$$

(district/State)

$$\bar{y} = \sum_1^n \frac{y_i}{n} = \text{average volume/no. of trees in sample}$$

$$\bar{Y} = \sum_1^N \frac{Y_i}{N} = \text{average volume/ no. of trees in population}$$

district/State

$$A = \sum_1^N X_i = \text{Total area of all villages in the population}$$

district/State

Then the mean volume/no. of trees per unit area for population (district/State) is given by.

$$\hat{R} = \frac{\bar{Y}}{\bar{X}}$$

The estimate of R is sample ratio

$$R = \frac{\sum_1^n y_i}{\sum_1^n x_i} =$$

The estimate of total volume/no. of trees in the population (district/State) is given by

$$\hat{T} = A \times \frac{y}{x} = A \times \hat{R}$$

Estimated variance of R is given by

$$V(\hat{R}) = \frac{N-n}{Nn} \times \frac{1}{x^2} \times \frac{1}{(n-1)} \times \left[\sum_1^n y_i^2 - 2\hat{R} \sum_1^n y_i x_i + \hat{R}^2 \sum_1^n x_i^2 \right]$$

When N is larger then

$$V(R) = \frac{1}{n(n-1)} \times \frac{1}{x^2} \times \frac{1}{(n-1)} \left[\sum_1^n y_i^2 - 2\hat{R} \sum_1^n y_i x_i + \hat{R}^2 \sum_1^n x_i^2 \right]$$

Estimated variance of T is given by $\hat{V}(\hat{T}) = A^2 \times \hat{V}(\hat{R})$

$$\text{SE of } \hat{R} = \sqrt{\hat{V}(\hat{R})} \quad \text{and SE \%} = \frac{S.E.}{\hat{R}} \times 100$$

$$\text{SE of } \hat{T} = \sqrt{\hat{V}(\hat{T})} \quad \text{and SE\%} = \frac{S.E.}{\hat{T}} \times 100$$

CHAPTER IV

STAND AND STOCK ESTIMATION

4.1 ENUMERATED DATA:

The distribution of enumerated data of 8 sample plots having an area of 4939.03 ha, has been shown in table no. 4.1T(1) for all categories combined, in table no. 4.1T(2) for all diameter classes combined and in table no. 4.1T(3) for all species combined, which are annexed with the report.

4.2 GROWING STAND ESTIMATION:

On the basis of data collected from these 8 sample villages the estimation of total growing stand (stems) have been made for the entire non-forest area (726400 ha) of Chhindwara district. The distribution of estimated stand has been shown in table no. 4.2T(1) for all categories combined, in table no. 4.2 T(2) for all diameter classes combined and in table no. 4.2T(3) for all species combined which are annexed with the report. The abstract of estimated growing stand is produced below:

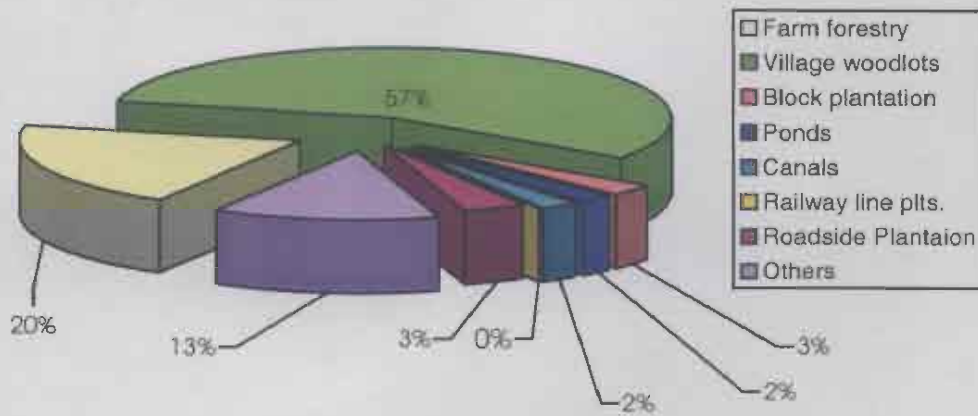
S.No.	Category	Total no. of trees	Percentage	Stem/ha
1	Farm Forestry	1216148	20.03	1.67
2	Road side plantation	206780	3.41	0.28
3	Village Wood lot	3412394	56.22	4.7
4	Block Plantation	174867	2.88	0.24
5	Ponds	122507	2.02	0.17
6	Railway lines	882	0.01	0
7	Canals	138980	2.29	0.19
8	Rest	797872	13.15	1.1
	Total	6070430	100	8.36

The estimation shows that in all about 6070430 trees at the rate of 8.36 trees per ha are existing in non-forest area of Chhindwara district. Out of this village wood lot has contributed more

than half i.e. 56.21% followed by farm forestry (20.03%). The contributions of other categories are very little.

