GOVERNMENT OF MAHARASHTRA

WORKING PLAN
for
EAST MELGHAT FOREST DIVISION
Amravati Circle

For the period
2006-07 to 2015-16

Revised and Extended for 2016-17 to 2025-26

VOLUME – I
(Part – I and II)

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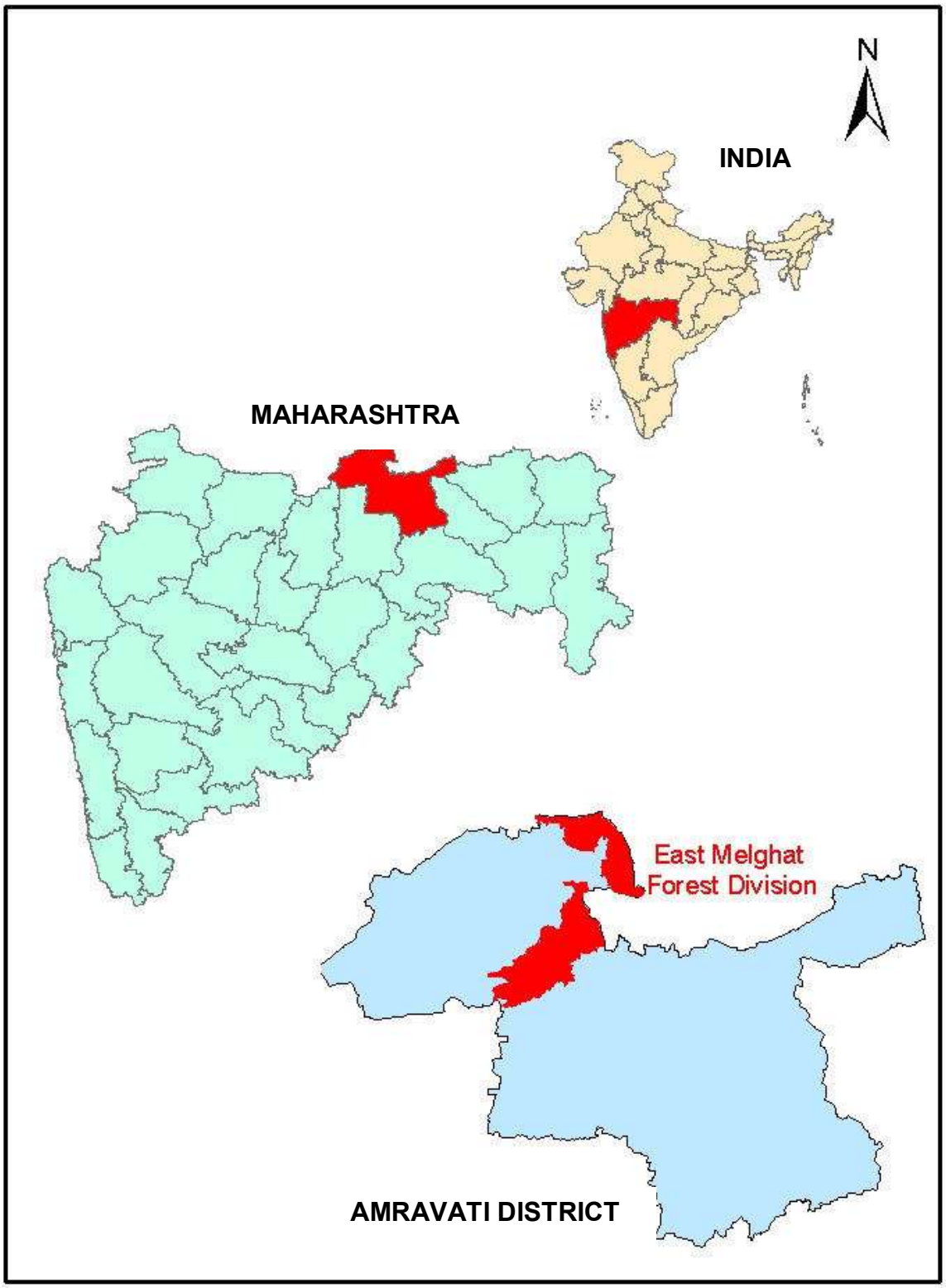
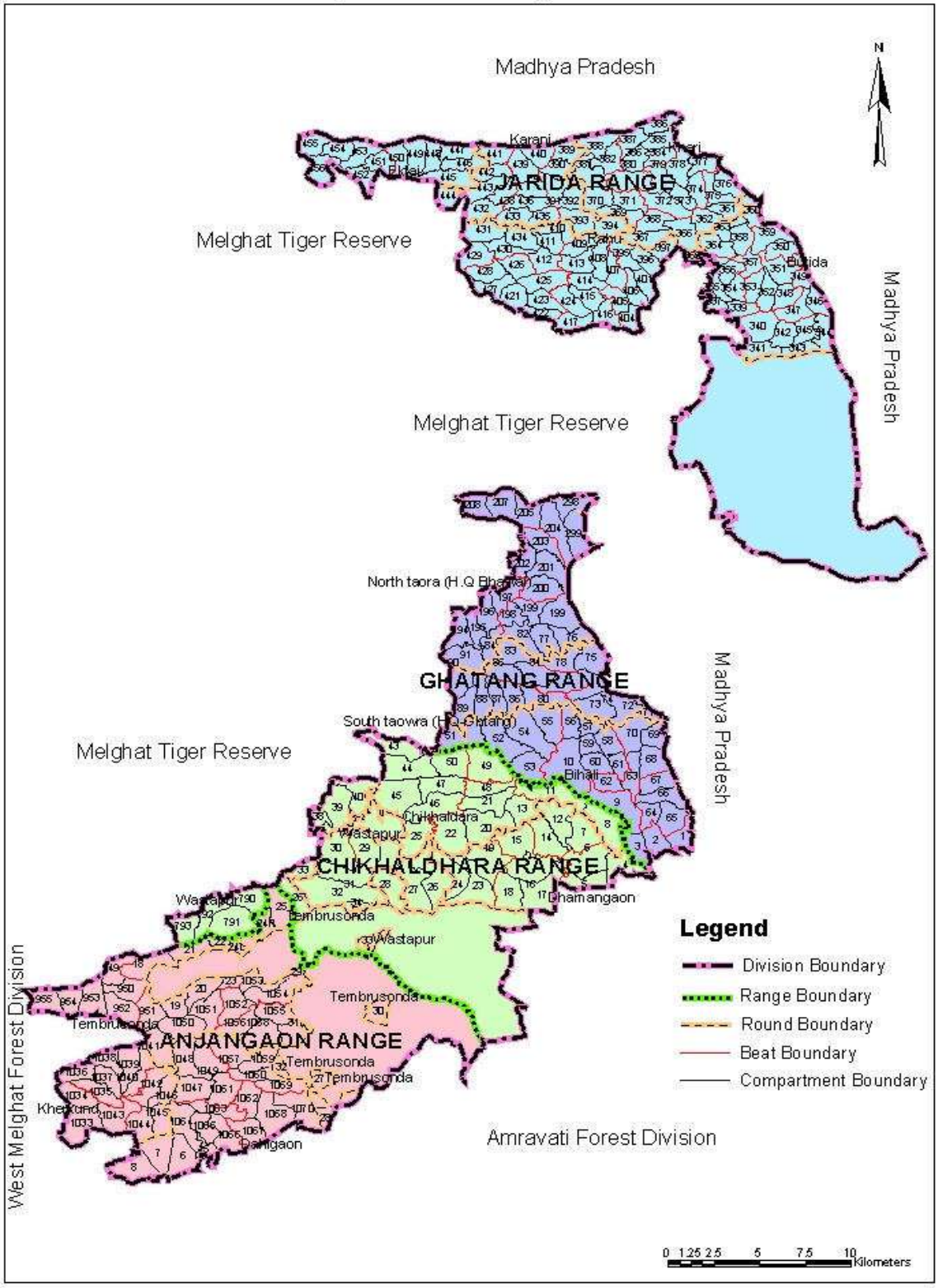
Office of the Conservator of Forests,
Working Plan,
Amravati.

Location of East Melghat Division



Administrative map of East Melghat Forest Division



सत्यमेव जयते

ASK Sinha, IFS
Principal Chief Conservator of Forests,
(Production and Management)
M.S. Nagpur.

FOREWORD

The present Working Plan for East Melghat Forest Division originally written and authored by Shri.Vinod Kumar,Shri.G.P.Garad, Shri.M.K.Rao for the period 2006-07 to 2015-16 was revised and updated by Shri.S.Yuvaraj and plan is prepared for the year 2016-17 to 2025-26.

Shri Sanjeev Gaur, CCF (Territorial) Amravati made presentation on the PWPR of East Melghat Forest Division and highlighted past performance of different working circles and proposed that there is no change proposed in the future managements as out of 20 only 09 coupes were worked and there is no negative change has been seen so far and hence desired that the same Working Plan be continued further. The felling cycles mentioned in working plan under different working circles is 20years and period of working plan is of 10 years. Hence after discussion in SLC, 10 years working under different working circles got extension of the same Working Plan for next 10 years for all the 20 felling cycles.

The PWPR prepard for East melghat Forest division is modified in the form of Mid-Term Review report and it is prepared for next 10 coupes i.e. coupe number 11-20 worked accordingly. All suggestions given at the time of State Level Committee Meeting held on 24th and 25th September, 2014 at Nagpur has been incorporated in this Working Plan.

As per suggestions given at the time of State Level Committee for preparation of Mid-Term review and extension proposal of working plan is according to National Working Plan Code – 2014 and the information given in the old working plan is revised as per National Working Plan Code – 2014.

Shri. S.Yuvaraj and his team took special efforts in updating this Working Plan. I wish to complement them for the hard work and sincere efforts put by them. Besides I appreciate Shri.M.Karunakaran, IFS APCCF, Working Plan (East), Nagpur for his sincere efforts and hard work in guiding the Conservator of Forests and his staff.

Place - Nagpur,
Dated - 21/08/2015.

Ask Sinha

(ASK Sinha)
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INTRODUCTION

from the Original Author

The working Plan for East *Melghat* Division is the first plan of the area, after the reorganization of the divisions. It covers both Reserved Forests and Un classed Forests (compensatory afforestation areas) in charge of East *Melghat* Division.

The present East *Melghat* Division is formed by drawing and merging the part areas of erstwhile East *Melghat* division, West *Melghat* division, and South *Melghat* Division. Accordingly *Jarida* and *Ghatang* Ranges were managed under V. K. *Sinha* and B.S.*Thengdi*'s working plan till 2002-03. *Chikaldara* Range was managed under *Shailendra Bahadur* and B.S.*Thengdi*'s plan till 2002-03. The *Anjangao*n Range was managed under B. S. *Thengdi*'s working plan till 2002-03. The present plan replaces the above three plans and will be in force till 2014-15.

The preliminary working plan was prepared by *Shri* G. P. *Garad* and *Shri Vinod Kumar* and was approved by the state level committee on 10-3-2004, and communicated vide letter no.1261, dated 8-2-05. On the basis of the approved PWPR, the current draft plan has been prepared. The chapters of the draft plan have been prepared according to the National working Plan Code-2004. Accordingly, 5 mandatory overlapping Working Circles have been introduced. These are 1. Bamboo (Overlapping) Working Circle, 2. Wildlife (Overlapping)Working Circle 3. N.T.F.P. (Overlapping) Working Circle 4. J. F. M. (Overlapping) Working Circle 5. Forest Protection(Overlapping) Working Circle. In addition to this, new chapters on Forest fauna, Socio Economic Survey Report, Five Year Plans were added to the Draft Plan.

A new Chapter, Teak Plantation Working Circle has been introduced for the first time in the *Melghat*s and all the old Teak Plantations will be thinned as per the schedule given in the appendix, irrespective of the coupe in which they are falling.

To preserve the *Melghat* ecosystem in perpetuity, conservative fellings have been prescribed. Earlier working was prescribed up to 45^0 slope and the same has been brought down to 25^0 slope.

The computerized inventory management system evolved by *Shri Dhabekar* ACF has been extensively used in analyzing the enumeration data obtained from the field by S.O.F.R. unit *Amravati*. The digitized maps have been generated in the office of C. C. F. W.P. *Nagpur* Geo-media Cell. The Inventory Management System has been hyperlinked to the digitized maps for easy accessibility of the data. Georeferenced Village Maps showing survey numbers and village boundaries and Soil Maps were obtained from the MRSAC and have been incorporated in the GIS. Slope maps were generated and have been incorporated in the GIS as a separate feature-class, which can be used extensively in the preparation of the treatment map of the coupes. In short, the entire coupe treatment map can be obtained from the GIS, which will be verified on the ground. Ground truth verification of the satellite Imagery of LISS III was carried out and crown density and forest types were derived from it.

I express my deep sense of gratitude for the valuable guidance and advice provided by *Shri Jwala Prasad*, Addl. P.C.C.F. (Production) and *Shri Ramanuj Choudhary* C. C. F. W. P. *Nagpur*. This plan is an output of their continuous guidance. *Shri Ramanuj Choudhary* C. C. F. W. P. *Nagpur* regularly reviewed and guided us to make the plan in a presentable form and helped us in procuring geo-referenced village maps. It was due to his continuous efforts, the plan was prepared in a short time. I also express thanks to *Shri Thapliyal* R. F. O. for his valuable cooperation in the preparation of G. I. S. Project of East *Melghat* Division.

I express my deep gratitude to R. R. S. S. C. *Nagpur*, especially Dr. *Shri* Y.V.N. *Krishna Murthy* head, R. R. S. S. C., *Shri* S.S.*Rao*, Dr. *Shri* A.O.*Varghiese and* Dr. Ashish Sharma who helped us in preparing the G.I.S. Project of East *Melghat* Division. It would not have been possible to complete G.I.S. Project of East *Melghat* Division in 6 months, without their cooperation. They not only trained our officers in arc info but also provided computer to prepare G.I.S. Project of East *Melghat* Division. In addition to this, Head R.R.S.S.C. Nagpur advised us to procure Geo referenced village maps and to register the village maps on panchromatic data for better accuracy of boundaries of the survey numbers. In short the cooperation of R.R.S.S.C. *Nagpur* cannot be explained in a few words. Similarly, I express my gratitude to Joint Director F.S.I. *Nagpur* and *Shri* V. M. *Naik* Scientist F.S.I. for their valuable cooperation in the ground truth verification.

I express my gratitude to C. C. F. (Territorial) *Amravati* and D.C.F. East *Melghat* Division and staff, for their cooperation in providing the data and assistance required in the field.

Shri R.S. *Bhawar* R.F.O., Working Plans Division, *Amravati* contributed immensely, in the analysis of inventory of enumeration data collected by the F. R. S. S. Unit *Amravati*. He also contributed in the preparation of G.I.S. Project, ground truth verification, typing and formatting of chapters and preparation of appendices. In short, he worked very hard and deserve special appreciation. In addition to him, Sri S. B. *Dhabhade*, Surveyor, *Shri Satish Mohakar* Surveyor, *Shri* A.S.*Giri* Surveyor worked hard, day and night to prepare the appendices and G.I.S. Project. I acknowledge and special appreciation to all the four officers for their contribution in the preparation of this working plan. The entire staff of this office worked untiringly and zealously.

Sd/-
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Working Plans Division,
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Sanjeev Gaur, IFS
Chief Conservator of Forests,
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FOREWORD

As per the National Working Plan Code, the job of Terrirorial Chief Conservator of Forests is limited to the extent of preparation and presentation of PWPR to the State Level Committee (SLC). However, while preparing the PWPR, I found that most of the prescriptions already take care of silvicultural requirements for substantial period to come. This very fact was emphasized during my presentation on 25th September, 2014 before the SLC, which was kind enough to provide me the opportunity of updating the existing working plan without preparation of working plan afresh. Probably, it isfor the first time in the State when the SLC has convinced on the point that, if the coupes are laid for the 20 years then the existing Working Plan should live up to its natural life span of 20 years instead of revising it mechanically after 10 years.

Before proceeding further, I wish to point out the fact that the geographical location of East Melghat Division and its vicinity to thevast tracts under the Melghat Tiger Reserve make the task of Working Plan officer more difficult because of the fact that apart from taking care of silvicultural requirements, he must not overlook the needs of natural habitat providing to wide range of fauna in Melghat Forests. I find myself fortunate to remain present when the plan was presented before the SLC by Shri. M.K.Rao, IFS, the author of this Plan. More so, I also got the opportunity to remain present when the CoupeNo.I was worked under the Teak Plantation Working Circle around 2006-07 under the supervision and guidance of Shri. Tasneem Ahmad, the then Chief Conservator of Forests, Amravati. Thus, before discharging my duties of writing PWPR, I had basic idea about the complexities of forests in East Melghat Division.

As directed by the SLC, I have made effort to incorporate the subsequent developments and their consequences after the original plan was approved by the Central Government in the year 2006-07. First and foremost event that took place was the enactment of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA). Since the forest land over which the forest rights under the FRA were to be recognized has been mostly under the possession of the Forest Department, the major responsibility for facilitation to implement the Act came on the shoulders of the forest officers. The area within East Melghat Forest Division, mostly falls in the tribal belt of Melghat forests. Needless to mention that substantial number of claims has been presented in this Division and much of the time and energy had to be diverted by the field forest officials in assisting the authorities for implementation of the Act in letter and spirit. The process of recognition and vesting of forest rights is still goind on, making the task of execution of Plan more challenging.

East Melghat Forest Division lies in ChikhaldaraTaluka of Amravati District. The entire Chikhaldara and Dharnitaluka in Amravati District has been notified as Scheduled Areas. During the recent past, the Hon'ble Governor of Maharashtra exercising the powers conferred to him, under Para 5(1) of the fifth Schedule of the Constitution of India, has modified certain provisions in the Indian Forest Act, 1927 and has also modified certain provisions in Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act, 1997. With these amendments, the ownership over the Minor Forest Produce found in Government lands (excluding National Parks and Sanctuaries) shall be of the concerned Panchayats and Gramsabhas. It may further be pointed out that the definition of Minor Forest Produce has been brought at par with that given in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. These paradigm shifts in the legal provisions, shall have long term consequences so far as the execution of Working Plan is concerned. I have made an effort to highlight these amendments and prospective scenario in the respective Working Circles.

Another significant feature is the fact that the State Legislature with the prior ascent of Hon'ble President of India has brought certain amendments in the Indian Forest Act, 1927, whereby Forest Officers have been invested with the powers of summary eviction in the reserved forests. The jurisdiction of Civil Courts in such matters has been barred by these amendments. Thus, it has become crucial for field forest officers to understand, on the basis of relevant records and notifications that a particular piece of land belongs to the category of reserved forests. It is interesting fact that almost entire area in the East Melghat Forest Division is reserved forests. This status has been attained over a period of almost 70-80 years during which, these forests were under the administrative control of various regimes such as State of C.P. & Berar, Resident of Hyderabad and eventually under the British Management System. During updation of this Working Plan, I discovered such orders, documents and various notifications are neatly compiled in form of Form-I Register. This register incorporates a concise Note written by Shri. SWH Naqwi,the then Divisional Forest Officer, East Melghat Forest Division in the year 1985. This Note goes under the heading of **"Forgotten Links in the Legal History of Melghat Division"** and narrates the entire chronological sequence as to how certain lands attained the status of reserved forests. In view of the recent amendments, I find it important to incorporate this Note in Volumn-II for the benefit of the forest Administration and the future generations of foresters.

The chapter of Miscellaneous Regulations most often discusses about the provisions of grazing giving a passing reference to various GRs in this regard. For the benefit of the ForestOfficers as well as the stake holders, all these GRs along with grazing rules notified by the State Government in the year 1973, have been compiled and incorporated in Volumn-II. The grazing units giving the details of the carrying capacity as well as allowable cattle units in each such grazing units have been incorporated in the Updated Plan.

The Teak Plantation Working Circle is the most crucial Working Circle so far as execution is concerned. For the benefit of the field officers, the TeakSite Quality chart as well as the method for segregating the fit grids from the unfit grids under this Working Circle has been given in Volumn-II. The relevant extract of Yield Table and Stand Table has also been incorporated. This working circle also discusses the concept of the term known as **'Critical Crop Girth'**. The definition and concept has also been incorporated.

Updating an existing document, keeping its original spirit intact is like renovating a historical monument without disturbing its original structure. I am extremely thankful to Shri. Sunil Bedarkar, Assistant Conservator of Forests, Working Plan, Amravati and his entire team and Shri. S. Yuvraj, Incharge Conservator of Forests, Working Plan, Amravati for translating my instructions into accurate updation and precise incorporation in the Plan. Last but not the least,I shall ever be indebted to Shri. Jayant Kale, Senior Statistical Assistant for providing me vital statistics for correct assessment of the performance of the present Working Plan for the last 10 years.Shri.M.K.Rao, Author of this original working plan along with Shri.Vinod Kumar and Shri. G.P.Garad, the then Deputy Conservator of Forests, Working Circle deserve compliments for producing such a perfect document which needs only updation.

Place :- Amravati
Dated :- 20.08.2015

(SANJEEV GAUR)
Chief Conservator of Forests
(Territorial) Amravati.

Yuvaraj .S. , IFS
Conservator of Forests (I/c),
Working Plan, Amravati.

INTRODUCTION

From the Present Working Plan Officer

The working plan of East Melghat Division in Amravati (T) Forest Circle was originally prepared for 2005-06 to 2015-16. Five working circle proposed are Teak Plantation Working Circle, Selection Cum Improvement Working Circle, Protection Working Circle, Improvement Working Circle and Afforestation Working Circle. Except for the Protection Working Circle in all the working circles, 20 coupes were prescribed in the plan. At the end of the plan period i.e. 2015-16, only less than ten coupes were worked. There are overlapping working circles also viz. Bamboo overlapping circle, Non-Timber Forest Produce working circle, wildlife overlapping circle, Joint Forest Management Working Circle, which were also worked only for the first ten years.

Given the above facts, the Chief Conservator Of Forest, Amravati (T) during the PWPR Presentation before the State Level Committee for the Approval of working plan had emphasised that the result of the plan could not be ascertained because only less than ten coupes were worked till 2015-16. Further whatever results that were available met the objectives of the plan and proposed to continue the same prescriptions for the next plan period also. TheState Level Committee also gave its nod to the proposal and instructed to submit the revised plan for the next plan period.

The national working plan code 2014 also reiterates the need to have review of the plan at the end of 10 years. Chapter III Para 31 reads that;

"*Generally the working plan is to be revised every 10 years and the preparation of working plan of a territorial forest division should normally take two years which may vary depending upon the volume of work and technical facilities available. The number of working plan units in the state depends upon the workload i.e. the number of territorial divisions for which working plans are to be prepared/revised for a cycle of minimum 10 years. If the planning/prescriptions are given for a period of more than 10 years (for e.g., in a working circle if the conversion period of the crop is fixed for 30 years) then review will be done at the end of 10 years and the 11th year coupe will become the 1st year coupe, 12th year coupe will become the 2nd year coupe and so on after review. A mid-term review of the working plan may be carried to assess the progress made in implementation of the prescription for various working circle, review the difficulties being experienced and make mid-course corrections in the prescriptions, where ever required.*"

Accordingly a revised and updated plan is prepared for the year 2016-17 to 2025-26.In the current plan, the recent development like the implementation of Scheduled Tribes and Other Traditional Forest Dwellers Act 2006, the transfer of ownership of Minor Forest Produce found in government lands (excluding National Parks and Sanctuaries) to the concerned Panchayats and Gram Sabhas through the amendment done by Hon'ble Governorof Maharashtra in scheduled areas have been incorporated. The statistics like legal status of forest, staff position, grazing units etc. have been revised and updated. Thus only the developments which are likely to have an impact on the implementation of the plan have been incorporated and the technical aspects have been kept intact.

In this effort, many people have been associated with. The office of the Conservator of Forest, Working Plan Division acknowledges all of them;

1. All the members of SLC including(1) Anil Kumar Saxena, Principal Chief Conservator of Forests & Head of Forest Force, Maharashtra State, Nagpur (2) SarjanBhagat, Principal Chief Conservator of Forests, (Wild life)Maharashtra State, Nagpur. (3)A.S.K.Sinha, Principal Chief Conservator of Forests, (Production & Management), Maharashtra State, Nagpur (4) S.K.Bhandari, Chief Conservator of Forests, (Central)Representative of GoI, Bhopal, (M.P.) (5) M.Karunakaran, Add.Principal Chief Conservator of Forests, Working Plans (East), Nagpur. (6) Dr.S.C.Gairola, Add.Principal Chief Conservator of Forests and Nodal Officer, Nagpur. (7) Shree Bhagwan, Add.Principal Chief Conservator of Forests, (Budget, Planning & Development) M.S. Nagpur. (8) Dr.P.N.Munde, Add.Principal Chief Conservator of Forests, (Subordinate Cadre) Nagpur & Guardian APCCF, Amravati Circle. (9) Dr.MohanJha, Add.Principal Chief Conservator of Forests, (IT&P) Nagpur. (10) A.K.Mishra, Add.Principal Chief Conservator of Forests, (Personnel) Nagpur. (11) Sanjeev Gaur, Chief Conservator of Forests, (Territorial), Amravati fortheir positive consent for the revision of the plan.

2. Shri. Sanjeev Gaur IFS, Chief Conservator of Forest, Amravati (Territorial) Circle for the technical guidance and support by way to close monitoring on day to day basis in updating issues relating to FRA, ownership of MFPs to Gram Panchayat in Scheduled Areas,Incorporation of Relevant of Notification, Rules relating to Reserved Forests, Grazing etc.

3. Shri. Sunil Bedarkar, Assistant conservator of Forests, Working plan, Amravati for his valuable inputs in the revision and updation of the plan especially in redefining the chapter on Bio-diversity.

4. The timely and perfect data provided by shri. Jayant Kale, Statistician, CCF (T), Amravati, Shri.R.N.Devikar, Accountant, CCF (T), Amravati, ShriShailendraBisene, Accountant, East Melghat Division, Shri. Rajesh Khadse, Surveyor, Working Plan, Amravati is sincerely acknowledged.

5. The endurance and patience shown by Shri.Mufaddal A. Shakir, Forest Guard, Working Plan, Amravati in typing and bringing the plan to the final output is commendable. The support shown by Shri.UmeshSirswande, Stenographer, East Melghat Division, Shri. Gawande, Stenographer, CCF (T), Amravati is also appreciated.

6. The authors of the original plan, Shri. M.K. Rao, Conservator of Forests, Shri. Vinod Kumar and Shri.G.P.Garad, the then Deputy Conservator of Forests, Working Plan and the entire team of officials and staffs are also duely acknowledged here for providing an impeccable and visionary plan which gave us an opportunity just torevise and update.

Place -Amravati
Dated - 24.08.2015

(Yuvaraj.S.)
Conservator of forest (I/c)
Working Plan, Amravati.

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I. ABBREVIATIONS USED IN THE PLAN

ACF	Assistant Conservator of Forests
APCCF (W.P.-East)	Additional Principal Chief Conservator of Forest,(Working Plan-East)
B and C Dept.	Building and Construction Department
Bh	Breast height
CAI	Current Annual Increment
CCF	Chief Conservator of Forest
CF	Conservator of Forest
CF WP	Conservator of Forest, Working Plan
Cft	Cubic feet
Cm	Centimeter
Comptt	Compartment
Contd.	Continued
Dbh ob	Diameter at breast height over bark
Dbh ub	Diameter at breast height under bark
DCF	Deputy Conservator of Forest
Dn	Division
FLCS	Forest Labour Cooperative Society.
FRA	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.
FRH	Forest Rest House
FRSS	Forest Resources Survey Scheme
FS	Felling Series
FV	Forest Village
gbh	Girth at breast height
GIS	Geographical Information System
GOI	Government of India
Govt	Government
GPS	Geographical Positioning System
Ha	Hectare
HoFF	Head of Forest Force
Inch	Inches
JFM	Joint Forest Management
Km	Kilometer
M	Metre
M^3	Cubic–metre
Mah	*Maharashtra*
MAI	Mean Annual Increment
MFP	Minor Forest Produce
MTR	Melghat Tiger Reserve
No	Number
NTFP	Non Timber Forest Produce
(p)	Part
PB	Periodic block
PCCF	Principal Chief Conservator Of Forest
PCCF (P & M)	Principal Chief Conservator of Forest, (Production and Management)
PESA	The Provisions Of The Panchayats. (Extension To The. Scheduled Areas) Act, 1996.
PWC	Protection Working Circle
RFO	Range Forest Officer
RH	Rest House
Rs	Rupees
SCI	Selection Cum Improvement
SMC	Soil Moisture Conservation Works
Sq	Square
TCP	Tiger Conservation Plan
U	Under
WC	Working Circle
WL	Wild Life
WP	Working Plan
WPO	Working Plan officer
Yrs	Years

II. GLOSSARY OF LOCAL TERMS USED IN THE PLAN

Ara	A roughly fashioned piece of timber suitable for making into a spoke Also a pole of medium girth suitable for use as a ridge-piece or bressummer in house construction.
Bakhar	A hoe.
Balla	A plateau
Balli	A thin pole suitable for use as a rafter.
Bidi	A cigarette prepared by rolling dried leave generally of Tendu (*Diospyros melanoxylon*)
Dahya	Shifting cultivation.
Dengri	A short pole between 30 cm. and 45cm. in girth and under 2.5 m. in length suitable for use as a fencing post.
Dhar	A narrow ridge
Doh	A deep pond in a stream or river.
Geru	A paint prepared form red chalk.
Lakh	A hundred thousand.
Mahout	An Elephant Care Taker
Mandawa Mala	Wooden shelter or shed constructed for a temporary purpose such as protection of crops.
Murram	A reddish hard soil.
Nagar	A plough.
Padao	A camping ground or a place where timber is collected for export.
Patel	A headman of a village.
Putha	A roughly fashioned piece of timber suitable for making into a felloe.
Raiyatwari	A form of land tenure, applied to land in rayatwari Tenure and to villagers holding such land.
Ramna	A grass reserve.
Satkata	Miscellaneous trees.
Shikar	Hunting.
Tahsil	A part of a Revenue district formed for administrative purposes.
Tatta	A mat , usually made from split bamboos but occasionally from twigs of *Vitex negundo.*
Warli	A rectangular boundary cairn.

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BOTANICAL AND LOCAL NAMES OF PLANTS AND WILD ANIMALS

Note. - 1} H- *Hindi*; M – *Marathi*; K – *Korku*; E- English. V.A – Very abundant; A- Abundant F – Frequent; O – Occasional; R - Rare; V.R. Very rare; L. Local {prefixed to any of the above.)

A - Trees

Local Name	Botanical Names	Remarks
1	2	3
Amta, H. Ambotha, K.	*Bauhinia malabarica, Roxb*	O
Amaltas, H.	*Cassia fistula, linn*	F
Apta M.	*Bauhinia racemosa, Lamk*	F
Aonla, H.	*Emblica officinalis, Gacrtn*	
Aonla M. K.	*Syn. Phyllanthus emblica, linn*	V. A.
Anjan, M. H. K.	*Hardwickia binata, Roxb*	L. F. Dabida reserve
Arang, K.	*Kydia calycina Roxb* *Eriolaena keriana ,W. and A*	O.
Am H. K. Amba, M.	*Mangifera indica , Linn*	F
Ahl H. M.	*Morinda tinctoria, Roxb*	L. O
Ambada M. .	*Spondiam pinnata (linnf Kurz.).* *Syn. Spondias mangifera, willd.*	V. R.
Ain, M.	*Terminalia tomentosa, W. and A.*	A
Achar H. M.	*Buchanania lanzan, spreng Syn.* *Buchanania latifolia Roxb.*	F
Babul, H.M. K.	*Acacia arabica, willd.*	R
Bel. H. M. Bela K.	*Aegle marmelos, Correa*	F
Bhosa, K.	*Bauhinia racemosa, Lamk*	F
Bahawa, M. Bhanaka bongru,K.	*Cassia fistula, Linn.*	F
Baru, K.	*Schleichera oleosa, { Lour) Oken* *Syn. Schleichera trijuga, Willd*	F
Bhirra, H. M. K.	*Chloroxylon swietenia, D. C. L. A*	Kohana, Behali
Bhoti H. Bhondia-	*Eriolaena hookeriana, W and A.*	O
Bar H.. Banyan, E.	*Ficus bengalensis, Linn*	F
Bhorsal, M. K.	*Hymenodictyon excelsum, Wall*	R

Local Name	Botanical Names	Remarks
Barga, H. Bhoti, K.	*Kydia calycina, Roxb.*	A
Bakain, H. M. K.	*Melia azedarach Linn.*	V. R.
Bija, H. M.	*Pterocarpus marsupium Roxb.*	O
Bhilawa H. Biba M .	*Semecarpus anacardium, Linn f.*	F
Bahera, H. M. K.	*Terminalia bellerica Roxb*	A
Ber H. Bor, H. M. K.	*Zizyphus jujuba, Lamk Syn.* *Zizyphus mauritiana Lamk*	A
Baringa, K. Boria, K.	*Grewia tiliaefolia, Vahl Glochidion velutinum, Wight .*	V. A L. F. Chikhaldara
Chichwa, M. Chichlor, K.	*Albizzia odoratissima, Benth*	O
Chapa, K.	*Bauhinia variegata, linn*	L. F.
Char, H. M.	*Buchanania lanzan, Spreng Syn.* *Buchananina latifolia, Roxb.*	F
Chirohol, H. Chilla K.	*Holoptelea integrifolia, X Planch.*	O
Chakrej, K.	*Lagerstroemia parviflora, Roxb.*	V. A.
Chandan, H. M. K	*Santalam album ,Linn.*	V. R. Gawilgarh Fort
Choso , K.	*Semecarpus anacardium, Linn.f*	F
Chinch M. Chicha, K .	*Tamarindus indica.*	O
Chawar, K. Chaura, K.	*Sterculia colorata, Roxb.*	L. O. *Chikhalda*
Dhaora, H. M. K.	*Anogeissus latifolia, Wall .*	V. A
Dahi- palas, M.	*Cordia macleodii, H. F. and Th.*	L. O.
Dhoban, H.	*Dalbergia paniculata, Roxb.*	A
Dhaman, H. M. K.	*Grewia tiliaefolia, Vahl.*	V. A.
Dhaman, K.	*Grewia orbiculata, Rotter.*	V. R
Dudhi, H.	*Holarrhena antidysentrica, Wall .*	F
Dudhi, H Dudiya K.	*Wrightia tinctoria, A Br.*	V. R.
Dudhi H. Dudhari, K.	*Wrightia tomentosa , Roem. and Sch.*	V. R.
Goria nim. K.	*Cedrela toona, Roxb.*	L. O. *Chikhalda, Bairat, Makhala.*

Local Name	Botanical Names	Remarks
Gabdi, H . Gongal,M. Ganer,M.	*Cochlospermum gossypium, D.C.A.*	Dhulghat
Ganer, K.	*Erythrina suberosa, Roxb.*	L. A.
Gular, H .	*Ficus glomerata, Roxb.*	A.
Goraghoti, K.	*Flacourtia ramontchi, L Herit.*	F.
Ghetu, K.	*Randia dumetorum, Lamk.*	F.
Ghangru, K.	*Randia uliginosa, D. C.*	O.
Ghatbor, M. K. Ghota, K.	*Zizyphus xylopyra ,Willd,*	A.
Gondan, M.	*Cordia dichotoma, Forst.* *Syn. Cordia myxa, Linn.*	V. R. *Koktu.*
Hiwar, M.	*Acacia leucophloea, willd.*	L. O.
Haldu, H. M. K	*Adina cordifolia, Hook, f*	A and L. V. A.
Homba,M. K.	*Saccopetalum tomentosum ,* *H. f. and Th.*	A.
Harra, H . Hilda, M.K. Hirda, M. K.	*Terminalia chebula, Retz.*	L. A.
Imli, H.	*Tamarindus indica.*	O.
Jamrassi, H.M.	*Elaeodendron glaucum, Pers.*	O.
Jamun, H. Jambhul, M. Jambu K.	*Eugenia cumini (Linn.) , Dru.* *Syn. Schyzigium cumini.*	L. A.
Jhan, K.	*Schrebera swietenioides, Roxb.*	A.
Kala dhendra, H.	*Randia uliginosa, D. C.*	O.
Khair, H. M. K.	*Acacia catechu, Willd.*	L. F. occurs In opendry Forest and frost Areas.
Kinhi, M. K.	*Albizzia procera, Benth .*	O.
Khatua H, Katumba, K .	*Antidesma diandrum, Roth.*	R.
Keolar, H. Keolari, K.	*Bauhinia purpurea, linn.*	L. A.
Kachnar, H.	*Bauhinia variegata, Linn.*	L. F.
Khatsawar, M .	*Bombax malabaricum, O C. Syn.* *Bombax ceiba, Linn.*	O.

