



सत्यमेव जयते

GOVERNMENT OF MAHARASHTRA

**WORKING PLAN
for
Buldhana Forest Division
AMRAVATI CIRCLE**

For the period
2010-11 to 2019-20

**VOLUME – I
(Part I and II)**



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FOREWORD

The present Working Plan for Buldhana Forest Division authored by *Shri V.R.Tiwari*, I. F. S., Conservator of Forest, Working Plan, Amravati replaces the last Working Plan written by *Shri B.S.Thengdi*.

An overview of the results of past working and the data of statistics of growth and yield reveals that the forests have degraded during the last plan period. Hence the conservative approach for forestry management has been continued by the present Working Plan Officer. The work of revision of the present Plan has been taken up, keeping fully in view, the instructions contained in the National Working Plan Code, 2004 and ensure that the Plan remains updated as per the operational policies and guidelines, in both letter and spirit.

The major forests area, being degraded, is proposed to be treated under Improvement Working Circle. The majority of C class Reserved Forests, which are denuded, are proposed for treatment under Pasture Working Circle. The only patch of good forests in Ghatbori Range is included in Selection Cum Improvement Working Circle. The Protected Forests of Bhingara and Kuwardeo, being on hill slopes, have been included in Protection Working Circle. The Babul Ban area, now invaded by *Prosopis*, has been proposed under Fuelwood Working Circle. The mandatory working circles on the Forest Protection, Wildlife, N. T. F. P. and J. F. M., will certainly bring more objectivity and focus in the management of forests covered by the Working Plan.

The pressure of over grazing and increased biotic interference in and around villages is also revealing and needs to be addressed adequately by the administration through the J. F. M. tool. The need to tackle the biotic pressure through participatory management has been highlighted in the relevant chapter.

Shri.V.R.Tiwari, I.F.S., Conservator of Forests (Working Plans), Amravati and his team deserve compliments for bringing this work into reality. I wish all the success for their efforts and I am sure that if the prescriptions given in the Plan are implemented scrupulously, the forest and wildlife in the tract covered would be restored to prime health once again with consequential benefit accruing to the local people and economy

Nagpur,
Date: 18/08/2009

(*Krishnamohan*) IFS
Chief Conservator of Forests
(Working Plans), Nagpur.

INTRODUCTION

The Working Plan of *Buldhana* Division written by Shri B. S. *Thengdi* for the period 1995-96 to 2004-05 expired in March 05. The Plan was given annual extension till 2007-08 by the Government of India on condition that no felling operations are carried out. The I- PWPR of *Buldhana* Division was presented by Shri *Tasnim Ahmed*, the then Chief Conservator of Forest (Territorial), Amravati in the State Level Committee's meeting held on 18th January 2006. The minutes of said meeting has been circulated vide PCCF's letter No.D-14/WP/CR-369-A/1418/05-06 dated 17th March 2006. The views of territorial CCF expressed in I- PWPR as well as modifications suggested by the Committee has been taken into account while writing II- PWPR.

The II-PWPR covers not only Reserved Forest areas but also Protected Forest and Un-classed Forest areas of the Division. The good forests areas of *Ghatbori* Range and *Jalgaon Jamod* Range have been proposed to be treated under Selection cum Improvement Working Circle and Protection Working Circle respectively, considering the results of stock mapping and enumeration. Also the enumeration results in Babul ban reaffirms the views expressed by CCF (T) that they are invaded by *Prosopis* and *Babul* is hardly found in these forests. These forests are proposed to be treated under Fuelwood Working Circle. The C- class Reserved Forests proposed for sheep grazing by the Grazing Settlement Officer has been included in Pasture Working Circle, with 3 years rotation period. The remaining C-class Reserved Forests and A-class Reserved Forests are proposed to be treated under Improvement Working Circle. In this Working Circle, the areas having rooted stock are to be treated by Root Stock Management and Tending of NR whereas areas lacking in rootstock and suitable for planting will be artificially regenerated. The *Anjan* Forests are also included in Improvement Working Circle and rules for lopping of *Anjan* have been prescribed in consultation with the local staff. The compartment numbers have been assigned to the C- class Reserved Forests, Protected Forests and Un-classed Forests as suggested by the territorial CCF.

The A- class Reserved Forests and Protected Forests of *Bhingara & Kuwardeo* have been stock mapped. Also enumerations have been carried out in A- class Reserved Forests, Babul bans and *Kuwardeo* Protected Forests. Protected Forests have been enumerated and stock mapped for the first time. Earlier only *Ambabarwa* Forests were enumerated during 1960's by Shri *Parasnis*. Also for the first time, digitized topo-sheets have been procured from Survey of India, Hyderabad. This will reduce work of digitization and GIS based maps can be provided to the Division in much shorter time frame.

The II-PWPR of Budhana Division was discussed by the State Level Committee in the meeting held on 27th February 2009 and approved subject to some minor correction. These corrections/ changes as directed by the Committee have been incorporated in the Plan.

I must acknowledge the guidance given by Shri *Krishna Mohan*, I. F. S., Chief Conservator of Forests, Working Plan, Nagpur and Shri Alok Joshi, I. F. S., Additional Principal Chief Conservator of Forests, Production and Management , and Shri B. Mazumdar , I. F. S., Principal Chief Conservator of Forests, Maharashtra State, Nagpur, from time to time while writing of the Plan. The Chief Conservator of Forests (Territorial) Amravati also gave valuable inputs and the guidance given by Shri *Tasnim Ahmed*, I. F. S. and Shri S. D. *Sontakke*, I. F. S., is also acknowledged. The then Deputy Conservator of Forests, *Buldhana*, Shri *Sanjeev Gaud*, I. F. S. and Assistant Conservator of Forests Shri *Rajendra Dhongde* assisted by way of giving required information and valuable suggestions. The present Deputy Conservator of Forests Shri *Chandramore's* assistance is also put on record.

I must put on record the outstanding work done by Range Forest Officers of the Working Plan Division Shri D. N. *Jamodkar* and Shri S. V. *Bedarkar*, who helped in stem analysis and also writing of the Chapters of the Plan. Without their assistance it would have been difficult to stick to the time frame given for writing of II- PWPR. The Ranger Surveyor Shri D. M. *Korde* and Suveyor Shri S. B. *Dabhade* assisted in tedious work of reconciliation of area and compilations of tables and appendices. The hard work of Surveyors Shri *Satish Mohakar* and Shri *Amardeep Giri* of the GIS

cell, are also acknowledged. The Survey of Forest Resources unit led by Shri R. V. *Kakde*, I/ C ACF and assisted by Shri A.T. *Talokar* and Shri N. S. *Bodkhe*, Range Forests Officers carried out stock mapping work in very short time of four months. The other staff of Working Plan office particularly Shri S. M. Khajurkar, Shri Adesh Gazbiye helped in typing of the Plan. There are many others whose names could not be mentioned due to shortage of space, who contributed directly or indirectly, are also appreciated and acknowledged.

Dated: 15-05-2009

(Virendra R. Tiwari)
Conservator of Forests
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Part- I

**SUMMARY OF FACTS ON WHICH
PROPOSALS ARE BASED**

CHAPTER-I

THE TRACT DEALT WITH

SECTION 1. NAME AND SITUATION:

LOCATION:

1.1.1. *Buldhana* Forest Division is confined to *Buldhana* district of *Maharashtra* State and administratively it is under *Amravati* Forest Circle since 1.5.1999. Earlier *Buldhana* Division was under administrative control of *Yavatmal* Forest Circle. Geographical co-ordinates are latitude 20°13' to 21°32' North and Longitude 78° 49' to 75° 75' East.

BOUNDARIES:

1.1.2. *Khandwa (Nimar)* District of M.P. lies to North ; *Parbhani* district on South, *Akola & Amravati* district on East and *Jalna & Jalgaon* district on West.

AREA :

1.1.3. The Forest area of *Buldhana* Forest Division is 839.06 sq. km., out of this 756.87 sq. km is Reserve Forest, 77.65 sq. km. is Protected Forest and 3.49 sq. km. is Un-classed Forest. The Division also manages Lonar WLS, having area of 2.67 sq km., as per separate Management Plan.

Table No.1.1
Table showing comparison of area under Thengdi's Plan and current Plan
(Area in ha)

Sr. No.	Forest Category	Area in Thengdi's Plan	Area transferred to Wild Life	Balance Area	Area Added during Thengdi's Plan	Present Area
1	Reserved Forests	106354	30833.8	75619.9	66.97	75686.9
2	Protected Forests	9451.98	2262.64	7189.34	575.77	7765.11
3	Un-classed Forests	651.6	0	651.6	(-302.13)**	349.47
	Total	116557	33096	83461	336.22	83799

** DECLARED AS PF

The details of area transferred to Wild life Division are given in **Appendix No. IV** of Volume II.

1.1.4. The area of *Buldhana* district is 9661 sq. km. The forest area of *Buldhana* Division is approximately 8.68 % of geographical area of the District,

whereas total forest area is approximately 12.1% of geographical area of the District.

Table No.1.2
Table showing % of forest area with respect to geographical area

Division/ Sanctuary	Forest area in Sq. Km.	Geographical area of District in Sq. Km.	Forest area as % of geographical area
Buldhana Division	0839.06	9661	8.68
Lonar WLS	0002.67		0.03
Dnyanganga WLS	0203.56		2.11
Ambabarwa WLS	0124.73		1.29
Total	1168.55	9661	12.1

SECTION 2 : CONFIGURATION OF THE GROUND :

1.2.1. The Chief hills of the Division are the parts of *Ajanta* System towards South & *Satpudas* in the North. The *Balaghat* plateau situated on the *Ajanta* hills, covers the southern half of the *Buldhana* Forest division. The terrain is undulating & hilly and comprises part of *Satpuda* plateau at different level with fairly steep slopes in between. *Chikhli* and *Buldhana* are important plateau. The average elevation of this plateau in Division is about 610 m and highest point is 737 m above M.S.L. On slopes and ridges of the plateau and in the valleys intervening lie the main blocks of forest.

1.2.2. The vast fertile plain of *Purna* river known as *Payanghat* extends north of *Balaghat* Plateau; this covers the greater part of the northern half of the Division. The country is quite monotonous with undulations just enough to maintain a natural system of drainage.

1.2.3. Towards north of *Paynghat* is the third and the last natural feature, the ranges of *Satpuda* hills. They are popularly known as *Melghat*. Only a small part of these hills fall in *Buldhana* District.

SECTION 3. GEOLOGY, ROCK AND SOIL:

1.3.1. Only two geological formations are known to occur in this Division viz. *Purna* alluvium and *Deccan* trap. The *Purna* alluvium is restricted to *Purna*

valley and occur in considerable deposits over trap, which is sometimes mixed up with a calcareous conglomerate. Efflorescence of soda salts occur in some of the Babul bans(now *Prosopis* Forests) situated on the *Purna* alluvium.

1.3.2. The *Deccan* trap which covers almost entire Division belongs to the cretaceous period, when sheets of semi-molten trap broke through the cretaceous strata, and is found in this area in more or less horizontal layers. The underlying rock over the entire Division consists of hard grey basalt, and numerous samples of amygdaloidal with zeolitic vesicles may be seen every where. The *Lonar* Lake falls within this region of trap. It is large hollow, very nearly circular, more than 1.6 km in diameter, with sides almost precipitous. It resembles a crater, but is not one. There are however, no dykes and no trace of ash bed or lava flows, thus there is a total absence of everything that would characterize a volcano. On the other hand, the trap beds around its rim are found to dip away from it, eliminating any chance of its being considered the result of sinking. It is probably an explosion crater.

1.3.3. The soil over the entire trap area varies from a light reddish sandy loam, on the ridges and hill-sides, to black cotton soil in valleys and depressions, and on some plateau. The reddish sandy loam of varying consistency interbedded with the rounded fragments of the underlying rock covers most of the forest areas. This varies in suitability for the tree growth according to its depth and to the particular physical characteristics and the structure of the underlying rock.

1.3.4. The soil on the *Balaghat* is in general poor and shallow. Alluvium occurs in some of the large valleys in narrow strips and black cotton soil 0.5 to 1 m in depth on some parts of the plateau. On slopes, soil varies from Murum to light black. Usually, the hill slopes flanking ravines area covered with boulders strewn over the surface. Teak especially grows well in such localities as these afford a safe lodgment for seeds and a good foot-hold for a tree growth. Basalt whenever in the form of hard impenetrable rock lies very near the surface, the soil is dry and shallow and quite unsuited to the tree growth. In some localities there occur granular laterite beds, which are lacking in moisture and are almost impenetrable by the roots of the trees. The growth on such soils is invariably scanty, stunted and malformed.

1.3.5. The *Purna* alluvium overlies *Deccan* trap. It consists of black cotton soil with calcareous conglomerate which lies immediately below it. It is invariably found along the river courses along with a soil of light brown in colour, called *Kunkery*, which contains high percentage of soda salts. The depth of these alluvial deposits exceeds in places to 45 m. In breadth it extends roughly 25 km to the north and 16 km to the south of *Purna* river.

In these fertile plains of *Purna* lie the patches of *Prosopis* Forests.

SECTION 4. CLIMATE:

1.4.1. Temperature: The climate of *Buldhana* district in general is dry & hot, but *Buldhana* town is pleasantly situated at an elevation of 667 m above sea level on the *Balaghat* plateau and has moderate climate. The maximum and minimum temperature recorded in *Buldhana* district in year 1998 are 42.20°C and 10.00°C respectively. Heat is intense over *Khamgaon*, *Malkapur* and *Jalgaon* Talukas of the *Payanghat* region, while it is less so over *Chikhali* and *Mehkar* Talukas situated over *Balaghat* plateau.

Table No.1.3
Table showing Max. and Min. Temperature of *Buldhana* District.

Year 1998	Maximum Temperature	42.20° C
	Minimum Temperature	10.00° C

1.4.2. The winter in the Division is moderate. The average daily mean temperature rarely goes below 4.4 °C. It is of short duration i.e. from November to January. The increase in temperature is noticeable during February and the hot season seems to be extending from beginning of March to the end of June, hottest months being May and June. In general it is hotter over the *Payanghat* than on the *Balaghat*.

1.4.3. Rainfall: The average annual rainfall in the District varies from 565 mm to 1020 mm. The bulk of the rainfall is received from the South-West monsoons, which usually break in the latter half of the June, continues for nearly three months and usually ends in the latter half of the September. **Table No. 1.4** shows the year wise rain-fall data for the period from 1994 to

2007. **Appendix No. I** of Volume II gives *Tahsil* wise rainfall data of Buldhana district .

TABLE NO. 1.4
The Rainfall Data of *Buldhana* District.

Year	Average R.F. in mm
1994	663.0
1995	564.5
1996	716.5
1997	615.1
1998	1019.4
1999	684.4
2000	636.5
2001	785.9
2002	996.9
2003	687.4
2004	565.5
2005	590.1
2006	947.7
2007	712.0
Average	727.5

1.4.4. Humidity: The relative humidity is between 25 % and 30 % in the afternoon in the summer season which is driest part of the year.

SECTION 5. WATER SUPPLY:

1.5.1. The tract is drained by three main rivers namely, the *Purna*, the *Penganga* & the *Kate-Purna* on the Lower-*Purna*. The *Purna* which rises near *Bhaisdehi*, *Betul* district of M.P. flows due West across Amravati and Akola district in to Buldhana. The *Balaghat* plateau is drained north-wards by the *Nalganga*, the *Biswa* ; and the *Gyan* in *Buldhana* district. The *Penganga* which rises in the hills near *Daulghat* runs in south-eastern direction past *Mehkar* and then enters *Washim* district forming its southern boundary. The chief tributaries of the *Penganga* are the *Aran*; the *Arnaoti* and the *Pus*. The *Kate* or Lower *Purna* rises in the *Ajanta* hills to the West of *Buldhana* district and runs through them paralleled to and south of the *Penganga*. The *Penganga* and the Lower *Purna* dry up during summer leaving only few pools; so also the *nalas* and streams running through the forests. Most of the wells are, however, perennial. Wells sunk in *Purna* valley hold brackish water. A statement showing Existing Wells in charge of Forest Department is given in **Appendix No.**

II of Volume II. A list of Forest Tanks (*Van Tale*) constructed is given in **Appendix No. III** of Volume II.

1.5.2. Ground Water Status: In the northern portion of the valley, belt an East-West stretch extending for over 30 km, with average width of 6 km, is the potable fresh water belt with a discharge of 8 to 12 liters per second within a depth range of 40 meters. In the southern part of the valley south of river *Purna* there is acute scarcity with the rivers alluvium, but the major part of the alluvial portion of the district is generally free from it.

SECTION 6. DISTRIBUTION AND AREA:

1.6.1. The total area of *Buldhana* Division is 83799.06 ha classified as under:

- (a) 'A' Class Reserved Forest is covering an area of 37183.99 ha, spread over 9 Reserves and 1 Fodder Reserve, and has been divided into 122 compartments.
- (b) 'A' Class *Babulban* area is 1245.73 ha, divided into 122 compartments.
- (c) 'A' Class forest area of Village is 410.23 ha, divided into 02 compartments (new).
- (d) Five Villages of Ex-*Jagir* Protected forest of 7189.34 ha, divided into 21 compartments (new).
- (e) New RF (Sec 4) 66.97 ha, divided into 01 compartment (new).
- (f) C Class Forest 36777.56 ha., divided into 168 compartment (new).
- (g) Protected Forest and Un Classed Forest 925.24 ha., divided into 14 compartments (new).

The *Buldhana* Division consists of 7 Ranges. Their distribution on the Maps of Survey of India 1:50000 scale is given in the **Appendix No. V** of Volume II of this Plan.

1.6.2. The distribution of area, reserve-wise, compartment-wise is given in **Table No. 1.5**.

TABLE NO.1.5
Reserve wise compartment wise distribution of area in Buldhana Division

Sr. No.	Name of the Reserve	Included compartment no. in Reserve	Total Area (in ha) of compartment	Total no. of compartments in the Reserve
1	Ghatbori	171 to 173,174a,175a,176, 177a,177b, 178,187a,188 to190,191a,192a,193,194, 195a to198a,199,200,201,202, 203a, 204a,205 to 208	10979.08	31
2	Mel Janori	179 to 186	1477.51	08
3	Mendi	213 to 216	1023.05	04
4	Hiwarkhed	217a,217b,	1306.22	02
5	Geru Matergaon	218a,218b,219 to 222,229,264p,266p,	2363.65	09
6	Amdari	313b,320 to 328,329a, 330 to 339 340,341 to 343	8423.63	25
7	Gumi	344a,344b,345 to 349	2637.34	07
8	Ambabarwa	363,364a,365,366	3436.18	04
9	Raipur	367 to 385	4614.23	19
10	Fodder	438 to 450	923.10	13
11	Babulban	B292 to 300,B309, B310,B321 B322,B327toB336, B339,B340 B342 toB438.	1245.73	122
12	Chichkhed & A Itkhed Class	451 452	410.23	02
13	C Class	453 to 620	36777.56	168
14	RF (new)	621	66.97	01
15	Ex-Jagir Protected Forest	622 to 627, 630to641,644,647,648.	7189.34	21
16	PF & Un Classed Forests	628,629,642,643,645, 649 to 656	925.24	14
	Total		83799.06	450

1.6.3. The range wise distribution of forest area is given in **Table No. 1.6:**

Table No. 1.6
Range-wise Area distribution of Buldhana Forest Division :

Sr. No.	Range	Area In Hectare				
		A Class RF	C Class RF	PF	UF	TOTAL
1	Jalgaon Jamod	9295.55	464.63	6898.37	304.33	16962.88
2	Khamgaon	4267.86	8331.69	475.35		13074.9
3	Motala	4164.15	7088.8			11252.95
4	Buldhana	7155.69	3375.76	221.13	3.27	10755.85
5	Deulgaon Raja	377.18	7686.9	51.25	36.99	8152.32
6	Mehakar	1122.93	3806.33			4929.26
7	Ghatbori	12456.59	6090.42	119.01	4.88	18670.9
G. Total		38839.95	36844.53	7765.11	349.47	83799.06

SECTION 7. STATE OF BOUNDARIES :

1.7.1. The total length of the external boundary lines of the Reserved Forests and Protected Forest of *Buldhana* Division is 1158.43 Km, out of which 346.87 km. are natural features such as rivers, streams, ridges. The length of the Internal Boundary lines are 2446.69 Km., of which 97.02 Km. are natural features. A statement showing the extent of Natural and Artificial boundaries is given in **Appendix No. XI** of Vol. II The external boundary along the State *Madhya Pradesh* is clearly demarcated with 13 meters (40') wide cleared lines with serially numbered pillars of wooden posts embedded in cairn of stones. *Ex-Jagir* forests are not demarcated on ground. New RFs and PFs which are received as compensatory land are demarcated on ground. Since the reserves are spread over different divisions, it would be more appropriate to have demarcated boundaries along Range, Round and Beats.

SECTION 8. LEGAL POSITION:

1.8.1. The reserves were originally constituted between 1891 to 1900. These reserves and the remaining blocks of reserves were declared as "State Forest, Class A, Division II" by notifications issued under rule 8 of the *Berar* Forest Rules of 1871 or section 40 © of the *Berar* Forest Law of

1886, as amended by the *Berar Forest Law Amendment Law* of 1891, as shown below. The C class Reserved Forests have been declared in the year 1892 and 1894.

Table No.1.7
Table showing Reserve wise Gazette Notifications of Buldhana Division.

Name of Reserve	No. and date of notification issued under rule 8 of the Berar Forest Rules of 1871	No. and date of notification issued under section 40 © of the Berar Forest Law of 1886	Particulars
(1)	(2)	(3)	(4)
Ghatbori, Mel- Janori Madhi Hiwarkhed	NA	-	Constituted and declared as State Forest class A
Geru- Matergaon Andhari,	H.R.O.No. 358 10Oct 1894	-	Constituted and declared as State Forest class A
Gumi, Ambabarw a Raipur	H.R.O.No. 216 & 218 of 6 Sept. 1900	-	Constituted and declared as State Forest class A
Fodder	H.R.O.No. 3591Oct 1891	-	Constituted and declared as State Forest class A
C Class Forest	-	H.R.O. No. 165 of 1st June 1892 & No. 394 of 09.11. 1894.	Declared as “ State Forest Class C” Declared as “State Forest Class C.”

1.8.2 The details of villages / survey numbers and area of Ex-Jagir Forests declared as Protected Forest under Section 29 of Indian Forest Act, 1927 vide Notification No. 3065 -2171-XI dated 4th June 1955 is given below :

Table No.1.8
Table showing details of Ex- Jagir Protected Forests

Sr.No.	Name of Village	Total No. of Survey numbers	Area in ha
1	Kunwardeo	Unsurveyed	2280.00
2	Bhingara	Unsurveyed	4588.59
3	Rohinkhed, Salvan,	Unsurveyed	2264.64
4	Maharkhed(Ganeshpur)	3	0392.95
	Total :		9526.18

1.8.3. The forests of villages Chichkhed (301.66 ha) and Itkhed (108.20 ha) are declared as A class Reserved Forest under section 20 of IFA, 1927 vide Notification No. FLD-4158-12671-Y dated 2nd June 1964.

1.8.4. The PF of Ada-Andhari belongs to Jalna district and the same have been transferred to Buldhana Division for management vide letter no. FDS-1357/138109/J dated 15-11-1957. The copy of notification or said letter is not available. **Appendix No. VI** of Volume II gives list of notifications of Reserved Forest / Protected Forest and also village wise area of Unclassed Forests.

1.8.5. In addition 992.21 ha area has been received as Compensatory lands (The details given in **Appendix No. VII** of Vol. II) , out of which 66.97 ha has been declared as Reserved Forest under section 4 and 575.77 ha area has been declared as Protected Forest under section 29 respectively of IFA 1927. The Un-classed area to the extent 349.47 ha is yet to be declared as RF or PF under IFA, 1927. Also action is required to be taken for declaring 66.97 ha area under section 20 of IFA, 1927.

Table No. 1.9
Table showing details of compensatory land received and its status

Sr. No.	Name of Village	Survey No.	Area RF/PF	Area UF	Status	Sec. I.F.A. 1927	Date of Notification.
1	Kamod	14	66.97	-	RF	Sec.4	21 st Sept 1990
2	Kamod	14	45.23 58.21 7.95 15.77 8.98 8.00 1.80	- - - - - - -	PF	Sec.29	14 th Jan 1990 23 rd Jun 1993 13 th Jan 1994 22 nd May 1995 13 th Jan 1994 16 th Aug 1997 16 th Aug 1997
3	Sungaon	133	4.00 143.00	-	PF	Sec.29	8 th July 1993 * 21 st Nov 2005
4	Hiwarkhed	23 44 290	12.30 21.35 48.75	--	PF	Sec.29	22 nd June 1993 30 th April 1998 28 Oct 1993*
5	Dhal Sawangi	35,37	14.18	-	PF	Sec.29	28 th Oct 1993
6	Shelgaon Adol	82	26.25	-	PF	Sec.29	21 st Nov 2005
7	Deulgaon Dhangar	456	25.00	-	PF	Sec.29	21 st Nov 2005

Sr. No.	Name of Village	Survey No.	Area RF/PF	Area UF	Status	Sec. I.F.A. 1927	Date of Notification.
8	Wadali	125	80.37	-	PF	Sec.29	21 st Nov 2005
9	Bhadola	394	15.99	-	PF	Sec.29	21 st Nov 2005
10	Ghatbori	362	38.64	-	PF	Sec.29	6 th Sept 2005
11	Kahu-Patta	46	-	025.36* *	UF	-	-
12	Khel-Shivapur	148	-	090.80* *	UF	-	-
13	Kamod	14	-	188.17	UF	-	-
14	Madh	131	-	003.27	UF	-	-
15	Andhara	13,14,108	-	036.99	UF	-	-
16	Deulgaon Sakharsha	511,591,607	-	004.88	UF	-	-
		Total :	642.74	349.47			

* Date of publication in the Govt Gazette. , ** E class lands

1.8.6. The Government of India vide sanction letter No. F No 8-148/2006-FC dated 12.11.2008 has approved in principle diversion of 1055.64 ha of forest land for Jigaon Major Irrigation Project in Buldhana district. The department has received 772.53 ha compensatory land in Yavatmal Division, 104.54 ha land in Akola Division and 178.57 ha land in Buldhana Division. These lands are yet to be notified as RF/PF.

1.8.7. The details of forest area diverted for non forestry purposes under FC Act 1980 is given in **Appendix No.VIII** of Volume II.

1.8.8. The details of area identified as ‘forests’ as per Supreme Court’s order is given in **Appendix No. IX** of Volume II.

SECTION 9. RIGHT AND CONCESSIONS:

1.9.1. The ‘A’ class forest is burdened with adverse rights. The concessions exercised in the ‘C’ class reserved forest are given in the M.P. Forest Manual. The Protected and Un-classed forest are burdened with *nistar* and grazing rights. The list of ex-forest villages is given in the **Appendix No.X (A)** .The Rights and concessions of the People of Buldhana district is given in **Appendix NO. X (B)** of Volume II.

CHAPTER II
FLORA , FAUNA AND BIODIVERSITY
CHAPTER II A
FOREST FLORA

SECTION 1. GENERAL DESCRIPTION OF THE GROWING STOCK.

2A.1.1. The majority of the important forests are confined to the hilly region and fall under the “Southern Tropical Dry Deciduous Forests”. Dry Teak i.e. 5A/C1 of Champion and Seth’s classification. These forests lie on soils derived from trap and are characterized by the presence of Teak of varying quality depending on the configuration of the ground and the depth of soil. The rest of less important forests such as *Prosopis* Forests occur in a few big and numerous small isolated blocks scattered over fertile plains of “Purna” rivers. Areas under “Anjan (*Hardwickia binata*) are quite extensive where in “Anjan” occurs in pure patches or mixed with *Teak* and is representative of the E-3-*Hardwickia* forests of Champion’s classification.

2A.1.2. For management purpose the following local types can be distinguished:-

- I- Dry Teak Forests- 5A/C1.
- II- Open Mixed Forests- 5A/C3
- III- Salai Forests- 5A/E2
- IV- Anjan forests- 5A/E3
- V- Grass lands with brushwood- 5D/S4
- VI- *Prosopis* forests-

2A.1.2.1 Dry “Teak” bearing forests: These Forest in general are composed of a mixture of mostly deciduous species having Teak in high proportion which ranges up to 80 % in some patches. These form the most important common type and include the remainder Teak Forest. They are found in dry exposed localities where the layers of soil are superficial, soil moisture is low, grazing is heavy and fires are frequent. The site quality is generally IV. *Ghatbori* and *Meljanori* are the two main reserves containing these types of forests. *Teak* occurs in gregarious patches forming up to 60 to 80 % of the over wood. It is

spreading rapidly into the mixed miscellaneous under stocked patches and is coming up well under *Salai* trees. Where *Teak* finally disappears, *Salai* is dominant in the crop. On exposed spur *Dhaora* (*Anogeissus latifolia*) comes under *Salai* (*Boswellia serrata*) and in less exposed places *Teak* (*Tectona grandis*). On many sites of old cultivation, *Palas* (*Butea monosperma*), *Saja* or *Ain* (*Terminalia tomentosa*), *Lendia* (*Lagerstromia parviflora*) and some thorny species are the first to appear, but they seem to form only a temporary stage and *Teak* follows rapidly. The seedling regeneration of *Teak* is adequate on lower gently sloping grounds while it decreases along the steeper upper slopes and is sparse on hill tops. *Teak* reproduction of coppice origin is adequate over the major portion of the *Teak* bearing areas. The main reason for the occurrence of the pure crops of *Teak* or its preponderance lies in the inherent quality of *Teak* to withstand the damaging effects of grazing and fire to much greater extent than its usual associates. Common associates of *Teak* are *Salai* (*Boswellia serrata*), *Dhaora* (*Anogeissus latifolia*), *Aola* (*Emblica officinalis*), *Palas* (*Butea monosperma*), *Bor* (*Zizyphus jujuba*), *Ghot* (*Zizyphus xylopyra*), *Ain* (*Terminalia tomentosa*), *Ahl* (*Morinda tinctoria*), *Jamrasi* (*Cassine glauca*), *Khair* (*Acacia catechu*), *Hiwar* (*Acacia leucophloea*), *Achar* or *Charoli* (*Buchanania lanzan*), *Tendu* (*Diospyros melanoxylon*), *Amaltas* (*Cassia fistula*), *Kalam* (*Mitragyna parviflora*), *Moha* (*Madhuca latifolia*), *Movai* (*Lannia grandis*), and *Behada* (*Terminalia bellarica*), *Anjan* (*Hardwickia binata*), is common along most of the nalas and streams. Other less common associates are *Bija* (*Pterocarpus marsupium*), *Tiwas* (*Ougenia oojinesis*), *Dhaman* (*Grewia tiliaefolia*), *Mokha* (*Schrebera switeniodes*), *Kulu* (*Sterculia urens*), *Kusum* (*Schleichera oleosa*). Reproduction of *Teak* is often quite good and among other species *Dhawda*, *Lendia*, *Tendu*, *Ain*, regenerate reasonably. *Teak* and most other species coppices well. Under growth is not dense, except in moist valleys or along nala banks where *Nirgudi* (*Vitex negundo*), *Murad sheng* (*Helecteres isora*), and *Bhander* (*Colebrookia oppositifolia*), *Bharati* (*Gymnosporia montana*) are found in dense patches. In dry localities *Bharati* (*Gymnosporia montana*), *Chilati* (*Mimosa hamata*), stunted *Khair* (*Acacia catechu*), occurs and at very few places *Lantana* (*Lantana camara*), and *Parijatak* (*Nyctanthes arbortristis*) are found.

The principal grasses are *Sheda* (*Sehima nervosum*), *Ghonal* (*Themada triandra*), *Kusal* (*Heteropogon contortis*), *Rusa* (*Cymbopogon martini*), and *Bhurbhusi* (*Eragrotis tenella*).

Climbers are not very common except along nala and streams. The more common climbers are *Chilatichoti* (*Acacia pennata*), *Malkangani* (*Celastrus paniculata*), *Piwarbel* (*Combratum ovalifolia*), *Nagbel* (*Cryptolepis buchanani*), *Dudhi* (*Hemidesmus indicus*), *Dhimarbel* (*Ichnocarpus prutescens*), *Mahul* (*Bauhinia vahlii*), *Ironi* (*Zizyphus oenoplia*).

All these forests have been worked at least once under some or other form of felling in the past, and as such some sort of age gradations are noticed. The bulk of the crop is young between 15-60 cm. girth classes. The crop has suffered from fire at many places, which have eliminated much of the re-growth of miscellaneous species where fires have been frequent and severe, open stands of *Teak* poles which are stunted and malformed are visible. Trees of bigger dimensions are rare and are confined to valley portions with better soil. The major part of the forests has been worked under coppice with standards or Coppice-with-Reserves system in the past.

2A.1.2.2. Anjan Forests: These forests occur extensively, in portions of *Amdari*, *Geru-Matergaon*, *Ghatbori* reserves on *Balaghat* and *Raipur* reserve on the *Gawilgarh* hills. The areas covered by Anjan Forests are mostly open. The quality of the crop in majority of portion is poor i.e. IV or below IV. *Anjan* (*Hardwickia binata*) of all sizes forms about 60 percent of the crop. Patches of mixed crop of site quality IV and similar enclaves with *Teak* predomination occur along nala beds. This type on its outer fringes gradually merges into site quality IV *Teak* or Mixed Forests. *Anjan* being a good fodder species is hacked and pollarded and forests do not give a very healthy appearance. Mature trees are mostly malformed while young trees are stunted. On the hill slopes and plateau the trees rarely attains a height greater than 8 meter and girth at breast height more than 90 cm.

Well stocked areas with better quality crop with trees exceeding 10 m in height and 90 cm in girth are met in the valleys with better type of soil. The

greater part of these forests is far from adequately stocked. The selection type of forest with an admixture of middle age classes predominates.

The main associates of *Anjan* are *Dhawda* (*Anogeissus latifolia*), *Tendu* (*Diospyros melanoxylon*), *Khair* (*Acacia catechu*), *Kulu* (*Sterculia urens*), *Salai* (*Boswellia serrata*), *Lendia* (*Lagerstromia parviflora*), *Ain* (*Terminalia alata*), etc.

The under growth is composed of *Chilati* (*Mimosa hamata*), *Bharati* (*Gymnosporia montana*) and *Nirgudi* (*Vitex negundo*). *Sheda* (*Sehima nurvosum*), *Kusal* (*Heteropogon contortis*), and *Bhurbhusi* (*Eragrotis tenella*) are the main grasses. Climbers are mainly *Piwarbel* (*Combratum ovalifolia*) and *Chilati-cheti* (*Acacia pinnata*).

In most of the areas *Anjan* is not reproducing satisfactorily. Teak reproduction is plentiful in folds of the hills and along nala banks and it is probable that *Teak* may replace *Anjan* in such areas. Un-established *Anjan* regeneration is seen in small patches along nala banks and in remote areas but established regeneration occurs sparsely.

The areas under *Anjan* are heavily grazed and browsed and are badly hacked by graziers, thus killing back whatever reproduction comes up. For getting sufficient reproduction areas have to be well protected from grazing and fire.

The greater part of this type of forests has been very lightly worked or has remained un-worked in the past owing to the open condition of crop and poor reproduction.

2A.1.2.3. Babul Ban now turned as Prosopis Bans : The title name Babul Bans no more remain relevant because now they are purely turned as *Prosopis* Bans. The majority of these forests are situated in the *Payanghats*. In the past these areas were well stocked with three main varieties of *Babul* viz. *Telia*, *Kauria* and *Ramkathi* and few other species like *Neem*, *Hiwar* and *Chandan*. But the recent enumeration carried out in these areas shows a completely different picture. The whole *Babul* crop is replaced by the new species called as *Prosopis juliflora*. This is exotic species native of African continent but now its

appearance is global. This species is so hard and sturdy that it is almost impossible to eradicate. Its manual and even mechanical eradication is very costly. Even if it is eradicated successfully from the certain area, with small negligence, this species again occupies the same area very rapidly.

It is not known how this species appeared in this area. But most probably this species was planted as a hedge plant. Being a very sturdy species which tolerate droughts and fires and not palatable by sheeps and goats and coppices vigorously if cut. It spread out in the fertile areas of *Babul* Ban like a wild fire and *Babul* a very important species for the local people was completely invaded by *Prosopis*.

Prosopis is a good firewood species. Charcoal prepared from this species is known for its high calorific value. The thorny branches are used by the local people for temporary fencing. Subtracting all these uses it is a most undesirable species. Every body wants it to be replaced by some better species.

Regeneration of *Prosopis* is natural. It is a very good coppicer and most of the regeneration is of coppice origin.

Growth of *Prosopis* is good in deep black cotton soils (Regur) especially along water courses where moisture content is more. It grows so dense almost becoming impossible for other species to grow. Because of dark shade of *Prosopis*, even grasses do not come up profusely.

Prosopis forests occur almost pure. However following species are found in a scattered way:

Tree species- *Neem* (*Azadirachta indica*), *Hiwar* (*Acacia leucophoea*), *Chandan* (*Santalum album*), *Hinganbet* (*Balanites aegyptica*), *Babul* (*Acacia nilotica*). The under growth generally consists of *Chilati* (*Mimosa hamata*), *Bharati* (*Gymnosporia montana*), *Nirgudi* (*Vitex negundo*), *Tarwad* (*Cassia auriculata*), *Tarota* (*Cassia tora*), *Pachora* (*Capparis grandis*), *Yelati* (*Dichrostachys cinerea*), *Takal* (*Clerodendron phlomoides*)

The climbers are *Chilati-choli* (*Acacia pinnata*), *Gunj* (*Abrus precatorius*), *Ironi* (*Zizyphus ocnoplica*), *Piwarbel* (*Combratum decandrum*), *Vassan vel* (*Cocculus hirsnlus*), *Kanch Khayen* (*Mucuna pruriens*)

The common grasses are *Bhurbhusi* (*Eragrotis tenella*), *Sheda* (*Sehima nurvosum*), *Ghonal* (*Themada trianora*), *Kunda* (*Ischaemum pilosum*), *Kusal* (*Heteropogon contortis*), *Harali* (*Cynodon doctylon*), *Tikhadi* (*Cymbopogon martinii*), *Mustul* (*Iseilma laxum*), *Seprut* (*Panicumisa isachme*), *Pakli* (*Apluda varia*)

2A.1.2.4. Open Mixed Forests: These forests occur intermixed with *Teak* and *Anjan* types. Along with the miscellaneous species *Teak* occurs in strips or patches in areas adjoining *Teak* forests in all large reserves. Dense patches of better quality of mixed crop are met within the moist valleys along banks of water courses only. Generally these are open formation of very poor quality below site quality IV and are usually situated on soils varying from *murum* mixed with light black cotton to deep black cotton soils situated on the plateau or on similar water logged areas in some of the broader valleys. The undergrowth is usually dense along banks of streams and in pockets of the hill sides and sheltered slopes but sparse elsewhere. Climbers are found on the banks of the streams. Reproduction of most of the species is inadequate.

The tree species commonly found in the Mixed type of forests are *Dhawda* (*Anogeissus latifolia*), *Salai* (*Boswellia serrata*), *Khair* (*Acacia catechu*), *Ghot* (*Zizyphus xylopyra*), *Palas* (*Butea monosperma*), *Lendia* (*Lagerstromia parviflora*), *Amaltas* (*Cassia fistula*), *Jamrasi* (*Cassine glauca*), *Gongal* (*Cochlospermum religiosa*), *Kulu* (*Sterculia urens*), *Ain* (*Terminalia tomentosa*), *Dudhi* (*Writia tinctoria*), *Kalam* (*Mitragyna parviflora*), *Tendu* (*Diospyros melanoxylon*), *Achar* or *Charoli* (*Buchanania lanzan*), *Semal* (*Bombax ceiba*), *Apta* (*Bauhinia racemosa*), *Aola* (*Embllica officinalis*), *Mokha* (*Schrebera swietenoides*), *Moha* (*Madhuka latifolia*), *Kala-shirish* (*Albizzia lebbek*), *Chichwa* (*Albizzia odoratissima*), *Bija* (*Pterocarpus marsupium*), *Shivan* (*Gmelina arborea*), *Dhoban* (*Dalburgia paniculata*), *Dhaman* (*Grewia tiliaefolia*), *Kasai* (*Bridelia retusa*), *Pangra* (*Erythrina indica*), *Kusum* (*Schleichera oleosa*), *Movai* (*Lannea grandis*), *Rohan* (*Soymida febrifuga*), *Tiwas* (*Ougenia oojeinesis*), *Koha* (*Terminalia arjuna*).

The under growth consists of species like *Bharati* (*Gymnosporia montana*), *Tarota* (*Cassia tora*), *Nirgudi* (*Vitex negundo*).

The climbers noticed are *Dudhi* (*Ichnocarpus frutescence*), *Piwarbel* (*Combratum decandrum*), *Malkanguni* (*Celestrus paniculate*), *Kanch Khuari* (*Mucuna pruriens*).

Some of the main grass species are- *Kusal* (*Heteropogan contortus*), *Sheda* (*Sehima nurvosum*), *Ghonal* (*Themada trianora*), *Rusa* (*Cymbopogan martini*), *Bhurbhusi* (*Eragrostis tenella*), *Paoniya* (*Ischoemum sulcatum*), *Barru* (*Sorghum halepense*)

2A.1.2.5. Salai Forests : This type of forests covers extensive areas in many reserves like *Ambabarwa*, *Amdari* & *Gummi*. It occurs almost as pure crop of *Salai* (*Boswellia serrata*) on interior dry and exposed sites with a few scattered *Khair* (*Acacia catechu*), *Rohan* (*Soyimida febrifuga*), *Ghot* (*Zizyphus xylopyra*), *Chilatichoti* (*Acacia pennata*). General quality of crop is below IV. On the outskirts of this type, *Teak* of quality IV occurs in open groups of poles or saplings. *Salai* crop is mostly malformed and unsound. Shrubs and climbers are practically absent. *Salai* reproduction is fair but reproduction of *Teak* and other species is scanty.

2A.1.2.6. Grass lands with brush wood. : This type comprises grass ramnas or fodder reserves. The woody species in this type occurs scattered are principally *Bharati* (*Gymnosporia montana*), and stunted bushy *Khair* (*Acacia catechu*), *Hinganbet* (*Balanites aegyptica*),

The common grasses are *Kusal* (*Heteropogan contortis*), *Sheda* (*Sehima nurvosum*) and *Paoniya* (*Ischoemum sulcatum*). Other inferior grasses are *Bhurbhusi* (*Eragrostis tenella*), *Ghonal* (*Themada trianora*), *Kunda* (*Ischaemum pilosum*), etc.

SECTION 2. STATUS OF NATURAL REGENERATION:

2A.2.1. Overall Status of Natural Regeneration/ha in Buldhana Forest Division is as under:

Table No. 2.1
Table showing status of natural regeneration and its establishment

Sr.No.	Name of Species	R1 0.3 to 1 m	R2 1 to 3 m	R3 > 3.0m	Total	%	Establishment %
1	Ain	19.02	6.92	2.11	28.05	4.63	7.52
2	Bija	0.02	0.00	0.00	0.02	0.003	0.00
3	Lendia	4.35	3.54	0.54	8.42	1.39	6.41
4	Shivan	0.02	0.11	0.00	0.13	0.02	0.00
5	Sisam	0.22	0.09	0.00	0.31	0.05	0.00
6	Teak	61.60	50.65	23.36	135.62	22.38	17.22
7	Tiwas	0.94	0.00	0.00	0.94	0.15	0.00
8	Haldu	1.41	0.00	0.00	1.41	0.23	0.00
9	Kalam	0.94	0.02	0.02	0.99	0.16	2.02
10	Khair	1.90	1.32	0.40	3.63	0.60	11.02
11	Salai	0.47	0.52	0.16	1.14	0.19	14.03
12	Tendu	28.88	12.19	2.67	43.73	7.22	6.11
13	Ahl	0.40	0.11	0.04	0.56	0.09	7.14
14	Anjan	10.79	5.26	1.75	17.79	2.93	9.84
15	Bel	1.34	1.48	0.04	2.87	0.47	1.39
16	Behda	2.04	1.75	0.22	4.01	0.66	5.49
17	Hirda	0.00	0.00	0.00	0.00	0.00	0.00
18	Aola	0.60	0.02	0.00	0.63	0.10	0.00
19	Char	0.69	0.94	0.04	1.68	0.28	2.38
20	Biba	0.13	0.07	0.00	0.20	0.03	0.00
21	Moha	0.04	0.00	0.00	0.04	0.06	0.00
22	Kulu	0.04	0.00	0.00	0.04	0.006	0.00
23	Dhaora	56.56	36.92	11.72	105.20	17.36	11.14
24	Kusum	0.16	0.07	0.02	0.25	0.04	8.00
25	Others	132.13	103.70	12.43	248.27	40.97	5.00
	Total :	324.73	225.67	55.53	605.94	100	-

2A.2.2. It may be noted that regeneration of Teak, *Lendia*, *Ain*, etc is taking place, but it is not adequate. Also the percentage of establishment is low, may be due to uncontrolled grazing and incidental fires. In N.T.F.P. species good regeneration is seen in *Dhawada*, *Tendu* etc. However, it is inadequate in *Moha*, *Biba*, *Aola* and *Kulu* and establishment is almost absent in these species. The compartment wise status of natural regeneration is given in **Appendix No. XXXV** of Volume II.

SECTION 3. INJURIES TO WHICH CROP IS LIABLE:

2A.3.1 Human being causes maximum damage to the forests. Most common ones are discussed below:-

1) **Illicit cutting:** Illicit cutting of trees for fuel and timber is the main source of injury to the crop. **Appendix No. XII** of Volume II gives statement showing damages due to illicit felling. The record shows illicit cutting of Teak and other miscellaneous species for timber and poles is observed in forests of *Bhingara*, *Challistapri*, *Jamod*, *Sungaon*, *Karmoda*, *Umapur* villages in *Jalgaon Jamod* range which is adjoining to *Madhya Pradesh*. *Rathia* and *Barela* are the new

community tribes, originally from the Khargone district of Madhya Pradesh, recently settled down here, have a tradition of preparing sheds in front of their houses every year. This is causing considerable damage to the forests. Many cases of commercial illicit felling have been observed in the village *Bagdeo*, *Mandwa*, *Iswi*, *Belgaon*, *Janwha* in *Ghatbori* range. *Deulghat*, *Padali*, *Girda* and its adjoining area are also known for illicit cutting of *Teak*. Illicit cutting of *Anjan* trees is another problem. Gangs of 15-30 aggressive people are active in area of villages *Kanzara*, *Godhanapur*, *Undri*, *Amadapur* and *Pipalgaon Raja*.

No losses have been reported due to illicit felling of *Tendu* trees between period 1993-94 to 2006-07.

2) **Lopping of *Anjan* trees:** Lopping of *Anjan* trees is another serious problem that exists in this Division. *Anjan* leaves are good fodder for cattle, especially for milch cattle. Traditionally *Khamgaon* is the main market for *Anjan* leaves. Besides this, it is transported to *Buldhana*, *Jalgaon Jamod* and *Akola*. Lopped *Anjan* leaves are transported by cycles, Autorikshaws or occasionally by Matador. Till the year 2003-04 Forest Protection Committees were authorized to issue permit for *Anjan* leaves. Now this system has been stopped. Many offences of transportation of *Anjan* leaves are recorded in the forests areas of villages *Khamgaon*, *Matergaon*, *Ganeshpur*, *Pipalgaon Raja*, *Chichpur*, *Undri*, *Jalgaon Jamod*, *Buldana* and *Warwand*. *Anjan* Forests of *Khamgaon* range, western part of *Jalgaon Jamod* range, eastern part of *Buldhana* range and northern part of *Ghatbori* range are badly damaged due to lopping of *Anjan* leaves.

3) **Encroachments:** Adjoining areas of *Madhya Pradesh* in *Jalgaon Jamod* range is vulnerable to encroachments. Many peoples originally from *Madhya Pradesh* encroached upon the lands of *Bhingara*, *Chalistapri*, *Jamod*, *Karmoda*, *Sungaon* and its adjoining areas. Land records of the village *Bhingara* is yet to be updated. Besides this *Babulban* on the banks of river *Purna* in villages *Bhendwal*, *Pasoda*, *Kawthal*, *Takli* are the main encroachment prone areas. In *Motala* range *Khairkhed*, *Kihadki*, *Gulbheli*, *Mohagaon*, *Rajur* are the encroachment prone areas. Besides this a flat portion occurs at the bottom of *Rajur ghat* in the south of *Motala* town is also being occupied by the encroachers. Local union named as “*Bhoomi Mukti Morcha*” is encouraging landless people for encroaching upon forests areas. They make false complaints

of atrocities and molestation against forest officials/staff. They have already filed a Writ Petition before the Mumbai High Court , Nagpur Bench against Forest Department (Writ Petition No. 4173/2007 Bhoomi Mukti Morch Vs Government of Maharashtra and others) Besides this adjoining areas of village *Wadali*, *Deulgaon Sakarsha*, *Shirle (Nemane)* and *Mandwa* also have encroachments on large scales. **Appendix No. XIII** of Volume II gives list of encroachers upto 13-12-05 in the Division.

4) **Forest Fires:** Occurrence of annual fires is frequent in this Division. The areas which have less grazing, leaving behind grasses and other combustible material, are more vulnerable to forest fires. Thus adjoining areas of *Dnyanganga* Sanctuary, northern portion of the *Jalgaon Jamod* range and small parts of *Buldhana*, *Motala* and *Khamgaon* ranges are fire prone areas. Fires cause considerable damage to young seedling of *Teak* and other species. *Teak* being a fire hardy species suffers less from fires than its associates. Repeated fires also make soils hard and compact reducing natural regeneration. **Appendix No. XIV** of Volume II gives year wise data of number of offence cases of fire incidences reported in the Division.

5) **Grazing:** In the drier type of the forests, continuous and unlimited grazing is ultimately fatal to the vegetation. On clayey soils trampling by cattle renders soil hard and reduces soil aeration, thus making conditions unfavorable for germination of seeds and survival of seedling of tree species. On sandy soils heavy grazing may cause denudation and fastens process of soil erosion in general. *Teak*, being an unpalatable species, is not readily browsed by cattle and so it is left out in the forest, while other species are heavily grazed and browsed. Excessive grazing reduces the grazing value of forests and always results in the replacement of annual grasses by perennial coarse grasses or weeds. However, grazing by sheep is a very serious problem in this Division. There had been instances of attack on field staff while preventing illegal grazing of sheep. **Appendix No. XV (A)** of Volume II gives statement showing number of cattle grazed in forests of the Division. **Appendix No. XV (B)** of Volume II gives year wise data of number of offence cases booked for illegal grazing in the Division.

6) **Mining:** The damage due to mining activities is not reported in the Division.

2A.3.2. Besides this, some negligible damages are also caused by other agencies. They are as follows:-

1) **Damage by Wild animals:** The damage caused to the tree growth by wild animals is negligible as the forests are poor in wild game. However, a certain amount of damage is noticed in the *Jalgaon Jamod* range, where animals like *Sambhar*, *Blue bulls* and *Wild boars* exists.

2) **Damage by Insects:** *Teak* skeletonizers and defoliators, namely *Hapalia machaeralis* and *Hyploea purea* are common in the forests and growth of *Teak* is retarded to some extent in the years of severe attack.

3) **Damage by Fungus:** *Fomes papianus* attacks Babul trees on exposed parts and damages the timber. The damage is not of much importance as most of the Babul wood is used as fire-wood.

4) **Damage by Drought:** The damage due to drought is rare. Severe drought affecting the forests crops has not been noticed in the past.

5) **Damage by Storms and Winds:** The winds are generally moderate. Occasional storms in the pre monsoon period are also experienced which sometimes results in uprooting of isolated trees.

CHAPTER II B
FOREST FAUNA

SECTION 1. DESCRIPTION OF FAUNA.

2B.1.1 *Buldhana* Forests Division is not very rich in wild life. The bulk of the forest except for those situated on *Balaghat* plateau, lie in scattered blocks spread all over the Division. As such these forests do not afford natural abode for a variety on wild animals. Whatever wild life is present is confined to remotest block of forests such as *Ambabarwa* and to the central belt of forests consisting of *Geru-Matergaon* and *Amdari* Reserves. The area rich in wildlife has been declared as Wild life Sanctuary viz. *Ambabarwa* & *Dnyanganga* and transferred for management to wild life wing. However, some of the animals found in the tract are as under:-

1) Carnivora :- Panther (*Panthera pardus*), Hyaena (*Hyaena hyaena*), Jackal (*Canis lupus*), Indian Fox (*Vulpes bengalensis*), Jungle Cat (*Felis chaus*), Wild dog (*Cuon alpinus*) etc.

2) Herbivora :- Sambar (*Cervus unicolor*), Barking Deer (*Muntiacus muntjack*), Spotted Deer (*Axis axis*), Bluebull (*Boselaphus tragocambaclus*), Common Langur (*Presbytis entellus*), Black Napped Hare (*Lepus nigricollis*), Blackbuck (*Antelope carvicapra*), Four Horned Antelope (*Tetracerus quadricornis*), Rhesus Macaque (*Malaca macaca*), Common Grey Mongoose (*Herpestes edwardsii*), Bats etc.

3) Omnivora :- Civet Cat (*Paradoxurus hermaphroditus*), Sloth Bear (*Melursus ursinus*), Wild Boar (*Sus scrofa*), Porcupine (*Hystrix indica*) etc.

4) Aves :- There are as many as 114 birds that exists in the districts including migratory birds. Most common birds are Common Babbler (*Turdoides cazedatus*), Jungle Babbler (*Turdoides striatus*), Small Bee Eater (*Merops orientalis*), Red Vented Bulbul (*Pycnonotus cafer*), Spotted Dove (*Streptopelia chinevgis*), Black Drongo (*Dicrusus macrocerus*), Cattle Egret (*Bubulcus ibis*), Little Egret (*Egretta garzetta*), Grey Heron (*Ardea cinerea*), Pond Heron (*Ardeola*

gragii), Common Hoopoe (*Upupa epops*), Black Ibis (*Pseudibis papillosa*), Grey Jungle Fowl (*Gallus sonnerati*), Small Black Kingfisher (*Alcedo atthis*), Lesser Pied Kingfisher (*Ceryle rudis*), Red Wattled Lapwing (*Vanellus indicus*), Common Myna (*Acridotheres tristis*), Common Indian Nightjar (*Caprimulgus asiaticus*), Spotted Owlet (*Athene brama*), Roseringed Parakeet (*Psittacula krameri*), Indian Peafowl (*Pavo cristatus*), Indian Roller (*Coracias benghalensis*), Grey Wagtail (*Motacilla cinerea*), Woodpecker (*Picoides maharattensis*), Bay Backed Shrike (*Lanius vittatus*), Common Tailor Bird (*Orthobomus sutorius*) etc.

SECTION 2. HISTORY OF THE WILD LIFE MANAGEMENT IN GENERAL:

2B.2.1. Shooting and hunting of game in the Reserved Forests used to be controlled as per the following Acts :-

- i. Shooting rules made under Section 26 (i) and 76 (d) of Indian Forests Act given in Appendix VIII of M.P. Forest Manual, Volume II.
- ii. Wild Birds and Animal Protection Act of 1912.
- iii. Central Provinces Games Act of 1935.
- iv. Restrictions on issue of Arms Licenses under Indian Arms Rules of 1924.

2B2.2. As per Maharashtra State Government, Forest Department No. WLP/1056/12412-E dated, 25th May 1961, the Bombay Wild Animals and Wild Birds Protection Act (Extension and Amendment Act, 1960 XI of 1961) came into force in this Division from 1st June 1961.

2B.2.3. By division of area into shooting blocks and limiting the number of animals to be shot in each block, destruction of animal had been controlled to a great extent in 1950 . Poaching in some areas had reduced the number of Deer, Blue bulls and Wild boars as the forests are scattered and surrounded by cultivation. In drought of 1953-54 some animals died or could be easily shot at the water holes outside the reserved forests by the poachers. Approximately 647 sq. km. of 'A' class Reserved Forests were divided into 9 shooting blocks. On an average 10 shooting permits per year were issued by the Divisional Forest Officer during 1951-1961. Tigers, Panthers, Blue-bulls, Sambar, Wildboar and Deers were hunted. 1951-52 census showed presence of 16 Tigers, 7 Tigresses,

6 Tiger cubs and 12 Male Panther, 6 Female Panthers and 1 Panther Cub. The *Tiger* and *Panther* population remained almost constant till 1960-61.

SECTION 3. LEGAL POSITION:

2B.3.1. The first step towards the protection of wildlife was taken by including certain provisions, in this regard, in the Berar Forest Act of 1886. Under Section (3) sub section 7, the definition of forest produce incorporated the 'skins, tusks, bones and horns' and as per Section 10, sub section 4, the residency by orders may regulate any part of the State Forests for hunting, shooting, fishing, poisoning water and setting up traps or snares."

The Berar Forest Act, 1886 amended in 1891 provided under section 7(b) that forest produce includes the following when found in or brought from a forest: "Wild animals, skins, tusks, horns, bones, silk cocoons, honey and wax and all other parts or produce of animal." Section 7(2)(b) of this Act after this amendment provided that any one who hunts, shoots, fishes, poisons water or sets traps or snares, shall be punishable with the fine which may extend up to fifty rupees or, when the damage resulting from the offence amounts to more than twenty five rupees, to double the amount of such damage. Section 10(4)(iii) of this Act empowered the resident to frame the rules regarding regulation of hunting, shooting, fishing, poisoning water and setting traps and snares.

2B.3.2. Vide Notification G.I.F.D. No. 2197-1-B, dated 13th October 1911, the Indian Forest Act, 1878 was also made applicable. The section 2(b)(iii) included wildlife in its definition of the forest produce. Section 25 (i) provided that any person in contravention of any rules, which the local Government may from time to time prescribe, kills or catches elephants, hunts or shoots fishes, poisons water or sets traps or snares shall be punishable with imprisonment for a term which may extend to six months or with fine not exceeding five hundred rupees or with both in addition to compensation for damage done to the forests.

2B.3.3. After the promulgation of the Indian Forest Act 1927, rules relating to wildlife regulations were framed under section 26(l) and 76(d). These were

essentially to regulate hunting of wild animals and were given in the appendix VIII of MP Forest Manual Vol. II. Wild Birds and Animal Protection Act 1912 as amended in 1935 also ensured protection to certain animals and a check on hunting of others. Shooting block system of hunting was started from 1927. Under the provisions of the two Acts, the Conservator of Forests in consultation with the DCF concerned used to declare areas having abundant game as open to hunting. The DCF accordingly used to issue shooting permits, wherein the type of game and their number allowed to be hunted together with other relevant conditions were used to be mentioned.

2B.3.4. The Bombay Wild Animals and Wild Birds Protection Act, 1951 was extended to *Vidarbha* region from 1.6.1961. Though this Act did not propose a significant change in the management of game in the Reserved and the Protected Forests, yet it incorporated following significant provisions:

1. Its provisions were also applicable out side the Reserved and the Protected Forests.
2. Arms license holders for sports were to register themselves with the Wildlife Preservation Officer.
3. This Act prescribed a closed season for hunting and classified game into four categories, viz. small game, big game, special big game, and pet animals.
4. It also sought to control transaction in trophies and other wildlife products.
5. Wildlife Advisory Board was constituted under this Act to advise the Government on various important matters concerning wildlife.

DEVELOPMENTS AFTER 1972:

2B.3.5. At the national level, the Indian Board for Wildlife was constituted in 1952. Its main object was to devise ways and means for conservation of wildlife through co-ordinated legislative and practical measures and setting up of National Parks and Wildlife Sanctuaries. A comprehensive and unified National and State Park Act, 1971 was passed which provided for appointment of an Advisory Committee to advise in regard to the constitution and declaration of National Parks and Sanctuaries and formulation of policy for their

administration and management. The Parliament then enacted the Wildlife (Protection) Act, 1972, which came into force in the State of Maharashtra with effect from 1st June 1973. With this, other Acts relating to any matter contained in this Act and in force in the State stood repealed. This Act as amended from time to time as well as the various regulations made under this Act and guidelines issued by the Central and the State Government provide for establishment of a network of National Parks and Sanctuaries representing various habitats and for giving protection to all type of wildlife in the state. These provisions also address issues relating to the management of wildlife outside the Protected Areas. Following rules have so far been enacted under the relevant sections of this Act:

- i) The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra with effect from 1.6.1973).
- ii) The Wildlife (Transactions and Taxidermy) Rules, 1973 (became effective in Maharashtra w.e.f. 1.6.1973).
- iii) The Wildlife (Protection) (Maharashtra) Rules, 1975 (became effective from 6.3.1975).
- iv) The Wildlife (Protection) Rules and Licensing (Additional matters for consideration) Rules, 1983 (became effective from 13.4.1983).
- v) Wildlife (Protection) Rules, 1995
- vi) Wildlife (Specified Plants-Condition for Possession by License) Rules, 1995
- vii) Recognition of Zoos Rules, 1992.
- viii) Declaration of Wildlife Stock Rules, 2003.

2B.3.6. Besides the above specific legal framework available for wildlife management, provisions contained in Indian Forest Act, 1927, Forest Conservation Act, 1980 and The Environment (Protection) Act, 1986 may go a long way in protecting and conserving the biodiversity of this Division. Ambabarwa Wildlife Sanctuary, Dnyanganga Wildlife Sanctuary and Lonar Wildlife Sanctuary are located within geographical boundary of the district. Clearance under the Environment Protection Act, 1986 from environmental angle is required from the Govt. of India for any project (other than those relating to improvement of forests and particularly the projects relating to industrial Activities damaging the environment of these Protected Areas)

including an industry located within 10 km from these PAs. Hence, such clearance is obligatory in case of many of the projects involving forestland of this Division because large part of its forests is located in the vicinity of these protected areas.

SUMMARY OF WILDLIFE (PROTECTION) ACT. 1972

2B.3.7. The Wildlife (Protection) Act 1972 provides for effective protection and conservation of wildlife, that is, fauna as well as flora, total ban on hunting of wild animals and severe restrictions on wildlife related trade. The Act has been amended from time to time and its amendments done in 1991 and recently in 2002 have brought far-reaching changes in it.

2B.3.8. The scope of the Wildlife (Protection) Act, 1972 has been widened appreciably, which can be summarised as below :

- (i) The objective of Wildlife (Protection) Act 1972 is Protection of Wild animals, Birds and Plants with a view to ensuring the ecological and environmental security of the country.
- (ii) The words and phrases related to hunting like game and game reserve are now totally removed from wildlife management.
- (iii) New categories of PAs have been added. 'Chapter IV - Sanctuaries, National Parks and Closed area', has been changed to 'Chapter IV - Protected Areas' and Protected area has been defined under Section 2(24A). These categories are-
 - 1) Sanctuary (Section 2(26) and 18)
 - 2) National Park (Section 2(21) and 35)
 - 3) Conservation Reserve (Section 36A)
 - 4) Community Reserve (Section 36C)
- (iv) The category of game reserve was deleted from this chapter by the 1991 amendment and that of closed area has now been deleted through the 2002 amendment.
- (v) The 1991 amendment brought zoos under its jurisdiction and the 2002 amendment makes norms for proper upkeep of animals applicable to zoos, also applicable to circus and rescue centers.

2B.3.9. A wild animal can be hunted only under special and exceptional circumstances and that too after following elaborate procedure prescribed for the purpose.

2B.3.10. When an animal included in the schedule I becomes dangerous to **human life** or is disabled/ diseased beyond recovery, it may be hunted but while doing so, it will be killed only when it can not be captured, tranquillized or translocated and further such captured animal shall not be kept in captivity unless it is established that it can not be rehabilitated. Animals belonging to other schedules however can be allowed to be hunted in cases where they become dangerous to **human property**.

2B.3.11. Penalties for the wildlife offences have been made much more severe and amendments done in the year 2002 have inserted a new chapter "V A- Forfeiture of Property Derived from Illegal Hunting and Trade" containing 25 sections. These provisions can be invoked if an illegal property has been acquired by carrying on business involving animals included in schedule I and Part II of schedule II of Wildlife Act.

2B.3.12. No one is allowed to carry on trade relating to any animal or animal article etc. included in Schedule I and Part II of Schedule II and severe restrictions are put even on the trade relating to other wild animals.

2B.3.13. The Wildlife (Protection) Act, 1972 does not allow acquiring of any wild animal, animal article etc. now, yet a large number of individuals do possess the same having owned it prior to promulgation of this Act. The Act, therefore, required such individuals to declare these articles within 30 Days of coming into force of this Act. CWLW was to issue ownership certificate as per those declarations and after doing the necessary scrutiny. This did not happen due to lack of publicity of the Act and consequent ignorance among the public in general about its relevant provisions

2B.3.14. The 2002 amendment to the Act has identified this problem and a new section '40A-Immunity in certain cases' has been inserted to provide another

chance to such holders of captive animal/animal article etc. Declaration of Wildlife Stock Rules, 2003 have been promulgated to prescribe the time, form and the manner through which such declarations can be made and ownership certificates can be obtained even now. According to these rules, declaration under Section 40A could be done within 180 days from the date of coming into force of these rules. The CWLW shall, as far as possible, decide such cases within 6 months from the date of declaration.

2B.3.15. No animal except live elephant or animal article can now be acquired except by way of inheritance.

Delegation of Powers to Forest Officers

2B.3.15. The CWLW of the State has been authorised to delegate his powers, except those which authorised him to permit hunting of an animal under Schedule I that has become dangerous to human life or is so disabled or diseased as to be beyond recovery, under various sections of the Act to various forest officers with previous approval of the State Government. Besides the State Government has conferred powers of Wildlife Wardens (Govt. Order No.WLP/1077/86854/F-1, dt.5.5.1977) as follows:

1) Chief Wildlife Warden (CWLW)	PCCF(WL)
2) Addl. Chief Wildlife Warden	CCF/CF/CF(WL)/RM
3) Dy. Chief Wildlife Warden	DCF/DFO/DM
4) Wildlife Warden	ACF
5) Asstt. Wildlife Warden	RFO

2B.3.16. The present delegation under practice is the one which is in force from 18.8.1993 and was ordered vide CCF (Wildlife) letter No.D-22 (D)(1)/C.No.117/1180, dt. 18.8.1993. The delegation of power empowers the forest officers in the field for the various purposes narrated in the Act and the manner in which they are to be achieved. This may be summarized as below:

- 1) Receive declaration of animal/ animal article and applications for different purposes under the Act. Also power to deal with matters

ancillary to the above.