Though 17 main species have been identified for which the estimation of growing stock was made yet only few species are leading. They are *Madhuca latifolia* (14.84%), *Tectona grandis* (14.81%), *Terminalia chebula* (14.4%), *Terminalia crenulata* (4.19%), *Terminalia arjuna* (3.31%) and *Accacia arabica* (2.4%) etc.

Percentage of Stems under various Categories.



4.3 GROWING STOCK ESTIMATION:

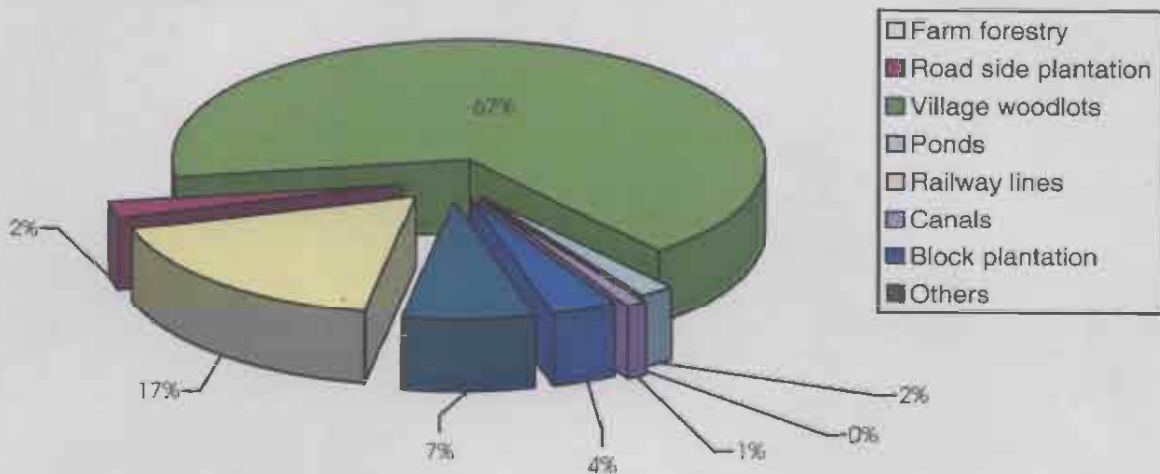
The estimation of growing stock of trees estimated above, also been made using local volume table (no. 3.3T) of Chhindwara district which was prepared by applying local volume equation derived during forest inventory of Chhindwara and other neighbouring districts where Forest Survey of India has conducted forest Inventory. Since there was no local volume table for trees occurring in non-forest areas, the table available for forest areas was applied to compute volume of trees found in non-forest lands and in estimation of growing stock in such areas.

The distribution of estimated stock has been shown in table No. 4.3T(1) for all categories combined in table No. 4.3T(2) for all diameter class combined and in table no. 4.3T(3) for all species combined. The abstract of estimated volume in non-forest area of Chhindwara district is produced below:

S.No.	Category	Total stems	Total volume in cu.m.	Volume Percentage	Vol/ha
1	Farm Forestry	1216148	1220382	17.42	1.68
2	Road side plantation	206780	157416	2.25	0.22
3	Village Wood lot	3412394	4655478	66.46	6.41
4	Block Plantation	174867	249582	3.56	0.34
5	Ponds	122507	125908	1.8	0.17
6	Railway lines	882	906	0.01	0
7	Canals	138980	92755	1.32	0.13
8	Rest	797872	502832	7.18	0.69
	Total	6070430	7005259	100	9.64

The above table shows that over 70 lakh cu.m. Of volume has been estimated from 60.7 lakhs trees of different species and diameter classes. The village wood lot has contributed over 66% followed by farm forestry (17.42%). Out of this volume about 60% is utilizable as timber in house building, furniture making and agricultural implements while about 40% is utilizable as domestic fuel wood.