Local Name	Botanical Names	Remarks
Kasai ,H. Katiyen, M. Karkha, K.	*Bridelia retusa, spr.*	A.
Kumbhi, H. M. K	*Careya arborea, Roxb.*	C. and L. A. The latter on high Plateau.
Kesa, K.	*Casearia tomentosa, Roxb.*	A.
Karanleo K.	*Dolichandrone crispa, Seem.*	R.
Korelawa, K.	*Ficus cunia, Ham.*	R.
Korelawa, K.	*Ficus hispida Linn.*	R.
Karkai, M.	*Flacourtia ramontchi, L Herit.*	E.
Kakar, H. Kekda.	*Garuga pinnata, Roxb.*	A.
Kolya, K. Kolsa, K.	*Glochidion velutinum Wight.*	L. F. *Chikhalda* . .
Kasmar, K.	*Gmelina arborea, Roxb.*	O.
Kuda , M. Kurakat ,K.	*Holarrhena antidysenterica. Wall.*	F.
Karanjalam, K.	*Holoptelea integrifolia, Planch.*	O.
Kukum K.	*Mallotus philippenesis, Muell.*	O.
Kari, H. M. K.	*Miliusa velutina, H. f and Th .*	O.
Kalam, M. Kuram, K. Kurumbo K.	*Mitragyna parvifolia, Korth* *Syn Stephegyne parvifolia, Korth.*	F.
Kari, H.	*Saccopetalum tomentosum, H. f and Th.*	O.
Kusum H.	*Schleichera oleosa (Lour), Merr.*	F.
Kusumb M.	*Syn. Schleichera trijuga, Willd.*	F.
Katamba, K.	*Spondias pinnata, (Linn.f) Kurz* *Syn. Spondias mangifera, Wild.*	V. R.
Kulu H. M. Karhai, H. M.	*Sterculia urens ,Roxb.*	A.
Kudal K. Kuthada, K.	*Sterculia villosa , Roxb.*	R.
Kalatetu, K.	*Stereospermum xylocarpum*	L.O. *Chikhalda, Bajrat*
Kahu, H. Kowa, K.	*Terminalia arjuna, Bedo.*	L.A.

Local Name	Botanical Names	Remarks
Khudaibidi, K.	*Trema orientalis, Bl.*	O.
Kura, K .	*Wrightia tinctoria, A Br.*	A.
Limbori, K.	*Azadirachta indica, A Juss.*	
Lasora, H.	*Cordia dichotoma, Forest* *Syn. Cordia myxa.Linn.*	V. R. *Koktu.*
Laurikasmar, K.	*Cordia macleodii, H.f and Th.*	L. O.
Lawa, K.	*Ficus glomerata, Roxb.*	A.
Lokhandi, M.K.	*Ixora parviflora, Vahl.*	L.A.
Lendia J. M .	*Lagerstroemia parviflora*	V. A.
Lenia K.	*Litsee sebifera, pers.*	R. Higher Elevations.
Maharuk, H. M. Marukha, K.	*Ailanthus excelsa, Roxb.*	R.
Medsing, H.M.	*Dolichandrone falcata, Seem*	R.
Mohin, H.M. K. Moyen ,H. Mohi. H. M. K.	*Lannnea grandis, Engl* *Syn. Odina woodier, Roxb*	A.
Maidalkri, H.	*Litsia glutinosa pers .*	R. Higher. Elevation .
Mahua ,H Mohawa. M. Mu, moha, K.	*Madhuca latifolia, Roxb macbride* *Syn. Bassia latifolia*	F .
Mango, E.	*Mangifera indica, Linn.*	F.
Mainhar, H. Mainphal, H..	*Randia dumetorum, Lamk*	F.
Mokha H. M.	*Schrebera swietenioides, Roxb.*	A.
Nim H. M.	*Azadirachta indica, A Juss.*	L.O. occurs in southern foot hills.
Nazarijot, K.	*Dolichandrone falcata seem*	R.
Niru, K.	*Elaeodendron glaucum, Pers.*	O.
Nagthada, K.	*Erythrina suberosa, Roxb*	L. A.
Palas, H.M. Pharsa K.	*Butea monosperma Lam..*	L. A.
Phangra, K.	*Cochlospermum gossypium, D.C*	A. Dhulghat.
Phansi, M. Passi, K.	*Dalbergia paniculata Roxb.*	A.
Padar, M.	*Dolichandrone crispa Seem.*	O.
Phangra, M.	*Erythrina suberosa, Roxb.*	L. A.

Local Name	Botanical Names	Remarks
Pakar, H. M. Pipri, K.	*Ficus infectoria , Roxb.*	O.
Pipal,H.M.	*Ficus religiosa, Linn.*	
Phendra ,M, Phetra M. Purputta K.	*Gardenia turgida, Roxb.*	O.
Phulangaty K.. Phulangaty Pu, K.	*Oroxylum indicum, vent.*	R.
Putpuyys, K.	*Randia uliginosa, D.C.*	O.
Pinj, M .	*Sterculia colorata, Roxb.*	V. R. *Chikhalda.*
Padar, H M. K.	*Stereospermum chelonoides,D,C.*	R.
Padar H M. K.	*Stereospermum suaveolens,D,C.*	O.
Rawa chachu K.	*Acacia lenticularis, Ham.*	
Rounjha. H.	*Acacia leucophloea, willd.*	L. O.
Rivit, K.	*Casearia graveolens . Dalz .*	A.
Rori.	*Mallotus philippinensis Muell.*	O.
Ruthu. K.	*Ougeinia dalbergioides. Benth.*	V. A.
Rohan M Rohani M. K..	*Soymida febrifuga , a Iuss.*	O.
Safed siris, H.	*Albizzia procera, Benth.*	O .
Sagon, H. Sag. Sagwan M. Sipna, K.	*Tectona grandis. Linn.*	V. A.
Saj H, Sadram, M.	*Terminalia tomentosa, W. and A.*	A.
Siris kala H.	*Albizzia odoratissima Benth.*	O.
Sitaphal H. K.	*Anona squamosa. Linn.*	L.F. occurs near *Khatkali* in *Khirpani* Range.
Semal, H. Saori , K.	*Bombax ceiba, D.C.*	O.
Salai , H. M. K.	*Boswellia serrata, Roxb*	V. A.

Local Name	Botanical Names	Remarks
Silu, K.	*Cordia dichotoma, Forest* *Syn. Cordia myxa, linn.*	V. R. *Koktu.*
Shisham, H. M.	*Dalbergia latifolia, Roxb*	O.
Sisoo, K.	*Dalbergia sisso*	
Shewan, M.	*Gmelina arborea , Roxb*	O.
Shendri, M.	*Mallotus philippinensis, muell.*	O.
Sejna, H. K.	*Moringa oleifera, Lamk.*	R.
Shewaja, M.	*syn. Moringa pterygosperma.*	
Shindhi, M. Sendhi, K.	*Phoenix sylvestris, Roxb.*	R.
Tarop, K.	*Buchanania lanzan, spreng* *Syn. Buchanania latifolia Roxb.*	F.
Tun, H.	*Cedrela toona, Roxb.*	L. O. *Chikhalda. Bairat, Makhala.*
Tendu, H. Tembru, M. K. Tembhurni, M. K.	*Disopyros melanoxylon, Roxb*	F. and L. A.
Tetu, K.	*Dolichandrone crispa, seem*	O.
Thuar, H.M.K.	*Euphorbia nivulia, Ham*	L. A. Rocky steep and Precipitious slopes.
Tetu,K.	*Oroxylum indicum, Vent*	R.
Tetu ,K.	*Stereospermum xylocarpum, Benth*	L. O. *Chikhalda, Bairat.*
Tinsa, H. Tiwas, M.	*Ougeinia dalbergioides, Benth Sym. Ougeinia oogeinensis.*	V. A.
Teklet, K.	*Sterculia urens, Roxb.*	A.
Teak, E.	*Tectona grandis, Linn.*	V. A.
Thoar , K. Thori, K.	*Trema orientalis. Bl*	O.
Thoar, K. Thori ,K. Turat, K.	*Trema politoria Planch*	O.
Tilwan, H. K.	*Wendlandia exserta.D. C*	V. R.
Umber, M.	*Ficus glomerata, Roxb,*	A.
War , M. Wora, K.	*Ficus bengalensis, Linn*	F

B – Shrubs

Local Name	Botanical Names	Remarks
Bhandar, K.	*Colebrookia oppositifolia, Smith*	L. A.
Baibarang, H. Brengeh ,K. Bharangeh, K.	*Embelia ribes, roxb.*	L. A.
Bharati, M. K.	*Gymnosporia montana, law*	L. O.
Bholari, K. Bhirhol, H.	*Indigofera pulchella, Roxb.*	L. F
Banda, H. K.	*Loranthus scurrula, linn*	R
Banda, H. K.	*Loranthus longiflorus, Desr*	R
Bhandar, K.	*Pogostemon plectranthoides Desf.*	L. A.
Bhandar, K.	*Strobilanthes callousus, nees.*	L.V. A.
Bankabas, H.M.K.	*Thespesia lampas, Dalz and Gibs*	L. A.
Bor, M. K.	*Zizyphus rotundifolia,, Lamk Syn. Zizyphus nummularia W. and A.*	L. F.

C-Climbers

Local Name	Botanical Names	Remarks
Chilati, M.	*Caesalpinia sepiaria Roxb*	L. F.
Chameli, H.	*Jasminum arborescens,Roxb*	L. F.
Chilatri M. K.	*Mimosa rubicaulis, Lamk.*	L. F.
Churni, K.	*Zizyphus rugosa, Lamk.*	F. and L. A
Dhawan, H. Dhawati, M. Dhi, K. Dhin, K.	*Woodfordia floribunda, Salisb.* *Syn Woodfordia fruticosa, Kurz.*	L. A.
Guno-hi,H. M. K.	*Abrus precatorius, Linn.*	
Gursakri, H. Ghordhaman, M.	*Grewia flvescens, Juss.*	O.
Gwagar, K.	*Hamiltonia suaveolens.*	L. F.
Jhau, H M. K.	*Tamarix gallica, Linn.*	L. A.
Katakholsa, K.	*Daedalacanthus roseus, T. anders.*	L. A.
Korajoth, K.	*Helicteres isora, Linn.*	A.
Karsali, K.	*Nyctanthes arbortristis, Linn..*	L. A.
Kawarka, M.	*Loranthus longiflorus, Desr.*	R.
Karsah, K.	*Nyctanthes arbortristis, Linn.*	L. A.
Lalgunchi, H	*Lantana aculeata, Linn.*	O.

Local Name	Botanical Names	Remarks
Lalgunchi H.M K	*Abrus precatorius, Linn.*	O.
Mekar, K	*Gymnosporia montana, Benth.*	L. O.
Lantana, H.	*Lantana aculeate, Linn.*	V. A.
Marorphal, H.	*Helicteres isora, Linn.*	A.
Muradsheng, M.		
Nirguri, M.	*Vitex negundo, linnn.*	L. A.
Pithondi, M. K.	*Fluggea microcarpa, Bl.*	L. A.
Raimunia, K.	*Lantana aculeate, Linn. Syn. Lantana camara, Linn*	V.A.
Ringni,K.	*Solanum indicum, Linn.*	F.
Samalu, K.	*Vitex negundo, Linn.*	L. A.
Sakria, K.	*Zizyphus rugosa ,Lamk.*	F. and L. A.
Tarwar, K. M.	*Cassia auriculata, Linn.*	L. F.

D - Herbs

Local Name	Botanical Names	Remarks
Babra, M. K.	*Dioscorea pentaphylla, Linn.*	A climbing Herb. O.
Baichandi, H.	*Dioscorea daemona, Roxbn.*	A climbing Herb. F.
Baval, K.	*Dioscorea bulbifera. Linn*	A climbing Herb F.
Jangli Kela, H.	*Musa superba, Roxb.*	L.F. occurs on On Rocky hillside and bank of streams especially at high evelations.
Kulu, K.	*Dioscorea daemona, Roxb*	A. climbing herb F.
Tora, K.	*Musa superba, Roxb.*	L. F.
Tarota, M. K.	*Cassia tora, Linn.*	L. A. Occurs in heavily grazed Forests in the south.
Wild banana, E.	*Musa superba, Roxb.*	L. F.

E- Grasses, Sedges and Bamboos

Local Name	Botanical Names	Remarks
Baba Jara, K.	*Heteropogon ritchiei , (Hook . f.) Blatter and Mc. Laun.*	A.
Bamboo, E.	*Bambusa arundinacea,willd.*	L. A.
Bamboo, E. Bana, H. M. K.	*Dendrocalamus strictus nees.*	
Baru, K. Boru, K.	*Sorghum halepense, pers.*	L. A. occurs on frost areas and on old Village sites.
Dongra, K.	*Cyperus tegetum, Roxb.*	L. F. occurs River bed in the north west.
Gondall, K. Gondhali,K.	*Anthistiria ciliata, Linn.*	F. L. A. occurs hill Tops. and old village areas.
Karsah, K.	*Chioncachne barbata, R. Br.*	L. A. occurs in forest areas and invalleys.
Katang bans,H.M.K.	*Bambusa arundinacea, willd.*	L. A. occurs in the Sipna valley between Semadoh and Pili Where it has been Introduced.
Kusal, M.	*Heteropogon contortus, (L Beauv. Ex Roem. and Sch. Syn. andropogan contortus)*	A.
Podar, H	*Sorghum halepense. Pers*	L. A.
Phor, K. Pochati ,K. Phuli, K.	*Heteropogan ritchiei(Hook, f Blatter and Mc. Laun..)*	A.
Poc-hati, K. Phuli K.	*Apluda varia, hack.*	A.
Rusa, H. M. K.	*Cymbopogon martini, stapf Syn. andropogon schoenanthus, Linn.*	F. Two varieties Called '*Motia*' and '*Sofia*' occur.
Sainar, K	*Ischaemum sulcatum, Hack.*	A.
Sukal ,M. Sukla , M.	*Steropogon contortus (L) Beauy. Ex Roman and Sch. Syn, andropogan contortus, Linn*	A.
Tikhari, H. M. K.	*Cymbopogon martini, Stapf Syn.andropogon Schoenanthus, Linn.*	F. Two varieties called '*Sofia*' and '*Motia*' Occur.

F - Plants grown as field crops

Local Name	Botanical Names	Remarks
Arhar, H.	*Cajanus indicus , Spreng.*	
Betel vine, E.	*Piper betle, Linn.*	
Channa H,M.	*Cicer arietinum, Linn.*	
Cotton E.	*Gossypium herbaceum, Linn.*	
Gram, E.	*Cicer arietinum, Linn.*	
Jagni, K.	*Guizotia abyssinica, cass.*	
Juari, H.M.K.	*Sorghum vulgare, pers.*	
Kapas, H, M.	*Gossypium herbaceum, Linnn.*	
Kodon,M.K.	*Paspalam scrobiculatum, Linn.*	
Kutki, H.M.K	*Panicum miliare, Lamk.*	
Masur, H.M.	*Ervum lens Linn.*	
Pan, H. M.	*Piper betle Linn.*	
Sawan, K.	*Pancium crus-galli-frumentaceum, Roxb.*	
Tur, M.	*Cajanus indicus. Spr.*	

PART – I

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

PART-I

CHAPTER 1

THE TRACT DEALT WITH

SECTION 1. NAME AND SITUATION:

Location:

1.1.1. East *Melghat* Forest Division is situated in the North-West of *Amravati* district of *Maharashtra* State under the administrative control of *Amravati* Forest Circle. Geographical coordinates are Latitude 21^0 13' 14" to 21^0 46' 6" North & Longitude 77^0 10' 39" to 77^0 36' East. The headquarter is at Chikhaldara.

Area:

1.1.2. This plan covers an area of 56097.06 ha. The details are as under.

Reserved Forests	--	56070.98 ha.
Protected Forests	--	26.08 ha.
Total area	**--**	**56097.06 ha.**

Boundaries:

1.1.3. *Betul* District of *Madhya Pradesh* lies to the north and to the east. It is bound by West *Melghat* and *Melghat* Project Tiger on South and West respectively. The Core area of Melghat Tiger Reserve is on North-West side of the Division. Small section of South-East boundary is shared with *Amravati* Forest Division.

1.1.4. The tract is situated on the branch of *Satpuda* range to the south of Tapti River, known as the *Gavilgarh* hills of *Melghat, Gavilgarh* being the name of an old fortress and *Melghat* being the name of confluence of *Khapra* and the Tapti river in the north. Gavilgarh fort, now in ruins, is situated along the southern spurs of *Gavilgarh* hills in compartment number 29 and is about 2km. from the *Chikhaldara* plateau to the south.

Entire tract lies in *Chikhaldara taluqa* and *Chinchona-Nimkhera* 'C' class forest lies in *Anjangaon taluqa.*

SECTION 2. CONFIGURATION OF THE GROUND:

1.2.1. As the name implies, *Melghat* is literally a meeting place of *Ghats*. The tract is very hilly and consists of succession of hills and valleys in a changing pattern with constant and abrupt variations in altitude, aspect and gradient. Even within the limits of a compartment of which the average area is slightly more than 2 sq. km., all the variations are visible. In some compartments, the difference in elevation is as much as 600 meters but there is hardly any one in which the difference is less than 150 meters.

1.2.2. The prominent physical feature is the main ridge of the Gawilgarh hills which enters the tract just north of *Ghatang* from the Betul district and runs westerly and south-westerly directions through the southern part of the tract barely 15 km. Away from the southern boundary leaving 4/5 of the area dealt with to the north of this ridge. After running westerly direction from *Ghatang* for a short distance, it turns to southwest and widens into *Chikhaldara* and *Vairat* plateau with summit levels of 1,100 meters. From here, it continues north of *Shahapur* river as a flat topped ridge and after lowering at the pass it again attains an elevation of 1, 101 meters along *Akot-Harisal* road just north-west of *Jhiri* and then gradually descending with peaks of about 820 meters south of *Golai*, it leaves the district boundary just west of Wan railway station. The conspicuous hump on this ridge at *Vairat* is the highest point being 1,177.75 meters above sea level and lies in the compartment No. 34.

1.2.3. The striking feature of this ridge is its almost flat-topped plateau descending in a series of precipitous scarps on either side, one below the other separated by narrow steps of lesser gradients and finally sloping down to the narrow steep valleys known as *khoras*. These are most conspicuous on the slopes of the plateau of Vairat, *Chikhaldara* and *Gawilgarh* fort area. Numerous spurs branch off from this main ridge towards north and south, having narrow ridges known as ghors or dhars and flat tops known as ballas, a few of which towards north are of considerable size such as *Masondi*, *Vairat*, *Chikhaldara*, *Makhala*, *Borkhedi* etc., with an average height of about 1,100 meters. Between the plateau and hills there are saddles known as *Khandies,* the prominent ones are *Sirasban*, *Amjhiri* etc., used for crossing the ridge. These subsidiary ridges also usually have abrupt scarped sides, which are ideal natural fortifications.

1.2.4. The area to the north of the main ridge, though interrupted with a series of hills and valleys, gradually descends to the north-west with an altitude of about 480 meters in the east and about 230 meters in the west near the *Tapti* river. The northeast portion is much cut up by deep narrow valleys, while the northwest is characterized by shallow valleys and low steep hills, the valleys just north of main ridge are very deep but later on they gradually widen where the best forest of the region occurs.

1.2.5. From the main ridge to the south, the land slopes very steeply but irregularly through several minor ridges to the *Amravati* plains. The altitudinal variation along the boundary is from 300 meters in east to 150 meters in west. This main ridge forms a natural hill barrier between the most valuable wooded part of the tract in the north, and cultivated and populated plains in the south.

1.2.6. The main ridge of *Gawilgarh* hills forms the watershed of *Tapti* and *Purna* rivers, which drain the tract of *Melghat* towards north and south, respectively. As the ridge is situated in the southern part, the greater area of *Melghat* is a drained northwestward towards the Tapti River. The more important among the tributaries of the Tapti River are the *Khursi, Tingria, Khandu* and *Sipna*. The Khursi and Tingria rivers take their sources in *Katkumbh* plateau. The former after a brief sojourn into the *Betul* district re-enters the tract flowing close to the district boundary for some distance and then follows it for a while till it leaves it to flow northwards to join the *Tapti*. The *Kdhandu, Khapra* and *Sipna* rivers rise near *Kukru* and *Khamla* in *Betul* district, while the *Dewal, Garga* and *Darbar* rivers have their sources in the tract itself. The *Khandu* and *Khapra* rivers have a fairly long and sending courses in general northwesterly direction cutting their beds deeply through several ranges of hills before joining the *Tapti*. *Khandu* River is just outside the district and *Khapra* is along the district boundary. The Sipna River has a longer course through the tract and with its tributaries including the *Kuapati* River, drains a great area than other. Unlike the aforesaid rivers the *Sipna* has several flat stretches of the land along its lower and middle course, supporting luxuriant forest growth. The tributaries of Purna drain the southern slope of Gawligarh ridge. The chief rivers and streams in this region are the *Sapan, Chandrabhanga* and *Shahapur*. The Drainage Map is shown in **Appendix No. I.**

SECTION 3. GEOLOGY, ROCK AND SOIL:

1.3.1. The entire region consists of *Deccan* traps with occasional this trap soil. *Deccan* traps are *Deccan* lava flows of basaltic composition and are emplaced through long narrow fissures in the earth's crust. They generally form flat-topped hills and display step-like terraces. The lava flows are almost horizontal of with a very low dip (2 to 3 degrees) to the north.

1.3.2. In this region crest of the range attains an average elevation of 1,000 meters, the highest point being *Vairat* at a height of 1,177.75 meters above m.s.1. A fault, which has been responsible for exposing the *Gondwanas* sandstone at the foot of the Gawilgarh hills, near *Mukatagiri* and *Bairamghat* is noticed to the north and NE of *Achalpur* at the base of the hills, sedimentary beds crop out from beneath the traps.

1.3.3. At *Bairamghat* field sequence of the rocks is as follows: -

Deccan Trap

Lametas	*Sandstones*
Unconformity	*Limestone*
Upper Gondwanas	*Conglomerate and gritty sandstone*
	Sandstone-Inter bedded with clay.

1.3.4. Sedimentary rocks generally dip towards north and the dip varies from 15 degree to 28 degree. As these formations are dipping to north the outcrop is restricted by high hills of Deccan trap. Sandstones are mainly fine to medium grained, dirty white to brownish in colour. Brownish colour is due to ferrutinous matter. At *Baiaramghat*, length of sandstones exposure is about 1.800 meters and the width is about 800 meters.

1.3.5. Due to weathering of sandstone soil in this area is sandy and clayey.

Lava Flows:

1.3.6. Two varieties are generally noticed, namely the hard compact and vesicular. The most common is hard compact flow. This form occurs in thick layers and often shows cracks and joints on the surface but with no preferred orientation. These cracks and joints are filled up with secondary silica when thickness varies from a fraction of an inch to nearly one inch. Columnar jointing is well seen. Some times in porphyritic basalts, phenocrysts of plagioclase laths are clearly seen even in hand specimens, Vesicular and amygdaloidal varieties are generally seen along the slopes. The vesicles are filled by zaolite and secondary siliceous minerals.

1.3.7. Traps, particularly the soft, amygdaloidal and vesicular varieties on weathering and alternation, give rise to a soft decomposed rock, known as *murrum*, which is seen especially along the hill slopes. Spheroidal weathering is also common all around the area.

Soil:

1.3.8. Decomposition of traps has given rise to either deep to rich red or black cotton soil. The soils show a wide variation in their depth. The soils on the hills and slopes have shallow to medium depth while in the low-lying areas and river valleys, deep soils are formed due to the accumulation and deposition of the soils from uplands.

1.3.9. The run off is very quick and due to the shallowness of the soil on steeper slopes and the impermeable rock, which is very near the surface, the moisture is drained off completely and rapidly. In spite of a good rainfall in the Melghat, the soil for most of the year is dry.

Different types of soils:

(i) Bouldery Soil: This type of soil covers the greater part of the Melghat division and is generally confined to the slopes. It is dark brown in colour, clayey in texture and blocky in structure. In most of the areas the drainage is very excessive which results in the soil becoming absolutely devoid of its moisture content in dry season. Samples of this type of soil were sent to the Forest Research Institute, Dehradun, for analysis. The report of the Central Silviculturist reads as follows:

"Soils seem to be fairly well supplied with nutrients. The texture of the soil in case of slopes area, is clay loam to clay and in valley it is clay in top and sandy loam or sandy clay loam at the lower depth. The pH of soil is neutral to slightly acidic in both the areas".

The quality of the forest on this soil chiefly depends on its depth and drainage. The best forests of *Melghat* grow on this type of the soil in the valleys and on lower gentle slopes.

(ii) Clayey Soil: This type of soil occurs in depression and level areas. It is very fertile but is not suitable for teak because of lack of drainage. Most of the low-lying areas where this type of soil occurs are liable to frost damage.

(iii) Lateritic Loam: Lateritic loam generally caps the Deccan trap plateau and is noticed around *Chikhaldara, Vairat* and other parts of the division. It has a characteristics red brown colour. The soil is very shallow and dry.

SECTION 4. CLIMATE:

Seasons:

1.4.1. Due to the rapid variations in altitude and aspect, the climate in Melghat is very varying. The year however, may be divided into four periods as follows:
1.The monsoon of rainy season from the middle of June to the end of September.
2. The post-monsoon period from October to November.
3. The cold season from December to February.
4. The hot season from March to middle of June.

Rainfall:

1.4.2. A record of rainfall in the tract is available only for *Chikhaldara* and *Dharni*. The rain gauges were installed at *Dhulghat* and *Tarobanda* but due to their faulty functioning the recorded rainfall data is not reliable. However, from the records of rainfall from the surrounding stations and past observations, it appears that there is a wide variation in rainfall from place to place even within a short distance, with a change in latitude and topography. The average annual rainfall is usually higher on the main ridge of Gawilgarh, which amounts to 1784 mm. at *Chikhaldara*. The rainfall gradually decreases towards the north and west, average annual rainfall at *Dharni* being 1373 mm. Some of the valleys perhaps receive up to 2500 mm. rainfall in a year. It, however, abruptly decreases towards the south of main ridge, the annual precipitation being only 770 mm. Although the total annual rainfall in Melghat is good, it is not well distributed over the period of the year. Almost entire rain i.e. 90 to 94 per cent is received during the rainy season while the clod season received the least precipitation i.e. only 1 per cent. Occasionally a few showers are received in the month of December, January, March and May. Except for the months of rainy season the rest of the year is dry. The variation in rainfall from year to year is large. The highest annual rainfall recorded at Chikhaldara is 2845 mm. in 1887,1432 mm. on August 19, 1886.

1.4.3. The rainfall data is given below;

TABLE 1.1
The Rainfall Data

Year	May		June		July		August		September		October		November		December		Total	
	R.D	R.F.	R.D.	R.F.	R.D.	R.F.	R.D.	R.F.	R.D.	R.F.	R.D.	R.F.	R.D.	R.F.	R.D.	R.F.	R.D.	R.F.
2004	1	10	7	211	13	266.8	27	557.2	4	67.2	5	62.4	0	0	0	0	**57**	**1174.6**
2005	0	0.8	7	77.5	18	463.4	13	335.3	10	417	3	76.8	0	0	0	0	**51**	**1370.8**
2006	0	0	8	80.2	21	424.8	21	549.8	17	302.3	3	66.2	0	0	0	0	**70**	**1423.3**
2007	0	0	15	351.4	16	1023.5	15	415.6	17	364.4	0	0	0	0	0	0	**63**	**2154.9**
2008	0	0	8	127.8	19	289.4	17	384.3	13	299.5	4	43	0	0	0	0	**61**	**1144**
2009	0	0	6	68.6	20	564.2	9	183.1	6	94.5	3	54.8	4	93.8	0	0	**48**	**1059**
2010	1	13.5	7	134.8	19	434.4	19	339.5	10	449	7	102.1	6	107.8	0	0	**69**	**1581.1**
2011	0	0	13	203	21	489	22	635.7	12	228	0	0	0	0	0	0	**68**	**1555.7**
2012	0	0	6	274.7	18	620.4	20	679.9	14	478.6	3	14.3	0	0	0	0	**61**	**2067.9**
2013	0	0	15	450.1	28	596.3	20	748.2	11	218.6	10	128.1	0	0	0	0	**84**	**2141.3**
2014	0	0	3	35.6	18	743.8	13	180	12	286.8	3	22.4	0	0.9	0	0	**49**	**1269.5**
Total	**2**	**24.3**	**95**	**2014.7**	**211**	**5916**	**196**	**5008.6**	**126**	**3206**	**41**	**570.1**	**10**	**202.5**	**0**	**0**	**681**	**16942.1**

Note:- R.D.- Numbers of Rainy Days, R.F.- Rain Fall
(Source- htttp://www.maharain.gov.in)

Temperature:

1.4.4. The temperature, like the rain falls, varied considerably with the altitude. The higher hills, plateau and valleys to the north of the main Gawilgarh ridge are very much cooler in summer than the southern foothills. The plateau and higher hills enjoy almost equitable and pleasant climate throughout the year while valleys become very cold during winter when the temperature frequently falls below freezing point in December-January. These valleys experience heavy dews and occasional frost. The records do not, however, show the occurrence of any serve frosts during the last 65 years but they are not unknown. Stein records the occurrence of such frosts on the following nights when the temperature at Chikhaldara fell to 3.9 degree C on 1st Feb., 1929, 2.2 degree C on 12th Jan., 1934 and 7.8 degree C on 14th Jan., 1935.

1.4.5. Damage to the crop from ordinary frost does occur as observed by Sharma in a valley near *Dhargarh* as early as the 11th of December 1954. Such damage was also reported in low valleys near *Chaurakund* during the winter of 1967.

1.4.6. The southern foothills are warm or even warmer than the *Berar* Plains and experience hot winds (38 ^{0} C) in May and June.

1.4.7. During summer, there is usually a very marked difference in the day and night temperatures in most of the Melghat valleys. It is not uncommon to get a chilly night after scorching heat in the midday. After October, temperature decreases progressively till December, which is the coldest month. After February, temperature rises rapidly till May, which is the hottest month of the year.

1.4.8. The temperature data of East Melghat shown in Table 1.2:

TABLE 1.2
Table showing Mean Max. and Mean Min. Temperature

Cold season	Mean Daily Maximum Temperature	22.97^0 C
	Mean Daily Minimum Temperature	9.4^{0}C
Hot Season	Mean Daily Maximum Temperature	39.88^0 C
	Mean Daily Minimum Temperature	16.49^0 C

(Source- From Old Working Plan Reports)

SECTION 5. WATER SUPPLY:

1.5.1. The whole of *Melghat* suffers very badly from water scarcity. The rainwater is quickly drained off the steep slopes and through the hard-bedded hill streams. As a result, there are very few perennial springs and not a single perennial river in the tract. Most of the rivers are dry from December onwards and water is confined to stagnant small pools called '*doh*' which are usually the camping places of *Gawalis* who with their herds of cattle held a nomadic life nearly eight months by shifting camp in search of water. It is not uncommon in summer for the cattle of the villagers on the plateau or even the inhabitants to walk about 5 km. To and from or to climb down and up at least 300 meters every day to reach the pool or water. The plateaus have porous shallow soil with hard impermeable strata. Thus there is no other possible source of water to local inhabitants than to hold up the rainwater.

1.5.2. *Chikhaldara* Civil Station is, however, slightly better of having two underground and one over surface tanks for storage of drinking water and three other surface tanks for washing purposes. But this much water is hardly sufficient and in years of scanty rainfall, scarcity of water greatly felt.

1.5.3. The B. and C. Department has constructed a tank at *Ghatang* and anicuts at *Bori*, *Silona, Behali, Sirashan, Jhira* and *Khatkali* besides some wells for the convenience of local population and travelers. Recently a tank at *Tarobanda* has been constructed by the Forest Department. A regular programme of constructing anicuts, storage tanks and wells is the urgent need to relieve the local population of this hardship. The State Government has also launched an ambitious scheme in December, 2014, namely *Jal Yukt Shivar* under which all the State Departments are taking up soil and water conservation measures wherever feasible.

SECTION 6. DISTRIBUTION AND AREA:

1.6.1. The total area of East *Melghat* Division is 56,097.06 ha. classified as under:

(a) Reserved Forest is covering an area of 56,070.98 ha. spread over **6 Reserves** (2 Reserves completely 4 Reserves partly) 'A' Class forest area has been divided into 261 compartments.
(b) **'C' Class** forest is 958.30 ha. The 'C' class area is still identified with survey number.
(c) **Ex-*Jahagir*** forest 2835.97 ha.
(d) 26.08 ha of **Protected Forest**.

The East *Melghat* Division consists of 4 Ranges. Their distribution on the Maps of survey of India 1:50000 scale is given in the **Appendix No. III** of Volume II of this plan.

1.6.2. The distribution of area, reserve-wise, compartment-wise is as below:

TABLE 1.3
Details of Area in East Melghat 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	*Motha Reserve*	1 to 23 Ex –Jahagir (Kulangana)	5027.44	23
2	*Chikhaldara Reserve*	24 to 33,38 to 40,43 to 51	5852.34	22
3	*Kohana Reserve*	52 to 73	3786.19	22
4	*Bairagarh Reserve*	74 to 91,194 to 205,207,208,298,299,337, 339 to 397,401,404 to 417,421 to 456	25940.10	149
5	*Gugamal Reserve*	949 to 955	2641.18	07
6	*Khirpani Reserve*	1033 to 1070	9025.01	38
7	Ex-*Jahagir Reserve*	1) Tekada Nagzira 2) Jamoli 3) Girgati 4) Ambapati 5) Chouramal 6) Sakri-Chikhal Pati 7) Dharamdoj 8) Sattirui Patha	2835.97	-
8	*"C" Class Reserve Forest*	Survey no. 5,6,7,8	958.30	-
9	***Compensatory Afforestation***			
	(A) Reserve Forest	-	4.45	-
	(B) Protected Forest	-	26.08	-
Total			**56097.06**	**261**

SECTION 7. STATE OF BOUNDARIES:

1.7.1. The total length of the external boundary lines of the 'A' Class reserved forests of East *Melghat* Division is 334.793 km. Of which 60.764 km. are natural features such as rivers, streams, ridges. The length of the Internal Boundary lines are 697.08 Km., of which 196.629 Km. are natural features. 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. Since the Reserves are spread over different divisions, it would be more appropriate to have demarcated boundaries along Range, Round and Beats.

1.7.2. Internal boundary line of the reserve, though originally demarcated with a clear line and pillars is not now maintained, so also the interdivisional boundary of these two divisions.

1.7.3. The boundaries of 'C' Class reserved forests have total length of 32.0 km. and are demarcated by *warlies*, the position of which is shown on the settlement maps of the villages in which these forests are situated and which are maintained by the Revenue Department.

SECTION 8. LEGAL POSITION:

The detailed note under the heading of "THE FORGOTTEN LINKS IN THE LEGAL HISTORY OF THE MELGHAT FORESTS" written by Shri. S.W.H.Naqvi, I.F.S., the then Divisional Forest Officer, East Melghat Division, is attached in **Appendix IV** in Vol.II alongwith the relevant Notifications. The Readers are urged to go through this note carefully to understand how the status of these forest came into existence as Reserve Forest.