- 2) Deal with wildlife offences as well as their compounding.
- 3) Registration of arms license holder.
- 4) Power to make complaint in the court.
- 5) Power to grant permit for hunting of an animal other than specified in schedule I, which has become dangerous to human life and property.
- 6) Power to deal with a wild animal live or dead, which is a government property.

2B.3.17. Any person (that is, common man) is authorised to make a complaint regarding the commission of a wildlife offence and the competent court shall take cognisance of such complaint provided complaint is made 60 days after such person must have given a notice to wildlife warden concerned.

2B.3.18. The 1991 amendment introduced a provision for payment of a 50% of fine (imposed under Section 51) or of compensation (accepted and paid while compounding of a case under Section 54) as reward to a person who renders assistance in detection of offence/apprehension of offenders and the amendment of 2002 has now introduced the provision under Section 60B for arrangement of money to facilitate giving reward up to Rs.10,000/- to the informer, that is, the person who renders assistance in detection of offence or the apprehension of the offenders.

2B.3.19. Definition of livestock has been appreciably widened to include animals like camel, donkey, horses, mules and pigs, and 2002 amendment has specifically made a mention under this definition that livestock does not include any animal included under Schedule I - V of the Act.

2B.3.20. The 1991 amendment to the Act also addressed to the conservation of floral biodiversity, although present scheduled plants (under the schedule VI) are not found in Maharashtra.

2B.3.21 Zoos have been brought under the purview of the Act. No zoo can operate without being recognized by the Central Zoo Authority and no new zoo can be established without obtaining prior approval of this authority. CZA has

framed regulations providing elaborate procedure, norms and set of conditions under which a zoo can be established and run. A zoo under the Act means a facility where captured animals are kept for exhibition to the public and it also includes Circus (where such animals are used wholly or mainly for performing tricks) and rescue centers.

2B.3.22. All the arms license holders within 10 km radius from the PA boundary are to be registered with Wildlife Wardens and no new license in this area can be issued without prior concurrence of the Chief Wildlife Warden.

2B.3.23. The Wildlife (Protection) Act, 1972 does not recognise rights and concessions of local people over wild animals or articles made from them except things like peacock feathers. In fact any wild animal found live or dead and or animal articles etc. are a government property. However, State Wildlife Advisory Board may advise the State Government in regard to harmonising the needs of the tribals and other dwellers of the forest with protection and conservation of wildlife. The Act also provides that any forest produce removed from a PA can be used for meeting the bonafide needs of people living in and around the PA but the same cannot be sold for commercial purposes.

2B.3.24. Only Central Govt. can alter entries in the various Schedules. However, the Act empowers the CWLW to state to take appropriate management measures including hunting for an animal/group of animals (of schedule II, III, IV) as a part of scientific management of such animals which have become abundant in a localised area. This may include translocating such animal/group of animals for the purpose of population management from a specified area to other suitable places.

2B.3.25. The Wildlife (Protection) Amendment Act, 2002 has inserted Section 36A to 36D for constitution and management of Conservation and Community Reserves. Thus, the areas linking various PAs may be formed into a Conservation Reserve and private/ community lands, wherein the owner (individual/community) volunteers to conserve wildlife, may be formed into a Community Reserve.

2B.3.26. Sanctuaries have been brought to almost same conservation status as of National Parks through 1991 and now through the of 2002 amendment –

- There is a complete ban on sale of forest produce recovered from PAs;
- No construction of tourist facilities or establishment of Zoos etc. inside a PA without prior approval of the National Board for Wildlife is allowed;
- Forest officers have been empowered to remove encroachments from PAs;
- Boundary of PAs cannot be altered without National Board's recommendation.

2B.3.27. Tourism is not recognised as an objective in this Act. Nor is it so under forest Acts, namely Indian Forest Act, 1927 and Forest Conservation Act, 1980. Tourism facilities on the other hand within a PA can be established only after concurrence from National Board for Wildlife. National Board for Wildlife is also expected to frame policies on promoting wildlife conservation, impact assessment of various projects as well as matters relating to resolution of disputes in PAs. The National Wildlife Action Plan, 2002-2016 however discusses eco-tourism but in relation to PAs where it is supposed to be subservient to conservation. However, tourism in forest areas outside the PAs is also gathering momentum and hence the strategy and Action plan developed under this document (National Wildlife Action Plan, 2002-2016) may become a guideline for forest tourism albeit with lesser restrictions.

SECTION 4. WILDLIFE CENSUS:

Wildlife Census is carried out in territorial Divisions once in four year. While in Protected Areas it is carried out every year. Within the district there are **three** Protected Areas. *Dnyanganga and Ambabarwa* Sanctuaries are managed by two different Wildlife Divisions and *Lonar* Wildlife Sanctuary is managed by the territorial Division.

These Protected Areas lie within the geographical boundary of the *Buldhana* district and the animals may eventually cross the artificial boundary in search of prey and water. Hence, a compiled census figures are given below:

Table No. 2.2
Census figure of the wild life in Buldhana District.

Sr.No.	Common English Name	Scientific Name	Buldhana Division 2005 census	Dnyanganga Sanctuary 2007 census	Ambabarwa Sanctuary 2008 census
1	Panther	<i>Panthera pardus</i>	01	09	01
2	Wild dogs	<i>Cuon alpinus</i>	08	-	21
3	Jungle cat	<i>Felis chaus</i>	32	04	01
4	Hyena	<i>Hyaena hyaena</i>	19	03	08
5	Sloth Bear	<i>Melursus ursinus</i>	11	25	20
6	Porcupine	<i>Hystrix indica</i>	-	-	05
7	Small Indian civet	<i>Veveverricula indica</i>	-	-	05
8	Mongoose	<i>Herpestes edwardsii</i>	-	01	05
9	Pangolin	<i>Manis crassi caulata</i>	-	-	02
10	Fox	<i>Vulpus benghalensis</i>	29	-	-
11	Indian Gaur	<i>Bos gaurus</i>	-	-	05
12	Sambar	<i>Cervus unicolour</i>	-	-	04
13	Blue bull/Nilgai	<i>Boselaphus tragocamelus</i>	135	112	06
14	Spotted Deer/Cheetal	<i>Axis axis</i>	396	-	02
15	Barking deer	<i>Muntiacus muntjack</i>	55	36	44
16	Four Horned Antelope/Chausinga	<i>Tetraceros quadricornis</i>	11	-	02
17	Rhesus macaque	<i>Macaca mulatta</i>	43	16	-
18	Common Langoor	<i>Presbytes entellus</i>	817	141	630
19	Wild Boar	<i>Sus scrofa</i>	155	108	13
20	Black Napped Hare	<i>Lepus nigricollus</i>	39	07	09
21	Peacock	<i>Pavo cristatus</i>	79	47	20
22	Wolf	<i>Canis lupus</i>	12	-	-
23	Grey Jungle Fowl	<i>Gallus sonnerati</i>	-	-	99
24	Black buck	<i>Antelope cervicapra</i>	40	-	-
Total :			1882	509	902

Though census data of Lonar Sanctuary is not available separately, 75 species of Birds are recorded by bird observers in the Sanctuary. Main species

are Peacock, Blue jay, Flamingoes, Ruddy shelduck, Coots, Stilts, Hornbills, Herons, Owls, Eagles, Doves, Falcon, Kingfisher, Bee Eaters, Wagtails and Cormorants. Wild animals recorded are *Hyena, Chinkara, Jackal, Fox, Monitor Lizard, Mongoose, Hares, Squirrel and snakes* etc.

SECTION 5: INJURIES TO WILDLIFE:

POACHING:

2B.5.1. In spite of stringent provisions as aforesaid, poaching for skin, bones and flesh continues to be the most important reason for destruction of wildlife in the Division. Poachers usually shoot the animals when they (wild animals) come to waterhole. Therefore the animals are particularly vulnerable during summer, when number of such water holes is drastically reduced and also water in a water hole recedes to minimum.

2B.5.2. It has been recently noticed that a new and very dangerous method of poaching through poisoning of drinking water by mixing urea in large concentration has been innovated by the poachers. When an animal drinks such water, it dies within hours due to intense gas formation in stomach and choking of breathing organs. The poachers then remove skin or bones of the dead animal for trafficking. Setting of nets and traps for catching birds, hares and sometimes small animals like deer has been employed in the past but of late the poachers have been found using the improvised traps for killing the large animals like tigers very effectively and regularly.

2B.5.3. The Man-Animal conflicts are common. In adjoining areas of *Dnyanganga* Sanctuary, attacks of Sloth Bears on human being are common. Cases of poisoning of Sloth Bears are also recorded. Even a few cases of killing of Leopard is also on the record. Blackbucks are present in fairly large numbers in *Deulgaon Raja* and *Mehkar* ranges. Some cases of poaching of *Black bucks* have also occurred in these areas. A statement showing cases of poaching in the Division is given in **Appendix No. XVI** of Volume II.

2B.5.4. Use of pesticides rather than the plant poison, to catch the fish of water bodies, by the tribals led to the death of wildlife which preyed upon the fish

containing poisons. **This practice be discouraged to save the wildlife by bringing awareness and also by providing the methodology to the tribes to extract plant based poisons.**

DISEASES TO WHICH WILDLIFE IS LIABLE:

2B.5.5. The livestock from the villages in the forests regularly frequent the forests and share the water holes used by wild animals. Therefore various diseases common in domestic cattle, and which spread through contact and are water borne (contagious diseases) are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (4) Canine distemper. FMD has a potential to wipe out large populations, while Rinderpest, Anthrax and Rabies are highly infectious and lead to death

FIRES

2B.5.6. Fires are major culprit reducing food availability for the herbivores very drastically. Thus, wild animal habitats are very adversely affected due to recurrence of fires every year. Besides, fires pose a major danger of wiping out of floral bio-diversity from the region.

INJURIES DUE TO WILDLIFE

2B.5.7. The carnivores, particularly Panthers sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. A statement showing number of human beings attacked by wild life is given in **Appendix No XVII** of Vol. II . The villagers sometimes indulge in poisoning the carcass to show vengeance and cases of electrocution of wild animals by the villagers to kill the animal suspected to have killed the cattle have also been reported. In such cases the persons involved in illegal killings of the wild animals do not have any intention of poaching or trade but such activities on the part of local people pose grave danger to animal populations in the forests. The Government of Maharashtra, therefore, has evolved a policy of compensating for the loss of livestock, for the injury to and loss of human life and crop damage. This is summarized below:

COMPENSATION FOR THE LOSS OF LIVESTOCK

2B.5.8. The scheme, which was introduced for the first time in 1971, covers the loss of Cow, Buffalo, Bullock, Sheep, Goat and other livestock (as per definition given under Section 2(18A)) due to attack of a Tiger, Panther or any other wild animal. The present rates of compensation as per the GR No.WLP-1002/C.No.258/F-1 of 27.1.2003 are as follows and compensation is to be paid within 3 months.

- | | |
|-----------------------------------|--|
| 1] Cow , Buffalo, Bullock | 75% of the market price or
Rs.9000/- and whichever is less |
| 2] Sheep , Goat, other livestock | 75% of the market price or
Rs.3000/- and whichever is less. |

The conditions to be fulfilled are:

- 1) Death to be reported within 48 hours.
- 2) Carcass is not to be removed before case is made.
- 3) No death of any wild animal within 10 km radius area in the next 6 days.
- 4) Immediate investigation by forest officers as to the wild animal, which killed the cattle as well as likely amount of compensation.
- 5) Compensation to be sanctioned by an officer not below DCF/DFO.
- 6) No compensation in case the livestock was grazing illegally.

Table No. 2.3 shows that in general there is increase in the cattle kill cases from the year 2000-01. It is maximum i.e.34 cases in the year 2004-05.

Table No.2.3
Table of cattle kill cases from the year 1993-94 to 2006-07

Sr.No.	Year	No. of Cases	Compensation paid
1	1993-94	02	2465/-
2	1994-95	01	750/-
3	1995-96	01	9638/-
4	1996-97	01	2200/-
5	1997-98	04	14000/-
6	1998-99	05	12550/-
7	1999-00	06	18000/-
8	2000-01	15	42500/-
9	2001-02	13	28325/-
10	2002-03	20	37225/-
11	2003-04	13	49350/-
12	2004-05	34	157862/-
13	2005-06	15	84400/-
14	2006-07	09	5100/-

COMPENSATION FOR THE INJURY TO AND LOSS OF HUMAN LIFE

2B.5.9. Introduced through GR dated 27.1.1986, the scheme covers death as well as injury including minor injury caused to any individual in an attack by a wild animal. Any such attack by Tiger, Panther, Sloth Bear, Bison, Wild Pigs, Wolf, Hyena, Jackal and wild dogs is covered under the scheme. Present rates of compensation have been fixed through GR No.WLP-1002/C.No.258/F-1, dt.17.1.2003 and dt.20.5.2003. These are as follows:

- | | |
|--|---|
| 1) Death or permanent disability
(Adult as well as minor) | Rs.2.00 lakhs to legal heir |
| 2) Major injury | Rs.50000/- to the individual injured |
| 3) Minor injury | Cost of medication preferably in govt. hospital but in case of unavoidable private medication limit should be up to Rs.7500/- per individual. |

Following are the conditions put for claiming and deciding above compensations:

- 1) Such attacks should not have occurred when the individual was indulging in violating the Wildlife (Protection) Act 1972.
- 2) Relative/friend should report the attack within 36 hours.
- 3) Police/forest officer to investigate within 3 days.
- 4) Death/injury due to wild animal is to be certified by the govt. medical officer.
- 5) Compensation due to death is to be given only to a legal heir and compensation due to injury is to be given to individual concerned.
- 6) Compensation is to be sanctioned by the officer not below the rank of DCF/DFO.

Perusal of **Table No.2.4** shows that the majority of the cases of attack on human being (approx 90 %) are by Sloth Bear. These incidences mostly occur around *Dnyanganga* Wildlife Sanctuary. The census data also corroborate the presence of large number of Sloth Bear in *Dnyanganga* Sanctuary as well as the Division. There are a few incidences of attack by Panther, Wild boar and even

Indian Gaur. **Appendix No. XVII** of Volume II gives summary of cases of attack on human beings by wild animals.

Table No. 2.4
Attacks on human being by Wild animals between the period 1996 to 2007.

Animals Species	Deaths	Permanent disability	Serious injuries	Minor injury	Total
Sloth Bear	09	01	03	51	64
Wild Boar	-	-	-	03	03
Leopard	-	-	-	01	01
Indian Gaur	01	01	-	-	02
Total :	10	02	03	55	70

Table No.2.5
A Table showing the compensation paid in the cases of Human deaths or injury due to attack by wild animals.

Sr.No.	Year	No. of Cases	Compensation paid
1	1994-95	01	20000/-
2	1995-96	01	20000/-
3	1996-97	04	1763/-
4	1997-98	06	85975
5	1998-99	07	61926/-
6	1999-00	11	98190/-
7	2000-01	10	59415/-
8	2001-02	04	7512/-
9	2002-03	09	161435/-
10	2003-04	03	55500/-
11	2004-05	06	82794/-
12	2005-06	09	467882/-
13	2006-07	07	166925/-

COMPENSATION FOR CROP DAMAGE

Introduced vide GR No WLP/1094/C.No.-15/F-1 dated 23 rd August 2004, it provides for compensating losses to the agricultural crops due to wild animals. A compensation of Rs. 2000/- per hectare is paid to the farmers subject to maximum of Rs. 5000/- per annum to a family.

Cases of crop damages and its extent is increasing day by day in the Division. It is because the predator species like Tiger has already vanished from the area and Leopards are on the verge of extinction. More peoples are coming forward to claim crop damages due to awareness of the provisions of the GR dated 23 rd August 2004.

Table No. 2.6
Table showing the crop damage cases and compensation paid.

Sr.No.	Year	No. of Cases	Compensation paid in Rs.
1	2004	30	28100/-
2	2005	20	26020/-
3	2006	12	15400/-
4	2007	323	196708/-

CHAPTER II-C

BIODIVERSITY

SECTION 1. GENERAL DISCRIPTION OF BIODIVERSITY

2C.1.1 Forests of this Division have a considerable large expanse. Therefore, they are fairly rich in biological diversity. This area is having potential of holding large number of flora and fauna. But that potential is deteriorating because of huge biotic pressure on the forests. With the current awareness and emphasis on biodiversity, it has become imperative to identify the flora and fauna of the area and due care is taken to conserve it.

Biogeographic location :

2C.1.2. Biogeographically, the area of the reserve represents:

- | | |
|---------------------------|--------------------------|
| a. Bio geographic kingdom | Paleotropical |
| b. Sub kingdom | Indomalaysian |
| c. Biogeographic zone | 6-Deccan peninsula |
| d. Biotic province | 6E-Central highlands |
| e. Sub Division or Region | Satpuda Maikal Division. |

SECTION 2. FLORAL DIVERSITY:

2C.2.1. Buldhana district is fairly rich in floral diversity. As many as 567 species, 3 sub species and 11 varieties spread over 378 genera and 102 families, besides 3 species of Gymnosperms and Pteridophytes occurs in the area. Special feature of the flora is that they are general vegetation type plants of medicinal, economical and horticultural importance.

2.C.2.2. Past Work: The area of *Buldhana* district from botanical exploration point of view is almost virgin. Witt (1908) published a list of Trees, Shrubs and Climbers and other plants of economic importance found in the Berar Forests Circle of the Central Provenances. The list contains a total of 333 species of which most of the plants are from Amravati, Akola and Yavatmal districts. No floristic work other than this has been published in the past.

In the year 2000 the Botanical Survey of India has published Flora of Buldhana District. Its abstract is given below:

Table No. 2.7
Table showing summary of various botanical surveys carried out by BSI in Buldhana Forests

	Tree	Shrub	Herbs	Grasses	Climber	Total
Flora of Buldhana (By P.G.Diwakar & B.D.Sharma)	91	97	255	60	64	567
Total :	91	97	255	60	64	567

In order to have the precise picture of the flora, the available data may be presented in the following table. The relevant statistical analysis is also appended for ready reference.

Table No. 2.8

	Dicots	%	Monocots	%	Total
Families	89	87.3	13	12.7	102
Genera	311	82.2	67	17.6	378
Species	460	82.9	107	17.1	567

The detailed analysis of life form of indigenous species is as follows:

Table No. 2.9

Sr. No.	Life form	Species	Percentage
1	Herbs(Erect)	315	55.60
2	Herbaceous climbers, Twiners	64	11.15
3	Shrubs	97	17.15
4	Trees	91	16.10
	Total	567	

Analysis of life form (Herbs, Climbers etc) reveals high percentage (66.75%) of herbaceous members in contrast to 33.25% woody members. The relatively higher proportion of herbaceous members clearly indicates very limited forest in the area under study. Considering the total or about 12500 genera in the whole world only 3.2% are found in the area under study.

2C.2.4 Above floral survey contains the species of cultivation also. But there is a addition of more than 500 species which were not collected earlier by Witt.

Forest Types :

2C.2.5 Forest of this Division are of Tropical Dry Deciduous Forests of Central India. However because of hilly terrain, changes in basic rock structure and water availability etc. the crop changes even within the limits of a compartment.

2C.2.6 The forest type is as per Champian & Seth's revised classification is described in **Chapter II**.

Tropography :

2C.2.6 Most of the part of the district is an elevated land separated from plains to the North of Ajantha Range. The average elevation of the plateau is 550 m above M.S.L. Out of the old five tehsils, now forming the entire district, the tehsils of Chikhali and Mehkar lie on Balaghat Plateau, while rest three tehsils Malkapur, Khamgaon and Jalgaon-Jamod are in the great plain below known as Payanghats.

2C.2.7 The main system of hills in the Ajantha Range which has formed plateau is called *Balaghat*. It covers the southern portion of the district, comprising Chikhali and Mehkar tehsils. A ridge of low hills running from North West to South- East through the Balaghat forms the watersheds between the valley of the *Penganga* and the *Katepurna*. The main Ajantha Ranges forms the northern wall of the deccan table land and water shed between *Godavari* and *Tapti* valley.

2C.2.8 There is also a branch of Satpuda in the North of Jalgaon- Jamod tehsil which separates the district from the Madhya Pradesh.

Climate :

Temperature : The climate of the district is dry and hot in general and considered to be generally healthy. The rainy season is pleasant and the winter is invigorating. Buldhana town itself is the coolest and the most pleasant district head quarter in Amravati Division. The climate of Payanghat affords a

great contrast. There, the heat is intense, especially in the month of March, April and May. It is perhaps so intense as the hottest part of the country. The strong Western wind which then prevails become intensely heated and exercises their influence.

Rainfall : The rainfall is not uniform in all parts of the district. It is highest in Chikhali with an average of 808 mm against the 754 mm for rest the district. The district receives rain from the South-West Monsoon. Monsoon period is from June to September.

Floristic : As mentioned above the first exhaustive work was published by the Botanical Survey of India in a document named Flora of Buldhana District by P.G.Diwakar and B.D.Sharma, which describes 91 tree species, 97 Shrubs, 255 Herbs, 60 Grass species and 64 Climber/Twiners. They have recorded 16 endemic or rare plants from the district.

Trees :

2C.2.10 Teak (*Tectona grandis*) is the most dominant species. It surpasses all other component species in frequency and density. It is seen mixed in various proportions with other species. Even most valuable species like Chandan (*Santalum album*) have its appearance in the area. It is because of the efforts by our predecessors of sowing of Chandan seeds in bushes in large areas but this species is again disappearing rapidly. Anjan (*Hardwickia binata*) is again another dominant species of this area, but it is lopped heavily for fodders. Even illicit cutting of Anjan is common for firewood. Therefore Anjan Forest has a rarely good appearance. Salai (*Boswellia serrata*) also have presence in large scale. But in the most of the area it is crooked or stunted. Most of Babul (*Acacia nilotica*) bans were situated in the Payanghat in scattered blocks. But in most of the places this species is replaced by *Prosopis juliflora*. Ain (*Terminalia crenulata*), Lendia (*Lagerstronia parviflora*), Kalam (*Mitragyra parviflora*), Kulu (*Sterculia urens*), Dhawda (*Anogeissus latifolia*), are a most another common tree species. Bija (*Pterocarpus marsupium*), Shisham (*Dalburgia latifolia*) have rare appearance.

Bamboos :

2C.2.11 *Bamboo (Dendrocalanus strictus)* very rarely occur with the territory of this Division.

Climbers :

2C.2.12 There are as many as 64 climbers/ twinnings recorded in the district. *Mahulvel (Bauhinia valhii)*, *Chilati (Acacia pinnata)*, and *Palasvel (Butea superba)* are the main woody climbers. *Malkanguni (Celastrus paniculata)*, *Gunj (Abrus precatorius)*, *Kach kuyari (Mucuna pruriens)*, *Gulvel (Tinospora cardifolia)*, are of medicinal importance. Moist places of the forest abounds in a variety of woody climbers.

Shrubs :

2C.2.13 There are 97 shrubs that exist in the area. *Raimunia (Lantana camara)*, *Bharati (Meytenius emarginata)*, *Nirgudi (Vitex negundo)*, *Tarota (Cassia tora)* are most common Shrubs.

Herbs :

2C.2.14 There are as many as 255 species of herbs recorded in the district. Most of the herbs have medicinal value. But herbs like *Rantulsi (Hyptis suaveolens)* and *Chatak chandani (Paothenum hysterophorus)* are found on large area.

Grasses :

2C.2.15. There are few grass lands or fodder reserves in this Division. In most of the grassy blanks, soil depth is less. They are associated with brush wood or stunted tree growth. The most common grass species are *Kusali (Heteropogan contortis)*, *Pochati (Apluda mutica)*, *Gondel (Themade triandra)*, *Mothi kusal (Aristida setacea)* and *Thikhadi (Cympopogan martinii)*, *Marvel (Dicanthian annulatum)*.

Plant parasite :

2C.2.17 The flowering plant parasites occurring in the forests of this Division are *Bandgul* (*Cuscuta chinensis*) and *Amar vel* (*Cuscuta reflexa*), It is noticed that these species are gradually spreading in Ghatbori forest range, away from the human habitations.

Exotics :

2C.2.20 The exotic species found in this Division are *Eucalyptus* hybrid, *Eucalyptus camaldulensis*, *Grevillea robusta* etc.

SECTION 3. FAUNAL DIVERSITY:

2C.3.1 Buldhana district is also having fairly good faunal diversity. But no information of non chordates is available with this office. Therefore information of Chordates are given below:

Phylum- Chordata :

2C.3.2 As mentioned above there is fairly good faunal diversity that exists in this area.

Class – PIECES

2C.3.3. The district is drained by the river Dnyanganga, Nalganga, which harbours 23 species of fishes.

Class – AMBIBIA

2C.3.4. Hill streams draining into major river of Buldhana district has ample water for the aquatic fauna as well as amphibians, who required water bodies for completing their life cycles. There are three species of Amphibians in this district.

Class – REPTILIA

2C.3.5 There are 30 species of this class in the district.

Class – AVES

2C.3.6. This district has a variety of avian fauna. 103 birds including resident, winter migratory and migratory birds observed in the district.

Class – MAMMALIA

2C.3.7. Most important class of phylum Chordata is Mammalia which consists of very important species of primates and carnivore. There are 29 species of class listed in this district.

SECTION 4. : THE BIOLOGICAL DIVERSITY ACT 2002.

2C.4.1 The Biological Diversity Act 2002 came into existence from February 2003. The Act provides for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources.

2C.4.2 Some of the important sections of the Act are reproduced for ready reference.

Definition :

Sec 2(b) Biological diversity : Means the variability among living organisms from all sources and the ecological complexes of which they are part, and includes diversity within species or between species and ecosystem.

Sec 2(c) Biological resources : Means plant, and animal and micro-organism or parts thereof, their genetic material and by products (excluding value added products) with actual or potential use or value, but does not include human genetic product.

Sec 2(h) Local bodies : Means Panchayats and Municipalities, by whatever name called within the meaning of clause (i) of article 243 B and clause (i) of article 243 Q of constitution and in the absence of any Panchayats or

Municipalities, institutions of self government constituted under any other provisions of the constitution or any Central Act or State Act.

Sec 2(o) Sustainable use : Means the use of components of biological diversity in such manner and at such rate that does not read to the long term decline of the biological diversity there by maintaining its potential to meet the needs and aspirations of present and future generations.

Regulations to Access to Biodiversity.

Sec 3. (1) No person referred to in sub-section (2) shall, without previous approval of the National Biodiversity Authority, obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.

(2) The persons who shall be required to take the approval of the National Biodiversity Authority under sub-section (1) are the following, namely:

- (a) a person who is not a citizen of India;
- (b) a citizen of India, who is a non-resident as defined in clause (30) of section 2 of the Income-tax Act, 1961;
- (c) a body corporate, association or organization-
 - (i) not incorporated or registered in India; or
 - (ii) incorporated or registered in India under any law for the time being in force which has any non-Indian participation in its share capital or management.

Results of research not to be transferred to certain persons without approval of National Biodiversity Authority

Sec 4. No person shall, without the previous approval of the National Biodiversity Authority, transfer the results of any research relating to any biological resources occurring in, or obtained from, India for monetary consideration or otherwise to any person who is not a citizen of India or citizen of India who is non-resident as defined in clause (30) of section 2 of the

Income-tax Act, 1961 or a body corporate or organization which is not registered or incorporated in India or which has any non-Indian participation in its share capital or management.

Explanation.- For the purposes of this section, "transfer" does not include publication of research papers or dissemination of knowledge in any seminar or workshop, if such publication is as per the guidelines issued by the Central Government.

Sections 3 and 4 not to apply to certain collaborative research projects

Sec 5.(1) The provisions of sections 3 and 4 shall not apply to collaborative research projects involving transfer or exchange of biological resources or information relating thereto between institutions, including Government sponsored Institutions of India, and such Institutions in other countries, if such collaborative research projects satisfy the conditions specified in sub-section (3).

(2) All collaborative research projects, other than those referred to in sub-section (1) which are based on agreements concluded before the commencement of this Act and in force shall, to the extent the provisions of agreement are inconsistent with the provisions of this Act or any guidelines issued under clause (a) of sub-section (3), be void.

- (3) For the purposes of sub-section (1), collaborative research projects shall-
- (a) conform to the policy guidelines issued by the Central Government in this behalf;
 - (b) be approved by the Central Government.

Application for intellectual property rights not to be made without approval of National Biodiversity Authority

Sec 6.(1) No person shall apply for any intellectual property right, by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without

obtaining the previous approval of the National Biodiversity Authority before making such application.

Provided that if a person applies for a patent, permission of the National Biodiversity Authority may be obtained after the acceptance of the patent but before the seating of tile patent by the patent authority concerned:

Provided further that the National Biodiversity Authority shall dispose of the application for permission made to it within a period of ninety days from the date of receipt thereof.

(2) The National Biodiversity Authority may, while granting the approval under this section, impose benefit sharing fee or royalty or both or impose conditions including the sharing of financial benefits arising out of the commercial utilization of such rights.

(3) The provisions of this section shall not apply to any person making an application for any right under any law relating to protection of plant varieties enacted by Parliament.

(4) Where any right is granted under law referred to in sub-section (3), the concerned authority granting such right shall endorse a copy of such document granting the right to the National Biodiversity Authority.

Prior intimation to State Biodiversity Board for obtaining biological resource for certain purposes

Sec 7. No person, who is a citizen of India or a body corporate, association or organization which is registered in India, shall obtain any biological resource for commercial utilization, or bio-survey and bio-utilization for commercial utilization except after giving prior intimation to the State Biodiversity Board concerned:

Provided that the provisions of this section shall not apply to the local people and communities of the area, including growers and cultivators of

biodiversity, and *vaids* and *hakims*, who have been practicing indigenous medicine.

Biodiversity heritage sites

Sec37. (1) Without prejudice to any other law for the time being in force, the State Government may, from time to time in consultation with the local bodies, notify in the Official Gazette, areas of biodiversity importance as biodiversity heritage sites under this Act.

(2) The State Government, in consultation with the Central Government, may frame rules for the management and conservation of all the heritage sites.

(3) The State Government shall frame schemes for compensating or rehabilitating any person or section of people economically affected by such notification.

Constitution of Biodiversity Management Committee

Sec 41(1) Gives the power of constitution of Biodiversity Management Committee. Every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, fold varieties and cultivators domesticated stock and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

Sec 41(2) The National Biodiversity Authority and the State Biodiversity Boards shall consult the Biodiversity Management Committee while taking any decision relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the Biodiversity Management Committee.

Sec 41(3) The Biodiversity Management Committee may levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purpose from areas within its territorial jurisdiction.

CHAPTER III
UTILIZATION OF THE PRODUCE

SECTION 1. AGRICULTURAL CUSTOMS AND WANTS OF PEOPLE

3.1.1. The area and population of Buldhana district according to latest figures available are as follows:-

Table No.3.1
Table showing Population, Population density etc of Buldhana District

Area in Sq.Km.	Population (2001)	Population density/Sq.km.	Forests in Sq.Km	Per capita Forest area in ha.
9661	22,32,480	231	839.05	0.038

3.1.2. The local population consists chiefly of agriculturist of various classes such as Kunbis, Marathas, Andhs, Malis, Banjaras, Korku, Nihals, Kolis, Mahars, Mangs, Chambhars, Dhangars, Gaolis, and Wanis etc. These, while being primarily cultivators, depend on forest for their daily needs. Of these the Korkus, Bhils, Andhs, Nihals and Banjaras are chief inhabitants of Ex-forest villages.

3.1.3 The Most important field crop are Cotton and Jawar, Wheat, Rice, Bajra, Soyabean, Gram and the usual pulses, Linseed, Til, Groundnut. Sugarcane is also grown.

3.1.4. The chief local wants for which the village population has to depend upon the forest are timber for house building and agricultural implements, fuel, grasses, and grazing. The demand is heavy is *Chikhali*, *Khamgaon* and Buldhana town.

SECTION 2. MARKETS AND MARKETABLE PRODUCTS:

3.2.1. *Chikhali*, *Buldhana*, *Khamgaon*, *Shegaon*, are the major market places in Buldhana district.

3.2.2. Teak is the most valuable species used for building purpose.

3.2.2.1. Timber : The demand for teak timber is keen and it is saleable in all sizes. Other species which are in demand for timber are *Saja, Tiwas, Dhawra, Babul, Bija, Tendu, Kalam, Shioham, Siwan* and *Dhaman*. The size of miscellaneous species mostly in demand and saleable throughout the division are poles from 30-60 cm. girth over bark but teak of any size can be readily sold.

3.2.2.2. Fuel : Fuel is in great demand in almost all important towns in the division. *Babul, Dhaora, Anjan, Khair,* and *Saja* are preferred fuel to most other species. Wood from all tree species is saleable as fuel. **Appendix No. XVIII** of Volume II gives statement of annual out-turn of timber and firewood in the Division.

3.2.2.3. Grass : There is heavy demand for grass and grazing. Fodder grass to stall feed the cattle and thatching grass for cattle sheds, huts and houses of the villages are extracted.

3.2.2.4. Other Non Timbet Forest Produce : Tendu leaves, Char fruits, Mahua flowers & fruits, Gum, Honey and Sitaphal are other Non Timber Forest Produce which are obtained in small quantities. **Appendix No. XIX** of Volume II gives statement of annual out-turn of NTFP in the Division.

SECTION 3. LINES OF EXPORT:

3.3.1. The tract is served by railway lines. The central railway broad gauge Mumbai-Kolkalta line runs West to East through most northern portion of the tract. However railways are little used for transport of forest produce from the division.

3.3.2. There is fairly good network of tar roads constructed and maintained by the P.W.D. or Zilla Parishad, over which forest produce is transported to important markets within the Divisions. These roads greatly assist the transport and distribution of forest produce. There is also an adequate system of metal roads, fair weather roads or cart tracts through most of the reasons. The length of forest roads in the Division is 158.50 Km. A detailed list of these is given in the **Appendix No. XX** of Volume II.

SECTION 4. **METHOD OF HARVESTING AND THEIR COST :**

3.4.1. The Working Plan written by B.S.Thengdi did not prescribe felling of trees. Hence no harvesting of timber and fuelwood were done. Earlier they were harvested Departmentally or through FLCS or contractors.

3.4.2. *Tendu* leaves are harvested by licensees as per Modified Lump Sum system with ceiling on upper limit. As per Govt. Resolutions R&FD No. MFP 2104/CR 67/F-1 dated 28.02.2006 the royalty received after deduction the expenditure on collection is to be distributed as bonus to the labourers involved in collection of *Tendu* leaves from 2006 season.

3.4.3. *Moha* and *Gum* are being collected by local population for their consumption.

SECTION 5. **TIMBER DEPOTS:**

3.5.1. Though harvesting of timber & fuelwood is currently not in force, however, timber & fuelwood seized in offence cases is sold on Timber depots. There are 4 depots in the Division located at Buldhana, Deulgaon Sakarsha, Khamgaon and Jalgaon- Jamod.

3.5.2. There are 83 privately owned saw mills in the Division. The range wise distribution of Saw Mills are given in **Appendix No.XXI** of Volume II.

SECTION 6. **COST OF HARVESTING:**

3.6.1. Though harvesting of timber and fuelwood is not being done currently, wage board rates for harvesting for the year 2008-09 are given in the **Appendix No.XXII** of Volume II.

SECTION 7. **PAST AND CURRENT PRICES:**

3.7.1. Timber and fuelwood harvesting is not being done in the Division. A statement showing market rate of Teak at depots is given in the **Appendix No.XXIII** of Volume II.

CHAPTER IV
THE SOCIO ECONOMIC SURVEY REPORT

SECTION 1. FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA:

4.1.1. The entire area of the *Buldhana* Forest Division is vested with Forest Department of *Maharashtra*. However, 29338.28 ha (11147.46 ha A- class RF and 181190.82 ha C- class RF) forest area was earmarked for FDCM. *Khamgaon* Forest Project Sub-Division of FDCM Ltd carried out plantation over 20,310.03 ha between 1988 to 2003. These plantations had been handed over to the territorial Division after the routine maintenance period. The year-wise summary is given in the **Table No. 4.1**. A list of plantation carried out by FDCM and the date of handing over to the territorial Division is given in **Appendix No. XXIV** of Volume II.

Table No 4.1
Table showing year-wise area planted by FDCM Ltd
and handed over to the Division

Year	Area in ha Planted
1988	0929.00
1989	1718.05
1990	1784.00
1991	1903.73
1992	2008.00
1993	1707.00
1994	1370.25
1995	1333.00
1996	1225.00
1997	1233.00
1998	1389.00
1999	1615.00
2000	0735.00
2001	0415.00
2002	0625.00
2003	0320.00
Total	20310.03

SECTION 2. THE SOCIO ECONOMIC SURVEY REPORT:

4.2.1. The total population of Buldhana district as per 2001 census is 22, 32,480; of which 79 % live in rural areas. The rural population is spread over 1433 villages. The Male population is 11, 47,403 and Female population is 10, 85,077. The average rate of growth of population in last decade (1991-2001) is 18.35%. The Schedule Caste population and Schedule Tribe population forms

about 10.82% (State average 10.82%) and 5.35% (State average 8.9%) of the total population respectively as per the census of 2001.

4.2.2. The density of population of Buldhana district 231 per Sq. km which is less than the State average of 315. As per census figure of 2001, there are 946 women for every 1000 men in Buldhana district, which is more than the State average of 922.

4.2.3. The literacy rate of Buldhana district is 75.8% as per 2001 census, the male literacy rate being 86.9% and female literacy rate of 64.1%. The district ranks 17th in the State in literacy.

4.2.4. The total number of families in Buldhana district are 4,45,634 of which 80.42% lives in rural area and 19.52% live in urban area. As per 1999-00 report, 1.5 lakh rural families are below poverty line.

4.2.5. Land use pattern in Buldhana Forest Division is as under:-

Table No.4.2
Land use Pattern [2004-05(temporary)]

Geographical area (ha)	Area under Forest (ha)	Land not available for cultivation (ha)	Land under Grazing (ha)	Land under trees/shrubs (ha)	Cultivable but fallow (ha)	Fallow land (ha)	Land under cultivation (ha)
9,67,000	54,000	63,000	29,000	10,000	32,000	31,000	7,56,000

4.2.6. The irrigation is done through wells, Minor Irrigation Projects, Medium Lift Irrigation Projects and by pumps on rivers / nalas. In 2002-03, 6.29% of land under cultivation was under irrigation. In 1999-00, there were 48,581 wells in the district of which 76.67 % wells were fitted with electric pump and 1.11% wells were fitted with diesel pump.

4.2.7 In *Buldhana* district there are 4 Major Irrigation Projects with approx. command area of 2, 23,000 ha. Also there are 9 Medium Irrigation Projects having irrigation capacity of 45,000 ha. Similarly, there are 10 Minor Irrigation Projects, having command area 7,600 ha. 35,000 ha area is irrigated through wells.

4.2.8. Out of 1433 villages, 1398 villages in *Buldhana* district are electrified up to March 2007.

4.2.9. Based on 1999-2000 series, the gross per capita income for the year 2005-06 was Rs. 20,469/- (State average Rs. 41,515/-) at current price. For the same period, net per capita income was Rs. 18,776/- (State average Rs. 37,081/-) at current price.

4.2.10. The labour population in Buldhana district as per 2001 census is 45.51% which was 47.64% in 1991 census. This shows a substantial decrease in labour population in 1991-2001 decade. 32.53% labour population are involved in agriculture and related activities.

4.2.12. The cattle population of Buldhana district as per 2003 census is 10,80,098. The same in 1997 was 11,75,139. This shows that cattle population has decreased by approx. 8 %.

Table No. 4.3
Table showing Cattle population as per Census of 2003.

Cattle	Cow	Bull/ bullock	Sheep	Goat	Buffaloes	Total
No.	235414	283830	94138	336795	129921	10,80,098
Percentage	21.80 %	26.28 %	8.72 %	31.18 %	12.02 %	100

CHAPTER V
FIVE YEAR PLANS

SECTION 5.1. IMPACT OF FIVE-YEAR PLANS ON ATTAINMENT OF MANAGEMENT OBJECTIVES:

5.1.1. The forest area of *Buldhana* Forest Division is to the tune of 8.70 % of total geographical area of *Buldhana* district. Earlier forestry sector was the only sector providing the employment to the people in the vicinity of the forest. All the silvicultural operations, timber extraction and afforestation works were executed with the funds made available in the Non-Plan. Gradually the grants under Non-Plan were reduced. Hence, proposals were submitted to obtain contingency funds and the trend continued for the last some years. But even these funds being less compared to the requirements and as they are released at the fag end of the financial year all the working plan operations could not be carried out properly, hence the management objectives could not be attained fully. The other EGS sources cannot be utilized because most of the forestry operations were not recognized, as many of them are not measurable one.

5.1.2. First Five-Year Plan (1951 To 1956): *Buldhana* Forest Division was not a separate unit during this period. During this period Working Plan was not in operation.

5.1.3. Second Five Year Plan (1956-1961): Just like the First Five-Year Plan period the tract dealt was not having separate identity. During this period also Working Plan was not in operation.

5.1.4. Third Five-Year Plan (1961-1966): *Buldhana* Forest Division was not a separate unit till 1963. It came into existence in the year 1964 and the Working Plan by S. S. Parasnis for this Division was operative from 1966-67 onwards. Working Plan prescriptions were only for A class Reserved Forests but C class Reserved Forests and Protected Forests were not given any treatment. Stock maps were prepared for A class Reserved Forests . Plantation data is not available for the period.

5.1.5. Post Third Five-Year Plan (1966-1969): Working Plan by *Parasnis* was operative but plantation data for this period is not available.

5.1.6. Fourth Five Year Plan (1969-1974): Working Plan by *Parasnis* was operative but plantation data for this period is not available.

5.1.7. Fifth Five Year Plan (1974 - 1979): Working Plan by *Parasnis* was operative but plantation data for this period is not available.

5.1.8. Annual Plan (1979-1980) And Sixth Five Year Plan (1980-85): Working Plan by *Parasnis* was operative. The afforestations were carried out under EGS as given in the Table below:

Table No. 5.1. Showing Plantation Areas Covered During Sixth Five Year Plan Under Different Schemes:

EGS	Plan/ Non Plan	FDCM	Total
2185.00 ha	-	-	2185.00 ha

5.1.9. Seventh Five Year Plan (1985-90): Working Plan by *Parasnis* was extended upto 1987-88 but after 1988 Working Plan was not in force. Meanwhile *Khamgaon* Forest Project Sub Division of FDCM Ltd started their work of plantation in *Buldhana* Forest Division. The plantations taken under various schemes during this period was as under:

Table No. 5.2. Showing Plantation Areas Covered During Seventh Five Year Plan Under Different Schemes:

EGS	Plan/ Non Plan	FDCM	Total
7495.00 ha	-	2647.05 ha	10142.05 ha

5.1.10 Post Seventh Five-Year Plan (1990-1992): During this period Working Plan was not in operation. New working plan was under preparation. Protection work continued alongwith Massive Afforestation Programme under EGS. The plantation taken under various schemes during this period was as under:

Table No. 5.3. Showing Plantation Areas Covered During Post Seventh Five Year Plan Under Different Schemes:

EGS	Plan/ Non Plan	FDCM	Total
4552.00 ha	-	3687.73 ha	8239.73 ha

5.1.11. Eighth Five-Year Plan (1992-1997): During this Five-Year Plan new Working Plan by *B.S.Thengdi* for the period 1995-96 to 2004-05 came into force. The working plan for entire forest areas of the tract was under operation. The plantation taken under various schemes during this period was as under:

Table No. 5.4 Showing Plantation Areas Covered During Eighth Five Year Plan Under Different Schemes:

EGS	Plan/ Non Plan	FDCM	Total
4881.60 ha	1547.91 ha	7643.25 ha	14072.76 ha

5.1.12. Ninth Five-Year Plan (1997-2002): During this Five Year Plan period , some areas were transferred to WL Division. Prescriptions of existing plans continued during Ninth Five Year Plan. The JFM in *Buldhana* Forest Division was started in the year 1998-99 under *Maharashtra* Forestry Project. The plantation taken under various schemes during this period was as under:

Table No. 5.5. Showing Plantation Areas Covered During ninth Five Year Plan Under Different Schemes

EGS	Plan/ Non Plan	FDCM	Total
1843.00 ha	2318.07 ha	5387.00 ha	9548.07 ha

5.1.13. Tenth Five-Year Plan (2002-2007): Prescriptions of existing plans continued upto the year 2004-05 and same prescriptions were extended till 2007-08. Work of FDCM (*Khamgaon* Forest Project Sub Division) stopped since 2004. The implementation of project under FDA started in year 2005. The plantation taken under various schemes during this period was as under:

Table No. 5.6. Showing Plantation Areas Covered During Tenth Five Year Plan Under Different Schemes

EGS	Plan/ Non Plan	FDCM	Total
43.00 ha	484.34 ha	945.00 ha	1472.34 ha

5.1.14. Eleventh Five-Year Plan (2007-2012): The new Working Plan for *Buldhana* Division is being prepared and is expected to be implemented from 2010-2011 onwards. The plantation taken under various schemes during this period was as under:

Table No. 5.7. Showing Plantation Areas Covered During Eleventh Five Year Plan Under Different Schemes

EGS	Plan/ Non Plan	FDCM	Total
-	360.64 ha	-	360.64* ha

* upto 2008

CHAPTER – VI

STAFF AND LABOUR SUPPLY

SECTION 1. **STAFF:**

6.1.1. In 1865, one Assistant Conservator of Forests was appointed for regular forest administration of Berar. In 1869-70 Berar was split up in to two divisions, one as a Deputy Conservator in charge of Northern Division and another as Assistant Conservator incharge of Southern Division. In 1881, Berar became a Conservator-ship and the Provincial branch of service was organized, the staff was strengthened and a reclassification of the forests began. In the year 1870, Akola formed the part of Southern Division under the Assistant Conservator. This was split up in 1880-81 into the Wani, Washim and Purna divisions, when Buldhana forests were included in the Purna forest division and Akola forests formed the part of Wani and Washim Divisions. In 1885-86 Akola and Buldhana became separate Forest Divisions. In 1901 the forests of Akola Division were included in the Buldhana Division but restored to Akola Division in 1906, when Akola Division was formed. On the first of April, 1932 the Buldhana and Akola Forest Divisions were amalgamated to form West Berar Forest Division with Head quarters at Akola. The old Buldhana Division now formed sub-division of the new West Berar Division. Akola and Buldhana Divisions were reconstituted in the year 1964.

6.1.2. In Buldhana Forest Division, there is a post of Deputy Conservator of Forests, assisted by three Assistant Conservator of Forests who are class-I officers. One Assistant Conservator of Forests is at Khamgaon and is incharge of Khamgaon, Motala & Jalgaon Jamod ranges. Another Assistant Conservator of Forests is stationed at Buldhana and is incharge of Buldhana, Ghatbori, Mehkar and Deulgaon Raja ranges. One A.C.F. is in charge of E.G.S. with head quarter at Mehkar. With the elevation of Range Forest Officer to the gazetted level, the total gazetted officer's strength has been increased considerably. Out of 13 Range Forest Officers in the Division , seven are in charge of territorial ranges. Two hold the charge of mobile squad, with head quarter at Khamgaon and Buldhana. There are four E.G.S. Range Forest Officers at Jalgaon Jamod, Khamgaon, Sindkhed Raja and Mehkar.

6.1.3. The existing organization showing distribution of Ranges, Rounds and Beats showing distribution of compartment is given in **Appendix No. XXV** of Vol. II.

6.1.4. The present strength of staff as on June, 30, 2008 is given under **Table No. 6.1** for Buldhana Forest Division, and **Appendix No. XXVI** of Vol. II enlists the names of the Divisional Forest Officers/Deputy Conservator of Forests who were incharge since 1964.

Table No. 6.1
Table Showing Staff Position in Buldhana Division:

S. No.	Name of Post	No. of Post/ posts				
		Sanctioned	Permanent	Temporary	Filled	Vacant
Class I-						
1	Deputy Conservator of Forests	1	1	-	1	-
2	Assistant Conservator of Forests	3	2	1	2	1
Class I-Total		4	3	1	3	1
Class II-						
3	Range Forests Officer	13	10	3	11	2
Class II-Total		13	10	3	11	2
Class III						
4	Foresters	31	28	3	29	2
5	Forest Guards	143	122	21	137	6
6	Chief Accountant	1	1	-	1	-
7	Accountant	11	9	2	11	-
8	Clerks	19	12	7	18	1
9	Surveyor	2	2	-	1	1
10	Driver	6	2	4	6	-
11	Police Constable	2	2	-	2	-
Class III Total		215	178	37	205	10
Class IV -						
12	Naik	1	1	-	1	-
13	Peon	5	4	1	5	-
14	Daftari	1	1	-	1	-
15	Watchman	1	1	-	1	-
16	Mali	3	3	-	3	-
17	Van mazoor	55	55	-	55	0
	Class IV -Total	66	65	1	66	-
	Total Staff	298	256	42	285	13

SECTION 2. **LABOUR:**

6.2.1. Population density is fairly good in the Division. The main occupation is agriculture, hence during agricultural season there is a decline in manpower availability, for the forestry works. A statement showing village wise population, agricultural labours population, casual labours population and marginal labours population is given in **Appendix No. XXVII** of Vol. II.

6.2.2. There are 23 Vankamgars (Barmahi Mazdoors) on muster rolls at present. They execute watch and ward operation of plantations and assists in patrolling of forest area along with regular staff. The wage rates are by annually revised as per the Labour Department's directions. The present wage rates per month are as follows for unskilled labours Rs. 2339/- and Semiskilled Rs. 2539/- , Skilled labours Rs. 2739/- w.e.f.1.1.09

CHAPTER VII

PAST SYSTEMS OF MANAGEMENT

SECTION 1. GENERAL HISTORY OF THE FOREST:

7.1.1. In 1853, when the Berar was assigned to the British, it was in a very undeveloped condition. Shifting cultivation was in practice and forests were cut at their will by the neighbouring villages. Soon after the assignment, the districts were rearranged, but Buldhana did not acquire its present dimension till 1905, when Khamgaon and Jalgaon talukas were added to the three talukas Mehekar, Chikhli and Malkapur to form the district of Buldhana with Buldhana as its head-quarter.

In 1865, regular forest administration was started by the appointment of one Assistant Conservator of Forests for the Berar. For the first few years all that could be done was to select and demarcate a few reserves. In 1869-70 Berar was split up into two divisions with a Deputy Conservator placed in-charge of the Northern Division as Chief Forest Officer and an Assistant Conservator in-charge of Southern Division. Forest management was further systematized by the Government of India, Revenue and Agriculture Department, Notification No.520, dated the 25th October 1871, which established the following classification of forests :-

- a) Demarcated State Forests.
- b) District Reserved Forests-Defined as lands not to be assigned for cultivation.
- c) District Unreserved Forests-All other lands which were neither cultivated nor assigned for village purposes, nor included in Izara or Jagir.

7.1.2. In 1881, Berar became a Conservator-ship and the provincial branch of the service was organized, the staff was strengthened and a reclassification of the forests began. The classification then adopted was completed in 1885-86, and was practically the same as that legally recognized in 1892, by Notification under section 40 (c) of the Berar Forest Law, viz :-

- A. 1. Reserves :- Tract of some extent primarily intended for production of timber and fuel.
- 2. Woods :- Areas suitable for growing Babul.
- B. 3. Grass lands :- Areas set aside for production of grass.
- C. 4. Grazing lands :- Areas reserved for pasture.
- 5. Open forests :- Lands awaiting excision and until then to be treated as 4.

7.1.3. This classification worked fairly well till 1900, when after the famine, a boom in land set in and prices of Cotton increased almost annually. Due to this, land under cultivation increased and areas under grazing curtailed, while the livestock increased until the free grazing and 'C' (i) class lands could no longer sustain the increased pressure. 'C' (ii) areas were either transferred to 'A' class or given out for cultivation or formed into 'E' class in 1911. Cultivable lands were disforested, waste lands afforested and some new A class reserves formed out of 'C' class, but no definite policy was laid down. In November 1913, all 'B' class forests were transferred to 'A' class.

7.1.4. Territorial and internal changes in the history of these forests were as follows :-

In the year 1870 Akola formed part of the Southern Division under an Assistant Conservator. This was split up in 1880-81 into the Wani, Washim and Purna Divisions, when Buldhana forests were included in the Purna Forests Division and Akola forests formed part of Wani and Washim Divisions. In 1885-86 Akola and Buldhana became separate Forests Divisions. Ambabarwa reserve was constituted in 1890. Since then large tracts of forests from the district adjoining the Buldhana Division were transferred to it with a view to distribute the work, and at the same time develop the areas transferred, and to work then to their fullest capacity. These objects not being fulfilled, the areas transferred were restored to their divisions. Thus in 1901, the forests of Akola Divisions were included in the Buldhana Division but restored to Akola Division in 1906, when Akola Division was reformed. In March 1924, 12740 acres of area from Nimar Division was transferred to Buldhana, but, in June, 1926 it was restored to Nimar. In November, 1929, the Burhanpur range of the

Nimar Division was transferred to Buldhana and restored in December 1931. Certain forests of Murtijapur taluqa of Akola district which till 1906 formed part of Amravati Division were also transferred to the Akola Division when it was reformed. These included three square miles of Babul woods and 35 acres of *Bamboo* plantation. In 1925, an internal change was effected. The Palodi Sub-range of Pangra range was transferred to Murtijapur range. In 1931 Pangra range was abolished and its forests distributed amongst the three remaining ranges Balapur, Murtijapur and Morna of Akola Division. On the first of April, 1932, the Buldhana and Akola Forests Divisions were amalgamated to form West Berar Forest Division with head-quarters at Akola. The old Buldhana Division now formed Sub-Division of the new West Berar Division. Internal changes in the old Buldhana division also had taken place. The Purna range of Buldhana Division was split up into Jalgaon, Chikhali, and Mehkar ranges. In 1936 and 1938 respectively, the Mahoja reserve and Risod C-class both lying in the Washim taluka of Akola district were transferred to the Buldhana Sub-Division.

7.1.5. Jagir forests of Bhingara, Anyar, Rohankhirki, Salwan (area 23259 acres) of Jalgaon range, Asola, Bhanosa and Shekapur (area 971 acres) of Mehkar range were abolished and declared as Protected Forest on 4th June, 1957 and now form the part of the range in which they occur.

7.1.6. In year 1957 Protected Forests of Andhari and Ada (area 472 acres) of Aurangabad division were transferred to West-Berar Division and formed part of Chikhli range.

7.1.7. Akola and Buldhana Divisions were reconstituted in the year 1964.

7.1.8 Dnyanganga Wildlife Sanctuary has been constituted over an area of 203.56 sq.km in Buldhana district vide Govt. notification No. WLP 1094/CR-363/F-1 dated 9th May 1997. Also Ambabarwa Wildlife Sanctuary has been constituted over an area 127.11 sq.km (102.10 sq.km RF + 22.63 sq.km PF + 2.38 sq.km private land) of Buldhana district vide Govt. Notification No. WLP-1094/CR-123/F-1, dated 9th April 1997. The areas of Dnyanganga Wildlife Sanctuary and Ambabarwa Wildlife

Sanctuary were transferred to Dy. C.F. (Wildlife) Akola, and Akot respectively on 13.1.1998. This led to re-organization and reduction of ranges from eight to seven. Lonar Wildlife Sanctuary has been constituted over 2.67 sq. km of 'C' class Reserve Forests of Buldhana district vide Govt. Notification No. WLP-1098/CR-48/F-1 dated 8th June 2000, however, it is continued to be managed by the territorial Division.

SECTION 2.PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS:

7.2.1. The forests before the regular working started in the year 1865, suffered badly from heavy fellings and over grazing as such the object of management in the beginning was to give them complete rest from felling and to ensure protection against fire and grazing.

7.2.2. 'C' class forests suffered to a much greater extent than the 'A' class forests. Fellings flush with ground with a view to obtain coppice regeneration was as far as possible insisted upon, and in some cases departmental fellings were made as back as 1891 and even earlier to improve condition of some of these reserves. It was in the year 1896 that the necessity for the working of these forests on silvicultural lines in accordance with the resources and capabilities was felt, because of the increased demand of timber and firewood. Accordingly, in 1898 simple provisional working schemes for period of 5, 10 and 15 years were approved by Conservator for the greater portion of the timber and fuel reserves and introduced as the demands extended. These felling schemes were based on area and the treatment prescribed was "Coppice-with-Standards". Fifteen felling series were formed under the schemes and an area of 42 square miles was exploited by 1912 with fairly satisfactory results.

7.2.3. Provisional working of 'A' class forests of Buldhana began in 1902-03, Coppice-with-Standards fellings on a 20 year rotation were carried-out in Ambabarwa reserve and followed by Cutting Back Operations. *Bamboos* were worked on three years rotations. For grazing the forests were divided into blocks for each of which a maximum limit of cattle was fixed.

Working Plan by Rao Bahadur Naidu (1912-13 to 1937-38)

7.2.4. In the year 1912-13, Working Plan for the Buldhana forests, drawn up by Rao Bahadur Srinivasalu Naidu was sanctioned. According to it forests were worked on the following lines :-

i. *Teak*, *Salai* and mixed areas were worked under the Coppice-with-Standards system on 20 years rotation with a minimum of 25 trees reserved per acre. Cutting Back Operations followed the main fellings and coupes were closed to grazing for five years after the main fellings.

ii. The greater part of the *Anjan* type was declared unworkable; a small area was to be worked under Improvement fellings on 20 year rotation. Coupes were closed to grazing for five years after fellings. In parts of the felled coupes the soil was to be broken up to the leeward side of seed bearers.

iii. *Babul* areas were worked under a treatment of clear fellings followed by agricultural sowings. Coupes were to be leased by auction on an agreement of five years. The rotation adopted was twenty five years. The area affected by insect attack was excluded from working. Lines of forest species sown were to be 18 feet apart. Cleanings and Thinnings were prescribed. Grazing was permitted in coupes under regeneration at the rate of one cow or bull per acre. Browzers and Buffaloes were excluded.

iv. *Bamboo* areas were worked on three years cycle by annual coupes. No culm under one year was to be felled and all remaining culms were to be cut between 1 to 2 feet from the ground.

v. The leasing out of pasture lands was prescribed. Unlimited grazing was permitted in 'C' class forests.

vi. All the *Anjan*, *Teak*, *Salai* and mixed areas were fire protected.

7.2.5. The areas prescribed for working under the Coppice-with Standard system were from 1926-27 onwards, worked under Improvement fellings. *Anjan* areas were worked under Improvement fellings, but in part only, the demand for produce from coupes of these areas being very small till 1925-26, when for two years clear fellings were adopted. After this they have been worked under Improvement fellings in whole

or part or not at all, according to the demand each year from each coupe. The prescription of breaking of the soil in these areas did not appear to have been followed rigidly for long.

7.2.6. In the *Babul* forests the areas damaged seriously by insect attack, were found to have recovered sufficiently by 1925 to be worked. They were consequently placed under a separate Felling Series and worked under the same system as the rest, but under a longer rotation of 30 years. Several forest species too were tried in the agri-silvicultural sowings of *Babul*, *Mesquite*, *Garari*, *Teak*, *Rohan*, *Sissoo*, *Kala-siris*, *Neem*, *Siwan*, *Semal* and *Bhirra*; of these the following proved failures, *Semal*, *Bhirra*, *Garari* and *Mesquite*. The leasing of some *Babul* reserves to village bodies for grazing was tried, and continues till today, having proved in these cases to be suitable.

7.2.7. The past management has in the Coppice-with Standard areas, resulted principally in the increase of *Teak* reproduction and the spread of *Teak* into *Salai* areas being benefited in that direction by factors such as fire protection, regulated grazing and the protection and preferential treatment given to the species. Judging from the standing parent trees, the condition and quality of the crop was improving. Some areas of the *Anjan* type that were unworkable have benefited by the protection allowed to them, and are today stocked sufficiently to fit for working. In the case of these areas again there is an increase in the reproduction of *Teak*, for reasons given already. *Anjan* reproduction, too, has improved in a few places, it being another favored species.

7.2.8. The past working in *Babul* reserves has in some cases proved a failure but on the whole it can be described as a success. Vagaries of weather, too little or too much rainfall, lack of proper selection of species suited to the soil, that varied so much in each coupe, lack of timely weedings and damage by wild animals and semi wild cattle, heavy floods combined with attacks of root-borer to *Babul* and pith borer to *Siwan*, have been the causes of failure. The quality of the *Babul* forest has apparently deteriorated for which the short rotations may be responsible. The purpose of management, namely, the production of fuel and quick return, however, offers no

alternative. Past experience has shown that the forest species to be sown in each coupe under regeneration must vary with the quality of the soils in the area. Trials with several forest species have led to the conclusion that where there is better quality deep soil *Babul*, *Prosopis juliflora* (Australian variety), *Bamboo* (*Dendrocalamus strictus*) and *Siwan* would grow well, the only species that are likely to give the best results in the poorer soils (bhurandi and chunkhedi) are *Prosopis juliflora* (Australian variety) and *Babul*. Of the two varieties of *Babul*, *Telia* yielding a better quality wood and more hardy against attacks of root-borers and *Fomes Pappianus* should be preferred to *Kaudia*. The regeneration of *Babul* bans by agri-silvicultural methods had, in spite of occasional failures, proved to be the best and most remunerative.

7.2.9. Bamboos (*Dendrocalamus strictus*) of Ambabarwa have suffered in quality on account of uncontrolled or only partly controlled extraction permitted in the past. All along bridle paths and nalas of Ambabarwa, where Bamboos abound, may be seen, clumps that have been subject to merciless hacking, year after year.

Working Plan by S.A.Cornelius. (1938-39 to 1947-48)

7.2.10. The Working Plan of 1912-13 of Buldhana forests prepared by *Rao Bahadur S.Naidu* with subsequent modifications was replaced by the Working Plan prepared by *S.A.Cornelius*. The entire area was stock mapped, and following working circles were formed:-

(i) **Ambabarwa Working circle** : All the workable areas of the *Ambabarwa* reserve were allotted to this working circle. The method of working prescribed was improvement fellings with ultimate idea of conversion to uniform system by clear-felling suitable patches. A rotation of 40 years was fixed. Originally, intermediate fellings were prescribed at mid rotation. This provision was, however, deleted subsequently. Improvement fellings, thinnings, selection felling and clear-fellings

under different conditions and Cutting Back Operations to follow main fellings were prescribed. The grazing closure was of five years after the main fellings.

(ii) **Teak Coppice-with-Reserves Working Circle** : This included the Teak, Salai and Mixed forests of the Amdari, Geru Matergaon, Gumi, Ghatbori, and Mohoja reserves. The silvicultural system prescribed was Coppice-with-Reserves. Rotation of 30 years was fixed. However, in Moegaon FS. Rotation of 45 years was fixed. Clear fellings in well-stocked areas with pollarding of Anjan, Selection-cum-Improvement fellings in the other areas and reservation of Teak patches with healthy advance growth was prescribed. A line of trees on nala banks preferably of Koha and Mahua, Achar, Kulu, elsewhere to be reserved. Only C.B.O. was prescribed. Double closure of grazing one of 4 years after the main fellings and another 4 years after mid rotation were prescribed.

(iii) **Selection-Cum-Improvement Working Circle** : All workable Anjan forests of Chikhli Range found in the central belt were allotted to this working circle. The system of working followed was selection-cum-improvement fellings. Neither regular system subsidiary operations nor any thinnings were prescribed. Actual felling rules were based on the division of the area under different categories namely, (a) Areas fully stocked with *Anjan* advance growth-sapplings below 9" were to be retained and everything else was to be felled. (b) Areas well-stocked with advance growth of teak and other valuable species except of babul was to be retained and the rest was to be felled. (c) In other areas selection-cum-improvement fellings were to be carried-out. A felling cycle of 30 years adopted because teak and *Anjan* could grow to 18"-24" girth in 30 years.

(iv) **Babul Working Circle** : The *Babul* reserves of the Sub-Division were allotted to this working circle. The system of clear fellings followed by agrisilvicultural regeneration was prescribed. Rotation was fixed at 30 years. Five years leases were granted for felling and regeneration by agrisilvicultural method. Pure field crops were allowed for the first two years only. In the third year *Babul* (*Telia* variety) was raised in lines 18 feet apart. Repeated tending particularly in monsoon months were

prescribed. Thinnings were prescribed at 5th, 10th and 20th years commencing from the year of leasing out.

(v) **Open Pasture Working Circle** :_ This Working Circle included all unworkable *Anjan*, *Salai*, and Mixed forests. A periodical grazing closure of 3 years closed and 12 years open was prescribed. Prior to closure fellings to exploit mature trees and thinnings in congested portions were to be carried out at the discretion of the D.F.O. Fruit bearing and shade trees were to be reserved. Grazing, by limited number of cattle, after grass cutting was allowed. 18 Grazing Series were formed out of which 3 were to remain permanently open to grazing. The rest were divided into 5 coupes each. Each coupe was to be closed in turn for three years.

(vii) **Miscellaneous Working Circle** : This Working Circle consisted of 14 grass ramnas and 12 forest villages. Except for 1622 acres from Hiwarkhed Ramna, all the areas were closed to grazing. Grazing was allowed after grass cutting.

7.2.11. Prior to 1912-13 the 'C' class forests, had always been open to unrestricted and unlimited grazing of all animals, while grazing in 'A' and 'B' classes was always under control. All the 'A' class forests when first constituted as State Reserves were absolutely closed for grazing of all kinds. In 1884-85 very light grazing excluding sheep and goats was allowed. This continued till 1888-89. In 1889-90 this was again stopped and all the reserves were closed to grazing, till 1898-99, when owing to the scarcity of fodder and general distress of famine year 1899-1900 all reserves were thrown open to grazing. From this date grazing continued upto 1904-05; only exploited compartments being closed to grazing. Geru-Matergaon and Amdari Reserves of Buldhana district were open for light grazing in 1885-86. In Ghatbhoari and Ambabarwa reserve, light grazing was allowed till 1900-01 and in Gumi reserve, which was formed in 1901, cattle were admitted from 1907-08. In the 'A' class reserves of Buldhana forests during the years 1908-10 definite measures to regulate grazing were taken on the following lines :-

- i) Buffaloes were excluded from all reserves.
- ii) To keep the grazing within the prescribed incidence, where necessary, cattle belonging only to villages adjoining to the forests were admitted and
- iii) Grazing cattle belonging to more distant villages were provided in camps in the interior of the reserves.