Percentage of volume under various categories.



4.4 CONCLUSION:

The result of the survey indicates that there is substantial quality of trees occurring in non-forest area which support the demand of local people for timber and fuel wood. Under the condition when forest wealth is depleting day-by-day due to pressure of population both in terms of area as well as vegetation cover, the trees growth existing in non-forest area has greater contribution to meet day-today demand of local people. Apart from this, the villagers earn good amount of money from selling of their timber and fuel wood to others villagers and also to near by towns. It helps them to rise their socio-economic condition as well.

It is advisable that planting of trees in non-forest land is encouraged at all levels to individual and also to the community at large. This will help in many folds i.e. the pressure on government forest will be reduced to some extent and the socio-economic condition of the local people will also be improved, besides improvement in environmental conditions of the areas.

NON FOREST AREA SURVEY REPORT

TABLE NO. 3.3T

VOLUME TABLE FOR NON FOREST AREA SURVEY OF CHHINDWARA DISTT OF MADHYA PRADESH.

S.NO.	NAME OF SPECIES	10-20	20-30	30-40	40-50	50-60	60-70	>70
1	Acacia arabica	0.108	0.405	0.903	1.588	2.445	3.46	4.619
2	Acacia catechu	0.095	0.311	0.673	1.18	1.833	2.631	3.574
3	Anogeissus latifolia	0.137	0.492	1.067	1.818	2.703	3.678	4.7
4	Bombax celiba	0.096	0.412	1.029	1.946	3.164	4.683	6.503
5	Boswellia serrata	0.151	0.475	1.021	1.821	2.91	4.319	6.083
6	Diospyros melanoxylon	0.126	0.448	1.016	1.829	2.889	4.194	5.745
7	Lagerstroemia parviflora	0.135	0.457	0.973	1.984	2.588	3.687	4.98
8	Lannea coromandelica	0.108	0.439	0.995	1.754	2.698	3.806	5.059
9	Madhuca latifolia	0.108	0.405	0.903	1.588	2.445	3.46	4.619
10	Mangifera indica	0.108	0.405	0.903	1.588	2.445	3.46	4.619
11	Mitragyna parviflora	0.111	0.421	0.944	1.68	2.631	3.794	5.172
12	Pterocarpus marsupium	0.192	0.517	1.09	1.947	3.113	4.607	6.444
13	Tectona grandis	0.139	0.461	0.965	1.647	2.508	3.546	4.761
14	Terminalia arjuna	0.108	0.405	0.903	1.588	2.445	3.46	4.619
15	Terminalia belerica	0.133	0.491	1.076	1.887	2.925	4.188	5.679
16	Terminalia chebula	0.108	0.405	0.903	1.588	2.445	3.46	4.619
17	Terminalia crenulata	0.128	0.464	1.063	1.915	3.014	4.359	5.947
18	Other species	0.108	0.405	0.903	1.588	2.445	3.46	4.619

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.1 T(1)

ENUMERATION DATA OF NON FOREST AREA IN CHINDWARA(RURAL)DISTRICT OF MADHYA PRADESH.											
ALL CATEGORIES COMBINED		Area 4,939.030 ha									
S.NO.	NAME OF SPECIES	DIAMETER CLASS								TOTAL	
		10-20	20-30	30-40	40-50	50-60	60-70	>70			
1	Acacia arabica	264	324	209	130	35	22	5	989		
2	Acacia catechu	130	95	26	8	0	0	0	259		
3	Anogeissus latifolia	90	140	106	32	8	5	4	385		
4	Bombax ceiba	58	59	29	15	16	14	37	228		
5	Boswellia serrata	7	5	7	7	1	0	0	27		
6	Diospyros melanoxylon	110	50	28	23	7	2	0	220		
7	Lagerstroemia parviflora	437	278	114	44	14	6	11	904		
8	Lannea coromandelica	99	67	74	49	21	6	9	325		
9	Madhuca latifolia	200	408	1048	1249	855	609	1758	6127		
10	Mangifera indica	183	172	171	188	125	124	382	1345		
11	Mitragyna parviflora	41	51	34	33	21	8	23	211		
12	Pterocarpus marsupium	9	9	3	2	2	0	2	27		
13	Tectona grandis	2911	1913	907	293	65	15	8	6112		
14	Terminalia arjuna	369	314	223	131	96	74	159	1366		
15	Terminalia belerica	75	43	28	18	5	5	12	186		
16	Terminalia chebula	32	861	1980	1527	638	353	554	5945		
17	Terminalia crenulata	669	496	297	138	58	33	40	1731		
18	Miscellaneous	6242	4242	2263	1060	392	214	475	14888		
	Total	11926	9527	7547	4947	2359	1490	3479	41275		