1.8.1. The *Bairagarh* and *Gugamal* reserves were originally constituted in 1866 and 1876, respectively. These reserves and the remaining blocks of reserves were declared as "State Forest, Class a, Division II" or as "State Forest. Class C 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 in the **Table 1.4.**

TABLE 1.4
Table showing Reserve wise gazette notifications of East *Melghat* 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)
Bairagarh	H.R.O. No. 14 of 18 January1889	-	Declared as " Demarcated State Forest"
Gugamal	-	- H.R.O. No. 184 of June 1892. H.R.O. No. 440 of 12 December 1894.	Declared as " State Forest Class A" Declared as "State Forest Class A, Division II"
Chikhaldara	H.R.O. Nos. 205 of 15th November1883 & 213 of 22 July 1891.	- H.R.O. No. 14 0f 18 January1889 H.R.O. No. 14 0f 18 January1889	Constituted and declared as "Demarcated State Forest". Declared as "State Forest Class A". Declared as "State Forest Class A, Division II".
4. *Kohana*	H.R.O. No. 167 of 1 June 1892.	- H.R.O. No. 444 of 12 December 1894. H.R.O. No. 440 of 12 December 1894.	Declared as "State Forest". Constituted and declared as "State Forest Class A". Declared as "State Forest Class A, Division II".
Khirpani	-	C.P.G. No. 612 of 6 July 1911.	Constituted and declared as "State Forest Class A, Division II".
Motha	-		
	-	C.P.G. No. 614 of 6 July 1911.	Constituted as a separate reserve of "State Forest Class A, Division II".
Dhamangaon and	H.R.O. No. 156 of 1 June 1892.	-	Constituted and declared as "State Forest".
Chichona-Nimkhera	--	H.R.O. No. 194 of 6 June1892. H.R.O. No. 440 of 12 December 1894.	Declared as "State Forest Class C, Division II". Declared as "State Forest Class C, Division III".

1.8.2. Reserves *Motha* and *Khirpani* were formed partly by transfer of areas from the previously constituted *Bairagarh* and *Gugamal* reserves, but mostly out of State forest of Class C Division III.

1.8.3. Reserves 1 to 6 have been declared as "A Class State Forest" And reserves 7 and 8 as a "C Class State Forest" by the central Provinces Gazette Notification No. 2121 of November 28, 1913 under section 75 (d) of the Indian Forest Act, VII of 1878, as amended by Act XV of 1911, and as applied to *Berar*. At present the *Dhamangaon* Reserve is attached with *Amravati* Division.

1.8.4. A number of alterations and adjustments affecting the area of the reserves have subsequently taken place. Full details are recorded in Form No. 1, Register of Reserved Forests, which also contains Notification No. under which they have been affected. The list of the notifications is given under **Appendix No. II** of Volume II of this plan.

SECTION 9. RIGHTS AND CONCESSIONS:

1.9.1. Prior to the reservation of the Melghat forests, the petty chiefs who resided in Melghat exercised certain rights in the tract. These rights were commuted at the time of reservation and certain annual allowances were granted to these Rajas. Under the M.P. Abolition of Proprietary Rights Act of 1950 the payment of allowances to the Rajas were discontinued with the effect from 14th March, 1951 vide M.P. Forest Department No. 2240-2056-XI, dated 13th July 1951 except in the case of *Raja Aman Singh* of *Khatkali*.

The continuance of payment of the annual compensation of Rs. 1,561-15-7 to *Raja Aman Singh* of *Khatkali* was ordered by the M.P. Government vide the Forest Department Memo No. 496-2971-XI-51, dated 16th February 1952. From 1969-70, the payment of the amount of compensation of *Raja Aman Singh* of *Khatkali* was, however, discontinued under Government of *Maharashtra*, G.A.D. Resolution No. PPR-1070-62753-S, dated 15th September 1970 under which the privileges and privy purses of the rules were terminated with effect from September 6, 1970.

1.9.2. Recognition and Vesting of Forest Rights under the FRA.

In the year 2006 the Parliament has enacted the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, whereby the Forest Dwelling Scheduled Tribes and the Other Traditional Forest Dwellers are entitled for the forest rights. The various types of forest rights are specified in Sec. 3(1) of the said Act and the procedure for Recognition and Vesting of such forest right is laid down in the said Act and Rules framed thereunder. The process of filing the claims, recognition and vesting of such rights is still going on. Thus, these forest rights are still accruing.

1.9.3. Rights over MFPs under the Panchayat (Extension to Scheduled Area) Act 1996 and Maharashtra Transfer of Ownership of Minor Forest Produce Act, 1997 :

(i) The entire division falls in the Scheduled Area notified by the Hon'ble President of India vide Notification No.521, dated 02/12/1985 **(Appendix No.V).**

(ii) The State Legislature has enacted the Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Area and the Maharashtra Minor Forest Produce (Amendment) Act, 1997 in consonance with the Panchayat (Extension to Scheduled Area) Act 1996. As per the provisions contained in these Acts, the Panchayats at appropriate level and Gram Sabha are endowed with the ownership of MFPs over government land excluding National Park and Sanctuaries. The terms "MFP" has not been defined in the Panchayat (Extension to Scheduled Area) Act 1996. Maharashtra Transfer of Ownership of Minor Forest Produce Act, 1997 defined the term "MFP" as those forest produce, which were listed in the Schedule contained in that Act.

The Hon'ble Governor of Maharashtra in exercise of powers vested with him under Para 5(1) of the Fifth Schedule to the Constitution of India has modified the said Act, whereby the term "MFP" has been defined in line with the definition contained in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. The definition read as under:-

"Minor Forest Produce" includes all non-timber forest produce of plant origin including bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu or tendu leaves, medicinal plants and herbs, roots, tubers and the like."

(iii) Vide the same Notification, the Indian Forest Act, 1927 has also been modified to the extent of Scheduled Area such that the definition of the word 'Tree' in Sec.2(7) has been modified deleting the word "Bamboos, Stumps, Brushwoods and Canes".

(iv) Hon'ble Governor, exercising the same power has further modified the Indian Forest Act, 1927 for the schedule areas vide Notification No.35528, dated 30/10/2014, whereby a new Section viz. Sec. 28-A has been inserted in the Act in respect of Scheduled Areas. As per the said provisions –

(1) The Transit Permits in relation to transportation of Minor Forest Produce in the Scheduled Areas shall be given by Panchayats at appropriate level and the Gram Sabha or a Committee thereof and ;

(2) All decisions for the collection and sale of Minor Forest Produce in the Scheduled Areas and sharing of sale proceeds shall be taken by the Panchayat at appropriate level and the concerned Gram Sabha.

With such major changes in legal provisions in respect of Scheduled Areas, the spectrum of the rights enjoyed by the local people has widened significantly.

1.9.4. Concessions and Privileges:

The following concessions are, however, permitted;

(i) The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of reserved forests, in accordance with the grazing rules in force.

(ii) The villagers of newly constituted Revenue villages are allowed to enjoy the same privileges and concessions regarding grazing of their cattle and obtaining timber and other forest produce for their bona fide domestic use as were given to the erstwhile forest villagers.

(iii) Agriculturists of villages in the vicinity of the reserved forests are given certain quantity of timber bamboos for their bona fide domestic use at concessional rates from the coupes under working.

None of these concessions is a legal right and Government can withdraw these concessions. The details of the Privileges and concessions are given in the **Appendix No. VI** of Volume II of this plan.

CHAPTER II

FLORA AND FAUNA

CHAPTER II A

FOREST FLORA

SECTION 2A.1. GENERAL DESCRIPTION AND CONDITION OF THE FOREST

2A.1.1. The forests of *Melghat* are entirely dry deciduous and belong to the formation 'Dry Tropical Forests' of the Champion and Seth's "Revised Survey of the Forest Types of India" and fall under the sub-group 5-A 'Southern Tropical Dry Deciduous Forests'.

2A.1.2. The tract being sparsely populated, the biotic factors like fires and grazing are highly influential which along with general distribution of rainfall, aspect and changes in depth and nature of soil are responsible in determining the local variations within the above broad type. The area, north of main Gawilgarh ridge, which receives rainfall higher than the part south of it, bears good growth. Within this area the better growth is confined to the northern aspects of the lower gentle slopes and in valleys having good drainage. Besides receiving less rainfall, the southern part of the region is also subjected to fires frequently and bears more open forest with species rather resistant to fire.

2A.1.3. The forests in general are composed of a mixture of mostly deciduous species having teak *(Tectona grandis)* in high proportion resulting in almost pure teak forest in patches. Understorey is not well defined and shrubby undergrowth is rather sparse except lantana, which is very dense in the moist localities where bamboos are absent. *Bamboos (Dendrocalamus strictus)* occur extensively and form the chief undergrowth particularly on moist slopes. The grasses form a thick ground cover throughout the area except where latana and *bamboos* are present. *Tikhadi (Cymbopogon martini),* though scattered, is found all over the tract but the *motia* variety contain about 80 to 90 per cent geraniol is confined to southern part while elsewhere it is '*Sofia*' variety which has only 38 to 66 per cent geraniol.

2A.1.4. In general, the quality of the forest is III, which improves in patches on loamy soil having good drainage, but degenerates into IV quality poorer and arid locality. Along the lower slopes and in the valleys the density is good but the forests are generally open in the upper steep slopes and plateau. The natural regeneration of tree species is mostly deficient.

SECTION 2A.2. COMPOSITION OF THE CROP:

2A.2.1. For the purpose of description, these forests are distinguished into the following local sub-types in the types as per Champion and Seth's revised classification of forest types.

Table No. 2.1
Table showing the classification of forest types of East *Melghat* Division

1	**Champion and Seth's Classification** 2	**Local sub-type** 3
Group 5-	Tropical Dry Deciduous Forests	
Sub-group 5A	Southern Tropical Dry Deciduous Forests	
I Climax type—		
(1) 5A/Ci	Dry Teak bearing forest	
5A/Cib	Dry Teak Forest	(i) Teak forest
(2) 5A/C_3	Southern Dry mixed deciduous forest	(ii) *Tiwas* forest (iii) Mixed forest
II Edaphic climax—		
5/E2	Boswellia forests	(iv) *Salai* forests

2A.2.2. The factors influencing the composition and condition of the crop are so variable in *Melghat* that even the limited limits of a compartment it is not uncommon to find abrupt changes in the crop representing all the above local sub-types.

Teak Forests:

2A.2.3. These forests are more extensive and cover major parts of *Bairagarh*, *Gugamal,* parts of *Kohana, Chikhalda* and *Motha* reserves comprising of whole of *Jarida* range and part of *Ghatang, Chikhaldara* and *Anjangao* ranges of East *Melghat* Division. It generally occurs between the elevations ranging from 300 m to 900 m. The extent of the forest is about 46,000 ha.

2A.2.4. The general quality of the forest is III. The better growth is found all along in *Bairagarh* and *Gugamal* reserves except along bigger steep slopes and plateau, which are covered with poor forests of IV-a or IV-b quality. Quality II forest is found in patches confined to the valleys. The forests lying to the south of main ridge and parts of Chikhalda reserves are mostly of IV-a and IV-b quality.

2A.2.5. The density of stocking is good throughout the area, being best in the valleys and along the moderate slopes. However, it degenerates along the steep slopes having southern aspect and on high elevation plateaus.

2A.2.6. So far, Teak (*Tectona grandis)* is the most prominent species in the better quality forests. It forms nearly 50 per cent of the growing stock. Teak (Tectona grandis) has higher percentage along the lower gentle slopes and in valleys and in small patches it is almost pure but the percentage decreases with the rise in altitude.

2A.2.7. Teak (*Tectona grandis*) is mostly of middle age to mature.

2A.2.8. Haldu *(Adina cordifolia*), and Dhaora *(Anogeissus latifolia*) are the main associates of Teak while Saj (*Terminalia tomentosa*) forms a fair proportion in low-lying areas. Other associates are Lendia (*Lagerstroemia parviflora*), Kekad (*Garuga pinnata),* Kasai (*Bridelia squamosa*), Kalam *(Mitragyna parvifolia*), Dobin (*Dalbergia paniculata*), Mokha (*Schrebera swietenioides*), Kahu (*Terminalia arjuna*), Bahera (*Terminalia bellerica*), Mahuwa *(Madhuca latifolia*), Aam (*Mangifera indica*), Bhilwa (*Semecarpus anacardium*), Bija (*Pterocarpus marsupium*), Kulu *(Sterculia urens*) and Kusum *(Schleichera oleosa*).

2A.2.9. The understorey consists of Moyen *(Lennea grandis*), Tiwas (*Ougeinia oogeinensis*), Tendu (*Diospyros melanoxylon*), Dudhi *(Wrightia tinctoria*), Dhaman (*Grewia tiliaefolia*), Aonla (*Emblica officinalis*), Salai (*Bosewllia serrata*), Achar (*Buchanania lanzan*), Siwan (*Gmelina arborea*), Gongal (*Cochlospermum religiosum*), Ghot (*Zizphus xylopyra*), Bhosa (*Coix gigante),* Aran *(Eleaeodendron glaucum*), Amaltas (*Cassia fistula*), Palas (*Butea monosperma*), Rohan (*Soymida febrifuga),* Hirda (*Terminalia chebula),* Khair (*Acacia catechu*) and Ber (*Zizyphus mauritiana).*

2A.2.10. The shrub undergrowth is sparse except in the areas invaded by lantana, which forms practically impenetrable dense mass throughout the moist locality. However, it is rare or practically absent where bamboos are present as in Jarida range or where dense growth of grass exists. Other shrubs that occur are Marorphal (*Helicteres isora*), Bhandar *(Colebrookia oppositifolia*), Nirgudi (*Vitex negundo*), Khirsali *(Nyctanthes arbortristis*), Bankapas *(Thespesia lampas)*, Baibarang (*Emblica tsjeriamcottam*), Gokharu (*Acanthospermum hispidum*) and Pithondi (*Fluggea microcarpa*). The grassy undergrowth is dense and forms main ground cover where bamboos and latana are absent. The most common and abundant grasses are Pochati (*Heteropogan ritchei*), Gondhali *(Anthistiria ciliata*), Kusal (*Heteropogan contortus*), Sainar (*Ischaemum sulcatum).* Other grasses found area Phuli (*Apluda varia*), Tikhari *(Cymbopogan martini)*, Paonia (*Ischaemum sulcatum*), Marvel (*Dicanthium annulatum),* Sheda *(Ischaemum laxum),* Baru (*Sorghum halepense*) and Jungalikela (*Musa superba*).

2A.2.11. The climbers are few and generally confined to moist localities. These are Nagbel (*Cryptolepis buchanani),* Palasbel *(Butea superba*), Mahul *(Bauhinia vahlii),* Chilati *(Acacia pennata*) and Kaunchkhuri (*Mucuna pruriens).*

2A.2.12. Jungalikela is found very scattered along the rocky hillsides and on slopes along the streams.

2A.2.13. Haldu *(Adina cordifolia*) is found where the crop is well stocked, generally at an elevation above 600 m. trees of over 180 cm. girth are usually common as Haldu *(Adina cordifolia*) was not exploited in the past. In compartment number 386 of Jarida range, along the Kursi river upto Chuleta Doh Haldu forest is found as a local sub type. Salai *(Boswellia serrata)* occurs along drier upper slopes, which are poorly stocked. The trees are mostly crooked. Tiwas *(Ougeinia oogeinensis)* though common in occurrence, increases its percentage with the rise in elevation, but does not attain big size. The trees of 75c.m. girth are generally rare, and if present, are unsound and cranky. Semal *(Bombax ceiba*), Bija (*Pterocarpus marsupium*) and Shisham (*Dalbergia latifolia*) form a negligible proportion in the crop.

2A.2.14. Natural regeneration of Teak *(Tectona grandis*) is somewhat deficient, though; stray, very small patches of reproduction are sometimes observed in the fully stocked forests. Regeneration of Dhawda (*Anogeissus latifolia),* Tiwas *(Ougeinia oogeinensis*), Haldu *(Adina cordifolia*) and Saj (*Terminalia tomentosa)* is fair, while that of the other species is generally scanty. The seedlings of Haldu *(Adina cordifolia*) are seen sometimes concentrated in patches on flat raised ground.

2A.2.15. Comparatively poor and open teak forests of IV-a and IV-b quality having composition of the crop almost the same as described under paras 2A.2.8. to 2A.2.10. are found in parts of Kohana, Chikhaldara, Motha reserves and Dahegaon block, the percentage of Teak *(Tectona grandis*) in the crop is, however, not more than 45. The density and quality of the crop improves in depressions on cooler aspects and along the streams.

Tiwas Forests:

2A.2.16. This type is found on the top of the higher hills, plateau and terraces over almost the whole of area at an altitude of over 1,000 m. The quality of the forest is poor, mostly IV-b. These forests are generally very poorly stocked with stunted tree growth. There are numerous blanks containing only grasses, Lantata or Bhandar (*Colebroekia oppositifolia*). Tiwas *(Ougeinia oogeinensis)* is the most prominent species although it forms only 10-15 per cent of the growing stock. The remaining stock is made up by Dhaman (*Grewia tiliaefolia),* Aonla *(Emblica officinalis),* Kumbhi *(Careya arborea*), Jamun (*Schyzigium cumini*), Gular (*Ficus glomerata*), Semal *(Bombax ceiba*), Arang *(Eriolaena hookeriana*), Amaltas (*Cassia fistula*), Pakar (*Ficus infactoria*), Phangra (*Erythrina suberosa*), Kolsa (*Glochidion velutinum*), Dahipalas *(Cordia macleodii*), Bahera *(Terminalia bellerica),* Ghatber *(Zizyphus xylopyra*), Thur (*Euphorbia nivulia*) and Maidalakri (*Litsea glutinosa*) etc. Teak (*Tectona grandis*) occurs in this type of forests but is generally scattered. On some of easy slopes on northern aspects, it reaches to fair dimensions but elsewhere it is stunted and very poorly formed.

2A.2.17. Lantana and Bhandar *(Colebrookia oppositifolia*) have invaded large areas to the exclusion of other undergrowth. Most of the tops of ridges and plateau in the Chikhaldara, Jarida and Ghatang ranges are under dense impenetrable lantana. It is generally observed that grazing areas were invaded by lantana. Kusal (Heteropogon contortus), sainar (Sehima sulcatum) and Gondhali *(Anthistiria ciliata*) are the common types of grasses found in this type. Tikhari *(Cymbopogon martini*) grass is also found here and there and is generally of *'sofia'* variety.

2A.2.18. Most of these high level plateaus were under shifting cultivation for a long time and besides locality factors such as high winds, shallow soils, and lack of soil moisture, this has been a very important factor responsible for the inadequate stocking of these areas.

2A.2.19. Regeneration of Teak (*Tectona grandis*) is absent but Tiwas (*Ougeinia oogeinensis)* seedlings and saplings are plentiful. Regeneration of *Kunkum* and *Aola* was noticed.

Mixed Forests:

2A.2.20. This type of forest is found on the upper hills of *Kohana, Chikhaldara* and southern-eastern part of Gugamal reserves and practically whole of Kirpani reserve. In Bairagarh reserve, it occurs in patches interspersed with teak forest. The quality of the forest is mostly IV-a and IV-b. But in shady places it touches to III.

The forest is well stocked, better stocking being obtained along the northern aspect. The composition of crop is a mixture of variety of species, prominent being Tiwas *(Ougeinia oogeinensis*), Dhaman *(Grewia tiliaefolia*), Moyen (*Lannea coromandelica*), Salai *(Boswellia serrata)*, Ghatbor *(Zizyphus xylopyra*), Saj (*Terminalia tomentosa*), Sewan *(Gmelina arborea*), Tendu (*Diospyros melanoxylon*), Kunkum *(Mallotus phillipensis*), etc. Bhirra *(Chloroxylon swietenia*) is very common along the hill near Behali.

Teak (Tectona grandis) is rare, however, it is found encroaching on the fringes where teak forest adjoins this type. Bamboos are generally absent. The undergrowth varies considerably with the density. Lantana has invaded this type at many places. Common grasses are Gondhali (*Anthistiria ciliata*) and Pochati (*Apluda varia*). Regeneration of trees species is scanty.

2A.2.21. Flora Of *Chikhaldara* Plateau: The salient features of flora of *Chikhaldara* plateau are given below.

i) The vegetation of *Chikhaldara* plateau has been influenced much by the interference of biotic factors. Firstly, it is gradually expanding as a Hill station and secondly, a lot of temperate exotic species have been inducted in this plateau. *Chikhaldara* and *Vairat* are in the *Melghat* portion of *Satpuda* hill range with elevation of 1116.79 meter and 1178.85 meter respectively with higher rainfall and typical climate conditions**.**

ii) This led to the introduction mainly by the British officers and the missionaries, of typical species, which need a temperate condition, especially conifers and others such as Cupressus species, Pinus species, Thuja sp., Cryptomeria sp., Areaucaria sp., Grevillea robusta and coffee plantations. All these species are growing well on the plateau. Some of the trees among them have grown very old. The trees present in the plateau are Dillenia indica, Ficus elastica, Prunus persicai, Cedrela toona, Magnolia sp. are growing in forest garden. These trees are suggestive of the climatic and edaphic factors of Chikhaldara plateau. There are certain indigenous species whose population has dwindled and need multiplication. The species are *Mallotus Phillipensis, Radermachera xylocarpa, Careva elliptica, Casearia graveolan, Mangifera indica, Careya arborea, Syzigium cumini, Terminalia sp., Embelia ribis, Stereospermum personatum, Litsea glutinosa, Trema orientalis, Ensete superbum* (wild banana).

Salai Forest:

2A.2.22. Forest of this type is mostly confined to Southern-Western parts of Gugamal reserve in *Anjangaon* Range and also occurs along the lower slopes of *Chikhaldara* range. The quality is mostly IV-a and IV-b. The crop is generally open. Full stocking is found only on relatively small areas. Salai (*Boswellia serrata*) is the main species and in many places grows almost pure. Its most usual associate is Dhawda (*Anogeissus latifolia*), other being Lendia *(Lagerstroemia parviflora*), Tiwas *(Ougeinia oogeinensis*), Moyen (*Lannea grandia*), Kekad *(Gaurga pinnata*), Mokha (*Schrebera swietenioides*), Palas *(Butea monosperma*), Aonla *(Emblica officinalis*), Dhobin *(Dalbergia paniculata*), Gongal *(Cochlospermum religiosum*), etc. Teak (*Tectona grandis*) occurs only in small patches particularly along the Nala banks and lower gentle slopes and is found invading sheltered locations. Khair *(Acacia catechu*) and Hiwar *(Acacia leucophloea*) occur chiefly on the plain areas at the foothills. Khair (*Acacia catechu)* is found to attain size not more than 45 cm. in girth. Lokhandi (*Ixora parviflora*) is common only along the streams.

2A.2.23. Natural regeneration is generally very scanty. Gongal *(Cochlospermum gossypium*) regenerates profusely on some of the dry hills. Bamboos are generally absent. Bushes of ber *(Zizyphus mauritiana*), Chilati (*Acacia pennata*), Bharati *(Gymnosporia montana*), Tarota (*Cassia tora)* and Samalu *(Vitex negundo*) and grasses such as Pochati (*Apluda varia*), Gondhali (*Anthistiria ciliata*), Kusal *(Heteropogon contortus*) and Sainar (*Sehima suicatum*) form the undergrowth.

2A.2.24. In few patches of Chinchona 'C; Class forest regeneration of Chandan (*Santalum album*) was observed while the host plant is Lantana. Samalu (V*itex negundo)* and lantana are competing to occupy the area.

2A.2.25. Tikhari grass (*Cymbopogon martini*) both of '*sofia' and 'motia'* varieties occur in this forest. *Motia* variety is in abundance in almost the whole of *Anjangaon* range is scattered on the southern foothills in *Chikhaldara* range.

2A.2.26. Climbers are very few and usually found in shady, moist situations along the streams. The more common climbers are Palasbel *(Butea superba*), Nagbel *(Cryptolepis buchanani)* and Chilati *(Acacia pennata).*

2A.2.27. Microclimate: Due to variation in the light, temperature, moisture, humidity and soil different types of vegetation occur in the area. The compartments 51, 55, 56 of *Masaundi* beat of *Ghatang* range are having *Amba-Jamun* vegetation particularly above 1000M altitutde. The regeneration of j*amun* is abundant both in the forest and nonforest areas. These areas bear leaves even in the month of May indicating semi evergreen or moist deciduous forest conditions. Similar vegetation type is found in *Shirasban* nala but it is at a lower altitude. Here the variation is due to the prevailing moist conditions in the valley as well as to the availability of moisture in the soil.

SECTION 2A.3. INJURIES TO WHICH THE CROP IS LIABLE:

2A.3.1. The most significant menacing agency causing considerable damage to the forest is grazing. Next to it is fire, followed by lantana, to some extent. Other injurious agencies such as insect, wild animals etc. are very negligible.

Fire:

2A.3.2. Fires, though not heavy, are of common occurrence in the recent past. Due to highly combustible undergrowth consisting of dense grass and dry lantana, a tiny spark can trigger off a conflagration in a short time. As the area is thinly populated the labour is in short supply. The high hot winds during summer, combined with the hilly configuration flames of the land-fires spread easily when it occurs and engulfs vast areas before it can be brought under control only by counter firing. Owing to lantana undergrowth, the fire rises to a height of 4-6 m. The height of the flame, thick lantana undergrowth, steep slopes and distance of the villages are the main impediments in putting off the fire. The fire spreads so rapidly before the arrival of the staff. It would be dangerous to put off fire manually in such high-rise flames. 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. The cause of the fires is given below.

1. To get good flush of *tendu* leaves people set fire to the area after flushing tendu plants to the ground level between Feb. 15 to March 15.
2. To collect *Mahuwa* flowers people burn the surface to make it black so that it becomes easier to pick the flowers. Generally it is carried in the March month.
3. To get good growth of grasses the *gaolis* set fire to the forest in the month of May.
4. To trace the *Sambhar* horns the local people set fire to the forest in the month of May.
5. The night torches used in the night to travel from one village to other village also cause fires in the forest.
6. To take revenge some times people set fire to the forest. Some times to prevent the bear attacks also they set fire to the forest.

Grazing:

2A.3.3. The entire forests are liable to damage from grazing except the interior areas away from the villages. The two 'C' class blocks of forests are very heavily grazed. In fact, there is hardly any grass left in these blocks and they only serve as exercise grounds for the cattle. These areas are very undulating and the soil is very poor and are therefore, even unfit for cultivation. The 'A' class forests adjoining the *Berar* plains are very hilly, and the upper slopes are steep. The grazing is, therefore, confined to the lower hills and the calculated incidence does not give the true picture of the grazing pressure here, while a large inaccessible area of the units remains ungrazed. A realistic calculation of grazing incidence is required. No grazing incidence should be calculated for the slopes above 25 degree.

2A.3.4. The forests on the plateau in *Chikhaldara* range are heavily grazed only 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.

2A.3.5. The grazing incidence figures are misleading as the erstwhile forest village cattle are grazed only in the immediate vicinity of the villages. The true grazing incidence in the areas adjoining the villages is therefore, heavier than is shown by the figures.

2A.3.6. The animals, mostly buffaloes, from *Chikhaldara* and some *rayatwari* villages, and some cattle from Berar plains are grazed from cattle camps, locally known as *hettis* in the interior of forests in the hot season. During this hot weather grazing after the depletion of grasses, grazers start lopping green foliage, especially of Ain (*Terminalia tomentosa*), Bhosa *(Bauhinia racemosa*), Kusum *(Schleichera oleosa*), Karkha (*Bridelia retusa*), Dhaman (*Grewia tiliaefolia*), Kahu (*Terminalia arjuna*), Salai (*Boswellia serrata*), Ghatbor (*Zyzypus xylocarpa*) and Bamboo (*Dendrocalamus stictus*). The lopping 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. The problem of migration of cattle is severe.

2A.3.7. According to the directives issued by the Government contained in the land reforms Department Ex-*Madhya Pradesh* memorandum No. 1290-1227-XXVIII dated 4th September 1953, sheep and goats are not allowed to graze in forests meant for production of timber or in the forest areas where villagers generally exercise their *nistar* rights. But 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.

Lantana:

2A.3.8. Lantana, which is indigenous to South America, was introduced into Ceylon in 1842 and thereafter into India as an ornamental garden shrub. It was brought to *Melghat;* probably from South India by some misguided persons many years ago round about 1870 and certainly much before 1890. It is said by old forest villagers that when lantana first appeared in *Melghat*, it was planted intentionally along roadsides in *Sembadoh* and *Raipur* ranges.

It is noticed that lantana is dense near the villages and it is quite likely that it was planted as a hedge round the fields. It is the greatest menace to the Melghat forests now, except for some of the drier salai forest in the *Aanjangaon* ranges there is hardly any compartment where lantana is not found and in most of them it forms very dense thickets. Its spread during the last half century is very alarming. Regarding lantana menace in 1895, Bagshawe in his Working Plan for the area, mentioned, "At present the only serious inroad is down the *Ambadoh nadi*", and it was only found in considerable quantities in higher altitudes which contain forest of comparatively little value. Similarly, Dunbar Brander in his Working Plan in 1916 remarked, "Mr. Williamson", in submitting proposals for the revision of the Working Plan in 1901, considered climbers (including lantana) need only be cut when found on teak and was of opinion that during his seven years acquaintance with the *Melghat*, their tendency was to decrease. This is a most remarkable statement in the light of the present condition of affairs and if, correct, shows the very rapid increase which must have taken place during the last three decades". Lantana thrives both in the open and under shade. It has not, however invaded the area occupied by bamboos. Besides forming a dense cover on the ground, which does not permit any regeneration of trees species, lantana, when dry, is extremely combustible. It throws up a huge flame, which scorches the leaves of trees completely. The splinters of lantana go high up and are blown across wide area, which make fire fighting very difficult.

2A.3.9. The damage from lantana was realized quite early and it is believed that efforts to control the spread of lantana were made in the early nineties. The measures were relaxed during the World War I, 1914-18 for reasons of economy. By 1921 lantana had invaded extensive area. From 1921 to 1931 deliberate fires in the middle or later part of the hot season were chief measures adopted to kill lantana. This drastic method had to be abandoned in 1931, because fires were causing appreciable damage to the tree growth not only in the lantana-infested areas but also in the adjoining forests where they would spread. Since then, uprooting of lantana by hand and with the help of elephants in the coupes under working started.

The spread of lantana could not be checked either with burning or by uprooting as its root suckers give rise to shoots again which restock the area very soon. The areas around Chikhaldara, which were set to fire and the coupes in which uprooting was tried for few years are as full of lantana as ever.

2A.3.10. The areas containing lantana were stock mapped to assess the spread under different Plans revised from time to time viz. Stein's Plan, Sharma's Plan as well as P. P. Joshi's Plan for the area. Accordingly, it still covers the whole of Chikhaldara, Ghatang and Jarida ranges.

2A.3.11. It was observed that grazed areas are invaded by lantana. After the invasion of lantana, cattle start grazing in a different area, leading to fresh invasion of lantana in the newly grazed areas. So, grazing areas be restricted to the surroundings of villages to prevent further spreading of lantana. It is also observed that lantana fruits are the source of food to bears; its bushes are acting as hiding places to wild animals, as a shade provider during the scorching summer season. It is also observed that the lantana is providing the necessary breeding habitats.

2A.3.12. Lantana bushes are providing a very good cover to soil, acting as a soil Binder. Rotational grazing has to be practiced in those areas, where lantana was removed otherwise neither grasses nor any other undergrowth will come up leading to soil erosion. Reducing/Controlling the grazing areas perhaps would be the best solution to prevent the lantana spread, it was also noticed that man-animal encounters are few in number in the lantana cleared areas compared to lantana covered dense areas.

Encroachments:

2A.3.13. In recent past tendency for encroaching forestland for cultivation has increased. The actual encroached area is higher than the recorded one. The area under dispute is not clearly demarcated. A few cases of clearance of the forest growth for cultivation are booked in some parts of Anjangaon Range. Prosecution of offenders led to bitter relationship between the forest staff and the local people. Samaj Kranti Aghadi an organization based at *Murtizapur* is advocating the people to encroach the forestland. As stated in Para 1.9.2. The process of settling of claims under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Rights) Act, 2006 is still going on even after 8 years since the Act came into force. Section 4(5) of the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Rights) Act, 2006 stipulates that save as otherwise provided, no member of the Scheduled Tribes and other Traditional Forest Dwellers shall be evicted or removed from forest land under his occupation till the recognition and verification process is complete.

As per the the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Rights) Act, 2006, the claims of forest rights are finally decided at the level of District Level Committee, which is supposed to communicate its decision both to the claimants as well as the Forest Department. However, it is the common experience that the final decision of acceptance of claims and subsequent conferring of titles as well as the decision of rejecting claims are not communicated by the District Level Committee, particularly to the Forest Department. In such a scenario, the field staff remains completely in dark as to the authenticity of occupation on forest land. This results in delay in eviction process in respect of ineligible encroachers resulting in a vicious cycle of further encroachment of forest lands by such ineligible encroachers in connivance with anti-social elements.

During the recent years, it has come to the notice of the Department that some of such anti-social elements, in the guise of tribal activists are instigating the local people to further encroach on forest lands in the hope of their regularization in the time to come.

Frost:

2A.3.14. Frosts occur in the valleys. Frost damage is caused in the low areas which are open, have either been once under cultivation or adjoin cultivation. No damage is caused to the crop if it is well stocked unless a severe frost occurs, which is rare. Teak (*Tectona grandis*) is the most susceptible species to frost damage.

Other species usually occurring in these areas viz., Saj (*Terminalia tomentosa*), Kahu (*Terminalia arjuna*), Dhaman (*Grewia tiliaefolia*), Baranga (*Kydia calycina*), Ber *(Zizyphus mauritiana)*, Khair (*Acacia catechu*) and Palas (*Butea monosperma*) etc. are quite resistant to frost damage. In the years of ordinary frost, the damage is confined to young growth when the leaves and tender shoots are killed, but severe frost kills saplings and the leading shoots to poles and sometimes even the crown of the old trees are affected.

In some of the badly affected areas, the teak trees are very forked and branchy and present in general an unhealthy appearance. If such areas are clear felled, the tree growth is completely prevented from coming up by frost and areas reduced to open grasslands. **It is, therefore, indicated that big gaps in canopy should not be created in the frost liable areas.**

2A.3.15. The liability of particular area to frost damage is indicated by its low lying situation, black cotton soil, the presence of dominant Saj (*Terminalia tomentosa*) bushes like *dhi, samalu, pithondi, baibrang*, etc., and *karsali* and *baru* grasses.

2A.3.16. The records show that there has not been any severe frost during the last 65 years. Small damage to young crop is noticed in some of the worked coupes here and there, as per P.P.Joshi's observations.

2A.3.17. The forests of *Chikhaldara* range lying to the south of the main ridge of *Gawilgarh* hills do not experience frost damage.

Drought:

2A.3.18. The forests, especially in the drier parts in the south and west, are liable to damage from drought only in or immediately after years of deficient rainfall. During the famine in the year 1899, chiefly old and unsound trees died in such a large numbers that in 1901 the prescriptions of Working Plan had to be held in abeyance to exploit these trees. Mortality in small stray patches on rocky substrata during the year of less rainfall is attributed to drought. The damage, however, is negligible. In the past 50 years severe drought has not been recorded. In 1951-52 the rainfall was below normal, but no appreciable damage was noticed to the crop except that few trees of teak dried here and there.

Winds:

2A.3.19. The effects of winds are negligible. Occasionally, trees are uprooted and branches broken by the high gusts, which accompany thunderstorms towards the end of the hot season. The stunted nature of the forest in exposed situations at high elevations is partly due to strong winds, which are frequent during the hot and rainy season.

Insects:

2A.3.20. Attacks of Teak Defoliator (*Hyblea puera*) and the Leaf Skeletoniser (*Hapalia macheralis*) occur almost every year in teak stands but the damage is seldom on of a severe nature. Much damage is done to bamboos by Chrysomelid and Curculioid beetles, which make tunnels in young culms during the rains.

Animals:

2A.3.21. *Sambhars* are found all over the division although their number is not very great. They rub their horns to the teak poles and debark them. These animals do some damage to the young coppice shoots and poles by scratching their horns of side against the poles. Occasionally some damage by porcupine is also noticed. They usually eat the outer bark or cambium of *Haldu, Mohwa, Amaltas, Bhilwa*, etc., near the base of the trees.

2A.3.22. As mentioned by Dr. Schlich in 1883 rats had done great damage in the teak plantations and their reappearance in large number is recorded in the annual reports of 1902.

2A.3.23. The damage by wild animals in *Melghat* forests, generally, is very little.