Period 1912-13 to 1937-38:-

7.2.12. The forests were divided into 41 grazing units. Grazing was regulated in order to preserve tree growth and pasture and at the same time to provide sufficient grazing.

7.2.13. Coppice areas :- Coupes were closed to grazing for five years after felling. The remaining areas were open to grazing at the rate of 1 head per 1½ acres except in Gumi reserve where an incidence of 1 head per acre was permitted.

7.2.14. Babul areas :- The only restriction to grazing in this Working Circle was that during the period of regeneration and establishment of the young crop which was estimated from five to seven years. Cows and bullocks were allowed to the limit of one head per acre after the harvesting of the field crops. Thereafter the limit was to be removed and buffaloes could be admitted. Camels, goats and sheep were not allowed.

7.2.15. Anjan areas :- (a) In Felling Series in which regular working was prescribed, coupes were closed to grazing for five years after felling. In the remaining areas grazing of cows and bullocks was allowed at the rate of 1 head per acre. (b) In the areas for which no regular working was prescribed the grazing of cows and bullocks was allowed at the rate of 1 head per 1½ acres

7.2.16. Fodder Reserves :- The grazing of cows and bullocks only in ramnas under Fodder Working Circle was allowed after the 31st October at an incidence of 1 head per

1½ acres, provided that the demand for fodder grass was satisfied with exception of Januna ramna situated in the catchment area of Khamgaon tank which was closed to grazing throughout the year.

7.2.17. Grazing Working Circle: - This included all the unworkable blocks and unrestricted grazing of all kinds was permitted.

Prescriptions in Cornelius's Plan for Buldhana introduced from 1938-39.

7.2.18. Grazing was regulated by a system involving periodic closures. All the 'A' class reserves were divided into 43 units. Villages were allotted to each unit and maximum number of cattle allowed to graze in them was fixed.

7.2.19. The grazing prescriptions laid down for different Working Circles were as below:

- i) **Ambabarwa Working Circle :-** Coupes in this Working Circle were closed for five years after working and for another five years after the lapse of fifteen years as under :-

Close period	Open Period	Close period	Open period		
5	15	5	15	=	40 Years.

At no time more than quarter of the area was closed to grazing. Coupes worked under intermediate felling were to be closed for grazing after working.

- ii) **Teak-Coppice-with Reserve Working Circle :-** Coupes in this Working Circle were closed for 4 years and open for 11 years, after which repetition of period of closure and grazing was followed thus :-

Close	Open	Close	Open	
4	11	4	11	= 30 years

The maximum area closed to grazing was four fifteenth.

iii) **Anjan Selection-Cum-Improvement Working Circle :-** These areas had suffered heavily from grazing in the past and as such a long period of 10 years closure after felling was prescribed, the coupes remained open for the rest of the period.

Close Period	Open Period	
Years	Years	
10	20	= 30 years.

In the Hiwarkhed Felling, Series which formed about a fifth of the area of this Working Circle, not more than 1400 acres was to be opened to grazing annually at the discretion of the Divisional Forest Office. Of the remainder of the Working Circle, a third was the minimum closed to grazing.

iv) **Babul Working Circle :-** Grazing was permitted during the period of regeneration of each coupe only to the lessee's cattle subject to a maximum of one animal per acre. At no time more than a sixth of the area was under such restricted grazing. Buffaloes were not permitted during the period of regeneration and for the two years following.

7.2.20. Goats and sheep were not permitted to graze in any of the above mentioned Working Circles.

7.2.21. The forest areas were classified for grazing control according to the M.P.Government Memorandum No.605-284-XV of 19th July, 1933 under the plan prepared by S.A.Cornelius for Buldhana . The classification was as below :-

Table No.7.1.
Table showing classification of Forest for Grazing

Range	Tree Forests		Scrub Forests		Other Forests	Total
	A (i) moist type	A (ii) dry type	B (i) Pasture	B (ii) Open pasture		
Mehkar	-	23,082	-	13,756	3,042	39,880
Khamgaon	-	48,513	13,047	24,206	6,594	92,360
Jalgaon	-	20,685	-	24,395	4,888	49,968
Total :	-	92,280	13,047	62,357	14,524	1,82,208

Results of Past Working

7.2.22. Growing-stock :- The regular working and past management based on scientific lines for the last 50 years or so had resulted steadily in the improvement of the crop both in composition and condition. Fire protection, regulated grazing, the general protection and the preferential treatment given to *Teak* had increased, *Teak* reproduction and it spread in *Salai* and other miscellaneous areas. *Teak* is tending to be almost pure in dry exposed localities in these forests of trap zone. This is because of its inherent quality to withstand effects of grazing and fires better than its usual associates. The general condition of crop was healthy. Except for few old and mature trees in remote forest reserves like *Ambabarwa*, crop in general was young to middle aged. Lack of proper prescriptions regarding treatment and tendings in the forests of *Buldhana* Sub-Division had resulted in congestion of young growth of teak and miscellaneous species.

7.2.2 Reproduction :- Coppice reproduction of *Teak* all over the forest of this Division and to some extent of *Lendia*, *Dhaora*, *Saja*, *Tendu*, *Tinsa*, *Palas*, was satisfactory. Seedling reproduction of *Teak* was good especially in better quality forests of the Division. Elsewhere it was fairly satisfactory. Seedling reproduction of *Dhaora*, *Lendia*, *Saja*, *Tendu*, and to a lesser extent of *Bija*, and *Tinsa*, was fairly satisfactory where the soil moisture conditions are favorable, while it was very scanty or entirely absent in dry exposed localities with a superficial layer of soil.

7.2.3. Grazing :- Though grazing was regulated and controlled its incidence was quite high in easily accessible areas adjoining big villages and towns.

Working Plan by S.S.Parasnis from 1966-67 to 1979-80 (extended up to 1987-88)

7.2.11. Only 'A' class Reserved Forests 73767.21 ha (182205 acre) were dealt with under this Plan. These forests were stock mapped. Enumeration, stem and stump analysis were carried out during revision of the Plan.

(i) **SCI Working Circle:** - The area allotted to this Working Circle was **20,685 acres**, spread over *Jalgaon Jamod* range. Two felling series viz. *Ambabarva* and *Mangeri* were formed. Harvestable girth prescribed was 90 cm. Felling cycle of 40 years was adopted. Areas were taken up for clear felling with a view to raise *Teak* plantation. Areas were also taken up for heavy felling for promoting natural regeneration of valuable species. C.B.O., cleaning, thinning etc. were prescribed.

(ii) **The Coppice-with-Reserve Working circle:** - Total Area allotted to this W.C. was **71,595 acres** comprising 104 compartments. All the miscellaneous forest and inferior *Teak* forests producing timber and fuel-wood were included. 19 felling series were formed. Rotation was kept at 40 years and harvestable girth was fixed 37.5 cm. in IVb areas and 45 cm. in IVa areas. Yield was regulated by area. Different treatments were prescribed for unworkable area, clear felled areas. Under normal condition, retention of minimum 30 trees/acre was prescribed. Clear felling for raising teak plantation were prescribed. C.B.O., cleaning and half rotation, thinnings were prescribed after 1, 6 and 20 years after main felling respectively.

(iii) **Improvement Working Circle :-** The total area allotted to this Working Circle was **27454 acre**, comprising of 40 compartments (4 in Khamgaon Range, 17 in Gerumatargaon Range & 19 in Jalgaon Range of Raipur Reserve). This Working Circle included all the workable, predominantly Anjan Forests of Khamgaon & Jalgaon ranges. 5 Felling Series were formed. Felling cycle of 30 years was adopted. Only

felling of malformed, diseased, dying and over mature trees and thinning in congested patches were prescribed for improvement of growing stock.

(iv) **Babul Working Circle:-** The total area allotted to this Working Circle was **4,016 acres** comprising of 147 compartments. All the *Babul Bans* in the *Jalgaon* range were included in this working circle. It formed 3 Felling Series. The system of clear felling with agrisilvicultural regeneration was prescribed. Rotation was kept at 30 years. Stock mapping was done. Before clear felling preparation of stock map and soil map was prescribed. Subsidiary silvicultural operations like weeding and thinning were prescribed.

(v) **Open Pasture Working Circle: -** The total area allotted to this Working Circle was **50,955 acres**. All the open forest of Buldhana Division which were not capable of producing timber or firewood and where the demand for grazing was quite heavy were included with the object of improving the stocking. The periodic rest to these areas were prescribed. Such areas were treated under rotational grazing system for improvement of percentage of palatable grasses, introduction of superior fodder grass species and fodder species.

(vi) **Fodder Reserve Working Circle: -** The total area allotted to this Working Circle was **2279.46 acres**. These were set apart for the production of fodder grass. Cutting of grass was allowed after seeding i.e. after October. For improvement of quality and quantity of the fodder grass following measures was suggested:

- a) Periodic burning of grass ramanas once in five years in the last week of May.
- b) After burning the light soil working, broadcasting of superior grass seeds, planting of tussocks etc.
- c) Removal of dense patches of tree growth.
- d) Eradication of weeds/climbers.

(vii) **Sandal Overlapping Working Circle: -** *Warwand*, *Rajur* and *Lonar* were three felling series formed in Khamgaon & Mehkar Ranges . Each Felling Series was divided

into five coupes. a, b, c, d and e to be worked on a five year cycle. Tending of young crop, harvesting of only dead trees were prescribed. Plantation of *Sandal* in at least two acres area of working coupe was prescribed.

(viii) **Bamboo Overlapping Working Circle:** - All the Bamboo bearing compartments were included in this. No felling was prescribed. Period thinning with a felling cycle of 4 years was prescribed. Bamboo planting in suitable 5 acre area was prescribed.

(ix) **Miscellaneous Working Circle:** - The total area allotted to this Working Circle was **5221 acres**. The areas which have not been allotted to any of other working circle had been allotted to this. No regular working was prescribed.

7.2.11.1. Result : Areas managed under CWR, have lost its coppicing vigor. Further these forests have dwindled to degradation due to failure to restock the area by artificial regeneration and natural regeneration. As a result the soil loss was accelerated. This was accentuated with biotic interference and illicit cutting which remained unchecked for over the years. Bamboo areas have become unworkable and hence need to restock the areas of bamboos. Sandalwood areas are not workable; rather the species is rarely seen. In the areas worked under SCI system, clear felling to raise *Teak* plantation, could not give encouraging results because the plantations were not successful, and clear felled areas could not remain productive. Further, heavy felling to induce natural regeneration caused the adverse effect on the stocking, because the natural regeneration could not be induced, protected and tended. Thus, the opportunity to improve the growing stock was lost. As a result, number of stems/ha of *Teak* trees was reduced. Further no soil and water conservation works were taken. Illicit cutting, biotic interference, repeated fires, absence of soil and water conservation works have led to the density reduction greatly and sites became degraded.

Working Plan by B.S.Thengdi from 1995-96 to 2004-05 (Extended up to 2007-08)

7.2.12. The working Plan by B.S.Thengdi included 'C' class R.F. and Ex-Jagir forests declared as P.F. apart from 'A' class R.F. dealt with under Parasnis' Plan. The stock mapping was carried out in 101 compartments, however, enumeration or stem analysis were not carried out during preparation of Plan by B.S.Thengdi.

Thengdi's Plan included following Working Circles:-

Table No. 7.2

Working Circle-wise area included in Thengdi's Plan

Name of Working Circle	Area in ha
Afforestation cum Improvement WC	90004.64
Protection WC	12797.93
Catchment	12509.36
Babul Ban WC	01245.74
Total	116557.67

i. Afforestation Cum Improvement Working Circle : This working circle included area under Coppice with Reserve Working Circle (*Ghatbori* & *Isvi* F.S. area), Improvement Working Circle, Open Pasture Working Circle and Fodder Reserve Working Circle under Parasnis' Plan. It also included 'C' class Reserved Forests & Ex-Jagir Forests (P.F.). The total area of the Working Circle was **90,004.64 ha**. Most of these areas were comparatively barren. The areas of *Ghatbori* & *Isvi* felling series was exception to this. The principal species in this area was *Anjan* and miscellaneous species, in the depression of valley with Teak.

The usual practice of planting 2500 seedlings per hectare tends to over stocking of plantations, ultimately leading to competition for soil, moisture and nutrients resulting in natural thinning and growth retardation. Hence, the concept of "Ecological Index" was adopted, which dictates the number of seedlings which can be sustained by prevalent ecology. The Ecological Index for Buldhana Division worked out to be 1.9 , which meant that number of plants to be planted should not be more than 432 / ha. More stress was given on soil and moisture conservation works. Main objectives of this working circle were to protect the soil from further degradation by

adopting soil and moisture conservation works & increase the stocking. Silvicultural system was Afforestation Cum-Improvement. The vegetation which was crooked, stunted, multi forked etc. was recommended for suitable tending operations.

No appreciable yield was available in this working circle. Area was classified into various categories viz. A to E for the purpose of working. Tending of Natural Regeneration was recommended. Artificial Regeneration by afforestation was recommended in D2 area (having regeneration below 625 seedlings per/ha) to the shortfall of 625 seedling per/ha. Besides planting of Bamboo, Jamun, Anjan, agave, grasses was prescribed in 'A' area (25° or more slope and 20 meter wide strips on both sides of rivers & perennial nalas or tanks). Bamboo under planting was prescribed in 'B' area (Blank area having slope upto 25°) 'C' area (young well grown pole crop area) & D area (Well stocked area). In area 'E' II (Blank area having slope beyond 25°) broadcasting of *Prosopis juliflora* seed was recommended in inaccessible areas.

ii. Protection Working Circle : In this working circle the area belonging to upper precipitous and very steep slopes of the Sonala Range was included. It was the area managed under Selection Cum Improvement Working Circle, during the Parasnis Plan. It also included the contiguous Protected Forests. In this working circle six felling series viz. North Mangeri, South Mangeri, North Ambabarva, West Ambabarva, South Ambabarva, & Rohinkhed/Salvan were formed. Mangeri & Ambabarva Felling series were having good miscellaneous stocking. Total area of this working circle was **12797.93 ha** having 20 coupes in each felling series having 20 years working cycle. This area is transferred to wild life divisions since 1998.

Primary objective of this working circle was to preserve and improve the existing growing stock in these vulnerable areas by resorting to soil & moisture conservation works.

No felling of trees or shrubs were prescribed in this working circle. Extensive soil and moisture conservation works were recommended. Bamboo under planting was prescribed. Tending of N.R. & rigid fire protection was recommended. Artificial regeneration of valuable species in 'B' area; D2 area was recommended. C.B.O. cleaning and thinning operations were recommended.

iii. Catchment Treatment Working Circle : In this working circle total area of **12509.36 ha** was included which mainly comprises catchment of *Dnyanganga* Irrigation Project. Most of this area is now transferred to the Wild Life Division viz. *Dnyanganga* Wild Life Sanctuary since 1998. The primary objectives of this working circle were to prevent and reduce the rate of siltation of tanks and to improve and restore ecological balance through maintaining and improving adequate soil cover by adopting soil and moisture conservation measures. For the purpose area was classified in 'A' to 'G' categories & the different treatments were prescribed for each category.

Soil and moisture conservation works were prescribed in area 'A' (area having crop density less than 0.4), area 'C' (area having crop density more than 0.6) along with gap planting and under planting. In area 'B' (area having crop density more than 0.4 but less than 0.6) area 'D' (area of slopes on 25 ° or more & 20 meter width on both sides of rives and perennial nalas or tanks) enrichment planting & planting of Bamboo; Jamun, Arjun etc. was prescribed respectively. No planting was prescribed in area 'E' (patches of young well grown pole crop of valuable species.) area 'F' (areas containing adequate seedling regeneration). In 'G' area (areas between full tank level & H.F.L.) planting of two rows of Babul followed by rows of Ain; Jamun; Bamboo etc. off F.T.L. was prescribed.

Conditional removal of silviculturally available tree was recommended in 'D' area. No fellings were prescribed in other areas.

iv. Babul ban Working Circle : It was confined to Khamgaon, Jalgaon & Sonala Ranges. The Babul ban were scattered in more than 100 small patches of 2 ha to 50 ha. Scientific management had been stopped since 1974-75 which ultimately resulted in gradual degradation of these forests. Total area under this working circle was **1245.74 ha.**

The objectives were to improve the status of present vegetation by sowing & suitable tending operations & to raise Babul as a main species in the area with the involvement of local people so as to augment the supply of firewood & small timber to local people.

The treatment prescribed was improvement felling supplemented by Artificial Regeneration. The principal species was *Babul*. Some fruit species were also to be planted.

The rotation of 30 years was prescribed. All dead, except 2 trees/ha & 50 % Babul trees above 60 cm girth were prescribed for felling. Planting & protection by Forest Protection Committees was prescribed.

v. N.T.F.P. (o) Working Circle : This working circle was a overlapping working circle & it included the entire area of the Division. Besides general objectives, improvement of stocking of NTFP species was one of the objectives. Hence, in case of Tendu 50 ha plantation per year was prescribed, besides circular ditch creation was recommended for the inducement of root-suckers. Scientific pruning of Tendu leaves was recommended, however no specific method was prescribed. Moreover for collection of Moha flower clearing of wasteful litter beneath the crown was recommended. Planting of NTFP species Like eg. Sitaphal, Aola, Char, Myrobalans etc. was recommended. Identification & preservation of medicinal plants was prescribed.

Results : Although the period of the Working Plan started from 1995-96, sanction was received from GoI in April 1997. Hence, the Plan could not be implemented in the first two years. Non availability of funds at proper time had been another reason for non execution of the prescriptions of the Plan. Though afforestation was done in the Division, it wasn't done in the sequence prescribed in the Afforestation cum Improvement Working Circle .Forest areas were also assigned to FDCM, which carried out Plantations .However, concept of Ecological Index introduced by Thengdi remained on paper and was not followed. Results of plantations are not encouraging, the plantations were badly affected due to uncontrolled grazing by sheep, goat and other cattle.. Tending operations were also not carried out . The areas

allotted to Catchment Working Circle was declared as Dnyanganga Wildlife Sanctuary and transferred to Akola Wildlife Division .The areas allotted to Protection Working Circle was declared as Ambabarwa Wildlife Sanctuary and transferred to Akot Wildlife Division. Works as prescribed in Babul ban Working Circle was also not carried out. Overall, implementation of Working Plan was not done as per prescription. Hence, improvement did not take place and crop further degraded. The control forms and compartment history forms have not been received from territorial divisions. Therefore, detailed comments are difficult to make regarding results of Thengdi's plan.

SECTION 3. SPECIAL WORKS OF IMPROVEMENT

7.3.1. Roads: - Forests are fairly well connected to main metalled roads by cart tracks and fair wheather roads. For the improvement of communications short lengths of *ghat* roads have been constructed in some of the reserves in the past. Minor repairs to roads maintained by Forest Department are carried out annually. A list of such roads maintained by Forest Department is given in the **Appendix No. XX** of Volume II.

7.3.2 Buildings and wells:- The list of all the buildings, wells, and tanks constructed and maintained by Forest Department is given in the **Appendix No.XXVIII and II & III** of Volume II respectively.

7.3.3. Soil and Moisture Conservation Works-Van Talao : There is one permanent forest tank near Pachdeola village in Ghatbori range. From the year 2005-06 to 2007-08, many temporary forest tanks (Vantalao) are constructed in the Buldhana Forest Division which are as under :-

Table No. 7.3

Table showing summary of Van Talaos constructed in Division

S.No.	Name of Range	Year of Construction	No. of Forest Tanks
1	Deulgaon Raja	2005-06	73
2	Buldhana	2005-06 2006-07	04 14
3	Motala	2005-06	01
4	Mehkar	2006-07 2007-08	17 57
5	Khamgaon	2007-08	39
6	Jalgaon	2007-08	52
Total			257

7.3.4. Boundary Demarcation Works-R.C.C. Pillars: Reinforced Cement Concrete Pillars are constructed on the forest boundary in the Division. The details are as under:-

Table No. 7.4
Table showing details of RCC Pillars constructed in Division

S.No.	Name of Range	Name of Village	Surve No.	No. of R.C.C. Pillar
1	Buldhana	Buldhana	68, 95	267
2	Jalgaon	Tiwri Ajampur	39,40,41	35
3	Mehkar	Lonar	290	57
Total				340

7.3.5. JFM and F.D.A.: In Buldhana Forest Division total **230** forest protection committees were formed under Joint Forest Management & forest area of **33254 ha** has been assigned for joint management. However, out of 230 FPCs; 9 committees are in Wild Life area; in 36 FPCs. either the forest area is not available or the committees are not working. Therefore, number of active FPCs comes down to **One hundred eighty five. 197** FPCs have been registered & M.O.U.s are signed with **171** FPCs.

A Forest Development Agency (FDA) has been constituted in the Division .In phase I, the programme is being implemented in 26 villages. So far 375 ha plantations have been carried out in 13 villages.

7.3.6. Reorganization of ranges: -After reorganization the number of ranges reduced from eight to seven. The existing ranges are Jalgaon Jamod, Motala, Buldhana, Khamgaon, Ghatbori, Mehkar, and Deoulgaon Raja. Sonala range which includes newly created Ababarwa WLS has been transferred to Wild Life Division.

7.3.7. Central Forest Nursery: - There is only **one** Central Nursery in the Buldhana Division at Kalapani in Deoulgaon Raja range. This nursery provides plants for regular plantation works as well as *Vana Mahotsava*.

7.3.8. Plantations: The year-wise plantations carried out in the Division during Thengdi's Plan is given in **Table no 7.5**

Table No. 7.5
Table showing summary of plantations done in the Division
during Thengdi's Plan

Planting Year	Plan	EGS	FDCM	Total
1996	328.933	664	1225	2217.933
1997	450.940	980	1233	2663.940
1998	734.630	320	1389	2443.630
1999	160.000	171	1615	1946.000
2000	872.500	097	0735	1704.500
2001	100.000	275	0415	0790.000
2002	-	043	0625	0668.000
2003	-	-	0320	0320.000
2004	074.340	-	-	074.340
2005	375.000	-	-	375.000
2006	035.000	-	-	035.000
2007	300.640	-	-	300.640
2008	60.000	-	-	60.000
Total	3491.983	2550	7557	13598.983

Appendix No.XXIX and **XXX** gives list of Plantations done under Plan / Non Plan and EGS in the Division respectively.

SECTION 4 : **PAST YIELD.**

7.4.1. As felling were not prescribed, there is no out-turn of major forest produce. The out turn of Non Timber Forest Produce from years 1995-96 to 2007-08 is given in the **Appendix No. XIX** of Volume II.

SECTION 5 : **PAST REVENUE AND EXPENDITURE.**

7.5.1. The gross revenue and expenditure of the Division for each of the financial years from 2003-04 to 2007-08 are given in **Appendix No.XXXI** of Volume II

CHAPTER -VIII

STATISTICS OF GROWTH AND YIELD

SECTION 1. STATISTICS OF RATE OF GROWTH OF TEAK:

8.1.1. Stem analysis: During revision of the current Plan stem analysis was carried out in September 2008, by selecting 2 *Teak* trees of seed origin and 2 *Teak* trees of coppice origin for site quality IV in the compartment No.173(*Janona* Beat) and Comptt No.175

(*Isvi* Beat) of *Ghatbori* Range. The result of Stem analysis is given in **Appendix No. XXXII** of Volume II. The heights of the trees were between 13.50 m to 14.50 m. The growth details are given below :

Table No.8.1

Table Showing Age -Height Parameters of Seed Origin Teak trees

Site Quality: IV

Division: Buldhana

Age	Height of section in m.
0.00	1.37
8.50	4.24
19.50	7.24
42.50	10.24
72.00	13.24

Table No.8.2

**Table showing Age- Volume parameters of
Seed Origin Teak trees**

Site Quality: IV

Division: Buldhana

Age	Volume in Cum.
0	0.0000
10	0.0069
20	0.0392
30	0.0834
40	0.1559
50	0.2452
60	0.3488
70	0.4489
80	0.5318
90	0.5800

Table No.8.3**Table Showing CAI/MAI of Seed Origin Teak trees****Site Quality: IV****Division: Buldhana**

Age	MAI in cum.
0	0.0000
10	0.0007
20	0.0020
30	0.0028
40	0.0039
50	0.0049
60	0.0058
70	0.0064
80	0.0066
90	0.0065

Age	CAI in cum.
0	0.0000
10	0.0007
20	0.0032
30	0.0044
40	0.0072
50	0.0089
60	0.0104
70	0.0100
80	0.0083
90	0.0055

Table No.8.4**Table Showing D. U. B. - Twice Bark Thickness (B.T.) of Seed origin Teak trees****Site Quality: IV****Division: Buldhana**

D.U.B. in cm.	2xB.T. in cm.
0.00	0.00
03.85	0.49
15.60	0.80
25.68	0.76
32.95	0.80

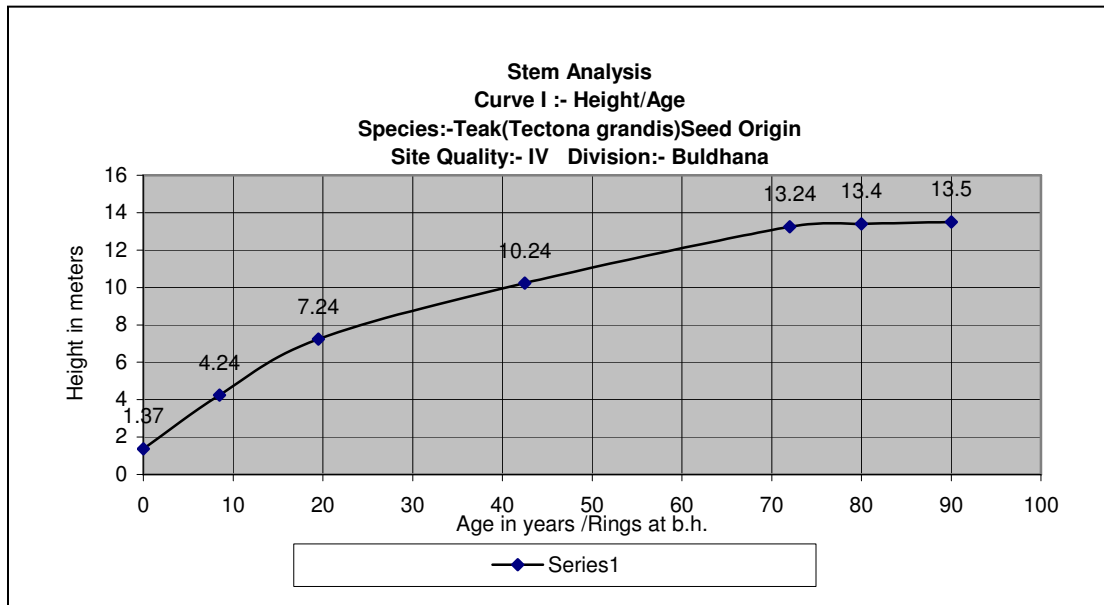
As the field measurements are taken over bark corresponding bark thickness needs to be taken into account.

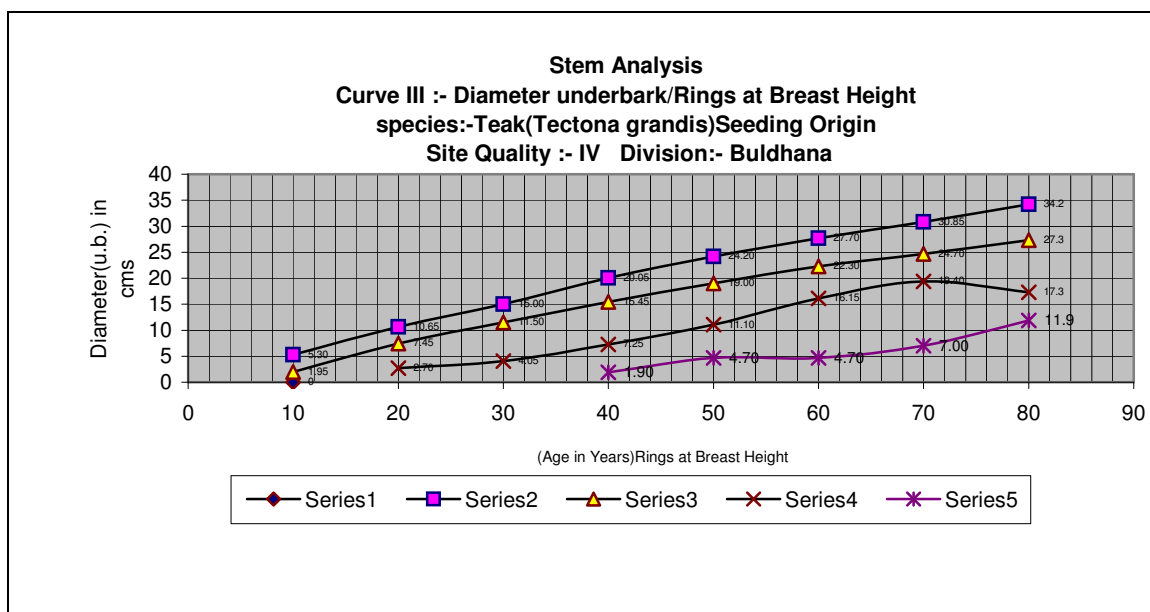
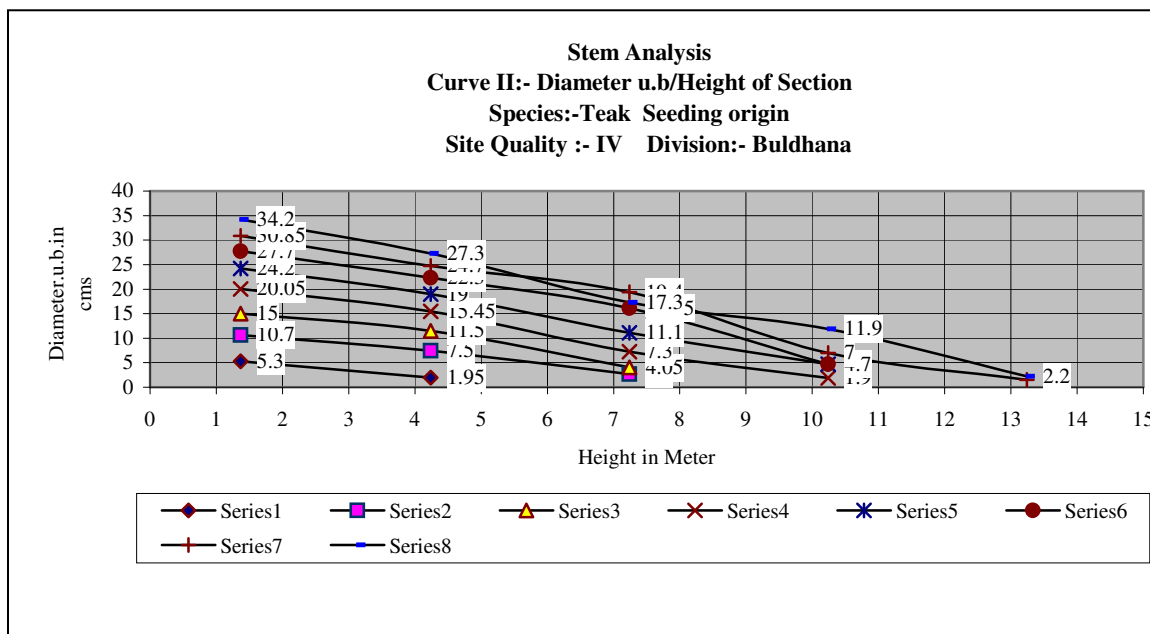
8.1.2. It is evident from the graphs that the age of culmination at which CAI & MAI curves of Seed Origin teak trees intersect each other is 87 years (+4yrs correction to be

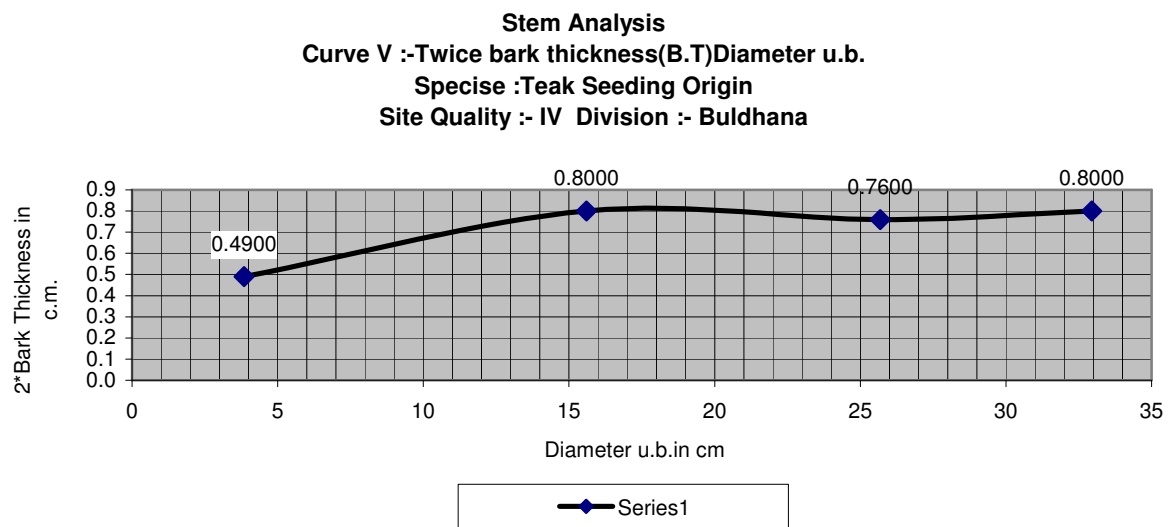
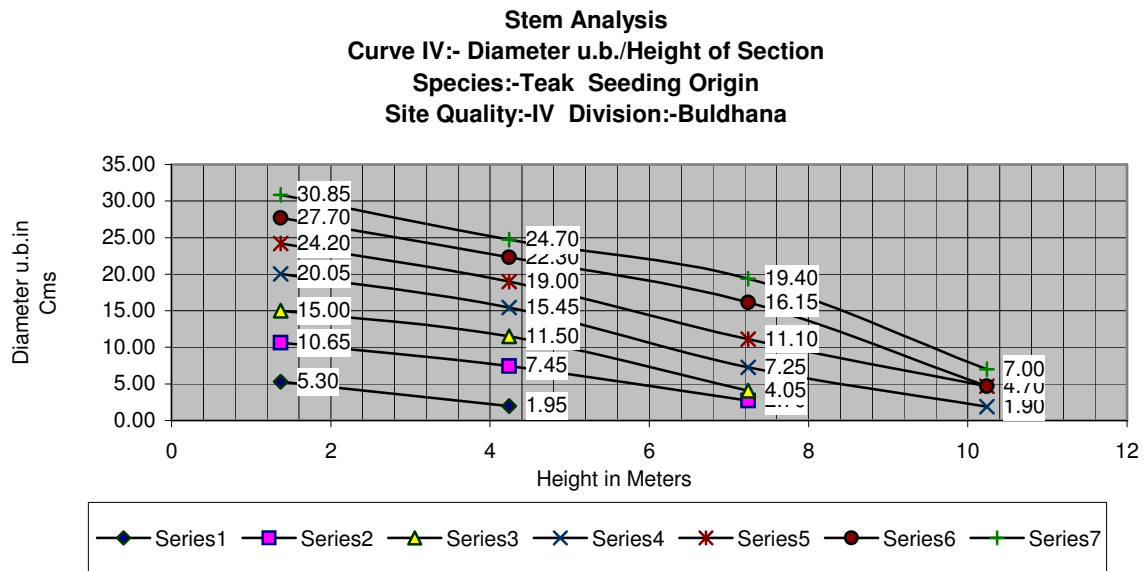
made from seedling data). The corresponding girth is 116 cm. The data is reproduced as under:

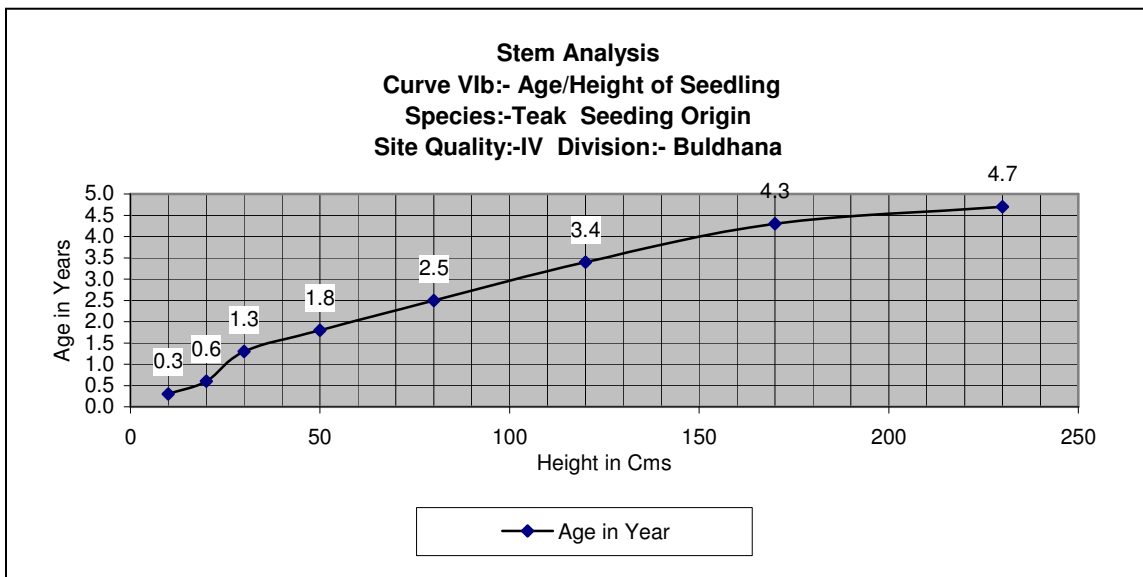
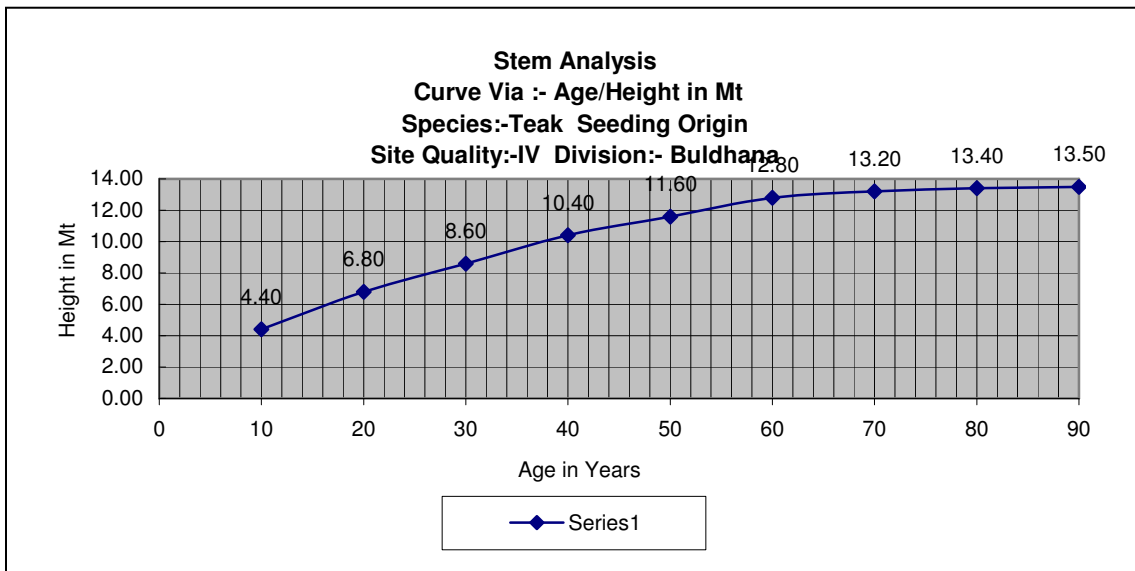
Table No. 8.5
Table Showing Stem Analysis Of Seed Origin Teak For Site Quality – IV

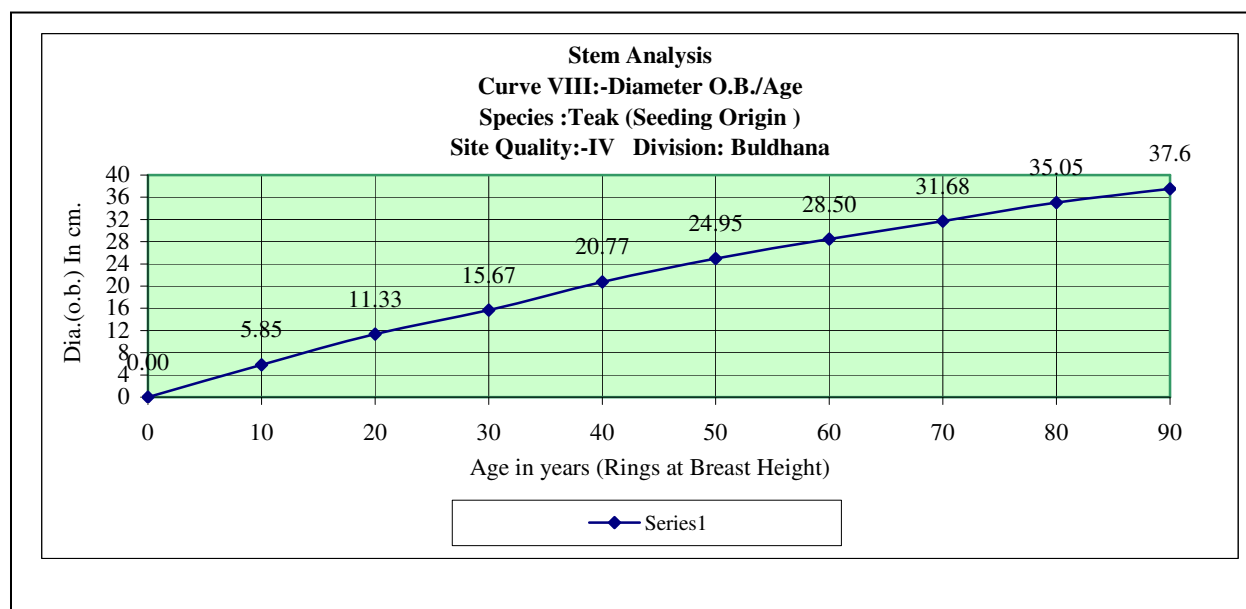
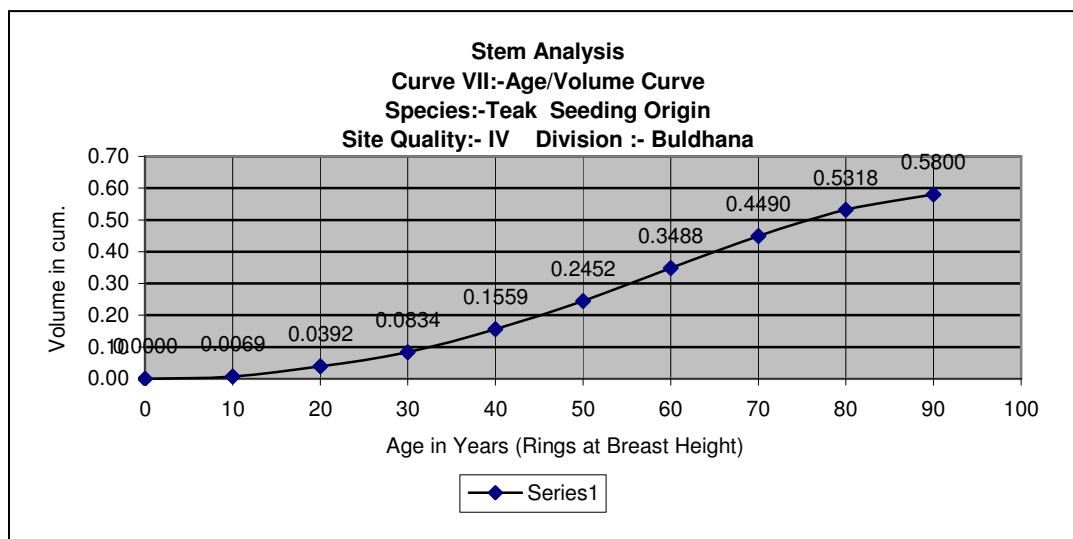
Age in years	D.B.H. (O.B.) in cm	G.B.H. (O.B.) in cm	Ht. In Mt.	Volume per tree cum	MAI Cum/yea r	CAI Cum/ye ar
10	5.85	14.70	4.40	0.0069	0.0007	0.0007
20	11.33	35.58	6.80	0.0392	0.0020	0.0032
30	15.67	49.20	8.60	0.0834	0.0028	0.0044
40	20.77	65.22	10.40	0.1559	0.0039	0.0072
50	24.95	78.34	11.60	0.2454	0.0049	0.0089
60	28.50	89.49	12.80	0.3488	0.0058	0.0104
70	31.68	99.48	13.20	0.4489	0.0064	0.0100
80	35.05	110.06	13.40	0.5318	0.0066	0.0083
90	37.55	118.00	13.50	0.5800	0.0065	0.0055











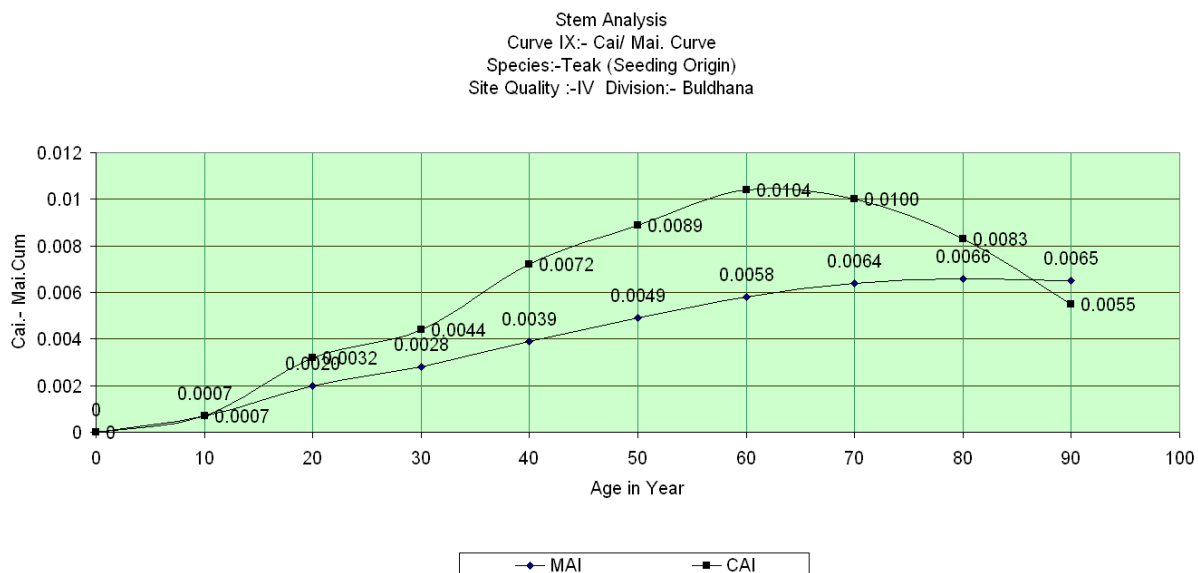


Table No. 8.6
No. of years required to cross the Girth Class.

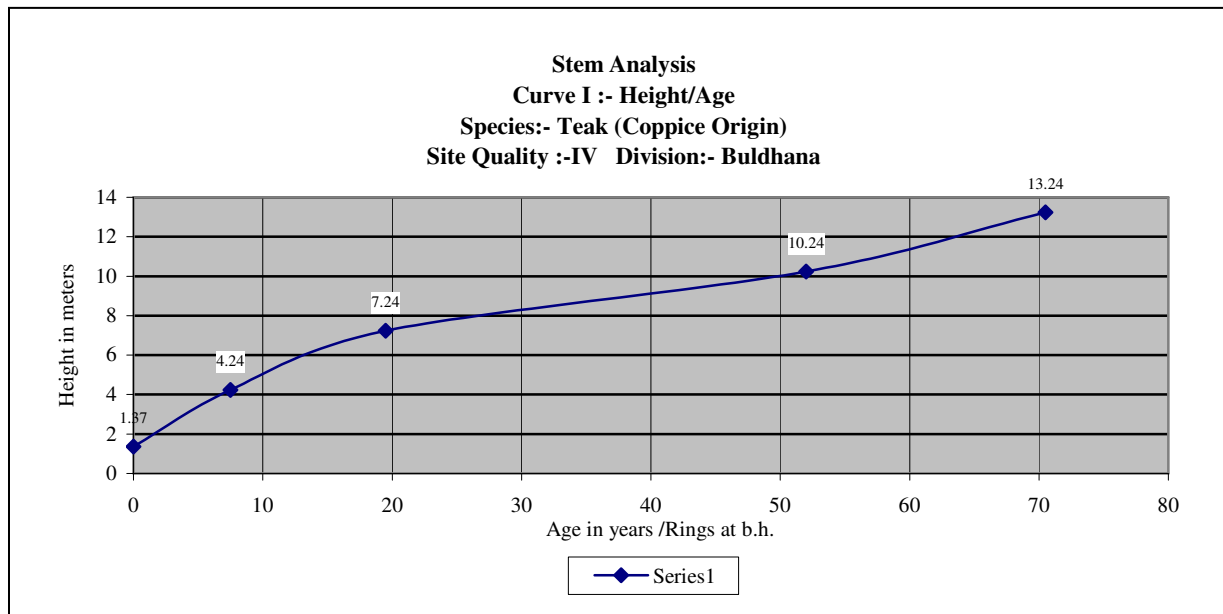
Girth Class cm	Mid girth cm	IV	
		Age in years	Years required to cross to the class
15-30	22.5	12.50	--
		--	9
30-45	37.5	21.50	--
		--	11
45-60	52.5	32.50	--
		--	9
60-75	67.5	41.50	--
		--	12
75-90	82.5	53.50	--
		--	15
90-105	97.5	68.50	--
		--	15
105-120	112.5	83.50	--

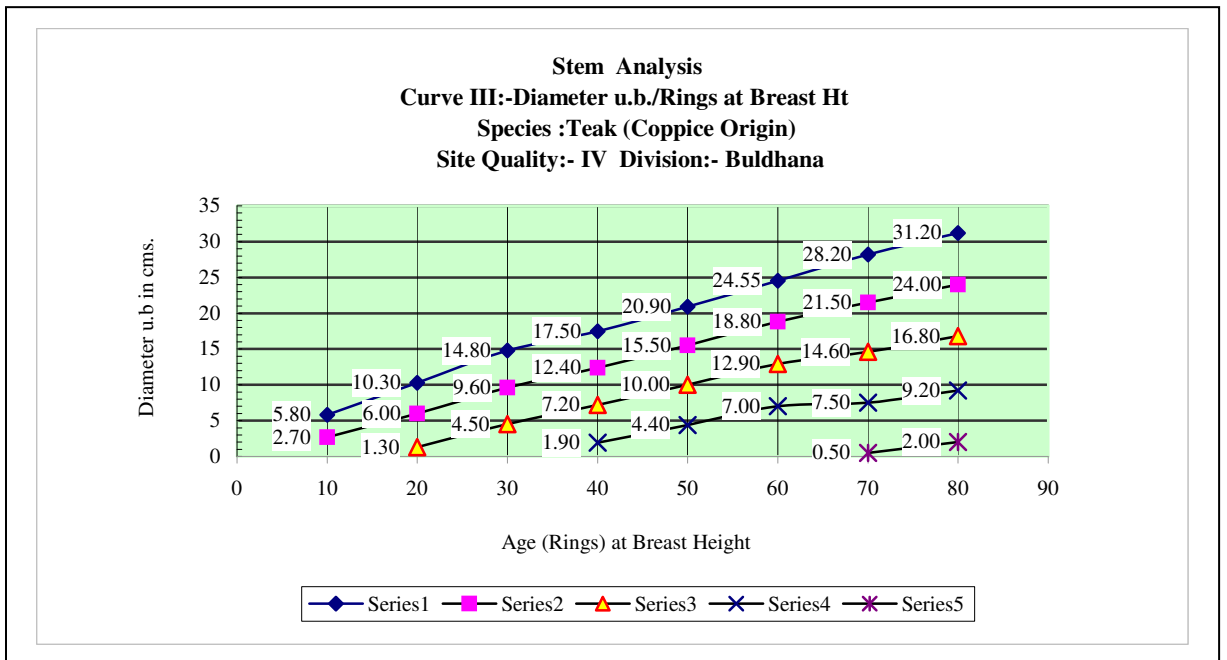
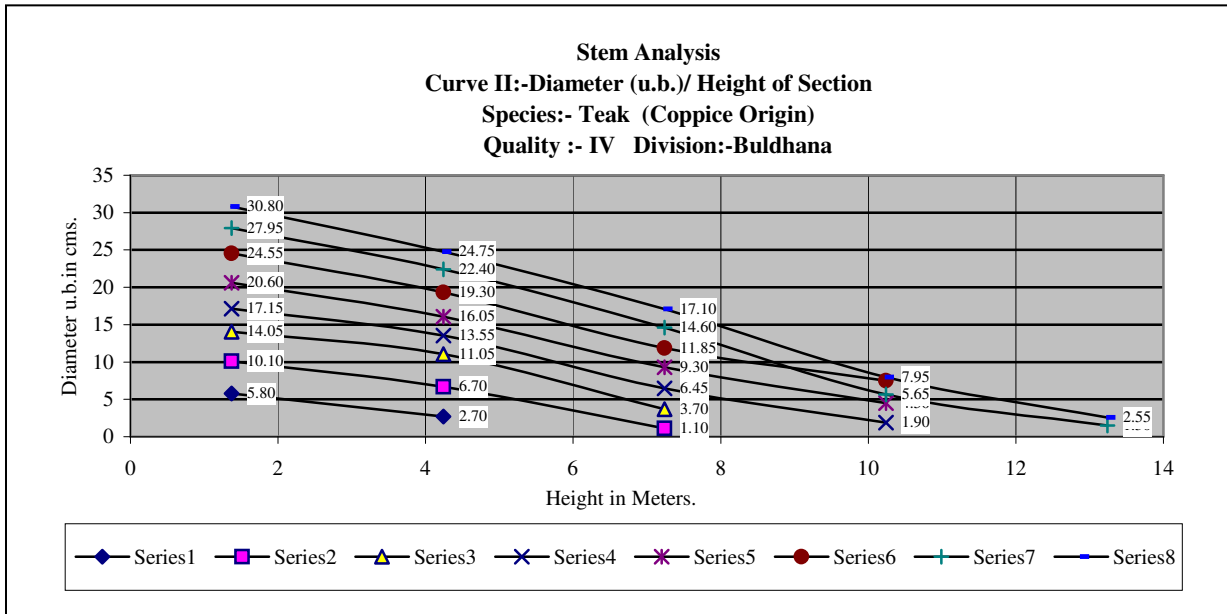
8.1.3. Stem analysis was also carried out for 2 representative *Teak* tree of coppice origin for site quality IV. It is evident from graph the age of culmination at which CAI & MAI curves intersect each other is 77 yrs (+4 yrs correction to be made from seedling data). The corresponding girth being 97 cm. The data is reproduced as under:

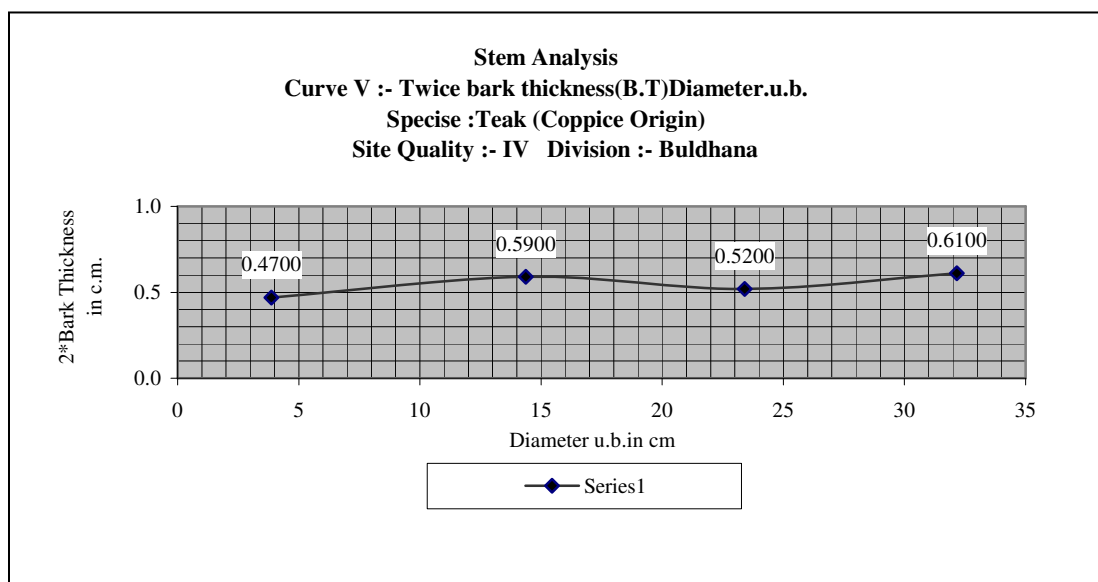
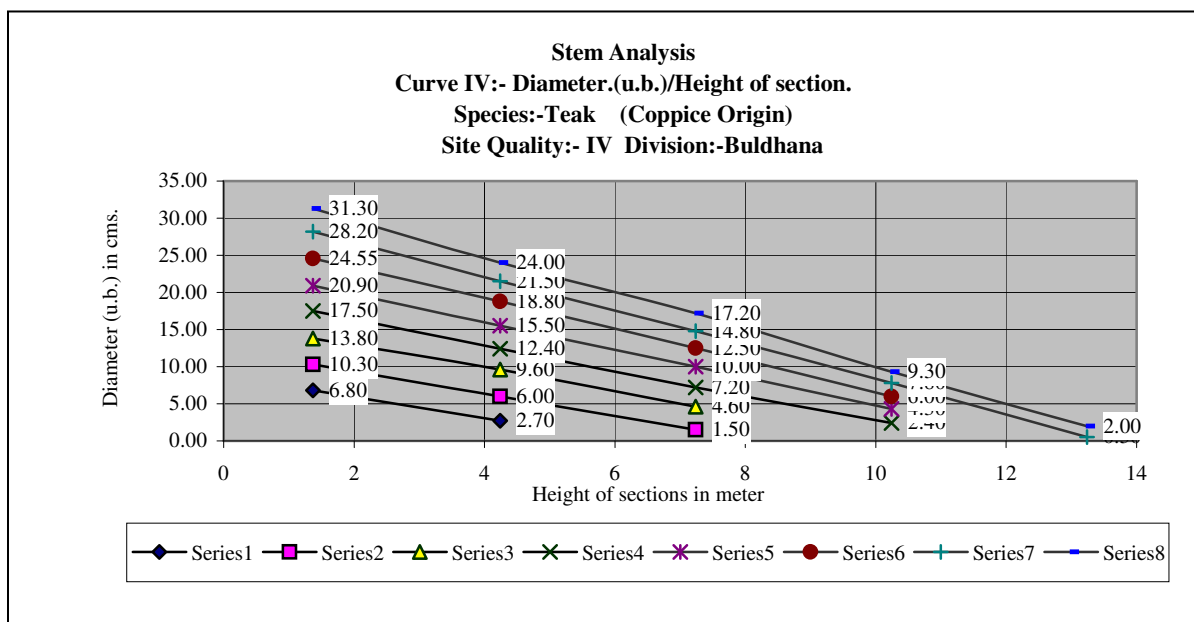
Table No 8.7

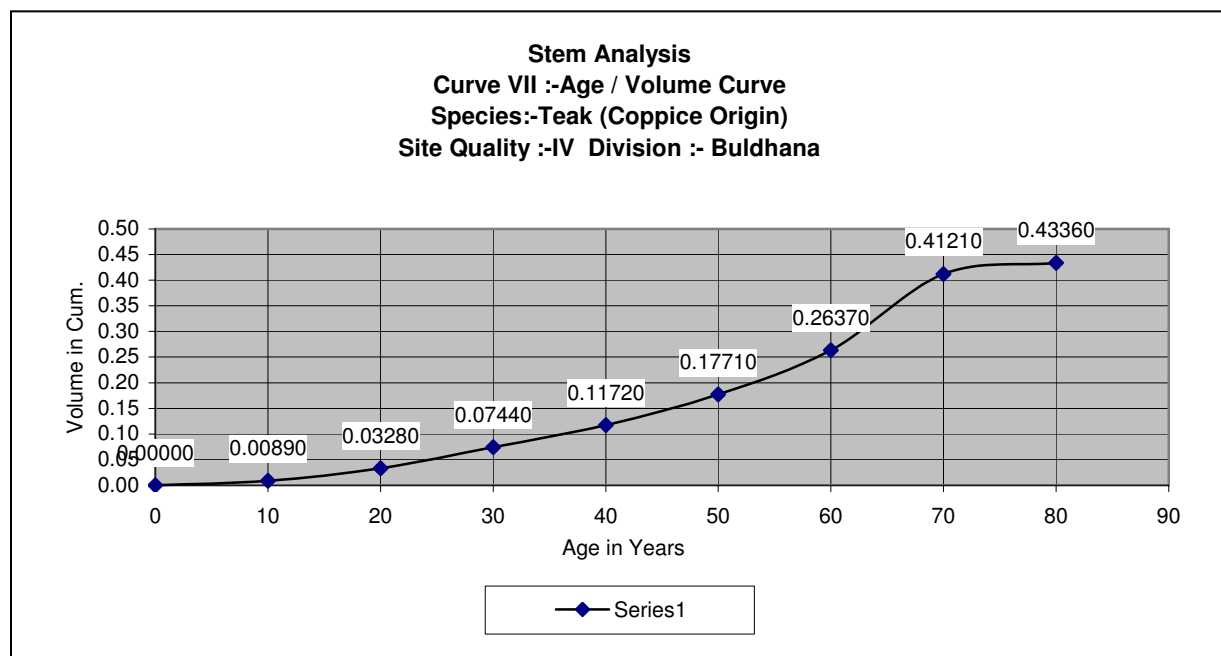
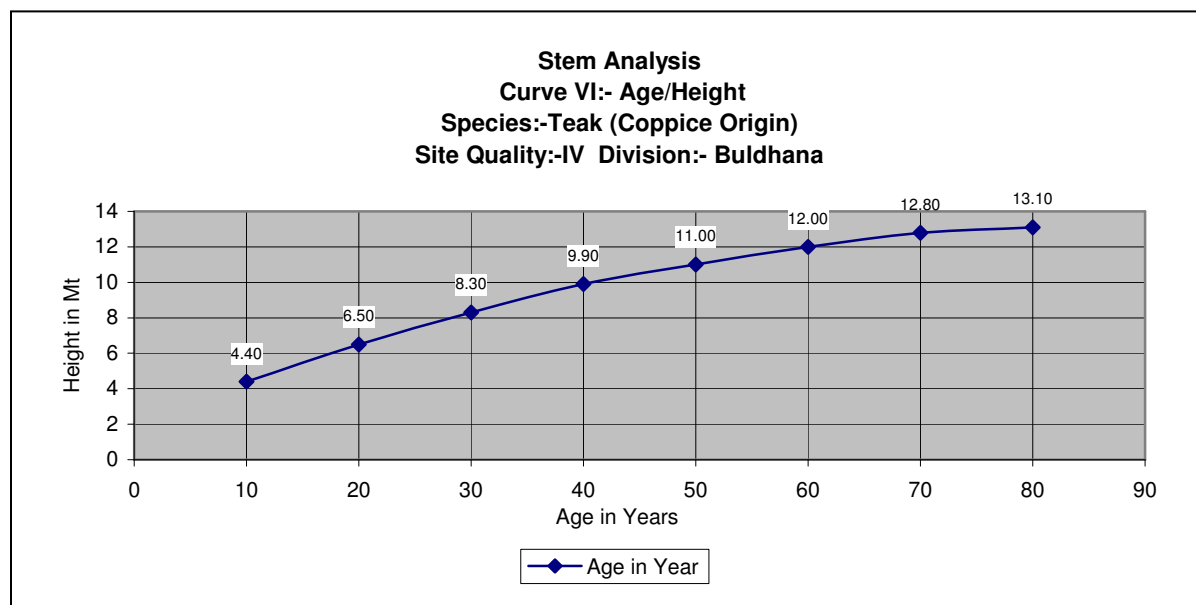
Table Showing Stem Analysis Of Coppice Origin Teak For Site Quality – IV

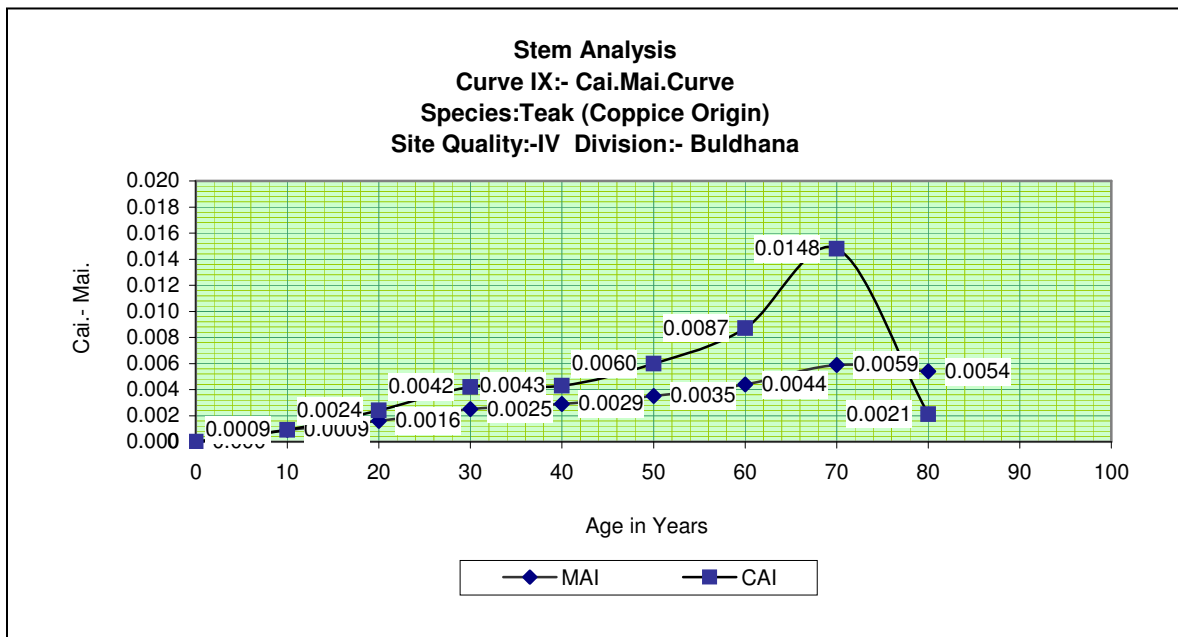
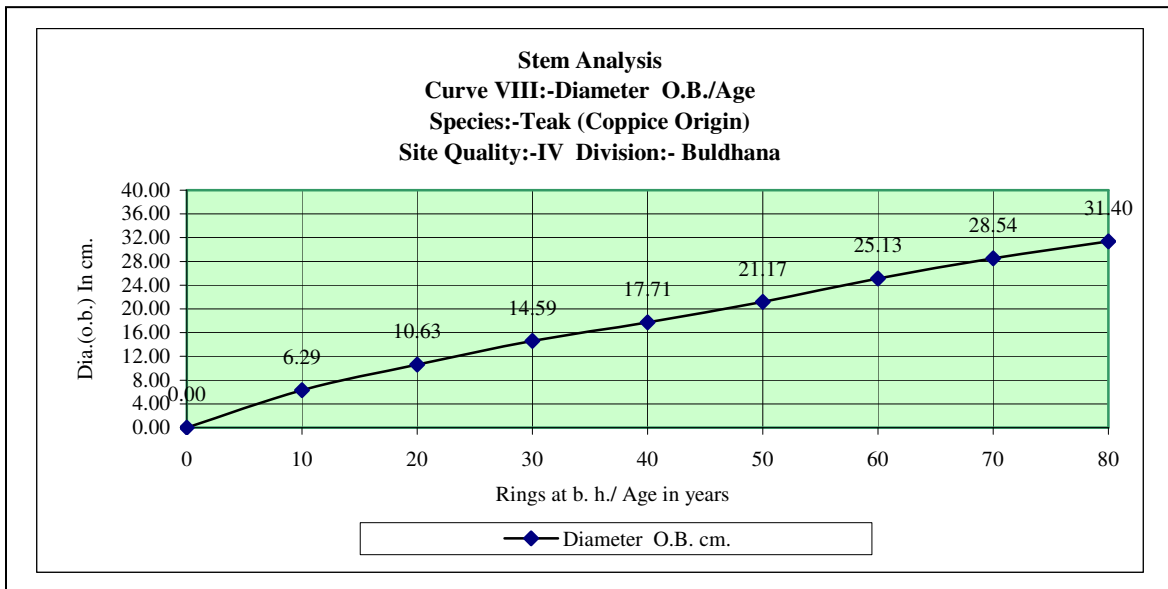
Age in years	D.B.H. (O.B.) in cm	G.B.H. (O.B.) in cm	Ht. In Mt.	Volume per tree cum	MAI Cum/year	CAI Cum/year
10	6.29	19.75	4.40	0.0089	0.0009	0.0009
20	10.63	33.38	6.50	0.0328	0.0016	0.0024
30	14.59	45.81	8.30	0.0744	0.0025	0.0042
40	17.71	55.61	9.90	0.1172	0.0029	0.0043
50	21.17	66.47	11.00	0.1771	0.0035	0.0060
60	25.13	78.91	12.00	0.2637	0.0044	0.0087
70	28.54	89.62	12.80	0.4121	0.0059	0.0148
80	31.40	98.60	13.10	0.4336	0.0054	0.0021











SECTION 2.STOCK MAPPING :

8.2.1. The A class Reserved Forests of the Division were stock mapped by types, densities and standard quality classes for the first time at the time of revision of the Working Plan by S.A.Cornelius. In case of Babul Bans; soil classes, namely, high lying, low lying and calcareous were shown on the maps. During preparation of Plan by S.S.Parasnis fresh stock maps of all the 'A' class Teak and Mixed Forests showing quality classes had been prepared on 2" = 1 mile sheets except for three sheets of Geru Matergaon Reserve which were on 4" = 1 mile scale. Stock mapping of fodder reserves were shown on 2" = 1 mile traces. Maps of Babul bans showing soil classification denoting soils deep black, light-black, Chunkhedi and Bharak on scale 8" = 1 mile were prepared on tracing cloth. During preparation of Plan by B.S.Thengdi, stock mapping were done in 101 compartments over an area of 31928 ha. of A class RF.