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.1 T(2)

ALL DIAMETER CLASS COMBINED		Area 4,939.030 ha											
ENUMERATION DATA OF NON FOREST AREA IN CHINDWARA(RURAL)DISTRICT OF MADHYA PRADESH.													
S.NO.	NAME OF SPECIES	CATEGORY											TOTAL
		I	II	III	IV	V	VI	VII	VIII				
1	Acacia arabica	1	125	797	1	3	0	62	0	989			
2	Acacia catechu	51	7	139	0	0	0	29	33	259			
3	Anogeissus latifolia	85	5	163	0	1	0	1	130	385			
4	Bombax ceiba	50	7	138	15	2	0	3	13	228			
5	Boswellia serrata	8	0	9	2	0	0	2	6	27			
6	Diospyros melanoxylon	70	6	71	1	3	0	11	58	220			
7	Lagerstroemia parviflora	165	25	506	2	0	0	15	191	904			
8	Lannea coromandelica	73	22	133	1	8	0	14	74	325			
9	Madhuca latifolia	1314	50	4395	138	15	2	23	190	6127			
10	Mangifera indica	171	71	569	486	6	0	38	4	1345			
11	Mitragyna parviflora	60	2	43	0	6	0	1	99	211			
12	Pterocarpus marsupium	7	1	9	0	1	0	5	4	27			
13	Tectona grandis	2398	91	1215	0	194	0	0	2214	6112			
14	Terminalia arjuna	111	5	218	0	413	0	16	603	1366			
15	Terminalia bellerica	29	35	35	5	10	0	55	17	186			
16	Terminalia chebula	4	1	5932	5	0	3	0	0	5945			
17	Terminalia crenulata	196	30	1229	1	24	0	140	111	1731			
18	Miscellaneous	3476	923	7601	532	147	1	530	1678	14888			
	Total	8269	1406	23202	1189	833	6	945	5425	41275			

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.1 T(3)													
ENUMERATION DATA OF NON FOREST AREA IN CHINDWARA(RURAL)DISTRICT OF MADHYA PRADESH.													
ALL SPECIES COMBINED													
Area 4,939.030 ha													
S.NO.	NAME OF SPECIES	10-20	20-30	30-40	40-50	50-60	60-70	70+	DIAMETER CLASS				TOTAL
1	I	2850	2073	1445	669	378	254	600					8269
2	II	514	417	236	121	44	27	47					1406
3	III	4896	4766	4809	3639	1676	1021	2395					23202
4	IV	405	211	139	125	60	55	194					1189
5	V	265	232	146	63	33	30	64					833
6	VI	1	0	4	0	1	0	0					6
7	VII	373	294	152	69	19	12	26					945
8	VIII	2622	1534	616	261	148	91	153					5425
	Total	11926	9527	7547	4947	2359	1490	3479					41275

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.2 T(1)

DISTRIBUTION OF ESTIMATED TREES BY SPECIES AND DIAMETER CLASSES OF NON FOREST AREA IN CHINDWARA(RURAL)DISTRICT OF M.P.