Chapter II B

FOREST FAUNA

SECTION 2B.1. DESCRIPTION OF FAUNA:

The Melghat Forests in Maharashtra cover an area of about 2500 Sq.Kms confined to Dharni and Chikhaldara taluka of Amravati District. This region is considered to be one of the major biodiversity hotspot in the world. The Melghat Forests offer natural habitat to major carnivorous species, namely tiger, leopard, variety of cat species and other associate species. It may not be out of context to mention that central part of Melghat forests is notified as Melghat Tiger Reserve, one of the nine original tiger reserves, designated under the Project Tiger conceived by Late Smt. Indira Gandhi, the then Prime Minister of India. MTR consists of Gugamal National Park, Wan Sanctuary, Melghat Sanctuary, Ambabarva Sanctuary and Narnala Sanctuary. The Melghat Tiger Reserve is chunked on eastern and western side by East and West Melghat Forest Divisions, respectively. Thus, the East Melghat Division provides natural buffer to one of the prime tiger habitats in the world. Recent studies conducted by Wildlife Conservation and Research Society, Pune has indicated the presence of at least 4 tigers along the borders with Melghat Tiger Reserve. Apart from this, 5 tigers have their territories overlapping with the core area of Melghat. Needless to mention that the presence of these many tigers indicates that the health of forests in these regions is satisfactory. However, a large chunk of region on the northern and eastern sides adjoining to the Madhya Pradesh State. Thus, the entire area is vulnerable from poaching of wild animals. Therefore, the smooth coordination with the forest officials of Madhya Pradesh State is the need of the hour. Moreover, the strict action against the offenders need to be insured as per the provisions of Wild Life (Protection Act), 1972. For effective implementation of the Wild Life (Protection) Act, the State Government has authorized certain officers under the said Act. Apart from this, the Chief Wildlife Warden has also authorized certain officers to carry out the conflicts specified in the Act. The notifications delegating the officers under the Wild Life (Protection) Act are enclosed in **Appendix No. VII.**

Stray cases of cattle kill and injuries to human due to wild animals do take place in the region. However, to prevent the possibility of wild animals human conflicts, the State Government has adopted the policy of financial assistance and compensation in case of human injuries and cattle kill, respectively. Apart from this, the crop damage due to herbivorous wild animals is also compensated financially as early as possible. The rates for such compensation have been revised and modified from time to time.

2B.1.1. The wild animals noticed in the tract are:

1) Carnivora:-Tiger (*Panthera tigris*) Panther (*Panthera pardus*), Hyena (*Hyena hyena*), Jackal (*Canis aureus*), Indian Fox, (*Vulpes bengalensis*), Jungle cat (*Felis chaus*), Indian wild dog (*Cuon alpinus*).

2) Herbivora:- Four horned antelope (*Tetracerus quadricornis*), Sambhar (*Cervus unicolor*), Barking deer (*Muntiacus muntjac*), Spotted deer (*Axis axis*), Blue bull (*Boselaphus tragocamelus*), Gaur (Bos gaurus), Common Langur (*Presbytis pileatus*), Indian Hare (*Lepus nigricollis*), Black buck (*Antilope cervicapra*).

3) Omnivora:- Civet cat (*Paradoxurus hermaphroditus)*, Sloth bear (*Melursus ursinus*), Wild boar (*Sus scrofa*),

4) Aves: - Apart from the common birds the following avi-fauna are observed: -
Pea fowl (*Pavo cristatus*); grey jungle fowl (*Gallus sonneratii*); Painted partridge (*Francolinus pictus*); Common quail (Conturnix); Crow pheasant (*Centrupus sinensis*); yellow legged green pigeon; gray tit; pond heron; cattle egret; crested serpent eagle; Golden backed woodpecker (*Dinopium bengalensis*); Black drongo (*Discrurus adsinillis*); kingfisher; small kingfisher, Long billed and White backed Vultures etc.,

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

2B.2.1. From time immemorial the wild animals have occupied a place of pride in the folklore of Indian culture. They were respected and protected by the tribals who never used to kill the animals for fun or pleasure. However, hunting became an important pastime for the Rajas and Maharajas who used to hunt and kill the animals for meat as well as for preparing trophies. In the Reserved Forests, hunting was restricted and licenses were used to be issued for small game, big game, etc. and shooting blocks were set apart, where the animals specified in the license only could be hunted.

However, after the enactment of the Wildlife (Protection) Act, 1972 and subsequent amendments in this act particularly those in 1991 and 2002, no permission for hunting of wild animals, as game or sport, can be granted. Hunting of wild animals however can be allowed for special purposes but only in exceptional circumstances. This act also enjoins on us the responsibility for wildlife conservation outside the protected areas. The wildlife, which used to flourish in the forests of the division, is threatened due to various factors like population explosion, encroachments, improved network of road and availability of sophisticated weapons. Due to increase in demand for wildlife products all over the world, poaching problems have increased over the years.

SECTION 2B.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 anyone 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. Section10(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. 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 outside 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.

SECTION 2B.4. : **INJURIES TO WILDLIFE:**

POACHING:

2B.4.1. 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.4.2. 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.4.3. Electrocuting the animals including tigers by laying electric wires on the tracks followed frequently by wild animals and by drawing electric current from the 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.

2B.4.4. Use of pesticides rather than the plant poision, to catch the fish of water bodies, by the tribals led to the death of wildlife which preyed upon the fish containing poisions. This practice be discouraged to save the wildlife by bringing awareness.

DISEASES TO WHICH WILDLIFE IS LIABLE:

2B.4.5. 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.4.6. 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.4.7. The carnivores, tigers and panthers particularly sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. 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 govt. of Maharashtra therefore have evolved a policy of compensating for the loss of livestock as well as for the injury to and loss of human life.

The details of poaching of wild animals during recent past and the compensation paid towards cattle kill/injury caused to human beings by wild animals is given below.

Table No. 2.2
Table showing the poaching of wild animals

Sr. No	Year	Kind of wildlife	POR and Date	Place where offence occured	Reasons of death	Name of Offender	Remarks
1	2	3	4	5	6	7	8
1	2008-09	Sambar	11/4 17/06/2008	Rahu (Jarida)	Poaching	Bhaydu Chhote, Rahu	-
2	2009-10	-	-	-	-	-	-
3	20010-11	-	-	-	-	-	-
4	2011-12	-	-	-	-	-	-
5	2012-13	-	-	-	-	-	-
6	2013-14	Sloth Bear	15/24 29/05/2013	Masondi	Poaching	1.Parman Banu Sawalkar	Under Trial
						2. Shobheram Babnu Sawalkar	
						3.Sanjay Moti Sawalkar	
						4.Madhu Babnu Sawalkar All R/o Masondi Tq-Chikhaldara	
						5.Mamru Badlu S/o Pansari Patlepawar	
						6.Chika S/o Jer Khaskas Patle Pawar R/o Sagoni Tq.Hata, Distt.Khandwa.	
						7.Shri Prakash S/o Bisan Chavan, R/o Chhanera, Distt.Khandwa (MP)	
						8.Nirafal Parmulal Chavan	
						9.Srival Nirafal Chavan both R/o Moujoli Distt. Jabalpur (MP)	
						10.Nipustan Betalal Patlepawar R/o Killai Distt. Damoh (MP)	
						11.Ujiyar Bhagru Rumalsingh Dhurve R/o Banapur Tah.Timala, Distt.Hoshangabad	
						12.Arkas S/o Darkas Chavan	
						13.Bandariya S/o Darkas Chavan both R/o Kondegaon Tah.Haruda Distt.Katani.	
						14.Kuntar Nanka Rajput R/o Purena Tah.Pawai, Distt.Panna.	

Sr. No	Year	Kind of wildlife	POR and Date	Place where offence occured	Reasons of death	Name of Offender	Remarks
1	2	3	4	5	6	7	8
	2013-14	Leopard	1/1 21/09/2013		Poaching	1.Shrival Nirafal Chavan R/o Birihali Distt.Katni.	Under Trial
						2.Nipustan Betalal Patlepawar R/o Killai Distt.Damoh (MP)	
						3.Nirafal Parumalal Chavan R/o Biruhali Distt.Katni. (MP)	
						4.Ujiyar Bhargu Rumalsingh Dhruvar R/o Barhanpur Tah.Timla Distt.Hoshangabad (MP)	
						5.Chika Krushna S/oJer Khaskhas Patle Pawar R/o Sagoni, Tq.Hata, Distt.Khandwa	
						6.Shri Prakash S/o Bisan Chavan R/o Channera, Distt.Khandwa (MP)	
						7.Mamru Badlu Pansari Patlepawar R/o Sagoni, Tq.Hata, Distt.Khandwa	
	2013-14					8.Luteriya Tej Rajput R/o Ajaygadh Tah.Panna, Distt.Panna	
						9.Bandariya Darkasd Chavan R/o Kondegaon Tah.Haruda Distt.Katani	
						10.Arkas Darkas Chavan R/o Kondegaon Tah.Haruda, Distt.Katni	
	2013-14	Tiger	10/10 09/10/2013		Poaching	1.Nanaji Bhura Sakom R/o Chinchkheda Ta.Chikhaldara, Distt.Amravati	Under Trial
						2.Suresh Gangu Belsare	
						3.Babulal Bhura Sakom	
						4.Sunil Masram Mavaskar	
						5.Sundarlal Janle Mandekar	
9	2014-15	-	-	-	-	-	-

Table No. 2.3
Table Showing The Financial Assitance And Compensation Due To Human Injury And Cattle Killing By Wild Animals.

Sr. No.	Year	No. of cattle killed	Compensation paid (Rs.)	No. of cases of human injury	Finalcial Assistance (Rs.)
1	2	3	4	5	7
1	2004-05	42	98676	-	-
2	2005-06	11	29450	-	-
3	2006-07	13	38325	-	-
4	2007-08	09	23700	-	-
5	2008-09	32	97626	-	-
6	2009-10	51	100140	-	-
7	2010-11	55	313575	7	45000
8	2011-12	27	127800	2	2500
9	2012-13	57	345200	1	207500
10	2013-14	47	270600	14	852925
11	2014-15	51	423875	4	23000

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 identity the flora and fauna of the area and due care needs to be taken to conserve it.

Biogeographic location :

2C.1.2. Biogeographically, the area of the division 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. Many botanical surveys were carried out by different authorities, experts with various objects for Amravati District. Abstract of these botanical surveys and the reports/flora/thesis is given below. Since, the forest of Amravati division is located in 12 talukas out of 14 talukas in district, therefore the floras present the partial information about Amravati division.

2C.2.2. Past Work: The area of East Melghat Division from Botanical Exploration point of view is almost virgin. Except for the Stewart and Brandis "Forest flora of North-West and Central India (1874). In 1887 Van Someron published "A list of Trees in the Melgaht Forests" wherein he has given 110 trees species. Dikinson (1892) prepared a list of the Berar Circle of the Central Province. This was followed up in 1908 by Witt's "List of Trees, Shrubs and Climbers and Other Plants of Economic importance found in the Berar Forests Circle of the Central Provenances which includes Melghat tract. These lists were found to be of much use in the Central Provenance in absence of any flora for this region. Haine's "Descriptive list of Trees, Shrubs and Economic Herbs of Southern Circle" (C.P.) was published in 1916. This list proved to be most useful to the forest officers.

2C.2.3. Later on the listing of flora of Melghat Tiger Reserve was done by Dr.M.A.Dhore, Professor in V.M.V. College at Amravati and Mr.P.A.Joshi, Research Officer, Project Tiger Melghat which describe 648 naturalised species, belonging to 398 generas of 97 families. The flora describes 90 Trees species, 343 Herbs and 72 Climbers. 99 Shrubs and 84 Grass species. Out of these 28 species has been described for first time of Vidarbha region. This was published as the Technical Bulletin No.1 for Melghat Tiger Reserve.

2.C.2.4. Further addition in this list was done and published vide Technical Bulletin-VII as "Additions to flora of Melghat Tiger Reserve" authored by Dr.Prabha Bhogonkar and V.D.Dewarkar, (1999) This re-exploration resulted in addition to 67 species to the earlier reports of Angiosperms. In all 10 generas 44 species, one subspecies, one variety and two variation (Total 48 Texa) are added to the list of dicots. Out of these 13 were first time reported for Maharashtra and 12 for Vidarbha region. For monocots, the addition was 8 genera and 19 species.

2C.2.5. Later on 58 species were added to this by Dr.Aparna Watwe of Botanical Survey of India, W.R.S.Pune during 2004-05.

2C.2.6. In 2002 Mr.M.A.Dhore written a Ph.D. Thesis named as "Flora of Amravati District with special reference to the Distribution of Tree Species" which appears to be expansion of Technical Bulletin-I of Melghat Tiger Reserve.

The above works are tabulated as below:-

Table No.2.9
Table showing the floral Biodiversity of the Amravati District.

Sr. No.	Name of Survey	Herbs	Shrubs	Climber	Grass	Tree	Total
01	Flora of Amravati District by Dr.M.A.Dhore	572	210	89	123	90	**1084**
02	Additions to flora of Melghat by Dr.Prabha Bhogaonkar and Prof. V.D.Dewrkar	58	04	05	-	-	**67**
03	Survey by B.S.I. Pune by Miss.Aparna Watwe	49	06	2	-	01	**58**
	Total -	**679**	**220**	**96**	**123**	**91**	**1209**

Florestic Distribution :

2C.2.7. The floristic distribution changes along with the altitude. These changes are conspicuous.

TREES -

2C.2.8. 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,

2C.2.9. Enumeration data reveals ten major species of the region which are (1) Teak *(Tectona grandis)* (2) Bhera (*Chloroxylon sweitenia),* (3) Khair *(Acacia catechu),* (4) Palas *(Butea monosperma),* (5) Salai (*Boswellia serrata*), (6) Tendu *(Diospyros melanoxylon),* (7) Moyan *(Lannea coromendelica),* (8) Hiwar *(Acacia leucophloea),* (9) Apta *(Bauhinia recemosa),* (10) Char *(Buchanania lanzan)*

2C.2.10. 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 (*Hardwikia binata*) is again another dominant species of this area, but it is lopped heavily for fodder. 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 are situated in the scattered blocks in Division.

Bamboos :

2C.2.11. *Bamboo (Dendrocalanus strictus)* very rarely occur with in the territory of this Division. It occurs is Warud and Morshi Ranges.

Climbers :

2C.2.12. There are as many as 89 climbers/ twinners recorded in the district. *Mahulvel (Bauhinia vahlii),*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.

2C.2.13. Malkanguni is now declared "Red Data" species as it on the verge of extinction from the Western Ghats.

Shurbs :

2C.2.14. There are 220 shrubs that exists in the area. Raimunia *(Lantana camara)*, Bharati (*Meytenius emarginata*), Nirgudi (*Vitex negundo*), Tarota (*Cassia tora*) Parijatak/Karsadi *(Nyctanthes arbortristis)* are the most common Shrubs.

Herbs :

2C.2.15. There are as many as 679 species of herbs recorded in the district. Most of the herbs have medicinal value. But herbs which have medical importance is on the verge of extinction because of uncontrolled and unscientific method of exploitation and tremendous biotic pressure and they are replaced by the obnoxions weeds like Rantulsi (*Hyptis suveolens*), Gajar gavat (*Parthenium hysterophorus*), Datura (*Dhatura metals*) and Mexican poppy *(Argemone mexicana).*

Grasses :

2C.2.16. There are few grass lands or fodder reserves in this Division. In most of the grassy blanks, soil depth is less. These are associated with brush wood or stunted tree growth. The most common grass species are Kusali *(Heteropogon contortis),* Pochati *(Apluda mutica),* Gondel *(Themade triandra),* Marvel *(Dicanthian annulatum)* and Bhurbhusi (*Aristade depressa*) Most of the grassy lands are surrounded by thickly populated villages and few Kathiawadis also settled around these ramnas. Cattles of these villages and Kathiawadis graze in these fodder reserve. Due to heavy grazing pressure and recurrent fires the grasses from these areas are being replaced by the coarse unpalatable grasses and weeds species like Rantulsi and Gajar gavat.

Plant parasite:

2C.2.17. The flowering plant parasites occurring in the forests of this Division are *Bandgul* (*Cuscuta chinensis*) and *Amar vel (Cascuta reflexa).*

Exotics :

2C.2.18 The exotic species found in this Division are *Eucalyptus hybrid*, *Eucalyptus camaldulensis, Grevillea robusta* etc.

SECTION 3. FAUNAL DIVERSITY:

2C.3.1. Amravati district is also having fairly good faunal diversity. Zoological Surveys were carried out for the Division by Zoology Department of the Sant Gadge Baba Amravati University mostly for Arachnids. Surveys were also conducted by Wildlife and Environment Conservation Society, Amravati but all these are limited works. The collective summary of these surveys is given below.

Class – PIECES

2C.3.2. There are few water bodies in the Amravati Division. Some perennial streams and rivers retain water throughout the year. Earlier M.G.Gogte (1988) reported preliminary list of 19 fish species for Melghat.

2C.3.3. The list was further updated by Dr. D.R.Gujar (1993) and enlisted 24 fish species. Now after the survey by B.E.Yadav of Zoological Survey of India, W.R.S. Pune, the list has gone upto 96 species under 52 genera belonging to 19 families.

Class – AMPHIBIA

2C.3.4. Hill streams draining into major river of this division has ample water for the aquatic fauna as well as amphibians, which required water bodies for completing their life cycles. The forests have enough moisture during the winter months which is ideal for the survivals of the amphibians.

2C.3.5. There are 8 species of frogs and toads reported by Satish S. Kamble of Zoological Survey of India, W.R.S. Pune.

Class – REPTILIA

2C.3.6. The habitat of Amravati district is equally ideal for Reptiles also. However, tragically no consolidated account on the reptilian diversity from this region is available. From recent survey of Zoological Survey of India, Pune M.S. Pradhan reported 54 species of reptiles of which 36 species were collected or actually seen by the survey parties.

List of Reptiles in Schedule I (Part II) of Wildlife Protection Act, 1972.

Sr.No	English Name	Scientific Name	Local Name
1	Indian Rock Python	*Python molurus*	v t xj

Class – AVES

2C.3.7. Amravati District is reach in avian fauna. The vegetation of area is of Southern Tropical Dry Deciduous Forests. The most dominant element of this forest is Teak. The large area is Scrub forest and Pasture land. Climbers and herbaceous flora is also rich in some patches like Mahendri. This has supported the insect fauna of this reserve and in turn the avian community. The inventory of birds of the district is given by Wildlife and Environment Conservation Society, Amravati. Heading Check List Of Birds Of Amravati District which enlist 341 species. The list of birds found in the District is given in **Appendix No. LXVII.**

2C.3.8. List of important birds mentioned in various Schedules of Wildlife (Protection) Act 1972 which are found in Amravati District.

List of Birds in Schedule I (Part III) found in East Melghat Forest Division.

Sr.No.	English Name	Scientific Name	Local Name
1	Red Headed Falcon	*Falco chicquera*	Yky MkD;kpk efyvl
2	Peregrine Falcon	cghVh l l kkk	
3	Indian Peafowl	eksj	
4	Indian White backed vulture	*Gyps beghalensis*	'kqHkzkBh fx/kkM
5	Osprey or Fish eating eagle	*Paudo haliaetus*	eR; x: M

List of Birds Schedule II (Part II)

Sr.No.	English Name	Scientific Name	Local Name
1	Grey Jungle Fowl	*Gallus sonneratii*	jkdkh jkud kaMk

Red Data Book Species:

Sr. No	English Name	Scientific Name	Local Name	Status
1	Ferruginous Pochard	*Aythya nyroca*	u;ul jh	NT
2	Malabar Pied Hornbill	*Anthracoceros coronatus*	eyckjh iVVjh /kuus'k	NT
3	Forest Owlet	*Heteroglaux blewitti*	jku fiaaGk	CR
4	Black-tailed Godwit	*Limosa limosa*	dkG;k 'ks Vhpk eky xqyk	NT
5	Sociable Lapwing	*Vanellus gergarius*	lkekftd kjh fVVoh	VU
6	Indian Skimmer	*Rynchops albicollis*	---	VU
7	Egyptian Vulture	*Neophron percnopterus*	bft l'kh;u fx/kkM	EN
8	Red-headed Vulture	*Sarcogyps calvus*	jkt fx/kkM	CR
9	White-rumped Vulture	*Gyps bengalensis*	ikaa&;k ihB;kps fx/kkM	CR
10	Indian Vulture (longbilled)	*Gyps indicus*	Hkkjrh; fx/kkM	CR
11	Pallas's Fish Eagle	*Haliaeetus leucoryphus*	iYyl pk eRL; x#M	VU
12	Pallid Harrier	*Circus macrourus*	ikaqjs dk gkfj.k	NT
13	Lesser Kestrel	*Falco naumanni*	yghu [k#ph	VU
14	Laggar Falcon	*Falco lagger*	yXxM l l ku k	NT
15	Darter	*Anhinga melanogaster*	fr jaakt	NT
16	Lesser Flamingo	*Phoenicopterus minor*	NksVk jkgr	NT
17	Black-headed Ibis	*Threskiornis melanocephalus*	dkG;k MkSD;kpk 'kjkVh	NT
18	Painted Stork	*Myeteria leucocephala*	jaahr dj dkpk	NT
19	Black and Orange Flycatcher	*Ficedula nigrorufa*	dkGk ukjaaph ek'khekj	NT
20	Green Avadavat (Munia)	*Amandava formosa*	fgjok eqU;k	VU

CR-Critically Endangered, VU-Vulnerable, NT-Near Threatened

Class – MAMMALIA

2C.3.9. These is the most important class of vertebrates. Which consists of very important species of primates and carnivore from the various surveys carried out in Amravati District. i.e. 1. By M.S. Pradhan of Zoological Survey of India, WRS Pune and 2. Nature Conservation Society, Amravati 3. Wildlife and Environment has reported 80 species of Mammals in Amrvati District list of Mammals is given in **Appendix No. LXVII**.

2C.3.10. List of mammals found in Amravati District which are mentioned in various Schedules of Wildlife (Protection) Act 1972 and Red Data Lists are given below :-

Schedule I Part I

Sr.No.	English Name	Scientific Name	Local Name
1	Tiger	*Panthera tigris*	ok?k
2	Leopard/Panther	*Panthera pardus*	fcc V; k
3	Sloth bear	*Melursus ursinus*	v Loy
4	Gaur/Indian bison	*Bos gaurus*	j ku x ok
5	Indian wolf	*Canis lupus*	y kM+x k
6	Black buck	*Antelope cervicapra*	d kGoh V
7	Four horned antelope	*Tetraceros quadricornis*	p kS aa k
8	Indian pangolin	*Manis crassicaudata*	[koY; k eka j
9	Ratel/Honey badger	*Mellivora capensis*	p kah v Loy
10	Mouse deer	*Moschiola meminna*	fi l kjh gfj .k
11	Leopard cat	*Felis bengalensis*	ok?kkVh

Schedule II (Part I)

Sr.No.	English Name	Scientific Name	Local Name
1	Common langur	*Presbytis entellus*	oku j
2	Rhesus macaque	*Macaca mulatta*	y ky r kM+kpos ekd M
3	Wild dog/Dhole	*Cuon alpinus*	j ku d qk@<ks

Schedule II (Part II)

Sr.No.	English Name	Scientific Name	Local Name
1	Common palm civet or Toddy cat	*Paradoxusus hermaphroditus*	mm eka j
2	Small Indian Civet	*Viverricula indica*	t okmh eka j
3	Flying Squirrel	*Rutufa indica*	mM.kkj h [kkj
4	Jackal	*Canis aureus*	d kSgk
5	Indian grey mangoose	*Herpestes edwardsii*	e qaiw
6	Indian ruddy mangoose	*Herpestes smithii*	e qaiw
7	Jungle cat	*Felis chaus*	j kue kaj
8	Otter	*Lutragale perspicillata*	i kue kaj

Schedule III

Sr.No.	English Name	Scientific Name	Local Name
1	Barking deer	*Muntiacus muntijak*	Hkd j
2	Chital	*Axis axis*	fpr G
3	Hyaena	*Hyaena hyaena*	r MI
4	Nilgai/Bluebull	*Boselaphus tragocamelus*	j kgh
5	Sambar	*Cervicarpus unicolar*	l kaj
6	Wild pig	*Sus scorfa*	j ku MDd j

Schedule IV

Sr.No.	English Name	Scientific Name	Local Name
1	Black Napped Hare	*Lepus nigricollis*	l l k
2	Five Stripped Palm Squirrel	*Funambulus pennatii*	[kkj
3	Indian porcupine	*Hystrix indica*	l kGhaj

Red Data Species of class Mammalia

1	Tiger	*Panthera tigris*	Endangered
2	Black buck	*Antelope cervicarpa*	Vulnerable
3	Dhole	*Cuon alpinus*	Vulnerable
4	Sloth Bear	*Melursus ursinus*	Vulnerable

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 recourses.

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 lead 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 seeking of title 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 resources, field varieties and cultivators domesticated stock and breeds of animals and micro-organisms and chronicle 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 entire population within the division consists of *rayatwari* villages, which were forest villages till 1970. The tract is surrounded by *Rayatwari* areas in the northeast and *Berar* plains adjoin the southern boundary. These villages are mostly inhabited by *Korkus* except some villages in *Chikhaldhara* range, which are mostly occupied by *Gaowlis*. There are 53 ex-forest villages of which *Bilu* is a deserted village. In addition to this in 9 villages Ex.*jahagir* forest is spread. Only the *Chinchona* village forest is situated in *Anjangaon taluqa*. These Ex-forest villages were converted in to revenue villages. The process was started in 1969 and was completed by issue of final notification in 1987. Korku, Hindi and Marathi are main languages spoken in the area.

TRIBALS:

3.1.2. Traditionally '*Korkus*' are chiefly dependent for their livelihood on trade in forest produces in plains. They are good forest workers and even now their dependency on forest work is high. *Gonds* generally work as herdsman for *Korku* livestock and are poorer lot. Other small groups either make service sector or are dependent on forest in one way or another. There is a good number of landless people. Land holdings are small. All these people do practice subsistence level of agriculture. They raise inferior grains like *kodon*, *kutki* and *jagni* on lighter soil and gram, *jawar* and wheat on clayey soil. Cultivation of cotton is rare.

3.1.3 It is usual practice to fence the field with bamboo mats and to erect scarecrows. They camp out in the open, till grain is taken out. To scare wild animals small pieces of bamboo are tied with two logs of wood and worked by a rope making a clapping noise. Harvested grain, if surplus, is normally stored on a platform upon stilts in field itself. Irrigation is rare and crops are rain fed only.

3.1.4. Houses are made of mud, bamboos, mats, poles, timber and grasses. A typical village has all houses arranged in two rows facing each other. Central place is common and used by entire village. Cattle sheds are located on backside of these huts. Now a days brick structures and tiles on roofs are becoming popular.

3.1.5. There is a system of weekly bazaar. In addition many big villages have one or two shops. High interest rates and money lending is said to be common.

3.1.6. Their level of development demands higher consumption of firewood and timber. As a practice they keep fire alive round the clock in their houses. They use poles and timber for house building.

3.1.7. Though tribals do not use milk they raise cattle as draught animals. Perhaps use of cattle for barter trade in the past, may also be a reason for their attachment to cattle.

NON-TRIBALS:

3.1.8. Gaoli: They enjoy high status. They are professional graziers and have large herds of buffaloes and cows. During rainy season most of them cultivate some land. Many of them take out their cattle in the adjoining area in nonagricultural season. Grazing pressure from Gaoli's cattle is perceived as detrimental to wildlife. It is suspected that some of them set forest fire for getting better flush of palatable grasses.

3.1.9. In the Tribal sub-plan areas, as per the Maharashtra Tribal Economic Upliftment Act. (1956), the Government has declared monopoly over the purchase of food grains as well as the minor forest produce with the exception of *Tendu*. The Maharashtra Government has recently passed an Act called Maharashtra Transfer of Ownership of M.F.P in the Scheduled Areas and the Maharashtra M.F.P. (Regulation of trade) (Amended) Act, 1997 as Act. No. XIX of 1997 on 10th December 1997.

According to section 4 of the Ordinance the ownership of the M.F.P. found in the Government lands in the scheduled area, excluding the National Parks and Sanctuaries, shall vest in the Village Panchayats within whose jurisdiction such area fall. However, the ownership of M.F.P. does not include the ownership of land or trees in that Panchayat area. The list of M.F.P. covered under the ordinance is specified in the schedule. Tendu, Apata, Bamboo have been excluded from the purview of this ordinance and still remain the property of the State Government.

3.1.10. The rural population consists mainly of agricultural labourers and agriculturists. The way of the life of the people in rural areas has direct bearing to the forests as they depend on forests for timber, poles, firewood, bamboo and grasses for constructing their houses and cattle sheds and making agricultural implements. They also require fodder, flowers and fruits as well as variety of other non timber forest produce such as moha, gum, lac, honey, tendu leaves, herbs, roots etc. for food and medical purposes.

Wants Of The People:

3.1.11. Teak is the most valuable species used for building purposes. However, due to its prohibitive cost, other species like *Bija, Ain, Tiwas, Haldu, Kalam, Siwan, Rohan, Dhaora* etc., are being used as timber for various household purposes.

3.1.12. Timber: Timber is required for construction purposes and for making furniture for households and business enterprises. The most preferred timber species is Teak. Other species used are *Bija, Ain, Tiwas, Haldu, Kalam, Dhaora, Bhirra, Lendia, Siwan and Bamboos.*

3.1.13. For the construction of carts, teak is preferred for making the body, T*iwas, Ain, Dhaman, lendia, dhaora* or *tendu* for shaft, *dhaora* for axles, *tiwas, kusum* or *kahu* for naves, teak for spokes and *shiwan* for yokes; *mowai* and *salai* are also used if *shiwan* is not available in the required quantity. For the purposes of agriculture implements such as ploughs *tiwas, shiwan, khair* and *babul* are preferred.

3.1.14. Firewood: Dhaora is the most preferred firewood. In the absence of *dhaora* they bring other miscellaneous wood. Generally they bring it on cartloads or on head loads, on an average, a minimum of 5 cartloads of firewood is required for one family.

3.1.15. Bamboos: *Bamboos* are available in *Jarida* range and northern parts of *Ghatang* range. The requirements of the *burad* people are met through *nistar*. However, local people depend on bamboo for their bonafide needs.

SECTION 2. MARKETS AND MARKETABLE PRODUCTS:

3.2.1. *Paratwada* has a reputation of being a major timber market mainly because of supplies from *Melghat* forests. Purchasers come from diverse places. Paratwada itself is a good saw mill center. *Amravati* has a good number of sawmills.

3.2.2. Apart from timber mainly teak and fuelwood, important forest produces are bamboos, *tendu* leaves, *moha* flowers and fruits, *kulugum, aonla, hirda, musli. Charoli* etc. The tract has a number of important medicinal plants, which are not harvested properly at present.

SECTION 3. LINES OF EXPORT:

3.3.1. It is well connected by road to Paratwada and Amravati. Though there is a railhead at Achalpur it is rarely used for export of timber and minor forest produces.

SECTION 4. METHOD OF HARVESTING:

3.4.1. Firewood, bamboos and grasses for local consumption are harvested on rated passes.

3.4.2. Departmental harvesting is carried out in case of timber and firewood in main felling and thinning coupes. Timber coupes are also harvested through FLCS.

3.4.3. *Tendu* was harvested through the contractors on standard bag basis with ceiling on upper limit. However, due to recent developments, the ownership of Tendu collection and sale rests with the Panchayat and Gram Sabha.

3.4.4. Integrated Unit: It was established to popularize the use of non-teak, in the year1962-63. But the unit was not commercially successful as the people's response was poor. Hence the Govt. decided to close the unit.

3.4.5. Mechanized Logging Unit: After the reorganization of the Divisions the mechanized logging unit at *Paratwada* was transferred from Timber and Marketing Division to East *Melghat* Division. The following animals and machines are available with the logging unit *Paratwada.*

Table No.2
Table Showing The Livestock, Equipments And Machineries Of M.L.U.

Particulars	Working	Written off	Under repair	Total
01. Trucks	1	4	2	7
02. Tractors	2	-	-	2
03. Elephants	1	-	-	1

3.4.6. Tractors are used for dragging and local transport. Elephants are also used for dragging in the inaccessible areas. Trucks are used for transport of timber to sale depots. Felling of trees is carried out by using saws. The present list of equipments is given below.

3.4.7. Machinery: Lathe machine, Drill machine, Grinder machine, Hand Drill machine, Nozzle machine are available and are in good condition. Power Chain Saws were used earlier but withdrawn from the service for want of Spare Chain Saws.

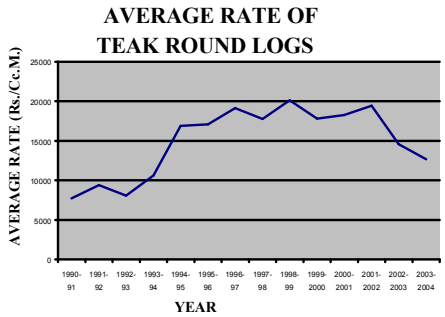
SECTION 5. TIMBER DEPOTS:

3.5.1. *Paratwada* is main depot for good quality timber. Small temporary depots are made generally at range headquarters or some times at round headquarters for sale of offence materials or small quantity of fuel wood.

SECTION 6. COST OF HARVESTING:

3.6.1. The cost of harvesting depends on the Wage board rates for harvesting of timber and is fixed every year.

SECTION 7. PAST AND CURRENT PRICES:



3.7.1. Average prices obtained for teak during auction at Paratwada has been compiled and over the years the price of teak has gone up. Grade wise rates obtained between 2007-08 and 2014-15 are given below to have a fair understanding on the teak quality wise rates.

Table No.3.
Average Price Obtained For Teak And Other Species Round Logs Per Cu.Mt.

Species	Grade I	Grade II	Grade III	Grade IV	Grade V	Grade IV	Average
Teak	-	39887	34581	40968	29597	19995	34648
Haldu	-	-	17145	12456	9892	14705	13984
Non Teak	-	-	-	8860	5606	6564	6860

CHAPTER IV

THE SOCIO ECONOMIC SURVEY REPORT

SECTION 1. FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA:

4.1.1. The entire area of the East *Melghat* Division is vested with Forest Department of *Maharashtra*. Forest area was neither handed over to FDCM nor earmarked to them.

SECTION 2. THE SOCIO ECONOMIC SURVEY REPORT:

4.2.1. The entire East Melgthat Division is spread over *Chikhaldhara taluqa* of *Amravati* District except 1 village of *Anjangaon taluqa*. Hence, Socio-ecomomic Survey report of Chikhaldhara taluqa is given. The total population of *Chikhaldhara taluqa* as per 2001 census is 95,568, of which 95.16% live in rural areas, only 4.93 % live in the urban areas. The population is spread over 169 villages. The literacy rate of the area is 66.6%. The census data shows that 40000 population was added in the last 20 years indicating the fast growth of population. The Scheduled castes and Scheduled Tribe populations forms about 9.38 % and 90.6 % of the total population of the *Chikhaldhara taluqa* respectively as per the census of 1991 (1991 census total population is 63,782).

4.2.2. The density of population of the *taluqa* is 38 per sq.km. which is far below the state average (257 persons per sq. km.) as well as the national average (267 persons/ sq. km.). As per census figures, there are 956 women for every 1000 men in the *taluqa,* which is more than the state average of 922.

4.2.3. The 2006 livestock census estimated 56,665 domestic cattle in the *Chikhaldhara taluqa* The abstract of the cattle census figures is given below. All the cattle graze in the forest area, in addition to them the cattle of *Parathwada* and other *taluqas* come to the forest area for the grazing purposes in the rainy season, leading to the degradation of the forests. The migratory cattle number is not recorded.

Table No. 4.1
Cattle census of Chikhaldara Taluqa (2006)

Cattle	Sheep	Goats	Horses	Buffaloes	Bulls	Cows	Bullocks	Calves	Total
No.	0	19888	0	2428	4955	3572	23042	2780	**56665**

(Source :- Livestock Census Report 2006-07)

4.2.4. Land use pattern of the *Chikhaldhara taluqa* is as given below:

Table No. 4.2
Land use pattern of the Chikhaldhara taluqa

Year	Geographical area (ha)	Forest area (ha)	Non-agricultural area (ha)	Agri. Land (ha)	Waste land (ha)	Grazing land (ha)	Others (ha)
1998-99	3,21,893	2,76,787	1,996	45,106	2,568	4,830	2,987

4.2.5. 84.41 % of the total geographical area is under forest. The *Chikhaldhara taluqa* includes East Melghat Division area as well as Tiger project area (total 169 villages). The average yield/ha. is very low compared to national average. (Paddy: 656kg., Wheat:1084kg., Jowar:1399kg., Bajra:513kg.,). Out of 45,106 ha. only 1791 ha is under irrigation. Only 207 irrigation wells are present. Of them, some are not functioning. All these indicate poor agricultural practices and poor productivity of the area. There are 14,000 families in the taluqa and the average land holding comes around 3.2 ha./family which includes cultivable wasteland. Due to poor productivity, the agricultural produce is not sufficient to feed the family members, hence they are forced to look for other alternatives.