8.2.2. During revision of the Plan, preparation/updating of stock maps were done in 36228.29 ha of A- class RF, 591.35 ha of C- class RF, 6605.43 ha Protected Forests of Bhingara, Kuwardeo . The total area stock mapped is 43425.07 ha. The results of stock mapping are given in **Appendix No.XXXIII** of Volume II. The stock maps have been digitized in the GIS cell of Amravati Working Plan Division.

8.2.3. The State of Forest Report 2005 published by Forest Survey of India has given forest cover classification of Buldhana district as in Table No. 8.9. There is no change reported in Forest Cover compared to 2003.

Table No.8.8

Table Showing The Results Of Stock Mapping obtained from digitized maps.

Forest Type	Site Quality	SCIWC	IWC	PROT WC	Total Area in ha.	% to the total area
Teak	IV	4687.55	2632.30	642.32	7962.17	17.89
Mixed	IV	2854.65	16515.34	3818.49	23188.48	52.12
Salai	IV	29.29	3297.74	210.76	3537.79	7.95
Old Plantation	-	-	365.99	-	365.99	0.82
	Total	7571.49	22811.37	4671.57	35054.43	78.78
Under stocked	-	593.32	5544.67	-	6137.99	13.80
Cultivation	-	409.87	1184.09	1138.68	2732.64	6.14
Blank	-	14.32	555.31	-	569.63	1.28
	G.Total	8589.00	30095.44	5810.25	44494.69*	100

Table No.8.9

**Table Showing Forest Cover of Buldhana District
as per State of Forest Report 2005**

Category	Area in Sq. Km.
Very Dense Forest	35
Moderately Dense Forest	156
Open Forest	422
Total	613
Geographical Area	9661
Percentage of GA	6.35
Scrub	87

8.2.2. The Site Quality based on the top height of mature dominant Teak trees is adopted as given below:

Table No. 8.10

All India Teak Site Quality Table

Site Quality	Top height of Teak tree in meters.
IV	12-18 meters
III	18-24 meters
II	24-30 meters
I	> 30 meters

SECTION 3 :ENUMERATION :

8.3.1. Enumerations were carried out by ‘Systematic line plot sampling with random start’ in the Division over 37888.73 ha ‘A’ class Reserves Forests and Kuwardeo PF. The enumeration work was carried out by Forest Resources Survey Unit, Amravati. The enumeration work was started in October 2005 and completed in December 2005. The sampling intensity was roughly 1%.

8.3.2. Systematic line plot sampling was carried out in 1230 plots at the intersection of 600 meter grid. Trees species were enumerated in 15 cm girth classes in 0.36 ha plots (60 m X 60 m). All tree species were enumerated from 16-30 cm girth class onwards. Results of enumeration are given in **Appendix No. XXXIV** of Volume II. Regeneration count of seedlings was done in three height classes (0.3 to 1.0 m, 1.0 to 3.0 m and above 3.0 meters) in 0.04 ha (20m X 20m) sub plots. The summary of regeneration analysis is given in **Appendix No.XXXV** of Volume II.

8.3.3. Enumeration data was analysed using the Forest Inventory Management System developed by Shri. J.S.Dhabekar and also by Chief Forest Statistician, M.S. Nagpur. Enumeration results have been computed separately for each Working Circle and have been discussed, in the chapters of respective Working Circle. Results of Enumeration are discussed below:

8.3.4. Afforestation Working Circle :- The total stocking in Afforestation Working Circle is 209.27 trees per ha. It is observed that stocking of species of general utility viz. (i) Bija, (ii) Lendia, (iii) Shisham, (iv) Teak, (v) Tiwas (vi) Ain are 102.43 trees/ha. (49%) to the total growing stock. The Teak is predominant species 94.13 trees/ha. (45%) of total stock. The Species of special utility viz (i) Khair, (ii) Salai, (iii) Kalam, (iv) Haldu are 10.62 trees/ha. (5 %) to the total growing stock and rest of the species are 96.22 trees/ha. (46 %). Dhaora constitute 12.9 %, Anjan (12.8%), Palas 5.34% and Salai 4.2% of the total growing stock.

Table No.8.11
Estimated Growing Stock: No. of trees per hectare in Afforestation W.C.

Species	15/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151&Up	Total
<i>Group A:- Species of General Utility</i>											
Bija	0.07	0.009	0.012	0.023	0.017	0.003	0.006	0.006	0	0	0.14
Lendia	1.67	0.975	0.525	0.196	0.089	0.023	0	0.006	0	0	3.48
Shisam	0.141	0.112	0.066	0.046	0.043	0.014	0.012	0.009	0	0.003	0.44
Shivan	0	0.006	0.006	0	0	0	0	0	0	0	0.01
Teak	33.79	26.382	19.121	8.625	4.009	1.598	0.412	0.147	0.037	0.009	94.13
Tiwas	0.014	0.014	0.012	0	0.012	0.009	0	0	0	0	0.06
Ain	1.696	1.061	0.629	0.418	0.179	0.121	0.023	0.009	0.003	0.006	4.14
Total	37.38	28.55	20.37	9.30	4.34	1.76	0.45	0.1	0.04	0.01	102.43
<i>Group B:- Species of Special Utility</i>											
Khair	0.343	0.479	0.378	0.118	0.043	0.017	0.003	0	0	0	1.382
Salai	0.072	0.193	0.519	0.914	1.687	1.768	1.552	1.105	0.756	0.32	8.887
Kalam	0.061	0.055	0.04	0.049	0.037	0.02	0.009	0.006	0.012	0.009	0.297
Haldu	0.009	0.014	0.026	0.003	0	0.003	0.003	0	0	0	0.058
Total	0.485	0.741	0.963	1.084	1.767	1.808	1.567	1.111	0.768	0.329	10.62
<i>Group C:- Species of Minor Forest Produce</i>											
Total	35.54	19.01	14.12	12.69	9.53	4.38	2.08	1.02	0.59	0.30	96.22
Gr.To	70.41	48.31	35.46	23.03	15.64	7.96	4.10	2.31	1.40	0.65	209.27

8.3.5. Catchment Working Circle :- The total stocking in Catchment Working Circle is 261.03 trees/ha. It is observed that species of General utility viz (i) Teak, (ii) Ain etc are 40.95 trees/ha (15.7 %) to the total growing stock. The species of special utility viz. (i) Kalam, (ii) Khair, (iii) Salai etc are 20.39 trees/ha (7.8 %) to the total growing stock and rest of the species are 199.69 trees/ha. (76.5 %) to the total growing stock. In this Working Circle, Anjan is predominant species which constitute 108.0 trees/ha.

i.e. 41.5% of the total stock where as Dhaoda constitute 59 trees/ha. (i.e. 23 %) of the total stock. Teak constitute only 38 trees/ha. (i.e. 14.5 %) of the total stock.

Table No.8.12
Estimated Growing Stock : No. of trees per hectare in Catchment W.C.

Species	15/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151&Up	Total
<i>Group A:- Species of General Utility</i>											
Teak	12.69	8.57	6.50	3.81	4.12	1.42	0.39	0.31	0	0	37.85
Ain	0	0	0	0.55	1.03	1.27	0.23	0	0	0	3.09
Total	12.69	8.57	6.50	4.36	5.15	2.69	0.63	0.31	0	0	40.95
<i>Group B:- Species of Special Utility</i>											
Kalam	0	0	0.15	1.42	1.74	1.03	0.79	0	0	0	5.15
Khair	0	1.50	1.90	0.15	0	0	0	0	0	0	3.57
Salai	0	0	0	1.27	2.93	3.49	2.46	1.34	0.15	0	11.66
Total	0	1.50	2.06	2.85	4.68	4.52	3.25	1.34	0.15	0	20.39
<i>Group C:- Species of Minor Forest Produce</i>											
Total	25.32	39.52	49.37	38.10	27.70	11.43	6.59	1.67	0.00	0.00	199.69
Gr.To	38.02	49.60	57.94	45.32	37.54	18.65	10.48	3.33	0.16	0.00	261.03

8.3.6. Babulban Working Circle :- The total stocking in Babulban Working Circle are 70.72 trees/ha. It is observed that species of general utility viz. Ain etc. are 0.42 trees/ha. (0.61 %) to the total stocking. The species of special utility are absent and rest of the species are 70.29 trees/ha (99.40 %) to the total growing stock. In this Working Circle Prosopis is predominant species 62.32 trees/ha. (i.e. 88.10 %) of the total growing stock where as Babul constitute only 1.42 trees/ha. i.e. 2.0 % of the stock. Teak is absent in Babul Ban Working Circle.

Table No.8.13
Estimated Growing Stock : No. of trees per hectare in Babulban W.C.

Species	15/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151&Up	Total
<i>Group A:- Species of General Utility</i>											
Ain	0.07	0	0.14	0.07	0.14	0	0	0	0	0	0.42
Total	0.07	0	0.14	0.07	0.14	0	0	0	0	0	0.42
<i>Group C:- Species of Minor Forest Produce</i>											
Prosopi	29.84	9.97	5.55	3.63	4.55	4.48	2.06	1.049	0.64	0.07	62.32
Babhul	0.42	0.57	0.21	0.14	0.07	0	0	0	0	0	1.42
Total	31.48	12.60	7.97	4.62	4.77	4.55	2.06	1.49	0.64	0.07	70.29
Gr.To	31.55	12.60	8.11	4.69	4.91	4.55	2.06	1.49	0.64	0.07	70.72

8.3.7. Standard Error and Standard Deviation: Calculated estimates of enumeration are not 100 percent accurate but lead to certain error. The percentage of standard error and standard deviation calculated for each working circle is as under :-

Table No.8.14
Table showing % of standard error and standard deviation

Name of Working Circle	Population area in ha.	Intensity of sampling	% of Standard Error	Standard Deviation
AWC	35445.39	0.97	2.56	58.34
CAT. WC	1197.60	1.05	9.35	53.48
BB WC.	1245.74	1.18	17.16	37.80

8.3.8. Comparison of current enumeration results with past enumeration.

Enumerations were not carried out during preparation of B.S.Thengdi's Working Plan. However, it was carried out (by the method of random sampling) in Ambabarva reserve over an area of 20685 acres during Parasnis's Plan. Recording of 12 species (i) Teak (ii) Shisham (iii) Tinsa (iv) Kalamb (v) Haldu (vi) Saja (vii) Kakad (viii) Salai (ix) Moyan (x) Bija (xi) Sawar (xii) Dhaora were done. All species were enumerated right from seedling stage. Teak and Shisham were enumerated in 15 cm girth classes and rest of the species in 30 cm. girth class. The result of enumeration is given in Parasnis Plan. Now the area of Ambabarwa Reserve has been declared as Ambabarwa Wild Life Sanctuary and transferred to Wild Life wing. Hence, it was not covered in current enumeration. Therefore, it would not be appropriate to compare the results of current enumeration with that done during Parasnis Plan (in Ambabarwa Reserve.)

SECTION 4. VOLUME TABLES:

8.4.1. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of this Plan is given in the **Table 8.15**. No data regarding growth of miscellaneous species could be collected during preparation of this plan. The figures of rate of growth given in C.P. Forest Pocket Book can be adopted for guidance, given in **Table 8.16**

Table 8.15
Table Showing Volume Table (Round Timber) For Teak in Buldhana Division
(All India Teak Site Quality IV)

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.280
6	90/105	0.435
7	105-120	0.555

Table 8.16
Table showing rate of growth of miscellaneous species

Species	Mean girth in cm at 30 yrs	Mean height in m at 30 yrs
<i>Ain or Saja</i>	44.20	10.15
<i>Aaola</i>	36.07	07.92
<i>Bel</i>	33.53	10.66
<i>Bija</i>	46.74	08.71
<i>Dhaora</i>	33.27	07.07
<i>Lendia</i>	33.78	07.62
<i>Moha</i>	33.52	06.91
<i>Tendu</i>	33.02	06.64
<i>Tiwas</i>	35.81	06.70

SECTION 5: STATISTICS OF YIELD:

8.5.1. As harvesting of timber and firewood have not been done in these forests for more than two decades data of past yield in respect of timber and firewood is not available.

Part - II

**FUTURE MANAGEMENT DISCUSSED
AND PRESCRIBED**

CHAPTER 1
BASIS OF PROPOSAL

SECTION 1. THE NATIONAL FOREST POLICY:

1.1.1. The National Forest Policy was first enunciated in 1894 and was revised in 1952, after independence. It was again revised in the shape of the National Forest Policy 1998, which is presently in force.

1.1.2. The basic objectives and thrust areas enshrined in the National Forest Policy 1988 are given as under:

- 1.** Maintenance of environmental stability through preservation and where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of forest.
- 2.** Conserving the natural heritage of the country by preserving the remaining natural forest with the vast variety of flora and fauna, which represents the remarkable biodiversity and genetic resources of the country.
- 3.** Checking the soil erosion and denudation in the catchment area of the rivers, lakes and reservoirs in the interest of soil and water conservation for mitigating flood and droughts and for retardation of siltation of reservoirs.
- 4.** Checking the extension of sand dunes in the desert areas and along the coastal tracts.
- 5.** Increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programs, especially, on all denuded, degraded and unproductive lands.
- 6.** Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- 7.** Increasing productivity of forest to meet essential needs.

8. Encouraging efficient utilization of forest produce and maximizing substitution of wood.

9. Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.

10. The principal aim of the Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium, which are vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to the principal aim.

1.1.3. Essentials of Forest Management embodied in the Nation Forest Policy 1988 are given as follows:

1. Existing forest and forestland should be fully protected and their productivity be improved. Forest and vegetal cover should be increased rapidly on hill slopes, in catchment of the rivers, lakes and reservoirs and ocean shores and on semi arid, arid and desert tracts.

2. For conservation of biodiversity networks of national parks, sanctuaries, and biosphere reserves and other protected areas should be strengthened and extended adequately.

3. Provision of sufficient fodder, fuel and pasture, especially, in areas adjoining to forests beyond sustainable limits.

4. Minor forest produce provides sustenance to the tribal population and to other communities residing in and around the forests. Such produce should be protected, improved and their production enhanced with due regard to generation of employment and income.

5. Schemes and projects, which interfere with forests that clothe steep slopes, catchment of rivers, lakes and reservoirs, geologically unstable terrain and other ecologically sensitive areas should be severely restricted.

6. No forest shall be worked without the Government approved management plan, which shall be tuned to the provisions of National Forest Policy.

7. The rights and concessions enjoyed by the tribal and other rural poor living within and near the forests should be fully protected. Their domestic requirements of fuel wood, fodder minor forest produce and construction timber should be the first charge on forest produce.

8. Inculcate in the people, a direct interest in forest and make them conscious of the value of trees, wildlife and nature in general through forest extension, education and training.

FOREST POLICY OF MAHARASHTRA STATE 2008

1.1.4. The State Government has recently declared State Forest Policy- 2008 vide Revenue & Forest Department Resolution No. TRS-1098/CR-190/F-6 dated 22-09-2008. This has also been taken into consideration while preparing the current Plan.

National Wildlife Action Plan (NWAP):

1.1.5. The first National Wildlife Action Plan (NWAP) was adopted in 1983 subsequently revised in the year 2002. The plan had outlined the strategies and action points for wildlife conservation. Increased commercial use of natural resources, continued growth in human and cattle populations and changes in consumption patterns are causing greater demographic impacts. It also says that effective ecosystem conservation is the foundation of long term ecological and economical stability. Natural processes, forests, and other wild habitats recharge aquifers, maintain water regimes and moderate the impact of floods, droughts and cyclones. Thereby they ensure food security and regulate climatic change. They are also a source of food, fodder, fuel and other products supplementing the sustenance of local communities.

1.1.6. India ranks sixth amongst the 12 mega biodiversity countries of the world. Conservation of biodiversity is directly linked with conservation of ecosystem and thus with water and food security.

1.1.7. The NWAP proposes restoration and management of degraded habitats outside protected areas to provide sufficient habitat for spatial movement of spill over species outside PAs, and to provide biological resources needed by the local communities to prevent their dependence on PA resources. Degraded habitats outside PAs and their needs must urgently be identified for restoration, which would involve a combination of protection, soil and water conservation and planting of local species coupled with the removal of exotics.

NATIONAL FORESTRY ACTION PROGRAMME (NFAP):

1.1.8. To reverse the process of degradation and for sustainable development of forests, the Government of India have prepared National Forestry Action Plan programme a comprehensive strategic plan to address the issues underlying the major problems of the forestry sector. The objective of NFAP is to enhance the contribution of forestry and tree resources to ecological stability and people centered development through qualitative and quantitative improvement in the forest resources.

1.1.9. Major Programmes of NFAP are given below:

1. Protect Existing forest resources: It has three main sub programmes. (1) Forest protection (2) Soil and water conservation and (3) Protected Areas and Biodiversity conservation. These include the works of forest survey, demarcation and mapping, inventory, encroachment and fire etc., and other related issues.

2. Improve forest productivity: It has four main programmes (1) Rehabilitation of degraded forests (2) Research and technology development (3) Development of NTFPs, (4) Assisting private initiatives with community participation. These involve mainly research, improvement in technology,

enrichment planting soil and water conservation, regeneration, rehabilitation and afforestation mainly in existing forests.

3.Reduce total demand: It has three main sub programmes for the efficient use of (1) Fuel wood and fodder, (2) Timber (3) NTFP. This includes the programmes for substitutions, and other measures for the efficient utilization of forest products and also through extensive biomass plantations.

4. Strengthen Policy and Institutional Framework: It has three main sub programmes of strengthening of (1) Central forestry administration (2) Central forestry institutions and (3) State forestry administration and institutions

5. Expand forest area: It has two main sub programmes of (1) Tree plantation on forest and non-forest lands (2) Peoples participation in plantations and its protection.

SECTION 2. FUNCTIONAL CLASSIFICATION OF FORESTS:

1.2.1. The broad principles of classification of forest on functional basis have been embodied in Resolution No. MRF-1365/132211-Y dated December 6, 1968 issued by Government of Maharashtra. The following functional classes have been recognized by the state.

1.2.2. Protection Forests: It includes forests on steep slopes (25 and above) or along river banks and forest that have become depleted through maltreatment and further exploitation of which will accentuate soil erosion and adversely affect the productivity of agricultural lands in the region. The management should aim conserving these forests, through soil and moisture conservation measures, so that they may exert beneficial influence on the soil, the water regime and the physical and climatic factors of the locality.

1.2.3. Tree Forests: These forests are situated in remote tracts that are mainly capable of growing large sized timber and other products of commercial value.

1.2.4. Minor Forests: It includes forests that are interspersed with cultivated lands and are capable of producing small timber and fuel wood and provide grazing which are indispensable needs of adjoining agricultural works.

1.2.5. Pasture Lands: They are openly stocked forests of scrublands that have ceased to yield even the small timber but are conveniently situated for providing grazing to the cattle used for agricultural works.

Miscellaneous forests:

1.2.6. Grass reserves: These are small blocks of forest situated amidst cultivated tracts carrying scrubby growth and capable of producing good fodder grasses.

1.2.7. Remaining areas needed for other purposes.

1.2.8. Taking into consideration the above aspects besides the growing stock and condition of site has made the functional classification of the forests. The various types of forests will be treated as follows.

1.2.9. Protection Forests: The category includes steep and precipitous slopes of *Jalgaon –Jamod* Range. These forests were not included in Parasnis Plan but were included in Afforestation cum Improvement Working Circle in Thengdi's Plan. Stocking is good in the entire area. It is proposed to treat the area with soil and moisture conservation works and by gap planting.

1.2.10. Tree Forests: This type of forest includes the better quality *Teak* forests of Ghatbori range, capable of producing large sized timber. They have been worked under Coppice with Reserve Working Circle under Parasnis

Plan but were included in Afforestation cum Improvement Working Circle in Thengdi's Plan. Steep slopes will be excluded from harvesting operations, but will be covered for soil and moisture conservation works. The natural regeneration will be tended and areas having inadequate natural regeneration will be induced for N.R. simultaneously, the area will be planted with suitable valuable species. The percentage of *Teak* in the existing crop is nearly 58%. These areas will be worked under SCI working circle.

1.2.11. Minor Forests: This type of forest include inferior quality *Teak* forest , *Anjan* forest, Mixed forest and *Prosopis* forests, C-class Reserved Forests not proposed for sheep grazing and will be managed to meet the local needs of small timber, poles ,fuel wood and grazing. These forests have been worked under Coppice with Reserve, Improvement, Babul Ban, Open Pasture and Fodder Reserve W.C. under the Parasnis Plans but were managed under Afforestation cum Improvement W.C. and Babul Ban W.C.under Thengdi's Plan. This forest will be managed under Improvement W.C. and Fuelwood W.C. Soil and Moisture Conservation works will be taken up in the open and eroded areas. NR will be induced, tended and Root Stock Management will be done. It will be supplemented with Artificial Regeneration in suitable areas.

1.2.12. Pasture Land: The C-class Reserved Forest, devoid of much vegetation and reserved for sheep grazing is included in this category .Rotational grazing is proposed in this area. Attempt will be made to introduce better variety of grass species.

Table No. 1.1
Table Showing Functional Categories of Forests in Buldhana Division

Category	Area in ha.				Percentage
	R.F. (in ha.)	P.F.	Un classed	Total	
Protection Forests	-	6605.43	-	6605.43	07.88
Tree Forests	7884.05	-	-	7884.05	09.41
Minor Forests	38099.12	1159.68	349.47	39608.27	47.27
Pasture land	29701.31	-	-	29701.31	35.44
Total	75684.48	7765.11	349.47	83799.06	100

SECTION 3. FACTORS INFLUENCING OBJECTS OF MANGEMENT:

1.3.1. The forests are mixture of *Teak* Forests, *Anjan* Forests, Mixed Forests and *Prosopis* Forests and inferior in quality in general except that of *Ghatbori* and *Jalgoan –Jamod* ranges. A large chunk of forest tract is under stocked, degraded and needs proper tending of the crop.

1.3.2. The natural generation of *Teak* and miscellaneous is not up to the mark. Seedlings and saplings, no doubt, were observed at places but far short of required numbers.

1.3.3. A portion of forest of the Division adjoins the Protected Areas, namely, *Dnyanganga* Wildlife Sanctuary and *Ambabarwa* Wildlife Sanctuary. Thereby, require treatment in conformity with the wildlife and bio-diversity conservation.

1.3.4 The forests suffer heavy biotic pressure, especially, uncontrolled grazing, resulting in trampled regeneration and compact soils, devoid of humus. Excessive grazing is the main adverse factors causing degradation of forests in the Division. The situation requires some bold measures like control of grazing beyond carrying capacity and strict control measures for some areas for fixed periods on rotational basis to minimize these adverse influences.

1.3.6. The NTFPs species form small proportion of the forest crops that contribute to the livelihood of local communities. The forest areas rich in NTFPs require special thrust for their sustainable management and use in the interest of local communities, by involving them through JFMCs.

SECTION 4. GENERAL OBJECTS OF MANAGEMENT:

1.4.1. Following general objectives of forest management were identified in pursuance of the National Forest Policy, 1988; and other directives issued by the state and the union governments, from time to time.

1. To preserve forest cover on hill slopes, along streams, watercourses and water bodies in order to prevent soil erosion and to check siltation in tanks; and to maintain their essential protective and life support functions, including, regulation of the water regime and to maintain ecological balance.
2. To meet the expectations of wild life protection and biodiversity conservation.
3. To restore and augment tree cover in under-stocked and degraded forests, and to improve productivity and growing stock of natural forests using appropriate modes of management and techniques with a view to enhance the carrying capacity of the forest.
4. To enhance the productivity of firewood, fodder, non-timber produce, small timber and other construction wood required for meeting local household demands, particularly of the local communities.
5. To improve the availability of fodder and grazing, to local communities.
6. To ensure optimum sustained yield of desirable forest produce and services consistent with the objectives of National and State Forest Policies.

SECTION 5. TREATMENTS PRESCRIBED:

1.5.1. The following treatments have been prescribed for the forest dealt with:

1.5.2. Management treatment will depend upon requirements of environment stability, protection of topography, biodiversity conservation, characteristics of growing stock in the forest and forest produce utilization.

1.5.3. Existing protection forests will be preserved and augmented. Soil and moisture conservation works will improve moisture regime and prevent soil erosion and siltation in the water bodies.

1.5.4. Suitable tending operations will be carried out to stimulate the growth of the naturally regenerated seedlings.

1.5.5. Timber, if otherwise available, will be extracted from dense forests capable of producing large timber on sustained basis.

1.5.6. Open forest areas and traditional pastures will be managed with active participation of village communities for meeting local domestic needs.

1.5.7. The general approach of treatment has been described, as follows:

1.5.8. The entire forests on steep precipitous slopes will be protected from harvesting. 20-meter wide strip on both sides of streams and watercourses will also be protected from harvesting in the similar manner.

1.5.9. Forest areas susceptible to erosion and falling in catchments of rivers, which flow, from the area shall be protected.

1.5.10. Recommended soil and moisture conservation works should restore ecological balance and ensure biodiversity conservation.

1.5.11.. Snag, den trees and down logs shall be sufficiently protected, to meet the habitat requirement of birds and small animals. Wildlife requirements shall be the most important consideration for water hole management in forest areas.

1.5.12. The divisions will co-ordinate compilation of a comprehensive database of floral and faunal resources as well as ecologically sensitive sites in the division.

1.5.13. Preference will be accorded to natural regeneration and rootstock management. Natural regeneration and promising coppice growth will receive suitable tending to stimulate growth and development. Areas having good natural regeneration of valuable species shall be protected from fire

and grazing. N R will be supplemented with Artificial regeneration in suitable areas.

1.5.14. Management of forests close to village will give priority to meeting demands of local people for small timber, firewood, pasture, non-timber forest produce, etc. Local people will be actively involved in forest management, forest protection, plantations and development of natural resources in the village.

1.5.15. Non- Timber Forest Produce (NTFP) has great potential for sustainable economic improvement of local communities with conservation of forest resources. Sustainable NTFP production will be given high priority in the forest management.

1.5.16. Sustainability of forest resources serves as the guiding principle for managing demands for produce and services, various government and non-government agencies will be engaged in identification and promotion of ecologically sound and economically feasible alternatives like wood saving technology, stall-feeding and livestock improvement.

1.5.17. Involving local people in managing forests and awareness in rural and tribal areas is considered indispensable for the forest conservation.

1.5.18. Reducing biotic pressure on forest, particularly, illicit felling, unsustainable grazing and encroachment near villages will be considered on priority basis.

1.5.19. Forests capable of producing large sized timber will be harvested under the Selection-Cum-Improvement management system.

1.5.20. Boundary demarcation will be carried out in time-bound manner for ensuring territorial integrity of forest. The Revenue and Forest Departments shall ensure maintaining forest boundaries, updating land records and reconciling revenue records in accordance to forest notifications.

SECTION 6. ANALYSIS AND VALUATION OF THE CROP:

1.6.1. The first stage analysis of forest crop is based on the species and tree girth distribution obtained from the enumeration data in Afforestation Working Circle which constituted approximately 95% of Division area and density distribution observed in satellite imageries.

Table No. 1.2
Table Showing No. of Trees/Ha and their Volume
in cum in Enumeration during Current plan

Sr. No.	Name of Species	No. of Trees/ha	Volume in cum
1	2	5	6
1	Ain /Sajad	4.145	0.7792
2	Bija	0.147	0.0444
3	Lendia	3.484	0.3911
4	Sivan	0.012	0.0958
5	Teak	94.135	11.4537
6	Tiwas	0.061	0.0185
7	Haldu	0.058	0.0113
8	Kalam	0.297	0.1274
9	Khair	1.382	0.1631
10	Salai	8.887	7.7236
11	Anjan	26.759	10.2268
12	Dhaora	26.999	4.2631
13	Palas	11.166	1.9445
14	Moin	7.632	3.5918
15	Others	23.667	3.7532
	Total	209.278	44.5893

1.6.2. Areas on precipitous slope susceptible to high erosion are included in the Protection Working Circles (PRT).

1.6.3. Compartments having sufficient dense tree cover and mature trees fit for harvesting with adequate regeneration are allotted to the Selection-Cum-Improvement Working Circles (SCI). This working circle is expected to produce timber and firewood.

1.6.4 Compartments having tree cover with inadequate mature trees are allotted to Improvement Working Circle (IWC). These compartments are expected to produce poles, small timber and firewood. In such areas the focus would be upon tending of existing rootstock supplemented by

plantations, wherever necessary. Involvement of the local community is considered focal for management of such areas.

1.6.5 Babul Bans which are now invaded by Prosopis are capable of producing small timber and firewood. These forests are proposed to be included in Fuelwood Working Circle and managed under Coppice System.

1.6.6. The C –class RF areas having sparse tree crop, open areas with tree growth and isolated small forest patches are included in the Pasture Working Circle .Rotational grazing is recommended .Valuable grass species is proposed to be introduced in suitable areas.

SECTION 7. WORKING CIRCLES AND THEIR DISTRIBUTION:

1.7.1. For the purpose of formation of working circles, compartments have been

used as unit for distribution. The allocation of compartments is based on preponderance of suitability to a specific working circle. Thus, five area-specific and four overlapping working circles, namely-Wildlife (Overlapping) WC, NTFP (Overlapping) WC, JFM(Overlapping) WC and Forest Protection (Overlapping) WC are prescribed. The details of the compartments allotted to working Circle Range wise and their areas are given in the **Appendix XXXVI** of Volume II of this plan.

Table No. 1.3
Table Showing Distribution of forest areas in various working circles

Sr. No.	Working Circle	(Area in ha)					
		A-class RF	C-class RF	PF	UF	Total	%
1	Protection Working Circle	-	-	6605.43	-	6605.43	7.87
2	Selection-Cum-Improvement Working Circle	7884.05	-	-	-	7884.05	9.41
3	Improvement Working Circle	29710.17	7143.22	1159.68	349.47	38362.54	45.80
4	Pasture Working Circle	-	29701.31	-	-	29701.31	35.44
5	Fuelwood Working Circle	1245.73	-	-	-	1245.73	1.48
Total		38839.95	36844.53	7765.11	349.47	83799.06	100.00

Table No. 1.4
TABLE SHOWING WORKING CIRCLES WISE AREA DISTRIBUTION OF
THENGDI'S PLAN AND IN CURRENT PLAN

(AREA IN HA)

WC IN LAST PLAN	AREA	TRANSF. TO WL	BALANCE AREA	WORKING CIRCLES WISE AREA DISTRIBUTION IN CURRENT PLAN				
				SCI	IWC	PASTURE	PROT	FUEL WOOD
AFF	90004.64	9391.53	80618.12	7884.05	36427.33	29701.31	6605.43	-
CAT	12509.36	11232.24	1277.12	-	1277.12	-	-	-
PROT	12797.53	12472.66	321.87	-	321.87	-	-	-
BABUL	1245.73	-	1245.73	-	-	-	-	1245.73
AREA ADDED	-	-	336.22	-	336.22	-	-	-
TOTAL	116557.27	33096.43	83799.06	7884.05	38362.54	29701.31	6605.43	1245.73

1.7.2. Range wise distribution of Working Circles and their areas are given in the **Appendix No. XXXVI** of Vol. II of this plan.

Table 1.5. Protection Working Circle

Range	Reserved Forest (ha.)		Protected Forest (ha)	Un classed Forest (ha.)	Total (ha.)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	-	-	6605.43	-	6605.43
<i>Khamgaon</i>	-	-	-	-	-
<i>Buldhana</i>	-	-	-	-	-
<i>Ghatbori</i>	-	-	-	-	-
<i>Motala</i>	-	-	-	-	-
<i>Mehkar</i>	-	-	-	-	-
<i>D'Raja</i>	-	-	-	-	-
Total	-	-	6605.43	-	6605.43

Table 1.6. Selection-Cum-Improvement Working Circle

Range	Reserved Forest (ha.)		Protected Forest (ha)	Un classed Forest (ha.)	Total (ha.)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	-	-	-	-	-
<i>Khamgaon</i>	-	-	-	-	-
<i>Buldhana</i>	-	-	-	-	-
<i>Ghatbori</i>	7884.05	-	-	-	7884.05
<i>Motala</i>	-	-	-	-	-
<i>Mehkar</i>	-	-	-	-	-
<i>D'Raja</i>	-	-	-	-	-
Total	7884.05	-	-	-	7884.05

Table 1.7. Improvement Working Circle

Range	Reserved Forest (ha.)		Protected Forest (ha)	Un classed Forest (ha.)	Total (ha.)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	8483.70	263.12	292.94	304.33	9344.09
<i>Khamgaon</i>	3833.98	1285.32	475.25	000.00	5594.65
<i>Buldhana</i>	7155.69	1494.44	221.13	003.27	8874.53
<i>Ghatbori</i>	4572.54	1408.45	119.01	004.88	6104.88
<i>Motala</i>	4164.15	536.90	-	-	4701.05
<i>Mehkar</i>	1122.93	1364.57	-	-	2487.50
<i>D'Raja</i>	0377.18	790.42	051.25	036.99	1255.84
Total	29710.17	7143.22	1159.58	349.47	38362.54

Table 1.8. Pasture Working Circle

Range	Reserved Forest (ha.)		Protected Forest (ha)	Un classed Forest (ha.)	Total (ha.)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	-	0201.51	-	-	0201.51
<i>Khamgaon</i>	-	7046.37	--	-	7046.37
<i>Buldhana</i>	-	1881.32	-	-	1881.32
<i>Ghatbori</i>	-	4681.97	-	-	4681.97
<i>Motala</i>	-	6551.90	-	-	6551.90
<i>Mehkar</i>	-	2441.76	-	-	2441.76
<i>D'Raja</i>	-	6896.48	-	--	6896.48
Total	-	29701.31	-	-	29701.31

Table 1.9. Fuelwood Working Circle

Range	Reserved Forest (ha.)		Protected Forest (ha)	Un classed Forest (ha.)	Total (ha.)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	811.85	-	-	-	811.85
<i>Khamgaon</i>	433.88	-	-	-	433.88
<i>Buldhana</i>	-	-	-	-	-
<i>Ghatbori</i>	-	-	-	-	-
<i>Motala</i>	-	-	-	-	-
<i>Mehkar</i>	-	-	-	-	-
<i>D'Raja</i>	-	-	-	-	-
Total	1245.73	-	-	-	1245.73

1.7.2. The Wildlife (Overlapping) WC , NTFP (Overlapping) WC , JFM (Overlapping) WC and Forest Protection (Overlapping) WC covers area of entire Division.

SECTION 8. BLOCKS AND COMPARTMENTS:

1.8.1. The A-class Reserved Forests of the Division are distributed in 246 compartments and C-class Reserved Forests are assigned Compartment numbers and are distributed in 170 compartments. In addition to this the Ex-Jagir Forest i.e. Protected Forests are also assigned compartment numbers and are distributed in 21 compartments. The areas transferred to Forest Department, as part of compensatory afforestation some of which are declared as Protected Forest while other are Un-classed Forest, in process of being notified are also assigned compartment numbers and are distributed in 14 compartments. **Appendix No. XXXVII** of Volume II gives statement showing village/ survey numbers and compartment numbers assigned to them. An abstract of compartments allotted to various working circles with felling series and ranges are given in **Appendix No. XXXVII** of Volume II.

Table No. 1.11
Table Showing Distribution Of Forest Compartments
Under Various Working Circles

Area-specific Working Circles	A-class Reserved Forest	C-class Reserved Forests	Protected /Un classed Forests	Total number of Compartments
Protection Working Circle	-	-	18	18
Selection-Cum-Improvement Working Circle	24	-	-	24
Improvement Working Circle	100	50	17	167
Pasture Working Circle	-	119	-	119
Fuelwood Working Circle	122	-	-	122
Total	246	169	35	450

SECTION 9. **PERIOD OF PLAN:**

1.9.1. This plan is for 10 years from the year of approval. The operations, however, have been prescribed for a period of 20 years except for the areas allocated to Fuelwood Working Circle (10 years). Mid-term review of the prescriptions of the plan is proposed in the 5th year of its implementation, on receipt of the proposal from the CCF (Territorial) *Amravati* Circle.

CHAPTER-II

SELECTION CUM IMPROVEMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

2.1.1. The Selection Cum Improvement Working Circle includes areas of Ghatbori Range. These forests were worked under Coppice with Reserve Working Circle in Parasnis's Plan and under Afforestation cum Improvement Working Circle in Thengdi's Plan. The area details are as under.

Table No 2.1
Table Showing the Distribution of Areas Range wise

Sr. No.	Range	Total Area (ha.)	Area allotted to SCI WC (ha.)	No. of Comptt. included
1	Ghatbori	18670.90	7884.05	24
Total		18670.90	7884.05	24

SECTION 2: GENERAL CHARACTER OF VEGETATION

2.2.1. The forests of **Buldhana Division** belong to "Southern Tropical Dry Deciduous Forests" 5A/C1 type and mostly belonging to site quality IV.

2.2.2. Generally the crop is a mixture of all age classes with crop density varying between 0.3 to 0.6. The crop is mostly of coppice origin, having malformed and crooked bole. Density wise (number of stems per ha.) young and middle girth classes predominate.

2.2.3. *Teak* is the dominant species constituting approximately 50 % of the forests. At places, patches of pure *Teak* can also be seen. The associates of *Teak* are *Lendia*, *Ain*, *Kalam*, *Khair*, *Salai*, *Dhawda*, *Dhaman*, *Tendu*, *Karu* etc. The shrubs in the area consist of *Murudsheng*, *Bhandar*, *Nirgudi*, *Bharati* etc. The grass species found are *Sheda*, *Ghonal*, *Kusal* etc.

2.2.4. Status of Regeneration: Forest Resources Survey Unit, Amravati, collected the regeneration data during enumeration. The results are tabulated as under:

Table No 2.2 a
Table Showing the Status of Regeneration of Teak and Miscellaneous Species
(Per hectare)

Sr.No.	Name of Species	R1	R2	R3	Total	% of Regeneration	Establishment %
1	Ain	13.76	10.35	4.55	28.66	4.86	15.86
2	Lendia	4.29	5.93	1.26	11.49	1.95	10.99
3	Teak	60.61	93.81	44.57	198.99	33.36	22.40
4	Kalam	0.13	0.13	0.13	0.380	0.06	33.33
5	Khair	1.77	2.27	2.02	6.06	1.03	33.33
6	Tendu	7.58	9.72	2.78	20.08	3.41	13.84
7	Ahl	0.13	0.00	0.00	0.13	0.02	0.000
8	Bel	3.91	5.56	0.00	9.47	1.61	0.00
9	Char	0.76	0.00	0.00	0.76	0.13	0.00
10	Kulu	0.13	0.00	0.00	0.13	0.02	0.00
11	Dhaora	64.27	53.16	31.82	149.24	25.32	21.32
12	Others	64.27	80.56	19.19	164.02	27.83	11.70
	Total :	221.59	261.49	106.31	589.39	100	

Table No. 2.2 b
Table Showing the Status of Regeneration of Teak and Miscellaneous Species

Species	R1	R2	R3	Total R
Teak	60.61	93.81	44.57	198.99
Non Teak	160.23	167.68	61.74	390.40
Total	221.59	261.49	106.31	589.39

R1= 0.3m to 1.0 m, R2 = 1.0 m to 3.0 m, R3 > 3.0m (Height of the plants in meters)

2.2.5. From the above data it is inferred as below:

- 1) Recruitment of *Teak* and Misc. species is 33.80% and 66.20 % respectively.
- 2) 22.40% of the recruitment of *Teak* is establishing. Whereas 15.84 % that of Misc. species is establishing.

2.2.6. Natural Regeneration of *Teak* is adequate and that of miscellaneous species is also satisfactory but only 18.06% of overall regenerations are establishing. The main reasons for the non-establishment of natural regeneration appear to be fires and heavy uncontrolled grazing. Due to fire *Teak* dies back and coppices next year. Hence, *Teak* establishment is fairly better than miscellaneous species. Due to hacking, trampling and grazing of miscellaneous species, few miscellaneous plants are establishing.

SECTION 3: SPECIAL OBJECTS OF MANAGEMENT

The special objects of management are:

- (i) To obtain big sized timber.
- (ii) To increase the stocking of *Teak* and other valuable species.
- (iii) To promote and to tend the available *Teak* reproduction and other valuable species and to improve the condition of the growing stock by facilitating Natural Regeneration supplemented by Artificial Regeneration.
- (iv) To maintain and improve the adequate soil cover in the forest areas as a safeguard against soil erosion.

SECTION 4: COMPARTMENTS AND FELLING SERIES

2.4.1. Total 24 compartments have been allotted to this working circle. They are divided into 3 felling series having 20 coupes in each of them. The average area of the coupe is 131 ha. Coupe boundaries will be mostly natural features, so that coupe demarcation problems will be minimized.

Appendix No. XXXVIII of Volume II gives allotment of compartments to various felling series.

Table No. 2.3
Table Showing Number of Felling Series, Compartments and their Areas Range wise

Range	No. of Compts in SCI WC	No. of Felling Series	Area under SCI WC (ha)
<i>Ghatbori</i>	24	3	7884.05
Total	24	3	7884.05

Table No. 2.4
Table Showing the Distribution of Area Felling Series wise

Range	Name of Felling Series	Area of Felling Series in ha	No. of compartments included
<i>Ghatbori</i>	<i>Ghatbori</i>	2984.94	12
	<i>Isvi</i>	2462.10	7
	<i>Mandwa</i>	2437.01	5
Total		7884.05	24

SECTION 5: ANALYSIS AND VALUATION OF CROP

2.5.1 Stock Mapping: The stock mapping of the area was carried out and was verified with enumeration data. **Table No. 2.5** shows the abstract of results of stock mapping for the areas allotted to this Working Circle.

Table No 2.5
Table Showing Stocking Details Site Quality Wise and Their Area

Forest Type	Site quality	Area in ha	% area w. r. t. Total W.C.
Teak	IV	4687.55	54.58
Mixed	IV	2854.65	33.24
Salai	IV	29.29	0.34
Old Plantation	-	-	-
	Total	7571.49	88.15
Under stocked	-	593.32	6.91
Cultivation		409.87	4.77
Blank		14.32	0.17
	Grand Total	8589.02	100

* Difference due to digitization error

2.5.2 Teak IV Quality is predominant in this forest. It constitutes approximately 55% of the crop.

2.5.3 Age and Density: The crop is a mixture of all age classes. The young and middle aged girth classes predominate. The crop density varies from 0.3 to 0.6.

2.5.4 Enumeration: 100 % enumeration was carried out in 1% of the total area by laying sample plots of 60m x 60m i.e. 0.36 ha size at the intersection of grids 600m apart. Each sample plot represented corresponding area of 0.36 ha. These forests were included in Afforestation cum Improvement Working Circle in Thengdi's Plan. However, as these forests are distinctly different from rest of the forests and of good quality, separate analysis of this area has been done. A summary of results of analysis is given in **Table No. 2.6**. The data reveals that out of total 349 trees/ha found in this area 202.24 i. e. 57.95% are *Teak* and *Lendia* is 1.16 %, , *Salai* 0.83%, *Sajad* 1.16 %, and *Khair* 0.78% .

Table No. 2.6
Table Showing Enumeration Data Of Number Of Trees Per Ha In SCI Buldhana Forest
Period of Enumeration Oct 2005 to Dec 2005 Total area covered_ 7884.05 ha

Area enumerated_ 73.44 ha		Intensity of Sampling_ 0.93 %							
Sr. No.	Girth Class (cm.)	Teak			Other			Total	
		No.	Percentage of total teak by no.	Percentage of total stock by no.	No.	Percentage of total non teak by no.	Percentage of total stock by no.	No.	Percentage of total stock by no.
1	15/30	69.71	34.47	19.98	53.72	36.60	15.39	123.43	35.37
2	31/45	60.10	29.72	17.22	34.09	23.23	09.77	94.19	26.99
3	46/60	35.56	17.58	10.19	21.03	14.33	06.02	56.59	16.21
4	61/75	20.47	10.12	05.87	15.22	10.37	04.36	35.69	10.23
5	76/90	10.37	05.13	02.97	11.68	07.96	03.35	22.05	06.32
6	91/105	04.32	02.14	01.24	06.40	04.36	01.83	10.72	03.07
7	106/120	01.23	00.61	00.35	02.92	01.99	00.84	04.15	01.19
8	above120	00.47	00.23	00.13	01.88	01.28	00.54	02.35	00.67
Total		202.24	100.00	57.95	146.76	100.00	42.05	349.00	100.00

2.5.5. (v) Analysis of growing stock: The average volume of the growing stock in SCI Working Circle is approximately 48 cum/ha.

Table No. 2.7
Table Showing No. of stems/ha , Basal Area and
Volume of the Growing Stock as per current
Enumeration

Girth Class in cm	No. of Trees/ha	Mid-girth in cm	B. A. / tree In sq. m.	Volume Cum./ tree	B. A. in sq. m.	Volume in Cum
15-30	123.43	22.5	0.0040	0.014	0.494	1.728
31-45	094.19	37.5	0.0112	0.057	1.059	5.369
46-60	056.59	52.5	0.0219	0.155	1.239	8.771
61-75	035.69	67.5	0.0363	0.240	1.296	8.566
76-90	022.05	82.5	0.0542	0.365	1.195	8.048
91-105	010.98	97.5	0.0756	0.565	0.830	9.113
106-120	004.15	112.5	0.1010	0.830	0.419	3.444
121 & Above	002.82	127.5	0.1290	0.965	0.364	2.721
Total	349.00				6.896	47.760

A statement showing compartment wise stem distribution, basal area, volume / ha, and allotment of compartments to various working circles & felling series are given in **Appendix No. XXXIX** of Volume II.

SECTION 6: SILVICULTURAL SYSTEM

2.6.1. The silvicultural system will be Selection system .Improvement felling shall also be carried out wherever necessary. The main object of SCI will be to produce big sized timber. Natural Regeneration will be induced and encouraged through rigid fire protection and grazing control. However this will be supplemented by artificial regeneration wherever required.

SECTION 7: FELLING CYCLE

2.7.1. The working cycle has been fixed as 20 years from the year of working.

SECTION 8: HARVESTABLE GIRTH

2.8.1. Most of the *Teak* crop belongs to quality IV. Stem Analysis for *Teak* trees of both seed origin as well as coppice origin have been carried out, for site quality IV. The CAI and MAI curves of seed origin teak tree intersect at 87 years (+4 yr correction from seedling data to be added) of age corresponding to g.b.h. is 116 cm. The CAI and MAI curves for coppice origin teak trees intersects at 77 years(+4 yr correction from seedling data to be added) of age corresponding to 97cm girth at breast height .The average of 116 and 97 is 106.5 cm. Therefore, for avoiding confusion between seed and coppice origin trees and convenience of marking, the harvestable girth of 105 cm is prescribed. The harvestable girth for the miscellaneous species *Ain*, *Kalamb*, *Dhavda* and *Salai etc* are also fixed at 105 cm. girth, as their growth is comparable to that of *Teak*. Harvesting of large sized trees will open the canopy; this will help regeneration of *Teak* and other valuable species to come up in the area.

SECTION 9: FORMATION OF THE FELLING SERIES

2.9.1. There shall be 20 coupes in each Felling Series. The forests of this Working Circle have been divided into 3 felling series. Total coupes will be 3

x 20 = 60 Coupes in SCI Working Circle. Details are given in **Appendix No. XL** Volume II of this plan.

SECTION 10: REGULATION OF YIELD

2.10.1. The annual yield shall be regulated by area. The coupes are neither equi-extent nor equi-productive.

2.10.2. The boundaries of the coupes have been made to follow natural features as far as possible; therefore the coupes could not be made equi-extent.

2.10.3. For yield regulation, the *K.P. Sagariya's* modification of Smithies formula has been applied.

2.10.4 Enumeration: No. of *Teak* trees as per the current enumeration are as under:

Table No 2.8

Girth class cm.	No. of Teak trees/ ha.
15/30	69.71
31/45	60.10
46/60	35.56
61/75	20.47
76/90	10.37
91/105	04.32
106/120	01.23
Above 120	00.47

2.10.5 Survival Percentage: The percentage of trees that will be reaching the harvestable girth will be calculated on the basis of number of trees that should have been in each girth class if present stock was evenly distributed. The expected value of trees in an evenly balanced stock will be obtained as per law of De-Liocourt.

Table No 2.9

Girth classes in cm	Tree no. / ha (De Liocourt)	Survival percentage for reaching harvestable girth
VIII 15U30	71.33	05.45
VII 30U45	47.08	08.26
VI 45U60	31.07	12.52
V 60U75	20.51	18.97
IV 75U90	13.53	28.75
III 90U105	08.93	43.56
II 105U120	05.90	65.93
I Above 120	03.89	100.00

2.10.6. The ideal number of trees in different girth classes in an evenly balanced growing stock is obtained by applying **F-delicourt's law**. This law states that in a fully stocked Selection Forest i.e. in a normal growing stock of the uneven aged forest, the number of stems fall off from one diameter girth class to the next higher girth class in a geometrical progression with a constant ratio. In other words the percentage reduction in the number of stems from one diameter girth to the next higher class is constant.

Fraction Surviving while Reaching Next Class:

Table No 2.10

Girth classes	I	II	III	IV	V	VI	VII	VIII
Survival %	100	65.93	43.56	28.75	18.97	12.52	08.26	05.45
Proportionate Initial Availability	100	151.51	229.57	347.83	527.02	798.51	1209.86	1833.13
Fraction Surviving when reaching next class	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66

Table No. 2.11

Average Annual Recruitment (R_n)

Class	Tree reaching class I		Years in class		Average Annual recruitment (R _x)
	%	No.			
I > 120	100.00				
II 105-120	65.93	$1.23 \times 0.6593 = 0.81$	15	t ₂	0.054 (R ₂)
III 90-105	43.56	$4.32 \times 0.4356 = 1.88$	15	t ₃	0.125 (R ₃)
IV 75-90	28.75	$10.37 \times 0.2875 = 2.98$	12	t ₄	0.248 (R ₄)
V 60-75	18.97	$20.47 \times 0.1897 = 3.88$	9	t ₅	0.431 (R ₅)
VI 45-60	12.52	$35.56 \times 0.1252 = 4.45$	11	t ₆	0.405 (R ₆)
VII 30-45	08.26	$60.10 \times 0.0826 = 4.96$	9	t ₇	0.551 (R ₇)
VIII 15-30	05.45	$69.67 \times 0.0545 = 3.80$	12	t ₈	0.317 (R ₈)

v) Recruitment in Successive Cycle: -

Felling Cycle 20 years

Table No 2.12
Recruitment in Successive Cycle

Felling Cycle Total	Total Recruitment During Felling Cycle (fR _n)
1	15R ₂ +5R ₃ =1.435
2	10R ₃ +10R ₄ =3.730
3	2R ₄ +9R ₅ +9R ₆ =8.020

vi) **Realizable Recruitment in Successive Cycles: -**

$$R_{rn} = \frac{1}{2}[f R^n \text{ an } (R^n - R_x)]$$

$$R_{an} = fR^n - R_{rn}$$

Where Rⁿ = Average recruitment in that felling cycle in the nth cycle

f = Felling cycle

R_{an} = Available Recruitment in that nth felling cycle

R_x = Recruit in the class x

(a) 1st felling cycle: -

$$R_{r1} = \frac{1}{2} [1.435 - 15 (1.435/20 - 0.054)]$$

$$= 1.1687/2$$

$$= 0.5844$$

$$R_{an} = fR^n - R_{rn}$$

$$R_{a1} = 20 \times 0.054 - 0.5844$$

$$= 0.4956$$

(b) 2nd felling cycle: -

$$R_{r2} = \frac{1}{2} [3.730 - 15(3.730/20 - 0.125)]$$

$$= 1.4037$$

$$R_{an} = fR^n - R_{rn}$$

$$R_{a2} = 3.730 - 1.4037$$

$$= 2.3263$$

(c) 3rd felling cycle: -

$$R_{r3} = \frac{1}{2} [8.020 - 12 (8.020/20 - 0.248)]$$

$$= 3.092$$

$$R_{an} = R_{an} = fR^n - R_{rn}$$

$$R_{a3} = 8.020 - 3.092$$

$$= 4.938$$

Table 2.13

Cycle	Accruing	1. Realizable 2. Accumulating	Hence Available in Cycle
1	1.435	1. 0.5844 2. 0.4956}2	0.5844
2	3.730	1. 1.4037}2 2. 2.3263}3	1.8993
3	8.020	1. 3.092}3 2. 4.928	5.4183

The availability in the first cycle is $1.700 + 0.5844 = 2.2844$

(vii) Annual Realizable yield in cycle

Table No. 2.14

If stock in hand is liquidated in no of Cycles	Annual Realizable yield in cycle		
	1	2	3
1 cycle	0.1142	0.0950	0.271
2 cycle	0.1046	0.1046	0.271
3 cycle	0.160	0.160	0.160

If stock in hand is liquidated in no of Cycles	Annual Realizable yield in cycle		
	1	2	3
1 cycle	2.2844	1.8993	5.4183
2 cycle	2.0920	2.0920	5.4183
3 cycle	3.2000	3.2000	3.2000

Liquidation in cycle	At hand	Accruing	Total	Realizable	Total liquidated	Percentage liquidation	Balance
1 cycle	1.700	1.435	3.135	0.5844	1.567	50%	1.567
2 cycle	1.700	5.165	6.865	2.4837	3.432	50%	3.432
3 cycle	1.700	13.185	14.885	7.902	7.442	50%	7.442

Thus, if available stems at hand are liquidated in three felling cycles, sustainable yield will be available. On an average 3.200 trees/ ha will be available for felling per cycle.

Total prescribed yield for Teak trees per ha, per cycle

$$= 3.200 \times 0.5 \text{ (if 50\% retained)}$$

$$= 1.60 \text{ trees}$$

$$= 1.60 \times 0.532 \text{ cum}$$

$$= 0.851 \text{ cum}$$

Prescribed yield of Teak trees per year/ha. = 0.0425 Cum.

If we assume that all the area of coupe to be well stocked and are worked then we can expect average annual yield of Teak timber to be approximately 325 Cum.

SECTION 11: AGENCY OF HARVESTING

2.11.1. The coupes will be worked departmentally through FLCS or JFMC. Preference will be given to the JFM committees wherever the forest area is allotted for joint management to the village committees.

SECTION 12: DEMARCATION OF COUPES AND PREPARATION OF THE TREATMENT MAP

2.12.1. Demarcation: The main annual coupe will be demarcated one year in advance along with the remaining coupes due for cleaning and thinning. The coupes will be divided into four sections to control the various operations effectively.

2.12.2. Treatment Map: Soon after the demarcation of the coupes and sections, a treatment map will be prepared by R.F.O. and it will be verified by the A.C.F. and D.C.F. for the purpose of raising plantations, felling and protection. Treatment map will be prepared on graph paper in 1:5000 scale. Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B areas, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid. The base line should as far as possible run through center of coupe. The trace of the coupe map will show the contours along with important features like nala, streams.

The areas will be classified as below and shown in the map:

I) Area 'A': Protection Areas

It will include the following areas

A1 Areas with steep slopes i.e. more than 25° slope.

A2 Twenty meter wide strip on either side of the rivers or perennial nalas or around tanks.

A3 Highly eroded areas.

II) **Area 'B': Blanks and Under stocked Areas:** (In patches of 2 ha or more)

This will include areas with crop density less than 0.4 up to the slope of 25° but exceeding 2 ha in extent at a place.

III) **Area 'C': Pole crops and Old Plantation Areas:** (In patches of 1 ha or more)

This will include patches of young well-grown pole crop of Teak and other valuable species such as *Shisam*, *Bija*, *Ain*, *Bhirra*, *Dhaora*, *Salai*, etc. exceeding 1.0 ha in extent.

IV) **Area 'D' - Well Stocked Areas:**

This will include areas with crop density more than 0.4. In the entire area, tending of the crop shall be carried by providing a spacing of 1/3rd height of the tree to be retained to facilitate the growth of standing trees. Preference for Teak shall be given while retaining the trees in the tending.

2.12.3. Treatments:

Area (A): (i) The Soil and Moisture Conservation treatment shall be given as mentioned in Miscellaneous Regulations.

(ii) *Jamun*, *Arjun*, *Agave*, etc shall be planted along the *nala* and river banks. Seed sowing of *Khair*, *Lendia*, *Kusum*, *Bhirra* and other local species and also stake planting of *Ficus* species, *Pangara*, *Salai*, etc in suitable area shall be carried out.

(iii) The area will be completely protected and felling of any kind shall not be permitted.

Area (B): (i) Soil and moisture conservation treatment shall be as given in Miscellaneous Regulations.

(ii) Planting of *Teak* and miscellaneous species, at silviculturally prescribed spacing, shall be carried out.

(iii) Tending of root stock will be carried out.

Area (C): (i) This area does not need any planting. Tending of the crop shall be carried out.

(ii) Thinning of old plantation and pole crop will be carried out.

Area (D): (i) This area does not need any planting, mature trees shall be harvested from this area only.

(ii) Tending of natural regeneration (singling and spacing out) will be carried out among seedlings/saplings of *Teak* and other valuable species.

2.12.4. Marking Technique And Marking Rules:

(a) Marking Technique: All trees above 60 cm. girth will be enumerated separately species wise. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Marking technique has been discussed in the chapter "Miscellaneous Regulations"

(b) Marking Rules: Marking will be undertaken one year in advance and will be carried out by R.F.O.

I) Marking For Area 'A': No tree shall be marked for felling.

II) Marking For Area 'B': (In patches of 2 ha or more)

(i) All dead trees after retaining 2 dead trees per ha shall be marked for felling.

(ii) All live high stumps will be cut as close to the ground (15 to 25 cm above ground) as far as possible and dressed.

(iii) Malformed seedlings will be cut back to induce coppice growth.

(iv) The established multiple coppice shoots and poles will be reduced to one per stool retaining the vigorous one originating from the side bud, provided no seed origin plant is available in the vicinity.

III) Marking For Area 'C': (In patches of 1 ha or more)

The congested group of young poles will be marked for thinning so as to bring the spacing between the plants to the $\frac{1}{3}$ rd of the height of the trees retained.

IV) **Marking For Area ‘D’:**

- (i) All climbers, except those of NTFP value, will be cut.
- (ii) All dead (after retaining 2 dead trees/ha) shall be marked for felling. Also 2 stag trees per ha will be retained for purpose of Wildlife management. All live high stump will be cut as close to the ground as possible and dressed. All malformed trees shall also be marked for felling.
- (iii) The multiple coppice trees will be marked to reduce the number to one coppice per stool retaining the most promising one. Care shall be taken to ensure that coppice originating from callus shoots is not retained.
- (iv) No tree of pre harvestable girth class i.e. (90 U 105 cm) shall be marked for felling. The removal of a tree should not accelerate soil erosion.
- (v) If the no. of trees in approach class is more than in the harvestable girth class then the no. of trees is equal to 50% of harvestable girth class shall be marked for felling in the harvestable girth class.
- (vi) If the no. of trees in approach class is less than those in the harvestable girth class then the no. of trees equal to 50 % of approach girth class trees shall be marked for felling in the harvestable girth class.
- (vii) Care shall be taken for retention of 50% of healthy trees of each species in harvestable girth class. This will prevent tendency of field staff to preferentially mark teak and other valuable species instead of miscellaneous species.
- (viii) Removal of trees from harvestable girth classes shall be first of highest girth and then next below and so on so that over-matured trees are given preference for removal.
- (ix) *Bija, Shisam, Semal, Kulu* and all edible fruit trees such as *Mahua, Tendu, Awala, Mango, Jamun, Char, Bel, Biba, and Behada* etc will be reserved against felling. Religious trees such as *Ficus* etc. shall be retained.
- (x) Felling will be done after demarcation of coupes and marking of trees and due certification by the Competent Authority as per rules.
- (xi) The undesirable undergrowth, which is preventing or likely to prevent the development of seedling regeneration of the desired species, will be removed.
- (xii) Tending of the Natural Regeneration shall be done.

Malformed Tree: A tree is malformed when it is defective or abnormal either in crown or bole, which include conditions like, slag headness, crookedness, gnarls, twist or constrictions by climbers beyond recouperment etc.

SECTION 13. METHOD OF OBTAINING REGENERATION:

2.13.1. The NR is the best source for getting growing stock, provided available NR is well protected and tended. The NR has grazing, fire and weed growth as its worst enemies amongst many such things. *Troupe* observed that weed-growth is one of the serious obstacles to the establishment of NR. In this area of forest NR can be secured only by means of systematic weeding commenced in first rainy season and continued there after until the plants are free from the risks of suppression.

In these forest areas, NR of *Teak* has suffered from fire as observed by die-back phenomenon depending upon incidences and extent of fire occurrences. In deciduous forests *Teak* seedling suffers from desiccation, which needs mulching individually to reduce this effect.

2.13.2. Inducement of Natural Regeneration:

- (i) Identified NR will be rigidly protected from grazing, trampling and fire incidences, by resorting to rigid grazing control fire protection measures applicable to current coupe of working.
- (ii) Abundant natural reproduction, from *Teak* seed lying dormant on the ground, could be induced by opening canopy. Coppice shoots interfering with NR when established should be removed.

2.13.3 ARTIFICIAL REGENERATION :

Area (A): No planting shall be done. However in case of nala and river banks *Jamun*, *Arjun*, *Agave*, etc., at spacement of 3m x 3m should be undertaken.

Area (B):- In these areas plantation shall be undertaken in 2nd year of main felling, at the Silviculturally prescribed spacement, if the site is suitable It means PYO/PPO works will be taken up in the immediate year of main felling.