ALL CATEGORIES COMBINED		Area 726400 ha												
S.NO.	NAME OF SPECIES	DIAMETER CLASS										TOTAL	Percentage of trees	Stem per ha
		10-20	20-30	30-40	40-50	50-60	60-70	>70						
1	Acacia arabica	38827	47652	30738	19119	5147	3235	735	145453	2.4	0.2			
2	Acacia catechu	19119	13972	3824	1176	0	0	0	38091	0.63	0.05			
3	Anogeissus latifolia	13237	20589	15590	4706	1176	735	588	56621	0.93	0.08			
4	Bombax ceiba	8530	8677	4265	2206	2353	2059	5442	33532	0.55	0.05			
5	Boswellia serrata	1029	735	1029	1029	147	0	0	3969	0.07	0.01			
6	Diospyros melanoxylon	16177	7353	4118	3382	1029	294	0	32353	0.53	0.04			
7	Lagerstroemia parviflora	64272	40886	16766	6471	2059	882	1618	132954	2.19	0.18			
8	Lannea coromandelica	14560	9853	10883	7206	3088	882	1323	47795	0.79	0.07			
9	Madhuca latifolia	29415	60006	154132	183694	125747	89568	258556	901118	14.84	1.24			
10	Mangifera indica	26914	25296	25149	27651	18385	18238	56182	197815	3.26	0.27			
11	Mitragyna parviflora	6031	7501	5000	4853	3089	1176	3383	31033	0.51	0.04			
12	Pterocarpus marsupium	1323	1323	441	294	294	0	294	3969	0.07	0.01			
13	Tectona grandis	428131	281352	133396	43093	9560	2206	1176	898914	14.81	1.24			
14	Terminalia arjuna	54271	46180	32796	19266	14120	10883	23385	200901	3.31	0.28			
15	Terminalia belerica	11030	6324	4116	2646	735	735	1764	27350	0.45	0.04			
16	Terminalia chebula	4706	126630	291205	224581	93833	51917	81479	374351	14.4	1.2			
17	Terminalia crenulata	98392	72949	43680	20296	8530	4854	5882	254583	4.19	0.35			
18	Miscellaneous	918033	623885	332826	155897	57653	31474	69860	2189628	36.07	3.01			
	Total	1753997	1401163	1109954	727566	346945	219138	511667	6070430	100	8.36			
	Percentage of trees	28.89	23.08	18.28	11.99	5.72	3.61	8.43	100					
	Stem per ha	2.41	1.93	1.53	1	0.48	0.3	0.7	8.36					

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.2 T(2)

DISTRIBUTION OF ESTIMATED TREES BY SPECIES AND CATEGORIES OF NON FOREST AREA IN CHINDWARA(RURAL)DISTRICT OF M.P.

S.NO. NAME OF SPECIES		ALL DIAMETER CLASS COMBINED													TOTAL	Percentage of trees	Stem per ha
		Area 726400 ha															
		CATEGORY															
		I	II	III	IV	V	VI	VII	VIII								
1	Acacia arabica	147	18383	117217	147	441	0	9118	0	145453	2.4	0.2					
2	Acacia catechu	7501	1029	20443	0	0	0	4265	4853	38091	0.63	0.05					
3	Anogeissus latifolia	12501	735	23972	0	147	0	147	19119	56621	0.93	0.08					
4	Bombax ceiba	7354	1029	20298	2205	294	0	441	1911	33532	0.55	0.05					
5	Boswellia serrata	1176	0	1323	294	0	0	294	882	3969	0.07	0.01					
6	Diospyros melanoxylon	10294	882	10442	147	441	0	1617	8530	32353	0.53	0.04					
7	Lagerstroemia parviflora	24267	3677	74419	294	0	0	2206	28091	132954	2.19	0.18					
8	Lannea coromandelica	10736	3234	19560	147	1176	0	2059	10883	47795	0.79	0.07					
9	Madhuca latifolia	193255	7353	646387	20296	2206	294	3382	27945	901118	14.84	1.24					
10	Mangifera indica	25149	10444	83686	71478	882	0	5588	588	197815	3.26	0.27					
11	Mitragyna parviflora	8825	294	6324	0	882	0	147	14561	31033	0.51	0.04					
12	Pterocarpus marsupium	1029	147	1323	0	147	0	735	588	3969	0.07	0.01					
13	Tectona grandis	352683	13384	178694	0	28532	0	0	325621	898914	14.81	1.24					
14	Terminalia arjuna	16325	735	32061	0	60741	0	2353	88686	200901	3.31	0.28					
15	Terminalia belerica	4264	5147	5147	735	1470	0	8088	2499	27350	0.45	0.04					
16	Terminalia chebula	588	147	872440	735	0	441	0	0	874351	14.4	1.2					
17	Terminalia crenulata	28827	4412	180753	147	3529	0	20590	16325	254583	4.19	0.35					
18	Miscellaneous	511227	135748	1117905	78242	21619	147	77950	246790	2189628	36.07	3.01					
	Total	1216148	206780	3412394	174867	122507	882	138980	797872	6070430	100	8.36					
	Percentage of trees	20.03	3.41	56.21	2.88	2.02	0.01	2.29	13.15	100							
	Stem per ha	1.67	0.28	4.7	0.24	0.17	0	0.19	1.1	8.36							