The *korkus* go upto *Bhopal, Akola* and other far away places for employment purposes. Few *korkus* do forestry works. Whereas the *gaoli*'s sell their milk and milk products at *Bhaisdehi, Akot, Akola, Parathwada* and *Barhanpur* places. On an average they obtain 60% of their income from milk and milk products itself. The rest of income, comes from agriculture. In the rainy season their cattle graze in the forest areas in camps called hetti's, which are shifted for every 15 days. After rainy season they shift their cattle to the plains or they graze in the forest by hacking poles and bamboos to provide fodder to their cattle and cause lot of damage to the natural regeneration. Though gaoli's maintain certain uncultivated wastelands as *kurans*, and collect the grass in heaps in the month of November and December, they are not enough to feed their cattle forcing them to look for other alternatives. Sometimes they do collect grass from forest areas too. Originally the gaoli's belong to the villages Motha, Masaundi, Alado, Churni, Pasthalai, Shahpur and Amdari but now they have settled in the entire chikaldara taluqa. Many of them maintain two houses one in plains and one in the forest areas.

4.2.6. The rural population consists mainly of agricultural labourers and agriculturists. The way of the life of the people in rural areas has direct bearing to the forests as they depend on forests for timber, poles, firewood, bamboo and grasses for constructing their housed and cattle sheds and making agricultural implements. They also require fodder, flowers and fruits as well as variety of other non timber forest produce such as *moha,* gum*, lac*, honey, *tendu* leaves, herbs, roots etc. for food and medical purposes.

CHAPTER - V

STAFF AND LABOUR SUPPLY

SECTION 1. STAFF:

5.1.1. The *Melghat* forests were under the charge of the Deputy Commissioner of North *Berar* for administrative purposes when *Melghat tahsil* along with the rest of Berar came under British rule in 1883. The regular forest administration commenced with the appointment of Assistant Conservator of Forests for *Berar* in 1865, under the supervision of Conservator of Forests, Central Provinces. Even then the forests of *Melghat* continued to be under the charge of revenue officer known as Assistant Commissioner, *Melghat* till 1868 when a professionally trained forester Mr. Ballantyne was employed. With the appointment of a Deputy Conservator of forests for the whole of *Berar* forest in 1869, the Assistant Commissioner, *Melghat* ceased to hold the charge of *Melghat* forests. In 1880, further reorganization changes were effected and *Elichpur* division comprising entire *Melghat* forest came into existence. Subsequently, it was renamed as Melghat division in 1906. In 1938 the *Melghat* division was abolished and a new *Amravati* division was formed by adding *Amravati* and *Morsi* ranges of former *Amravati* division to *Melghat* forests, with headquarters at *Amravati* where the divisional staff and office used to stay while Divisional Forest Officers; headquarters was oscillating for 8 months during open season at *Chikhaldhara* and 4 months in rainy season at *Amravati*. This arrangement, was however, discontinued after 1952 and Divisional forest Officers' headquarters were permanently shifted to *Amravati*.

5.1.2. The administrative set up has again undergone a change in 1964. East *Melghat* division, West *Melghat* division and independent *Amravati* sub Division with headquarters at *Amravati, Chikhaldhara* and *Amravati* respectively were formed on April 1, 1964 by splitting the existing *Amravati* division. *Amravati* Sub-division comprised of forests of *Amravati* district barring *Melghat tehsil* and 'C' class forests of *Dhamangaon* and *Chichona-Nimkhera*, while as the names suggest, East *Melghat* division contains forest east of a diagonal line passing through *Melghat tehsil* from south-east to north-west and forest west of this diagonal line forms West Melghat division. At the same time Integrated Unit at *Paratwada* was established and to this Unit Government timber depot at *Paratwada* was transferred from East *Melghat* division in 1966.

5.1.3. The Divisional Forest Officers are usually assisted by Gazetted Officers. In the post war development period the activities of the department increased considerably. Besides, more and more forest areas, which were hitherto inaccessible, were brought under working. Naturally the strength of staff has to increase to cope up with the pressure of work. In 1935 the strength of Range Forest Officers was only 4 while in 1955 it increased to 11 and Later it was 24 for both the divisions. The addition of Mechanized logging units, one in each division, caused a sudden spurt in the strength of staff in various categories.

5.1.4. In 1964, by the order of Government of *Maharashtra*, Agriculture, Food and Forest Department Resolution No. FDM-1361/12464-111-J dated February 6, 1964; the administrative setup was again changed. The old *Amravati* Division was divided into three administrative units (a) East Melghat (b) West Melghat, (c) *Amravati* Sub-Division. This arrangement continued till 1983, when vide Government Resolution No. FDM/1880/1F-2 dated August 29, 1983, a new division called South *Melghat* was created by carving out area from East and West *Melghat* Division and *Amravati* Sub-Division was upgraded as *Amravati* division vide aforesaid Govt. Resolution. Carving out areas from the three divisions of Melghat Forests created proposed Gugamal National Park.

The responsibility of managing timber depot at *Dharni* and *Akot* was also transferred from West *Melghat* by the creation of post of Deputy Conservator of Forests (Transport and marketing) vide resolution no. FDM-1880/1-F-2 dated August 29,1983. After reorganization, the name of this division was changed to *Akot* forest Division, which was subsequently named as South *Melghat* vide FDM/1084/4577/F-2 dated February 25,1986.

5.1.5. The staff pattern underwent changes with the passage of time. Under the supplementary rules framed on April 5,1872 under *Berar* Forest Rule 1871, a post of District Forest *Darogah* was created, who was to be appointed and dismissed by Deputy Conservator of Forests. However, since the management of forest was with The then Deputy Commissioner, all the orders were routed through him only. The provision of cadre of Forest Ranger, forester and Forest Guard was made under Berar Forest Law 1886.

5.1.6. A large number of staff was added to different cadre. 8 The post of Range Officer (Mobile Squad) was created by TRS-1378/136915-F-6 dated August 23,1979. The statistical wing was strengthened by the creation of post of Junior Statistician.

5.1.7. Two Assistant Conservator of Forest, who are Class-I officers, assist the Divisional Forest Officer now known as Deputy Conservator of Forests. With the elevation of Range Forest Officer to the gazetted level, the total gazetted assistant with Deputy Conservator of Forests has increased considerably; this will go a long way in improving the quality of the work.

5.1.8. East Melghat Division is reorganized vide *Maharastra* Govt. resolution no. WALP-1094/PK.211/F-1 dated April 26,1999. The H.Q. of East Melghat Division was shifted from *Amravati* to *Chikhaldara* w.e.f. May1, 1999.

5.1.9. The existing organization of Ranges, Rounds and Beats showing distribution of compartment is given in **Appendix No. VIII** of Volume II.

5.1.10. The present strength of staff as on March 31, 2005 is given under **Table No.5.1**. for East *Melghat* Division and **Appendix No. IX** of Volume II enlists the names of Divisional Forest Officers who were in charge since 1964.

Table No. 5.1
Table Showing Staff Position in East Melghat Division:

Sr. 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	3	-	3	-
Class I-Total		**4**	**4**	**0**	**4**	**0**
3	Range Forests Officer	7	6	1	7	-
4	Office Superintendent	1	1	-	1	-
5	Dy. Engineer (Mech.)	1	1	-	-	1
Class II-Total		**9**	**8**	**1**	**8**	**1**
Class III						
6	Deputy Workshop Superintendent	1	1	-	-	1
7	Foresters	29	24	5	26	3
8	Forest Guards	91	77	14	87	4
9	Chief Accountant	1	1	-	1	-
10	Accountant	9	7	2	9	-
11	Clerks	16	11	5	9	7
12	Store keeper	1	1	-	-	1

Sr. No.	Name of Post	No. of Post/posts				
		Sanctioned	Permanent	Temporary	Filled	Vacant
Class II-						
13	Welder	1	1	-	-	1
14	Steno Typist	1	1	-	1	-
15	Surveyor	2	2	-	2	-
16	Wireless Operator	5	2	3	3	2
17	Electrician	1	1	-	-	1
18	Statistician	1	1	-	1	-
19	Jeep Driver	3	2	1	3	-
20	Truck Driver	5	4	1	4	1
21	Tractor Driver	7	7	-	6	1
22	Road Roller Driver	1	1	-	1	-
23	Mechanic	7	5	2	2	5
24	Assistant Mechanic	3	3	-	2	1
25	Blacksmith	1	1	-	-	1
26	Lethe man	1	1	-	-	1
27	*Mahavat*	6	4	2	-	6
28	Air Compressor Operator	1	1	-	-	1
29	Armed Police Constable	1	1	-	1	-
Class III Total		**195**	**160**	**35**	**158**	**37**
Class IV -						
30	Naik	1	1	-	1	-
31	Daftari	1	-	1	-	1
32	Peon	1	1	-	1	-
33	Watchman	7	7	-	5	2
34	Dak Runner	1	1	-	1	-
35	Mali	6	6	-	4	2
36	Waterman	1	1	-	1	-
37	Sweeper	1	1	-	1	-
38	Truck Cleaner	23	16	7	14	9
39	Tractor Cleaner	7	7	-	4	3
40	*Khalashi*	1	-	1	1	-
41	*Chara* Cutter	3	2	1	3	-
42	Driller	1	1	-	-	1
43	Messenger	1	1	-	1	-
44	Cook	1	1	-	1	-
	Class IV -Total	**56**	**46**	**10**	**38**	**18**
Total		**264**	**218**	**46**	**208**	**56**

5.1.11. In addition, at present 125 supernumerary van majoors are also assisting the regular field staff for protection purpose.

SECTION 2. LABOUR:

5.2.1. Population density is low in the division. The main occupation is agriculture, hence during agricultural season there is decline in manpower availability, for the forestry works. Labour problem is also faced during *Fagun* festival of *Holi*, and on other festivals. Forestry operations are vitally important for local residents for their livelihood because hardly any other non-agricultural employment exists in the tract.

CHAPTER VI

PAST SYSTEMS OF MANAGEMENT

SECTION 1.GENERAL HISTORY OF THE FOREST:

6.1.1. The tahsil along with the rest of Berar came under British rule in 1853 by assignation from the *Nizam* of *Hydrabad*. At that time, there was no forest administration in the tract and aboriginal Korkus living in numerous scattered villages populated it, whose principle means of live hood were Dahya cultivation and export of timber and bamboos to the Berar plains for sale. There is reason to believe that many of the areas now under forest were under cultivation and that tract supported a larger population than at the present day. Space cannot be given in the report for a detailed account of the subsequent history, but a summary of the principle events showing the gradual growth of forest administration in the tract is as follows.

6.1.2. In the year 1855 soon after *Berar* came under the British rule, the importance of forest began to be realized. In 1855 the Dy. Commissioner of N. *Berar* reported the existence of teak in the hills and recommended that felling should be prohibited so that a final selection of best tracts could be made as special reserves.

6.1.3. In the year 1884 the Commissioner of Berar ordered that certain teak trees be selected and conserved in the forests. The selected trees were marked with red paint and not allowed to be felled by the local population. A small establishment costing Rs. 32.50 per month was sanctioned for the purpose and a written report in 1964 shows that over 12,900 teak trees were selected and marked by the year 1862 within the limits of 14 villages where the best Teak timber was found. These villages were situated in the areas now comprising *Semadoh* Range and part of old *Raipur* Range. These areas still contain best of teak forests, at present part of it is with Project Tiger as per Government Notification dt. 26/04/1999.

6.1.4. In the year 1860-61 the topographical survey of was carried out under the charge of Mr. James Mulheran on the map of scale 1" = 1 mile. The whole tract was then under the revenue administration and they were following the *Nizam*'s System of administration. The area under cultivation was found to be 7,800 acre and the land revenue never exceed Rs.12, 000/-

6.1.5. In the year 1860 the Government of India called the attention of the Resident at *Hyderabad* to the importance of preservation of the teak forests of *Berar* and directed that rules be framed to this effect.

6.1.6. In the year 1863-64 Colonel Pearson, who was at that time Conservator of Forests of the Central Provinces inspected and reported on the forests of *Berar* to the Government of India. The instructions from G.O.I required Colonel Pearson to report firstly whether the forests, which were Government Property, were worth preserving and secondly whether they could be managed by the Forest Department of the Central Provinces without undue additional expenses. The report that was written by Colonel Pearson is of great interest as it contained the earliest known description of the forest of the Melghat in addition to his conclusions and recommendations.

6.1.7. In the year 1865 as a result of Colonel Pearson's recommendations an Assistant Conservator of Forests with an establishment of his own was appointed for *Berar*, under the supervision of the Conservator of Forests of the Central Provinces. This appointment of ACF marked the commencement of regular forest administration of *Berar* in the *Forests*.

6.1.8. Despite the appointment of the Assistant Conservator of Forests, the forests continued to be under the revenue officer in charge of the tract who was known as the Assistant Commissioner, till 1868.

The first matter which received the attention was the selection and demarcation of areas generally unsuitable for agriculture and suitable for reservation as Permanent State Forests, and between 1865 and 1867, Captain Mackenzie, who was Assistant Commissioner, at that time, demarcated an area of 425 square miles as suitable for reservation which now forms the greater portion of the *Bairagarh* reserve. The remaining unalienated areas of the *taluqa* were regarded as unreserved forests. From 1866 onwards *teak, tiwas and shisham* were reserved, and indiscriminate felling of these species in the demarcated area was practically stopped. Untill 1868 the major portion of the forest revenue was derived by leasing the rights to levy dues at certain rates fixed by Government on all timber and bamboos exported from the forests to the *Berar* plains for sale, but in 1868 this practice was discontinued and replaced by the system of collecting dues by departmental agency at revenue stations on the forest produce exported from the forests for sale. Partly as a result of Colonel Person's (foresters) suggestions and partly owing to Captain Mackenzie's enthusiasm, a forester trained in the Edinburgh, a School of Forestry, Mr. Ballantyne was engaged for the purpose of forming teak plantations in the demarcated area. He joined his appointment in October 1868.

6.1.9. In the year 1869 - the Conservator of Forests of the Central Provinces ceased to exercise supervision over the forests of *Berar*, and a Deputy Conservator of Forests was appointed to the independent Charge. With the appointment of the Deputy Conservator of Forests, the Assistant Commissioner, ceased to hold charge of the forests of Melghat. The Deputy Conservator was in charge of the northern of the two forest divisions into which Berar was divided at that time and which included the forests of the Melghat. He in addition supervised the Assistant Conservator of Forests who held charge of the southern division. In March 1869, Sir Dietrich Brandis, who was then the Inspector General of Forests, paid a visit in Berar and made suggestions for the future administration and management of the forests. He suggested that idea of forest conservancy should be abandoned in the undemarcated forests. The only restriction suggested was that *dahya* cultivation should be prohibited but grazing, cultivation and extraction of timber and bamboos should be continued freely on payment of dues at revenue collection points.

6.1.10. In the year 1870-1875 - Sir Dietrich Brandi's visit to Berar bore speedy results. In 1871 the *Berar* Forest Rules were published. It defines, the status of the forests and made prescriptions for their management and control. These prescriptions were in force until the *Berar* Forest Law was passed and forest rules were issued under that law. In, area fire protection was commenced near *Raipur* in 1870 and by 1872 it was extended to the whole *Bairagarh* reserve. Mr. Ballantyne formed the Teak plantations over extensive areas formerly under cultivation in the valley of the *Sipna* River. The *Bairagarh* reserve was divided into 40 blocks for working purposes and the cutting-back of unsound teak was commenced in the valley of the Sipna River, the cutting of bamboos was also regulated. The general policy at that time was, however, to leave the *Bairagarh* reserve unworked and give it a rest to recover it from past ill-treatment, and to confine exploitation of timber to the unreserved forests only which comprised the whole of the area of the *taluqa* other than the *Bairagarh* reserve and certain alienated areas. This policy naturally resulted in heavier fellings as compared to past in the unreserved forests. In 1872 an attempt was made by Mr. Drysdale, who was then Deputy Conservator of Forests of Berar, to limit the destruction of the unreserved forests by dividing them into 15 blocks, one block only to be opened annually for the felling of teak, tiwas and shisham timber, though the felling of other species was allowed in all the 15 blocks, and cutting of bamboos, was also regulated.

6.1.11. The restrictions imposed on the felling of timber and bamboos in the unreserved forests of the led to discontent among population and gave rise to some apprehension that a considerable portion of the population would migrate. To meet this situation therefore a tract of 300 square miles containing the best of the unreserved forests was selected and demarcated in 1876-77 and named as Gugamal reserve. The measures for protection including fire portection, similar to measures that were in force in Bairagarh reserve were introduced in it, while the restrictions on fellings of timber and bamboos in the remaining unreserved forests were entirely withdrawn.

6.1.12. Sir Dietrich Brandi's, the Inspector-General of Forests paid a second visit to Berar in 1877 and wrote a very interesting report containing a detailed description of the forests with suggestions for their future administration. The *taluqa* at the time contained 725 square miles of reserved forest and 927 square miles of unreserved forest. The Inspector-General, in addition to making suggestions for the future management of the reserved forest, gave his opinion, that apart from the prohibition of shifting cultivation, no other form of forest conservancy should be attempted in the unreserved forest, the felling of timber and bamboos and grazing should be permitted unrestricted, except for the payment of certain dues, and the extension of permanent cultivation should be permitted. This recommendation largely determined the policy adopted for the unreserved forests for the next thirty years. The chief burden of the demand for forest produce was thus thrown upon the unreserved forests which resulted in their over-exploitation

6.1.13. In the year 1880 - grazing dues were charged on all the cattle other than plough bullocks in actual use of their owner. Licences were issued by the various revenue stations. The villagers in the C-III area were permitted to extract produce of all sorts by head-loads from the forests for their own requirements, but were liable to pay royalty on all produce extracted in quantities larger than head-loads and on produce exported outside the from that area. In practice, however, no attempt was made to distinguish between extraction of head load, and larger quantities and the residents of C-III was unrestricted free user of the C-III forests so long as they did not attempt to export beyond. All produce extracted from the A class reserve together with all C-III produce intended for sale outside the Melghat were asked to pay royalty at one or other of the 14 revenue stations situated on the routes leading to out of the. The out come of this policy was that though the Forest Department between 1880 and 1906 earned an income of 23 Lakhs of rupees from C-III forests as against nearly 16 Lakhs of rupees from the reserved forests. Result was that the C-III forests were almost completely destroyed in the process.

6.1.14. As a result of the Inspector-General's suggestions the reorganization of the forest of Berar was effected during 1880, and the *Ellichpur* division or the division as it was subsequently named in 1906, became self-contained forest charge. A small area of unreserved forest in the vicinity of Chikhaldra was demarcated as a reserve to provide for the requirements of the inhabitants of Chikhaldara for firewood and grass.

6.1.15. Sir William Schlich, who was the Inspector-General of Forests paid a visit and made suggestions for the future management of the forests, in continuation of his predecessor's suggestions.

6.1.16. During the years 1883-1886 the whole of forest was surveyed by the Imperial Forest Survey Department on the scale of 4"=1 or 2”= 1 mile in the more advanced parts where it comprises a continued cadastral survey and on the scale of 2"=1 mile in the more backward tracts where it comprised contour surveys. The separate villages of the C-III area were demarcated and surveyed and some internal demarcation was also done, but this served no useful purpose as the survey was not utilised as an aid to the assessment or to record of title.

6.1.17. The *Berar* Forest Law was passed in 1886 and rules for the constitution and management of the various classes of State Forests were issued in 1892. The *Bairagarh, Gugamal* and *Chikhaldara* reserves were constituted as State Forests of Class A, while the unreserved forests of the *taluqa* were included in class-D (forests pending further classification).

6.1.18. After considerable discussion between the Revenue and Forest Departments the forests included in class D in 1892 were reclassified in 1894. About 105 square miles were classified as State Forests of class A (Forests reserved for the production of timber and fuel) and were added to the existing areas of Bairagarh, Gugamal and Chikhaldara reserves, or were included in a new reserve called the Kohana reserve; about 6 square miles were classified as State Forests of class C Division III (forests in the Melghat reserved for pasture). The result of this classification was as below.

A Class	--	475,967 Acre
B Class	--	3,529 Acre
C Class	--	485,115 Acre
Total	**=**	**964,674 Acre**

6.1.19. In the year 1892 Mr. Francis, the Director of Land Records in *Berar* submitted proposals for a regular settlement of the greater part of the Melghat along with the preparation of the usual village registers. The work was carried out in 79 villages but stopped by his successor Major Carret. It was because of *Korkus*'s unsettled nature of cultivation that no survey could be carried out.

6.1.20. In the year 1894-1903 the State Forests of classes A and B were under the charge of the Divisional Forest Officer but the State Forest of Class C Division III comprising the balance of the State Forests of the taluqa were managed under a system of dual control by the Deputy Commissioner of the district and the Divisional Forest Officer in charge of the division. The Deputy Commissioner issued licenses for felling, the concurrence of the Conservator was necessary in the case of certain trees, and in general the Deputy Commissioner was the sanctioning authority for any acts done in the C-III forests under the rules controlling their management. The Divisional Forest Officer was nominally the authority to see that the rules were enforced and that the concessions permitted in C-III forests were not abused, but in practice, as he had no staff in the C-III forests and had therefore no means of enforcing the rules, additionally as his attentions were becoming more and more diverted towards the State Forest of classes A and B under his control, the only concern of the Divisional Forest Officer in C-III forests was to collect dues in respect of the forest produce exported for sale.

This collection was made at the revenue stations situated on the roads leading out, from the to the plains. The dual system of control was not satisfactory; and the C-III forests continued to bear the burden of the demand for forest produce from the *Melghat* and to become more and more depleted of forest growth. But nothing was done to remedy the matters except the transfer of certain areas of C-III forests aggregating 102 square miles, to State Forests of class A in 1895, 1878 and 1903, these areas were added to the existing reserves of *Bairagarh, Gugamal, Chikhaldara* and *Kohana*. In 1898, a little over one square mile of Bairagarh reserve and a little less than one square mile of Kohana reserve were transferred to class C-III. In 1899 transfer of 8 square miles of the Bairagarh reserve increased the area of Kohana reserve. An area of 799 acres of the *Chikhaldara* reserve was deforested to form the ***Chikhaldara* Civil Station area** in the year 1902.

6.1.21. In the year 1903 the treaties under which *Berar* was assigned in 1853 were superseded by an agreement under which the *Nizam* of *Hyderabad* leased *Berar* to the Government of India in perpetuity in lieu of an annual rent. In consequence of this *Berar* ceased to be under the administration of the Resident at *Hyderabad* and came under the administration of the Government of the Central Provinces, due to which the forests of *Berar*, including the forests of the, once again were merged with the forests of the Central Provinces for the purpose of forest administration.

6.1.22. Between 1905-1914 by the year 1905 the C-III forests of the *taluqa* had reached a stage where some portions had been entirely depleted of forest growth was been brought under the cultivation, though certain portions still contained a fair amount of forest growth. In the forest administration report of 1905-06 attention was called to this state of affairs and the need for a proper revenue settlement was stressed. A revenue officer was appointed to enquire into the conditions of the tract in 1906-07. As a result of his enquiry it was decided that the disforestation of a large area of C III forest and introduction of some form of revenue settlement in the disforested area were necessary. Settlement operation were carried out between 1907 and 1911, and as a result, 370 sq. miles of C III were disforested and brought under revenue settlement as the *Dharni- Bairagarh, Katkumbh* and *Wastapur-Gaulkhera Raiyatwari* tracts, and 320 square miles of C-III forest were transferred to State Forests of class A in 1911. The transferred areas were either added to the existing **Bairagarh reserve** or included in the new reserves of *Tapti, Chitri, Bod, Jhapnadeo, Dhulghat, Dabida, Wan, Rupagarh, Khirpani* and *Motha*. In 1911 a new reserve called *Chikhli* was also formed by the transfer of 8 square miles of forest from ***Bairagarh* reserve** and 5 square miles from Gugamal reserve, and certain area, aggregating 52 square miles of Gugamal reserve were transferred to the Jhapnadeo, *Dhulghat, Rupagarh* and *Khirpani* reserves. About 2 square miles of Dhulghat and a small area of Khirpani reserves were disforested in 1911. In 1913 the State Forests of Berar were reclassified e.g. the existing State Forests of classes A and B as A class and the existing State Forests of class C, Division III as C Class. So far as the Melghat division was concerned this reclassification chiefly affected the block of State Forest of class B known as the ***Hattighat* Ramna,** which thus became A class forest. In 1914, 8 square miles were afforested as 'A' class and added to the Dhulghat reserve. After this afforestation the division consisted of **1,175 square miles of A class forest** all lying in the taluqa.

6.1.23. In the year 1909 - Chief Commissioner visited Melghat along with Commissioner and Forest Officer. In Secretariat letter No.188-XI-21-11 dated 29th March 1909, the Chief Commissioner issued the orders regarding Melghat that large blocks of unculturable land in the C-III area should be demarcated and reserved as A class forests to be managed with the object of (1) Securing a continuous supply of bamboos, small timber, fodder etc. (2) protecting the forest on the steep hill sides in order to secure a continuance or improvement of present meterological condition, the small cultivation inside these forests were to be abolished so as to secure a compactness or to be managed under the Forest village rules. The area thus transferred totaled 247,465.7 acre. The remaining areas of C-III was to be disforested; smaller blocks of un-culturable lands being left as village waste over which inhabitants of C-III would be allowed free grazing rights and nistars of all sorts except the right to gather *Rusa* grass and Myrabolans

6.1.24. During the year 1925 to 1931 the greater part of the Dhulghat and Rupagarh reserve and the whole of the Wan and Dabida reserves were transferred to Akola division in 1925 for the convenience of administration, but were again handed back to the Melghat division in 1931 when Buldhiana division for the sake of economy was incorporated within the Akola division as part of the **West *Berar* division**.

6.1.25. With the introduction of Mr. Dunbar-Brander's working plan in 1915 the forests of Melghat were distributed between eight Ranges namely, *Chikhalda, Semadoh, Khandu, Butrum, Chaurakund, Gugamal, Khirpani* and *Dhulghat*. In 1925, certain transfers took place between these eight Ranges, and the *Dhulghat* Range became part of Akola division. In 1931 the Dhulghat Range was returned to the division. In 1932 further transfers took place between *Chikhaldara, Gugamal* and *Khirpani* Ranges for convenience of management, and the *Butrum* Range was abolished as a measure of economy, part of it went to Semadoh Range and part to *Khandu* Range, thus reducing the number of Ranges to seven.

6.1.26. The changes which were made in the area of the division since 1914 were the transfer of the Hattighat Ramna with an area of 3,592 acres to the Amravati division in 1917, the transfer of the *Dhamangaon* and *Chinchona, Nimkhera* blocks of C Class forest with areas of 2,035 and 2,311 acres, respectively from the Amravati division in 1917, the afforestation and addition to the *Tapti* reserve in 1919 of 964 acres of the *Bhondilawa Rayatwari* village, and the disforestation of 188 acres in 1928 of *Chikhaldara* reserve to add to the ***Chikhaldara*** **civil station** area and 46 acres of Chithri reserve to improve the boundary.

6.1.27. In the year 1927, the Indian Forest Act, 1927 was passed and it came into force vide Government of India, Foreign and Political Department Notification No.719-1 dated 13/12/1927. The previous enactment of 1878 was repealed. However these forests were continued as Reserve Forests by virtue of section 24 of the General Clauses Act 1897.

6.1.28. The Division, which was constituted in 1906, was abolished and it was named as ***Amravati*** **Division**. The areas of *Amravati* and *Morshi* Ranges were added to it. The head quarter was kept at Amravati. The office staff used to stay at Amravati while D.F.O's headquarter was for Eight months at Chikhaldara and for four months at Amravati. This arrangement was however discontinued in 1952. Subsequently the reorganization took place in 1964. The increased activities during the 5-year plan periods intensive working of the forest and bringing hitherto inaccessible area under working necessitated the change in the territorial limits of the division as the then existing Amravati division was found unwieldy both in extent and work. Hence, Govt. of Maharashtra, Agriculture, Food and Forest Department, Resolution no. FDM-1361/12464-III-J, dated 6th February 1964. It was divided into three administrative units, Independent Amravati sub division, East Melghat Division and West Melghat Division and these three units started functioning from 1st April 1964 with head quarter at Amravati. After a year, head quarter of the West Melghat Division was shifted to Chikaldhara with the transfer of chikaldhara round to West Melghat Division. This arrangement continued till 1983, when vide Government Resolution No. FDM/1880/1F-2 dated August 29, 1983, a new division called South Melghat was created by carving out area from East and West Melghat Division and *Amravati* Sub-Division was upgraded as *Amravati* division vide aforesaid Govt. Resolution. The responsibility of managing timber depot at *Dharni* and *Akot* was also transferred from West Melghat by the creation of post of Deputy Conservator of Forests (Transport and Marketing) vide resolution no. FDM-1880/1-F-2 dated August 29, 1983. Further reorganization of the divisions took place vide *Maharashtra* Govt. Resolution No.WLP/-1094/P.K.-211/(Part-3) F-1 dt.26/04/1999 separating wildlife sanctuary and National Park areas which were brought under unified control of field Director and Conservator, Project Tiger H.Q. Amravati and rest of the area was reorganized into East Division and West Division. South Division was transferred to wildlife wing as Division III of Tiger Project along with the staff and areas except a few patches, which were attached to West Division.

6.1.29. The Head Quarter of East Melghat was shifted from Amravati to Chikhaldara and Head Quarter of West Melghat was shifted from Chikhaldara to Parathwada. The present East Melghat Forest Division consists of Chikhaldara, Jarida, Ghatang and Anjangaon Ranges.

SECTION 2. PAST SYSTEMS OF MANAGEMENT AND THEIR RESULT:

(**A) Period Before 1893**:

6.2.1. Up till 1896, the management of the reserved forests was chiefly governed by giving them a rest from past ill-treatment and by introduction of protection including fire protection The Improvement fellings to remove the large unsound teak of preservations days were carried out over a portion of Bairagrah reserve, principally the portion lying to the South of Sipna river near Pilli and between 1871 and 1883, 117,906 trees were felled.

In 1887-88 and 1888-89, 1000 first class teak i.e. trees over 6 feet (180 cm) in girth, were felled annually in the *Raipur* and *Makhla* block of the *Bairagarh* reserve under a working plan prepared by colonel Mr.Van-Someren, Conservator of Forests in *Berar* which was based on a valuation survey but this plan was cancelled in 1889 partly as the author of the plan was too much optimistic about the soundness of the large teak, trees and partly as it was proposed to prepare a working plan to cover the whole of the *Bairagarh* and *Gugamal* reserves. Improvement fellings were recommended and were carried out over 29,685 acres (12,013.10 ha.) in *Chaurakund, Semadoh* and *Butrum* blocks of the *Bairagarh* reserve between 1889 and 1893.

Result: The management of the Forests was mostly successful

(B) Bhagshawe Plan-1893-1915:

6.2.2. A working plan covering the whole of *Bairagarh* and *Gugamal* reserve as then constituted was originally drown up by Mr. Dickinson, Conservator of Forests in Berar, which was revised and completed by his successor Mr. Bhagshawe and introduced in 1893-94. Under this plan, **four felling series** were formed in the more valuable forests of Bairagarh reserve, each felling series with **twenty annual** coupes to be worked under improvement fellings. Fellings **other than selection fellings** in forest village areas to meet the requirement of the villager were not prescribed for the Gugamal reserves. Bamboo cutting was regulated in both the reserves on a **two year rotation**, complete fire protection was prescribed for the entire area of the forest eradication of Lantana and climber cutting was prescribed and grazing was confined to the cattle of forest villages the cattle of *Chikhaldra* and *Wastapur* and the cattle of exporters. Plantations were not considered necessary and therefore were not prescribed. The working of the first ten coupes prescribed in that plan was sanctioned but as regular working was held in abeyance in 1901-02 and 1902-03 to allow the exploitation of the large no. of trees that had become top dried or had completely died owing to the drought of 1890-1900 and previous years, the sanctioned working of ten years did not come to an end until 1904-1905.

6.2.3. A preliminary working plan report was drawn up in 1901 by Williamson, Deputy Conservator of Forests, who was then in charge of the division, with the object of revising Dickinson and Bhagshawe's plan and for introducing regular fellings in Gugamal reserve and other additional areas. The preliminary working plan report was not sanctioned, but as a result of it, one coupe of 684 acres (276.80 ha) in Chikaldara reserve of Chikhaldara Range and one coupe of 567 acres (229.46 ha.) near Khatkali, now in Akot range were worked under the **Coppice with Standards CWS system** between 1903 and 1909 and seven coupes, aggregating 11,320 acres (4581.04 ha.) in the Koha block of the present Dhakna Range, were partially worked under **improvement fellings**, between 1902 and 1909.

6.2.4. Sanction was obtained in 1905 to continue the prescription of Dickinson and Bagshawe's plan for another ten years. As a result of this plan, therefore, **improvement fellings** were carried out over the greater portion of the *Bairagarh* reserve during the period 1893-1894 to 1914-15.

***Gugamal* Reserve Working Scheme, 1910-15:**

6.2.5. A working scheme was introduced in 1910-11 under which Gugamal reserve was divided into **six felling series**, each with **six annual coupes** and the first five coupes in each felling series were worked **under improvement fellings** between 1910-1911 and 1914-1915.

Tapti Reserve Working Scheme, 1912-15:

6.2.6. In 1912-13 as a result of a visit of Mr. Hart, the then Chief Conservator of Forests, the fellings under the **Coppice with Standards CWS system** were commenced in the newly created **Tapti reserve**. The reserve was divided into three felling series, and three coupes in each felling series were partially worked according to demand, under the coppice with standards system during the years 1912-13, 1913-14 and 1914-15.

(C) Dunbar Brander's Working Plan, 1915-16 To 1935-36:

6.2.7. A revised working plan covering the whole of the division was prepared by Dunbar Brander, the then Deputy Conservator of Forests who was then in-charge of the division. The plan was introduced with effect from 1st July 1915. This working plan divided the forests into **four working circles**, namely, the **High forests**, **the coppice with standards**, **the unregulated and the Bamboo Working Circle**.

6.2.8. The High Forest Working Circle consisted of the best forests considered suitable for eventual treatment as high forest. It covered the whole of the *Bairagarh, Gugamal* and *Kohana* reserves, - a total area of 724 sq. miles (1875.15 sq.km.). It was divided into ten felling series each with twenty annual coupes, to be under worked improvement felling. The felling were carried out in two distinct stages, namely the fellling of marketable trees by purchases of rated prunes passes, and cutting back of unmarketable trees or cultural operations. The whole of the working circle was completely protected from fires, and coupes were closed to grazing for **five years** after working.

6.2.9. The Coppice with Standards CWS Working Circle consisted of the forests containing irregular pole growth and a large number of young teak pollards requiring replacement by coppice shoots as early as possible. It covered the whole of the Tapti reserve, and was divided into **three felling series**, each with **twenty annual coupes** which were worked under the **Coppice with Standards System**. As was in the high forest working circle, has also the fellings **were carried out in two distinct stages**. The whole working circle was completely fire protected and coupes were closed to **grazing for ten years** after working.

6.2.10. The unregulated working circle consisted of all the remaining reserves of the division- a total area of 404 sq. miles (1046.36 km), and was divided into 14 blocks or units of working. Regular fellings were not prescribed, but **improvement fellings were permissible** with the conservator's sanction in Chandrabhaga, Memna and Khatkali block. The felling of green timber species other than teak, tiwas, shisam or bija which was permitted in a part of Dhulghat block and felling of green firewood was permitted in any block. Six blocks were completely fire protected, early burning protected five blocks and the remaining three blocks were not protected from fire.

6.2.11. The Bamboo working circle consisted of the best bamboo bearing tracts and overlapped the other working circles. It was divided into **sixteen felling series**, eleven of which were worked under felling cycle of **three years** and the remaining five under a cycle **of two years**.

6.2.12. In the year 1922-23, the *Khatkali* block of unregulated working circle was made into a felling series with twenty annual coupes and was added to coppice with standard working circle.