Area (C):- This area does not need any planting.

Area (D):- This area does not need any planting.

SECTION 14: **SUBSIDIARY SILVICULTURAL OPERATIONS:**

2.14.1. The following Subsidiary Silvicultural Operations shall be carried out departmentally:

(a) **Cut Back Operations (CBO):** It shall be taken up in the immediate year of main felling.

- i) All standing trees marked for felling but not felled shall be felled.
- ii) All damaged trees, which are not likely to recover, shall be cut back.
- iii) All climbers, except of NTFP value, in the plantation area shall be cut out.
- iv) All malformed, suppressed or damaged advance growth of *Teak* up to 30cm. Girth shall be cut to ground level to obtain good coppice.

(b) **Cleaning:** In the 6th year commencing from main felling following operation shall be carried out:

- i) All climbers , except of NTFP value, will be cut.
- ii) Weeds interfering or likely to interfere with the reproduction of *Teak* and other valuable species will be cut and removed.
- iii) Coppice shoots of *Teak* will be removed if NR and AR are successful, otherwise shoots will be cut and reduced to one well grown shoot.
- iv) The established advanced growth of *Teak* and other valuable species will be spaced out suitably.

c) **Thinning:** Thinning will be carried out in the 11th year.

- i) All climbers, except NTFP value, shall be cut.
- ii) All dead, badly damaged or uprooted trees shall be felled.
- iii) In groups of young pole crop of *Teak*, thinning shall be carried out so that the average spacing between poles to be left shall be 1/3rd of the height of the trees retained.
- iv) Weeds interfering or likely to interfere with the reproduction of *Teak* and other valuable species will be cut back.
- v) No trees of gbh above 60 cm. shall be thinned.

A statement showing the sequence of CBO, Cleaning and Thinning is given in **Appendix No. XLI** of Volume II.

SECTION 15: **OTHER REGULATIONS:**

2.15.1. Protection from Fire: Main-felling coupes will be fire traced and rigidly fire protected for a period of **Five years** from the year of felling. The cut material will be spread over the area to be planted in such a way that the cut material remains sufficiently away from the stems of the trees and burning do not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests.

2.15.1.1. The NR needs to be protected from the hazards of fire so that the regeneration becomes future growing stock. Hence the main thrust should be on protection of regeneration.

2.15.1.2. To ensure effective protection from fire the workable schemes of fire protection should be prepared in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village Forest Protection Committees will be formed and fire protection will be done through the Forest Protection Committee. Money earmarked for Fire Protection works should be given to the Forest Protection Committee.

2.15.1.3. The techniques of fire protection should be as per the paragraphs given in the Chapter on Miscellaneous Regulation.

2.15.1.4. As such the area being prone to fire hazard and NR of species being the first and the biggest causality, this economic source of regeneration should be rigidly protected from fire. It causes damage to productive crop also. The comprehensive Fire Fighting Scheme should be chalked out so that effective Fire Fighting force is created, for the period 15th February to 15th June on 24 hour duty on suitable area basis.

2.15.1.5. Grazing Control: - The areas of main felling shall remain closed to grazing for a **period of 5 years**. Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. Lopping of trees such as *Anjan*, *Bija*, *Shivan*, *Ain* etc shall be prohibited. The method of rotational grazing shall be followed. This will facilitate opening of area on rotational basis. The closed areas should be specifically mentioned in the grazing licenses and villagers be communicated of such closures by suitable means such as drum-beating, notices on prominent places, village *Panchayat* officers etc. and by binding grass *pullies* or stacks along the boundaries of closed coupes.

2.15.1.6. Soil Conservation Works: Contour trenching works , WATs, Gully plugging and *nala* bunding works will be taken up .Cement plugs or earthen *bandhara* be taken up on a large scale to preserve moisture for a longer period simultaneously the catchments areas of the cement plugs/ earthen *bandhara* be treated with loose boulder structures so as to prevent siltation in the dams. In addition to this contour stone bunding 60 cm x 30 cm size will be taken up on the slopes to prevent soil erosion, where boulders are not available agave suckers in 2 rows will be planted.

2.15.1.7. People's Participation: The people's participation is the need of the hour, to protect the forest from fire, grazing, illicit cutting etc. Unless the villagers living nearby are made aware of the material benefit from the forest, they would not feel associated with the well being of the forest and may not visualize the distinct valuable utility of forests for their material benefit they get or likely to get. Therefore, it should be expedited through viable measures.

2.15.1.8. Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle.

2.15.1.9. By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests.

2.15.1.10. Grazing and fodder as well as fuel wood should be related with their efforts for protection and management of forests.

2.15.1.11. Incentives to FPC/Village committees in terms of cash awards/ free grants on annual basis would be formalized. These measures would help actively involve people in the forest management and should benefit them in the longer run. The people should be made aware of their responsibilities so that long lasting relations get strengthened and well being and sustenance of forests along with people is ensured.

CHAPTER – III

IMPROVEMENT WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION:

3.1.1. The areas, which are deficient in stocking and require improvement through silvicultural operations and artificial regeneration, have been included in this Working Circle. The main aim is to rehabilitate and improve the status of the degraded crop and site. Therefore, obtaining produce of any kind is neither expected nor desired. However, through silvicultural operations, poles and firewood may be obtained in some quantities.

3.1.2. These forests have been worked under Coppice with Reserve, Improvement, Open Pasture and Fodder Reserve W.C. under the Parasnis Plans but were managed under Afforestation cum Improvement and Catchment Working Circle under Thengdi's Plan. It also includes C class RF, not included in Pasture WC and Compensatory Land received for afforestation purposes. The area details are given in the table below:

Table No. 3.1
Table Showing Area Allotted To Improvement Working Circle

Range	Total area of Range	Area under IWC	% w. r. t. Range Area	% w. r. t. W. C. area
<i>Jalgaon-Jamod</i>	16962.88	9344.09	55.09	24.36
<i>Khamgaon</i>	13074.90	5594.65	42.79	14.59
<i>Buldhana</i>	10755.85	8874.53	82.51	23.13
<i>Ghatbori</i>	18670.90	6104.88	32.70	15.91
<i>Motala</i>	11252.95	4701.05	41.78	12.25
<i>Mehkar</i>	5196.43	2487.50	47.87	6.49
<i>D'Raja</i>	8152.32	1255.84	15.40	3.27
Total =	84066.23	38362.54	45.63	100.00

SECTION 2. GENERAL CHARACTER OF VEGETATION:

3.2.1. In general, the forests of this Working Circle are inferior both in quality and composition. The prevalent quality is IV or below IV. It consists of *Anjan* Forests, Open Mixed Forests and also Inferior *Teak* Forests. In *Anjan* Forests, *Anjan* (*Hardwickia binnata*) is the main crop, wherein stunted *Teak* occurs scattered individually or in small pure patches. The other common associates of *Anjan* are *Salai*, *Dhaora*, *Moyen* and *Saja*. The major portion of the crop is young to middle aged. Over-mature and unsound trees

are sometimes noticed. Generally seedling regeneration of *Anjan* is sparse and is noticed along nala banks and in remote areas where grazing is low. Open Mixed Forests occur inter-mixed with *Teak* and *Anjan* types. Along with the miscellaneous species *Teak* occur in strips or patches in areas adjoining *Teak* Forests. Generally these are open formations of Site quality IV or below IV. In inferior quality *Teak* Forests, the bulk of the crop is young. The stands are stunted and malformed. Trees of bigger dimensions are rare. Some C class RFs, devoid of much vegetation (scrub forests) are also included in this Working Circle.

SECTION 3. **FELLING SERIES AND COMPARTMENTS :**

3.3.1. The area of the Working Circle is divided in 7 Felling Series. 167 compartments have been allotted to this working circle. The details are given in **Table No 3.2** as under:

Table No. 3. 2
Table Showing No. of Compartments Allotted to Working Circle

Range	Felling Series	No. of Comptts. included	Area in ha.
<i>Jalgaon-Jamod</i>	<i>Jalgaon-Jamod</i>	32	9344.09
<i>Khamgaon</i>	<i>Khamgaon</i>	20	5594.65
<i>Buldhana</i>	<i>Buldhana</i>	39	8874.53
<i>Ghatbori</i>	<i>Mohana</i>	26	6104.88
<i>Motala</i>	<i>Motala</i>	16	4701.05
<i>Mehkar</i>	<i>Mehkar</i>	17	2487.50
<i>D'Raja</i>	<i>D'Raja</i>	17	1255.84
Total		167	38362.54

Appendix No. XXXVIII of Volume II gives allotment of compartments to various felling series.

SECTION 4. **SPECIAL OBJECTS OF MANAGEMENT:**

3.4.1. The special objects of management of the forests are:

- i) To increase the proportion of valuable species in the growing stock.
- ii) To increase the condition of the growing stock by appropriate tending.

iii) To preserve and improve the composition and density of the crop for progressively increasing yield of timber and

iv) To check the soil erosion by creating and maintaining the vegetative cover.

SECTION 5. ANALYSIS AND VALUATION OF THE CROP

3.5.1. Age: The crop is generally young to middle aged. The crop is generally stunted and malformed.

3.5.2. Stock Mapping: Stock maps have been prepared for A class Reserved forests (except grass ramanas). The C class RF, Protected Forests and Unclassed Forests have not been stock mapped. The prevalent site quality is IV or below IV. The results are verified with enumeration data.

Table No 3.3
Table Showing Stocking Details Site Quality Wise And Their Area

Forest Type	Site quality	Area in ha	% of area w. r. t. Total W.C.
Teak	IV	2632.30	8.75
Mixed	IV	16515.34	54.88
Salai	IV	3297.74	10.96
Old Plantation		365.99	1.22
	Total	22811.37	75.80
Under stocked	-	5544.67	18.42
Cultivation		1184.09	3.93
Blank	-	555.31	1.85
	Grand Total	30095.44*	100

*** Stock mapping not done in C class RF, PFs and UFs**

3.5.3. Density: The density is generally between 0.1 to 0.5.

3.5.4. Enumeration: The detailed results of enumeration are given in the **Appendix. No. XXXIV** of volume II of this Plan. The table showing number of trees in various girth classes in Afforestation Working Circle in Thengdi's Plan are given in the **Table No. 3.4**.

Table No. 3. 4
Table Showing Number of Trees/Ha in
Afforestation Working Circle in Thengdi's Plan

Girth class	Number of trees/ha as per current enumeration	
	Teak	Miscellaneous
15u30	33.795	36.620
30u45	26.382	21.931
45u60	19.121	16.299
60u75	08.625	14.406
75u90	04.009	11.639
90u105	01.598	06.362
105u120	00.412	03.693
120u135	00.147	02.170
135and above	00.005	02.049
Total	94.135	115.145
Percentage	44.87	55.13

3.5.5. Analysis of the Crop: Analysis of enumeration results show that out of 209.278 trees /ha ; about 169.29 trees (81%) are below 90 cm in girth. Also it can be noted that upto 60 cm girth , the percentage of *Teak* in crop is more than 50%. However, there is drastic reduction in proportion of *Teak* in higher girth classes.

SECTION 6. **SILVICULTURAL SYSTEM:**

3.6.1. The growing stock consists mostly of *Teak*, *Anjan* and miscellaneous species. Very few matured trees are available in the growing stock for harvesting. Hence there is a need to reserve all the trees of higher girth classes till the trees of lower girth classes graduate into higher girth classes. To facilitate this, improvement fellings are suggested.

SECTION 7. **ROTATION AND CONVERSION PERIOD:**

3.7.1. Since we are resorting to improvement fellings only, there is no need for fixing the harvestable girth.

SECTION 8 **FELLING CYCLE**

3.8.1. Felling cycle is fixed as 20 years. Only marking for improvement of the crop shall be carried out.

SECTION 9 **AGENCY OF HARVESTING:**

3.9.1. The coupes shall be worked departmentally through FLCS or JFMC. JFM Committees may be involved if they are actively protecting forests assigned to them.

SECTION 10. **REGULATION OF YIELD**

3.10.1. As the felling is meant for improvement of the crop, it is not necessary to prescribe yield regulation.

SECTION 11. **SEQUENCE OF FELLING:**

3.11.1. The sequence of coupes and compartment numbers is given in the **Appendix No. XL** of volume II.

SECTION 12. **DEMARCATIION OF COUPES, PREPARATION OF TREATMENT MAP, TREATMENT PROPOSED AND MARKING RULES**

3.12.1. Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

3.12.2. Preparation of Treatment Map: It will be prepared by RFO and verified by ACF. Treatment map will be prepared on graph paper in 1:5000 scale. Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B1 areas grids of 1 ha size shall be laid. In B2 areas, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid. The base line should as far as possible run through center of coupe. The trace of the

coupe map will show the contours along with important features like *nala*, streams, old plantation, etc., the area will be classified as follows:

1. Type 'A'- Protection Areas: the area consisting of patches over 25° slope or more (A1); 20 meter strip on both sides of the rivers or *nalas* (A2) and erosion prone areas (A3).

2. Type 'B'- Under stocked Areas: Blanks and under stocked patches (crown density below 0.4) exceeding 2 hectare in extent. The area will be further divided into two classes:

Type - B1: Areas having adequate rootstock (400 or more per hectare)

Type - B2: Areas having inadequate rootstock.

3. Type 'C'-Old Plantations and Groups of Young Poles: This will include patches of well-grown poles suitable for retention as future crop in addition to old plantations. The patch should not be less than one ha in extent.

4. Type 'D' -Well Stocked Areas: This will include areas with crop density more than 0.4.

3.12.3. Treatments Proposed: The various treatments proposed are as under:

1. Area 'A': (i) The soil and moisture conservation treatment shall be as given in Miscellaneous Regulation.

(ii) No tree of any kind is permitted to fell.

2. Area 'B': (i) The Soil and Moisture Conservation treatment shall be as given in Miscellaneous Regulation.

(ii) In B1 areas, rootstock management as given in Other Regulation shall be carried out.

(iii) In B2 areas, plantation of *Teak*, *Anjan* and miscellaneous species at silviculturally prescribed spacing shall be carried out on suitable sites in 2nd year of main felling. It means PYP/PPO works will be taken up in the immediate year of main felling.

3. Area 'C':

This area does not need any planting. But the crop is tended to provide a space of 1/3rd height of the trees to be retained.

4. Area 'D':

This area does not need any planting.

3.12.4. Marking Technique and Marking Rules:

(a) Marking Technique: All trees above 60 cm. girth will be enumerated separately species wise. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Marking technique has been discussed in the chapter "Miscellaneous Regulations"

(b) Marking Rules: Marking will be undertaken one year in advance and will be carried out by R.F.O. The following marking rules are laid down.

1. Type 'A' Area:

No marking will be carried out.

2 Type 'B' Area:

- (i) All dead trees, after retaining 2 dead trees per ha, shall be marked for felling.
- (ii) All live high stumps shall be cut as close to the ground as far as possible and dressed.
- (iii) All Malformed advance growth of *Teak* up to 30 cm shall be cut back
- (iv) The established multiple coppice shoots will be reduced to one per stool retaining the vigorous one, which is closer to the ground.
- (v) The undesirable under growth, which is preventing growth of natural regeneration of desired species, will be removed.

3. Type 'C' Area:

Thinning shall be carried out in these areas by providing a space of 1/3 rd height of trees retained.

4. Type 'D' Area:

- i) All dead trees , after retaining 2 dead trees /ha , malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling.
- ii) Malformed advance growth of *Teak* up to 30c.m. in girth will be cutback.
- iii) Thinning, marking will be carried out in favour of teak and other valuable species
- iv) No fruit bearing tree shall be marked for felling.

SECTION 13. SUBSIDIARY SILVICULTURAL OPERATIONS:

3.13.1. Cut Back Operations (CBO): It shall be taken up in the immediate year of main felling.

- i) All standing trees marked for felling but not felled shall be felled.
- ii) All damaged trees, which are not likely to recover, shall be cut back.
- iii) All climbers ,except of NTFP importance, in the plantation area shall be cut.
- iv) All malformed, suppressed or damaged advance growth of *Teak* up to 30cm girth shall be cut to ground level to obtain good coppice.

3.13.2. Cleaning: In the 6th year commencing from main felling following operation shall be carried out:

- i) All climbers , except of NTFP importance, will be cut.
- ii) Weeds interfering or likely to interfere with the reproduction of *Teak* and other valuable species will be cut and removed.
- iii) Coppice shoots of *Teak* will be removed if NR and AR are successful, otherwise shoots will be cut and reduced to one well grown shoot.
- iv) The established advanced growth of *Teak* and other valuable species will be spaced out suitably.

3.13.3. Thinning Thinning will be carried out in the 11th year.

- i) All climbers, except of NTFP importance, shall be cut.
- ii) All dead, badly damaged or uprooted trees shall be felled.
- iii) In groups of young pole crop of *Teak*, thinning shall be carried out so that the average spacing between poles to be left shall be 1/3 rd of the height of the trees retained.
- iv) Weeds interfering or likely to interfere with the reproduction of *Teak* and other valuable species will be cut back.
- v) No trees of gbh above 60 cm. shall be thinned.

A statement showing the sequence of CBO, Cleaning and Thinning is given in **Appendix No. XLI** of Volume II.

SECTION 14. **REGENERATION:**

3.14.1. Natural Regeneration: The NR will be protected against fire and animals. TCM or other kind of fencing may be established. Root stock management and tending of natural regeneration shall be carried out in B1 areas.

3.14.2. Artificial Regeneration: Artificial regeneration shall be carried out in B2 areas in 2nd year of main felling. It means PYO/PPO works will be taken up in the immediate year of main felling. The choice of species will be *Teak*, *Anjan*, *Saja*, , *Khair*, *Shiwan*, , *Dhaora*, , *Salai*, , *Bhilawa* etc and other fruit trees .

3.14.3. Method of Planting:

The planting model approved by the competent authority will be implemented

3.14.4. Pre-Planting and Planting Operations: The pre-planting and planting operations as approved by the competent authority shall be carried out.

SECTION 15: **OTHER REGULATIONS**

3.15.1. Protection from Fire: Main-felling coupes will be fire traced and rigidly fire protected for a period of **Five years** from the year of felling. In the month of October / November after the demarcation is over all the undergrowth of lantana will be uprooted. The cut material will be spread over the area to be planted in such a way that the cut material remains sufficiently away from the stems of the trees and burning do not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests.

3.15.2. The NR needs to be protected from the hazards of fire so that the regeneration becomes future growing stock. Hence the main thrust should be on protection of regeneration.

3.15.3. To ensure effective protection from fire the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed and fire protection will be done through the village protection committee.

3.15.4. The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

3.15.5. As such the area being prone to fire hazard and NR of species being the first and the biggest causality, this economic source of regeneration should be rigidly protected from fire. It causes damage to productive crop also. The comprehensive Fire Fighting Scheme should be chalked out so that effective Fire Fighting force is created for, for the period 15th February to 15th June on 24 hour duty on suitable area basis.

3.15.6. Guidelines For The Rootstock Management: In view of tending the available natural rootstock to grow as a prominent constituent of the future crop, the rootstock management guidelines are prescribed, as follows.

(a) Singling of coppice shoots: One healthy and promising coppice shoot will be retained on the stump and the rest be removed. However, coppice shoots interfering with promising saplings of seed origin should be removed. Such coppice shoots should also be close enough to the ground so that it would not topple after gaining volume and weight and would be able to develop root system of its own subsequently.

(b) Coppice management of damaged and malformed saplings: The saplings and poles of up to 30 cm GBH having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, cause erosion and lead to soil loss.

(c) Tending of natural regeneration: All seedlings and saplings of valuable species more than 60 centimeters in height will be tended to leave nearly 400 saplings/seedlings per hectare at an average of 5 meter spacing. The natural regeneration present shall be assisted and encouraged. Order of priority among desirable species for retention is prescribed as: *Anjan, Aola, Bhilawa, Kusum, Shisham, Shivan, Ahl, Salai, Charoli, Khair, Bel, Beheda, Sajad, Tendu, Dhaora, Teak and Lendia.*

3.15.7. Grazing Control: - The areas of main felling shall remain closed to grazing for **a period of 5 years**. Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. The method of rotational grazing shall be followed. This will facilitate opening of area on rotational basis. The closed areas should be specifically mentioned in the grazing licenses and villagers be communicated of such closures by suitable means such as drum-beating, notices on prominent places, village

Panchayat officers etc. and by binding grass pullies or stacks along the boundaries of closed coupes.

3.15.8. Lopping Rules for Anjan trees: The following lopping rules for *Anjan* are prescribed:

- (1) The CCF(T) shall prescribe lopping techniques, in consultation with JFM Committees, for non destructive lopping of *Anjan* trees.
- (2) Lopping shall be permitted only from *Anjan* trees of more than 60 cm girth. Such trees shall be enumerated and given identification mark.
- (3) Lopping shall be permitted only from *Anjan* trees with good foliage cover . In a year not more than 30% foliage shall be removed.
- (4) The lopping shall be permitted for bonafide use of the local people and not for sale.
- (5) The royalty rates may be fixed by the DCF in consultation with CCF (T).
- (6) Only members of JFM Committees shall be issued permit. In case of violation of conditions, action as per rules shall be taken and permit shall be cancelled.

In addition to above, instructions given in Article No. 159 and 160 of Part VI of Bombay Forest Manual Volume III shall also be referred for collection of *Anjan* leaves in famine and other times.

3.15.9. Soil Conservation Works: CCT/ DCT, WATs, Gully plugging and nala bunding works will be taken up. Cement plugs or earthen *bandhara* be taken up on a large scale to preserve moisture for a longer period simultaneously the catchments areas of the cement plugs/ earthen *bandhara* be treated with loose boulder structures so as to prevent siltation in the dams. In addition to this contour stone bunding 60 cm x 30 cm size will be taken up on the slopes to prevent soil erosion, where boulders are not available agave suckers in 2 rows will be planted.

3.15.10 People's Participation: The people's participation is the need of the hour, to protect the forest from fire, grazing, illicit cutting etc. Unless the villagers living nearby are made aware of the material benefit from the forest,

they would not feel associated with the well being of the forest and may not visualize the distinct valuable utility of forests for their material benefit they get or likely to get. Therefore, it should be expedited through viable measures like.

3.15.11. Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle.

3.15.12. By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests.

3.15.13. Grazing and fodder as well as fuel wood should be related with their efforts for protection and management of forests.

3.15.14. Incentives to FPC/Village committees in terms of cash awards/ free grants on annual basis would be formalized. These measures would help actively involve people in the forest management and should benefit them in the longer run. The people should be made aware of their responsibilities so that long lasting relations get strengthened and wellbeing and sustenance of forests along with people is ensured.

CHAPTER – IV

FUELWOOD WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION :

4.1.1 The area included in this Working Circle is 1245.73 ha. The areas which were managed under *Babul Ban* Working Circle in *Parasnis's* Plan and *Thengdi's* Plan are included in this Working Circle. It is scattered in more than 100 small patches and confined to two ranges, namely *Khamgaon* and *Jalgaon-Jamod*. The details are as under:

Table No.4.1
Table showing the distribution of Area Range wise.

Sr. No.	Range Name	Total Area of Range (ha)	Area allotted to Fuelwood W.C. (ha.)	% of Range Area.
1	<i>Khamgaon</i>	13074.90	433.88	3.32
2	<i>Jalgaon Jamod</i>	16962.82	811.85	4.79
	Total	30037.72	1245.73	4.15

SECTION 2. GENERAL CHARACTER OF VEGETATION :

4.2.1. Though these areas were managed under *Babul Ban* Working Circle under Agrisilvicultural system by artificial regeneration of *Babul* (*Acacia arabica*), it is now completely invaded by *Prosopis juliflora*. The crop composition has drastically altered and *Prosopis* has replaced the principle species of the crop i.e. *Babul*. Other species such as *Babul* (*Acacia arabica*), *Neem* (*Azadirachta indica*), *Hingalbet* (*Balenite ageptica*), *Hiwar* (*Acacia leucophloea*) are also noticed.

SECTION 3. SPCECIAL OBJECTS OF MANAGEMENT :

4.3.1 As majority of these areas (Approximately 1030 ha) are likely to be submerged under *Jigaon* Irrigation Project in near future, the object of management is short term. The object of management is to obtain small timber and firewood and to retain the cover till actual submergence or the approval of the Project.

SECTION 4. COMPARTMENTS AND FELLING SERIES:

4.4.1. Total 122 compartments are allotted to this Working Circle. There is only one felling series which is divided into 10 coupes. The average area of coupe is 125 ha. **Appendix No. XXXVIII** of Volume II gives allotment of compartments to various felling series.

Table No.4.2**Table showing Felling series and compartments.**

Sr.No.	Name of Range	Felling Series	No. of Compartments	Area [ha]
1	Khamgaon	Bhongaon	45	433.88
2	Jalgaon Jamod	Bhongaon	77	811.85
	Total :		122	1245.73

SECTION 5. ANALYSIS AND VALUATION OF CROP:

4.5.1. Stock Maps: These areas were not stock mapped as stock consists of predominantly *Prosopis* .

4.5.2. Age and Density: - The Crop is a mixture of all age classes. The young and middle aged girth classes predominate. The crop density varies from 0.2 to 0.5.

4.5.3. Enumeration: Enumeration was carried out in 14.04 ha area (39 plots of size 0.36 ha) out of 1245.73 ha i.e. 1.127 % areas has been enumerated. Enumeration of all species was carried out. The detailed result of enumeration is given in the Statements I to V in **Appendix No. XXXIV** of Volume II. The summary of result is given in **Table No. 4.3**. The data reveal that there are total 70.73 trees/ha, out of which *Prosopis* constitute 62.32 trees (i.e. 88 %) Other species are *Babul* 1.42 trees/ha, *Neem* 3.13 trees/ha, *Hingalbet* 1.99 trees/ha and *Hiwar* 0.77 trees/ha.

Table No. 4.3**Table Showing Enumeration Data of Number of Trees Per Ha In Fuelwood WC****Period of Enumeration Oct to Dec 05 Total area covered_ 1245.73 ha****Area enumerated_ 14.04 ha****Intensity of Sampling_ 1.13 %**

Sr. No.	Girth Class (cm.)	<i>Prosopis</i>	Others	Total
1	15/30	29.84	1.71	31.55
2	31/45	9.97	2.64	12.61
3	46/60	5.56	2.56	8.12
4	61/75	3.63	1.07	4.70
5	76/90	4.56	0.35	4.91
6	91/105	4.49	0.07	4.56
7	106/120	2.07	0.00	2.07
8	above120	2.21	0.00	2.21
Total		62.32	8.41	70.73

4.5.4. Analysis of growing stock: As these areas were not enumerated during revision of plan either by *Parasnis* or *Thengdi*, hence there is no data available for comparison. The total volume of growing stock is 19.90 cum/ha.

SECTION 6. SILVICULTUREAL SYSTEM :

4.6.1. The growing stock consists of naturalized stands of *Prosopis juliflora*, which occur along water courses. The stands are uneven aged. Approx. 1030 ha areas are likely to be submerged under *Jigaon* Irrigation Project. As *Prosopis* is very good coppicer it is proposed to work it under Coppice System. The regeneration will be done through coppicing. Initially it was considered that the remaining areas (Approx 200 ha.) can continue to be treated under Babul Ban Working Circle by eradicating *Prosopis* and sowing babul seeds. However, no efficient and cost effective methods have been found for eradication of *Prosopis*. Hence the term eradication has gradually been replaced with that of control, as it became clear that even if exclusion of *Prosopis* from a site once invaded is done, it could not prevent further encroachment and reinvasion. The three recognized methods for control of *Prosopis* species are Mechanical, Chemical and Fire. Hand clearance was the first mechanical method in which all trees were felled, all seedlings and stumps uprooted. Though it is effective, the operation was too labour intensive and expensive. Second mechanical method of site clearance involves tractor operations developed for removing trees, which have to sever roots below the ground level to ensure tree kill. This method is, however, one of the most expensive control treatments. Chemical treatments involve the use of herbicide to kill trees. Effectiveness is dependent upon chemical uptake, which in *Prosopis* is limited by the thick bark, woody stems and small leaves which have a protective waxy outer layer. Ammonium Sulphamate was successful in killing *Prosopis juliflora* trees and as a stump treatment. However, considering that the area is near the stream/river, it is not advisable to apply chemical method. Considering that methods of eradication being very expensive and largely unsuccessful in long term, the balance area being small (Approx 200 ha.) it is also proposed to be treated under Fuelwood Working Circle instead of separate *Babul Ban* Working Circle.

SECTION 7. FELLING CYCLE :

4.7.1. Felling cycle is fixed as 10 years.

SECTION 8. HARVESTABLE GIRTH :

4.8.1. The *Prosopis juliflora* trees of girth above 30 cm at breast height will be harvested.

SECTION 9. FORMATION OF FELLING SERIES:

4.9.1 The forests of this Working Circle have been divided into only one Felling Series. The Felling Series is divided in 10 coupes. The sequence of coupes and compartment numbers are given in the **Appendix No.XL** of Volume II.

SECTION 10. REGULATION OF YIELD:

4.10.1. The annual yield shall be regulated by area. The coupes are neither equi-extent nor equi-productive. The boundaries of coupes have been made of follow natural features, as far as possible; therefore coupes could not be made equi-extent. Approximately 1875 cum firewood are expected per annum from this Working Circle. **The volume projection method applied here is based on analysis provided by the Forest Statistician and shall not be used elsewhere without due verification/ confirmation.**

SECTION 11. AGENCY OF HARVESTING:

4.11.1. These coupes shall be worked departmentally through FLCS or JFMC. Preference will be given to the JFM Committees wherever the forests are actively protected by the Committee.

SECTION 12. DEMARCATION OF COUPES AND MARKING RULES :

4.12.1. Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

4.12.2. Marking Technique and Marking Rules:

a. Marking Technique: All trees above 30 cm. girth will be enumerated.

b. Marking Rules: Marking will be undertaken one year in advance and will be carried out by Range Forest Officer.

1) All *Prosopis* trees above 30 cm. will be marked for felling. Cutting of trees shall be done at a height between 30 to 50 cm. above ground level.

2) All other species except *Prosopis* will be reserved against felling.

SECTION 13. METHOD OF OBTAINING REGENERATION:

4.13.1 The *Prosopis* being a vigorous coppicer, regeneration will be done by coppice method. Cut back and Pruning operations will be done as prescribed in **Section 14**.

SECTION 14. SUBSIDIARY SILVICULTUREAL OPERATIONS:

a. Cut Back Operation: It shall be taken up in the immediate year of main felling.

- 1) 3 to 4 vigorous coppices arising from stump of *Prosopis* will be retained; all remaining coppices will be cut back.
- 2) All the coppices of *Prosopis* which are interfering in growth of other important species shall be cut back.

b. Pruning: In the 6th year commencing from main felling pruning shall be carried out.

1) Trees pruned to three stems had a larger basal area than trees pruned to either one or five stems but there is no difference in vertical tree height. Therefore, **three coppices shall be retained on each stool**.

2) Pruning intensity or the amount removed at each pruning also affects tree growth. Removing all side branches up to one half (medium intensity) or three quarter (high intensity) of the total tree height resulted in significantly greater growth than pruning to one quarter (low intensity) of tree height or no pruning at all. Therefore, **medium intensity pruning i.e. removing all side branches up to one half of total tree height shall be carried out**.

A statement showing the sequence of CBO and Pruning is given in **Appendix No. XLI** of Volume II.

SECTION 15. OTHER REGULATIONS :

- 1) **Protection from fire:** Main felling coupes will be protected from fire for the period of the five years.
- 2) **Grazing Control:** Areas of main felling coupes will remain closed for the period of five years.

CHAPTER –V
PASTURE WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION :

5.1.1 The C – class Reserved Forests, to the extent of **29701.31 ha**, proposed for sheep grazing by the Grazing Settlement Officer has been included in this Working Circle. These areas were not included in *Parasnis's* Plan but in *Thengdi's* Plan, were included in Afforestation cum Improvement Working Circle. The details are as under:

Table No.5.1
Table Showing the distribution of Area Range wise.

S. No.	Range Name	Total Area of Range (ha)	Area allotted to W.C.	% of Range Area.
1	<i>Jalgaon-Jamod</i>	16962.88	0201.51	01.19
2	<i>Khamgaon</i>	13074.90	7046.37	54.52
3	<i>Buldhana</i>	10755.85	1881.32	17.52
4	<i>Ghatbori</i>	18670.90	4681.97	25.10
5	<i>Motala</i>	11252.95	6551.90	60.00
6	<i>Mehkar</i>	05196.43	2441.76	47.43
7	<i>D'Raja</i>	08152.32	6896.48	85.67
	Total :	84066.23	29701.31	35.56

SECTION 2. GENERAL CHARACTER OF VEGETATION:

5.2.1. This Working Circle includes C- class Reserved Forests area, which comprises of Scrub Forest, not capable of producing timber or firewood to any appreciable extent and where the demand for grazing is quite heavy. There exist few scattered trees and poor quality grasses in these forests.

SECTION 3. ANALYSIS AND VALUATION OF CROP:

5.3.1. Stock Maps: These areas were not stock mapped, as they are scrub forest with few scattered trees.

5.3.2. Age and Density: - The crop density is generally around 0.1.

5.3.3. Enumeration: These areas were not enumerated as they are devoid of much stock.

SECTION 4. SPCEIAL OBJECTS OF MANAGEMENT:

5.4.1 The special objects of management are as under:

- i) To meet the demand of grazing of the local population.
- ii) To prevent soil erosion and introduce superior fodder grasses.

SECTION 5. COMPARTMENTS AND GRAZING SERIES:

5.5.1. Total 119 compartments are allotted to this Working Circle. There are ten grazing series (S1 to S10). Each grazing series is divided into three coupes, namely A, B & C. Rotational grazing is prescribed. A statement showing allotment of compartments by ranges and grazing series is given in the **Appendix No.XXXVIII** of Volume II.Distribution of Grazing Series is shown in the **Table No. 5.2**

Table No.5.2

Table showing Ranges and Grazing Series and number of compartments included

Sr.No.	Name of Range	Grazing Series	No. of Compartments included	Area	Maximum annual carrying capacity
1	Khamgaon	S1	12	3922.50	3270
2		S3	10	3123.87	2600
3	Ghatbori	S2	13	4681.97	3900
4	Motala	S4	26	5054.19	4210
5		S5	5	1467.71	1220
6	Buldhana	S6	7	1881.32	1570
7	Jalgaon-Jamod	S7	1	0201.51	170
8	Mehkar	S8	9	1781.13	1480
9		S9	5	0660.63	550
10	D'Raja	S10	31	6896.48	5750
Total		10	119	29701.31	24720

SECTION 6. ROTATION :

5.6.1. Grazing cycle is fixed as 3 years. Rotational grazing is prescribed in coupe; subsequently it will be closed for grazing to the period of next two years. Sequence of rotational grazing in this working circle is given in **Appendix No. XXXVIII** of Volume II.

SECTION 7. METHOD OF TREATMENT:

5.7.1 The forest area of this working circle will be worked in the interest of grass and grazing. With the object of improving grazing these areas will be treated under rotational grazing to give periodic rest. Each grazing series is divided in to three coupes and each coupe will be closed for grazing in rotation for two years.

SECTION 8. DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP, TREATMENT PROPOSED :

5.8.1. Demarcation of Coupes: Coupes will be demarcated in the year proceeding the year of working.

5.8.2. Preparation of Treatment Map. : It will be prepared by Range Forest Officer and verified by Assistant Conservator of Forests.

5.8.3. Treatment Proposed:

- (1) Soil and moisture conservation works such as LBS, Gabian Structures, cement plug on nalas etc will be taken up as prescribed in Miscellaneous Regulations during closed period.
- (2) Obnoxious weeds will be eradicated by uprooting and burning to improve pasture.
- (3) In subsequent years broadcasting of grass seeds of valuable species such as Sheda, Pawnya, Marvel etc will be carried out in suitable areas.
- (4) Trees which yield leaf fodder may also be introduced.

SECTION 9. GRAZING REGULATIONS:

5.9.1. The following grazing regulations shall be strictly adhered to:

- (1) While permitting sheep grazing, sheep shall be considered as 1 Cattle unit.
- (2) Permission for sheep grazing shall be granted after considering permissible grazing limit as per functional classification of the forests given in the Working Plan i.e. 1 Cattle unit in 0.4 ha
- (3) The grazing season will be from 15th September to 15th May.
- (4) The system of rotational grazing shall be followed. The rotation shall be three years. All the coupes of grazing series shall be closed for grazing for a period of two years after the year in which it was open for grazing.
- (5) The grazing fee shall be charged as per the rates approved by the State Government.
- (6) The grazing permission to sheeps of outside the District shall not be given.
- (7) Permission for putting up camps in the forest area shall not be granted.
- (8) Identification marks shall be put up on sheeps permitted for grazing in the forest.
- (9) The name of the person accompanying sheeps shall be registered with the concerned Beat Guard.
- (10) The Range Forest Officer shall keep control on issuing of grazing permits.
- (11) All other regulations in the Grazing Settlement Report shall be strictly followed.

SECTION 10. OTHER REGULATIONS:

5.10.1. Protection from fire: The coupes closed to grazing shall be strictly protected from fire.

CHAPTER - VI

PROTECTION WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION:

6.1.1 This Working Circle includes the area belonging to the precipitous slopes of the *Jalgaon-Jamod* Range. The Protected Forests of *Bhingara* and *Kuwardeo* is included in this Working Circle. In *Thengdi's* Plans these areas were included under Afforestation cum Improvement Working Circles. These areas were not included in *Parasnis'* Plan. The areas allotted to this Working Circle are shown as below:

Table 6.1
Table Showing Area Allotted To Protection Working Circle

Sr. No	Range.	Area of Range ha.	Area allotted to P.W.C. ha.	% area w.r.t. to Range area	% area w.r.t. to W.C. area
1	<i>Jalgaaon-Jamod</i>	16962.88	6605.43	38.94	100
	Total	16962.88	6605.43	38.94	100.00

SECTION 2. GENERAL CHARATER OF VEGETATION:

6.2.1. The site quality of the forest is generally IV. The other species found with Teak are *Dhaora*, *Salai*, *Ain*, *Lendia*, *Moin*, *Anjan*, *Palas*, etc. The crop is young to middle age.

SECTION 3. SPECIAL OBJECTS OF MANAGEMENT:

6.3.1. The forests allotted to this working circle are on precipitous slope. Hence the special objectives of the management are as given below:

1. To preserve and improve the existing growing stock in these vulnerable areas for protecting soil and conserving moisture.
2. To preserve the habitat in its undisturbed form.

SECTION 4. ANALYSIS AND VALUATION OF THE CROP:

6.4.1. Stock Maps: These areas have been stock mapped for the first time during the current Plan. The analysis of stock mapping is given in **Table No.6.2.**

Table No 6.2
Table Showing Stocking Details Site Quality Wise And Their Area

Forest Type	Site quality	Area in ha	% area w. r. t. Total W.C.
Teak	IV	642.32	11.05
Mixed	IV	3818.49	65.72
Salai	IV	210.76	3.63
Old Plantation	-	-	-
	Total	4671.57	80.40
Under stocked	-	-	-
Cultivation	-	1138.68	19.60
Blank	-	-	-
	Total	5810.25*	100

* Difference due to digitization error

6.4.2. Age and Density: - The Crop is a mixture of all age classes. The young and middle aged girth classes predominate. The crop density varies from 0.3 to 0.6.

6.4.3. Enumeration: Enumeration was carried out in *Kuwardeo* PF.19.8 ha area has been enumerated (55 plots of size 0.36 ha.) out of total 2280 ha i.e. 0.87 % areas has been enumerated. Enumeration of all species is carried out. However, PF of *Bhingara* was not enumerated. The summary of result is given in **Table No. 6.4.** The data reveal that there are total 256.58 trees/ha, out of which *Teak* constitute 120.10 trees (i.e.47 %) . Other species are *Salai* 26.36 trees /ha (10.27%), *Dhavda* 22.83 trees/ha(8.90%), *Palas* 17.02 trees/ha(6.63%), *Lendia* 14.29 trees/ha(5.57%) , *Ain* 11.62 trees/ha (4.53%), *Moin* 4.19 trees/ha (1.63%) , *Anjan* 2.93 tree/ha(1.14%) etc.

6.4.4. Analysis of growing stock: As these areas were not enumerated during revision of plan either by *Parasnis* or *Thengdi*, hence there is no data available for comparison. Analysis of enumeration data shows that out of 120.10 *Teak* trees/ha found , 111.66 trees are of girth less than 90 cm. Similarly out of total 256.58 trees/ha , 226.43 trees are of girth less than 90 cm. This shows that the crop is young to middle aged.

Table No. 6.3

Table Showing Enumeration Data of Number of Trees Per Ha in Protection WC

Period of Enumeration Oct 2005 to Dec 2005

Total area covered_ 2280 ha

Area enumerated_ 19.8 ha

Intensity of Sampling_ 0.87 %

Sr. No.	Girth Class (cm.)	Teak	Others	Total
1	15/30	42.02	41.13	83.15
2	31/45	30.25	27.98	58.23
3	46/60	15.35	17.53	32.88
4	61/75	13.99	14.04	28.03
5	76/90	10.05	14.09	24.14
6	91/105	05.96	09.80	15.76
7	106/120	01.46	05.26	06.72
8	above120	01.01	06.66	07.67
Total		120.10	136.48	256.58

SECTION 5. COMPARTMENTS AND WORKING SERIES:

6.5.1. The areas allotted to Protection Working Circle have been divided into 2 Working Series, each containing 20 coupes. **Appendix No. XXXVIII** of Volume II gives allotment of compartments to various working series. Sequence of working of coupes is given in **Appendix No. XL** of Volume II. The statement of number of compartments allotted and Working Series are given below:

Table 6.4

Table Showing Compartments Allotted To Different Working Series

Sr. No.	Working Series	No. of Comptt. allotted	Area (ha)
1	<i>Bhingara</i>	12	4325.43
2	<i>Kuwardeo</i>	6	2280.00
	Total	18	6605.43

SECTION 6. WORKING CYCLE:

6.6.1. The Working Cycle is fixed for 20 years.

SECTION 7. AGENCY FOR WORKING :

6.7.1. The coupes shall be worked departmentally. All the prescriptions will be carried out with the help of JFM Committees if they are protecting the area.

SECTION 8. **TREATMENT PROPOSED:**

6.8.1. The main object of the management is to maintain and improve the adequate vegetative cover and to preserve the soil on the slopes. Soil and Moisture Conservation works with artificial regeneration are prescribed. Collection of Non Timber Forest Produce like *mahua* flower and fruit, *char*, *bel*, *tendu*, gum, etc is permitted to the local tribes/villagers for their bonafide use.

6.8.2. The forests under this Working Circle need special treatment in the form of soil and moisture conservation works. Since the slope is steep, no CCT or DCT is stipulated. To check the soil erosion, vegetal cover of the tract is to be increased through bush sowing and dibbling of *Lendia*, *Kusum*, *Bhirra* seeds in the under stocked and blank forest areas. It shall be carried out on regular basis through the concerned *Van mazdoors*, Beat Guards.

SECTION 9. **DEMARICATION OF COUPES AND PREPARATION OF TREATMENT MAP:**

6.9.1. Demarcation: Except for 1st coupe in the sequence of working, coupes will be demarcated one year in advance of the main working as given in the chapter XII, Miscellaneous Regulations of this Plan. But 1st coupe will be demarcated in the first year of operation and working will be in the same year where as in other coupes it will be in the following year.

6.9.2. Preparation of Treatment Map: After demarcation of coupe, Range Forest Officer will inspect the area and prepare a treatment map for the same and it shall be thoroughly verified by the Assistant Conservator of Forests. The treatment maps will show the following areas.

1. Type A - Protection Areas: It will include following areas:

- (a) **A1** : The area having steep slopes i.e. more than 25°.
- (b) **A2**: 20-meter wide strip on either side of water courses.
- (c) **A3**: Eroded areas or areas liable to erosion.

- (d) The area shall be protected completely; no felling of any kind is permitted. Soil Conservation works and seed sowings shall be taken up wherever possible.

2.Type B – Under stocked Areas: The forests areas having less than 0.4 density and area 2 ha or more in extent are included in this category. No felling of any kind is permitted. Soil and Moisture Conservation works and planting of local species in suitable area shall be carried out.

3.Type C - Groups Of Young Poles: It includes patches of well grown pole crop of Teak and other miscellaneous species suitable for retention as a future crop. The patch shall not be less than 1 ha in extent. No felling of any kind is permitted. Soil and Moisture Conservation works shall be carried out.

4.Type D - Well Stocked Areas: The forest areas having more than 0.4 density are included in this category. No felling of any kind is permitted. Soil and Moisture Conservation works shall be carried out.

SECTION 10. REGENERATION:

6.10.1. Natural Regeneration: Identified NR will be rigidly protected from grazing, trampling and fire incidences, by resorting to rigid grazing control and fire protection measures applicable to current coupe of working. The order of priority for retention and protection of NR will be *Anjan, Bija, Shivan, Beheda, Moha, Biba, Kulu, Teak, Ain, Tiwas, Khair, Dhavda, Char, Aaola* and *Lendia*.

6.10.2. Artificial Regeneration: Areas, which are deficient in natural regeneration, shall be supplemented with seed sowing of native species. The choice of species will depend upon site suitability. Species like *Anjan, Ain, Lendia, Mowai, Salai, Kusum, Char, Aonla, Beheda*, etc., shall be sown. *Van mazoors* and Beat Guards shall carry out seed sowing.

SECTION 11. **OTHER REGULATIONS:**

6.11.1. Fire Protection: The prescriptions given in Miscellaneous Regulation shall be followed.

6.11.2. Grazing Control: The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6th Dec.1968 according to which the grazing incidence in Protection Forests should not **exceed one cattle unit for 4 hectare.**

6.11.3. Soil and Moisture Conservation Works: On the steep slopes, neither CCT nor DCT works be carried out to prevent soil erosion. Loose boulder structures , Gabbian structures wherever possible shall be taken up in *nalas*. On the gentle slopes, cement *bandharas* and earthen bunds shall be taken up on a large scale to provide moisture regime in the area. In addition to this contour stone bunds of the size - 60cm. x 30cm. at an interval of 50m. on the slopes shall be taken up to prevent soil erosion.. Wherever boulders are not available *agave* suckers in two rows be planted along the contours to prevent the soil erosion. The works shall be completed before the onset of Monsoon. The quantum of work will depend upon the site requirement.

6.11.4. Survey and Boundary Demarcation: These forests are un-surveyed Protected Forests and prone to encroachments. **Hence, these areas must be got surveyed on priority basis.** A special program for survey and demarcation of the area is given in **Appendix No.XLII** of Volume II.

6.11.5. Declaring area as RF: These forests were declared as Protected Forests in the year 1955.These are good forest areas, which are on precipitous slope and are required for regulation of the water regime and for maintenance of ecological balance. **Hence action shall be taken up to declare the area as Reserve Forest under section 4 of Indian Forest Act, 1927.**

CHAPTER –VII

WILDLIFE (OVERLAPPING) WORKING CIRCLE

SECTION 1.GENERAL CONSTITUTION OF THE WORKING CIRCLE:

7.1.1. National Forest Policy 1988 and National Wildlife Action Plan 2002 aims at conserving and preserving the valuable natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country. The action plan emphasizes the necessity for the restoration of degraded wildlife habitats outside the Protected Areas in the following terms **“Forest management should take special care of the needs of wildlife conservation and forest management plans should include prescriptions for this purpose. It is especially essential to provide for ‘corridor’ linking with the protected area in order to maintain genetic continuity between artificially separated sub sections of migrant wildlife”**. The Wildlife (Protection) Act 1972 also emphasizes protection of wildlife in general and rare and endangered species in particular.

7.1.2. Further the areas outside the designated Protected Areas also harbours valuable and also major wildlife populations and rare endemic and endangered flora and fauna, which are many a times valuable storehouse of biodiversity and gene pools. These areas are required to be managed with the specific focus on conservation and augmentation of the valuable wildlife resources.

7.1.3. The tract dealt with is around *Dnyanganga* Sanctuary, Lonar Sanctuary and adjoining to *Ambabarwa* Sanctuary. Most of the wild animal resides in these two Sanctuaries. In the past these forests sheltered many Tiger (*Panthera tigris*) but now they are almost extinct not only from the territory of this Division but also from the geographical boundary of the Buldhana district. Still there are 11 Leopards (*Panthera pardus*), 56 Sloth Bears (*Mecursus ursinus*) and many other important wild animals recorded in this tract. Their presence is not only essential to preserve the eco-system

and biodiversity of the area but also to maintain the hygiene of the forests. Moreover, they add beauty to the forests. As man- animal conflict is increasing day by day, there is a great threat to the wild animals. Therefore, to preserve the remaining wildlife and to ensure that they will not be wiped out as the Tiger, keeping this necessity in the mind, Wildlife (Overlapping) Working Circle is constituted.

7.1.4. The Wildlife (Overlapping) Working Circle is spread over the entire Division.

SECTION 2. GENERAL STATUS OF FLORA AND FAUNA:

7.2.1. The tract comprises of large geographical area and is adjoining to Lonar ,Dnyanganga & Ambabarwa Sanctuary. However it is not rich in wild animals due to heavy biotic disturbance. Now-a -days these forests areas are in proximity to human settlements and the forests area are also close to agricultural areas and also the approaches to these forests areas have become more convenient due to network of roads. Therefore, it is observed that the species which have less tolerance for human beings are becoming extinct or are on the verge of extinction and the species which have human tolerance are flourishing. And other general observation is that predatory species are less tolerant to human being are becoming rare resulting in the great increase in prey species like Black buck (*Antelope cervicapra*), Blue bull (*Boselephus tragocamelous*). They graze in agriculture field causing great damage to agricultural crops. Tiger population was almost constant till 1960. It was in between 20 to 29. Then the deterioration started and now they are extinct from this district. Presence of only one Leopard (*Panthera pardus*) is recorded in the territory of this Division. :

7.2.2. The wild animals noticed in the tracts are:

1) Carnivora:- Panther (*Panthera pardus*), Hyaena (*Hyaena hyaena*), Jackal (*Canis aureus*), Indian Fox, (*Vulpes bengalensis*), Jungle Cat (*Felis chaus*), Wild Dog (*Cuon alpinus*), Mongoose (*Herpestes edwardsii*) etc.

2) Herbivora:- Four Horned Antelope (*Tetracerus quadricornis*), Spotted Deer (*Axis axis*), Blue Bull (*Boselaphus tragocamelus*), Common Langur (*Presbytis entellus*), Resus Macaque (*Macaca mulatta*), Barking Deer (*Muntiacus muntjack*), Black Napped Hare (*Lepus nigricollus*), Black buck (Antelope cervicapra) etc.

3) Omnivora:- Small Indian Civet (*Veeverricula indica*), Sloth Bear (*Melursus ursinus*), Wild Boar (*Sus scrofa*), Porcupine (*Hystrix indica*) etc.

4) Aves: - Apart from the common birds, the following avi-fauna are observed: -

Changeable Hawk Eagle (*Spizaetus cirrnatus*), Purple Heron (*Ardea purpurea*), Pale Harrier (*Circus macrourus*), Grey Jungle Fowl (*Gallus sonneratii*); Rain Quail (*Conturnix coromendelica*); Spoonbill (*Platalea leucorodia*), Brahminy Shel Duck (*Tadorna ferry ginea*), White Necked Stork (*Ciconia episcopus*), Lesser Golden Blacked Wood pecker (*Dinopium bengalensis*), Pintail Duck (*Anas acuta*) etc.

Detailed list of Mammals, Reptiles, Fishes, Amphibians and Aves found in the district are given in **Appendix No. XLIII** of Volume II.

7.2.3 Existence of Wildlife in Forest : Existence of particular wild animals in a particular forest can be identified from the following observations.

- 1. By Actual Sighting:** In the early morning or evening , near water holes, grazing sites or on the roads, we can see the wild animals.
- 2. Pug Marks:** By keen observation of these pug/hoof marks we can identify the category of wild animals, theirs sex and age.
- 3. Grazing Marks :** The method of grazing of different herbivores is different. We can identify the category of herbivore by the nature of grazing and browsing.
- 4. By Excreta :** By the examination of excreta we can know the category of wild life, their numbers, way of walking and, quantity of food etc.

- 5. Antlers Marks (on the stem of tree) :** Before falling of antlers , Spotted Dears and Sambers rub their antler to some stem. In spotted deer and Samber this habit can be observed.
- 6. By Smell (odour) :** Many animals having the smell glands. In hyena these glands are found in his Anus and in case of black buck they are found below their eyes.
- 7. By Salt Licking Places:** In forest some soil contains more percentage of salt and minerals and wild animals use to lick this soil to get the necessary amount of salt.
- 8. By Sound :** In forest we can hear different types of sounds of wild animals. Some wild animals give signal of danger to other animals with the help of different sounds. for ex. Dear, Samber, monkey etc.
- 9. By Wallowing Sights :** Samber, wild boars etc like mud and they wallow in mud. By this they clean their skin and protect it from insects.
- 10. Nail Marks :** Tiger and Bear with the help of their Claws/nails scratch the bark of some trees .

7.2.4. The floral species, with their botanical names found in the tract have been listed in the Glossary of Terms of this Plan and also the description of the flora of the tract is given in the **Chapter II of part I.**

SECTION 3: INJURIES TO WILD ANIMALS

7.3.1. Poaching : In spite of stringent provisions in the wildlife and forest laws, poaching for skin, bones, pets and flesh, continues to be the most important reason for destruction of wildlife in the division. Poachers usually shoot the animals when they (wild animals) come to waterholes. Therefore the animals are particularly vulnerable during summer, when number of such water holes are drastically reduced and also water in a water hole recedes to minimum.

It has been recently noticed that a new and very dangerous method of poaching through poisoning of drinking water by mixing urea in large concentration has been innovated by the poachers. When an animal drinks such water, it dies within hours due to intense gas formation in stomach

and choking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets, snares and traps for catching birds, hares and sometimes small animals like deer has been recorded in the past but of late the poachers have been found using the improvised traps for killing the large animals like tigers and panthers very effectively and regularly.

Electrocuting the animals including Tigers by laying live electric wires on the tracks followed frequently by wild animals and by drawing electric current by high tension lines passing through the forests is another new method which is proving to be a potential threat to animals, besides sometimes being hazardous to local people.

7.3.2. Degradation of Habitat : Due various human activities the habitat of various wild animals are degrading very fast and is manifested in the form of reduced population of many animal and bird species. The main factors adversely affecting the wild habitat are :

- Heavy biotic pressures, like over grazing, encroachments on forest lands, large scale human and cattle movement in the forest areas, forest fires etc. are responsible for the general degradation of these habitats.
- Large scale diversion of Forest Land for **projects like, irrigation dams and canals** are also adversely affecting the wildlife habitat by fragmenting the forest areas and creating permanent barriers for the movement of wild animals on one hand and risk to their lives, specially for the young ones, on the other hand. The Forest department should convince the Irrigation department to construct suitable passages for wild animals at suitable regular intervals. This could have been avoided had the Dy.C.F. put the condition for these passages in the proposal of the project under Forest Conservation Act, 1980.

7.3.3. Diseases : The livestock from the villages in the forests regularly frequent the forests and share the water holes used by wild animals. Therefore various diseases common in domestic cattle, and which spread through contact and are water borne (contagious diseases) are passed from

livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (4) FMD (5) Canine distemper. FMD has a potential to wipe out large populations, while rinderpest, anthrax and rabies are highly infectious and lead to certain death.

7.3.3.1. Animal Health, Diseases and it's Symptoms : Like other animals many times wild animals are also get Sick due to contagious diseases. The reasons for their sickness are as follows :

Following factors are responsible contagious diseases.

- 1) Common grazing areas with village cattle.
- 2) By contact.
- 3) Common water holes.
- 4) By excreta.
- 5) By meat.
- 6) By communication media.
- 7) By human being.
- 8) Other factors.

Types of diseases found in Wild animals.

- 1) Bacterial disease
- 2) Viral disease.
- 3) Fungal disease.
- 4) Parasitic disease.
- 5) Protozoan disease.

From the observation of its behavior and condition of its body, we can come to know whether the wild animal is sick or healthy. The following measures are helpful for the identification of condition of wild life health.

Table No. 7.1

Table Showing Symptoms of Healthy and Unhealthy Wild Animals

Sr. No.	Particulars	Healthy	Diseased
1	Behavior	Cautious, Clever, smart, swift	Drowsy
2	Head	Up-wards	Down-wards
3	Mouth and Nose	No bleeding	Bleeding may be seen
4	Hairs on body	Bright	Rough and erected
5	Ear	Erected	Fallen (Drooping)

6	Eyes	Bright	Drowsy
7	Diet	As usual	Avoid to take diet
8	Response	Alert	No response
9	Walking	Stylish	Prefer to sit
10	Milk kas	Good in condition	Found swollen
11	Back side observation	Backside high	Backside goes inwards
12	Ribs	Not seen	Seen
13	Waist bones, Back-bones and, skeleton of stomach	Continuous, bones not seen and , seen rounded from back side	Waist bones and back bones are seen, there will be deep portion on back
14	Two bones of waist	Seen triangular from back side	waist bones do not seen as triangular.

7.3.4. Fires : Forest fires are of common occurrence these days. The fires in the interior of the forests, besides destroying the natural habitat of the forest fauna drive them to take shelter near the human habitation and make them easy targets of poacher's guns or local villager's weapons. Due to fire even the young ones of big and strong animals may perish, besides other animals, reptiles and birds, who live on ground and can not escape the fire and it's heat. In case if they survive their food, grasses, herbs and shrubs are destroyed which is already insufficient to meet the requirements of cattle as well as the wild animals. The whole tract experiences water scarcity in summer. These fires aggravate the already existing water scarcity and expose these animals to above mentioned risks. It increases the man animal conflict.

SECTION 4. SPECIAL OBJECTS OF MANAGEMENT:

7.4.1. The conservation and protection measures are required to be taken through out the forest areas. Keeping this aspect into view, the special objects of management decided are as follows:

- 1.** To provide suitable habitat and protection to the spillover population of neighboring Protected Areas.
- 2.** To provide for better habitats and breeding environment for the wildlife population occurring in the area.

3. To control the illegal trade and poaching in wildlife and their products.
4. To reduce biotic interference affecting growth of wildlife and to regulate cattle grazing in prime wildlife areas.
5. To reduce man-animal conflict.
6. To provide gainful employment to local people through encouraging eco-tourism and capacity building on knowledge about wildlife and their habitat.
7. To develop infrastructure for the development of wildlife.
8. To educate and motivate people for protection and conservation of wild animals and thereby, providing an environment of security to the wild animals.

SECTION 5. LEGAL STATUS:

7.5.1. Wildlife (Protection) Act-1972 as amended up to 2002 is applicable to entire *Maharashtra* State. Indian Forest Act-1927 also deals with wildlife. Maharashtra Wildlife (Protection) Rules-1975 is also applicable. Hunting of wild animals has been completely banned as per the amendments made to the Wildlife (Protection) Act, 1972 in the year 2002.

SECTION 6 METHODS OF TREATMENT:

7.6.1. To address the needs of wildlife in the area, following methods of treatment are recommended:

7.6.2. General:

1. Occurrence of all rare endemic and endangered wild animals as per schedules appended to Wild Life (Protection) Act 1972, like Leopards, Sloth Bears, Blackbucks, *Chousinga*, *Sambhar*, Pea fowl shall be listed Beat wise, Round wise, and Range wise and protected.
2. All waterholes (perennial, seasonal) will be listed beat wise and protected from poisoning, unauthorized camping and trespassing by outsiders. The

dates of drying of waterholes shall be recorded and if necessary, artificial supply of water be arranged.

3. Cases of wildlife particularly related to hunting of Leopards, Sloth bears etc will be dealt by the concerned officers on priority basis.

7.6.3. Protection:

1. Regular patrols and vigilance shall be carried out to prevent illegal snaring, trapping, killing and hunting of wild animals and rare plants. It will be effected through protection huts and squads of labour, mobile squads, check *nakas* and inspecting officers and with the active cooperation of the villagers.

2. Strict checking at the checking *nakas* shall be effected to check or prevent illicit transport of forest produce and wildlife.

3. The rewards to the informer with respect to wildlife offence cases are given immediately. Secret fund for the informers shall be established with the approval of the Government.

4. Specific sites, which are frequented by wild animals, will be protected from biotic interference. The waterholes, which are frequently visited by wild animals, will be excluded from grazing by making a special mention of such areas in the grazing permit. Such areas should be kept under constant vigilance and the pH of the water shall be monitored weekly. The labour camps and transit depots will be established away from the areas having high density of wild animals and waterholes.

7.6.4. Habitat Development:

1. Existing waterholes will be de-silted/ maintained / repaired after the monsoon to augment the water supply during the pinch period. Action will be taken for artificial supply of water, whenever needed.

2. Suitable sites for the development of new waterholes, percolation tanks and cement bandharas etc., should be located and developed. Efforts shall

be made for making available water, either naturally or artificially, every 5 sq. km.

3. Meadows, salt licks, dens, caves, nests used by wild animals shall be identified and given complete protection from biotic interference.

4. At the selected important places blocks of salt lick will be kept, particularly near waterholes.

5. Fruit bearing and shelter trees, which are necessary to the wildlife, will be planted on suitable sites. 1% of total planting stock may consist of species like *Ficus*, *Zizypus* etc.

6. The prescriptions given for the wild life, in the Sections for Marking Rules in various Working Circles shall be followed.

7. The detailed plan of action shall be got approved by the Chief Wild Life Warden.

7.6.5. Awareness:

1. Hoardings on the importance of wild animals and its protection will be exhibited at strategic locations.

2. Mass awareness programs shall be taken up to explain the reasons of depletion of wild animals and the ways to restore the status of wildlife in the tract to the people.

3. To highlight the necessity and importance of wildlife to the society, by using stories of *Panchatantra* through audiovisual means.

4. People should be made aware of the Acts and Rules for the protection of the wild animals.

7.6.6. Estimation of wild animal populations:

1. Estimation of wildlife will be carried out every year by using water hole count method for herbivores and omnivores and pugmark analysis method for Tigers and Leopards during first week of May.

2. Permanent line transects shall be laid out and wildlife related incidences will be recorded and monitored through these transects. One transect at least in every beat covering different habitats will be laid. These transects should be visited at least once every year and pellet counts, scat encounter rates be done on these transects.

3. These prescriptions shall be explained to the field staff and shall be followed strictly.

SECTION 7. OTHER REGULATIONS:

7.7.1. Area will be strictly and effectively fire protected.

7.7.2 Every person residing in or within 10 km of the Protected Area and possessing a firearm shall register his name with the Deputy Conservator of Forests.

7.7.3. Rotational grazing in grazing areas of every village: Available grazing land of each village will be divided into three parts and practice of Rotational grazing be practiced so as to assure seeding of grasses in the area and rewards be given to those villages who practice it. Vaccination of the village cattle will be carried to prevent the spread of diseases to wildlife. Village wise cattle census will be carried out during winter season, only those cattle will be given grazing permits. Outside cattle will not be allowed for grazing.

7.7.4. Measures to reduce the cattle number are given top priority. The person, who comes forward to reduce their unproductive cattle shall be

encouraged by giving rewards and also preference be given to him while selecting the beneficiaries of any Government scheme.

7.7.5. Provide one set of tranquilizing equipment and capture and trapping equipment to each Range within the first two years of the Plan. Identify at least 10 members from the field staff who would be trained and deputed to handle wildlife emergencies, wherever these incidents occur in the Division.

7.7.7. Prepare a database of occurrence and status of all the plants and animal species with the help of the Botanical Survey of India and the Zoological Survey of India and also with the tie-ups with *Amravati* University.

7.7.8. Centrally Sponsored Scheme “Protection of Wildlife outside Protected Area” shall be implemented in the area by sending a proposal to the Central Government. The scheme details are appended in **Appendix No. XLIV** of Volume II of this plan.

7.7.9 Standing Order (Wildlife)No. 001

The PCCF (WL) MS, Nagpur has issued a standing order (Wildlife) No.001 (**Appendix No.XLV** of Volume II). This order prescribes duties and lists measures for the protection and conservation of the wildlife outside PAs. Following are the general prescriptions, majority of which are based on the guidelines under this standing order, for the protection of wildlife in the areas out side the protected areas. The territorial staff of the Division shall scrupulously implement these prescriptions.

1. Duties of Forest Guard, Forester, RFO and ACF include-

- Keeping information of waterholes, particularly in summer and watch on the same, that is, special vigilance at all the water holes in the division is prescribed.
- Keeping a watch on the electric lines passing through forests.
- Ensuring registration of arms licenses as required under Wildlife (Protection) Act 1972.

- Cognizance of cases of injury due to wild animals as per govt. orders from time to time.
 - Keeping a track of animals like tiger particularly tigress with cubs and a watch on such vulnerable animals.
 - Proper disposal of carcass of wild animals found dead or killed.
2. Local staff shall maintain record of sensitive wildlife areas such as areas with heavy wild animal concentration.
 3. A network of information system shall be established. A cell under RFO (MS) of the division and also under DFO (Vigilance) in the office of CCF (Territorial) for handling wildlife offence cases, shall be established. There shall be regular short-term training/ workshops in anti-poaching activities and legal requirements in dealing with wildlife offence cases. Forest check posts shall be sensitized for keeping a watch on wildlife offences. Any transit of wildlife articles etc. from these check posts should be scrupulously stopped.
 4. Nature education programme in the villages adjoining forests and in schools and colleges, shall be arranged.
 5. Ecologically sensitive habitats shall be identified and protected.
 6. Antler trade is now banned, hence, no collection of shed antlers is to be allowed.
 7. The involvement of honorary wildlife warden be actively taken for nature education programme, as well as in establishing network of informers and in eliciting people's participation.
 8. It will be insured that cattle grazing in forests near the important wildlife habitats are inoculated against contagious diseases.

7.7.10. Transportation of Wild Animals : In case some wild animal is rescued, they should be safely transported to a safe place , without any delay, after giving it the first aid.

1) Precautions to Be Taken while Translocating the Wild Animals :

- Generally the transportation is done by Truck
- The schedule of program should be prepared and should be intimated to the staff concerned.