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.2T(3)															
DISTRIBUTION OF ESTIMATED TREES BY CATEGORIES AND DIAMETER CLASSES IN NON FOREST AREA OF CHHINDWARA (RURAL) DISTRICT OF MADHYA PRADESH.															
ALL SPECIES COMBINED															
Area 726400 ha															
S.NO.	NAME OF SPECIES	DIAMETER CLASS										TOTAL	Percentage of trees	Stem per ha	
		10-20	20-30	30-40	40-50	50-60	60-70	70+							
1	I	419161	304881	212521	98391	55593	37357	88244					1216148	20.03	1.67
2	II	75594	61330	34708	17795	6470	3971	6912					206780	3.41	0.28
3	III	720073	700951	707275	535199	246495	150161	352240					3412394	56.21	4.7
4	IV	59564	31032	20442	18383	8825	8089	28532					174867	2.88	0.24
5	V	38974	34120	21472	9264	4853	4412	9412					122507	2.02	0.17
6	VI	147	0	588	0	147	0	0					882	0.01	0
7	VII	54857	43239	22353	10148	2794	1764	3825					138980	2.29	0.19
8	VIII	385627	225610	90595	38386	21768	13384	22502					797872	13.15	1.1
	Total	1753997	1401163	1109954	727566	346945	219138	511667					6070430	100	8.36
	Percentage of trees	28.89	23.08	18.28	11.99	5.72	3.61	8.43					100		
	Stem per ha	2.41	1.93	1.53	1	0.48	0.3	0.7					8.36		

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.3T(1)

ESTIMATED VOLUME OF TREES (M³) BY SPECIES AND DIAMETER CLASSES IN THE NON FOREST AREA SURVEY OF CHINDWARA(RURAL)DISTRICT OF MADHYA PRADESH.

S.NO. NAME OF SPECIES		DIAMETER CLASS										TOTAL (M ³)	Percentage of volume	Volume per ha	
		10-20	20-30	30-40	40-50	50-60	60-70	>70							
ALL CATEGORIES COMBINED		Area 726400 ha													
1	Acacia arabica	4193	19300	27758	30361	12585	11194	3395	108786	1.55	0.15				
2	Acacia catechu	1817	4345	2574	1387	0	0	0	10123	0.14	0.01				
3	Anogeissus latifolia	1813	10129	16635	8556	3179	2704	2764	45780	0.65	0.06				
4	Bombax ceiba	819	3577	4390	4293	7444	9641	35390	65554	0.94	0.09				
5	Boswellia serrata	154	350	1050	1873	428	0	0	3855	0.06	0.01				
6	Diospyros melanoxylon	2039	3295	4184	6186	2972	1233	0	19909	0.28	0.03				
7	Lagerstroemia parviflora	8676	18685	16313	10897	5329	3252	8058	71210	1.02	0.1				
8	Lannea coromandelica	1572	4326	10829	12639	8332	3355	6693	47746	0.68	0.07				
9	Madhuca latifolia	3176	24304	139180	291707	307451	309905	1194272	2269995	32.4	3.12				
10	Mangifera indica	2906	10245	22710	43910	44951	63103	259505	447330	6.39	0.62				
11	Mitragyna parviflora	669	3158	4721	8153	8128	4462	17497	46788	0.67	0.06				
12	Perocarpus marsupium	254	684	480	572	916	0	1894	4800	0.07	0.01				
13	Tectona grandis	59511	129703	128727	70975	23977	7823	5599	426315	6.09	0.59				
14	Terminalia arjuna	5862	18704	29615	30594	34524	37656	108017	264972	3.78	0.36				
15	Terminalia belerica	1468	3105	4429	4994	2150	3080	10018	29244	0.42	0.04				
16	Terminalia chebula	508	51285	262958	356634	229422	179633	376352	1456792	20.8	2.01				
17	Terminalia crenulata	12594	33848	48432	38867	25709	21159	34979	213588	3.05	0.29				
18	Miscellaneous	99147	252673	300542	247565	140961	108900	322684	1472472	21.01	2.03				
	Total	207178	591716	1023527	1170163	858458	767100	2387117	7005259	100	9.64				
	Percentage of volume	2.96	8.45	14.61	16.7	12.25	10.95	34.08	100						
	Vol per ha	0.29	0.81	1.41	1.61	1.18	1.06	3.29	9.64						

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.3 T(2)

ESTIMATED VOLUME OF TREES(M³) BY SPECIES AND CATEGORIES IN THE NON FOREST AREA SURVEY OF CHINDWARA(RURAL)DISTRICT OF MADHYA PRADESH.