6.2.13. The amendment of certain prescriptions of Dunbar Brander's plan became necessary by 1924-25 chiefly owing to alterations in Range boundaries, the transfer of **four felling series** of the **Coppice with Standards Working Circle** to the High Forest Working Circle, change in the method of felling in the protected area of the felling in the protected area of the felling series and the coupes having been found to be inconvenient large under the amended prescriptions which were brought into force with effect from 1924-25 the coppice with standard working circle was incorporated in the High forest working circle and the latter was divided into **twenty seven felling series**. **Twenty six felling series**, contained **twenty annual coupes** each to be worked under **improvement felling** one more felling series, containing the teak plantations in the valley of Sipna river in Semadoh Range Known as the Pili plantation felling series had **five annual coupes** to be worked under thinnings. Early burning was prescribed as the method of fire protection in such blocks of the unregulated working circles. The number of felling series in the **Bamboo working circle** was increased **to thirty one** of which **seventeen were** worked under a felling cycle of three years **fourteen under** a felling cycle **of two years**.

6.2.14. In the year 1927-28, the Bamboo circle was reorganized. The 'Pili plantation bamboo felling series', was omitted and the remaining thirty felling series were worked under a felling cycle of four years.

Result:- By the end of the period of Dunbar Brander's one cycle of light improvement fellings had passed over the greater portions of Bairagarh, Gugamal, Kohana, Tapti and Bod reserves during the twenty years period from 1915 to 1935, but owing to the rearrangement of felling series and coupes in 1924-25 certain areas in Tapti reserve and in the Khatkali felling series in Gugamal reserves and the teak plantation areas in the valley of the Sipna river in Semadoh Range had been worked, somewhat heavily, the former under the coppice with standard system and latter under the two cycles of thinning.

The important felling in the high forest working circle, greatly benefited the growing stock, especially in the more accessible coupes where it was possible to carryout cultural operations. Many of the unsound trees, most of which belonged to the older age classes were removed and the forest were not exploited to their full capacity. Since 1931-32 and with the introduction of departmental operations the fellings were distinctly heavier than earlier. On the whole, the result was the gradual building up of large stocks of sound, healthy - young or middle aged poles and trees.

The rest given to the forests of the unregulated working circle was recorded as beneficial. The growing stock became denser; the percentage of teak increased and teak reproduction became abundant.

Certain blocks, notably the *Chandrabhaga* and *Memna* blocks and part of Popatkheda and Rupagarh block was considered fit for the introduction of regular working. The growing stock improved in parts of *Chitri, Chikhali* and *Japnadeo* blocks and extensive growth of teak pole crop was found to be regenerated.

(D) Stein's Working Plan 1935-1955:

6.2.15. Dunbar Brander's plan was revised by A.H. Stain, Deputy Conservator of Forest and this revised plan came into force on 1st July 1936. This plan was originally sanctioned for a period of **ten years** but was subsequently extended and it continued to be in force till 1955.

6.2.16. Under this plan the whole of the forest, except Dhulghat, Wan, Dabida and part of Rupagarh block and two 'C' class blocks were divided into 1,086 compartments. These compartments were stock mapped and a detailed description of each was written.

6.2.17. Under this plan, the following **four working circles** were formed:

1) Teak high forest working circle, area 4,18,625 (1,69,411.68 ha.)
2) Coppice working circle, area 1,36,862 acres (55,388.97 ha.)
3) Miscellaneous working circle, area 2,04,600 (82,798.75 ha.)
4) Bamboo working circle overlapping the above.

Teak high forest working circle - All most whole of the Bairagarh and Gugamal reserves were allotted to this working circle. The siliviculture system prescribed was conversion to uniform forest with a conversion rotation of 60 years. This period was divided into three blocks of 20 years each. The compartments to be generated in the first 20 years formed Periodic Block I.

6.2.18. The following **felling rules** were prescribed for P.B.I:

A) In areas where established seedlings and saplings of teak were sufficient to ensure restocking:-

i) All teak with the exception of groups of unsuppressed established advance growth and well grown poles up to 18 inches (subsequently amended to 30 inches) in girth which were considered fit for retention to form a part of the new crop, was to be felled.

ii) All trees of other species, which were standing around or were close to teak reproduction, were to be felled. In crops containing 70 percent or more of teak and no bamboo, all well grown trees of other species between 12 inches (30 cm) and 24 inches (60 cm) girth were to be retained even if interfering with teak reproduction. Wherever there was danger of frost, all miscellaneous species, especially Ain, were usually to be retained even through interfering with teak.

iii) Bamboo, the removal of which was necessary was to be cut.

B) In areas where established regeneration of teak was insufficient or absent:

i) In all teak forest of quality II and in teak forest of quality III where labour and funds permitted, the old crop was to be Clearfelled and the area was to be regenerated artificially.

ii) In other forest areas only deteriorating and over mature trees were to be felled.

C) **In areas of quality IV b where teak and mixed forest were established** and reproduction of teak and tiwas was adequate, conversion felling on the lines prescribed under 'A' above was to carried out at the discretion of the Divisional Forest officer, otherwise only deteriorating and over matured trees were to be felled.

D) **Unworkable areas** and **steep coupes** were ordinarily to be left untouched but the Divisional Forest Officer was allowed to permit the felling of deteriorating and over matured trees.

E) **Frost Areas**: Dominant trees of other species especially Saja (Ain) were to be retained. Teak was only to be felled if the over wood of the miscellaneous species was sufficient to protect the resultant teak coppice crop from the frost.
In periodic blocks II and III, the main object of felling prescribed was to exploit mature and over matured teak likely to deteriorate and at the same time to carry out thinnings. The minimum girth limits for fellings were different for the two P.B.s and different from quality to quality. This ranged from 2 feet (60 cm) in quality IV b in P.B.III to 4 1/2 feet (135 cm) for quality II or III in P.B.II

6.2.19. These prescriptions were recorded in 1945 and in the revised prescription the following works were prescribed in these Periodic Blocks II and III:-

i) Crown thinnings.
ii) All dead and seriously diseased trees were to be felled.
iii) Such mature trees, which were not likely to survive 20 years, were to be felled.
iv) Matured trees of miscellaneous species and those having a disproportionately large crown were to be felled in the interest of teak reproduction.
v) Thinning in young teak poles and samplings crop was to be heavy. Wherever well grown poles of other species were present, they were to be encouraged.
vi) All malformed teak below 18' (45 cm) girth was to be cut back wherever there was a reasonable chance of the resulting coppice shoots to grow free from suppression.
vii) All climbers were to be cut.

6.2.20. The forests allotted to teak High Forest Working Circle, which had not been worked during Stein's Plan, contained generally young to middle aged teak crop with a few scattered old and mature teak trees, dense undergrowth of lantana and grasses. The natural regeneration of teak was very poor and scanty.

The inspection of P.B. I. areas, which had already been worked and the remaining areas which were not worked suggested that the condition of the crop in Stein's P.B.I was also the same before working i.e. **natural regeneration** was **definitely deficient**, there was hardly any area where the prescription of the plan succeeded therefore the only recourse was either to **clear fell the stock** and regenerate the areas **artificially** or remove only deteriorating and over matured trees as the plantations were not feasible because of acute labour shortage and removal of only deteriorating and over matured teak trees could have been an economic failure. The prescription of Stein's working plan, therefore, did not suit the Melghat conditions and were not strictly adhered to.

6.2.21. The resume of work done in the P.B.I. areas of this plan was as follows;-

In the first six or seven coupes of Stein's plan all well stocked teak patches were Clear felled and elsewhere also marketable teak trees were felled and also other trees were also removed which could interfere with teak coppice. In the subsequent coupes, clear felling was abandoned and the system of working was a sort of **selection felling** under which almost every teak tree above 30" (75 cm) girth could be removed from the accessible areas.

Results: This system of working involved a great deal of unjustified sacrifice of young and Middle aged trees which were still putting on valuable increment. Beside, the gaps that was created in the canopy, especially by felling in patches during the earlier years of the plan, it also encouraged the spread of dense undergrowth of lantana and grasses in the worked coupes.

No particular attention was paid to improvement felling or thinnings in the remaining crop in the coupes. The cultural operations were badly neglected. The lantana was removed from coupes, mainly once for the convenience of marking and coupe working but subsequently it was not kept down to help to establish whatever little regeneration was there.

The strip fellings were carried out in Harisal and Chaurakund felling series upto 1946 but as the method was very difficult to work and there was not any particular advantage against frost damage, the prescriptions of the working plan for PBI areas of these two felling series were suspended. No work was done in the PBI areas of these felling series except the removal of marketable teak trees here and there from the easily accessible areas of the unworked strip.

The compartments allotted to P.B.II and III were worked haphazardly till 1947 when works in these compartments were stopped because a no. of P.B.I coupes were in arrears. The compartments, which were, worked especially those near the roadside, had very heavy fellings in them and the trees, which should have been left for P.B.I, were removed. Improvement fellings and thinning were carried out rather casually. The main object of working these areas apparently being to supplement the yield.

6.2.22. Coppice Working Circle: *Khirpani* and *Rupagarh* reserves were allotted to this working circle and the forests were generally situated near the market where small size timber and fuel were saleable. These forests were also not capable of growing big size teak because of poor soil and low rainfall. The percentage of teak in the growing stock was also generally comparatively small. The silvicultural system prescribed was **coppice with reserve**. The coppice shoots after the felling were the chief source of replacing the crop.

Results: Generally speaking this system was quite suitable in view of the condition of the forest and the demand. Most of the worked areas were now well stocked with well grown young poles of teak. There were, however large areas where this system was **not suitable** due to the following reasons:

1) The country being too steep and the stocking was open with the result that the replacement of crop with coppice was not certain.
2) There was practically **no demand for small size timber**.

6.2.23. Bamboo Working Circle: The exploitation of bamboo was generally done from bamboo coupes of the year on rated passes expect for a few roadsides felling series in Gugamal, Semadoh and Chaurakund ranges, where the coupes were auctioned. This auction of bamboo coupes diverted the labour towards the contractor, therefore it was stopped subsequently.
Results: The clumps were very irregularly worked as they were left to the mercy of rated pass holders.

6.2.24. Miscellaneous Working Circle: Forests which were unworkable due to poor quality or stocking, remoteness or inaccessibility, forest village areas and also 'C' class forests all these were allotted to this working circle. No work was done in these forests except the removal of bamboos and firewood on rated passes.

Results: In spite of the long rest given to these forests they were not found to be improved enough to be put under any working circle. One of the important reasons for the slow progress must have been the fire which occurred frequently in these areas. This forest very sparsely populated and with the abolition of Dhulghat Range most of the area allotted to this working circle was neglected, especially so, for the fire protection concerned.

(E) Sharma's Working Plan, 1956-1974:

6.2.25. Stein's plan was revised by D.C. Sharma, Deputy Conservator of Forests and was introduced in 1956.

6.2.26. This Working Plan covered the whole of the forest areas in but the prescribed the working only for those forests which were practically under actual working during Stein's Plan. The whole *Dhulghat, Dabida, Wan*, part of *Rupagarh* Reserves and 'C' class forests were allowed rest by grouping them under Miscellaneous Working Circle. The stock mapping of the remaining forest area, which was divided into 1086 compartments, was revised and fresh stock maps were prepared showing teak forest with quality, mixed forest, unworkable areas and frost prone areas. The descriptions of these forests were written in detail for each compartment. Occurrence of lantana was also indicated.

6.2.27. The following Working Circles were formed:

Table No 6.1
Table Showing The Distribution Of Area Under Various Working Circles

Sr. No.	Name of the working circle	Area (Acres)	Area (Hectares)
1.	Selection Working Circle	4,38,885	1,77,610.61
2.	Coppice With Reserve Working Circle	1,25,237	50,681.66
3.	Miscellaneous Working Circle	1,51,066	61,134.20
4.	Protection Working Circle	44,896	18,168.38

6.2.28. Selection Working Circle: All the good quality teak bearing forests were allotted to this working Circle. **Selection system** was prescribed for Teak, *Haldu, Bija*, *Shisam, Saj* and *Tiwas* etc. **Felling cycle** was fixed as **20 years**. Yield was regulated by area. Exploitable girth was **135 cm in good quality teak forest and 120 cm in comparatively** poorer quality teak forest. The coupe was completely protected against fire for 5 years and grazing closure was for 3 years from the year of main felling.

6.2.29. Stump analysis of 223 stumps of teak trees was carried out. Out of these 163 stumps were of mature trees growing in open and showed a faster rate of growth than those remaining 60 stumps which were selected in the forest having average stocking. At the age of 80 years, the diameter growth over bark at breast height was 20.7" (52.57 cm) and 14.3" (36.32 cm) respectively as computed from these two sets of readings, besides this local volume tables were prepared. For the first time 5 percent enumerations were carried out in good quality forest. Teak, *Saj, Dhaora, Tiwas, Bija, Shisham, Salai, Haldu* and bamboo clumps were enumerated separately while remaining species were grouped under 'Miscellaneous' species. The total growing stock of teak trees above 25" (63.5 cm) girth class as indicated by the enumeration was 235 cu. ft. (6.654 cum) per acre.

6.2.30. The method of treatment was aimed at the production of big sized timber. The natural regeneration and advance growth of teak wherever present were to be helped to grow up and it was to be supplemented by as much planting as possible. The areas liable to frost damage were to be approached and treated continuously.

6.2.31. Before marking all teak trees above 42" (105 cm) in girth at b.h. in good quality felling series and above 36" (90 cm) in girth at b.h. in poor quality felling series were to be enumerated in 6" (15 cm) girth class and were to be classified into classes I, II, III and IV based on the out turns they would yield.

6.2.32. The following rules for working were prescribed.

(1) 25 percent of the enumerated teak trees above the exploitable girth were to be reserved from class I and if needed from class II. The remaining 75 percent teak and haldu trees were to be felled.
(2) All teak trees of class I, II and III of girth class below the exploitable girth were to be reserved. Trees below exploitable girth of Class III and IV if growing within 5 feet (1.52 m) of a reserved tree will be felled provided the crop density is not reduced below 0.5.
(3) Thinning was to be done in the lower girth classes.
(4) Suppressed trees of girth class below the reserved girth class were to be felled if saleable and trees of class III and IV were to be felled provided these were not required for maintaining the minimum stocking of 0.5.

(5) Compact groups of natural regeneration in areas not exceeding 1/2 acre (0.2 ha.) were to be opened out by removing the over wood. Established but suppressed advance growth was to be cutback.
(6) In lower storey, **satkata species** were to be retained to suppress grass and lantana.
(7) Teak plantation over 40 acres (16 ha) in the beginning and thereafter on increasing scale were to be carried out.

6.2.33. Since their reservations, the forests allotted to this working circle were worked under improvement fellings till the introduction of Stein's Plan when conservation to Uniform Forest System was attempted, for a brief period of about 7 years. Therefore these prescriptions were modified and forests were worked under a sort of selection system under which anything above 3' (90 cm) in girth could be removed. Sharma, while continuing this method of working for these forests adopted a higher girth limit for exploitation and tried to build up the growing stock in all girth classes by prescribing 25% reservation of trees in exploitable girth class and placing restrictions on fellings in lower girth classes so much so that even an embargo was placed on the removal of suppressed trees. The safeguard prescribed for maintaining the stock density, further restricted the removal of trees even though belonging to class IV i.e. unsound trees having no utilizable timber.

6.2.34. These safeguards in practice were, however difficult to implement. The advance growth which was to be cut back in the compact groups of natural regeneration was not clearly defined. Subsidiary cultural operations were not prescribed at all and no adequate attention was given to encourage the regeneration. Main coupes were left to the nature care after the main working.

6.2.35. Reservation of 25% of trees of exploitable girth was not a sound economical proportion. A teak tree of 135. Cm. (Exploitable girth) having a volume of 0.700 cum. fetches Rs. 400. If it was back for further 20 years its volume would increase to 0.780 cum and would fetch Rs. 455 thus showing an increase of Rs.55/- only over original value of Rs.400/- That increase of Rs.55/- in 20 years correspond to a compound interest rate of 0.6% Accordingly during the revision in the 1973-74 it was not considered justifiable.

Result: The execution of these rules was also found rather defective. It appears that the emphasis was more on marking trees for revenue as trees even belonging to the reserved class were found removed probably either under the pretext for thinning or freeing the reproduction. Teak plantations though suggested, were not carried out. The prescription for the thinning was also considered difficult.

Though these prescriptions helped in building up the teak growing stock, the teak reproduction suffered very badly as no particular attention was paid to encourage the same. Howover, in general considering the prevailing condition in Melghat the rules prescribed in Sharma's plan with minor exceptions were suitable as these were essentially in the nature of a compromise between the requirements of forests and the acute scarcity of labour.

6.2.36. Coppice With Reserve Working Circle: The working circle contained the remaining comparatively poorer teak forests as was in Stein's Plan. Teak and *Tiwas* were to be favoured. A rotation of 40 years was fixed with reference to the growth of teak. Fire protection and grazing closure were prescribed for 5 years from the main felling. The felling rules were:-

A) Fully stocked (density 0.75 and above) areas were to be clear felled with the following exception:
i) Groups of well-grown unsupressed saplings and poles up to 18 inches (45 cm) in girth.
ii) A strip of trees about 20 feet (6 m) along roads, rivers and streams.
iii) The fruit bearing trees.
iv) In frost liable areas with dense undergrowth of lantana only dead trees and teak trees above 4 feet (120 cm) girth were to be removed.

B) In areas with density 0.6 to 0.7, improvement fellings were to be carried out. Teak trees above 120 cm girth at b.h. height were felled. Young congested groups of teak and *tiwas* were to be thinned.

C) Only teak trees of 4' (120 cm) girth were felled from areas with density below 0.6 and steep slopes liable for erosion.

D) Bamboo likely to interfere with the coppice shoots was to be cut. Areas suitable for clear felling being negligible, the working in the most of forest areas resembled to the **Selection-Cum-Improvement Fellings**.

The young crop was to be kept clear of the climber and lantana continuously after the main felling. Similarly, the cleaning and thinning operations were prescribed at the 11th year of the main felling in teak areas. But these prescriptions probably would not be carried out simply because of **labour shortage**. Available labour was diverted to other operations as the Divisional Forests Officer was allowed to use his descriptions regarding their implementation.

Result: The forest allotted to this working circle had under gone one complete rotation either under coppice with standards system or coppice with reserve system. The C.W.R. system was found ideally suited as the forest adjoining the cultivated plain was having demand for firewood and small timber and most of the forest was capable of growing only small timber.

6.2.37. Miscellaneous Working Circle: This working circle included the remaining minor forest and the two blocks of 'C' class forests. These forests were frequently subjected to fires. Hence only **fire protection measures** were prescribed. Irregular exploitation however was allowed at the direction of the Divisional Forest Officer. The 'C' class forests were to be maintained as grazing ground.

Result: The condition of the forests though it was allowed to rest for a considerable period, did not improve much mostly owing to the **unchecked fires** which usually were found to sweep over large areas once they broke out. However, in 1961 part of these forests in pockets were brought under regular working with the introduction of the working scheme by Bhathena, in which **Coppice-with-Reserve system** was introduced.

6.2.38. Protection Working Circle: The upper precipitous and very steep slopes of the main ridge of **Gawilgarh hill** were included in this Working circle. As these forests was to be maintained for the indirect benefits.

Result: No regular working was prescribed to this working circle.

6.2.39. Bamboo Working Circle: This was overlapping working circle containing bamboo-bearing forest of the working circle. In all 36 cutting series formed with the cutting cycle of 4 years and bamboo were to be exploited only on rated passes. Simple bamboo fellings only were prescribed.

In 1969, this working circle was reconstituted on cutting cycle of 3 years and 19 felling series were formed to cover the areas of the division.
Result: Though the bamboo felling rules were simple, it was impossible to enforce it strictly except in areas allotted to the **paper mill** as exploitation was stopped on rated passes.

6.2.40. *Rusa* grass Working Circle: All the Rusa grass areas overlapping other working circles were allotted to this working circle and were mostly confined to *Chikhaldara*, Akot, Wan and *Dhulghat* Ranges. With the object of allowing the grass to seed **once in 4 years**, the forest was divided into **4 cutting sections**. Each cutting section was given rest for one year after 3 year of exploitation on rotation. Rusa grass plantations over 5 acres (2 ha.) in each Range every year were prescribed.

Result: Old plantations, which were carried out near Bihali, were abandoned after their exploitation. After a gap of **few years**, fresh plantations of ***Rusa* grass** were carried out near Barukhedai in *Wan* Range from 1965. But no departmental distillation of grass for oil was done

With a view to start a systematic management in areas of Miscellaneous Working Circle of Sharma's Plan, this working scheme was prepared and introduced in 1961. It covered all those forests which included Dabida Dhulghat and Wan reserves and part of forest were divided into 178 compartments which were numbered serially from 1087 to 1264 in continuation to the compartment numbers given in Sharma's Plan. No stock maps, however, were prepared.

(F) Bhatena's Working Scheme 1961-1974:

6.2.41. With a view to start a systematic management in areas of miscellaneous working circle of Sharma's plan, this working scheme was prepared and introduced in 1961. These scheme covered a large part of recent **South *Melghat* Division**, but the following compartments of South Melghat were also covered -1192 to 1195, 1198 to 1214, 1140 to 1145, 1157 to 1167 of Dhulghat reserve (at present in Dhakna range). No stock maps were prepared.

6.2.42. Having limited objects, in view this working scheme contained only **two working circles** as below: -

i) Coppice With Reserve Working Circle
ii) Miscellaneous Working Circle

(i) Coppice With Reserve Working Circle: All exploitable teak forests found in this tract were allotted to this working circle. The general quality is IV b. To suit the condition of forest, the **Coppice with Reserves System** was adopted. Teak was the principal species while tiwas, semal, ain and salai were to be favoured in the same order. The forest being of inferior quality, teak was not expected to attain size more than 2' (60 cm.) in girth at b.h. over a greater portion of the forest. The stump analysis carried out, indicated that the 2' (60 cm.) girth at b.h. is attained at the age of 41 years. Hence a rotation of 40 years was adopted. Yield was regulated by areas by laying out 40 approximately equiproductive coupes. Felling rules were:

1. Dead, dying and overmatured trees were to be felled from the unworkable and protection areas.
2. Dense patches of well-grown poles were to be thinned.
3. Improvement fellings were to be carried out in areas having density 0.5 to 0.7.
4. In *Salai* forest teak reproduction were to be freed from other interfering trees.
5. The remaining areas were to be clear felled with the exception of well-grown advance growth.
6. All climbers were to be cut.
7. Teak plantations were to be carried out on suitable sites.
   Cleanings were prescribed in the 6th year and thinnings were to be carried out in the 11th year and another in the 21st year of main working.

Result: Introduction of *Bhathena*'s Working Scheme marked the beginning of systematic working in these forests since their reservation. The tract is dry and soil is very poor. In spite of the long period of rest, the forest has not shown any striking improvement except that in valleys and shaded localities teak is found encroaching. Similarly, the tract being sparsely populated there is very little demand for the timber and firewood. As such, these prescriptions did not suit the forests. Most of the coupes remained in arrear either being unworkable or very little material was available for extraction. The prescription of carrying out the teak plantation in each coupe was not implemented. The forests in fact need further rest and strict protection form fire. This period of rest was meant to nurse and encourage the valuable existing growth.

(ii) **Miscellaneous Working Circle**: The remaining forest was included in this working circle, because of the poor condition of forest, no regular working was prescribed. To improve the stocking of these forests, adequate protection form fire was suggested.

6.2.43. P. P. Joshi's Plan: After D.C. Sharma's Plan, P.P. Joshi's Plan was implemented. The period of this plan was from 1975-76 to 1984-85. However it was extended till 1988, when the working was prohibited by the orders from Government of Maharashtra vide No.TRS-1088/PK-265-F-6 dated 7/6/1988. The order clarified that no harvesting of forests will be carried out for which there was no plan. However it exempted the silvicultural removal of bamboo and exploitation of grasses. The working plan prescribed the following working circles:

i) Selection Working Circle.
ii) Coppice With Reserve Working Circle.
iii) Improvement Working Circle.
iv) Protection Working Circle.
v) Miscellaneous Working Circle.
vi) Wildlife Working Circle (Over lapping).

Selection Working Circle: It covered area of this division except Ghatang area. In this division 17 Felling Series with 20 years Felling Cycle were prescribed. Harvestable girth was 120 cm gbh, yield regulation was by area. All trees above 120 cm. gbh was to be felled if available silviculturally. Improvement felling and thinning was to be carried out in rest of the crop. All *semal, kulu, moha, achar, tendu, aonla* trees were to be reserved. No felling was prescribed in seed production area, 100m from the perennial water holes and springs, site required for protection from frost. Cutting back was prescribed in the following year. Plantation after clear felling of 5 ha. in each coupe was prescribed. Clear felling was stopped by C. F. Amravati after 1978. Sixth year cleaning and eleventh year thinning was prescribed. Thinning of old plantations were prescribed.

Table No 7.2
Result: Stocking has increased in almost all girth classes except 15u30 cm.
Stocking Before And After P.P. Joshi's Plan

Enumeration Period	Midvalue of 15 cm girth classes									
	22.50	37.50	52.50	67.50	82.50	97.50	112.50	127.50	> 135	Total
Before	86.41	58.97	39.99	31.27	26.32	18.02	11.03	5.89	10.57	288.9
After	83.00	61.12	43.13	36.49	29.52	25.60	18.62	11.11	11.07	318.9
Inc {-}	2.59	2.15	3.14	4.77	3.20	7.58	7.59	5.25	00.05	30.0

In general cultural operations have not been done meticulously.

Coppice With Reserve Working Circle: One felling series Ghatang was under this working circle. Teak was to be main species, followed by shisham, bija, tiwas, saja and dhaors, semal and kulu was not be felled. Rotation was fixed at 40 years and hence 40 coupes. Area fully stocked was to be clear felled retaining well grown poles in group of advanced growth. Under stocked area was not to be worked. Steep area and liable to erosion and/or frost were not to be worked. Thinning in young pole crop was to be carried out. 6th year cleaning and 21st year thinning was prescribed. Spacing of regeneration was recommended.

Result: Two felling series, *Manbhang* and *Chandrabhaga* should have been put under protection working circle. The area belonging to these felling series are prescipitous and fragile. A large no. of coupes remained unworkable in these felling series.

However the above prescriptions of CWR appear to have not been followed. The marking was done more or less similar to that of Selection-Cum-Improvement which is clear from the present statistics of growth and yield. In fact the comparison of growing stock of teak before Joshi's Plan and after it showed improvement and increase in number of stems of teak trees per hectare in all girth classes. And since, these areas are capable of producing large sized timber, it was thought fit for working under **Selection-Cum-Improvement** System.

(iii) Improvement Working Circle: The areas are spread in *Anjangaon* range.
The prescription include climber cutting, canopy removal in the established natural regeneration, cutback of malformed growth thinning of the crop, retention of all the trees upto a radius of 100 m from the perennial nalas, water holes, springs and marking of matured trees and afforestation in the gaps.

Result: - Only the harvesting of trees was carried out under the pretex of improvement felling. Hence the areas became open and the crop has not definitely improved. No plantations were carried out in this working circle constituting deviation from the prescriptions.

(iv) Protection Working Circle: It contained upper precipitous and very steep slopes of the main hill ridges. The area allotted to this working circle formed the net work of important water course traversing the tract of Melghat. The forest of this working circle is mostly of quality IVa and IV b and composed of species like *Tiwas, Kumbhi, Dhaora, Jamun, Palas,* etc. along with teak.

No Silivicultural or management prescriptions were prescribed. The forest were conserved, for the indirect benefits like checking erosion, water conservation etc. The irregular exploitation was however permitted.

(v) Miscellaneous Working Circle: The forests are unworkable due to remoteness the situation. Hence no regular working was prescribed and areas will be given rest to reboise naturally.

(vi) Bamboo Overlapping Working Circle: 6 cutting series with 3 years cutting cycle were prescribed.

(vii) *Rusa* Grass Working Circle: There was one cutting series with 4 years cutting cycle. One section in them was to be given rest every year. The availability of rusa grass has gone down. It could be due to improper maintenance lack of rest, harvesting of the grass before seeding and fire.

6.2.44. Oak's Scheme for erstwhile Protected Forests:

a) The oak's scheme covered only the protected forests situated in **Old South Melghat Division**, now distributed between West *Melghat* Division and Tiger project area.

b) **Pasture working circle**: It contained the compartments 27-34, out of which 27 to 33 are allocated to **East *Melghat* Division**.

The area was heavily grazed and it has resulted in soil erosion leading to the loss of topsoil and exposure of rocks. Sites, at places had become refractory. The following treatments were prescribed.

The grazing series were divided into **four coupes** A, B, C and D and each coupe was to be closed for grazing for **three years** The patches with good soil was to be ploughed well before the onset of monsoon and seeds of palatable grasses were to be sown just after the onset of the monsoon.

It was also proposed to weed out obnoxious weeds in the grazing series along with the climbers. This was to be done before the seeding started.

Result: The area has shown continuous deterioration in the soil condition. It is felt that soil conservation works should have been proposed.

(G) (I) **Shri. V.K.Sinha and B.S.Thengdi's Plan for East Melghat Division from 1993-94 to 2002-2003.** In this plan the following ranges were included.

1) Ghatang 2) Semadoh 3) Raipur 4) Hatru 5) Jarida

Four working circles were prescribed in the Sinha and Thengdi's Working Plan.

1) SCI 2) PWC 3) Bamboo WC 4) Wildlife WC

1) **Selection Cum Improvement Working Circle**:- There was emphasis on obtaining regeneration through selective fellings for recruitment. One half of the trees of g.b.h. 120 cm and above if available in well stocked forests below 45^0 slope were prescribed for harvesting. Tending in the crop, inducement of natural regeneration, subsidiary silvicultural operations were prescribed. Where N.R. is deficient it is to be supplemented with A.R. protection from grazing and fire was prescribed after the main felling.

Results: The working plan prescribed very conservative fellings but under marking of coupe was carried, in order to prevent silvicultural gaps in the canopy. Marking of trees was done in those places where assured regeneration was available. So, fewer trees were marked than the prescribed one. During marking, low value matured miscellaneous species were retained and available matured teak trees were marked for felling. Tending in the crop was not carried as per the prescriptions. It was also observed that N.R. inducement operations, subsidiary silvicultural operations were not executed. A.R supplementation with bamboo in few patches was taken up, but their growth is far from satisfactory. Guidelines, outlined in the plan for the treatment map preparation were not followed properly. Comparative analysis of crop shows that middle and mature girth classes are satisfactory but the stem numbers in lower girth classes upto 45-cm. girth is deficient.

2) **Protection Working Circle**:- It included steep slopes and open forests of *Ghatang* Range. Soil and moisture conservation works were prescribed.

Result: Due to heavy biotic interference like grazing the areas have further degraded. DCT works were taken up on the slopes and it led to soil erosion.

3) **Bamboo (Overlapping) Working Circle**: - Scientific harvesting of bamboo clumps was prescribed to obtain sustained yield. Over exploitation of clumps led to lesser no. of bamboos in the clump. Clump formation in the gregariously flowered areas of Ghatang Range is yet to take place for want of cleaning, thinning of bamboo regeneration.

4) **Wildlife (Overlapping) Working Circle**: - Water and soil conservation works were to be given highest priority. But no new water hole was developed. The census report shows reduction in the number of herbivores and carnivores.

(ii) **Shailendhra Bahadur and B.S. Thengdi's Plan for West Melghat from to1993-1994 to 2002-2003.**

This plan covered the following Rages:

1) *Chikhaldara* 2) *Harisal* 3) *Dharni* 4) *Tarubanda* 5) *Dhakna*.

This plan had following working circles:

1) Selection Cum Improvement W.C. 2) Protection WC 3) Bamboo Overlapping WC
4) Wildlife overlapping WC 5) Miscellaneous WC.

Chikhaldara Range of old West *Melghat* Division was merged with the East *Melghat* Division. The area of *Chikhaldara* Range was managed as per the prescriptions of Working Plan for West *Melghat* Division written by *Shailendra Bahadur* and *B.S.Thengdi*. Entire area of *Chikhaldara* Range was allotted to Protection Working Circle.

Soil and moisture conservation works were prescribed. CCT and plantation works were taken up in the area. Few plantations are successful. Soil erosion was observed at many places as CCT works were taken up on the steep slopes.

(iii) **B.S. Thengdi's Working Plan for South *Melghat* Division, (*Akot*) from 1993-94 to 2002-03**

This plan covered the following Ranges:-

1) *Akot* 2) *Anjangaon* 3) *Somthana* 4) *Wan* 5) *Dhulghat*

Part of ex-South Melghat Division i.e. *Anjangon* Range was taken out and was merged with the present East Melghat Division, during reorganization, which took place in 1998.

Total Five Working Circles were formed.

1) Selection Cum Improvement Working Circle
2) Improvement Working Circle.
3) Afforestation Working Circle
4) Wan catchment treatment Working Circle
5) Wildlife Overlapping Working Circle.

The area of *Anjangaon* Range was allocated to various Working Circles as under.

1)	Selection Cum Improvement Working Circle	1551.68 ha. 10.9%
2)	Improvement Working Circle	4795.75 ha. 33.8%
3)	Afforestation Working Circle	7835.53 ha. 55.2%
	Total =	**14,182.96 ha.**

Selection Cum Improvement Working Circle: This working circle covered 10.9% of *Anjangaon* Range. It included Belkund F.S. of Selection Cum Improvement Working Circle of the P.P. Joshi's Plan excluding the areas allocated to *Melghat* Sanctuary. It prescribes harvesting of 50 percent of mature trees having girth more than 120 cm., tending in the crop, NR inducement operations and subsidiary silvicultural operations.

Result: Overall the crop has improved in all girth classes except in the lower girth classes. The forest yielded less timber compared to other SCI areas of *Jarida* and *Ghatang* Range.

2) **Improvement Working Circle**: -The primary object was to improve the growing stock in these vulnerable areas for protecting soil and conserving the moisture. Only improvement fellings were prescribed.

Result: In all girth classes the number of trees has increased, however selective irregular removal of matured *salai* trees is noticed.

3) **Afforestation Working Circle**: -This working circle included part area of improvement working circle of the Anjangaon Range as per the P.P.Joshi's Plan and A.G. Oak, Working Scheme. It included the degraded and under stocked areas of Dahegaon felling series. Under stocked area was proposed for planting and soil and moisture conservation works were prescribed.

Result: - The success of the plantations raised under this working circle is far from satisfactory.

SECTION 3. SPECIAL WORKS OF IMPROVEMENT

6.3.1. Fire protection was introduced in ***Bairagarh* Reserve** in 1870. It was commenced in Gugamal reserve and was extended to other reserves up to 1903. In the reserves created out of C III forests, fire protection was introduced gradually to enable the surrounding population to become accustomed to the new restriction imposed in the forest of the ***Tapti* reserve** in 1911 and subsequently in *Bod, Chitri, Chikhali* and *Motha* Reserves in 1914.

6.3.2. After the introduction of Dunbar Branderi's Plan in 1915, the whole of the High Forest and Coppice with Standard Working Circle and vulnerable areas of *Chikhali, Hattighat, Motha, Chandrabhaga* and *Dabida* blocks were under rigid fire protection. The whole of Chithri and Zapnadeo were fire protected by early burning and remaining areas were not protected owing to the poor qualities of the forest.

6.3.3. As rigid fire protection was costly, it was replaced by **early burning** over large portion of the tract in 1921-22 and 1922-23 and over the whole of area in 1923-24 and subsequent upto 1930-31. The system of early burning should have been stopped from 1927-28 as a result of the **Conservator's conference of 1926**, but as the rules were not properly understood, early burning continued in practice till 1930-1931.

6.3.4. From 1931-32 on wards early burning was stopped and standard fire protection system as given under paragraph 89 of the MP Forest Manual was introduced.

6.3.5. Under *Sharma*'s Plan the whole of the tract was completely protected as laid down in paragraph 89 of the M.P. Forest Manual Volume III. During the period of Stein's Plan the percentage of the area protected from fire ranged from 85-98%. During *Sharma*'s Plan period the range of success was about 77% to 99.9%.