- The cage with the trapped animal should be immediately covered so that the animal can not see out side specially the human crowd and is not scared or disturbed by people while loading, transporting and unloading.
- The crate should be kept smoothly in the truck with the help of crane.
- Before transportation wild animal should be tranquilized and should be lifted with the help of stretcher.
- Health of wild animal should be examined by a veterinary doctor before and after transportation.

2) Material Required for Transportation :

- Empty crate.
- Nylon rope, heavy duty wire rope, iron mesh, crow bar.
- Drinking Water.
- Bucket, Mug.
- Tarpaulin.
- Stretcher.
- Torch, Wacky talky, Mobile.
- Phenyl.
- Other essential materials.

Transportation Crates: Following 4 types of crates are used for transportation of wild animals. The size of crates varies according to size of animal and nature of transportation.

1) Transportation Crate : Used for transportation. General size is - length-- 8 feet, Width--5.5 feet, height--4.5 to 5 feet.

2) Treatment Crate : Treatment to wild animals is given in this crates. Sometimes transportation is also done in these crates. Size is according to the requirement.

3) Bate Crate : Without tranquilisation or where tranquilisation facility is not available, wild animals can be captured and transported in such crates. General size is Length-8 feet, width 4feet, height 4feet.

4) Combined Transportation and Treatment Crates : Many times wild animals gets injured while capturing in such a cases , it is necessary to give them treatment before transportation.

3) Materials Required for Tranquilization.

Materials Required :

- Blow pipe with standard equipment
- Gas rifle model no. 50 with standard equipment. (range 70 m)
- Gas pistol model no. 35 with standard equipment. (range 50 m)
- Pneumatic blow pipe model 45 delta-special with equipment.

Medicines for Tranquilisation :

- Ketamine 100 (50 ml. x 2)
- xylazil 100 (50 ml. x 2)
- Antagozil SA (20 ml x 10)

7.7.11. Marking Reservations, Other Restrictions : The following, prescriptions have been made for implementation along with coupe operations and other treatment prescriptions, in the wildlife area-specific coupes:

- No felling of trees or harvesting of any sort shall be allowed on these sites and in 50 meter wide buffer strips around them.
- While marking of dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.
- While harvesting at least 2 down hollow logs, of low commercial value, per hectare shall be reserved for shelter of wildlife.
- Tendu collection centres or labour camps shall not be allowed near water holes frequented by the large mammals or other important wildlife species. The labour camps shall be established away from areas of high wildlife density.

7.7.12. Other Protection Measures:

- Special vigilance is prescribed at water holes during summer season because of vulnerability of wildlife to poaching. Anti-poaching intelligence network of the wildlife wing should be used and supplemented to prevent wildlife offences in the division.
- The field staff should be trained in anti-poaching activities and dealing with offence cases related to wildlife. Forest check posts

should be made sensitive to the wildlife offences to check its illicit transport.

- The areas near sensitive water holes frequented by the wildlife may be excluded from grazing, and specially mentioned in the grazing license. Inoculation of cattle grazing near sensitive wildlife habitat sites and waterholes frequented by wildlife.
- The special wildlife habitat sites shall be effectively protected from fire, grazing and other adverse influences.
- Removal of flower, fruit and other medicinal parts and harvesting of herbs shall not be allowed in ecologically sensitive areas. The NTFP harvesting should be watched and monitored to prevent loss of genetic material from the forest area.
- Any person possessing a firearm and residing within 10 kms of the forests will register his name with the Deputy Conservator of Forests.
- Joint patrolling with police on the identified wildlife sensitive routes should be taken up in all the ranges.
- There is growing trend in killing the wild animals by electrocution. Normally the farmers take electric current illegally by attaching wire to the over head line wire in the night. The animals get killed due to electric current due to tripping. MSEB officials are involved in Tiger cell meeting. Tripping prone areas identified where vigilance is increased.

SECTION 8. ECO TOURISM:

7.8.1. As mankind originated and thrived in the wilderness, the forest has always beckoned him with enchanting realms of natural treasures. Now, even though man has stepped out in the modern urbanite world, the once thought inexhaustible woods still fascinate him, not only due to its eternal entertaining beauty, but also owing to their tremendous conservation significance. Wilderness recreation has an important role to play in support of management. It can directly benefit the cause of conservation, as tourism exposes diverse categories of tourists to the process of conservation

education, which is achieved in this field. Conservation education and nature interpretation are integral to wilderness tourism. Thus the need for evolving an appropriate policy for wildlife tourism emerged at national level and beyond as an effective tool for conservation of this natural heritage.

7.8.2. The IUCN Eco-tourism Programme defines **‘Eco-tourism’** as **“Environmentally responsible travel and visitation to relatively undisturbed natural areas in order to enjoy and appreciate nature, that promotes conservation, has low visitor impact and provides for beneficially active Socio economic involvement of local population”**.

7.8.3. The eco-tourism, if controlled and regulated and keeps in tune with provisions of Act and policies on wildlife conservation, it could prove to be an effective tool for management for eliciting public support, and also, provide ample opportunities to people for nature and wildlife viewing as well as enjoyment in sustainable manner.

7.8.4. Eco-Tourism Attractions: Places of ecotourism attractions are few but they are having great potentials. Some of them are- *Dnyanganga* Sanctuary, *Ambabarwa* Sanctuary, “*Saptarushi*” (Seven sages) in *Ghatbori* Range. *Lonar* Sanctuary is only crater in basaltic rock formed by the impact of a meteor. Forests of this Division have origins of many rivers. All these places need to be given specialized attention by ensuring preservation of their originality and potential in wild life conservation as well as from eco-tourism point of view.

7.8.5. Trekking Programs: Visiting all Seven sages (*Saptarshi*) in one day in the month “*Shravan*” is of religions important trek in this Division. Trekking in *Dnyanganga* Sanctuary and in *Ambabarwa* Sanctuary can be arranged in consultation with the concerning Divisions.

7.8.6 Nature Trails: Small nature trails either guided or self-guided of 2 to 5 km length exists around *Lonar* Sanctuary area. Still there is a scope to develop these trails.

7.8.7. Visits to Other Places of Tourist Interest: There are many places of tourist importance. Some of them are listed below:

- 1) Sindkhed Raja- which is a birth place of *Jijabai*.
- 2) Mehkar- Famous for the temple of *Lord Balaji (Sharandhara)*,
- 3) Lonar- Famous for crater, temple of "*Lawanasura*",
- 4) Deulgaon Raja - famous for temple of Lord Balaji.
- 5) Shegaon- famous for temple of Gajanan Maharaj; Anand Sagar
- 6) Nandura- famous for 105 feet Lord Hanuman statue.

CHAPTER –VIII
NON-TIMBER FOREST PRODUCE
(OVERLAPPING) WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

8.1.1. This is an overlapping Working Circle covering the entire forest area of the tract dealt with.

SECTION 2: NON-TIMBER FOREST PRODUCE OF THE TRACT:

8.2.1. NON TIMBER FOREST PRODUCE (NTFP): There are numerous Non-Timber Forest Produce available in this tract and are found in almost all ranges with varying extent. These natural produce contribute revenue to the State exchequers as well as generate employment to local people during their lean season. These natural produce play an important role in the rural economy of local population and help maintain their health.

8.2.2. The important Non- Timber Forest Produce, found in this tract are *Moha* flower and seeds, *Tendu*, *Kulu* gum, *Salai* gum and *Dhaoda* gum, *lac*, *Charoli*, *Bel*, *Neem seeds*, *Karanj seeds*, *Biba*, *Sitaphal*, etc. The girth class wise distribution of number trees of NTFP species per hectare is given below:

Table No.8.1
Table Showing Species and Girth Class Wise Distribution
Of NTFP Trees / Ha In Buldhana Division

S. No	Species	No. of Comptt	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151 & up	Total Trees
1	Amaltas	57	0.72	0.45	0.19	0.04	0.01	0.00	0.00	0.00	0.00	0.00	1.42
2	Aola	17	0.04	0.03	0.03	0.02	0.03	0.01	0.01	0.00	0.00	0.00	0.17
3	Babul	28	0.16	0.06	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.25
4	Beheda	29	0.16	0.12	0.06	0.04	0.04	0.01	0.02	0.01	0.01	0.01	0.50
5	Bel	25	0.06	0.05	0.05	0.08	0.06	0.00	0.00	0.00	0.00	0.00	0.32
6	Biba	14	0.04	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.08
7	Chandan	5	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

S. No	Species	No. of Com ptt	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151 & up	Total Trees
8	Charoli	40	0.18	0.08	0.05	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.40
9	Chinch	5	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.05
10	Dhaora	86	12.32	6.05	3.21	1.83	0.97	0.32	0.10	0.03	0.01	0.00	24.78
11	Jamun	2	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.05
12	Karanji	4	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
13	Khair	40	0.30	0.46	0.39	0.11	0.04	0.01	0.00	0.00	0.00	0.00	1.31
14	Kulu	8	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04
15	Kusum	10	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.09
16	Moha	16	0.03	0.07	0.06	0.05	0.04	0.03	0.01	0.01	0.01	0.03	0.35
17	Palas	82	4.19	2.68	1.53	0.86	0.43	0.14	0.05	0.02	0.01	0.01	9.93
18	Salai	89	0.06	0.17	0.45	0.84	1.57	1.64	1.43	1.00	0.66	0.28	8.06
19	Sitafal	1	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
20	Tendu	87	3.10	1.22	0.38	0.11	0.04	0.01	0.00	0.00	0.00	0.00	4.87
21	Neem	62	0.26	0.21	0.19	0.10	0.05	0.01	0.00	0.00	0.01	0.00	0.83
	Total		21.83	11.73	6.64	4.19	3.36	2.23	1.65	1.09	0.72	0.34	53.66

8.2.3. MEDICINAL PLANTS: The tract is rich in variety of medicinal plants which are used for curing various ailments by the local people. Medicinal plants occupy an important position in the socio- cultural, spiritual and medicinal arena or local villagers. Their sustainable management and harvesting can conserve bio-diversity, sustain human and environmental health, generate employment and earn foreign exchange by promoting exports.

8.2.4. The importance of medicinal plants and their uses are now world wide felt need of humanity. Even World Health Organization (WHO) is concerned about this. These plants are not only necessary for maintaining the environmental balance and biodiversity, but also they are looked upon as the future source of medicare of humanity. As most of the resources are still to be explored and their proper uses are yet to be brought to the knowledge domain of the people at grass roots and acceptable level. But the present methods of extraction of medicinal plants in the tract are not conducive for future conservation. The methods of non-destructive harvesting are also not known to the common people.

8.2.5. For sustainable and ecological development of medicinal plants it has been realized that medicinal plants conservation in the tract need to be intensified. Field surveys and studies are required at micro level for in situ conservation. The present inventory of Forest Resources Survey Scheme (FRSS) Units is at macro level and does not give true picture. The timing of surveys of resources by FRSS is after rainy season. It is not appropriate for NTFP survey. By the time surveys are conducted most of the herbaceous plants disappear due to their life cycle. Also mere identification of species does not suffice. Survey should be exhaustive and at the appropriate time with respect to NTFP species, which are annual and have short life cycle. This needs to be done by the territorial field staff.

SECTION 3. SPECIAL OBJECTS OF MANAGEMENT:

8.3.1. As per the National Forest Policy-1988, the development of Non Timber Forest Produce is one of the basic objectives for the forest management. Consistent with the above policy, the special objectives of management are as follows:

1. To manage NTFP and medicinal plants scientifically and to utilize the existing potential optimally and thereby, to enhance the productivity of these species.
2. To take measures for conservation and sustainable use of the species identified as NTFP.
3. To generate employment for providing work to the local people and thereby improving their socio-economic conditions.
4. To provide better and improved quality of life to local population through inclusion of traditions which support and link their life styles into sustainable harvest and use of NTFP.
5. To identify and conserve the forest areas rich in NTFP and medicinal plants.

SECTION 4: OWNERSHIP AND MONOPOLY PROCUREMENT OF THE NTFP:

8.4.1 Parliament has enacted a law “The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996 (Act No.40 of 1996)”. The said Act, provides for endowing by the States, the Panchayats in the Scheduled Areas, with such powers and authority as may be necessary to enable them to function as institution of self Government. It further provided that a State Legislature should ensure inter-alia that the Panchayats at the appropriate level and the Gram Sabhas are endowed specifically with the ownership of Minor Forest Produce.

8.4.2. Government. of Maharashtra has enacted a law “Maharashtra Transfer of

Ownership of Minor Forest Produce in the Scheduled Areas Act, 1997 and has amended Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No.45 of 1997)”, vide which ownership of 33 MFP specified in the Schedule; found in the Government land has been transferred to the Panchayats. The MFP’s included in the Schedule are (1) Mahuwa flower, (2) Mahuwa fruits, (3) Gum, (4) Hirda, (5) Charoli, (6) Awala, (7) Baheda, (8) Neem seeds, (9) Karanj seeds, (10) Amaltas seeds, (11) Tamarindus indica, (12) Tamarind seeds, (13) Lac of Butea monosperma, (14) Lac of Schleicheria oleosa, (15) Seeds of Jatropha carcus, (16) Takada/Pauda Clerodendron phburidis, (17) Nirmali/Kapi, (18) Guggul, (19) Bapchi bee, (20) Kunchala kari, (21) Shikakai, (22) Reetha, (23) Biba, (24) Gunj seed, (25) Broom grass, (26) Mango seed, (27) Wawding, (28) Baphali, (29) Cut Grass and fodder, (30) Honey, (31) Sitaphal, (32) Cashew nuts (33) Mangroves.

8.4.3. Panchayats are to strictly adhere to the prescriptions contained in the Working Plan with regards to the harvest of Minor Forest Produce. In the areas not covered under the Working Plan the Panchayats are to adhere to the rules made, with regard to the harvesting of Minor Forest Produce, by the Chief Conservator of Forests of the concerned circle.

SECTION 5. AGENCIES FOR COLLECTION:

8.5.1. The Deputy Conservator of Forests shall decide the agency for collection in accordance with the applicable rules and the policies of the department. In view of the National Forest Policy directives, local village communities should have the first charge over the NTFP collection.

SECTION 6. METHODS OF TREATMENT:

8.6.1. Modifications according to legal provisions: Since legal provisions are not very explicit, it is recommended that treatments prescribed in the following paragraphs be modified according to the legal directives issued by the State Government from time to time.

8.6.2. Fire Protection measures: Collection of NTFP is often associated with forest fire, because the villagers set fire around the NTFP-yielding trees for clearance of leaf litter and undergrowth. Fires are also caused by agents of *Tendu* contractors to get better flush of *Tendu* leaves. If left unattended, such fires spread into forests as forest fires. To control and prevent forest fires, following measures shall be adopted:

1. The village *panchayats* and JFMCs shall be involved in awareness generation program to control forest fires. Villagers should be encouraged to ensure that such cleaning do not end up as forest fire.

2. In case of forest fire, legal action should be taken up against the defaulters. Strict vigilance is necessary during the months of March-April to check the spread of fires in time during *Tendu* season.

8.6.3. Training for NTFP collection: Training programs for proper NTFP collection, value addition and marketing will be organized in each round to help ensure their sustainable harvest and use. The Education Circle should prepare and oversee the training modules. Considering the potential of NTFPs, such as

Moha, Gum and Lac etc, attention shall be given for non-destructive harvesting, value addition and marketing of these NTFPs.

Table No.8.2
Table showing potential yield of NTFP in Buldhana District.

Sr No.	Name of Species	No of Trees/ha	Yield Kg/Tree
1	Moha flowers	0.13(>75 cm girth)	1.300
2	Moha seeds	0.13(>75 cm girth)	0.283
3	Dhawda gum	0.46(>90 cm girth)	0.500
4	Salai gum	5.01(>90 cm girth)	0.500
5	Palas lac	3.05(>45 cm girth)	0.200

8.6.4. Documentation of NTFP collection: The Beat Guards shall send monthly reports to the Range Forest Officer on the quantity of NTFP collected in their beats. The Range Forest Officer shall compile and send the details to the Division office. The Division office shall compile the figures for each species for the Division with a view to monitor their collection and harvest, to sustainable limits.

8.6.5. Non-destructive collection of NTFP: Unless detrimental to the wildlife conservation and site conditions, sustainable harvesting of herbs, non-destructive removal of flowers, fruit and other medicinal parts may be permitted by D.C.F. after the approval of the C.C.F. territorial concerned.

8.6.6. Compartments having promising regeneration areas of NTFP species shall be identified and tended to remove congestion in the crop.

8.6.7. Considering site suitability and local needs; NTFP species shall be given due place (10 to 15%) in various plantation schemes.

8.6.8. Except dead and specifically provided for, no NTFP trees shall be marked for felling during the coupe working under various working circles.

SECTION 7. MANAGEMENT OF TENDU:

8.7.1. Collection of *Tendu* leaves: *Tendu* is the prominent revenue generating NTFP of this tract. *Tendu* leaves are used for manufacturing *bidis*. The collection season of *Tendu* leaves is short, and is hardly a month, from the last week of April to the last week of May.

8.7.2. This tract has potential to yield 9000 Standard Bags of *Tendu* leaves, amounting to annual revenue of about Rs.75 lakhs. **Appendix No. XLVI** of Volume II gives list of *Tendu* units of the Division and its notified yield.

8.7.3. *Tendu* leaves collection is monopoly of the State Government under the Maharashtra Forest Produce (Regulation of Trade) Act, 1969. The *Tendu* leaf collection shall be carried out in the manner prescribed by the Principal Chief Conservator of Forests and the Government from time to time.

8.7.4. *Tendu* leaves collection is an income generating activity for most local villagers in the region. The local village communities shall be gainfully engaged on priority in *Tendu* collection in the Division to support their livelihood.

8.7.5. Pruning of young *Tendu* plants does help in increasing the leaf yield. However, felling of *Tendu* trees or branch lopping for leaf collection shall be prohibited and dealt with firmly.

8.7.6. *Tendu* regeneration: In view of the importance of *Tendu* to support the livelihood of forest dwelling communities and its economic value for the region, sustainable management and use of *Tendu* is prescribed.

8.7.7. Maintenance and improvement of *Tendu* in the forest crop composition is proposed by ensuring regeneration of *Tendu* and by protection.

8.7.8. Singling of shoots and soil working around *Tendu* seedlings is prescribed in the plantation and root stocked areas to promote the growth of

Tendu seedlings along with the annual coupe working in the area-specific working circles.

8.7.9. Soil Working for *Tendu* trees: Digging of 30 cm deep trench encircling *Tendu* trees of diameter matching tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse suckers come out. Singling and tending shall increase the population of this species. The practice is proposed to regenerate areas deficient in *Tendu* species in stocking.

SECTION 8. **MANAGEMENT OF MOHA:**

8.8.1. *Moha* collection: *Moha* trees are found in 16 compartments during the enumeration. The villagers in the tract have local system for allocation of collection rights of *Moha* flowers and fruits. It is advised to number the *Moha* trees and document the trees allocated to each *Moha* collector.

8.8.2. *Moha* regeneration: NR of *Moha* shall be provided by dibbling of *Moha* seeds in the plantations and by carrying out weeding and soil working along with other planted seedlings during coupe operations of area specific working circles.

8.8.3. Soil working of *Moha* trees: Digging of 30cm deep trench encircling *Moha* trees of diameter matching the tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *Moha* in stocking.

8.8.4. *Moha* is to be included in the list of species prescribed for planting in various area specific working circles.

8.8.5. Yield: The *Moha* yield data collected by the MVSS Chandrapur are given below:

i)Moha trees starts bearing flowers and fruits between 10th to 15th years of planting. A study with reference to the yield of *Moha* flowers and fruits has been conducted by the MVSS, Chandrapur in comptt.No.195 in Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girths were selected for the purpose of this study. Results obtained are given in **Table No. 8.4**.

Table No. 8.4
Table Showing Yield Of Moha Flower And Fruits

Weight in Kg.			
Sr. No.	G. B. H. in Cm	Flower	Seed
1.	076 - 090	06.00	1.20
2.	091 - 105	10.00	1.00
3.	106 - 120	11.25	2.00
4.	120- 135	13.30	2.75
3.	136 - 150	13.00	3.80
6.	151 - 175	13.00	4.00
7.	176 - 190	20.00	4.30
	Average	12.94	2.72

(Note: As year 1992 was not a good seed year, the average obtained above is on lower side)

ii) As per the tree enumeration carried out by FRSS Amravati, the number of *Moha* trees/ha having gbh > 75 cm is 0.13/trees/ha. On the basis of the study mentioned above expected yields of flower and seed come to 1.30 kg/ha and 0.283 kg/ha respectively. Estimated yield for Buldhana Division forest area is 14,200 kg and 3100 kg respectively. However, the phenological character of the species is that flowering and fruiting generally occur alternate years or twice in three years.

8.8.6. Formation of Units And Coupes: The range shall be the unit of working for the purpose of this working circle. Since operation is to be carried annually throughout the area and so the unit will be the coupe in this case. Individuals are presently doing the collection of *Moha* flowers and seeds. Normally they confine themselves around their village only to collect *Moha* flower and seeds. As per latest Amendment to *Panchayati Raj* Act, the ownership of the Minor Forest Produce in Schedule Areas is vested with *Gram Panchayat*. The collection and disposal of produce is to be carried out by the *Gram Panchayat* as decided by the concerned *Gram Sabha*. In the Non-Scheduled Areas, for large-scale operation, collection may be done

either by FLCS or any other agency under terms and conditions as decided by the Government.

8.8.9. Market: The Forest Department will facilitate in the marketing of *Moha* collected through JFMC, so that better price can be made available to the collectors.

8.8.10. Other Regulations:

- i).** Compartment wise list of *Moha* trees shall be prepared and maintained at Beat, Round and Range levels.
- ii)** One of the important reasons of forest fire is the burning of leaf litter on ground under *Moha* trees by the people to collect *Moha* flower. Therefore, before the start of flower falling, the ground under the *Moha* tree crown shall be cleaned with the cooperation of villagers and *chaukidars*. This may be treated, as one of the most important duties of the Beat Guard, failure in it and occurrence of fire shall be viewed seriously.
- iii)** The measures for enhancing the production and productivity by local means shall be explored and taken up.
- iv)** The collection and removal of seeds/fruits shall not be more than 75% of production.

SECTION 9.GUM:

8.9.1. Use And Value: *Dhawda* (*Anogeissus latifolia*) , *Salai* (*Boswellia serrata*) and *Kulu* (*Sterculia urens*) gums are the main sources of gum production in this tract. These are used in medicines, chemicals, cosmetics and food industries. *Dhawda* gum is very good for the preparation of many food items. It is mostly used in the preparation of sweets. *Salai* gum is mostly used as incense and is said to be used in the Indian medicines for rheumatism and nervous diseases. This gum is very similar to turpentine oil. Varnish and paints prepared from it have been found to be suitable. It may also be suitable in the manufacture of elastic adhesive, lacquers,

oilcloth compositions, ink and perfumery. *Kulu* gum is the costliest gum and is having export potential.

8.9.2. Regeneration of Gum Yielding Trees: NR of **gum yielding trees** such as *Kulu*, *Dhawra* and *Salai* shall be provided soil working along with other planted seedlings during coupe operations of area specific working circles.

8.9.3. Soil Working of Gum Yielding trees:

i) Digging of 30cm deep trench encircling *Kulu*, *Dhawda* and *Salai* trees of diameter matching the tree crown has been found to be useful to regenerate the species from roots; By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *Kulu*, *Dhawra* and *Salai* in stocking.

ii) *Kulu*, *Dhawra* and *Salai* is prescribed to be included in the list of species prescribed in various area specific working circles.

8.9.4. Yield: The study of actual yield of gums has not been done in this tract. The production is low. No scientific method for tapping has been used so far in this area. This is a very potential field of employment generation and revenue earning. Besides, the regulations of the collection are very important from protection of forest from the fire point of view.

8.9.5. Use Of Ethephone To Increase Exudate Gum Yield:

i) Experimental tapping of gum from *Acacia Senegal* was carried out at Central Arid Zone Research Institute (CAZRI), ICAR India and study of the properties of the gum was made. An important finding of the CAZRI Scientists has been the observation, that gum exudation from most of the trees can be increased (nearly doubled), by injecting the plant hormone Ethephone (2- Chloroethyl Phosphonic acid) into the tree.

ii) Ethephone, a plant growth regulator has been known to be a precursor of Ethylene, which accelerates the ripening of the fruits and increases ball opening in cotton plants. It was for the first time that the CAZRI Scientists have shown its effect on increasing gum yield from trees.

iii) While using Ethephone injection, it is not necessary to scar the tree trunk and exudation starts due to abscission of cellulose tissues of various sites of the tree. Increase in exudation of gum when ethephone is injected, suggests that the gum is a normal metabolic product in certain plants, which is already present as sap in gum ducts. When cellulose cells are broken due to ethephone, creating abscission of gum ducts at several points, gum ooze out at such points.

iv) It has been observed that this method causes minimum injury to the tree and exudation is not confined to a particular site (e.g. place of blazing of the stem) as in the case of conventional method of gum tapping.

v) Similar experiments shall be carried out in the field to have a fair understanding on the efficacy of Ethephone on gum yielding trees.

8.9.6. Tapping Rules: The rules for tapping, derived by the FRI, *Dehradun*, are as follows:

i) The tapping season will commence from November to end of May each year. No tree below 90 cm in girth will be tapped.

ii) Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.

iii) Only trees above 90 cm in girth at breast height will be tapped.

iv) Each tree will be tapped continuously for 3 years and will be given a rest for 3 years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.

v) The initial blaze of 20 cm wide and 30 cm in length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edge having 7.5 cm wide blade. The blaze is made 0.6 cm deep in the bark.

vi) Blaze may be made horizontally leaving approximately equal space between the blazes. The blazes should not have any loose fiber. The lower surface of the blaze should be slightly slopping outwards to avoid lodging of guggul in the blazed pocket in case initial blazing is done by edge.

vii) The *guggul* starts oozing out soon after blazes are made and may be collected initially after a month i.e. by about December when the blazes may also be freshened. Subsequent collections and freshening may be done at fortnightly up to May. Thus 12 freshenings may be required to be made during the year.

viii) In each freshening, the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm is increased on either side in width at the end of 12th freshening. This means that about 0.3 cm should be scraped off either side in width in each freshening.

ix) The lowest row of blazes will be at one meter above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 meter from the ground level. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.

x) The number of blazes to be made on each tree will depend on its girth at breast height as given below:

Table No. 8.5
No of Blazes on Each Tree

Sr. No.	Girth at breast height	Max. No. of blazes to be made on each tree
1.	0.9 m to 1.3 m	2
2.	1.3 m to 2.0 m	3
3.	2.0 m to 3 m	4
4.	Over 3 m	1 blaze for every 45 cm girth in addition to category 3 above

a) No fresh blaze will be made on the partially healed up surface or old wounds.

b) Each blaze will be in a shape of parabola with a 2.5 cm. wide base. The curved side of the parabola will be upwards and of height not more than 7.50 cm and the depth of the blaze will not exceed 0.6 cm in the wood.

c) At the end of the session, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10 cm x 12.5 cm x 0.6 cm in width, height and depth respectively.

d) Since the tapping is to be done continuously for three years the total height of the blaze at the end of three years of tapping will be 37.5 cm, the width and depth remaining the same.

e) In the second cycle i.e. in the 7th year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operation will be repeated till unblazed portion is fully covered.

f) The above measures shall be implemented in certain areas to imbibe new techniques to the gum collectors by training the people and by monitoring the progress periodically.

8.9.7. Grading: The collected gum is graded into three classes: i) White, ii) Yellowish, iii) Black coloured. White coloured gum fetches higher price in the market compared to yellowish and black gum. Yellowish gum fetches fewer prices as compared to white one. Black gum fetches the lowest price. When gum is collected it is a mixture of all the three grades. By grading the gum the trader is able to assess correctly and offers correct price. So skill for grading is provided to the people by organizing training to the gum collectors. The colour of the gum is dependent upon the climatic conditions. It is said that clear sky in the night will exude white coloured gum.

8.9.8. Formation Of Units : Range is the unit.

8.9.9. Agency: As per latest amendment to *Panchayati Raj* Act, the ownership of the Minor Forest Produces in Scheduled Areas is with *Gram Panchayat*. The collection and disposal of that is to be carried out by the *Gram Panchayat* as decided by the concerned *Gram Sabha*. Hence the collection and disposal of these Minor Forest Produces will be governed by the *Panchayat* concerned. In the Non-Scheduled Areas, for large-scale operation, collection may be done either by FLCS or other agency under terms and conditions as decided by the Government.

8.9.10. Market: The Forest Department will facilitate in the marketing of gums collected through JFMC, so that better price can be made available to the collectors.

8.9.11. Other Regulations:

- i) The compartment wise list of such trees shall be prepared and maintained at Beat, Round and Range levels.
- ii) Cleaning around the trees to facilitate gum collection and to avoid fire, shall be done.
- iii) Gum producing trees shall be reserved from felling.
- iv) A strict watch is necessary to enforce tapping rules and check unauthorized collection of gum and tapping during the period of rest.

SECTION 10.KHAIR :

8.10.1 The *Khair* (*Acacia catechu*) trees are distributed in 40 compartments of the Division. The average number of Khair trees/ ha is found to be 1.31. As this is very valuable species, its proper use is essential to increase the productivity of the area and for that taking it under the purview of scientific management is must.

8.10.2 Properties of Khair: *Khair* is known to occur on granite, gneiss, schist, quartzite, basalt, trap, limestone, conglomerate and lateritic soils. It grows best on porous alluvium composed of sand. It also occurs on black cotton soil. *Khair* is strong light demander. It is capable of growing in dry situations where almost every other species fails to survive. The tree coppices well upto moderate size and produces root suckers, particularly where the roots have been exposed. This character can be used for its propagation as has been suggested for *Tendu*. However, it requires complete light for their development. Root and shoot cutting can also be used for the method of propagation.

8.10.3. The wood is very hard and heavy. The average weight at 12 % moisture is about 1010 kg/m³ (ranging from 880 to 1170). The specific

gravity of Khair is 0.875. Growth rings are formed and are fairly distinct, demarcated by a fine, interrupted line of parenchyma occasionally accompanied by somewhat larger vessels. The timber is very hard and strong, very sturdy and moderately tough. The sap wood is not durable. The heartwood is very durable and is described by Pearson, "One of the most durable Indian Woods which is seldom, if ever attacked by white ants and fungi. "

8.10.4. Use of Khair : The *Khair* heartwood is chiefly used for the production of Katha and cutch since very long time. It is also used for all kinds of agricultural implements and is excellent for making spokes and hubs of cart wheels.

8.10.5. Khair gum is considered to be of very good quality and it is a good substitute for gum Arabic. It is advisable that the *Khair* trees should be tapped for some years to obtain gum prior to felling for katha production.

8.10.6. The *Khair* is the species mainly of degraded miscellaneous forests. The number of stems/ha and its distribution among different girth classes have been given in **Table No. 8.1**. The yield of *Khair* has not been estimated separately.

SECTION 11 MYRABOLONS :

8.11.1. Myrabolons use : These NTFP is used in many ways. *Hirda*, *Beheda* and *Aonla* are most common amongst Myrabolons. These are of high medicinal value and are used in many Ayurvedic medicines. *Hirda* and *Beheda* are given to children in villages invariably for cold, cough and stomach disorder.

8.11.2. YIELD: So far no study has been conducted to know the yield of fruits for trees of such species. *Hirda* trees are virtually absent, as can be seen from the **Table No.9.1**. *Aaola* and *Beheda* constitute roughly 0.17 and 0.50 trees/ha respectively.

8.11.3. FORMATION OF UNITS AND COUPES: The range shall be the unit. Since working is annual and covers the entire area and so unit will also be the coupe.

8.11.4. AGENCY FOR HARVESTING: As per latest amendment to *Panchayati Raj Act*, the ownership of the Minor Forest Produces in Schedule Areas is with *Gram Panchayat*. The collection and disposal of that is to be carried out by the *Gram Panchayat* as decided by the concerned *Gram Sabha*. Hence the collection and disposal of these Minor Forest Produces will be governed by the *Panchayat* concerned. In the Non-Scheduled Areas, for large-scale operation, the units shall be given on lease. The lessee will collect the same as per the direction of the Deputy C.F. concerned. The lease period should be from 1st July to 30th June. Lease shall be given for one year by calling tender at Division or Circle level. On failure of tender, departmental harvesting can be thought of, provided marketing tie up is made with user industries.

8.11.5. Market: All probable industrial consumers shall be identified and quality grades be fixed and department shall act as a facilitator between JFMC and consumer.

8.11.6. Other Regulations:

- i) The detailed list of such species shall be prepared and maintained at Beat, Round and Range levels.
- ii) These species shall be excluded from felling.
- iii) The collection and removal of seeds/fruits shall not be more than 75% of production.

SECTION 12. LAC:

8.12.1 Management of lac: 1. Lac Collection: The *lac* collection is not in practice in Buldhana Division. It has potential to add substantially to the returns of the local inhabitants. *Palas* and *Kusum* trees serve as good host for the lac insect. *Palas* is in plenty in degraded tracts of the Division. It can provide additional source of income to the local farmers and can provide employment opportunity to landless poor in the area.

8.12.2. Formation of Lac units: The units for collection of lac are prescribed to be co-terminus with the range boundaries to ensure effective monitoring and control. Each unit prescribed to be sold for the period of five years.

i) The local JFMCs and FLCS and other village bodies shall be given first opportunity of collection, failing which units may be sold on public auction.

ii) The training in collection, grading and preliminary value addition will multiply the returns of people.

iii) Obtaining brood lac and growing them on the *Kusum* trees in the first instance shall be carried out departmentally.

SECTION 13. SITAFAL :

8.13.1. Sitaphal (*Annona squamosa*) is a common species especially in Mehkar, Ghatbori and Motala ranges. Auction of Sitaphal fruits is done which gives very small amount revenue to the Division. Enumeration data shows the composition of this species is about 0.03 trees/ha. Though the revenue earned is negligible, its delicious fruits add nutrition values in the diet of local people.

SECTION 14. CHAROLI :

8.14.1. Charoli (*Buchanania lanzan*) is another fruit yielding species. Enumeration data shows its composition is 0.12 trees/ha. Trees of higher girths have vanished. Pulp of ripe fruit is edible and liked by many birds and Sloth bear. Kernel of fruits is again a very costly commodity, fetches price more than Rs.300/-Kg.

SECTION 15. BIBA :

8.15.1. Biba (*Semicarpus anacardium*) is another fruit yielding species. Kernels of Biba seed is of commercial importance and a very costly commodity. Jacking out roasted kernels of the fruits is a very tedious and skillful job. *Andh* tribes of village *Waghdeo, Nagaswadi, Tembhurkhad,*

Malegaon , Ratnapur and Chanchala collect Biba seeds in Ghatbori range as traditional work. Kernal of Biba is a costly commodity and fetches price of approximately Rs. 200/-/kg.

SECTION 16. NEEM SEEDS :

8.16.1. Neem (*Azadiracta indica*) is another important species. Enumeration data show its composition is 0.83 trees/ha. Ripe fruits and seeds are collected for the oil, which is of commercial importance and cake is used as a manure. Collection of seeds generates some employment to local people.

SECTION 17. GRASSES :

8.17.1. There are few fodder reserves in this Division which also gives a small amount of revenue. They are under immense biotic pressure causing degradation of grass lands.

SECTION 18. MEDICINAL PLANTS:

8.18.1.1. Important Medicinal Plants: The important medicinal plants found in this Division along with the parts used is listed in **Table**

No.8.6.Detailed list of medicinal Plants is given in **Appendix No. XLVII** of Volume II.

TABLE No. 8.6

Table showing list of important medicinal plants and their uses

Sr.No.	Local Name	Botanical Names	Parts used
1	Aghada	<i>Achyranthus aspera</i>	Roots and seeds are used in Aurvedic medicines
2	Adulsa	<i>Adhatoda zelanica</i>	Leaves used in cough and bronchial asthma
3	Bel	<i>Aegle marmelos</i>	Fruits are used medicines
4	Maharukh	<i>Ailanthus excelsa</i>	Leaf extract is used for washing wounds and skin eruptions
5	Shirish	<i>Albizia lebbeck</i>	Bark and seeds are used given in piles and diarrhoea
6	Piwala dhotra	<i>Argemone mexicana</i>	Yellow juice is used in dropsy and jaundice
7	-	<i>Aristolochia bracteolata</i>	Leaf -paste is used as a remedy for itche and insect bites

Sr.No.	Local Name	Botanical Names	Parts used
8	<i>Kadu neem</i>	<i>Azadirachta indica</i>	All parts of the plants are used as medicinally. Seeds yield oil which is used for various skin diseases. The leaflets twigs are used for cleaning for teeth.
9	<i>Hinganbet</i>	<i>Balanites aegyptiaca</i>	Fruits decoction is used as fish poison and as detergent.
10	-	<i>Baliospermum montanum</i>	Seeds are used as drastic purgative. The roots are cathartic.
11	<i>Salai</i>	<i>Boswellia serrata</i>	Resin is used in preparation of ointment for sores and external eruptions.
12	<i>Rui</i>	<i>Calatropis giagantea</i>	Milky latex is applied for curing tooth-ache.
13	<i>Amaltas or Bahawa</i>	<i>Cassia fistula</i>	The pulp of fruit is taken as purgative.
14	<i>Malkagni</i>	<i>Celastrus paniculata</i>	Oil extracted from the seeds is used as stimulant.
15	<i>Tilwan</i>	<i>Cleome viscosa</i>	Juice of leaves is put in to ears to cure tooth-aches.
16	<i>.Gokharu</i>	<i>Clitoria ternatea</i>	Various parts of plants are used medicinally.
17	<i>Vasan-vel</i>	<i>Cocculus hirsutus</i>	Roots are used in chronic rheumatism
18	<i>Awla</i>	<i>Emblica officinalis</i>	Fruits are the rich source of vitamin C.
19		<i>Evolvulus alsinoides</i>	Leaves are used in chronic bronchitis and asthma.
20	<i>Wad</i>	<i>Ficus benghalensis</i>	Barks, roots and leaves are used in medicines.
21	<i>Murud-sheng</i>	<i>Helicteres isora</i>	Fruits are used against cough.
22	<i>Talim khana</i>	<i>Hygrophila auriculata</i>	Seeds are used in medicine.
23	<i>Mahua</i>	<i>Madhuca longifolia</i>	Oil is good laxative, used in rheumatism and treatment of inflammation, sprains, epilepsy and digestive disorders .Fruits - aphrodisiac.
24	<i>Arani</i>	<i>Maerua oblongifolia</i>	Juice or ash of leaves is used as preventive in dysentery.
25	-	<i>Malvastrum coromandelianum</i>	Juice or ash of leaves is used externally by local people for healing wounds and bruises.
26	<i>Khaj-khuiiri</i>	<i>Mucuna pruriens</i>	Roots and seeds are medicinal.
27	<i>Chitrak</i>	<i>Plumbago zeylanica</i>	Roots are used in rheumatism ,skin diseases and diarrhea.
28	-	<i>Polygala arvensis</i>	Roots are given in fever and dizziness.
29	<i>Peru</i>	<i>Psidium guajava</i>	Leaf decoction is used to cure pain in teeth.

Sr.No.	Local Name	Botanical Names	Parts used
30	Satap	<i>Ruta graveolens</i>	Rue is narcotic and stimulant.
31	Jambhul	<i>Syzygium cumini</i>	The kernel is used in diabetes.
32	Behada	<i>Terminalia bellirica</i>	Fruits are used as tannins and in Triphala churna that is laxative powder.
33	Parpimpal	<i>Thespesia populnea</i>	The extract of bark is applied externally for skin diseases.
34	Gulvel	<i>Tinospora cordifolia</i>	Roots are used as antidote in snake bite.
35	Gokhru	<i>Tribulus terrestris</i>	Roots used as tonic.
36	Dagadipala	<i>Tridax procumbens</i>	Juice of leaves used to cure wounds and cuts.
37	-	<i>Tylophora indica</i>	Leaves are used to cure bronchial asthma, leaves are also used against cold and fever.
38	Ashwagandha	<i>Withania somnifera</i>	Roots are used in treatment of leucoderma, nervous breakdown, leaves in fever and ophthalmities.
39	-	<i>Zornia gibbosa</i>	Roots given to children to induce sleep.

8.18.1.2. The plants found in Buldhana forest and included in the Red Listed Medicinal Plants of Maharashtra (Source: FRLHT) are given in **Table No. 8.7**.

Table No. 8.7

Red Listed Medicinal Plants of Maharashtra (Source: FRLHT)

Sr. No.	Name of Species	Common name
1	<i>Aegle marmelos</i>	Bel
2	<i>Celastrus paniculatus</i>	Malkanguni/Jotishmati
3	<i>Gloriosa superba</i>	Kallavi
4	<i>Santalum album</i>	Chandan
5	<i>Terminalia arjuna</i>	Arjun

8.18.1.3. Sustainable Management Regime: A sustainable harvesting system for Non-timber forest resources is generally defined as one in which fruits, roots, leaves, nuts, latexes, other products can be harvested till perpetuity from a given forest area without any adverse impact on the species being harvested sustainable harvesting is possible with various safeguards and methods. The best is to use only mature parts, harvest only at maturity and leave 20-40% parts behind for regeneration (this may

change with further research), which may be applicable through previous information and local experiences.

8.18.1.4. Sustainable harvesting: Sustainable harvesting should take into consideration the following aspects:

1. (a) time/season of harvest (b) quantum of harvest/collection (c) technique of harvest and (d) area of harvest.
2. The local people knowledge about the yield, as well as the sound scientific basis needs to be considered while determining the sustainable harvesting limit. A user friendly and well illustrated manual of sustainable harvesting techniques of some important species should be prepared.
3. Special care should be taken for post harvest value addition (grading, processing and shelf life improvement).
4. Community adaptive management strategy, based on sound scientific silviculture and local harvesting knowledge, needs to be adopted.
5. Monitoring and revalidation of the harvesting protocol need to be done on regular basis by the forest staff.
6. There should be restriction on multiple harvesting of a particular species e.g. Salai (*Boswellia serrata*) if used for gum extraction should not be used for any other purpose like fodder etc.

8.18.1.5. Silvicultural Treatment: For development of Silvicultural Prescription of NTFPs prioritization of the species has to be done. It will be based on its commercial importance, historical potential and threat status. NTFP based sites needs to be identified on the basis of its density, viz- NTFP rich areas, moderate density and poor density pockets. Some potential sites based historical importance, may also be identified by the territorial Deputy Conservator of Forests.

8.18.1.6. In special NTFP areas additional prescriptions under the broad silvicultural systems needs to developed for sustainable development of the NTFP in consultation with ICFRE/ SFRI and other Institutes.

8.18.1.7. Silvicultural prescriptions of the NTFP should be based on the usage of the NTFP species. These prescriptions should be species and site specific. Since NTFPs are available in plenty on forest floor, special care should be taken for ground floor management like fire, grazing, which does maximum damage to the NTFP should be taken care of with great efforts.

8.18.1.8. A synergy needs to be developed between the Community management practices and silviculture techniques.

8.18.1.9. Artificial regeneration: Restocking (enrichment) of commercially important, threatened and potential NTFP species should be done by artificial regeneration through different methods. Assisted Natural regeneration should also be adopted.

8.18.1.10. Nursery and plantation techniques should be developed for selected important prioritized species by the local/regional research institutes. Care will be taken for factors like seed viability, problematic regeneration etc.

8.18.1.11. Yield Calculation: For yield calculation the survey of NTFP should be done through stratified sampling as in case of bamboo on following basis:

- I. Dense areas
- II. Medium areas
- III. Low density areas.

8.18.1.12. The perception of the people about the previous yield of the species needs to be considered while determining sustainable harvesting limit of a NTFP.

8.18.1.13. Conservation strategy – (i) In-situ Conservation: NTFP cannot be segregated for a separate treatment in a mosaic of NTFPs that is occurring in nature. Conservation through the protection and assisted natural regeneration activities of natural areas should be the main focus for the maintenance of these resources. Some of the other points are as follows:

1. Natural regeneration through renewal of degraded forests and augmentation of NTFP resources through supplemental planting should be promoted.
2. The forest department staff as well as the communities should be jointly trained and motivated through reorientation ecological and economic importance of the NTFP species to be conserved and their sustainable harvesting.
3. SFRI's should be encouraged to take up research on insitu conservation issues.
4. A checklist of all available NTFPs and list of most important commercial NTFPs in each block separately. Should be prepared and incorporated in the compartment annexures.

8.18.1.14. ii) Ex-situ Conservation :Ex-situ conservation is an important strategy for the conservation of the NTFP. The following points needs to be considered for ex-situ conservation of the NTFPs.

1. Plant Genetic Resource Management (germ plasm collection, characterization and evaluation, conservation for sustainable use) of priority species viz. RET and species having economic potential needs to be developed by the local/regional research institutes and then incorporated in the Working Plan Code.
2. Herbal garden with genetic diversity in each Forest Division for conservation and need based use needs to be developed.
3. Bamboo arboretum/Bamboo setum / orchidaria and conservation areas for other important species should be created for the conservation of the germ plasm.
4. Domestication and cultivation of NTFP species (commercially important) needs to be promoted by offering technical and material

inputs to the farmers/villagers and prescriptions to such efforts should be incorporated in the Working Plan document.

ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS

8.18.2 Methodology for studying the medical plants-Survey etc: In order to assess the potential of areas rich in medicinal plants the field surveys were conducted by FRSS of Amravati Also it conducted enumeration of 1 % of the entire tract for trees and shrubs. Enumeration of herbaceous plants and grasses could not be done as these species occur in monsoon season. It should be done by the territorial Division.

MANAGEMENT OF THE AREA:

8.18.3. Medicinal plants are mainly herbaceous, tubers, shrubs and some trees. Hence the management of medicinal plants is same as that of Non Timber Forest Produces. It is a new concept in forest management. Judicious utilization of medicinal plants need detailed studies about its occurrence, area, extent, phenology, production level and non destructive exploitation.

8.18.4 Method of Treatment : The involvement of Joint Forest Management

Committees in conservation and management of medicinal plants to augment their income should be the basis of management. Division should facilitate the training for treatment of medicinal plants their product along with marketing. Help of taxonomists of local science college or university should also be sought for identification of plants. Creation of market links and bank guarantees for sale of produce will lead to generating confidence for forest management. Methodology to be adopted should be as follows:

- I. Selection of suitable non-degraded areas where medicinal plant collections are already underway.
- II. Involvement of a competent local NGO for organizing the community.

- III. Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- IV. Joint management of forest sites by the local Forest Department and organized local communities. Assign specific forest areas to specific local village communities with clear delegation of responsibilities, privileges and full accountability. Proceeds of the harvest of medicinal plants to be shared under the JFM framework.
- V. Creation of market links for sale of produce at the outset of the programmes.
- VI. Building and strengthening community institutions for sustainable management.
- VII. Only such plants/parts of the plant specified for each species whose medicinal values are recognized should be collected e.g. fruits and seeds of *Neem* tree.
- VIII. Removal of plants or plant parts of species other than the specified ones shall be totally prohibited.
- IX. Lopping of branches to gather buds, fruits or leaves shall be totally prohibited.
- X. Fruits and seeds that have fallen to the ground alone are to be collected. May be the branches can be gently shaken to facilitate the shading of fruits and seeds.
- XI. For each medicinal plant/tree species about 10-20 % of the population shall be left as seed bearers for encouraging natural regeneration and also seed collection. These trees shall be numbered and ring marked and no collection shall be done from these seed bearers.
- XII. Species to be raised for use in Primary Health Care, trade in the RF/PF areas will be listed out category wise, well in advance to facilitate nursery operation. Information already generated on

nursery and plantation techniques for the chosen species will be used for artificial regeneration.

- XIII. Based on the outcome of the survey of the vegetation, the proportion of medicinally important species shall be increased while taking up reforestation works under eco-restoration and water augmentation programmes.
- XIV. Tending of coppice shoots/root stocks of existing trees shall be taken up and the natural regeneration shall be encouraged.
- XV. Seeds/seedlings shall be sown / planted in the barren patches and in the weeded and soil worked areas around the tree saplings. Medicinal plant species of the nature of the climbers can be planted close to the naturally existing trees and shrubs or their natural hosts.
- XVI. If contour trenching is carried out, the species mentioned in the previous Para can be raised on the mounds in the first year and in the trenches during the next year when some silt gets deposited in them.
- XVII. At convenient contour intervals, say 30 m shrubs like *Kumari (Aloe barbensis)*, *Adulsa (Adhatoda vasica)*, *Nirgudi (Vitex negundo)* and *Vetiver (Vetiveria zizanioides)* can be raised as vegetative barriers along the contour. These species can also be planted along the RF boundary. This will incidentally facilitate demarcation of the RF from the buffer zone.
- XVIII. In the swamps, along the stream banks and on the water spread areas and aprons of check dams and percolation ponds, hydrophytes like *Neerbrahmi (Bacopa monnieri)*, *Vallarari (Centella asiatica)*, *Vekhand (Acorus calamus)*, *Arathi (Alphinia calcarata)*, etc can be planted.

8.18.5 SUSTAINABLE HARVESTING OF MEDICINAL PLANTS: Information suggesting norms for sustainable levels of harvest shall be worked out by the territorial Deputy Conservator of Forests after taking into consideration the results of vegetation survey and availability of medicinal plants species and

the parts of the plant or tree used for medicinal uses. Untimely harvesting should not be permitted otherwise natural regeneration will be affected. In case where the roots/tubers/rhizomes or the specific plant parts are used in medicine, the natural regeneration of these species shall be ensured by leaving well distributed and adequate numbers of seed bearers. An alternative would be replanting the area after harvest. Destructive collection should be prohibited. In some plants whose leaves are used for medicinal purposes, it is common practice to uproot the whole plant and therefore, in such cases only the leaves should be allowed to be collected. In case of *Vetiver*, the roots alone are used in medicine. Since it is raised as a soil binder and vegetative barrier, harvesting can be taken up only when the slips establish, produce tillers and the clumps form a thick barrier. At this stage, leaving a strip of grass barrier on the uphill side tillers can be uprooted on down hill side. Similarly in case of *Cymbopogon* species, leaves are to be harvested every quarter. On no account should the clumps be allowed to set fire to, to encourage tillering and development of new and young shoots. In this case if the clumps lie scattered, the harvesting will be done only once a year and that too well after the plants flower and seed dispersal has taken place.

8.18.5.1 National Medicinal Plant Board, Department of AYUSH, Ministry of Health & Family Welfare, Government of India has published a book “Agro-techniques of Selected Medicinal Plants”. In Introduction to the said book (Vol-I); WHO guidelines for good agricultural and collection practices for medicinal plants are mentioned. These guidelines can be equally applicable in forestry. Certain basic guidelines are to be followed for harvesting of the crop, some of which are described below:

- Prune and collect only desired mature part(s), without harming the mother plants.
- Do not collect the whole population; leave at least 30-40 % for regeneration.
- Do not cut twigs/branches for collection of plant parts.
- Use proper equipments for cutting, shearing, peeling, and so on.

8.18.5.2 For collection of underground part (s), barks and whole plants, following guidelines shall be adhered to:

- Collect after the seed are shed to facilitate regeneration.
- Do least digging for collection of underground parts and leave some underground part to facilitate regeneration.
- Collect underground parts when the mother plant is fully matured.
- Do not harvest bark from immature plants; instead, collect from the branch of the main trunk.
- Strip the bark longitudinally and not from all over circumference of the trunk/ branches.
- Harvest only mature branches for stem.

8.18.5.3 For collection of leaves, flowers, fruits, seeds, floral parts, and so on, follow the following recommendations:

- Harvest only matured parts from healthy plants.
- Do not collect all material of the plant at one time.
- Do not cut branches for collection of leaves, flowers, fruits and so on.
- Leave some floral parts on the plant to facilitate natural regeneration.
- Parts like stigma, anthers, buds and so on should be collected at appropriate time.
- Harvest the seeds once the fruits are completely mature.

8.18.5.4 For collection of gums, oils, resins, and so on

- Make incision only vertically on some portion of the tree and not horizontally.
- Treat the incision after collection of desired material.
- Do not collect the gum or resin from a tree continuously and collect them in precisely right season.

8.18.5.5. The detailed Operational Guidelines for the Central Sector Scheme for Conservation, Development and Sustainable Management of Medicinal Plants can be obtained from:

National Medicinal Plants Board
Department of AYUSH
Ministry of Health & Family Welfare
Government of India
Chandralok Building, 36, Janpath
New Delhi - 110001

Tel.- 011 – 23319255, 23730652, 23319360
Fax. – 011 – 23319356
Telefax: 011 – 23315637

Website – www.nmpb.nic.in , E-mail – info-nmpb@nic.in

Important Components of the Scheme are given below:

1) Survey, Inventorisation and In-situ conservation

Objective:

Survey, inventorisation, documentation and In-situ conservation of rare, endangered and threatened species of medicinal plants in their natural habitats.

Activities :

- Undertaking state-wise rapid threat assessment of medicinal plants through an internationally accepted mechanism of CAMP (Conservation Assessment and Management Prioritization) Workshops developed by IUCN to arrive at the following –
 - Threat status of various medicinal plant species traditionally obtained from the wild.
 - Major causes of threat to the populations of threatened species, prioritization of the same and methods to mitigate the threats.
 - Action plan for conservation and sustainable utilization of threatened medicinal plant species.
- Setting up medicinal plants conservation areas (MPCAs) - It is well established that *in situ* conservation is the best, the quickest and the cheapest method of conserving the diverse genetic base of various plant species. It only requires identifying natural vegetation zones of high medicinal plant diversity (apprx. 200 hectare area in each vegetation type) and setting aside these as MPCAs (Medicinal Plant Conservation Areas). An effective MPCA network across the country would ensure that the gene pool of a vast majority of threatened medicinal plant species is inventorised, documented and conserved in their natural and evolving ecosystem.

The work would involve identification of sites of medicinal plant richness across various forest types and

The activity will also need supporting fellowships, field and administrative expenses for the teams, training of forest staff, local organizations and local communities to be carried out through an organization with expertise and experience in this field.

- State Forest Department
- State Wildlife Department
- Voluntray agencies/Non-Governmental Organisations with expertise in the field (only for technical support and capacity building).

On an average an MPCA extends over an area of 200 ha., though smaller areas of unique medicinal plants bio-diversity, like sacred grooves may also be designated as MPCAs. The MPCAs will be set up in habitats based on their criticality for a particular species, endemism and uniqueness. The detailed guidelines to operationalise this will be issued separately.

The estimated expenditure per hectare for each MPCA will be of the order of Rs. 15,000/- per hectare. For an average MPCA with 200 ha. of area including expenditure on undertaking Rapid Threat Assessment and technical support, the estimated expenditure will be Rs. 30 lakhs per MPCA.

The proposal from the State Forest/Wild Life Department will be submitted to SMPB who will thereafter place it before the State Level Screening/Evaluation Committee and recommended to NMPB alongwith its technical comments and prioritization.

Objective

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prioritized medicinal plant species. It is especially desirable in case of species where wild populations have dwindled to critical levels and viable populations for some of these species are not available for initiating *in situ* conservation action.

Availability of authentic seeds of certified quality is a major constraint in undertaking large-scale cultivation. Unlike horticultural crops, seeds of medicinal plants species have to be largely sourced from the forests. Ex-situ conservation plots/plantation of medicinal plants will create a reliable seed source and field gene banks. Besides, a number of scientific experiments on sustainable harvest of medicinal plant parts that are destructively harvested can be taken up in such plots.

Activities

Under this component, special projects will be supported for plantation /ex-situ conservation of rare, endangered and threatened species of medicinal plants which are critical to ASU systems and are otherwise difficult to regenerate in the wild.

Eligibility

The programme will be implemented through the forest departments, the Scientific Organizations and AYUSH Institutions having clear long-term mandate in the field of medicinal plants and adequate land resources for the purpose. NGOs with expertise be eligible under the scheme for capacity building, technical handholding and training.

Public Sector Undertakings/Forest Development Corporations will also be eligible provided they have the land available and technical expertise to implement the projects.

Norms for assistance

The cost norms will be as per the cost norms of the National Afforestation Programme of NAEB, Ministry of Environment & Forests. This includes a maintenance for a period of 5 years

The Public Sector Undertaking/Forest Development Corporations will be eligible for an assistance not exceeding 50% of the project cost.

Management Support

The project management consultant will be permitted to be engaged for providing support at NMPB level for activities relating to scrutiny, implementation, monitoring and technical support to the state.

Submission of Proposals

The proposal from the State Forest/Wild Life Department will be placed before the State Level Screening/Evaluation Committee and recommended to NMPB alongwith its technical comments and prioritization.

3) Support to Joint Forest Management Committees (JFMCs)/Panchayats/Van Panchayats) for value addition, warehousing and marketing

Objective

The forest dwellers and tribals living near forest have been given full rights to NTFPs. Under the Panchayats (Extension to Scheduled Areas) Act (PESA) control over NTFPs has been passed on to the Panchayats. The Ministry of Environment and Forests has a large program of forest regeneration through Joint Forest Management Committee (JFMCs). The existing regeneration program, however, focuses on production aspects only and does not support activities for creating storage, primary processing infrastructure and marketing support. Regeneration of NTFPs through JFMCs requires to be supported with processing and marketing, to enable the forest dwellers and tribals to get higher incomes for the NTFPs collected by them due to the improved quality and longer shelf life. It is proposed to identify Forest Development Agencies with JFMCs having high potential of medicinal plants and provide assistance for warehousing, value addition, quality testing of medicinal plant parts, capacity building and marketing support.

Criteria for selection of JFMCs/Van Panchayats

The criteria for identification of JFMCs will be as under: -

- (i) The size of forest area to which JFMCs/Van Panchayat has access for collection of medicinal plants.
- (ii) The species details of medicinal plants traded and quantities thereof in local/village hats/mandies and weekly markets season-wise.
- (iii) Number of people primarily involved in collection of medicinal plants and those likely to benefit under the project.
- (iv) Dependence of community on local traditional vaidyas, medicinal plants for their healthcare needs.
- (v) Details of the infrastructure of trade centres, processing units, if any present in the area.

Activities for which support to be provided

Financial support will be provided for the following activities on a projectised basis:

- (i) Primary processing which may include drying, cleaning, grading, pulverizing, powdering, billeting and packaging etc.
- (ii) Warehousing.

- (iii) Capacity building including training programmes for JFMCs members, primary collectors and frontline forestry personnel.
- (iv) Marketing support including organization of stakeholders/buyer-seller meets at Forest Development Agency (FDA) level.
- (v) Enterprise development for micro and small enterprises.
- (vi) Setting up field testing labs and traceability mechanism.
- (vii) Resource augmentation on a limited scale through medicinal plants species, in exceptional cases, if not supported under National Afforestation Programme (NAP) of Ministry of Environment & Forests or any other schemes.

Eligibility

- Joint Forest Management Committees through FDAs.
- Van Panchayats.
- Panchayats, if they regulate usage of NTFPs in the state.
- Other state co-operative/corporate body incharge of medicinal plants collection and trade.

Coverage

In all 1500 JFMCs are proposed to be covered during the 11th Plan. Although a state-wise number of JFMCs to be supported is given in the enclosed statement. However, the actual coverage in each state will depend upon the proposals received from the states.

Norms of assistance

The assistance will be provided on a project basis to the JFMCs/Van Panchayats through the Forest Development Agencies (FDA) and will be limited to a maximum of Rs. 10.00 lakhs per JFMC/Van Panchayat. The project proposal should be consolidated at the level of FDA/District and forwarded to the State Govt.

Submission of Proposals

The proposal from the State Forest/Wild Life Department will be placed before the State Level Screening/Evaluation Committee and recommended to NMPB along with its technical comments and prioritization. Any proposal merely for construction of warehouses or purchase of equipment and machinery without an institutional arrangement for the

management of the enterprise at JFMC/Panchayat level may not be entertained. The proposal should also spell out marketing linkages through MoUs between JFMCs/Panchayats/FDA and the Industry or a Marketing agency

8.18.5.6. The National Medicinal Plants Board envisages establishment of Seed Centers and nurseries for Supply of Certified Planting Material. It is proposed to establish Seed Centres with Research Wing of State Forest Department. To meet the requirement of quality planting material Model Nurseries are proposed to be established. A model nursery should on average have an area of about 4 hectares and would cost Rs 20 lacs per unit. 100 % assistance is provided by the NMPB for establishment of model nurseries by the State Govt. The model nurseries are expected to produce 2-3 lakh plants depending upon the input cost and the time required for the plant to be fit for planting. Small nurseries, covering area of about 1 hectare , which can hold 60000 to 70000 plants can also be established. Small nurseries would cost Rs. 4 lacs per unit. 100 % assistance is provided by the NMPB for establishment of small nurseries by the State Govt. The Deputy Conservator of Forest shall explore suitable sites for establishment of model nursery as well as small nurseries and submit proposal to NMPB through State Government. The Joint Forest Management Committees shall be involved and people are encouraged to cultivate medicinal plants in their fields. The cost norms and list of prioritized plants for which subsidy @ ranging from 20 % to 75 % are admissible is given in detailed guidelines issued by NMPB. These details can be obtained from NMPB's website as mentioned earlier.

SECTION 19. RESEARCH WORKS:

8.19.1. There are so many Non Timber Forest Produce and Medicinal Plants in the forest which are unidentified and untapped. The efforts of the department shall be to explore them and manage them scientifically. The work of identification of medicinal plants and its estimated production shall be taken up. The proforma for collection of data is given as under:

Table No. 8.8
Proforma for collection of data for NTFP and Medicinal Aromatic and Dye plants.

Sr. No.	Scientific Name	Local Name	Type of Plant	Part used	Area where found (ha)	Quantity /ha.	Estimated harvest /ha.	Prevalent harvesting practices (sustainable/ destructive)	Special conservation measures if required.
1	2	3	4	5	6	7	8	9	10

8.19.2. Innovation and research works shall be carried out and the same is recorded and reported properly so that it could be of use to the local population.

SECTION 20. OTHER IMPORTANT PRINCIPLES AND PROCEDURES:

8.20.1. The following are important principles and procedures:

8.20.2. The annual estimates for collection of Non Timber Forest Produce and Medicinal Plants shall be made based upon the experience.

8.20.3. The Chief Conservator of Forests shall approve the annual estimates for the collection of NTFP.

8.20.4. The Range Forest Officer for the respective range shall issue the passes for collection of NTFP to the lessees and keep record of the collection etc.

8.20.5. The Non Timber Forest Produce and Medicinal Plants lease units shall have district boundaries.

8.20.6. NTFP collection estimates shall be based upon the inventories of forest resources.

8.20.7. Scheme shall be formulated for improving yield of Non Timber Forest Produce and Medicinal Plants e.g. plantations, protection against disease etc.

8.20.8. Measures shall be taken to maintain and improve the present output of the Non Timber Forest Produce and Medicinal Plants.

CHAPTER IX

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION 1. JOINT FOREST MANAGEMENT:

9.1.1. Background of the Joint Forest Management:

The National Forest Policy 1988 envisages massive people's movement for conservation of forest resources. Thus, the government of India advised state governments in June 1990 to involve local people in protection and development of forests. Participatory management strategy envisaged in forestry sector is known as Joint Forest Management (JFM). Therefore, instructions have been issued for incorporation of prescriptions of Joint Forest Management (Overlapping) Working Circle in the working plan.

9.1.2. Government Resolution no. SLF-1091/199/F-11 dated 16th March 1992, this approach was adopted for degraded forest area of the State and new guidelines have been issued vide GR No.MSC/2000/C.No.143/F-2, dt.25.4.03.

9.1.3. Villagers themselves are required to voluntarily participate in the programme. Forest Protection Committee (FPC) is to be formed in each village. The members of the committee will help in protection and development of forests and they will receive in turn a share in the usufructs and output from the forest areas assigned to such committee. The JFM area will be managed according to the micro-plans prepared jointly by the Deputy Conservator of Forests and members of the FPC. These micro-plans shall contain the details of forest and village development. This has to be sustainable, should cater to aspirations of local communities and at the same time the silvicultural requirements of the forests are to be met properly.

9.1.4. Later, the Government of India advised the State Governments to take up the Joint Forest Management in well stocked forest areas on experimental basis and accordingly guidelines dated 25.4.03 cited above

have authorized the Forest Department in the State in this respect. Summary of guidelines is as follows:

1. Good forests within 2 km from a village are to be covered under the programme on experimental basis and stage-by-stage other villages containing good forests are to be brought under it.
2. JFM is to be implemented with the help of *Gram Panchayat* and forest produce available is to be provided on priority to meet bonafide local needs.
3. The village having non-forest land, which has agreed to participate in the programme, may be brought under the scheme.
4. Help of the institutions of local self-govt., NGO, environmental expert, if any available locally, may be solicited.
5. The scheme though does not intend to facilitate agriculture based professions but non-irrigated horticulture schemes in (private) wastelands may be encouraged, if approved in the micro-plan.
6. The program underlines conservation of forests and wildlife and therefore, any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

SECTION 2. **SPECIAL OBJECTS OF MANAGEMENT:**

9.2.1. The special objects of management are as given below :

1. To rehabilitate and regenerate the degraded forest areas.
2. To check soil erosion.
3. To protect the forests and to utilize the degraded forest areas for productive purposes in order to meet the fuel, fodder and timber requirements of the people.

SECTION 3. **THE PRINCIPLES:**

9.3.1. Following principles should be adhered to during the implementation of J.F.M. in any village.

1. Eco system Protection.
2. Participatory Democratic structure.
3. Open communication.
4. Gender Equity.
5. Community Responsibility.
6. Effective Conflict Resolution.
7. Traditional Rights and use.
8. Effective Monitoring and Advocacy

SECTION 4. **STATUS OF JFM:**

9.4.1. The JFM in Buldhana Forest Division was started in the year 1998-99 under *Maharashtra* Forestry Project. 11 Forest Protection Committee were formed, for which Micro-plans were prepared and plantation were carried out on 330 ha area. In the year 2000, plantations were done on 780 ha area in 26 villages through JFM. The Forest Protection Committee, Botha received *Vanshree* Award given by the State Government. The efforts of the then DCF Shri Mohan Jha in the field of JFM needs to be mentioned , who also received Indira Priyadarshini Award .

9.4.1.1. However, the initial success achieved in Joint Forest Management during Shri. Mohan Jha's period could not be continued. An attempt has been made to analyze the reasons for this by discussing with the past and present DyCFs and the field staff, who worked in the Division both during the initial period of success and also afterwards.