ALL DIAMETER CLASS COMBINED		Area 726400 ha											TOTAL (M ³)	Percentage of volume	Volume per ha
		CATEGORY													
S.NO.	NAME OF SPECIES	I	II	III	IV	V	VI	VII	VIII						
1	Acacia arabica	133	14963	87451	133	209	0	5897	0			108786	1.55	0.15	
2	Acacia catechu	2505	215	5274	0	0	0	946	1183			10123	0.14	0.01	
3	Anogeissus latifolia	7999	1110	24578	0	72	0	20	12001			45780	0.65	0.06	
4	Bombax ceiba	12346	2308	42628	5207	347	0	540	2178			65554	0.94	0.09	
5	Boswellia serrata	1377	0	1169	92	0	0	44	1173			3855	0.06	0.01	
6	Diospyros melanoxylon	6201	518	8861	19	103	0	811	3396			19909	0.28	0.03	
7	Lagerstroemia parviflora	9948	1757	50666	40	0	0	468	8331			71210	1.02	0.1	
8	Lannea coromandelica	11123	5300	17383	744	1189	0	708	11299			47746	0.68	0.07	
9	Madhuca latifolia	536421	15026	1604801	42029	8316	492	7320	55590			2269995	32.4	3.12	
10	Mangifera indica	43940	21940	211917	151274	2172	0	14237	1850			447330	6.39	0.62	
11	Mitragyna parviflora	13747	1007	9142	0	2310	0	139	20443			46788	0.67	0.06	
12	Pterocarpus marsupium	950	28	1706	0	76	0	571	1469			4800	0.07	0.01	
13	Tectona grandis	215232	9043	69126	0	18836	0	0	114078			426315	6.09	0.59	
14	Terminalia arjuna	21381	297	34102	0	69335	0	1070	138787			264972	3.78	0.36	
15	Terminalia belerica	6127	5144	5144	1024	3002	0	4592	4211			29244	0.42	0.04	
16	Terminalia chebula	631	233	1453742	1788	0	398	0	0			1456792	20.8	2.01	
17	Terminalia crenulata	27430	2098	155366	19	4210	0	9640	14825			213588	3.05	0.29	
18	Miscellaneous	302891	76429	872422	47213	15731	16	45752	112018			1472472	21.01	2.03	
	Total	1220382	157416	4655478	249582	125908	906	92755	502832			7005259	100	9.64	
	Percentage of volume	17.42	2.25	66.46	3.56	1.8	0.01	1032	7.18			100			
	Net per ha	1.68	0.22	6.41	0.34	0.17	0	0.13	0.69			9.64			

NON FOREST AREA SURVEY REPORT

TABLE NO. 4.3 T(3)														
ESTIMATED VOLUME OF TREES (M ³) BY CATEGORIES AND DIAMETER CLASSES IN THE NON FOREST AREA														
SURVEY OF CHHINDWARA (RURAL) DISTRICT OF MADHYA PRADESH.														
ALL SPECIES COMBINED														
Area 726400 ha														
S.NO.	NAME OF SPECIES	DIAMETER CLASS										TOTAL	Percentage of trees	Stem per ha
		10-20	20-30	30-40	40-50	50-60	60-70	70+						
1	I	49843	130990	199809	159797	137762	131089	411092	1220382	17.42	1.68			
2	II	8427	25376	31949	28743	16085	14109	32727	157416	2.25	0.22			
3	III	83382	291286	646708	857474	608936	525180	1642512	4655478	66.46	6.41			
4	IV	6449	12592	18548	29245	21788	28275	132685	249582	3.56	0.34			
5	V	4509	14450	20075	15191	12014	15329	44340	125908	1.8	0.17			
6	VI	16	0	531	0	359	0	0	906	0.01	0			
7	VII	6302	18135	20739	16523	7177	6210	17669	92755	1.32	0.13			
8	VIII	48250	98887	85168	63190	54337	46908	106092	502832	7.18	0.69			
	Total	207178	591716	1023527	1170163	858458	767100	2387117	7005259	100	9.64			
	Percentage of vol.	2.96	8.45	14.61	16.7	12.25	10.95	34.08	100					
	Vol.per ha	0.29	0.81	1.41	1.61	1.18	1.06	3.29	9.64					