6.3.6. During P.P. *Joshi*'s Plan period the success of fire protection scheme came down.

6.3.7. Establishment of wireless station in the forest:

6.3.7.1. The incidence of fire in *Chikhaldara, Ghatang* and hilly parts of other ranges were frequent. Fire spreads very fast in the hilly terrain as wind velocity was high. The dry deciduous forests provide large amount of debris of leaf litter and dried branches, which are highly inflammable. A quick communication system to combat fire menace was considered necessary and scheme under the **five-year plan** was prepared for establishing wireless stations.

6.3.7.2. Government of *Maharashtra* Revenue and Forest Department decided in 1967 to set up Wireless Communications in Melghat Forest where there were no Telephone or Telegraphic Communication to carry out protection effectively from fire and illicit cuttings. Accordingly, it was decided to establish and maintain wireless stations.

6.3.7.3. The Wireless Advisor to Government of India, New Delhi, has allotted frequency of 77.05 MC/S and 77.03 MC/s to forest department.

6.3.7.4. Assistant Wireless Advisor to the Government of India, Department of Communications (W.P.C.Wing) in 1969, has granted permission to pass administrative type of traffic over the proposed VHF Link work initially for a period of one year with condition that this will be revised thereafter in the light of the prevailing land line pubic communication facilities in that area for which the department was advised to keep in touch with the P.M.G of the area. The secretary, standing advisory committee of Radio frequency allocation Monitoring station, *Goari* Road, Borivali Bombay-92 has accepted the proposal for establishing wireless communication at the above 3 places with the condition of providing identification marking on the masts.

6.3.7.5. According to the scheme of wireless network in West Melghat prepared by the superintendent of Police Wireless, Pune in the year 1964 this work was to be completed in three phases. The wireless station is based permanently at Akot and Chikhaldara
Mobile units: These mobile units are on the vehicles of (1) CCFAC (2) DCF East Melghat (3) DFO vigilance.

6.3.7.6. Assistant Wireless Advisor to Government of India vide letter No. L-14021/20/2012-WF/247 dated 13th August, 2012 has conveyed letter of intent to the Chief Conservator of Forest, Amravati, for establishing wireless telegraph (WT) station for operation of 49Fx +170 HH+ 17Vmo+16 stdby= 252 sets. Parameters of the allotted frequency are as follows:

Tx/Rx Frequency	**Carrier Freq. (in MHz)**	**Emission**	**Working hours**
159.9MHz	-	11K0F3E	H24
161.9625/167.0125 MHz	-	11K0F3E	H24
Power of Station			
FX station (in dBW)	HH station (In dBW)	VM station (In dBW)	
13.979	6.99	13.979	

The earlier allotted frequency of 77.05 MC/s an &&.03 MC/s is to be surrendered.

6.3.7.8. The wireless station works on hourly basis between 8.00 to 20.00 hours, however during fire season, during March 1, to June15, work round the clock.

6.3.8. Plantations: Most of the plantations were raised around 100 years back in Sipna valley in East Melghat Division. These plantations were mostly of teak. A no. of plantations were also raised during Steins Plan. Under Sharma's Plan though plantation were prescribed but no plantations were taken up. But under 5 years plan schemes of plantations of teak, bamboo and pulpwood species were carried out in suitable areas scattered all over the tract. During the period 1952 to 1972, plantations that were taken up are given in the **Appendix No. X** of Vol. II of this plan.

6.3.9. During P.P. Joshi's Plan period, the following plantations were carried out:

Table No 6.3
Table Showing Area Of Plantations Raised During P.P. Joshi's Plan period

Sr. No.	Species	Area in hectare
1.	Teak	558.00
2.	Others	4346.50
	Total	**4904.50 ha.**

6.3.10. Improvement Of Road Network:

No new forest road was constructed during the *Sinha*'s plan period.

6.3.11. Forest Rest House: All most all forest rest houses were constructed in the latter part of the **nineteenth century,** however during *Sharma*'s Plan, the major repairs to most of them were carried out, by replacing their thatched roofs and provided sanitary fittings. No new rest house was constructed. At present there are only two good rest houses in the division one at *Chikhaldara* and *Jarida*.

6.3.12. Buildings: The list of buildings is given in **Appendix No. XIII** of volume II of the plan.

SECTION 4: THE OUT TURN FROM THE FORESTS:

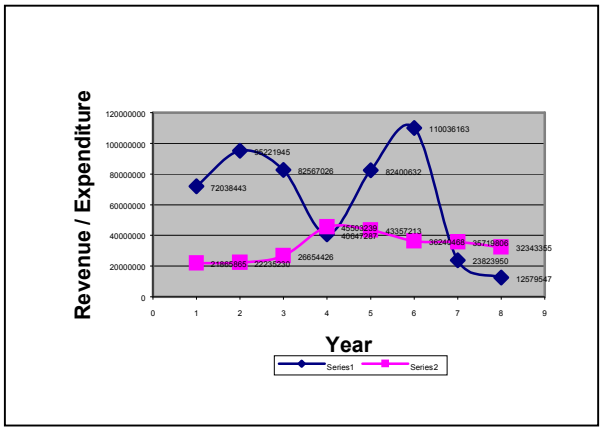
6.4.1. The **Appendix No. XII** & **XIII** showing outturn of major forest produce is given in the volume II. The production quantities are not uniform over the period of years as the topography of each coupe varies from one compartment to other. Maximum production was achieved in the year1994-95 and minimum production was achieved in the year 1991-92 and 92-93. The area has potential to produce large quantity of timber. The quantum of timber could be dependent upon the maturity of the crop in the coupe and timely budget available for operations. The yield details for the year 2000-01 SCI coupes are given below. It shows that teak yield of 2Cu.M./ha. on an average was obtained which is more than the prescribed assured yield of 0.53 Cu.M./ha. for the SCI areas.

Table No 6.4
Table Showing Coupe Wise yield of Teak and Non Teak For The SCI Coupes Of 2000-01

Sr. No.	Coupe No.	Area of the Coupe	Yield of Teak (Cu.M.)	Average yield/Ha.	Yield of Non Teak (Cu.M.)	Average yield/Ha.
1	VIII Sumita	330.03	762.112	2.309	314.704	0.954
2	VIII Butida	134.35	268.255	1.997	93.254	0.694
3	VIII Khari	341.15	1230.796	3.608	22.396	0.066
4	VIII Rahu	350.04	969.338	2.769	420.422	1.201
5	VIII Tawra	227.83	230.318	1.011	108.518	0.476
6	VII Belkund	141.42	67.867	0.480	51.216	0.362
	Total	1524.82	3528.686	2.31	1004.510	0.658

SECTION 5: PAST REVENUE AND EXPENDITURE:

6.5.1. Major revenue source of the division is timber. The sales of *tendu* and bamboo are also significant but not as much as of the timber. However, all these three operations provided employment to the people for maximum period of the year. The details of Revenue and expenditure for East Melghat Division are given in the **Appendix No. XIV** of Volume II of this plan.



Year	Revenue (crores)	Expenditure (crores)
1996-97	7.20	2.18
1997-98	9.52	2.22
1998-99	8.25	2.66
1999-00	4.06	4.55
2000-01	8.24	4.33
2001-02	11.00	3.62
2002-03	2.38	3.57
2003-04	1.25	3.23

6.5.2. The results of the present Working Plan since 2006-07 have been discussed in respective Working Circles in Part-II.

CHAPTER -VII

STATISTICS OF GROWTH AND YIELD

SECTION 1. STATISTICS OF RATE OF GROWTH OF TEAK:

7.1.1. Stem analysis: During revision of this plan stem analysis was carried out in November 2001, by selecting a representative teak tree of site quality II/III in the compartment no. 200 of *Ghatang* Range. The height of the tree is 21.7 M (22M). The growth details are given below.

Table No.7.1
Table Showing Age Height Parameters Of Stem Analysis Of Teak (*Tectona grandis*)
Site Quality: II/III **Division: E.*Melghat***

Age	ht. of section in m.
0	1.37
13	4.24
22	7.24
33	10.24
36	13.24
59	16.24
79	19.48

The above table shows that till 13 years the growth in height is sluggish. There afterwards it picked up and continued till 80 years. Later the growth was slowed down. Between 33 to 36 years age it had put up the maximum height.

Table No.7.2
Table showing age volume parameters of Stem analysis of teak
Species: Teak (Tectona grandis)

Site Quality: II/III **Division: E.*Melghat***

Age	Volume in Cum.
0	0.0000
10	0.0046
20	0.0329
30	0.0938
40	0.1854
50	0.3161
60	0.4932
70	0.6726
80	0.8768
90	1.0367
100	1.1720
110	1.3613

Volume growth is sluggish till 30 years. There afterwards it has picked up till 110 years. Though the height growth slowed down at 80 years age, the growth in volume is steady.

Table No.7.3
Table Showing CAI/MAI Of Teak Stem Analysis
Species: Teak (*Tectona grandis*)

Site Quality: II/III **Division: E.Melghat**

Age	MAI in cum.
0	000
10	0.0005
20	0.0016
30	0.0031
40	0.0046
50	0.0063
60	0.0082
70	0.0096
80	0.0125
90	0.0148
100	0.0167
110	0.0194

Age	CAI in cum.
0	0
15	0.0028
25	0.0061
35	0.0092
45	0.0131
55	0.0177
65	0.0179
75	0.0204
85	0.0160
95	0.0135
105	0.0189

MAI is very low during the first decade, later it has increased during 20- 70 years at the rate of 0.0016 cum./decade. During 70-110 years the growth is 0.0022cum/decade. Similarly, CAI growth is very low during first decade; during 10-60 yrs the rate is 0.0030 cum./decade afterwards the rate has fallen down gradually.

Table No.7.4

Stem Analysis Curve VI: Twice bark thickness (B.T.) **Species:Teak**
(*Tectona grandis*)

Site Quality :II/III **Division: E.*Melghat***

D.U.B. in cm.	2xB.T. in cm.
0	0
6.0	0.8
14.0	0.9
24.6	0.9
35.4	1.0
46.2	1.8

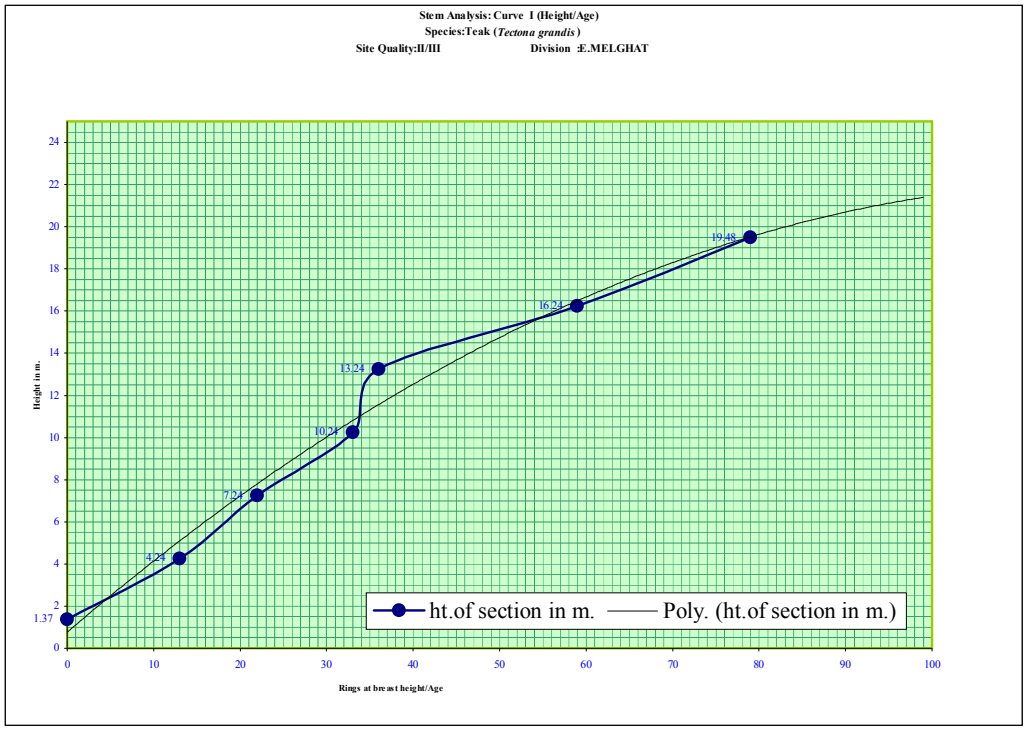
As the field measurements are taken over bark corresponding bark thickness needs to be taken into account.

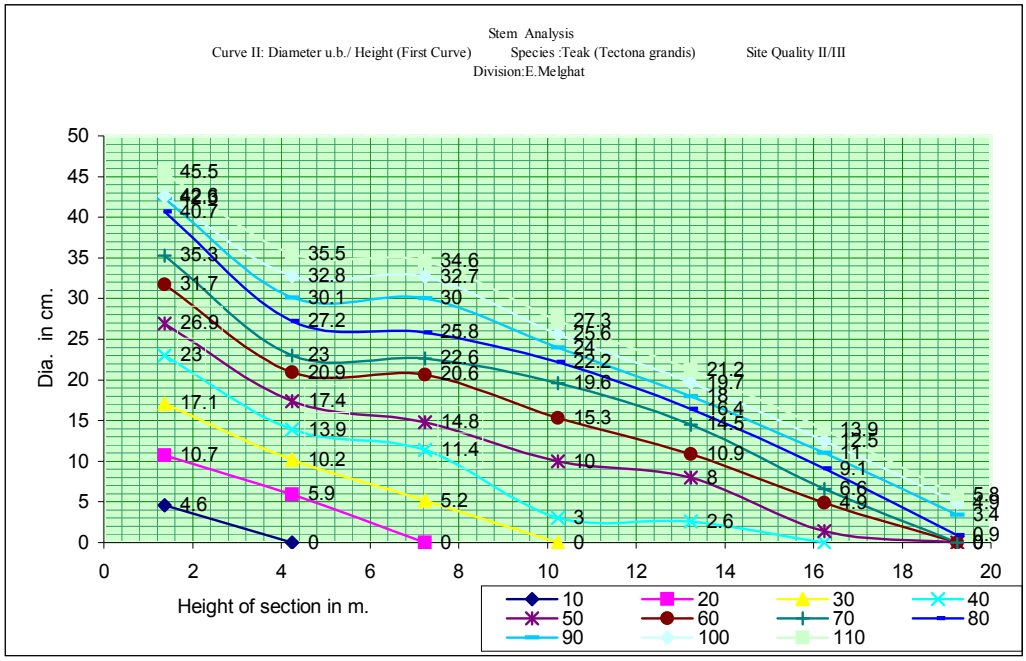
7.1.2. It is evident from the graphs that the age of culmination at which CAI & MAI intersect each other is 106 years. The corresponding girth is 144 cm. The data is reproduced as under:

Table No. 7.5

Table Showing Stem Analysis Of Teak For Site Quality –II/ III

Age in years	D.B.H.O.B. in cm	G.B.H. O.B. in cm	Ht. In Mt.	Volume per tree cm	MAI Cum/year	CAI Cum/year
10	2.5	7.95	2.5	0.002	0.0002	0.0002
20	9.7	28.9	5.7	0.0020	0.0012	0.0043
30	15.7	48.1	8.7	0.060	0.0025	0.0079
40	21.0	66.0	11.3	0.129	0.0040	0.0108
50	26.0	81.7	13.7	0.240	0.0055	0.0132
60	30.7	96.5	15.8	0.400	0.0070	0.0152
70	35.0	110.0	17.5	0.580	0.0090	0.0166
80	38.3	120.3	19.0	0.780	0.0110	0.0175
90	41.8	131.3	20.3	0.960	0.0133	0.0180
100	44.2	138.9	21.1	1.100	0.0157	0.0175
110	47.2	148.3	21.5	1.260	0.0182	0.0168


Stem Analysis: Curve I (Height/Age)
Species:Teak (Tectona grandis)
Site Quality:II/III
Division :E.MELGHAT
Height in m.
Rings at breast height/Age
ht.of section in m.
Poly. (ht.of section in m.)
1.37
4.24
7.24
10.24
13.24
16.24
19.48

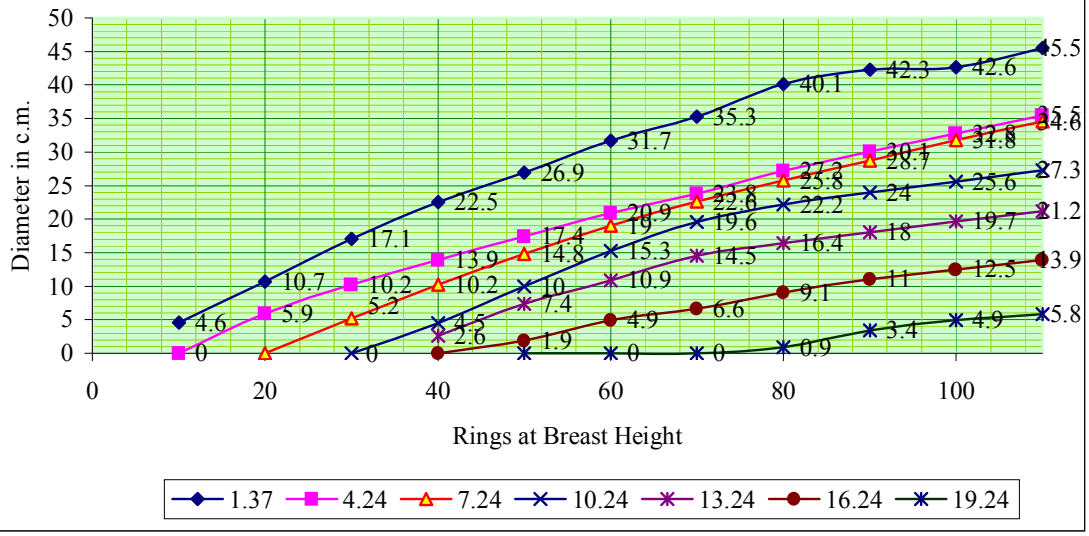

Stem Analysis
Curve II: Diameter u.b./ Height (First Curve)
Species :Teak (Tectona grandis)
Site Quality II/III
Division:E.Melghat
Dia. in cm.
Height of section in m.
10
20
30
40
50
60
70
80
90
100
110

Stem Analysis

Curve III:Diameter underbark /Height (Second Curve)

Species :Teak Site Quality II/III

Division: E.Melghat

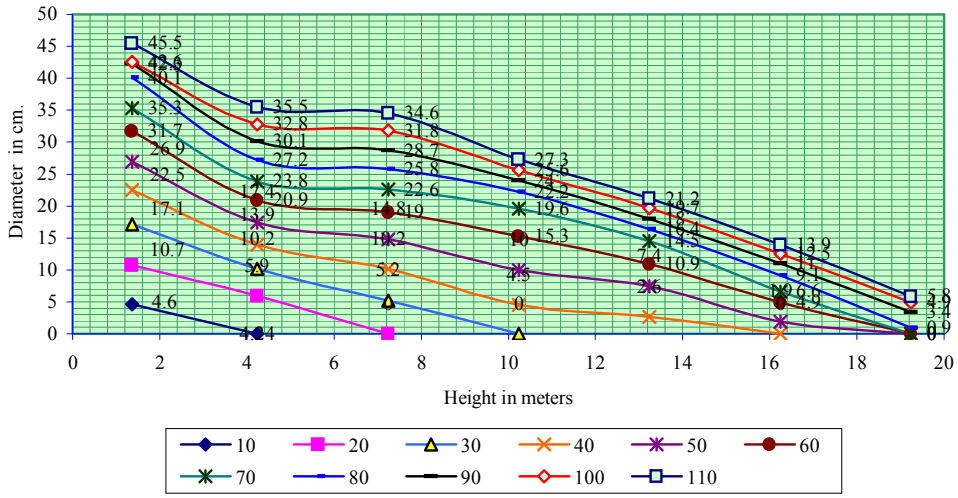


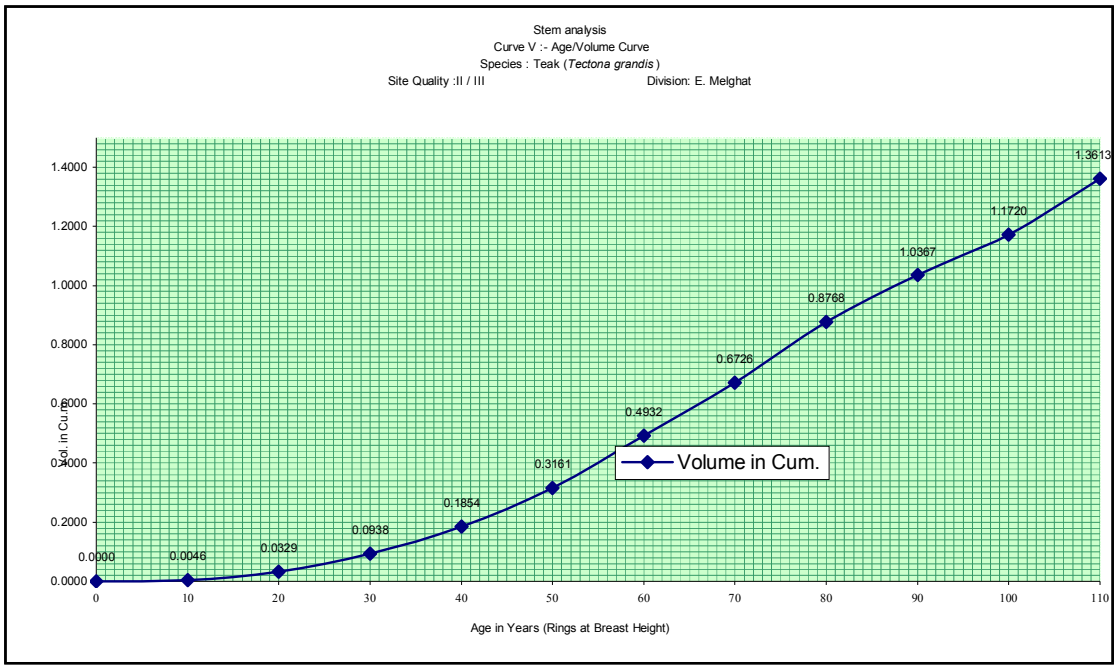
Stem Analysis

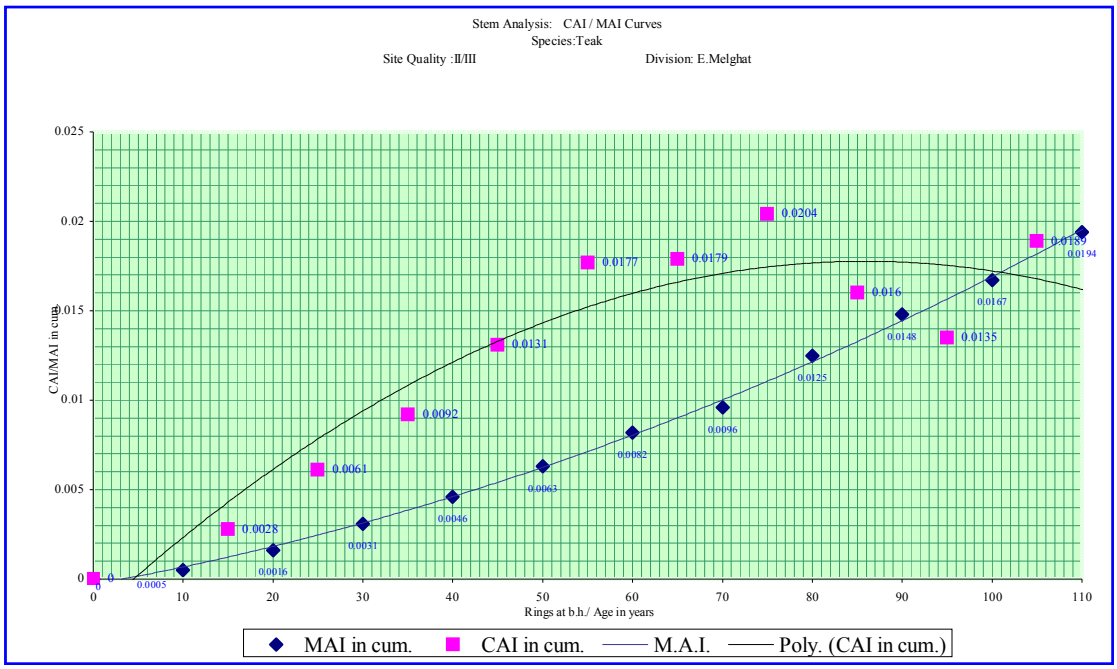
Curve IV: Diameter U.B./Height in m.(Final curve)

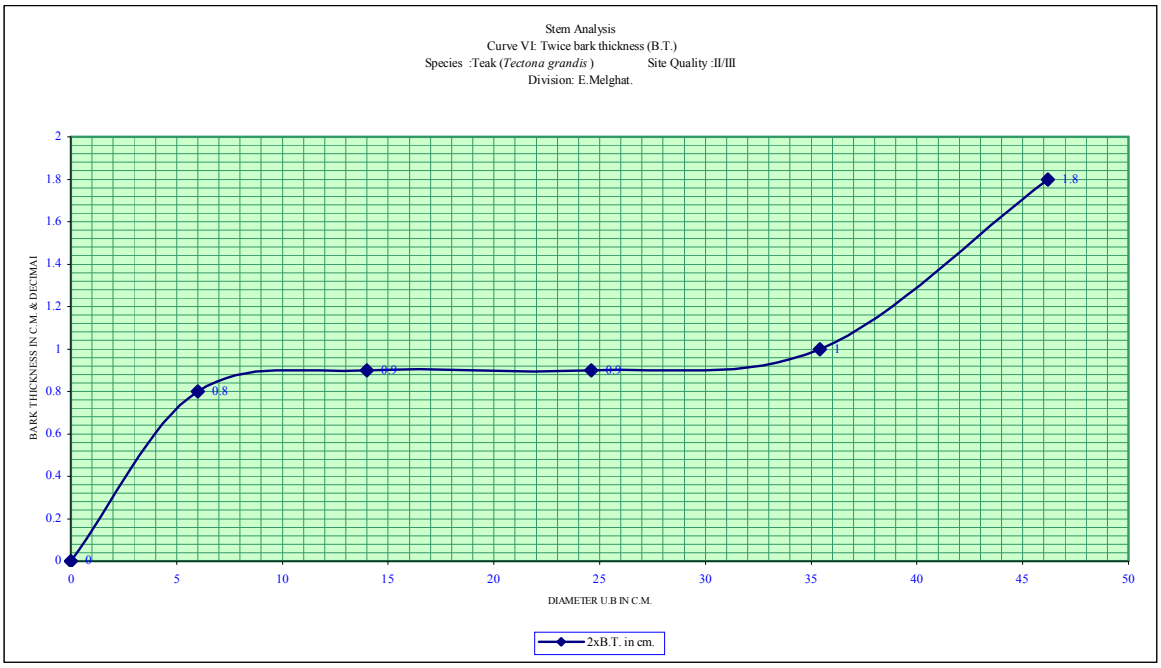
Species:Teak (*Tectona grandis*)

Site Quality:II/III Division :E.Melghat




Stem analysis
Curve V :- Age/Volume Curve
Species : Teak (Tectona grandis)
Site Quality :II / III
Division: E. Melghat
Vol. in Cu.m.
Age in Years (Rings at Breast Height)
Volume in Cum.
0.0000
0.0046
0.0329
0.0938
0.1854
0.3161
0.4932
0.6726
0.8768
1.0367
1.1720
1.3613


Stem Analysis: CAI / MAI Curves
Species:Teak
Site Quality :II/III
Division: E.Melghat
CAI/MAI in cum.
Rings at b.h./ Age in years
MAI in cum.
CAI in cum.
M.A.I.
Poly. (CAI in cum.)


Stem Analysis
Curve VI: Twice bark thickness (B.T.)
Species :Teak (*Tectona grandis*) Site Quality :II/III
Division: E.Melghat.
BARK THICKNESS IN C.M. & DECIMAL
DIAMETER U.B IN C.M.
0
0.8
0.9
0.9
1
1.8
2xB.T. in cm.

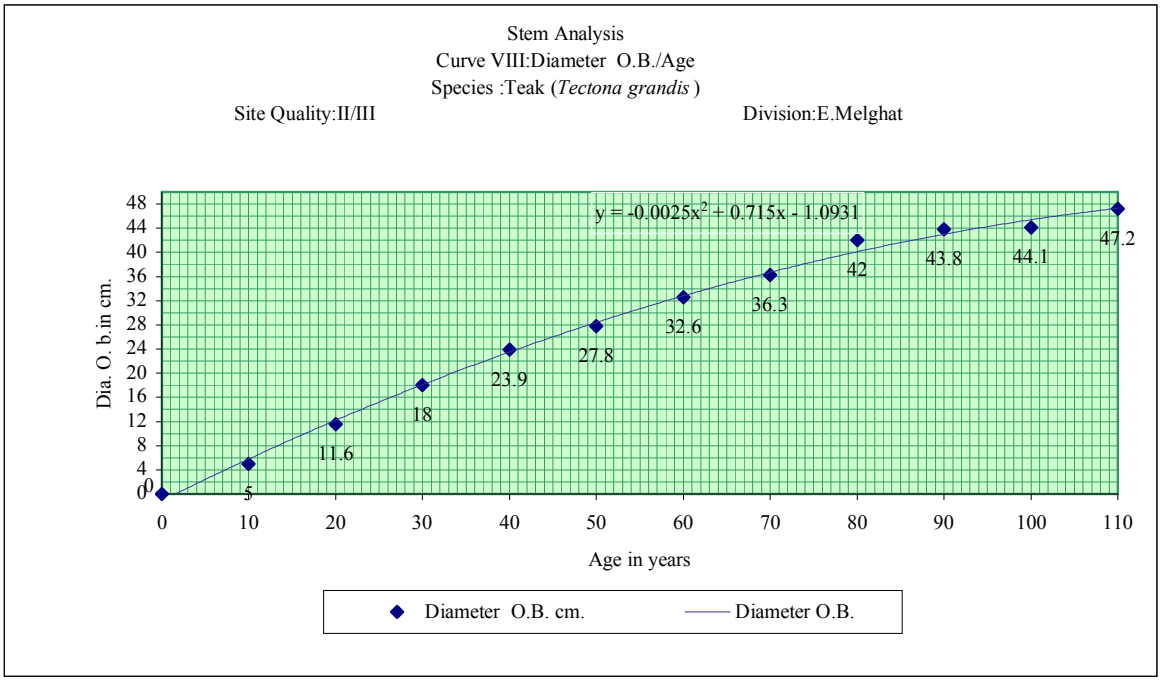

Stem Analysis
Curve VIII:Diameter O.B./Age
Species :Teak (*Tectona grandis*)
Site Quality:II/III
Division:E.Melghat
y = -0.0025x² + 0.715x - 1.0931
Dia. O. b.in cm.
Age in years
0
5
11.6
18
23.9
27.8
32.6
36.3
42
43.8
44.1
47.2
Diameter O.B. cm.
Diameter O.B.

Table No. 7.6
No. of years required to cross the Girth Class.

Girth Class cum	Mid girth cm	II	
		Age in years	Years required to cross to the class
15-30	22.5	17	--
		--	8
30-45	37.5	25	--
		--	8
45-60	52.5	33	--
		--	8
60-75	72.5	41	--
		--	9
75-90	82.5	50	--
		--	11
90-105	97.5	61	--
		--	12
105-120	112.5	73	--
		--	13
120-135	127.5	86	--
		--	19
135-150	142.5	105	
		--	--

For the initial four girth classes the tree has taken on an average 8 years time to cross one girth class to another girth class. Later on wards around 12 years on an average for the next 3 girth classes. The period further increased to 20 years i.e. felling cycle period to cross penultimate girth class to last girth class.

7.1.3 Stem Analysis Exercise was carried out in Dhulgat Range of adjoining West *Melghat* Division for site quality III teak having an height of 20.30 M. The CAI and MAI curves are drawn and results are shown as under:

Table No.7.7
Table Showing Age Height Parameters Of Stem Analysis
Species:Teak (*Tectona grandis*) **Site Quality III**

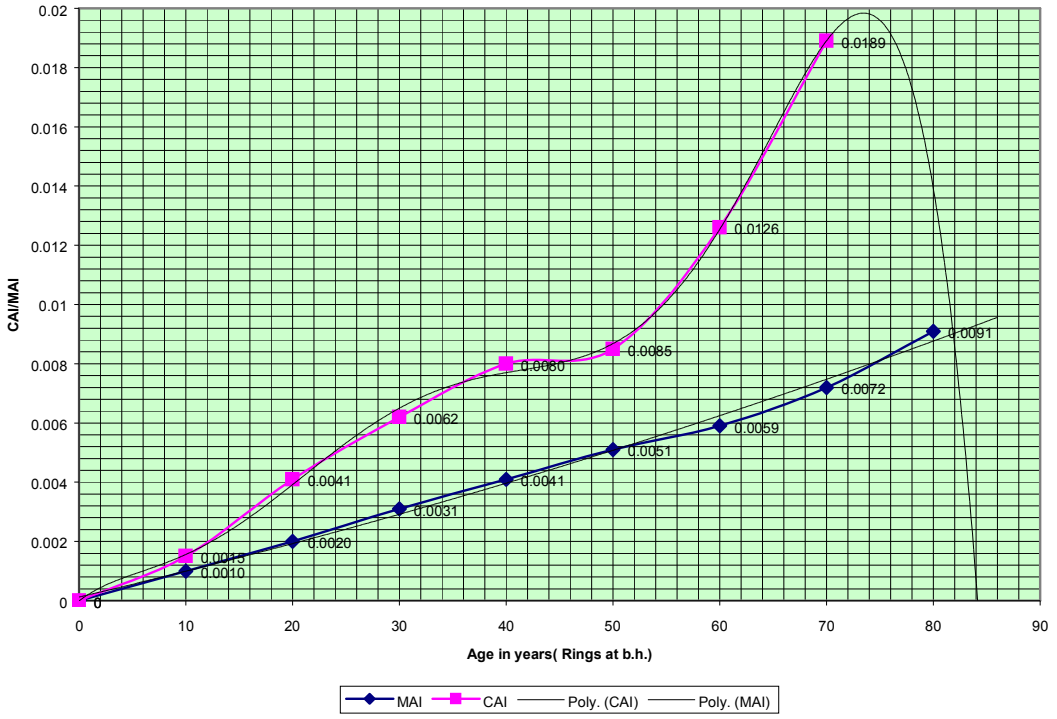
Age	ht. of section in m.
0	1.37
8	4.24
11	7.24
13	10.24
36	13.24
64	16.24
77	18.94

7.1.2 It is evident from the graphs that the age of culmination at which CAI & MAI intersect each other is 88 years. The corresponding girth is 107 cm. The data is reproduced as under.

Table No. 7.8
Table Showing Stem Analysis Of Teak For Site Quality – III

Age in years	D.B.H.O.B. in cm	G.B.H. O.B. in cm	Ht. In Mt.	Volume per tree cm	MAI Cum/year	CAI Cum/year
10	6.3	19.8	2.4	0.0103	0.0010	0.0015
20	10.7	33.6	7.5	0.0400	0.0020	0.0041
30	13.9	43.7	10.8	0.0930	0.0031	0.0062
40	16.3	51.2	12.8	0.1640	0.0041	0.0080
50	19.2	60.3	13.6	0.2531	0.0051	0.0085
60	22.0	69.1	14.7	0.3539	0.0059	0.0126
70	26.1	82.0	16.3	0.5065	0.0072	0.0189
80	32.3	101.5	18.0	0.7313	0.0091	0.0198
90	34.0	106.9	18.8	0.7600	0.0100	0.0092

Stem Analysis CAI/MAI Curves Species: Teak Site Quality: III



SECTION 2. STOCK MAPPING:

7.2.1. Reserved Forests of the division were stock mapped for the first time in the year1935 at the time of revision of the working plan by A.H.Stein. The stock maps were revised with each revision of the working plan. *P.P.Joshi* made the latest revision of stock maps at the time of the revision of the working plan.

7.2.2. As per the directives from the Chief Conservator of Forests, Working Plan, *Nagpur* the ocular and subjective stock mapping has been replaced with objective inventory based on the systematic line-plot sampling on 600 meter grid. The standard size of the sample plot is of 0.36 hectares and located at the grid intersections, in the NE quadrant. Inventory work includes complete enumeration of all trees species in these plots in 15cm girth classes. Regeneration counting is done in 0.04-hectare sup-plots. Recording of forest type, site quality, density and nature of forest damage have been included as an integral part of the enumeration exercise. Accordingly, SOFR (Survey of Forest Resource) Unit, Amravati in collaboration with the field staff of *Amravati* Working Plan division has carried out the comprehensive inventory in forests of East *Melghat* Division. The Inventory Management System developed by *Dhabekar* was used for analysis of the inventory data leading to provide the following statements for the purpose of estimation of the growth stock for treatment under various working circle.