9.4.1.2. The Joint Forest Management in Buldhana can be divided in two distinct periods namely-**before year 2000** and **after year 2000**. In the initial years, there was personal involvement of the DyCF who conducted village level meetings and involved/ convinced subordinate staff as well as people regarding benefits of forest protection. Subsequently, the personal

involvement of DyCF decreased and the subordinate staff could not generate faith due to lack of communication skill and dedication.

9.4.1.3. In initial years funds were available and works as per Micro-plan were carried out. The funds received for protection of plantations were transferred to the JFM Committees. Also *shramdams* were organized in planting and weeding works and corresponding amount were transferred to Committees account. The Committees which protected the assigned forest areas from fire were given funds meant for fire protection purpose. All these generated interest of people for forest protection. Subsequently due to non availability of funds, the works proposed in Micro-plan could not be done. This led to dis-interest in JFM by the forest staff as well as the Committee members.

9.4.1.4. In initial years the plucking and marketing of *Hardwickia* leaves (*Anjan pala*) was a good source of revenue to the JFM Committees, which issued passes and also to the people who got income from selling of *Anjan pala* in *mandis*. Till the year 1999, almost 40 JFM Committees had collected upto Rs. 1.5 lakhs in their accounts. As people got immediate benefit from forests, they were involved in protection of forest. Subsequently the system of issuing *Anjan pala* passes by the Committee was stopped due to damages caused by indiscriminate lopping of trees for collection of *Anjan* leaves. The flow of money to the Forest Protection Committees from issuing of permits stopped, leading to dis-interest of Committee members. It will not be exaggeration to say that success of JFM in Buldhana was based on supply of *Anjan* leaves at concessional rates to the Committee members and revenue generated by the Committee from issuing of permits.

9.4.1.5. Actions were taken by JFM Committee against the sheep graziers. This led to conflict and there were instances of physical assault on members of JFM Committees by sheep graziers. This led to police/ court cases. As there is no legal protection to members of JFM Committees, it discouraged people from protecting forests. The JFM Committees also did not get share from compensation recovered from offenders by the Forest Department. This again discouraged people from forest protection.

9.4.1.6. Involvement of local politics also led to internal disputes and forest protection suffered.

9.4.2. A project, to be implemented by F.D.A., through JFM Committees in 26 villages (6 in Mehkar, 5 in Khamgaon, 3 in Jalgaon-Jamod and 4 each in Buldhana, Deulgaon Raja & Motala ranges) involving 10556.2 ha forest area with plantation target of 750 ha (200 ANR, 300 AR, 250 SPD) was sanctioned vide Govt. of India's authentication No.1.1.27/2003-BII dated 19.11.2004 for an outlay of Rs.114.28 Lakh. The first installment of Rs.33.86 Lakh was sanctioned by Govt. of India vide letter cited above. The second installment of Rs 30 Lakh was received vide Govt. of India's authentication dated 27-02-2006.

9.4.3. In the year 2005 plantations on 375 ha have been carried out in 13 villages under FDA. The balance 375 ha plantations could not be carried out due to non- receipt of subsequent fund from GoI. The achievements are as given in the **Table No 9.1.**

Table No. 9.1
Table showing achievement under FDA (Phase I)

ACHIVEMENT												
ANR		AR		SPD		Sub Total		SMC	Fencing, & Micro Pla. Monitoring	EPA & Awareness	Over Head	G. Total
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin					
100	6.91	150	21.66	125	8.62	375	37.19	5.05	1.87	11.64	3.80	59.55

9.4.4 Another project to be implemented by FDA through JFM Committees in 25 villages(8 in Buldhana,9 in Ghatbori, 2 in Khamgaon , 5 in Jalgaon – Jamod & 1 in Mehkar ranges) involving 9071.84 ha forest area has been sanctioned by Government of India under National Afforestation Programme vide authentication No. CSS/NPAC/ (FDA) 438/2007-08 dated 13.03.2008 for afforestation on 325 ha (75ha. ANR + 250 ha. AR) at the cost of Rs. 40.34 lakh and released Rs. 28.00 lakh as maintenance cost of 10th Five Year Plan Activity and for advance work during 2007-08.

Table No. 9.2
Table showing activities under FDA (Phase II)

COMPONENTS				Sub Total		SMC	Fencing	EPA	Awar, & Micro Pln.	Over head	Total	Maintenanc e of plantation raised during 10 th plan	Grand Total
ANR		AR											
Phy.	Fin.	Phy.	Fin.	Phy.	Fin.								
75	3.04	250	14.58	325	17.62	2.64	0.88	3.25	0.53	1.76	27.04	13.30	40.34

9.4.5. In 2007, JFM programme was implemented in 6 villages and 180 ha area was planted through state funds. So far, 1665 ha area has been planted through JFMCs.

9.4.6. As of now there are 230 FPCs in the Division. Out of 230 JFM Committees so far formed, 207 JFMCs are registered with Forest Department. MoUs have been signed 171 JFMCs . Approximately 33254.37 ha forest area has been earmarked for management through JFM committees. The details of JFM villages with compartment numbers and area assigned is given in **Appendix No. XLVIII** of Volume II.

9.4.7. JFM envisages involvement of people in the Protection, Regeneration and Rehabilitation of degraded forests. However, involvement of people in the management of forest is poor.

SECTION 5. POTENTIAL AREAS FOR THE JFM PROGRAM:

9.5.1. The forest areas closer to the villages are included in this programme. It includes degraded as well as good forest areas. However, some of the villages could not be assigned any forest area as there is no forest area in the village .Some villages are reluctant to implement JFM programme whereas some villages are included in the Sanctuary and some villages do not exist. Hence, a fresh review must be taken and focus be concentrated on the JFM committees which are really involved in protection work.

SECTION 6. **TREATMENT PRESCRIBED:**

9.6.1. Based on the nature of work in the various Working Circles and local requirements, role of a JFMC will have to be identified and defined in the micro-plan. While doing that, following points may be taken into consideration:

9.6.2. While formulating micro-plans, silvicultural management, maintenance of forest boundary, and control over illicit cutting should receive high priority and it should be ensured that the Micro Plan prescription do not violate the silvicultural prescriptions of Working Plans, especially those related to sustainable forest management and regulation of yield of major forest produce. Approval of JFM Micro-plans from Ministry of Environment and Forests is not necessary as they are covered by the macro-level prescriptions of Working Plan of the Division. Any deviation from macro-level prescription will require prior approval of the Regional CCF. All the micro plans, which are being implemented, shall have to be amended in accordance with the prescriptions of present Working plan as per directions of GoI.

9.6.3. The micro-plans should be prepared in such a manner so as to ensure meaningful participation of all the stakeholders including disadvantaged groups like women, Scheduled Tribes, Scheduled Castes and locally backward groups.

9.6.4. Participatory methods, that is, PRA shall be used to adequately assess the needs and aspirations of the people. The FPCs should be used to address the concerns and apprehensions of all the groups.

9.6.5. The Forest Department should play only co-ordinating and catalytic role for the village development works recommended in the micro-plans and should also involve other government agencies and Non-Government Organizations for efficient and effective execution of these works. The FPC should execute actual works.

9.6.6. Material removed from the annual coupes from these working circles may be considered for its diversion to meet the bonafide local needs. The local needs may be identified and quantified on the basis of what has been allowed in the nistar patrak of the villages.

CHAPTER X
FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

SECTION 1. FOREST PROTECTION:

10.1.1 The National Working Plan Code prescribes Forest Protection (Overlapping) Working Circle as one of mandatory Working Circles in the Working Plan. The forests of *Buldhana* Division are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated incorporation of this Working Circle. Illicit felling, grazing, encroachments, poaching and fires are the major causes for the damage of the forests.

SECTION 2. ILLICIT FELLING:

10.2.1.. Illicit cutting of trees for fuel and timber is the main source of injury to the crop. Last five year's record shows illicit cutting of Teak and other miscellaneous species for timber and poles is observed in forests of villages in Jalgaon Jamod range which is adjoining to Madhya Pradesh. Many cases of illicit fellings have been observed in the village of Ghatbori range.

At present there is no wireless network in the Division. The territorial Division has 2 mobile squads apart from the territorial staff for protection purpose.

The Division has only 6 vehicles available for protection; 1 -Tata Victa used by DCF; 1- Tata Sumo used by ACF , Khamgaon ;1 -Mahindra Bolero and 1 -Maruti Gypsy used by RFO, MS Buldhana and Khamgaon respectively; 1- Mahindra Jeep used by RFO, Jalgaon Jamod and 1- mini Truck used by RFO Buldhana. Other ACFs and RFOs do not have vehicles.

There are 6 Forest Check Posts in Buldhana Division-namely at – Dongaon and Deulgaon Sakharsha in Ghatbori Range, Warwand in Buldhana Range, Khamgaon in Khamgaon Range, Malkapur in Motala Range and Deulgaaon Raja in Deulgaon Raja Range .

The Buldhana Division consists of 96 beats out of which 67 are Normal, 21 are Sensitive and 8 are Hyper Sensitive.

10.2.2. Faster communication including vehicle facilities, adequate defence capabilities, frequent training and establishment of forest stations at strategic places are recommended to control illicit felling and wildlife offences. Establishing intelligence network for this purpose is strongly recommended. In addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should be taken up like efficient wood utilization and energy efficient alternatives like Community Kitchens of Hindustan Petroleum, Biogas, solar cookers, etc. The following general Strategies are prescribed for the effective protection of the forest.

10.2.3. Review the offence cases beat wise, every month.

10.2.4. Review the *varas*, *bevaras* offence cases monthly; efforts are made to find out the offenders in each *bevaras* case.

10.2.5. Every *varas* case having more than Rs.10,000/- worth forest produce/loss to the forest invariably is submitted to the court within the prescribed time.

10.2.6. Delay in the submission of charge sheets in the courts is viewed seriously.

10.3.7. Use IPC provisions, for the effective control of the illicit felling.

10.2.8. The data related to offence cases shall be analyzed with the help of the computers using the available software.

10.2.9. Monitor the occurrence of all the offence cases daily through wireless.

10.2.10. Reorganize the beats in such a way so that the average beat area shall be 500 ha.

10.2.11. Identify and list all the paths used for the transportation of illicit material.

10.2.12. Place effective patrolling squads at all-important routes to prevent the transportation of illicit material.

10.2.13. Emphasis shall be made to arrest and prosecute the offenders rather than seizing the material.

10.2.14. Use the provisions of rewards for gathering of information.

10.2.15. Provide regular training to the staff in submitting the charge sheets, preparation of *panchanamas* etc.

10.2.16. Plan in such a way to have young guards in the hyper sensitive areas.

10.2.17. Patrolling squads shall be not less than 10 in number to over come the group of offenders.

10.2.18. History sheets of all the offenders along with their photo and bio-data are maintained at Round Level, Range and Division Level.

10.2.19. Prepare list of offenders, showing the offence cases registered against each offender.

10.2.20. Use Cr. P. C. 110 provisions with respect to habitual offenders.

10.2.21. Provisions of IPC 395 shall be used by registering the complaint in the police station for the offences wherein five or more than five offenders are involved. The DCF shall co-ordinate with the S.P. to see that stringent sections of IPC will be used in the F.I.R.

10.2.22. The provisions of the G.R. dated 8/5/2003 shall be implemented. If any difficulties are there be communicated to the Govt. with supporting data.

10.2.23. Sufficient funds for patrolling and honorarium of advocates be made available on top priority.

10.2.24. Efforts are made to appoint the forest counsel as directed by PCCF office.

10.2.25. Every stump in the forest be numbered with digit nail set both on the top of the stump as well as on the base.

10.2.26. Every beat guard shall maintain a register of stumps in the following Performa. Every stump is registered by a serial number followed by/ and year, for example, if tree number is 198/05. Here 198- is tree no. and 05- is year.

10.2.27. Every year from January 1, onwards start the new series.

10.2.28. After one year all the high stumps be dressed to ground level to obtain good coppice.

10.2.29. The supervisory officers, during the beat inspection, verify the registered stumps and unregistered stumps. The beat guard shall be held responsible for non-registering the illicit stumps.

10.2.30. Every Range and Division office shall maintain the Xerox copies of the judgments of all forest cases for the guidance and improvement purposes.

10.2.31. Sections of IPC having the trial jurisdiction of District Court be used in the complaints and in the FIR

10.2.32. Court Guard duties be assigned to a special duty guard for each Range office and as well as Division office to monitor the dates and for timely communication to the witnesses.

10.2.33. Proposals for the wireless network shall be prepared in such a way that every part of the division area becomes communicable.

10.2.34. Inter state co-ordination meetings with the authorities of M.P. Govt. shall be made, to arrest and prosecute the offenders of M.P who are involved in the offences of Maharashtra state.

10.2.35. Obtain the support of the local villagers in catching the offenders (JFM Committees)

10.2.36. The RFO shall collect the beat *khairiyat* report from each forest guard and Round officer monthly and shall submit Range *khairiyat* report to the DCF every month.

10.2.37. All cases of violation of the Forest Conservation Act, 1980 shall be referred to the regional CCF, Bhopal through Nodal Officer for prosecution purposes with respect to the government officers involved in the cases.

SECTION 3. **FIRE PROTECTION:**

10.3.1. Fire adversely affects natural regeneration, forest growth, ground Flora, soil organisms and site productivity. Effective fire control as prescribed in the plan is essential for the forest development. The division officials and local people shall be sensitized about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

10.3.2. Fires are of common occurrence. With a long standing fire protection measures and vigilance of the staff, the forests, in general, have been protected against fires in spite of the handicaps.

Classification of fire control Areas:

10.3.3. Class-I (Complete Fire Protection): The Class-I fire control areas include all felling coupes (six years) of SCI Working Circle, Improvement Working Circle, Protection Working Circle, Fuelwood Working Circle , thinning coupes (six years), plantations (five year), the A-type areas (permanent), forest depots (permanent), forest nurseries (permanent), Special habitat areas (permanent) and any other areas of special importance decided as such by the CCF (T).

10.3.4. Class-II (General Fire Protection): The Class-II fire control areas include the remaining areas of the Selection-Cum-Improvement and the Improvement Working Circle, Protection Working Circle, Fuelwood Working Circle as well as any other areas, which deserve the protection in the opinion of the CCF (T).

10.3.5. Class-III (General vigilance): The remaining forest areas of Pasture Working Circle (that is, areas not included in the above two classes) are identified as the Class-III fire control areas. Special measures for the fire protection are not undertaken, but deliberate setting of fire and burning the forest is prohibited.

Fire control measures:

10.3.6. A fire protection scheme for the entire division which would be consistent with the instructions given in this working Plan shall be prepared before November each year, identifying the watch points (including watch towers), strategic locations, and strength of firewatchers at each location, deployment of vehicles, use of wireless sets, supervisory forest staff and the co-ordination protocol. **Appendix No. XLIX** of Volume II gives tentative Fire Protection scheme for Buldhana Division.

10.3.7. Each location is proposed to have 5 to 10 persons including regular staff and firewatchers. The staff shall be trained in the application of modern fire-fighting tools. The fire prevention shall be taken as a high priority item. The scheme shall be implemented sincerely during the fire season.

10.3.8. Areas deliberately burnt for silvicultural reasons under the sanction of the Chief Conservator of Forests (T) shall be excluded from the fire

protection scheme. Fire in such areas need not be reported unless spreads beyond such area.

10.3.9. All the Class-I and Class-II areas will have external fire lines and internal fire lines dividing the forest area into convenient blocks.

10.3.10. Fire Watchers and local forest staff shall constantly patrol the Class-I and Class-II fire control areas. The directives require that fire in the Class-I areas be reported to the Deputy Conservator of Forests immediately along with details of the area burnt and the damage inflicted to the forest crop.

10.3.11. The group of firewatchers shall immediately rush to the site and extinguish fire as soon as the fire spot is located by upcoming smoke in their area of operation. Modern fire fighting tools shall be used for extinguishing the fire. The supervising officials should mobilize reinforcement in case of large fire. Utmost care will be taken to quench the smouldering material. Providing a thick layer of soil over such material is generally effective.

10.3.12. The fire lines shall be kept clear of all growth and combustible material during the season. Leaf litter and other dry material on the fire lines shall be collected periodically along the edge and burnt before the fire season starts. Firewatchers engaged for this purpose will have a duty to sweep the fire lines continuously and keep them clean of any debris or leaf litter. Depending upon the watchmen and other manpower available in the area, suitable blocks may be identified around which regular clearing of the fire lines should be ensured.

10.3.13. The cutting of fire lines shall be completed by December. Fire tracing (burning) shall be completed by February 15, and thereafter burning should require permission of the Deputy Conservator of Forests and physical presence of a gazetted officer.

10.3.14. The division office shall maintain a "Register of fire lines" showing the length and width of fire lines, and enter the period of cutting and burning of fire lines. The register will be kept up to date and checked every

year, in March. In addition, a map showing the length and width of fire lines division wise and range wise as far as possible shall be prepared in the beginning of the fire season and the same shall be used to depict the areas burnt every fortnight.

10.3.15. Negligence in the fire protection shall be taken as dereliction of duty. The supervisory officers shall extensively verify fire control measures.

10.3.16. Efforts will be made to motivate the JFM committees to protect the forest from fire by assigning them certain areas of forest, in case they agree and sincerely protect the assigned forest from fire, the grants earmarked for protecting that area should be given to JFM committees after verifying the area protected.

10.3.17. It was observed that the existing fire lines are not maintained in their prescribed width for its full length. Hence their efficacy could not be assessed in the absence of clearly laid fire lines. The committee formed by PCCF, based on its report, shall examine the scheme submitted by CCF (T); the PCCF shall take decision for further implementation of the scheme, if any.

10.3.18. Three rows of agave suckers in 1.5 m. wide strip along the contours shall be planted during the monsoon season at the foothills of steep slopes to prevent the spread of fire, as agave acts as a fire barrier. This activity shall be carried out along with regular coupe work.

10.3.19. Standard widths of fire lines are prescribed in the **Table 10.1.**

Table 10.1
Table Showing Standard Widths of Various Types Of Fire Lines:

S. No.	Characteristics of the area	Width of fire line in meters
1	External boundaries of the forest	12
2	Naturally or artificially regenerated areas (For 5 years) (coupes)	6
3	Remaining coupe boundary	3
4	Both sides of road and cart tracks through the forests	6
5	Timber, bamboo and firewood depots	40

Daily monitoring of fire incidences and the areas burnt and the efforts taken by the staff to control the fire shall be monitored through wireless on day-to-

day basis by D.C.F. and D.F.O. vigilance under the supervision of CCF Territorial.

SECTION 4. **GRAZING REGULATIONS**

10.4.1. The entire forests are liable to damage from grazing. The 'C' class forest is heavily grazed and is now earmarked for sheep grazing. In fact, there is hardly any grass left in this block.

10.4.2. The forests are heavily grazed during the few months of rainy season after which most of the cattle are shifted to lower ranges on account of the shortage of grass and water on the plateau.

10.4.3. The grazing incidence figures are misleading as village cattle are grazed in the immediate vicinity of the villages. The true grazing incidence in the areas adjoining the villages is therefore, heavier than estimated.

10.4.4. During this hot weather grazing after the depletion of grasses, grazers start lopping green foliage, especially of *Anjan* (Hardwickia binata). The lopping and hacking of trees has led to degeneration of the forests. The seedlings are grazed and saplings of these fodder tree species have been hacked to provide fodder to the cattle. Continuous and heavy grazing not only prevents regeneration of tree species but also the young regeneration obtained during the period of closure, is lost soon after the area is opened for grazing. In areas with clayey soil, the trampling by cattle results in hardening of soil and reduction in the soil aeration. In sandy soils, heavy grazing results in accelerated erosion and denudation. The grazing on undulating lands loosens the soil, which results in the soil erosion.

10.4.5. It is not uncommon to see goats grazing in timber forests. The goat grazing is prohibited because of their close level grazing in which the seedling or grass rhizome is uprooted.

10.4.6. The grazing shall be regulated as per guidelines of Grazing Policy 1968 of Maharashtra State issued vide Resolution No. MFP-1365/132211-Y

dated December 6, 1968 and Grazing Rules issued vide No. MFP-1371/237035-Z dated November 3, 1973. However no grazing beyond carrying capacity shall be permitted.

10.4.7. Heavy cattle pressure adversely affects the forest regeneration and soil condition. The present political economy of domestic animals in the area throws up strong challenge, and implementation of the grazing regulations in its current form. Therefore special efforts need to be taken up to ensure that no grazing is allowed beyond carrying capacity.

10.4.8. The situation may be substantially improved by establishing effective communication with the local people, awareness generation and efficient animal husbandry program. The forest officers should take up these preventive measures in co-ordination with the Animal Husbandry Officers.

10.4.9. Maximum admissible grazing incidence according to the current policy has been shown for various working circles in **Table 10.2**. A systematic survey of fodder availability is recommended during the plan period in each round.

10.4.10. The carrying capacity and period of closure should be calculated for the forest area adjoining each village. The grazing passes, free or otherwise to individual families are proposed to be distributed on the calculated carrying capacity basis. Village bodies should also be actively engaged in the implementation of grazing regulations.

10.4.11. The surplus cattle should be kept under regular watch, and villagers should be encouraged to adopt stall-feeding or other means to address mismatch between cattle-heads and fodder availability.

Table No 10.2.
Table Showing Admissible Grazing Incidence In Various Working Circles:

Working Circle	Functional classification	Maximum grazing incidence (ha per cattle unit)	Period
Special areas(overlapping)			
Protection areas (A1 & A2) & Special habitat areas	Protection forest	Nil	Permanent
Flowered bamboo area	Protection forest	Nil	Till seventh year
Annual coupes	Protection forest	Nil	Till six years
Plantations	Protection forest	Nil	Till fifth year
Other area (under Working Circles)			
Protection	Protection forest	4.0	
Selection-cum-Improvement	Tree forest	1.2	
Improvement	Minor forest	0.8	
Fuelwood	Minor forest	0.8	
Pasture	Pasture land	0.4	

Note: Area required for wildlife population should be calculated accordingly, and deducted from the available area for the domestic cattle. If relevant data is not available 20% area should be marked for the wildlife.

10.4.12. Fodder development on the community lands and translocation of surplus cattle may be encouraged.

10.4.13. Animal husbandry and Dairy Development Agencies should be motivated and influenced to take up breed improvement program. Fodder in the plantation areas should be made available free of cost on cut-and-carry basis.

10.4.14. The DCF shall carry out cattle census of each village during the winter season at the beginning of the plan period to find out the local cattle once for all and maintain record and passes shall be issued limited to those cattle subject to the availability of carrying capacity.

10.4.15. The passes shall show the compartment numbers meant for the grazing by writing clearly.

10.4.16. Hacking and felling of young plants and big trees be dealt seriously and offenders shall be prosecuted.

10.4.17. The misuse of transit passes of cattle for grazing be strictly checked and if found their passes be cancelled and be dealt according to law.

10.4.18. The maximum carrying capacity for grazing of cattle (other than sheep) in Buldhana Division has been worked out as per the functional classification of forests. The working circle wise maximum carrying capacity is given in Table No. 10.3.

Table No.10.3
Table showing maximum carrying capacity of Buldhana Division

Working Circle	Area in ha	Area in ha/ cattle unit	Maximum carrying capacity
Protection	6605.43	4.0	1650
Selection cum Improvement	7884.05	1.2	6570
Improvement	38362.54	0.8	47950
Fuel wood	1245.73	0.8	1560
Total			57730

It may be noted that the above figure is the maximum carrying capacity. However, this will be further reduced due to closure of working coupes from time to time as prescribed in the Plan.

10.4.19. The maximum carrying capacity of the forests is 57730 cattle units. The details are given in **Appendix No. LXI** of Volume II. The cattle population (except goat and sheep) of Buldhana District is approx. 6.50 lakh. Hence it requires some urgent measures to reduce the cattle number to save the regeneration of the forests.

10.4.20 Buldhana District has approximately 94000 sheep as per 2003 Census Report. The State Government vide GR No. MFP-2103/CR 135 /F-1 dated 21.3.2005 appointed ACF Shri Rajendra Dhongde as Grazing Settlement Officer for deciding availability of forest area for sheep grazing. The Grazing Settlement Officer proposed 29896.79 ha C class RF area for sheep grazing. These areas are divided in 10 grazing units (S-1 to S-10) and 3 years rotational grazing has been proposed with one year open period and two year closed period. The Grazing Settlement Report has been accepted and sanctioned by the State government vide GR No. MFP-2103/CR 135 /F-1 dated 29.10.2007 and 6.5.2008 subject to following conditions:

- (1) The grazing settlement Report shall be in accordance with Bombay Forest Manual Volume III, Government Resolution dated 6.12.1968 and Working Plan of the concerned Division.
- (2) The carrying capacity shall be worked out as per functional classification of forests into Protection Forest, Tree Forest, Minor Forest and Pasture Land.
- (3) While permitting sheep grazing, sheep shall be considered as 1 Cattle unit and as per Bombay Forest Manual Volume III grazing shall be permitted from 15th September to 15th May.

The permissible carrying capacity, for sheep grazing, as per functional classification of the forests given in the Working Plan (i.e. 1 Cattle unit in 0.4 ha) works out to 24720 cattle unit. The details are given in **Appendix No. LXI** of Volume II.

SECTION 5. **FOREST ENCROACHMENT:**

10.5.1. The problem of encroachment on forest land exists since 1970s. In recent past tendency for encroaching forestland for cultivation has increased. The actual encroached area is higher than the recorded one. The eligible encroachers' encroachment is yet to be finalized at the time of the preparation of the plan. The area under dispute is not clearly demarcated.

10.5.2. The encroachment problem is more prevalent in the *Jalgaon-Jamod* Range and some part of *Motala* Range and mostly made for agricultural purposes. The eviction operations led to animosity between the villagers and foresters.

10.5.3. The causes of forest encroachment shall be examined thoroughly and addressed in a comprehensive manner. All the necessary support should be provided. And encroachment should be evicted as early as feasible. The boundary management and standard administrative guidelines will help to control encroachment.

10.5.4. The state government should be urged to finalize and complete the land grant in all identified cases of encroachments to be regularized in accordance with the government resolutions issued before 1980. Renewed

and concentrated efforts on the part of division staff for eviction of the encroachment is proposed on priority basis.

10.5.5. Small isolated patches of the forestland are often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.

10.5.6. The civil powers of eviction are entrusted with ACF and DCF vide Govt. Res. No. R and F.D/PWR/1196/296/CR.No.17/LII, dated 30-1-97. The procedures laid out in the Land Revenue Code shall be followed before the execution of eviction.

10.5.7. Habitual encroachers shall be prosecuted as per Indian Forest Act.

10.5.8. All external boundaries shall be demarcated with concrete pillars.

10.5.9. All sensitive and important boundaries and wherever disputes are there, be surveyed with DILR and concrete pillars be laid immediately.

10.5.10. All encroachments be listed with their names, age, residence, profession whether belongs to SC, ST, OBC/NT, extent of encroachment, S. No. and location of encroachment, village/block.

10.5.11. A Detailed report of the case be prepared for each encroacher and be submitted to ACF to obtain summary eviction orders, in a time bound program. This is subject to provisions of The Scheduled Tribes and Other Traditional Forests Dwellers (Recognitions of Forests Rights) Act, 2006 and the Rules made there under.

10.5.12. After the completion of due procedure of Land Revenue code and after giving a reasonable opportunity of being heard to the encroacher, the ACF shall pass a summary eviction order if he satisfies so, quoting the findings.

10.5.13. The concerned RFO shall execute the eviction order.

10.5.14. If the encroachments in a village are more in number police protection be obtained for the operation.

10.5.15. Use of Cr. P. C. provisions like section 106 and 110 be used to obtain good character of offenders before *Tahsildar* and SDO respectively to smoothen the eviction operations as well as to prevent the tendency of future encroachments.

10.5.16. For the encroachments on the un-classed forests (though 7/12 shows clear possession of the departments) FIR shall be lodged in the concerned police station for the prosecution.

10.5.17. Regularization of the encroachments made earlier to 1980 be settled as early as possible and proposals to that extent be submitted to the Central Govt.

10.5.18. After the listing of all encroachments, sample verification shall be carried out by all supervisory officers to detect unregistered encroachments.

10.5.19. In the month of May, a drive for encroachment prevention be taken up in all the sensitive areas by taking meetings in the villages by *Dawandi* and distribution of leaflets and posters.

10.5.20. Keep a watch on all the sites meant for debris cleaning, ploughing etc., in the month of May, so that encroachments are removed even before the sowings.

10.5.21. A total of 857.120 ha of encroachment have been registered by the *Buldhana* Division, of which encroachments made earlier to 1978 are 556.440 ha. The encroachments made after 1978 is 300.680 ha. The Govt. of *Maharashtra* decided to regularize the encroachments made earlier to 1978 after scrutinizing the eligibility. The detailed list of encroachers is given in the **Appendix No. XIII** of Volume II.

10.5.22. Action as per The Scheduled Tribes and Other Traditional Forests Dwellers (Recognitions of Forests Rights) Act, 2006 and the Rules made there under must be taken.

SECTION 6. **POACHING:**

10.6.1. The issues related with poaching have been dealt in detail under Chapter on Wildlife (overlapping) Working Circle.

SECTION 7 **MINING**

10.7.1. The Agates, cornelians and calcite (double refracting spar) found in the trap in the southern part of the district, have some possible value, the two first named for ornamental purpose and the last for optical purpose. The potential locality of agate stone of carlenian variety are Undri, Amdapur, Dhasala villages of Chikhali Tahsil. Though damage due to mining is not reported, **care shall be taken to ensure that no illegal mining of agate stones from forest area takes place.**

CHAPTER XI

FINANCIAL IMPLICATIONS

SECTION 1. COST OF THE PLAN:

11.1.1. The cost of preparing this plan is worked out by summing the expenditure incurred for the year 2008-09 and 2009-10(up to Sept 09) that amounts to 116 *Lakhs*, including the cost of stock mapping and enumeration works carried out by SOFR unit, *Amravati*. The cost of plan per hectare worked out is about 138 rupees, only.

SECTION 2. COST-BENEFIT ANALYSIS:

11.2.1. Intangible Benefits: It is an acknowledged fact that forest ecosystems have both the tangible and the intangible benefits to the mankind. They contribute to a great extent in terms of intangible benefits. However, it is not easy to assign economic value to the intangible benefits of the forests ecosystems. Professor T M Das (1980) has quantified the environmental services, provided by a medium sized tree of 50 tons over a period of 50 years, by assigning notional values by using surrogate market techniques, as given in the Table 11.2 (Proceedings of the Indian Science Congress, 1980).

Table 11.1
Table Showing Environmental Benefits Derived From A Medium Sized Tree 50 Tons During Its 50 Years Life Span (Excluding The Value Of Timber, Fruits And Flowers)

Sr. No.	Environmental Benefits	Single Tree (Lakhs)	Forest Type	
			Tropical Lakhs/ha	Sub-tropical in Lakhs/ha
1	Oxygen Production	2.50	22.50	20.50
2	Conversion to Animal protein	0.20	01.80	01.64
3	Control of Soil Erosion	2.50	22.50	20.50
4	Recycling of Water and control of humidity	3.00	27.00	24.60
5	Shelter for Birds, Squirrels, Insects, Plants	2.50	22.50	20.50
6	Control of Air Pollution	5.00	45.00	41.00
	Total	15.70	141.30	128.74

11.2.2. Thus, according to Das, one hectare of subtropical forests accrues environmental benefits of worth Rs. 128.74 Lakhs over a period of 50 years i.e. benefits of worth Rs. 2.60 Lakhs per hectare per year.

11.2.3. Hence, intangible benefits accruing from Buldhana Division, having approx. 21,000 ha of well-stocked forests @ of Rs. 2.60 Lakhs per ha, are worth Rs.546 Crore per year.

11.2.4. Tangible Benefits: The tangible benefits accruing from forests can be computed in economic terms from various goods and services ensuring from forests. The estimation/forecast of timber, poles, fuel wood, *Tendu*, Gum and other non-wood forest produce accruing from forests can be made with reasonable accuracy with the help of yield regulating formulae and the available market trends.

The abstract of benefits and costs as a result of this plan is given as follows:

Annual estimated expenditure for the prescribed operations = 209 Lakhs
 Annual tangible benefit from the forest = 117 Lakhs
 Annual intangible benefit as calculated above = 54600 Lakhs
 Total benefits (both tangible and intangible) from the Forests = 54717 Lakhs
 Social Cost-Benefit Ratio is 209 Lakhs: 54717 Lakhs

Or 1: 261

Thus, the above Cost-Benefit Ratio favours the scientific management of forests, as prescribed, in this Working Plan.

11.2.5 The Net Present Value (NPV) of forest of Buldhana Division has been assessed base on Govt. Resolution No. S-30/1106/CR 189/F-10, dated 28.11.2008 as given below.

Table 11.2
Table Showing Net Present Value (NPV) of Forest of Buldhana Division.

S.No.	Working Circle	Area (in ha.)	Rate (in lakh/ha.)	NPV (in Crore)
1	S.C.I.	7884.05	8.03	633.09
2	I.W.C.	38362.54	6.26	2401.50
3	Fuelwood	1245.73	5.63	70.13
4	Pasture	29701.31	4.38	1300.92
5	Protection	6605.43	8.03	530.42
Total :		83799.06		4936.06

SECTION 3. FINANCIAL FORECAST

11.3.1. The approximate revenue expected from working of forests is given in **Table No.11.3**. The norms used for the financial forecasting are given in

Table 11.4. Forecast for the implementation of this plan is given in the **Appendix No. L** of Volume II of the Plan.

Table No. 11.3

Statement showing Expected Revenue from working of forests in Buldhana Division

Sr. No.	Working Circle	Expected Quantity	Approx. Rate In Rs	Expected Revenue Rs in lacs
1	Selection Cum Improvement			
	a) Teak timber	325 cum	15000/ cum	48.75
	b) Teak staked timber	325 cum	800/ cum	2.60
	c) Adjat fire wood	325 cum	300/ cum	0.955
2	Improvement			
	a) Adjat timber	300 cum	3500/ cum	10.50
	b) Adjat firewood	5000 cum	300/ cum	15.00
3	Fuel wood			
	a) Prosopis fire wood	7000 cum	200/ cum	14.00
4	NTFP			
	a) Tendu	9200 std bags	Lumpsum	25.00
	b) Sitafal	11 MT	Lumpsum	0.10
	c) Grass	30 MT	Lumpsum	0.25
Total				117.155

Table No. 11. 4.

**Rates used for estimating expenditure for the working plan prescriptions
(Daily wage rate Rupees 85.00)**

Sr. No.	Particulars of work	Unit of work	Man days/ unit	Labour component in %	Amount/ Rupees
1	Demarcation and Marking	Hectare	4.50	90%	382.50
2	Preparation of Grid wise Treatment Map	Hectare	1.00	90%	85.00
3	Singling of coppice shoots, etc.	Hectare	1.00	96%	85.00
4	Soil and moisture conservation				-
	Gully plugging (nala bunding)	Cu.m.	0.92	96%	78.20
	Continuous Contour Trenches (CCT)	Meter	0.085	96%	7.25
5	Coupe working				-
	Timber harvesting	Cu.m.	9.50	75%	807.50
	Firewood extraction	Stacks	3.50	80%	297.50
6	Removal of wind fallen				
	Timber	Cu.m.	9.50	75%	807.50
	Fuel	Stacks	4.50	80%	382.50
7	Thinning	Cu.m.	9.50	75%	807.50
8	Cutback Operations	Hectare	6	96%	510.00
9	Cleaning	Hectare	8	96%	680.00
10	Afforestation/plantation				
	Fencing including live hedge	Hectare	43	85%	3655.00
	Planting & sowing on fencing	Hectare	2	75%	170.00
	PPO/PYO (including fencing)	Hectare	60	85%	5100.00
	FYO (First year operations)	Hectare	95.10	77%	8083.50
	SYO (Second year operations)	Hectare	40.90	92%	3476.50
	TYO (Third year operations)	Hectare	20.70	93%	1759.50
	4th YO (Fourth year operation)	Hectare	15.15	93%	1287.75
	5th YO (Fifth year operations)	Hectare	15.15	93%	1287.75
11	Maintenance				
12	Road	Km.	38	95%	3230.00
13	1/5th boundary demarcation	Km.	7	80%	595.00
14	Fire protection length	Km.	6.5	96%	552.50
	Fire protection area	Hectare	1	96%	85.00
15	Joint Forest Management				
	Awareness generation	Village	12	20%	1020.00
	Micro plan preparation	Village	88	50%	7480.00
16	Training for NTFP collection	Round	30.00	50%	2550.00
17	Wildlife habitat improvement	Round	20.00	75%	1700.00
18	Fixing boundary pillars	Km.	70.00	30%	5970.00

SECTION 4: SOURCE OF FUNDING

11.4.1 Non Plan/Plan Schemes: Works prescribed by the Working Plan will be done through the funds made available under Non Plan schemes. They are mainly for felling of coupes and subsequent silvicultural operations and operations to secure adequate Natural Regeneration. If the NR is inadequate it is supplemented by Artificial Regeneration. CBO, Cleaning, Thinning, Rootstock Management, Fire Protection and Boundary Demarcation etc are to be done from these funds.

11.4.2 FDA: Certain works like Entry Point Activity, Plantation of choice of local people and soil and moisture conservation works will be done through this funding source.

11.4.3 EGS/MREGS: Works like soil and moisture conservation works will be done through this source.

11.4.4. DRDA: Soil and moisture conservation works will be done through this funding source.

CHAPTER XII
MISCELLANEOUS REGULATIONS

SECTION 1. PETTY FELLINGS (IRREGULAR HARVESTING):

12.1.1 Felling for carrying out Stem analysis : The Deputy Conservator of Forests (Territorial) shall submit proposal for felling of trees for the purpose of Stem/Stump analysis (as required by Working Plan Officer) to the Chief Conservator of Forests (Working plan), who shall accord sanction as per the provision of Para 84, of National Working Plan Code, 2004.

12.1.2. Restriction on Petty Fellings (Irregular Harvesting): Irregular harvesting of timber, firewood and other NTFPs is prohibited, except in the following cases:

12.1.2.1. Harvesting for the fire lines and the transmission line: The Deputy Conservator of Forests shall permit felling of trees within the prescribed width of the established fire lines and the approved power transmission line. The prescribed width in the guidelines for the Forest (Conservation) Act, 1980 and rules, there under, shall be applicable to the transmission lines. Creation of new fire lines shall require prior permission of the Principal Chief Conservator of Forests, and if felling is involved, permission from GOI shall be required for new fire lines.

12.1.2.2. Felling for the haulage roads: The Deputy Conservator of Forests shall permit felling of trees for the purpose of haulage roads, which shall be aligned properly to ensure minimum possible felling of trees.

12.1.2.3 Harvesting in forest areas diverted for non-forestry purposes: Felling of trees on forest land required by the other departments such as Irrigation, PWD, etc., shall be undertaken after the proposals for the use of forest land for non-forest purposes are approved by the Government of India under the provisions of the Forest Conservation Act, 1980. The Deputy Conservator of Forests shall permit felling of trees of forestland diverted for the non-forestry purpose as approved under the provisions of the Forest (Conservation) Act, 1980. The material obtained from such harvesting shall be brought to the depots and shall be disposed off as regular coupe material.

12.1.2.4 Harvesting of dead fallen and uprooted trees in the storm:

Removal of dead, fallen firewood and trees uprooted by wind of storm from all parts of the forest, except the coupes due for working, shall be carried out in the following manner:

Every year in the month of October each beat guard shall report the availability of dead, fallen firewood and trees uprooted by wind or storm to the concerned Range office. The Range Forest Officer shall estimate the availability of such material in each compartment and ACF concerned shall verify the same. If more than 2 (two) such trees per hectare is estimated, proper marking shall be carried out. Two dead and fallen trees are required for retention for wildlife conservation. Wood removal shall be carried out from the compartment after the approval of the Deputy Conservator of Forests. The details of material obtained from each compartment and revenue realized from it shall be entered in the respective Compartment History Form. Harvesting of dead and fallen firewood is governed by the *Nistar* privileges as admitted in the *Nistar Patrak* or directed by the Government from time to time. The *Nistar* holders are allowed to collect such material directly from the forests on rated passes or in the manner prescribed in the relevant directives.

No irregular harvesting, for the purpose of undertaking plantations/afforestation works under scheme outside the scope of this working plan shall be taken up in any of the forest areas under the working plan.

SECTION 2. DEVIATION:

12.2.1. The format of Deviation Statement is given below:

Table No. 12.1

Table Showing Deviation Form for Working Plan Prescriptions

Year -----		Division-----		
Serial No. of deviation	Control Book Name, Form No. Page No.	Reference to Working Plan		Nature of deviation requiring PCCF's sanction
		Paragraph	Nature of Prescription	

12.2.2. The DCF shall forward through the Territorial Chief Conservator of Forest typed copies of this form in triplicate, yearly, with his coupe control

forms. No explanatory remarks are required on this form, but these should be given in the forwarding letter. One copy of the statement will be returned to the DCF and another to the Territorial Chief Conservator after the deviations have been sanctioned by the PCCF. If the PCCF or the Working Plan Chief Conservator's sanction has been obtained in advance, the sanction number and date should be quoted in the last column.

12.2.3. All deviations, which permanently alter the basis of management laid down in a working plan, will require prior sanction of the PCCF. All deviations, which do not permanently alter the basis of management and with the necessity of which he agrees, may be approved and sanctioned by the Working Plan Chief Conservator on behalf of the PCCF. In case where there is difference of opinion between the Working Plan Chief Conservator and the Territorial Chief Conservator, the former will refer them to the PCCF for instructions. The PCCF/CCFWP, as the case may be will countersign the deviation statement.

12.2.4. Minor deviations can be sanctioned at the level of the CCF Working Plan or the PCCF as the case may be; but the PCCF, before sanctioning the major deviations of following nature, will necessarily take prior approval of the Regional CCF of the Ministry of Environment and Forests

- (i) Change in Silvicultural System
- (ii) Clear Felling of Natural forest
- (iii) Formation of new Felling Series
- (iv) Large scale felling due to natural calamities, which cannot be adjusted against future yield.

Criteria and Indicators of Sustainable Forest Management:

12.2.4. The government of India, the State Government, and IIFM-Bhopal are in the process of finalizing the criteria and indicators for monitoring and evaluation of Sustainable Forest Management. As and when these are finalized,

the monitoring and evaluation of implementation of the working plan will be done accordingly.

SECTION 3. **PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE:**

12.3.1. As per Forest policy of 1988, the first charge on the forest produce is that of tribal and other villagers living in and around the forest. Accordingly the forest produce obtained from the forest will first be supplied to the people living in the villages notified for *nistar* purposes at the rate fixed by the Deputy Conservator of Forests in consultation with the District Collector. Only the surplus forest produce, which is not required by the local people, will be sold in open auction.

12.3.2. Small Timber, Poles and Fire Wood: Small timber and poles required for agricultural purpose and repairs to houses as well as firewood for domestic use will be supplied from the depots at concessional rates (*Nistar*) to the villagers living near the forests, depending upon the availability of these produce. Depots will be opened at suitable places, throughout the Division, so that people have to traverse minimum possible distance to procure these products. Range, Round or Beat head quarters are proposed for this purpose, so that supervision and maintenance of these depots become convenient.

SECTION 4. **ROADS, PATHS, BRIDGES AND BUILDINGS:**

12.4.1. The Division has a network of different types of roads as given **Appendix No. XX** of Volume II of this Plan. The Division shall maintain comprehensive records for all roads passing through the forest area.

12.4.2. The Public Works Department of the State Government or the *Zilla Parishad* maintains large number of roads passing through the forest area. Some stretch has been permanently transferred to the Public Works

Department / *Zilla Parishad*. Proper records of these roads must be maintained on priority basis.

12.4.3. Forestry operations and forest protection should determine the priority for maintenance of the forest roads.

12.4.4. Unwarranted up-gradation of the forest roads shall be discouraged, but necessary culverts shall be constructed for forest protection purpose.

12.4.5. The list of buildings in charge of the Division is given in the **Appendix No. XXVIII** of Volume II of this Plan. The problem of accommodation is acute, as the existing buildings are not sufficient to house all the staff, especially the field staff. Residential quarters for many of the Forest Guards do not have residential facilities. The field staff is forced to occupy private accommodation. Sufficient funds should be made available for the maintenance and construction of buildings in the field. Funds will also be required for developing eco-centers and camping facilities for eco-tourists as prescribed in the chapter of Wildlife (Overlapping) Working Circle.

SECTION 5 **SILT MONITORING STATIONS:**

12.5.1 Silt Monitoring Stations shall also be established on all major nalas to regularly monitor the siltation rate and effectiveness of management practices being followed. One Silt Monitoring Station is to be installed for each mini-watershed (1500-5000 ha.)

SECTION 6. **DEMARCATIION AND PROTECTION:**

12.6.1. In order to keep the integrity of forest areas intact, strict vigilance over the forest boundary and periodic verification of demarcation on the ground for the entire forest area has been prescribed. However, in view of the position of demarcation and boundary pillars on the ground **concrete boundary pillars**,

as prescribed by the PCCF, shall be erected on the external boundary of the entire Reserved Forests, Protected Forests and Un-classed Forests, as per 1/5th boundary demarcation scheme. The 1/5th boundary demarcation scheme is given in **Appendix No.LI** of Volume II, of this Plan.

12.6.2. The Special Objective of Management: Object of the demarcation and protection is to maintain territorial integrity of forestlands in the Division by clearly delineating their boundaries by permanent pillar marks to act as psychological barrier. Ensure effective protection of the forest resources of the entire division against adverse influences.

Approach to the Forest Demarcation:

12.6.3. Forest areas vulnerable to boundary obliteration need to be identified for survey and demarcation so that forest encroachment on the forest fringes can be detected promptly. Presence of boundary marks also serves as psychological barrier against the forest encroachment. Well-defined forest boundary is a prerequisite for effective forest protection, but forest boundary marks are either missing or in poor state. Artificial boundaries adjoining private land should receive the highest priority.

12.6.4. The land records such as maps of dis-forested areas and Un-classed Forests shall be maintained and updated.

12.6.5. Lack of legal protection to the Un-classed Forests shall be rectified by immediate notification declaring such areas as the Reserved Forests and initiating the reservation process.

12.6.6. An extensive length of TCM (Trench-Cum-Mound) fencing has been dug up under various schemes for providing employment. However, the alignment was generally decided without proper survey and deviation from the forest boundary is quite common. TCM around plantations also suffer from the same

problem. Since field officials often consider TCM as the forest boundary, it is imperative to rectify the mistakes by creating boundary pillars at the actual boundary.

Survey and Demarcation Of Boundaries:

12.6.7. Demarcation of the external forest boundaries: The entire area shall be tackled as per the 1/5th boundary demarcation scheme. The external boundary of the Division is 1158.43 kilometers, out of which **natural boundary** is 346.87 km. The external **artificial** boundary will require permanent demarcation.

12.6.8. The Principal Chief Conservator of Forest has approved, in May 2001, a demarcation model using a series of concrete pillars. This model as modified, till date shall be followed for the external boundary demarcation.

12.6.9. Cement-concrete pillars at all bends and corners of the artificial boundaries should be raised immediately after the boundary survey. This work will require substantial fund allocation, as it will need sizeable manpower and resources.

12.6.10. Some of the forest staff shall be trained at the training institutes of the Land Records Departments, and engaged for boundary survey and demarcation work in undisputed sections. The officials engaged in demarcation work should prepare demarcation documents authenticated by the adjoining landholders in the presence of local revenue officials and village leaders. If the adjoining landholder refuses to authenticate the demarcation, an elaborate survey involving the Land Records Department and the Land Cell will be warranted in such disputed sections. The demarcation boundary will be checked once, in a 5-year cycle.

12.6.11. The protection staff shall continue with traditional demarcation using stone cairn or earthen cairn of standard size till such permanent boundary marks are created or re-established in the field. The specifications of a boundary cairn are given in the paragraph 12.6.20. The traditional demarcation work will be checked at least once a year.

12.6.12. Demarcation of the internal forest boundaries: Internal boundaries between compartments shall be demarcated using traditional stones cairn, earthen cairn of standard wooden pillar (Paragraph 12.6.20.). Fund allocation for this work is generally discouraged because it is a part of the responsibilities entrusted to the protection staff. This work shall not be unmanageable in light of the manpower available as Forest Labourers.

12.6.13. Routine boundary maintenance: The Beat Guard after his inspection of the entire compartment must submit the Compartment Inspection Certificates every month to the RFO, before disbursement of the monthly salary. The certificate must record forest encroachments, illicit cutting and condition of forest boundaries including pillar numbers and inter-pillar visibility conditions. Separate certificate should be submitted for each compartment.

12.6.14. The Round Officer should submit certificates for his inspections. Half of his certification should involve checking of the work done during the previous month by the Beat Guards in his jurisdictions, and the other half should involve checking of the compartments not reported by the Beat Guards during the months. He should also submit monthly report regarding the action taken on the forest offences recorded and the progress of the forest enquiries entrusted to him.

12.6.15. The Range Forest Officer can allow the delay not exceeding 15 days for reasons recorded in writing. Default on this account for 2 months should be viewed as dereliction of duty and should attract disciplinary action.

12.6.16. The Range Forest Officer shall check the accuracy of the Compartment Inspection Certificate according to the prescribed norms covering each round. He shall personally check at least 1 (one) vulnerable compartment other than those covered by the Beat Guards and the Foresters during the previous month.

12.6.17. The Range Forest Officer, Mobile Squad will co-ordinate cross-checking of compartment inspection certificates.

12.6.18. These guidelines shall be applied along with other directives issued for the forest protection from time to time. Other field officers shall carry out their field inspections according to these guidelines as modified from time to time.

12.6.19. Specification of boundary pillars: The May 2001 instruction referred above directs placing 1.40-meter long cement concrete pillars at roughly 50 meters interval on the external forest boundaries. Wherever, the external boundary is shared with other government land, the interval should be increased to 100 to 150 meters, and intermediate pillars may be 0.90 meter long. Both types of pillars should be embedded to 0.40 meter depth in the soil and the pillar is 0.10x0.15 meter at the top and 0.15x0.23 meter at the base. The 0.90-meter pillars are parallel pipes with 0.15-meter width and thickness. The prescribed design must be followed to carry out the task of fixing the boundary pillars as prescribed.

12.6.20. Specification of a boundary cairn: Artificial boundaries should be marked with a series of boundary cairn. A cairn should be made of loose stones upon excavated foundation to a depth of 30 (thirty) centimeters and shaped like a truncated cone. Inter-space between the large stones should be filled in with small stones, and the outer stones will be wedged with stone chips. A cairn will be 1.20 meter high, and have 1.20 meter top diameter and 1.80 meter base diameter, as described in the Central Province and Berar Forest Manual. A slab (0.20x0.20x0.90 meter) of a timber stake projecting ½ (half) meter in the center

will be fixed firmly on the top of the cairn, and marked with cairn serial number. Each boundary mark (cairn) must be visible from its neighbouring one on both sides. Distance between two consecutive boundary marks should not exceed 250 meters. The cairn stone or post should be colour washed white for the open forests and red for the closed forest. The cairn tops should have direction of boundary lines shown by the same colour lines radiating from the center. Such cairn can be made of earthen mass, where boulders are not available.

12.6.21. Recording locations of the boundary pillars or Cairns: The location of the boundary pillars and Cairns along with their numbers should be shown on the maps. The numbering will follow the convention communicated by the Chief Conservator of Forests in charge of the land matters. The numbers shown on the topo-sheets will be maintained unless warranted by the compelling reasons. Such reasons must be reduced in writing and entered as a note on the master set of the maps. This master set will be made available to the Working Plan Division for updating the working maps and the digital database

12.6.22. Clearance of boundary line: Boundary line clearance on the artificial boundaries will follow the standard width as described in the directives on the subject. Trees should not be felled for the boundary line, but shrubby undergrowth should be cleared. Norm for the external boundary line is 12 meters. The internal compartment boundary lines should be 3 meter wide.

12.6.23. Compartment plates: Metal plates on the boundary trees at a height of 2.5 to 3.0 meters will be fixed on the corners and roughly at half-kilometer interval on the side way from the compartment. The colour of the plate and lettering should agree with the state-level general guidelines. Till such guidelines are available, red letters on white plates will be used. Size of the plate and letters should not be less than 55 cm and 10 cm, respectively. Strokes should be at least 2cm wide.

12.6.24. Colour wash on the boundary marks: The Beat Guard will be responsible for annual freshening of the pillar numbers, the compartment plates and the colour-wash of the boundary pillars shall be carried out in the month of September-October. He must submit details of work done in each compartment in his Annual Colour-Wash Report. The Round Officer will carry out sample checking of the report in the manner directed by R.F.O. Only material cost should be admissible for this purpose.

SECTION 7. DEMARCATION, PREPARATION OF TREATMENT MAP AND MARKING OF COUPES.

12.7.1. Demarcation of Coupe: The annual coupes for the harvesting and tending operations shall be demarcated one year in advance, and each coupe shall be subdivided into four sections for effective management and control. The Range Forest Officer shall inspect the coupe after demarcation and issue Coupe Demarcation Certificate in the prescribed format, given in the following paragraph, which shall be verified by concerned Assistant Conservator of Forest.

12.7.2. Format for the Coupe Demarcation Certificate is, as follows :(Form No. 12.1).

Form No. 12.1

I----- R.F.O. -----
----- certify that I have personally inspected the demarcation of the coupe No. ----- in Compartment No. ----- of W.C.----- on dated ----- and found that the coupe has been demarcated as prescribed in the working plan. The area of the coupe is -----hectares.

Date:

Signature of the RFO

Date:

C/s of the ACF

Demarcation of Coupes:

12.7.3. Annual coupe shall be demarcated by cutting and clearing of bushy undergrowth on 3 (three) meter wide line and by erecting pillars of posts up to 2 meter height in the middle part of the cut line at suitable intervals, so that one pillar shall be visible from the other one, except where the coupe boundary runs along streams, fire line or road. The pillars shall bear the coupe number, name of the felling series and the working circle on the side away from the coupe.

12.7.4. Selected trees above 45 cm g. b. h., at suitable intervals standing on the periphery of the coupe shall be given two coal tar bands and a *geru* band in between after scrapping the loose dead bark. The lower coal tar band shall be at B.H. and the other coal tar band shall be 15 cm above it. Just below the lower coal tar band Tree serial number in Arabic shall be given on the side away from the area of the coupe. The band and serial numbers of such trees shall be maintained in the marking register, in the following table.

Table No. 12.2
Table Showing List of trees on the coupe boundary

Sr. No.	Name of species	GBH (OB)	Remarks
1			
2			
3			

12.7.5. No tree bearing coupe demarcation bands shall be marked for felling.

Demarcation of Sections:

12.7.6. For effective monitoring and control of the harvesting operations, each coupe marked for felling in SCI WC, Improvement WC and Fuelwood WC shall normally be divided into four approximately equal sections. 1.5 m. wide cut lines shall demarcate sections by clearing brushwood, unless the section lines runs along a permanent feature.

12.7.7. Trees above 45 cm girth, selected at suitable intervals on the inner edge of the 1.5 m wide cleared section line shall be given two coal tar band 15cm apart, the lower coal tar band being at breast height, just below the lower coal tar band, section number shall be given on the side away from the area they would denote.

Demarcation of Protection Areas:

12.7.8. Selected trees, on the periphery of the Protection areas shall be given two-geru bands 15-cm apart, lower band being at B.H. In addition, a cross in geru colour between the bands will also be given on the side away from the protection areas. All those trees will be serially numbered. The serial number will be given on the side away from the protection area just below the lower *geru* band, on the side bearing the cross. All the protection areas shall be numbered in Roman numerals and the trees standing on the periphery of each protection area shall be numbered in Arabic, adopting separate series for each areas, so that the trees on periphery of Protection Area No. I will be the Sr. no. I/1,I/2,I/3, etc. and the similar trees on periphery of Protection Area No. II will bear the Sr. no. II/1, II/2, II/3, etc.,

12.7.9. Demarcation of other areas given in the treatment map: Giving one *geru* band at B.H. and one coal tar band 5 cm. above it shall mark the other categories of areas shown in the treatment map.

Treatment Map:

12.7.10. Immediately, after completion of demarcation of the coupe, RFO shall prepare the Treatment map of the coupe, clearly showing the various Treatment-type areas in the coupe. Treatment map will be prepared on graph paper in 1:5000 scale. The entire area of the coupe shall be divided into grids of size not bigger than 100 M X 100 M (1 ha.) after taking the base line that should as far as possible run through center of coupe. The trace of the coupe

map will show the contours along with important features like nala, streams. The concerned ACF will verify the treatment map and make corrections, if necessary, before the submission to the DCF for approval.

12.7.11. The compartment maps prepared in the Forest GIS Cell, *Amravati* shall serve as the base maps, which would be used for making areas suitable for different treatment types. Corrections in the base maps, if any and observations on crop conditions in the coupe shall be recorded and sent to the Working Plan Officer for verification and updating the digital database.

12.7.12. Preparation of treatment map shall be preferably be done one year in advance of the coupe working. Timely preparation would facilitate necessary checking and corrections, if any, in time.

12.7.13. Immediately, after seeking the approval of the treatment map site specific Work Plan for the entire coupe shall be prepared by RFO, incorporating all the prescribed activities under various treatment-type areas marked on the map, entailing quantum of work involved, estimated amount required and period of operation for each activity. The Work Plan shall be verified by the ACF concerned and submitted to the DCF for approval by the DCF. The work plan shall be approved sufficiently, in advance, i.e. the before starting of coupe working in the respective coupes.

Marking Of Trees for Harvesting.

12.7.14. After the approval of treatment map, marking of trees for harvesting shall be carried out as per prescriptions given in respective working circles. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Marking of trees for harvesting shall be done one year in advance of the coupe

working. Timely marking would facilitate necessary checking and corrections, if any, in time.

12.7.15. Marking shall be done under the close supervision of RFO and inspected by the ACF concerned. The DCF shall himself inspect majority of coupes to ascertain proper marking as per prescriptions of working plan as well as to guard against the excessive marking, if any. It shall be responsibility of CCF(T) to ensure that marking rules are scrupulously be adhered to as there is increasing tendency of field staff to mark trees of teak and other economically important species as it may potentially alter the forest composition in the long run.

12.7.16. Trees marked for felling shall be given geru bands at breast height and will bear marking hammer impression at the B.H. (breast height) and at the base on the blazes of sizes 10 cm x 10 cm.

12.7.17. All trees of 30 cm and above girth at b.h. (o.b.) in addition, will bear digit serial numbers both at BH (breast height) and at the base.

12.7.18. The remaining trees below 30 cm girth at b.h. (o.b.) will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series.

12.7.19. The number of the tree marked shall be written vertically on the blaze, shown as under.

For Tree no. 210

XX (Hammer mark)
2
1
0

12.7.20. All trees bearing serial numbers shall be recorded in marking (recording) register, in the following table. Serial number given in coal tar must be recorded in the marking register.

Table No. 12.3
Table Showing Format for marking of trees for harvesting

Tree Digit No.	Serial No. Coal tar	Name of species	GBH (OB)	Remarks

12.7.21. Abstract of trees marked for felling will be made species wise in 15-cm girth classes. Timber, poles and firewood trees shall be shown, separately. Malformed trees alone shall be recorded as fuel trees, except that of teak. A tree shall be classified as fuel tree only when it is incapable of yielding any useful sawn timber.

Soil and Moisture Conservation:

12.7.22. The areas adjoining the human habitation have become devoid of vegetation by way of illicit cutting, heavy grazing and repeated fires. The compaction of soil reduces percolation and water holding capacity of the soil. Due to these factors NR of *Teak* and its associates die back before being established.

12.7.23. The soil and moisture conservation is crucial to maintain and improve the site conditions as well as water regime of a given tract. Moreover, extensive silvicultural works have been prescribed in this working plan to regenerate the forests primarily assisting and tending the existing NR and available rootstock. To ensure the success of these operations in improving the forests, soil and moisture conservation works are of utmost importance.

12.7.24. The soil and moisture conservation works would start along the marking of coupe and be completed before the onset of monsoon. Wherever

feasible, the material obtained from climber cutting, bamboo cleaning and shrub clearance shall be used for brushwood check dams to arrest the soil loss.

12.7.25. It is prescribed to follow watershed management approach viz. The ridge-to-valley approach for carrying out soil and moisture conservation works. The contour trenching and gully plugging/check dams, as given under, have been prescribed to constitute the major component of these works.

12.7.26. Continuous Contour Trenching and Water Absorption Trenches

i) The continuous contour trenching is prescribed in areas having density less than 0.4 and slope below 25. The size of the trench is 30 cm deep and 60 cm wide. Dug up soil from the trenches will form a ridge on the downhill side, and pebbly material from the trench will be neatly pitched on the lower side. Agave bulbils and other suitable soil binding species will be planted on the mound at one-meter interval in two staggered rows set 20 centimeters apart on the downhill side. The mound will also have sowing of seeds of *Khair*, *Babhul* and *Neem*, etc. *Chilati* seeds may be preferred on refractory sites.

ii) Trenches near the *nala* are prescribed to be discontinued and curved upward at both sides of the *nala* at 45° to prevent the run off of water stored. Contour trenches will normally be not more than 10 meter in length, and two contour trenches will be spaced based on the slope.

iii) Water Absorption Trenches (WATs) of size 60 cm x 30 cm may be taken up along contour interval of 50 m, at appropriate places.

13.7.27. Nala Bunding and Check Dams:

i) The primary objective of *nala* bunding and check dams is to reduce the speed of run off water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the *nala* bed or from the dug up soil. No blasting shall be done for this purpose. Where sufficient boulders are not available other bioengineering structure such as brushwood may be used. In this Plan check dams of both the loose rubble for arresting silt and soil loss and

earthen gully plugging (*nala* bunds) for moisture conservation and water harvesting are prescribed.

ii) The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions; local availability of suitable materials. LBS, Gabian structures may be constructed for preventing soil erosion. The streambeds more than 8 meters in width shall not be covered under the *nala* bunding. *Nalas* more than 8 meter wide at the top should normally require elaborate engineering structures for bunding, and therefore, such bunds should not be considered as part of the quantity prescribed here. Each of such *nala* bunds, if required, should be treated as an independent project.

iii) The forest tanks are proposed to be taken up in exceptional circumstances without causing damage to the tree crop either during construction or due to submergence. The guidelines issued by the PCCF, Nagpur must be strictly adhered to. The DCF shall ensure that the provisions of FC Act 1980 are not violated.

iv) To prevent the soil erosion on the slopes, contour stone bunding having the size of 60 cm x 30 cm shall be taken up at an interval of every 50 m. Where loose boulders are not available agave suckers shall be planted in two rows along the contours.

Plantation Guidelines:

12.7.28. From the beginning of scientific forestry, the plantation has been recognized as prominent activity to afforest and enrich denuded and under stocked forest tracts. It is prescribed to supplement the activity at places where natural regeneration is inadequate or is not likely to succeed. The following guidelines are, hereby, prescribed for adherence for undertaking plantations under this plan:

12.7.29. Consistency in plantation schemes: Since plantation schemes providing the funds may not exactly match with the prescriptions of this plan, all efforts will be made to bring the discrepancies to the notice of the concerned authorities so as to bring the scheme in consonance with the plan prescriptions.

12.7.30. Tending of natural regeneration: All seedling and saplings of valuable species more than 60 cm in height will be treated on par with planted seedling; and tended as a part of future crop. Spacing operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5-meter spacing. The natural regeneration present shall be assisted and encouraged as prescribed in guidelines for rootstock management.

12.7.31. Plantation in working circles: The PPO/PYO (Pre-Planting Operations) shall be taken up in the immediate year following the coupe working, while the seedling planting and other FYO (First Year Operations) activities shall be carried out in the 2nd year of main felling. Other plantation works will follow in the sequence. The cleaning and thinning operations in plantations will be done in the fifth and eleventh year of plantations. The extent of plantation should not exceed the prescribed staff norms.

12.7.32. Choice of species: Valuable local species suitable for the site and favoured by the local village communities will be preferred in plantations. Seedlings of edible fruit yielding forest species may constitute up to 20 percent and seedling of medicinal plants up to 5 percent of the planting stock. Stakes or tall plants of suitable species, such as, *Ficus*, *Umbar*, etc. useful to wildlife are also proposed in plantations, up to 5 percent of planting stock. An officer not below the rank of namely Deputy Conservator of Forests should approve the final choice of species and source nurseries. **Only certified seeds from known source shall be used in the nursery.**

12.7.33. Spacing in plantations: *Teak* stumps from root-shoot cuttings should be planted on well-drained sites at 2m x 2m spacing. *Teak* seedlings raised in poly-pots or root trainer containers can be used in special cases duly recording the reasons in the prescribed register. Mixed species plantations should be carried out as per the technical need of the species. Care should be taken to avoid planting of seedlings directly under the canopy of existing trees or established saplings.

12.7.34. Fencing of Plantations: The plantation areas or the rootstock management areas shall be fenced by TCM (Trench-Cum-Mound) fencing, live-hedge fencing or suitable mechanical fencing for effective protection. TCM of the standard cross-section, one-meter deep and 1.90 and 0.60 meter wide at top and bottom, respectively is prescribed. Across the slope, however, rubble wall is proposed in place of TCM. Two rows of *Agave* will be planted at the outer edge along with seed sowing of *Chilati*, *Babul*, *Jatropha*, and other local thorny species immediately before the onset of monsoon. The mechanical fencing, if found financially viable, may be used in areas prone to heavy biotic pressure, if the situation so demands. Justification for use of mechanical fencing should be recorded in the prescribed plantation register.

12.7.35. Pit digging: Pits of size, preferably, 30 cm³ for planting of Non-*Teak* species is prescribed. The dug up soil will be kept on the upper side of the slope, and allowed to weather from March to the first week of May. Pit refilling must be completed before the onset of monsoon.

Planting:

12.7.36. Planting of *Teak* stumps: Crowbar planting of *Teak* stumps shall be carried out within one week after the first monsoon shower.

12.7.37. Poly-pot or root-trainer planting: Seedling planting shall be completed within a fortnight after the first monsoon shower.