VILLAGE DESCRIPTION FORM

- 1 State
- 2 District
- 3 Mapsheet No
- 4 Sample village
- 5 Area of the sample village (in ha.)
- 6 Crew Leader (name)
- 7 Date of commencement of survey
- 8 Date of completion of survey
- 9 Conspicuous feature selected as the centre for starting the
- 10 Description of the centre and approach to this
- 11 Number of angular quadrabts formed in the sample village
- 12 Compassing done by
- 13 Tree enumeration done by
- 14 Height measurements taken by
- 15 Quadrantwise summary of enumerations

Quadrant No.	Date of survey	No. of trees enumerated
1		
2		
3		
4		
Total		

Date

Signature of crew leader

Rough diagram of sample village

FORM NO.1

Date collection on village forest (outside green wash area)

Mapsheet No.

Name of vil Tahsil

District

Range

Forest Division

Circle

1 Reference point for

Village

(mention distance from nearest Railway station/bus station etc.

2 Area planted by social forestry/individuals, Department etc.

- a. Village wood lot
- b. Rehabilitation of Degraded forest
- c. Rural fuel wood
- d. Any other schemes
- e. Any other Vanmahotsava etc.

3 Category of the village

4 Land use

Area under ha.

1. Habitation i.e School, collages, Hospital, Play ground Samshan etc.
2. Cultivation
 - A. Irrigated
 - B. Non-irrigated
3. Fallow lands including pasture lands, waste lands, water body ravines etc.
4. Strips.
 - A. Road (mention National, state, other
 - B. Railway
 - C. Canal
 - D. Others

Total Area

Signature

Name.....

Designation

Date:

DISTRICT TREE FORM

Job No.	Card design number	State	District	No of Village in the district	No. of Sample village in the district	Geographical area of the district(Ha)	Sample Village	Geo. Area of the sample village (ha)	Category of the sample village
1-3	4-6	7-8	9-10	11-15	16-17	18-22	23-27	28-31	32

Number of trees in the sample village according to category of he plantation/tract.

Farm forestry	Road side plantation	Village wood lots	Block plantation	Ponds	Railway line plantation	Canals	Rest	Total
33-36	37-40	41-44	45-48	49-52	53-56	57-60	61-64	65-70

Page No.....

Total No. of Pages.....

Signature of the crew leader.....

Name of the crew leader.....

Village sample Bamboo Enumeration and clump Analysis Form.

Job No	Card Design	District	Sample Village	Area of Sample Village(Ha)
1-3	4-5	6-7	8-12	13-16

Average culm height (in Culm)		Bamboo Quality
Upto 1 cm top	upto 2 cms top	
72-74	75-77	78

Species	Clump diameter(in cms)	Clump serial	Clump diameter(in cms)	Clump size class	Green Sound culms				Green damaged culms				Dry Sound culms	Dry Damaged culms	Decayed culms	Total No. of Culms
					Current year		over two seasons old		Current year		over two seasons old					
					one to two seasons old	over two seasons old	one to two seasons old	over two seasons old	one to two seasons old	over two seasons old						
					2<5 cms	5<8 cms	8+ cms	2<5 cms	5<8 cms	8+ cms	2<5 cms	5<8 cms				

Date.....

Signature of the crew leader.....
Name of the crew leader.....

TREE ENUMERATION FORM (VILLAGE FOREST SURVEY)

Job No	Card Design	State	District	Sample Village	Geo. Area of the Sample Village
1-3	4-6	7-8	9-10	11-15	16-19

Name of the Village:

Total No. of Trees
42-47

Map Sheet No.:

S.No	Species		DBH-OB(cms)	Tree Height(m)	Age (years)	Category	S.No	Species		DBH-OB(cms)	Tree Height(m)	Age (years)	Category
	Name	Code						Name	Code				

Date.....
Page No.....
Total No of Pages.....

Signature of the crew leader.....
Name of the crew leader.....

*Mention area in the case of Farm Forestry, Block Plantation & Village Woodlots (patches only)