Subsequent planting operations:

12.7.39. First year operations: All weeding and soil working operations should be carried out in a circle of one-meter diameter around the seedlings or saplings. The first scrape weeding shall be started immediately after completion of planting. Casualty replacement should be done in the first weeding. The second scrape weeding shall be carried out in the last week of August. The soil working and mulching shall be done in the first week of October. In case of prolonged hot and dry season, it is desirable to carry out one soil working in the month of January.

12.7.40. Second year operations: In the second year of plantation, casualty replacement should be done in the planting season. The first scrape weeding should be carried out in the first week of August, and the soil working and mulching should be done in early October. The first and second weeding should also be carried out around the seedling coppice in the plantation area.

12.7.41. Third year operations: One weeding in the third year should be done in July and the soil mulching in September. Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance should be repeated as third year operations.

Thinning Guidelines:

12.7.42. Definition: Thinning is defined as a felling made in an immature stand for the purpose of improving the growth and form of the trees that remain, without permanently breaking the canopy. Thinning is chiefly concerned with promoting good growth in the stems that are retained.

12.7.43. Special objectives in thinning: Plantations are made with various objects in view and thinning methods have to be varied accordingly. The

maximum volume production (in a given form) is generally on objective. Plantation work is expensive and it may be desired to get some return as soon as possible however, in this case, thinning will aim at giving some of the trees the adequate room they can utilize, thus ensuring rapid diameter growth. Plantations are all often made in an attempt to minimize a foreseeable shortage of timber consequent to the rapid exploitation of the mature stock of natural forests.

12.7.44. Observable Factors as the basis for thinning procedure

(a) **Tree classification:** To describe the nature and intensity of a thinning, there is a

choice between qualitative and quantitative methods, the former being almost inevitably mainly subjective. The older procedures were all of former category, as would be expected from the fact that the latter calls for standards of reference, which is still only available for a few species. The individual tree in a crop was classified by height and size of crown, while the thinning prescription lays down which classes are to be removed. The standard adopted is as follows:

I). **Dominant Trees (D):** All trees which form the uppermost leaf canopy and have their free crowns are usually subdivided as follows:

(1) Pre-dominant trees comprising all the tallest trees which determine the general top

level of the canopy, and

(2) Co-dominant trees which fall short of this, averaging about 5/6 of the height of

Predominant trees.

1. Trees with normal crown development and good stem form.

2. Trees with defective stems of crowns, e.g.:

i. Trees with crown space cramped by neighboring trees,

ii. Badly shaped old advance growth,

iii. Trees with forked leader and similar defects

3. Trees with every defective stems of crowns, i.e. with the same defects as (b) to such an extent that they are of little or no present value of promise.
4. Whips-Trees with very thin bole and very constricted crown incapable of existence without the support of the neighboring tree.

II) **Dominated Trees (d)**: These trees do not form part of the upper most leaf canopy, but the leading shoots of which are not definitely overtopped by the neighboring trees. Their height is about $\frac{3}{4}$ that of the tallest trees

- (a) Trees with normal crown development and good stem form.
- (b) Trees with defective crowns or stems.

III) **Suppressed Trees (s)**: which reach only about $\frac{1}{2}$ to $\frac{5}{8}$ of the height trees, with their leading shoots definitely over-topped by their neighbors or at least shaded on all sides by them.

IV). **Dead And Moribund Trees (m)**: This class also includes bent over and badly leaning trees usually of the whip type.

V). **Diseased Trees (k)**: This class includes those trees which are infected with parasites to such an extent the their growth is seriously affected or that they are a danger to their neighbours.

- (a) Dominant.
- (b) Dominated and suppressed.

12.7.45. Thinning Methods:

General considerations: When a plantation is made, silvicultural requirements, particularly, the restoration or creation of a tree cover to the soil, dictate spacing that would be adopted if economy is not the immediate cause and number of plants required had alone to be considered. Many of the original number of planted have to be cut out when they are of little or no sale value to

permit satisfactory development of those retained. Even so, the number of stems still standing after the first thinning of two, will be far greater than the final number at maturity, and somewhat irregular spacing is relatively unimportant as it can be adjusted in later thinning.

(1) **Mechanical Thinning:** There may be little objection to provide extra growing space by the mechanical removal of complete lines of plants, of every alternate plant subject to provision to cover cases of local gaps. Where spacing is irregular, the “stick” method used in natural regeneration is a possibility whereby one tree of every pair of adjoining tree is removed if the distance between them is less than a prescribed length.

(i) This method is followed in teak plantations for the first and less commonly for the

second thinning. Each operation removes 50% of the original planting lines reducing the number of plants to $\frac{1}{2}$ in each operation. For instance, in case of 2 x 2 spacing, number of plants will reduce from 2500 to 1250 and then 625 per hectare and increasing the spacing from 2 m x 2m to 4 m x 4 m. It is usually provided that where there is a gap in the retained line an adjoining plant in the cleared line should be retained.

(ii) This method is only practicable where casualties are very few and growth is both good and even under such conditions but it is out of question in poor or uneven plantations.

(iii) It is not suitable for mixed plantations. However, in rare cases, similar operation may be done in mixed plantations where one species has been introduced essentially to help cover the ground quickly and its removal or cutting back is necessary in the interest of the major species.

(2) **Silvicultural Thinning:** Alternatively, thinning may be selective, the case for removal or retention being considered for each tree in turn, according to a set of rules drawn up for the purpose. This is the most usual procedure even where additional checks are applied, being often described as a “silvicultural” thinning.

(3) **Thinning Schedule:** The other possibility is to be guided by thinning schedule which lay down the number of stems that should remain standing after thinning according to various criteria of dimensions, site quality and age viz. Stand Tables and Yield Tables applicable to that locality. The Stand Tables and Yield Tables applicable will be given in the **Appendix No. LX** of Volume II. Such criteria should ideally be based on a wide range of growth studies to reveal the development to be expected to take place under the conditions concerned.

12.7.46.Types of Thinning:

(a) Ordinary Thinning:

(i) The mechanical thinning meets the initial requirements of plantations. It soon ceases to be practical proposition owing to the unequal development of the trees and their smaller numbers, and hence call for other methods for thinning operations.

(ii) The most usual method has been to view each tree in relation to its neighbours, and to remove those trees which appears to have shown their inferiority by dropping behind, taking first the suppressed trees, then the dominated ones, and finally some of the dominants with restricted of, otherwise, inferior crowns. As the method begins with the removal of the lowest canopy class and then works upward, it has been called Low thinning, but it is now known, on account of its widespread application, as Ordinary Thinning.

(iv) The smaller dominated and suppressed trees are usually removed, they may be retained as soil cover and as insurance against casualties among the larger trees standing over them.

(v) Most foresters tend, at first, to thin very lightly corresponding to something between B and C grades, after experience however they mark heavily up to a full C-grade and D-grade. The term 'heavy thinning' implies the C-grade thinning.

(b) The standard grade of ordinary thinning:

- (1) **Light thinning (A-grade):** This is limited to the removal of dead, dying, diseased and suppressed trees i.e. classes V, IV and III of tree classification. Grade A is of no practical use, it serves as the initial stage, especially, in comparative research on the effect of thinning on increment.
- (2) **Moderate thinning (B-grade):** It consists further removal of defective dominated stems and whips. Branchy advance growth which it is impracticable or not desirable to prune may also be taken, i.e. classes V, IV, III, II (b) and I (d) and an occasional I(c). B-grade is also of little use in practice, due to its having little influence on the increment of the remaining stems.
- (3) **Heavy thinning (C-grade):** It consists further removal of the remaining dominated stems and some defective dominants without making lasting gaps in the canopy, i.e. classes V, IV, III, II and I (b), (c) and (d).
- (4) **Very heavy thinning (D-grade):** It consists further removal of some of the good dominants, subject to the condition of not making any lasting gap in the canopy. The trees for removal are selected in such a way that the remaining crop consists of trees, with good boles and crowns, well and evenly distributed over the area, and with space for further development, i.e. classes V, IV, III, II and I (b), (C), (d) and some I (a). If their removal is of no economic or hygienic value, class V, IV and III trees are not removed, in heavier grades.
- (5) **Very very heavy thinning (E-grade):** For research purposes it has been found desirable to make ordinary thinning even heavier than the standard D-grade. It prescribed removal of more of the dominant stems even in class I (a), so that all retained have ample room for further development. It goes as far as possible within the rule for avoiding permanent gaps in the canopy.

12.7.47. Crown Thinning: This method of thinning looks first of all to the dominants, and removes such of them, beginning with the least promising individuals, as are hindering the development of the best individuals. Due regards are paid to obtaining as even a distribution of good dominants over the area as possible. It requires special skill and acumen in carrying it out.

(a) **Grades of Crown Thinning:** Only two grades of crown thinning have been standardized; they are defined as follows:

(1) **Light Crown Thinning (L C-grade):** This consists in the removal of dead, dying and diseased trees, with such of the defective, after them the better dominants, as are necessary to leave room for the further development of the best available trees evenly distributed over the area, i.e. classes V, IV, I (d), (c), many of I (b) and few of I (a) but not III and II. This is similar to D-grade ordinary thinning, but retains all III and II, and is not quite so heavy on I.

(2) **Heavy Crown Thinning (H C-grade):** This grade pays more attention to favour the best selected stems by removing all the remaining I (b) which can be taken without creating permanent gaps, and more of I (a), i.e. classes V, IV, I (d),(c), most of I (b), some of I (a) but not III and II.

(3) Crown thinning is well adapted to moderately shade-tolerant species in which the retention of the lower canopy presents no difficulty.

12.7.48. Tending Procedure: For this, the figures from the Yield Table and from the Stand Table in respect of relevant site quality and age shall be reproduced and girth class wise comparison of number of stems actually present with that required as per Stand Table shall be done. **Appendix No. LX** of Volume II gives site quality wise Yield and Stand Table for *Teak*. Following principle should be followed for taking decision as to how many stems in different girth classes would be retained after thinning in the crop.

(i) When in any girth class, actual population of stems is found to be equal or less than that given in Stand Table, no removal in that girth class shall be affected and all existing trees shall be retained irrespective of the fact whether they are of coppice origin or of inferior miscellaneous species. However dead and top broken trees shall be removed as they have special reasons.

(ii) If actual population of stems in a girth class is found to be more than that given in the Stand Table, the excess number of stems in that girth class are liable to be removed keeping the number of stems to be retained in that girth class equal to the population given in the Stand Table. However, if shortage of stems in next higher girth classes were found and as a result, less number of stems are being retained in those girth classes, the number of stems to be retained in this girth class shall be increased by the number it is falling short in the higher girth class. Thus, in short, total number of stems per hectare to be retained shall be equal to that given in the Stand Table , but increasing equal number of stems in the lower girth classes where excess population was found shall compensate the shortage in higher girth classes. There may be instances where although actual total population per hectare is more than that desired, shortage of stem is occurring in lower girth classes as well. In that case, the shortage of lower girth classes shall be compensated by increasing the number in the next higher girth classes to that extent.

(iii) After it is decided, as to how many number of trees per hectare are to be retained and those to be removed in different girth classes, the marking for removal in that girth class shall be effected in the following order.

- 1) First, Non-*Teak* coppice shall be marked irrespective of species till all are marked.
- 2) Then *Teak* coppice shall be marked till all are marked.
- 3) Thereafter Non-*Teak* trees of seed origin shall be marked for felling. However, trees of *Shisam*, *Bija*, *Semal*, *Kulu* (of seed origin) shall not be marked for felling besides fruit bearing trees like *Aonola*, *Mahua*, and *Charoli* etc. for any reason

whatsoever. They shall be retained in excess of the desired population of the growing stock.

4) Then *Teak* trees of seed origin would be taken up for marking.

iv) Keeping the principles as prescribed above in clauses, (i), (ii) and (iii), detailed instructions as to how many trees of teak, non-teak including coppice, if any, and teak coppice shall be marked for felling and how many trees would constitute the residual crop after thinning shall be respectively recorded in items 10 and 11 of Form 3, and communicated to the marking officer by the Deputy Conservator of Forests in writing.

Harvesting And Disposal:

12.7.49. Agency for harvesting: The coupes shall be worked departmentally through FLCS or JFMC.

12.7.50. Disposal at timber depots: Harvested timber and firewood shall be transported to the established forest depots for sale by auction. The National Forest Policy, 1988 acknowledges the first charge on the forest produce to the local tribal and village community living in and around the forest areas. Disposal of the forest produce should meet the requirements of the first rights of the local village communities over the forest produce, as enunciated in the policy. In view of this to facilitate *nistar* distribution temporary bamboo depots shall be created at the Range Headquarters.

12.7.51. Stacking for the *nistar* supply: Each established or temporary depots is prescribed to have designated areas for stacking small timber, poles, firewood and *bamboo* for the *nistar* supply at the special low sanctioned rates to the local people including agriculturists and artisans. The Deputy Conservator of Forests can approve additional *nistar* depots at suitable places in the division, preferably the round or beat headquarters, so that villagers may not be required to traverse long distance to procure the *nistar* materials. The Deputy

Conservator of Forests in consultation with the District Collector fixes the *nistar* rate. Availability of the *nistar* material shall be informed to the Nistar/*Taluka Panchayats*, and the material left unused for three months will be sold through open auction.

Maintenance of Forest Land Record:

12.7.52. Maintenance of the land records and forest maps: The forestland records and the forest maps will be brought up to date, and maintained as such. Certificate to this effect will be recorded annually in the Form 1 Register during the month of June.

12.7.53. Forest notification: Attempt shall be made to procure the missing notifications of the Reserved Forests. Protected Forests and Un-classed Forests (non-forest areas) transferred to the Department, for the compensatory afforestation, shall be immediately proposed for notification as the Reserved Forests, and the reservation process shall be initiated with the section notification.

12.7.54. Reconciliation of the revenue records: The revenue records will be reconciled on the basis of the forest notifications. The Collector and the Deputy Conservator of Forests will jointly ensure that the Revenue Records are brought up to date according to the forest notifications. Since the Divisional Commissioner issues the forest notifications, there is no apparent need to issue separate orders for the mutation entries. The Revenue Department will provide a certified copy of the Records of Right to the *Buldhana* Division to mark completion of the process.

12.7.55. Along with the reconciliation, the details of land grants (*patta*) issued on the Forest land will also be made available to the *Buldhana* Division. The Collector and the Deputy Conservator of Forests shall send the details of all grants or occupancies rights issued since 1980 to the Nodal Officer at *Nagpur*.

12.7.58. Digital Database: GIS Cell, Amravati has converted all the forest maps into the digital format for analysis and quick retrieval. All primary land-related records digitized by the MRSAC were collected and stored in the digital form on CDs (Compact Discs). Copies of such CDs will be made available to the Chief Conservator of Forests and the Deputy Conservator of Forests as well as the Chief Conservator of Forests, Working Plans *Nagpur*. The DCF and RFO of the *Buldhana* Division will be provided with Geomedia Viewer. The maps of GIS can be viewed, enlarged, analysed and can be printed with the help of the Geomedia Viewer. The base maps for the coupe demarcation and treatment map will be obtained from the GIS and verified on the ground and if necessary updated and a fresh copy will be prepared. The updated coupe treatment map will be supplied to the GIS cell *Amravati* for the necessary correction and updating of maps.

THE ESTABLISHMENT AND LABOUR**SECTION 1. THE ESTABLISHMENT:**

13.1.1. The range, round and beat reorganization is proposed for reduction of present beat average area from 875 ha to 833 ha for better management, conservation and protection of forests. A proposal incorporating 7 Ranges, 23 Rounds and 102 Beats has been submitted to the CCF (T) Amravati.

Table No. 13.1
Table Showing No. of Ranges, Rounds and Beats Existing and Proposed in Buldhana Division

Particulars	Existing No.	Proposed No.
Ranges	7	7
Rounds	24	23
Beats	96	102

13.1.2. It has been observed that the division has inadequate staff for the implementation of the provisions of this Plan. However, there is hardly any substantial reduction in average beat area in the proposed reorganization and hence it needs reconsideration.

13.1.3. The details of existing Range, Round and Beats are given in **Appendix No. XXV** of Volume II. The division has ample number of *vanmazoors*, whose nature of duties changes quite frequently. Since their posts are supernumerary in nature, expenditure on their establishment does not reflect in routine budget. Hence, it is recommended that the Deputy Conservator of forests should identify and assign their services to different schemes for efficient utilization of their services. It is expected that a major proportion of the Forest Labourers are engaged in the repairs of boundary pillars, maintenance of fire lines, coupe demarcation, and marking and subsidiary silvicultural operations.

13.1.4. Adequate education and health facilities are usually not available at the beat and round headquarters in the interior areas, and majority of the field staff keep their families at a different station. These conditions necessitate special efforts for the staff welfare programme. Sufficient facilities

should be provided for quality education to the minor children of the field staff.

13.1.5. Skill up-gradation training or exposures on various aspects of forest management such as nursery management, plantations management and organizing and managing coupe operations like marking, felling, logging, etc. are proposed for the staff to improve their efficiency as well as keep them fully toned and abreast use of GPS and GIS be encouraged.

13.1.6. Training of field staff and village communities, in collaboration with NGO's, is essential and will be proposed for NTFP's collection, grading and value addition mechanisms to upgrade their skill in NTFP's management.

SECTION 2. **LABOUR AVAILABILITY:**

13.2.1. Most of the schemes have some amount on labour welfare. These amounts should be pooled, and utilized for the community welfare program in concerned villages by involving local communities. Labour skills shall be upgraded by organizing training camps in gum collection and grading etc.

13.2.2. Some scheduled adjustment should be sufficient for execution of the forestry operations. Temporary manpower shortage is experienced during the crop sowing period.

13.2.3. Care should be taken to ensure adequate employment availability to the local people. The Forest Labour Co-operative Societies (FLCS) often engage large manpower of non-members in coupe working allotted to the Societies, and the proportion of the work done by the non-members should be recorded.

CHAPTER – XIV
CONTROL AND RECORDS

SECTION 1. CONTROL AND RECORDS:

14.1. The following records shall be maintained in the Division office:

- i) Control Forms
- ii) Compartment History Forms
- iii) Plantation and Nursery Registers
- iv) Divisional Note Book.

SECTION 2. CONTROL FORMS:

14.2.1. Three permanent sets of these Control Forms will be prepared in the Working Plan Conservator's office and distributed one set each to Working Plan Circle, the Territorial Chief Conservator of Forests and the Deputy Conservator of Forest.

Formats of Control Forms

14.2.2 Following are two formats of Control Forms:

14.2.3. Coupe Control Form-For the Control of all silvicultural operations such as felling, subsidiary cultural operations, cleanings, thinning, burning, etc., prescribed to be carried out in a given coupe for the duration of the Working Plan.

14.2.4. Felling Control form- for controlling and maintaining a record of all trees marked for felling and trees retained as seed bearers or to safe guard future yield.

14.2.5. The prescribed proforma of the Control Forms mentioned above are given in **Appendix No LII** of the Volume II of this Plan.

14.2.6. The DCF will annually make entries in his copy of the Control Forms and send them together with the Deviation Statement in triplicate to the Working Plan Conservator through the Territorial Chief Conservator. After the entries have been checked and approved, the Working Plan Conservator will first get his copy completed and then send the DCF's copy to the Territorial Chief Conservator. The latter will then complete his copy and finally return the DCF's set for deposit in the latter's office till next year. The Working Plan Conservator will send three copies of Deviation Statement to the PCCF for sanction. After the sanction, one copy each will be sent to the Territorial Chief Conservator and the DCF for their record and the Working Plan Conservator will retain the third copy for his set of Control Forms.

14.2.7. The Control Forms should be submitted by the DCF to the Territorial Chief Conservator on or before December 1 and the latter should send them to the Working Plan Conservator concerned on or before January each year.

i) Coupe Control Form:

The format of Coupe Control Forms are as given in **Appendix No. LII** of the Volume II of this Plan.

ii) Felling Control Form:

The format of Felling Control Form is given in the **Appendix No. LIII** of the Volume II of this Plan.

SECTION 3. COMPARTMENT HISTORY:

14.3.1. The following forms (in two sets, one each for the Range and Division) are used for writing the Compartment History for each Compartment or Sub-Compartment:

- CH Form-1 Compartment Description to be filled by the WPO
- CH Form-2 Compartment Enumeration to be filled by the WPO
- CH Form-3 Trees Marked for Felling to be filled by the DCF
- CH Form-4 Compartment Out-turn to be filled by the DCF
- CH Form-5 Compartment History to be filled by the DCF

14.3.2. Compartment Description:

The format CH Form-1 is given in the **Appendix No. LIV** of Volume II of this Plan.

14.3.3. The description will be signed and dated by the WPO.

14.3.4. Compartment Enumeration:

The format of CH Form-2 is as given in **Appendix No LIV** in the Volume II of this Plan.

14.3.5. Trees Marked For Felling:

This form is to be filled by the DCF from time to time as the markings take place. The format of CH Form-3 is as given in **Appendix No LIV** in the Volume II of this Plan.

14.3.6. Compartment Outturn:

This form is to be filled by the DCF. The format of CH Form-4 is as given in **Appendix No LIV** in the Volume II of this Plan.

14.3.7. Compartment History:

This form is to be filled by the DCF. The format of CH Form-5 is as given in as given in **Appendix No LIV** in the Volume II of this Plan.

14.3.8. The Compartment History with full entries already exists, past entries made by the DCF will be sent to the WPO for scrutinization and editing if necessary.

14.3.9. The DCF is responsible for recording current events as they occur and will make his entries on the separate sheet of the form and not on that prepared by the WPO. At the next revision of the Plan, the WPO will scrutinize these entries and edit them if necessary.

14.3.10. The principal information, which the DCF should record, are as follows:

Felling, Subsidiary Silvicultural Operations, Slash Disposal with costs, Plantations, Control Burning with costs, Fire incidences and damage caused, Damage by other factors like Drought, Storm, Snow, Insect, Fungi, Grazing, etc., Remedial measures taken along with costs, Good seed or seedling years of important species.

14.3.11. The entries should be brief and concise, whole or part compartment that was involved should be made clear. For event timings- month or months- should be given.

14.3.15. Plantations Register and Nursery Register: The Plantation Registers will be maintained for all the areas regenerated artificially in the Form Nos. 1 to 9 as given in **Appendix No. LV** of Volume II. Plantation Registers must show dates of the rainy days and survival count. The Nursery Registers will be maintained in Form No. 1 to 10 as given in **Appendix No. LVI** of Volume II.

14.3.16. Divisional Note Book: The matters of the Divisional importance will be recorded in the Divisional Note Book under standard heading for records and ready reference. The standard format of the 'Divisional Note Book' is given in **Appendix No. LVII** of Volume II of this Plan.

MAPS:

Digital database:

14.3.17 The digital database described in the Chapter requires series of correction and revision to make it accurate and bring it up to date. The Deputy Conservator of Forests (Territorial), the Working Plan Officer shall jointly continue this work, and make it accurate and complete in the first 5 years of this Plan. Copies of this digital database will be made available to the Division and the Circle officers.

14.3.18. Maps: Maps are essential ingredients of forest management. All maps are updated, revised or new maps prepared.

14.3.19. The maps on the 4"=1 Mile scale, have been prescribed to be prepared on the 1:15,000 scale for Metric setting. In pursuance of the **Standing Order No. 55** of the Conservator of Forests, Working Plans, the following sets of maps have been prepared for the distribution to the concerned offices.

14.3.20. Divisional Maps: 6 sets of Divisional Maps on 1:15,000 scale, have been prepared by GIS Cell, *Amravati* for distribution to Divisional and Range Officers as follows:

Management Maps: 4 sets (2 cut and mounted +2 uncut and mounted)

Stock Maps : 2 sets (1 cut and mounted + 1 uncut and mounted)

These maps are proposed to be distributed, as follows:

14.3.21. Working Plan Office will retain 2 sets of uncut and mounted maps, as given under, as the **Master sets**.

Management Maps: 1 master set (uncut and mounted)

Stock Maps : 1 master set (uncut and mounted)

The **Stock Maps** show the compartment boundaries, density, site quality, age classes, regeneration and other stocking details, including nature and composition of crop. The signs used in maps including colours are given in the **Appendix No. LVIII** of Volume II.

The **Management Maps** show the boundary pillars with their numbers, the Coupes, Compartments, Felling Series, Working Circles, Ranges and other management details. The Management Maps and Stock Maps are prepared on 1:15000 scale.

Working Plan Map is prepared on 1:15000 scale showing all silvicultural units, administrative and physiographic features.

14.3.22. Buldhana Division will be provided, the following, set of maps showing the management details for office use:

Management Maps: 3 sets (2 cut and mounted +1 uncut and mounted)

Stock Maps : 1 set (1 cut and mounted)

Division office will retain 1 (one) set (cut and mounted) of Management Maps for office purpose, and provide 1 (one) set (cut and mounted) of Management Maps to the concerned Forest Range Office.

14.3.23. The Chief Conservator of Forests (Territorial) and the Chief Conservator of Forests, Working Plan each will be supplied 1 (one) set of the Management Maps on 1:50,000 scale, showing management details viz. Compartments, Working Circles, Felling Series, Range boundaries and other administrative details.

14.3.24. Reference Maps: The Reference Map on 1:2,50,000 scale, is provided along with the Plan showing Range boundaries, Compartments, Working Circles, Felling Series, roads and other prominent reference features .

14.3.25. Grazing maps: Tow set of Grazing Maps showing grazing area/series have been prepared on 1:2,50,000 scale. Working Plan Division will retain one set, while other one will be supplied to the *Buldhana* Division

A brief information for using GPS is given in Appendix No. LIX of Volume II.

CHAPTER XV
SUMMARY OF PRESCRIPTIONS

PART I

SECTION 1. SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED :

15.1.1 Area of Plan: Total area of *Buldhana* Forest Division is **83799.06** ha.

Range wise distribution of area is as under:

Table 15.1
Range wise distribution of area of *Buldhana* Division

Sr. No.	Range	Area In Hectare				
		A Class RF	C Class RF	PF	UF	TOTAL
1	Jalgaon Jamod	9295.55	464.63	6898.37	304.33	16962.88
2	Khamgaon	4267.86	8331.69	475.35		13074.9
3	Motala	4164.15	7088.8			11252.95
4	Buldhana	7155.69	3375.76	221.13	3.27	10755.85
5	Deulgaon Raja	377.18	7686.9	51.25	36.99	8152.32
6	Mehakar	1122.93	3806.33			4929.26
7	Ghatbori	12456.59	6090.42	119.01	4.88	18670.9
G. Total		38839.95	36844.53	7765.11	349.47	83799.06

15.1.2 Forest Type: As per Champion and Seth's classification the forest type is 5A/C1, Southern Tropical Dry Deciduous Forests.

15.1.3. Floral Diversity: In *Buldhana* District total 567 species of plants have been reported so far which are as under:

Table 15.2
Floral Diversity of *Buldhana* District

Trees	Shrubs	Herbs	Grasses	Climbers	Total
91	97	255	60	64	567

15.1.4. Faunal Diversity: Faunal diversity in *Buldhana* District is as under :

Table 15.3
Faunal Diversity of *Buldhana* District

Pieces	Amphiba	Reptiles	Aves	Mammals	Total
23	3	30	103	29	188

15.1.5. Human Population: Human population of *Buldhana* District is 22, 32,480 (2001 census)

15.1.6. Cattle Population: Cattle population of *Buldhana* District as per 2003 census is given in **Table No. 15.4.**

Table 15.4
Cattle population of *Buldhana* District (as per 2003 census)

Cattle	Cow	Bull/ Bullock	Sheep	Goat	Buffaloes	Total
No.	235414	283830	94138	336795	129921	10,80,098
Percentage	21.80 %	26.28 %	8.72 %	31.18 %	12.02 %	100

15.1.7. Stem Analysis for Site quality IV: For *Teak* (seed origin) CAI/MAI culminates at the age of 87 years, corresponding to 116 cm girth of breast height. For *Teak* (coppice origin) it culminates at the age of 77 years corresponding to 97 cm girth at breast height.

15.1.8. Stock Mapping: Stock mapping has been carried out over 43425.07 ha in A- class RF and *Bhingara & Kuwardeo* PF. The results of stock mapping are as under:

Table 15..5
Stock mapping results of *Buldhana* Division.

Teak	Mixed	Salai	Old Plantations	Under stocked	Cultivation	Blank	Total
7962.17	23188.48	3537.79	365.99	6137.99	2732.64	569.63	44494.69*

* Difference due to digitization error

15.1.9. Enumeration Results: Enumeration results shows that there are 261 trees /ha in Catchment Working Circle , 209 trees/ha in Afforestation Working Circle and 71 trees /ha in *Babulban* Working Circle of *Thengdi's* Plan.

PART II

SECTION 2. FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED.

15.2.1 Functional Classification : Functional classification of forests of *Buldhana* Forests Division is as under :

Table 15.6
Functional Classification of forests of *Buldhana* Division.

Category	Area in ha.				Percentage
	R.F. (in ha.)	P.F.	Un classed	Total	
Protection Forests	-	6605.43	-	6605.43	07.88
Tree Forests	7884.05	-	-	7884.05	09.41
Minor Forests	38099.12	1159.68	349.47	39608.27	47.27
Pasture land	29701.31	-	-	29701.31	35.44
Total	75684.48	7765.11	349.47	83799.06	100

15.2.2 Distribution of Area in Working Circles: Area of *Buldhana* Forests is distributed in Working Circles as given in **Table No. 15.7**.

Table 15.7
Distribution of Area in Working Circles

ha)		(Area in					
Sr. No.	Working Circle	A-class RF	C-class RF	PF	UF	Total	%
1	Protection Working Circle	-	-	6605.43	-	6605.43	7.87
2	Selection-Cum-Improvement Working Circle	7884.05	-	-	-	7884.05	9.41
3	Improvement Working Circle	29710.17	7143.22	1159.68	349.47	38362.54	45.80
4	Pasture Working Circle	-	29701.31	-	-	29701.31	35.44
5	Fuelwood Working Circle	1245.73	-	-	-	1245.73	1.48
Total		38839.95	38844.53	7765.11	349.47	83799.06	100.00

15.2.3 Selection Cum Improvement Working Circles: It includes better stocked areas of the Division. Total area allotted to S.C.I. Working Circle is 7884.05 ha.

Table 15.8
Range wise Distribution of Area in S.C.I. Working Circle

Range	Reserved Forests (ha)		Protected Forests (ha)	Un classed Forests (ha)	Total (ha)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	-	-	-	-	-
<i>Khamgaon</i>	-	-	-	-	-
<i>Buldhana</i>	-	-	-	-	-
<i>Ghatbori</i>	7884.05	-	-	-	7884.05
<i>Motala</i>	-	-	-	-	-
<i>Mehkar</i>	-	-	-	-	-
<i>D'Raja</i>	-	-	-	-	-
Total	7884.05	-	-	-	7884.05

Silvicultural System: Selection system with improvement felling, Natural Regeneration to be induced and encouraged, supplemented by Artificial Regeneration.

Felling Cycle: 20 years.

Harvestable Girth: 105 cm for both *Teak* and other miscellaneous species. *Bija*, *Shisham*, *Kulu*, *Semal* and all fruit trees are reserved against felling.

Yield Regulation: K.P. Sagariya's modification of Smithie's formula applied.

Agency of Harvesting: Departmental through FLCS or JFMC.

Enumeration: All trees above 60 cm. girth will be enumerated separately species wise. Grid wise record of enumeration and marking will be maintained.

Treatment Map: Treatment map will be prepared. . In B areas, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid.

Marking Rules: If the number of trees in approach class is more than in the harvestable girth class then the number of trees equal to 50 % of harvestable girth class shall be marked for felling in the harvestable girth class. But if the number of trees in approach class is less than those in the harvestable girth class then the number of trees equal to 50 % of approach girth class shall be marked for felling in the harvestable girth class. All dead trees, after retaining 2 dead trees per ha and malformed trees, all live high stumps and all except one vigorous growing coppice shoot per stool will be marked for felling.

Expected Yield: Teak timber - Approx.325 cum per year.

15.2.4. Improvement Working Circle: Total area under this Working Circle is 38362.54 ha.

Table 15.9
Range wise Distribution of Area in Improvement Working Circle

Range	Reserved Forests (ha)		Protected Forests (ha)	Un classed Forests (ha)	Total (ha)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	8483.70	263.12	292.94	304.33	9344.09
<i>Khamgaon</i>	3833.98	1285.32	475.25	000.00	5594.65
<i>Buldhana</i>	7155.69	1494.44	221.13	003.27	8874.53
<i>Ghatbori</i>	4572.54	1408.45	119.01	004.88	6104.88
<i>Motala</i>	4164.15	536.90	-	-	4701.05
<i>Mehkar</i>	1122.93	1364.57	-	-	2487.50
<i>D'Raja</i>	0377.18	790.42	051.25	036.99	1255.84
Total	29710.17	7143.22	1159.58	349.47	38362.54

Silvicultural System: Improvement felling with rootstock management and Artificial Regeneration.

Felling Cycle: 20 years.

Agency of harvesting: Departmental through FLCS or JFMCs.

Enumeration: All trees above 60 cm. girth will be enumerated separately species wise. Grid wise record of enumeration and marking will be maintained.

Treatment Map: Treatment map will be prepared. . In B1 areas grids of 1 ha size shall be laid. In B2 areas, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid.

Marking Rules: All dead trees, after retaining 2 dead trees per ha and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling. Lopping Rules are also prescribed for Anjan Leaves.

15.2.5. Fuelwood Working Circle : Total area under this Working Circle is 1245.73 ha. Distribution of Range wise area is given below:

Table 15.10
Range wise Distribution of Area in Fuelwood Working Circle

Range	Reserved Forests (ha)		Protected Forests (ha)	Un classed Forests (ha)	Total (ha)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	811.85	-	-	-	811.85
<i>Khamgaon</i>	433.88	-	-	-	433.88
<i>Buldhana</i>	-	-	-	-	-
<i>Ghatbori</i>	-	-	-	-	-
<i>Motala</i>	-	-	-	-	-
<i>Mehkar</i>	-	-	-	-	-
<i>D'Raja</i>	-	-	-	-	-
Total	1245.73	-	-	-	1245.73

Silvicultural System: Coppice method .

Felling Cycle: 10 years.

Agency of harvesting: Departmental through FLCS or JFMCs.

Enumeration: All trees above 30 cm. girth will be enumerated separately species wise.

Marking Rules: All *Prosopis* trees above 30 cm. will be marked for felling. All other species, except *Prosopis* , will be reserved against felling.

15.2.6. Pasture Working Circle: Total area under this Working Circle is 29701.31 ha. Distribution of Range wise area is given below:

Table 15.11
Range wise Distribution of Area in Pasture Working Circle

Range	Reserved Forests (ha)		Protected Forests (ha)	Un classed Forests (ha)	Total (ha)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	-	0201.51	-	-	0201.51
<i>Khamgaon</i>	-	7046.37	--	-	7046.37
<i>Buldhana</i>	-	1881.32	-	-	1881.32
<i>Ghatbori</i>	-	4681.97	-	-	4681.97
<i>Motala</i>	-	6551.90	-	-	6551.90
<i>Mehkar</i>	-	2441.76	-	-	2441.76
<i>D'Raja</i>	-	6896.48	-	--	6896.48
Total	-	29701.31	-	-	29701.31

Rotation: 3 years. Each grazing series is divided in to three coupes and each coupe will be closed for grazing in rotation for two years.

Treatment: Soil and Moisture Conservation works, eradication of weeds and burning, broadcasting of grass seeds of valuable species such as Sheda, Pawnya, Marvel etc, introduction of fodder yielding trees.

15.2.7. Protection Working Circle: Total area under this Working Circle is 6605.43 ha. Distribution of Range wise area is given below:

Table 15.12
Range wise Distribution of Area in Protection Working Circle

Range	Reserved Forests (ha)		Protected Forests (ha)	Un classed Forests (ha)	Total (ha)
	A Class	C Class			
<i>Jalgaon-Jamod</i>	-	-	6605.43	-	6605.43
<i>Khamgaon</i>	-	-	-	-	-
<i>Buldhana</i>	-	-	-	-	-
<i>Ghatbori</i>	-	-	-	-	-
<i>Motala</i>	-	-	-	-	-
<i>Mehkar</i>	-	-	-	-	-
<i>D'Raja</i>	-	-	-	-	-
Total	-	-	6605.43	-	6605.43

Working Cycle: 20 years.

Agency of working: Departmental.

Treatment: SMC Works along with regeneration activity.

15.2.8. Wild Life (O) Working Circle: Total area of *Buldhana* Division except that of *Lonar* WLS.

Treatment: Treatments prescribed are mainly Protection, Habitat Development supported by awareness.

15.2.9. N.T.F.P. (O) Working Circle: This Working Circle also comprises the entire area of Division except that of *Lonar* WLS.

Minor Forest Produce (M.F.P.) : The important N.T.F.P. found in the Division is *Moha flowers, Moha fruit, Tendu, Kulu gum, Salai gum, Dhawda gum, Lac, Charoli, , Neem seeds, Biba, Sitafal, etc.*

Medicinal Plants : The important medicinal plants found in this Division are, *Amaltas, Behada, Biba, Hingalbet, Palas, Umbar, Jambhul, Karanj, Chandan etc.*

Treatment: Fire Protection Measures ,Training for NTFP collection , Documentation of NTFP , Non destructive collection of NTFP , Tending and Soil Working , Planting , Ban on felling

Agency for Collection. : JFMC or Forest Department.

15.2.10. Joint Forest Management(O) Working Circle : 230 JFM Committees formed, 207 JFMCs registered with Forest Department, MoUs signed with 171 JFMCs, Approximately 33254.37 ha forest area earmarked for JFM.

Forest Development Agency: Phase- I being implemented in 26 villages, physical target of plantation is 750 ha. Phase- II will be implemented in 25 villages, the physical target of plantation is 325 ha.

15.2.11. Forest Protection (O) Working Circle:

Illicit cutting: The *Buldhana* Division consists of 96 beats out of which 67 are Normal, 21 are Sensitive and 8 are Hyper Sensitive.

Fire: Fire Protection scheme for the entire division shall be prepared and implemented after approval of CCF (T).

Classification of fire control Areas:

Class-I (Complete Fire Protection): The Class-I fire control areas include all felling coupes (six years) of SCI Working Circle, Improvement Working Circle, Protection Working Circle, Fuelwood Working Circle, thinning coupes (six years), plantations (five year), the A-type areas (permanent), forest depots (permanent), forest nurseries (permanent), Special habitat areas (permanent) and any other areas of special importance decided as such by the CCF (T).

Class-II (General Fire Protection): The Class-II fire control areas include the remaining areas of the Selection-Cum-Improvement and the Improvement Working Circle, Protection Working Circle, Fuelwood Working Circle as well as any other areas, which deserve the protection in the opinion of the CCF (T).

Class-III (General vigilance): The remaining forest areas of Pasture Working Circle (that is, areas not included in the above two classes) are identified as the Class-III fire control areas. Special measures for the fire protection are not undertaken, but deliberate setting of fire and burning the forest is prohibited.

Grazing: The reorganization of the Divisions has led to splitting of the Grazing Units. Hence, new Grazing Settlement Report shall be prepared as early as possible to avoid conflicts among the villages for grazing purpose. The State Government vide GR No. MFP-2103/CR 135 /F-1 dated 21.3.2005 appointed Grazing Settlement Officer for deciding availability of forest area

for sheep grazing. The Grazing Settlement Officer proposed 29896.79 ha C-class RF area for sheep grazing. The Grazing Settlement Report has been accepted and sanctioned by the State government vide GR No. GR No. MFP-2103/CR 135 /F-1 dated 29.10.2007. The Grazing regulations given in various Working Circles shall be strictly followed.

Encroachment: Total 857.122 ha area is under encroachment. Action as per the Scheduled Tribes and Other Traditional Forests Dwellers (Recognitions of Forests Rights) Act, 2006 and the Rules made there under shall be taken.

15.2.12. Financial Implications:

Annual estimated Expenditure = 209 lakhs.

Annual estimated Revenue = 117 lakhs.

SECTION 3. TREATMENT TYPES AND PREPARATION OF TREATMENT

MAP:

15.3.1. Each coupe for the purpose of annual coupe operations and site specific silvicultural treatment prescribed is to be divided into various Treatment Types on the basis of criteria, as given in **Table 15.13**. Treatment map will be prepared on graph paper in 1:5000 scale. The entire area of the coupe shall be divided into grids of size not bigger than 100 M X 100 M (1 ha.) after taking the base line that should as far as possible run through center of coupe. The trace of the coupe map will show the contours along with important features like nala, streams.

Table 15.13
Treatment types for coupe operations and site-specific treatment

Treatment areas	Symbol	Characteristics	Minimum patch size
Protection areas	A1-type A2-type A3-type	Area having more than 25 degree slope 20 meter wide strip on both sides of streams Area susceptible to excessive erosion	Any size
Open forests	B1-type B2-type	Open forests (density<0.4) with rootstock Open forests (density<0.4) without rootstock	2 hectare
Pole Crop and Old plantations	C-type	Pole crop of the identified valuable species, suitable for retention as future crop, having density 0.4 or more and old plantations.	1 hectare
Well-stocked area	D-type	Areas having density 0.4 and over	2 hectare

15.3.2. In the treatment maps are proposed to show adequate natural regeneration areas in the D-type & areas suitable for root- stock management (B1) and planting (B2).

15.3.3. Delineation of various treatment type areas on treatment maps will adhere to the following general guidelines:

15.3.3.1. An area having more than 25 degree slope and more than a quarter hectare in extent must be shown on the map as the A1-type; steep Slope. Smaller areas of steep slope, even if not marked on the map, will also receive the prescribed treatment.

15.3.3.2. 20-meter wide buffer along streams will be measured from the bank or the high flood mark. Rivers or streams shown on the base maps of the compartments or on toposheets of the Survey of India at 1:15,840 or smaller scales (such as 1:50,000) would suffice the purpose. Similar buffer of the A2-type areas will be marked along water bodies and tanks.

15.3.3.3. The A3-type (excessive erosion prone includes seasonally flooded areas and such pockets marked on the land use maps.

15.3.3.5. Natural regeneration would be considered adequate if at least 400 saplings/seedlings per hectare are present. The same criteria will be applied for the rootstock, and used for defining the B1-type.

15.3.3.6. The C-type areas would include groups of naturally grown poles, which are trees having 15 to 45 cm GBH and old plantations. Scheduled cleaning and thinning operations are expected in such areas.

15.3.4. The Range Forest Officer shall prepare Treatment Map of the coupe after a thorough inspection of the coupe, showing the various Treatment Type areas, as given in the above table, distinctively, on the compartment maps. The Assistant Conservator of Forests will check the treatment map and will make corrections in the map, if necessary. The Deputy conservator of forests will approve the treatment maps, after careful examination.

15.3.5. The treatment map will bear date of inspection by the Range forest Officer and the Assistant Conservator of forests under their signatures.

15.3.6. The compartment maps prepared in the Forest Geomatics Center, Amravati would serve as the base maps, which would be used for marking areas suitable for different treatment types.

SECTION 4. THE COMMON TREATMENT PRESCRIPTIONS FOR VARIOUS TREATMENT TYPES:

15.4.1. The treatment prescriptions, proposed at the time of coupe operations, which are common to different treatment-types, **excluding A-type:** protection areas are prescribed as follows.

15.4.2. Soil and Moisture conservation works: Soil and moisture conservation works such as check-dams, Gully plugging, etc. shall be carried out.

15.4.3. Dressing of high stumps: All high stumps of valuable coppice species shall be flushed close to the ground to ensure healthy coppice growth. Cutting should ensure that rainwater would not collect on the cut surface, and height of the stumps is not more than three inches away from the ground. Stump of more than 30 cm in height will be considered as high stumps. Stumps with intermediate height will be fashioned to allow growth of good coppice shoots. This operation will be repeated in the sixth year, eleventh year and twentieth year of the coupe operation, along with cleaning and thinning operations of the coupe.

15.4.4. Singling of coppice shoots: One healthy and promising coppice shoot will be retained on the stumps and the rest be removed. However, coppice shoots interfering with promising saplings of seed origin should be removed. Such coppice shoots should also be close enough to the ground so

that it would not topple after gaining volume and weight and would be able to develop root system of its own subsequently.

15.4.5. Coppice management of damaged and malformed saplings: The saplings and poles up to 30 cm GHB, having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, cause erosion and lead to soil loss.

15.4.6. Climber cutting and shrub clearance: Climber cutting of *Chilati*, *Mahulbel*, *Palasbel*, *Nagvel* and shrub cutting of *Lantana*, *Rantulsi*, *Bharati*, *Kharasani* may be carried out wherever the operation is warranted for the development of tree crop. Cutting of climbers and shrubs should generally be avoided for 20 meters from the forest edge along the roads. However no climber having medicinal value will be removed even if it is hindering tree growth.

15.4.7. Sixth-year cleaning: Cleaning operations are prescribed to be carried out in the entire coupe in the sixth year of coupe working.

15.4.8. Retaining den, snag and down logs: Two standing den and snag trees as well as two Non-*Teak* down logs per hectare will be retained in the annual coupes. Marketable down logs and snag trees in excess of this norm may be removed. Non-*Teak* trees away from roads will be preferred for retention as snag trees.

15.4.9. Control data: Pre-treatment and the post-treatment basal areas as well as other relevant parameters from the dispersed sample points using the wedge prism will be recorded by an officer not below the rank of Range Forest Officer and be entered in the Divisional Register.

15.4.10. Bias for regeneration: Tending operations should be integral parts of the coupe working and the coupe estimates. Tree harvesting shall not be carried out, unless tending operations prescribed in the annual coupes are also taken up.

15.4.11. The Prescribed Type-specific Treatment: In Addition to the common treatment prescribed in the foregoing sections type-specific treatment is prescribed for various types of areas in a coupe in Section 5.

SECTION 5. TREATMENT IN A-TYPE AREAS:

15.5.1. Soil and Moisture Conservation: Gully plugging and other Soil and Moisture Conservation works as described in the chapter of Miscellaneous Regulations shall be taken up.

15.5.2. Seed sowing: Sowing of *Khair*, *Lendia*, *Kusum*, *Bhirra* and other local seeds in bushes is prescribed to be carried out to the extent possible with the help of regular forest staff and the supernumerary forest labourers. Any one species should not constitute more than one-third of the disseminated seeds.

15.5.3. Stake planting: In the A3-type areas, stakes of *Ficus* sps., *Pangara*, *Salai* or other suitable species will be planted at, on suitable sites along *nalas* and on riparian sites with the help of regular staff and forest labourers.

15.5.4. Harvesting prohibited: Harvesting of standing trees is strictly prohibited in the A-type areas. The marketable down logs of valuable species such as *Teak*, *Shisham* and *Bija* etc shall be extracted.

SECTION 6. TREATMENT IN B-TYPE AREAS:

15.6.1. Rootstock management: Tending of rootstock in the B1-type will be carried out.

15.6.2. Plantations: Suitable sites of the B2-type areas shall be brought under the plantations. The choice of mixed species plantations or *Teak*-stump planting will depend upon objectives of the working circles and site suitability.

SECTION 7. **TREATMENT IN C-TYPE:**

15.7.1. Thinning: Thinning of old plantations and pole crop will be carried out maintaining basal area per hectare and no. of stems per hectare. The post-thinning crop should have basal area/ha and number of stems/ha as close to the relevant stand or yield table for that site quality and age as far as possible. Detailed guidelines for thinning are given in the chapter Miscellaneous Regulations. Poles of vigorously growing non-teak species should be preferred for retention if *Teak* is more than 20 percent of the crop in stocking.

15.7.2. Cutback operation: The cutback operations of trees damaged during the coupe felling, if available, shall be carried out in the year following the main felling. Trees damaged during the coupe felling, shall be marked for felling.

15.7.3. Preference of girth class: Marking in the C-type areas for the purpose of spacing out saplings and poles will be carried out from lower girth class upward.

SECTION 8. **TREATMENT IN D-TYPE:**

15.8.1. Enumeration in annual coupes: Species and girth-class of all trees above 60 cm girth are prescribed to be recorded for enumeration.

15.8.2. Marking for harvesting: Mature trees above harvestable girth are prescribed for harvesting to the extent defined by the marking prescriptions, described in the relevant Working Circle. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Well-formed and vigorous trees will be preferred for retention. Species listed as valuable species given in the paragraph 16.9.1 will determine the order of priority for retention.

15.8.3. B-grade Thinning: If the congestion is expected to persist in some patches after the harvesting, the B-grade thinning will be carried out in such patches. B-grade or moderate thinning is defined as removal of dead, dying, diseased, suppressed, defective dominated stems and whips in this order. Removal of inferior individuals will start from suppressed class and then to some of the dominant class of the crop. Advance growth having too many branches not desirable to prune or lop may also be removed.

15.8.4. Tending of natural regeneration: Singling and spacing out will be carried out among seedling/saplings of *Teak* and other valuable species listed in the section for the rootstock management. Spacing operations should leave nearly 400 seedling/saplings per hectare.

15.8.5. Cutback operations: The cutback operations shall be carried out in the year following main felling. Trees damaged during the coupe felling and marked trees not felled during the coupe operations should be marked for felling as prescribed earlier.

15.8.6. Preference of girth class: Marking in the D-type areas for trees above harvestable girth will be done from the higher girth class downwards.

SECTION 9. VALUABLE SPECIES FOR RETENTION:

15.9.1. Order of priority among desirable species for retention is prescribed as: *Anjan, Aola, Bhilawa, Kusum, Shisham, Shivan, Ahl, Salai, Charoli, Khair, Bel, Beheda, Sajad, Tendu, Dhaora, Teak and Lendia.*

15.9.2. Guidelines For The Rootstock Management: In view of tending the available natural rootstock to grow as a prominent constituent of the future crop, the rootstock management guidelines are prescribed, as follows:

15.9.2.1. Singling of coppice shoots: One healthy and promising coppice shoot will be retained on the stump and the rest be removed. However, coppice shoots interfering with promising saplings of seed origin should be removed. Such coppice shoots should also be close enough to the ground so

that it would not topple after gaining volume and weight and would be able to develop root system of its own subsequently.

15.9.2.2. Coppice management of damaged and malformed saplings: The saplings and poles of up to 30 cm GBH having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, cause erosion and lead to soil loss.

15.9.2.3. Tending of natural regeneration: All seedlings and saplings of valuable species more than 60 centimeters in height to leave nearly 400 saplings/seedlings per hectare at an average of 5 meter spacing.

SECTION 10. CUT BACK OPERATIONS (CBO):

15.10.1. Cut back operations are prescribed to be carried out in the year following the main felling, as per prescriptions given in subsequent paragraphs:

15.10.1.1. All the left over marked trees during the main coupe operations shall be harvested. Such trees, if less than 2 percent of original marking, can be felled after inspection of the Range Forest Officer. Deputy Conservator of forests may sanction felling up to 5 percent of the original marking, and a higher proportion would require prior permission of the Conservator of forests.

15.10.1.2. All trees damaged during the main coupe felling shall be marked for removal.

15.10.1.3. All left over multiple coppice shoots and poles shall be reduced to one per stool.

15.10.1.4. All newly risen coppice shoots shall be removed to encourage establishment of seedling regeneration.

SECTION 11. GUIDELINES FOR CLEANING IN THE SIXTH YEAR:

15.11.1. Clearing shall be carried out in the sixth year of the coupe working and in plantations in the sixth year of its formation. No cleaning is prescribed in the failed plantations, which are treated so as per Evaluation code. Cleaning shall be carried as per prescriptions given in the following paragraphs:

15.11.2. All inferior species including the unwanted undergrowth interfering or likely to interfere with the growth of NR of *Teak* and other valuable species shall be cut back.

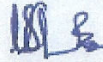
15.11.3. It will include climber cutting, shrub clearance, dressing of high stumps. Extraction of marketable down logs should be carried out in the entire coupe.

15.11.4. Coppicing of damaged and malformed saplings and singling of coppice shoots shall be carried out. All newly risen *Teak* coppice shoots shall be removed for the growth of seed origin plants.

15.11.5. Establishment seedling regeneration of *Teak* and other miscellaneous species shall be spaced out suitably. Spacing of dense growth will follow the stand table of the concerned species. In absence of the stand table, thumb-rule of keeping the spacing at one-third of the average height will be followed.

Ref : 1) Govt. G.R.Revenue and Forest Department MSC 2004/CR-102/F2,Dated 25.06.2004

With reference to the Govt. Resolution at Sr.No. 1, the II PWPR of Buldhana Forest Division was discussed by the state level committee for approval of Working Plan on 27th & 28th February 2009. The minutes of the meeting have been circulated vide PCCF's letter No. D-14/WP/CR-561(08-09) / 83 (09-10) dated 12.05.2009.

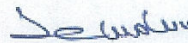


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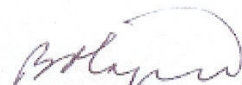
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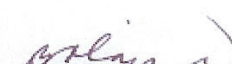
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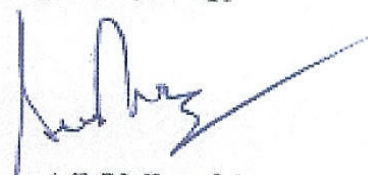
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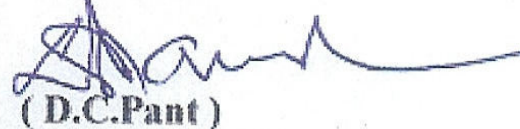
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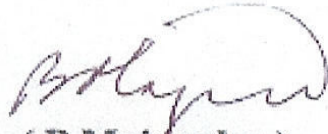
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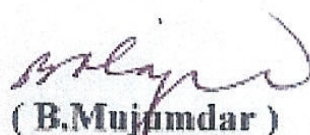
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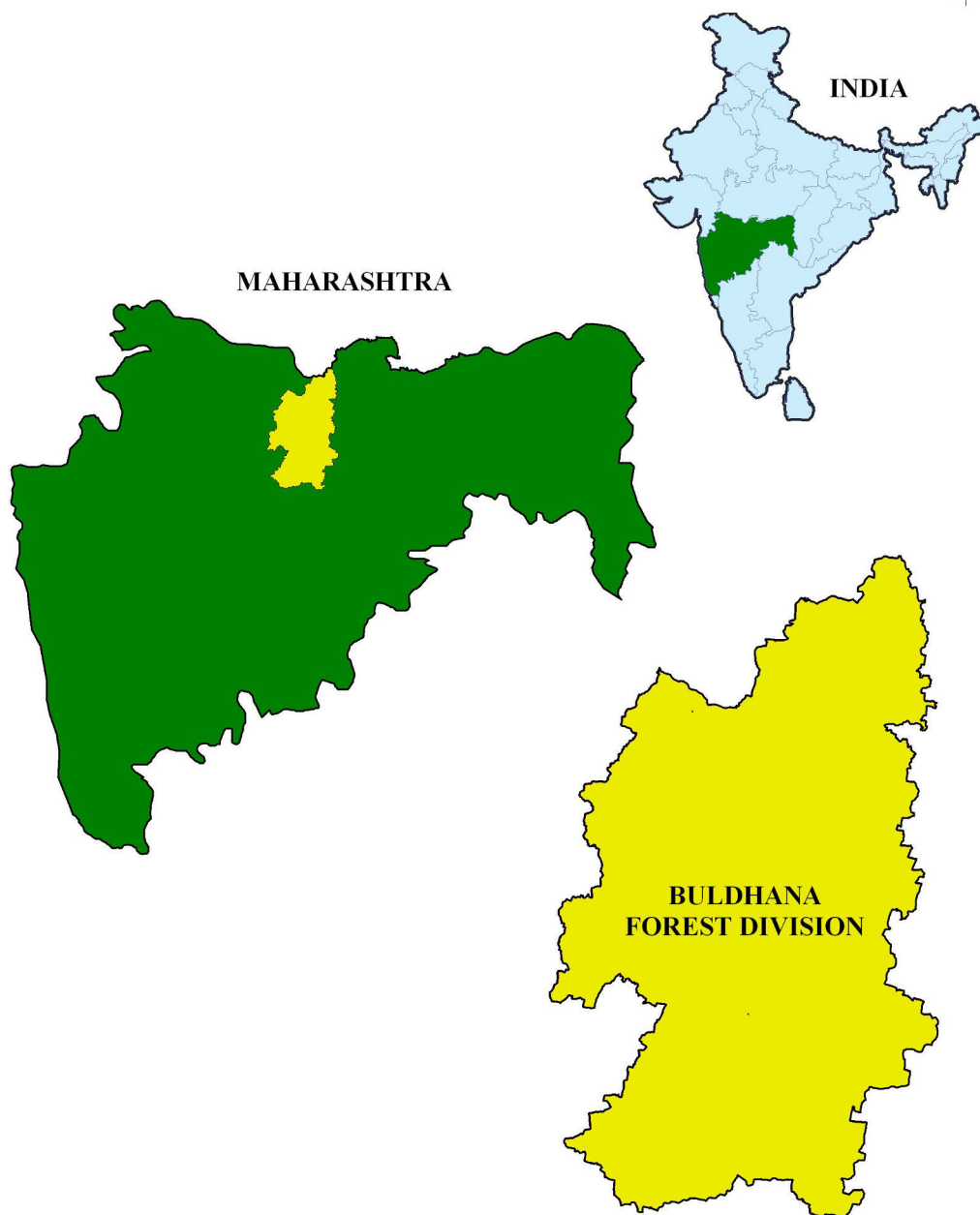
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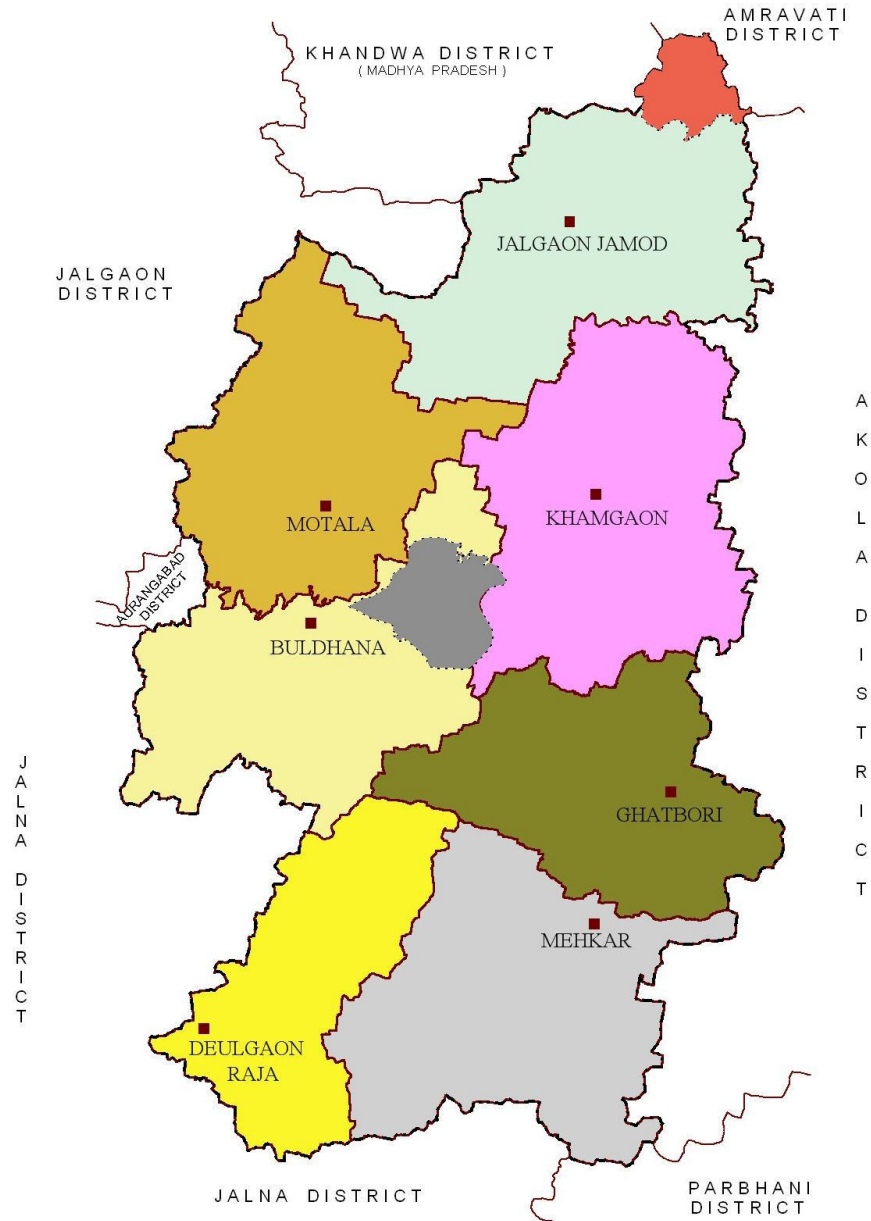
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Location of Buldhana Forest Division



Prepared By : S.R.Mohakar (Forest Surveyor) WP.Dn.Amravati.

MAP OF BULDHANA FOREST DIVISION **Showing Ranges**



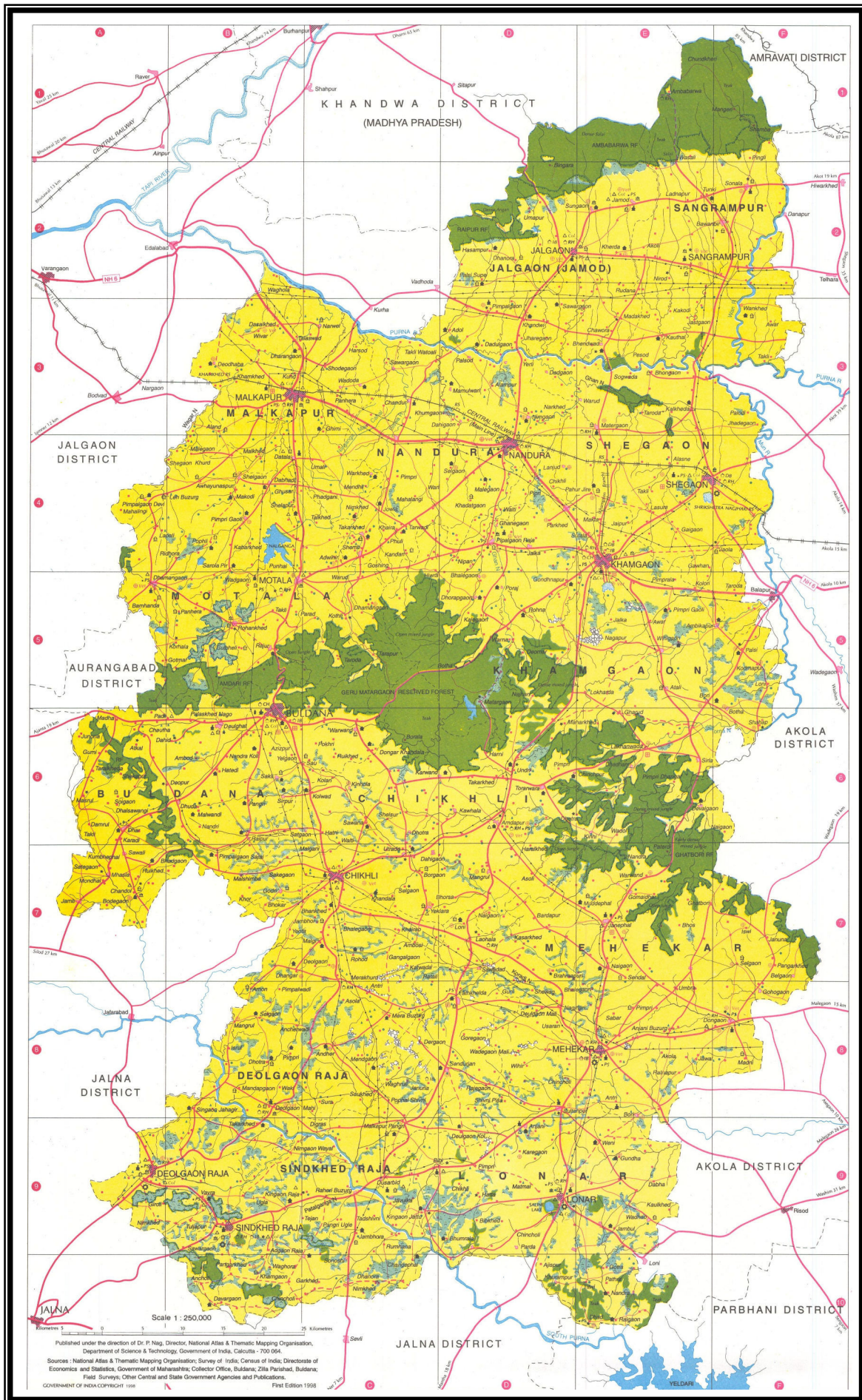
Legend

-  Division Boundary
-  Range Boundary
-  Range Head Quarter

Ranges

- | | |
|---|---|
|  JALGAON JAMOD |  MEHKAR |
|  KHAMGAON |  GHATBORI |
|  MOTALA |  AMBABARWA WLS |
|  BULDHANA |  DNYANGANGA WLS |
|  DEULGAON RAJA | |

Map of Buldhana District





STEM ANALYSIS

SELECTION CUM IMPROVEMENT WORKING CIRCLE



TEAK FORESTS IN GHATBORI RANGE



TEAK FORESTS IN GHATBORI RANGE

IMPROVEMENT WORKING CIRCLE



INFERIOR TEAK FORESTS IN GHATBORI RANGE



ANJAN FORESTS IN JALGAON JAMOD RANGE

IMPROVEMENT WORKING CIRCLE



LOPPING OF ANJAN TREES IN JALGAON JAMOD RANGE



ANJAN REGENERATION

FUELWOOD WORKING CIRCLE



PROSOPIS FORESTS IN JALGAON JAMOD RANGE



PROSOPIS FORESTS IN JALGAON JAMOD RANGE

PASTURE WORKING CIRCLE



C CLASS FORETS IN DEULGAON SAKHARSA



C CLASS FORETS IN DEULGAON SAKHARSA

PROTECTION WORKING CIRCLE



PROTECTED FORESTS OF BHINGARA IN JALGAON JAMOD RANGE



PROTECTED FORESTS OF BHINGARA IN JALGAON JAMOD RANGE

**NON TIMBER FOREST PRODUCE
(O) WORKING CIRCLE**



KALLAVI, GLORIOSA SUPERBA



BOUNDARY DEMARCATION