1. Girth class-wise estimated growing stock in respect of important 18-20 tree species and rest of species together.

2. Estimated growing stock per hectare separately for *Ain, Bija, Lendia, Shisham, Tiwas, Teak, Kalam, Khair, Salai, Semal, Dhaora, Garari* and rest of species together.

3. Girth class-wise percentage distribution of each of the above species in the growing stock.

The details are given in the **Appendix No. XXII** of Volume II of this plan.

7.2.3. The inventory data, so obtained, has been dynamically linked with compartment maps in the GIS environment; showing the stocking and management related details. The maps prepared in the GIS environment are cartographically more accurate than traditional stock maps based on ocular estimation. The process has been fairly standardised in the Forest GIS Cell *Amravati.*

7.2.4. The satellite imagery of LISS III of 22nd December 2002 was used to classify the forest patches according to density as revealed in the Normalized Density Vegetation Index (NDVI) mapping. The extensive line plot sampling data were used for the preparation of stock maps for those areas where stock maps were not prepared. The results of stock mapping are given below.

Table No.7.9

Table Showing The Results Of Stock Mapping

Forest Type	Site Quality	SCIWC	IWC	AWC	PWC	TPWC	Total Area in ha.	% to the total area
Teak	II	5.5366	-	-	9.6237	64.4797	79.64	0.14
	III	13475.3737	-	56.5733	2307.0926	4492.3844	20331.422	37.10
	IVa	1256.8493	157.5486	362.312	3990.5412	180.355	5947.6061	10.85
	IVb	633.5228	1882.3981	2843.3393	5729.2641	121.4646	11209.988	20.45
	Total	**15371.2824**	**2039.9467**	**3262.2246**	**12036.5216**	**4858.6837**	**37568.6590**	**68.55**
Mixed	III	1778.5885	6.1271	255.772	341.4341	152.0659	2533.9876	4.62
	IVa	211.9504	380.1958	62.6	82.1397	3.1106	739.9965	1.35
	IVb	131.1419	1147.5834	2518.3033	699.5167	4.3695	4500.9148	8.21
	Total	**2121.6808**	**1533.9063**	**2836.6753**	**1123.0905**	**159.546**	**7774.8989**	**14.18**
Salai	III	4.8127	-	-	10.0171	-	14.8298	0.03
	IVa	-	4.7374	11.1818	-	-	15.9192	0.03
	IVb	5.7152	718.6737	273.5164	0.8761	-	998.7814	1.82
	Total	**10.5279**	**723.4111**	**284.6982**	**10.8932**	**-**	**1029.5304**	**1.88**
Old Plantation	-	210.0299	84.0846	545.0144	61.1476	13.4879	**913.7644**	1.67
Under stocked	-	1379.1207	269.4113	425.1214	3336.4953	268.3650	5618.5137	10.25
Not Stock mapped	-	411.5986	4.2008	229.2095	1214.9013	40.2684	1900.1786	3.47
	Total	**19504.2603**	**4654.9608**	**7582.9434**	**17783.0495**	**5340.3510**	**54805.542**	**100.000**

Table No.7.10

Table Showing Crown Density Data Of East *Melghat* Division

Category	SCI	IWC	AWC	PWC	TPWC	Total	% of area w.r.t. total Not. area	Remark
Well stocked	14784.4676	3050.5371	3646.3041	13443.1215	3874.4262	38798.857	69.18	
Under stocked	4393.2502	1572.7846	3549.6572	3930.9236	1416.1712	14862.787	26.50	
Blank	239.3605	29.3459	371.3399	385.9536	44.0630	1070.0629	1.91	
Water body	4.8492	-	8.3740	14.3908	0.1538	27.7678	0.05	
Others	22.3129	2.2931	7.2681	8.6600	5.5368	46.0709	97.71	
Total	**19444.2403**	**4654.9608**	**7582.9434**	**17783.0495**	**5340.3510**	**54805.55**	4273.81	
Area of W.C.	**20120.96**	**4795.75**	**7835.53**	**17893.64**	**5441.71**	**56087.59**	**100**	
Difference	676.719	140.7892	252.5866	110.905	101.359	1282.3588	2.34	

****The above figures were calculated through GIS and the difference in the areas for each compartment are given in the Appendix No. XVI.***

Teak forest constitutes 68.55% of the total area and Mixed forest constitutes 14.18% and *Salai* constitutes 1.88 % of the total area. Majority of the area falls under site quality III. Of the total area 20331.422 ha is site quality III and 17157.59 ha area falls under site quality IV. The crown density analysis of the satellite imagery shows that 69.18 % of the area is well stocked or having more than 0.4 crown density.

SECTION 3. ENUMERATION:

7.3.1. The enumeration of trees and the regeneration survey of the forest crop in the division were carried out by Forest Resources Survey Unit, *Amravati* and Working Plan Division *Amravat*i during 1999-2000 to 2002-03. The sampling design was systematic line-plot survey and the intensity of sampling was 1 (one) percent.

7.3.2. Systematic line-plot sampling was carried out at the intersections of 600-meter grid. Species and girth distribution (15 cm girth classes) of trees and bamboo counting were done in 0.36-hectare plots (60 meter X 60 meter).

7.3.3. Regeneration count of seedlings and coppice shoots of teak and other miscellaneous species was done in three height classes (0.3 to 1/0 1.0 to 3.0 and above 3.0 meters) in 0.04-hectare (20 meter X 20 meter) sub-plots.

7.3.4. Enumeration data was analysed using the Forest Inventory Management System (developed by Shri J.S. *Dhabekar*). Enumeration results have been computed separately for each working circle and have been discussed, in the chapters of respective working circles. Stem density, basal area and frequency of each species have been calculated girth class wise and presented in the **Appendix No. XLV** and Species distribution in various working circles is given in **Appendix No. XII** of Volume II of this plan.

7.3.5. The analysis of enumeration data shows that the growing stock has improved marginally in both the S.C.I. and Improvement Working Circle areas. In the S.C.I. areas, teak in various higher girth classes (46-75 onward) has shown an increase in number due to conservation efforts. Whereas lower girth classes has shown decrease in number as compared to Sinha's plan of S.C.I. W.C. areas. It is attributed to poor recruitment and establishment of teak regeneration. The number of miscellaneous trees/ha has increased marginally in all girth classes, compared to Shri Sinha's plan period. Overall the growing stock has improved from 290 trees/ha to 376.8 trees/ha. In the areas of Improvement Working Circle Percentage of teak has increased from 27.86 to 40.11. Whereas the percentage of miscellaneous species has come down from 72.14 to 59.89. The number of miscellaneous species per hectare remained more or less same. Overall the growing stock has improved marginally from 252.15 trees/ha of P.P.Joshi's plan period to 315.98 trees/ha.

CROP GIRTH:

7.3.6. The crop girth, which has been calculated on the basis of the enumeration data, Is 90cm. for the forest allotted to the Selection Working Circle. It corresponds to the age Of 50 years. Following table shows crop girths, their corresponding ages and basal areas for the enumerations taken up under various plans.

Table No. 8.11
Table Showing Crop Girth, Average Basal Area Under Various Plans

Enumeration Period	Crop Girth cm.	Corresponding Age in Years	Average Basal Area in sq. m.
P. P. Joshi,s Plan	58.5	33	9.40
Sinha's Plan	69	41	12.30
Current Plan	90	50	17.94

NORMAL GROWING STOCK:

7.3.7. A modest endeavor has been made below to find out how close is the existing growing stock in Selection Working Circle to normal growing stock. This knowledge will help in bringing the forest as close to the normal as possible by careful manipulation of the crop over long periods.

7.3.8. The number of trees in each size class judges the normality of an uneven aged selection forest. It must contain more small trees than big ones per hectare. There are two ways of constructing a simple model of normal growing stock. One is by adopting the plantation crop yield table figures and the second method is to follow F. De Liocourt's theory (1898) that the number of stems in a Selection forest lessens from one-size-class to the larger class in a geometrical progression, so that the ratio of diminution is constant. The better quality selection forest, which is comparable to the All-India quality, III/IV is considered for the purpose of this exercise. The following normal growing stock model is constructed for All-India plantation teak quality III/IV and Natural teak quality III and is given under **Table 7.12.**

Table 7.12
Growing Stock Model Based On All-India Teak Yield (Plantation) Table and Natural Teak

Plantation Teak Q. III/IV				Natural Teak Q. III		
Age	**No. of trees**	**Reduced No.**	**50 percent of (iii)**	**No. of trees**	**Reduced No.**	**50 percent of (vi)**
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
5	--	--	--	--	--	--
10	1,310	82	41	2,174	136	68
15	940	58	29	1,169	73	37
20	678	42	21	785	49	24
25	550	34	17	588	37	18
30	463	29	14	477	30	15
35	395	24	12	394	25	12
40	350	22	11	329	20	10
45	323	20	10	290	18	9
50	297	17.6	9	258	16	8
55	278	16.5	8.25	230	14	7
60	260	15.4	7.7	214	13	6.5
65	242	14.5	7.25	192	12	6
70	230	13.8	6.9	184	11	5.5
75	217	13.5	6.5	168	10.5	5.2
80	205	12.5	6	158	9.9	4.9

7.3.9. Column (ii) gives number of trees on one hectare of land for 16 ages. Each represents five-age gradations. The total of this column represents what could be the crop on 16 ha. of forestland if all the age classes are mixed together. Dividing each figure in column (ii) by 16 gives the crop 1/16 ha. as in column (iii) and the total column (iii) the crop of 1 ha. with age gradation from 1 to 80. These figures are for a fully stocked area. Since Melghat areas have 50 per cent of the crop as teak, for the sake of comparability, column (iii) figures have to be halved to obtain the number in each age class in a normal selection forest with 50 per cent of the growth in teak.

7.3.10. Columns (v) to (vii) give similar information compiled from a yield table for natural teak forests. The basis of information has been secured through the kindness of Shri A.N. *Chaturvedi*, I.F.S., Mensuration Officer, FRI from an unpublished paper.

7.3.11. The four sets of figures (I) Existing growing stock (ii) Existing growing stock modified on de Liocourt's Theory (iii) Normal growing stock from natural teak yield tables is given in the table 8.13. Existing growing stock figures are for size classes; hence the average is also given.

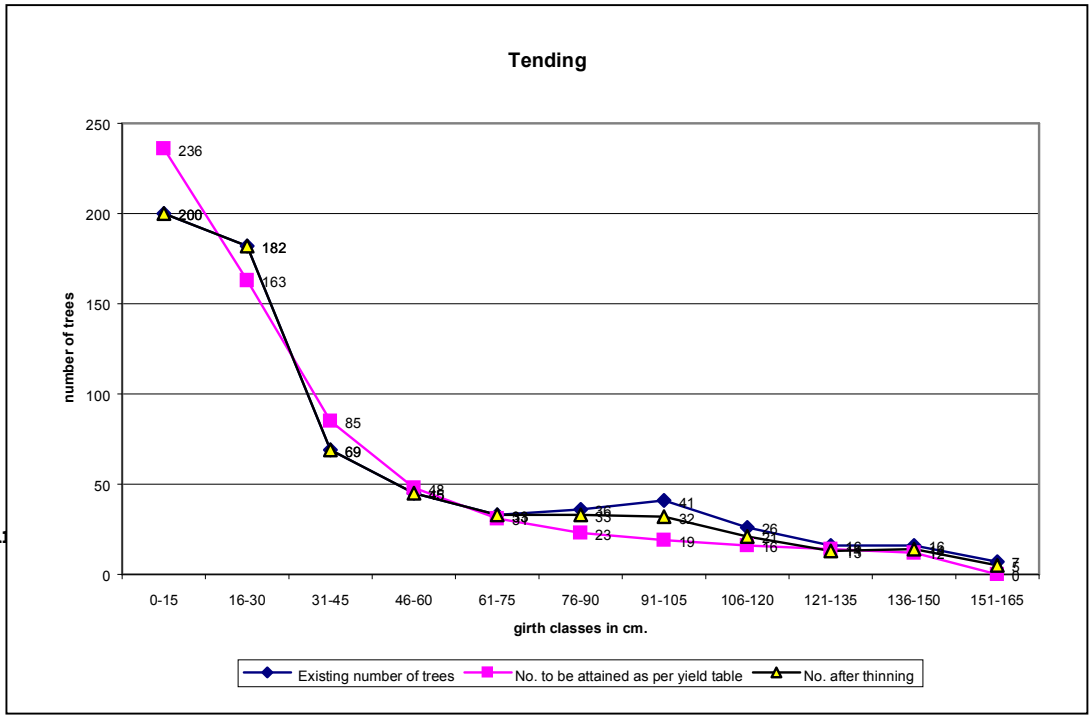
Table No. 7.13
Table Showing No. Of Teak Trees Per Hectare In The Existing And Normal Growing Stock

Existing Growing Stock				Normal Growing Stock Model		
Size-Class (cm)	**Age (Yr.)**	**Actual (No.)**	**De Liocourt (No.)**	**Age (Yr.)**	**(50) per cent stock**	
					Plantation teak yield table (No.)	**Natural teak yield table (No.)**
1	2	3	4	5	6	7
15 U 30	12	29.08	29.08	10 15	41 29	68 37
30 U 45	21	24.00	26.08	20 25	21 17	24 18
45 U 60	29	19.18	23.40	30 35	14 12	15 12
60 U 75	38	19.33	20.99	40 45	11 10	10 9
75 U 90	47	19.30	18.82	50 55	9 8.5	8 7
90 U 105	58	19.50	16.88	60 65	8 7.5	6.5 6
105 U 120	71	13.54	15.14	70 75	7.2 6.7	5.5 5.2
120 U 135	110	14.76	13.58	80	6.2	4.9
135 and over	--	---	---			
Total	**--**	**158.69**	**163.57**	**--**	**208.1**	**236.1**

7.3.12. From the above figures, it becomes evident that normal growing stock models with 50 per cent stock have a larger number of trees per hectare. A sample plot showing the existing tree numbers and number of trees /ha to be retained for a specific site quality with its corresponding rotation and after careful intervention how the tree numbers are distributed under various girth classes is given below to have a fair understanding of the exercise to be carried out.

Table No. 7.14
Table Showing Management Intervention To Attain Number Of Trees As Per Yield Table
Average Site quality II/III with rotation 150cm.
Range: *Jarida* Compartment No.: 410 Coupe No.:XI
Average top height in the grid 23M, Grid No.7

Girth class (c.m.)	Existing number of trees	No. of trees to be attained as per yield table	difference	No. to be removed	No. after thinning
0-15	200	236	-36	0	200
16-30	182	163	19	0	182
31-45	69	85	-16	0	69
46-60	45	48	-3	0	45
61-75	33	31	2	0	33
76-90	36	23	13	3	33
91-105	41	19	22	9	32
106-120	26	16	10	5	21
121-135	16	14	2	3	13
136-150	16	12	4	2	14
151-165	7	0	7	2	5
Total	**671**	**647**	**24**	**24**	**647**



SECTION 4. VOLUME TABLES:

7.4.1. The Local volume Table for Teak site quality II/III as prepared during stem analysis, which was carried out for preparation of this Plan is given in the **Table no. 7.15.** The volume tables for miscellaneous species are also given below in the **Table no.7.16.**

Table 7.15
Table Showing Volume Table (Stem Timber) For Teak
(Site Quality II/III) (Quarter Girth Volume)

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.005
2	30/45	0.033
3	45/60	0.080
4	60/75	0.142
5	75/90	0.240
6	90/105	0.420
7	105-120	0.640
8	120-135	0.900

Table 7.16
Table Showing Local Volume Tables Of Important Species

Name of species	Girth class in cm.							
	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120 & over
1	2	3	4	5	6	7	8	9
Tectona grandis	0.013	0.054	0.148	0.287	0.467	0.693	0.977	1.268
Ougenia oojeinensis	0.013	0.048	0.116	0.238	0.398	0.594	0.827	1.066
Anooeissus latifolia	0.015	0.081	0.197	0.372	0.599	0.887	1.238	1.574
Laoerstroemia parviflora	0.014	0.053	0.153	0.352	0.497	0.733	1.009	1.343
Boswellia serrata	0.008	0.037	0.102	0.212	0.364	0.549	0.785	1.122
Lannea coomandelica	0.008	0.037	0.097	0.215	0.392	0.628	0.934	1.352
Madhuca longifoliavar, latifolia	0.015	0.048	0.112	0.217	0.393	0.654	0.993	1.418
Adina cordifolia	0.007	0.048	0.118	0.239	0.422	0.670	0.398	1.348
Mitragyna parvifolia	0.010	0.043	0.103	0.213	0.376	0.590	0.885	1.209
Grewia tiliaefolia	0.013	0.053	0.126	0.249	0.427	0.649	0.916	1.240
Wrightia tinctoria	0.012	0.044	0.102	0.188	0.301	0.434	0.590	0.749
Rest of species	0.009	0.046	0.124	0.247	0.416	0.626	0.856	1.113

SECTION 5. ESTIMATION OF YIELD:

7.5.1. Yield On Clear felling Per Hectare:

Areas were clear felled for raising plantations under 5-year plan schemes. Marking abstracts for these areas were collected and the commercial yield on clear felling, separately for East *Melghat* division and West *Melghat* division was calculated and produced in the *P.P.Joshi's* plan are reproduced below.

Table 7.17
Table Showing Commercial Yield On Clear Felling Per Hectare

Girth-class Cm.	East *Melghat* Division				West *Melghat* Division			
	Teak		Non-teak		Teak		Non-teak	
	No.	Vol. cu.m	No.	Vol. cu.m	No.	Vol. cu.m	No.	Vol. cu.m
15 U 30	81.5	065	41.5	0.32	119.7	0.95	120.0	0.95
30 U 45	37.4	0.93	20.0	0.50	40.4	1.00	49.8	1.25
45 U 60	41.2	0.97	16.8	0.62	28.6	1.05	34.7	1.27
60 U 75	38.9	3.82	9.2	1.12	21.0	2.57	29.0	3.57
75 U 90	43.6	8.04	12.9	2.85	16.6	3.67	24.7	5.47
90 U 105	30.5	9.70	5.9	1.97	10.8	3.60	18.1	6.02
105 U 120	25.5	9.74	8.2	3.75	4.5	2.02	15.0	6.85
120 U 135	11.3	7.02	2.9	1.72	2.0	1.20	13.4	7.85
135 and over	12.7	7.92	4.0	2.92	1.6	1.15	14.5	10.70
Total	**322.6**	**48.16**	**121.4**	**15.77**	**245.2**	**17.21**	**319.2**	**43.93**
Grand Total	**No. of trees**		**444.0**		**564.4**			
	Volume		**63.93**		**61.14**			

PART – II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER I

BASIS OF PROPOSAL

SECTION 1.1. 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.

National Wildlife Action Plan (NWAP):

1.1.4. 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.

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

1.1.6. 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.

SECTION 1.2. : NATIONAL FORESTRY ACTION PROGRAMME (NFAP):

1.2.1. 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 developmental through qualitative and quantitative improvement in the forest resources.

1.2.2. 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 nonforest lands (2) peoples participation in plantations and its protection.

SECTION 1.3. FUNCTAIONAL CLASSIFICATION OF FORESTS:

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

1.3.2. 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.

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

1.3.4. Minor Forests: It includes forests that are interspersed with cultivated lands and are capable of producing small timber and fuel wood and provided grazing which are indispensable needs of adjoining agricultural works.
1.3.5. 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:

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

1.3.7. Remaining areas needed for other purposes.

1.3.8. 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.

1.3.9.Protection Forests: The category includes steep and precipitous slopes of *Ghatang* and *Chikhaldara* Range. Stocking is good in the entire area except *Chikhaldara* surroundings. It is proposed to treat the area with soil and moisture conservation works and by gap planting.

1.3.10. Tree Forest: This type of forest includes the better quality forests, capable of producing large sized timber having site quality III and IV, which are comparatively away from local habitations. They have been worked under SCI and Improvement Working Circle except areas under protected areas. They will be managed to produce large sized timber. 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 50%. These areas will be worked under SCI working circle and Teak Plantation Working Circle.

The area with mature crop having scanty regeneration will be worked under complete removal of over wood, followed by Artificial Regeneration of genetically superior species. These areas will be worked under Teak Plantation Working Circle. Part areas of *Anjangaon* Range will be managed to meet the local needs of small timber, poles and fuel wood. The growing stock is mainly of site quality IV a and IV b with patches of quality III. The density is 0.4 to 0.6. Natural regeneration is deficient in open areas. These forests have been worked under improvement and afforestaion W.C. under the previous plans. This forest will be continued to be managed under Improvement W.C. and afforestation W.C. Large-scale soil and moisture conservation works will be taken up in the open and eroded areas. NR will be induced, tended and supplemented with AR of suitable species.

Table No. 1.1:

Table Showing Functional Categories of Forests in East Melghat Division

Category	Area in ha.			Percentage
	R.F. (in ha.)	P.F.	Total	
Tree Forest	38177.36	16.60	38193.96	68.09
Protection Forest	17898.63	4.47	17903.10	31.91
Total	56075.99	21.07	56097.06	100

SECTION 1.4. FACTORS INFLUENCING OBJECTS OF MANGEMENT:

1.4.1. The forests are primarily Teak Forests in the nature and good in quality, having 50% proportion of valuable species, like teak, and need regeneration of valuable species in the stocking. A large chunk of forest tract is fully stocked, dense and needs proper tending of the crop.

1.4.2. 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.

1.4.3. A bulk of forest of the division adjoins the Protected Areas, namely, Gugamal National Park and Melghat Wildlife Sanctuary. Thereby, require treatment in conformity with the wildlife and bio-diversity conservation. The hilly topography of Melghat, steep slopes, species variation in the composition of crop with a change in the altitude is the salient feature of theMelghat. The topographical and biological biodiversity need to be taken care of while working these forests.

1.4.4. The bamboo is a most sought after forests produce in the division by local communities especially the burads. The uncontrolled bamboo extraction and Bamboo Flowering has resulted in shrinking of bamboo areas in the division. The bamboo areas require special focus and treatment to reverse this trend.

1.4.5. The forests suffer heavy biotic pressure, especially, uncontrolled grazing, resulting in trampled regeneration and compact soils, devoid of humus. Excessive grazing and uncontrolled fires are 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.

1.4.6. The NWFPs species form a substantial proportion of the forest crops that contribute substantially to the livelihood of local tribal communities. The forest areas rich in NWFPs require special thrust for their sustainable management and use in the interest of local communities, by involving them through JFMCs. Malnourishment among Tribal Children is a sensitive subject. Availability of NWFP will lead to nourishment of mothers as well as children, thus reducing malnourishment among them.

1.4.7. The whole taract is very hilly and is responsible for moderating climate in the region and brings rains to the plains down below. The tract contains valuable medicinal and endangered, rare plants and wildlife, which need to be preserved on first priority.

STATEMENT OF SIGNIFICANCE:

1.4.8. forest is a typical representative of Central Indian Highland forming a part of the Biogeographic zone '6 E-Deccan Peninsula'– Central Highlands (Rodgers and Panwar, 1988). This area constitutes forests, which are part of world's fifth biologically richest heritage country. The Reserve forms an important corridor between forest areas of Madhya Pradesh and Maharashtra ensuring contiguity of forests in *Satpuras*. It beholds one of the viable populations of tigers, the Royal Bengal Tiger, out of 5 surviving tiger species including all the Tiger range countries. Out of 237– 240 Tigers in Maharashtra, 75 - 80 i.e. about 30 % occur in Melghat forest only.

Catchments to 'Tapi ' and 'Purna ' rivers:

1.4.9. The Reserve forms a very important catchment to *Tapi* and *Purna* river systems with important tributaries like *Dolar, Khandu, Sipna, Gadga, Khapra* and Wan rivers. The *Chandrabhaga* River, which originates from *Chikhaldara* has its watershed in the reserve. The basic life support systems that the area beholds in terms of conserving soil, water and clean air, it serves as lifeline for the people of *Amravati*, and *Akola* districts.

Unique habitats harbouring rare and endangered wildlife

1.4.10 The forest forms an important extension of the *Satpura* hills into the West with its typical geological formations. It harbours a viable population of Tiger (*Panthera tigris)* and of the endangered *Gaur (Bos gaurus).* It also harbours a number of other faunal species some of which figure in the IUCN Red Data List. These are Wild dogs (*Cuon alpinus),* Jackal,*(Vulpes bengalensis),* Sloth bear *(Melurus ursinus),*Leopard *(Panthera pardus),* Caracal, *(Felis caracal)* and Ratel, (*Mellivora capensis).* There are 37 species of mammals and several species of reptiles, butterflies and insects. The reserve is also very rich in avifauna with 264 species of birds including the recently rediscovered Forest Spotted Owlet (*Athene belwitii).*

Rare endemic flora typical of Western Ghats and north Himalayas:

1.4.11 More than 718 naturalised species are listed in the flora of Melghat belonging to about 400 genera representing 97 families. It includes 90 tree species, 66 shrub species, 316 herb species, 56 climbers, 23 sedges and 99 grass species. The flora shows a combination of floristic elements from Western Ghat and *Satpura*, with many endemic species. Some of the Himalayan plant species like *Preistylus constrictus* are also reported here. The rare plants include *Convolvulus flavus, Utricularia striatula, Drosera indica* and many species of orchids like *Vanda tesselata* and *Aerides maculosum.*

Evidences of temperate Flora:

1.4.12 Quite suprisingly, there are enough evidences of presence of even temperate flora in the Reserve which are found in East and North East India, Himalayas, Jammu, Kashmir and Hills of Uttar Pradesh. *Peristylus constricts, Apium graveolens, Morchella conica, Geranium mascatens, Senecio chryanthemoides* are such examples. Species with extremely restricted distribution, *Achyranthes coynei* or the species *Ceropegia oculata* which is endemic to *Maharashtra* and is also endangered are speaking examples of the rich and varied habitat this Reserve provides to a variety of plant species. The forests also provide niche to insectivorous plant species like *Drocera indica,* rare species like *Sruithia bigemia*, medicinally important plants like *Habenaria* and *Senecio* spp. A varied and interesting orchid flora also inhabits forests of this Reserve.

Rich in avifauna:

1.4.13. The area has a diverse population of bird life with 265 species. Because of the role it plays in conservation, it is categorized prominently under **Global Important Bird Area (IBA).** Species like Lesser kestrel, Forest owlet, Green munia, White Backed Vulture and Long Billed Vulture which are reported in. The **congregative bird species** include Blossom Headed Parakeet, Rose Ringed Parakeet, **Biome Restricted species** conforming to Biome 10:B24 Indian Peninsula Tropical Moist Forest include Crimson Fronted Barbet and Malabar whistling thrush whereas the Biome 11: Indo Malayan Dry Zone includes 39 bird species.

Home for Flying squirrel, hornbills, Forest owlet, vulture and otters:

1.4.14 There are many species of reptiles, butterflies, insects, and fish inhabiting this Reserve. Ecologically sensitive animals like Flying Squirrel is abundantly seen here which is an example of close canopied and dense forest of old growth. Inhabitation by Grey Hornbills also supports this authentication. Pied hornbill is also reported in the area. Forest owlet, once thought to be extinct, has reappeared here, in one of the prominent forests of the Reserve, where it was rediscovered, after a significant gap of many years. Long billed and White Backed Vultures which are fast disappearing probably because of some mysterious microbial disease or indiscriminate use of pesticides and insecticides is seen breeding in *Panchbol* and *Bhimkund* areas abutting the Reserve area. The embankments of *Tapi, Khapra* and some '*doh*' in 'Koktu' valley are also reported to harbour Crocodiles and Otter.

Historical Vairat, Gavilgarh and Narnala forts in and around:

1.4.15 The Gavilgarh fort and Vairat points in the vicinity of Chikhaldara hill station, which is on the fringe of the Melghat forest, have important historical significance. The Nature Interpretation complex established at *Semadoh* in 1988 is unique in the country and attracts large number of nature lovers and tourists, particularly in the open season. The complex has museum, theatre, dormitory hutments, canteen and three buses for wildlife observation, to cater the needs of tourists, all beautifully nestled in the scenic landscape and ethnic surrounds of *Semadoh* forests and *Sipna* banks. Needless to mention that the area has a viable population of Tiger, which has a global significance. Ratel, Mouse deer and Forest owlet noticed in Melghat forest can be said to be of regional significance. The Crested eagle and Hawk eagle's presence in Melghat forest indicates ecological sustenance of the area. These two birds have therefore state level significance. Flying squirrels and Gaurs are flagship species of Melghat forest. Melghat forest, due to effective protection and management from 1974 has become an ideal habitat for Tigers in the state.

Topographical diversity and natural as abundance

1.4.16 Forest of this Reserve hold tremendous scope in recreation as well as education in its lush green vegetation, diverse fauna and hilly and rugged terrain. The area is visited by a number of tourists from all walks of life who try to fathom into the enticing realms of these pristine forests. They try to quench their thirst of knowledge in Ethnobotany, birds and butterfly identification, nature photography, wilderness experience and nature awareness. They also get attracted towards trekking, nature trails, scenic landscapes, culture of tribal people etc.

SECTION 1.5. GENERAL OBJECTS OF MANAGEMENT:

1.5.1. 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. To preserve the catchments of rivers originating from Melghats, which forms the lifelines of the people of A*mravati Akola* and *Wardha* districts.

2. To meet the expectations of wild life protection and biodiversity conservation with a view to conserve and maintain the gene pools in the natural forests.

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-wood produce, small timber and other construction wood required for meeting local household demands, particularly of the tribal 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.

7. To protect the ecologically fragile and sensitive Melghat ecosystem and to maintain the forests as a buffer to Tiger reserve, to preserve gene pool, endemic, medicinal, rare and endangered plants and wildlife.

SECTION 1.6. TREATMENTS PRESCRIBED:

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

1.6.2. 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.

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

1.6.4. Suitable tending and soil working operations will be carried out to stimulate the growth of the naturally regenerated seedlings.

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

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

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

1.6.8. 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.

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

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

1.6.11. Special habitat management for wildlife conservation will receive high priority. Riparian zones and mesic sites, important for wildlife management, will receive added protection and treatment. Adequate buffer will be provided to such sites while preparing treatment maps for coupe extraction. 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.

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

1.6.13. Preference will be accorded to natural regeneration and rootstock management. Natural regeneration and promising coppice growth will receive suitable tending and soil working to stimulate growth and development. Areas having good natural regeneration of valuable species shall be protected form fire and grazing. Artificial regeneration is inadequate or is not likely to succeed.

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

1.6.15. 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.

1.6.16. 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.

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

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

1.6.19. Forests capable of producing large sized timber will be harvested under the selection-cum-improvement management system.

1.6.20. 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 1.7. ANALYSIS AND VALUATION OF THE CROP:

1.7.1. The first stage analysis of forest crop is based on the species and tree girth distribution obtained form the enumeration data and density distribution observed in satellite imageries. It shows that number of trees have increased marginally in all working circles. A comparative statement of enumeration of sri Sinha's plan and current plan are given below, it shows that trees of 10 important species have shown increase in number as well as volume except for *bija.* In addition to this it is observed that on an average 1 Cu.m./ha./yr of increment was added.

Table No. 1.2
Table Showing Comparative Statement Of No. Of Trees/Ha.
And Their Volume In Cu.M.

Enumeration during Sinha's plan **Enumeration during Current plan**

Sr. No.	Name of Species	No. of Trees /ha.	Volume in Cu.Metre	No. of Trees/ha.	Volume in Cu.Metre	Difference	
						No. of Trees /ha.	Volume in Cu.Metre
1	2	3	4	5	6	7	8
1	Ain /Sajad	6.42	2.944	8.20	4.497	1.78	1.553
2	Bija	1.10	0.656	0.69	0.184	0.41	0.472
3	Lendia	13.34	3.567	17.82	4.126	4.48	0.559
4	Sivan	0.13	0.012	0.45	0.055	0.32	0.043
5	Teak	157.74	29.317	156.59	34.222	0.95	4.905
6	Tiwas	8.96	1.229	7.68	1.184	1.28	0.055
7	Haldu	5.12	1.675	8.66	2.525	3.54	0.850
8	Kalam	2.80	0.827	4.75	1.570	1.95	0.743
9	Khair	0.56	0.030	2.58	0.344	2.02	0.314
10	Salai	0.20	0.076	1.85	1.035	1.65	0.959
	Total	196.37	40.333	111.37	49.742	18.38	10.453

1.7.2. Areas susceptible to high erosion and falling in the catchments of large water bodies are included in the Protection Working Circles (PWC).

1.7.3. Compartments having matured crop with little regeneration but potentially capable of producing good teak plantations are included in the Teak Plantation Working Circle.

1.7.4. 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.

1.7.5. Compartments having preponderance of pole crop, dense tree cover with inadequate mature trees are allotted to Improvement Working Circle (IWC). These compartments are expected to produce poles, small timber and firewood.

1.7.6. Areas having sparse tree crop, open areas with tree growth and isolated small forest patches are included in the Afforestation Working Circle (AWC). 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 as well as Afforestation of open areas and isolated patches. The term Afforestation includes reforestation and management of existing rootstock.

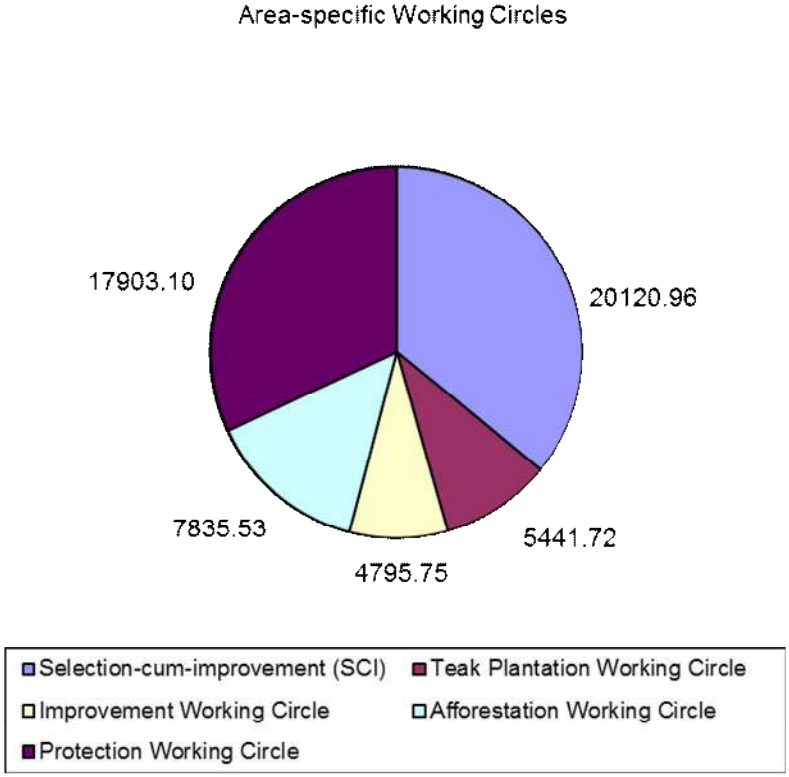
1.7.7. Bamboo patches are dispersed in the division, but mainly found in the northern parts. Compartments having more than 10 bamboo clumps per hectare are included in the Bamboo Overlapping Working Circle (BMB).

SECTION 1.8. WORKING CIRCLES AND THEIR DISTRIBUTION:

1.8.1. 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 five overlapping working circles are prescribed. The details of the compartments allotted to working Circle Range wise and their areas are given in the **Appendix No. XVIII** of Volume II of this plan.

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

	Area-specific Working Circles (Ha.)		% of Area
1	Selection-cum-improvement (SCI)	20120.96	35.88
2	Teak Plantation Working Circle	5441.72	9.70
3	Improvement Working Circle	4795.75	8.55
4	Afforestation Working Circle	7835.53	13.97
5	Protection Working Circle	17903.10	31.90
Total		**56097.06**	**100.00**



	Overlapping Working Circles (Ha.)		
6	Bamboo (Overlapping) Working Circle	30936.81	55.16
7	Wildlife (Overlapping) Working Circle	56097.06	100
8	NTFP (Overlapping) Working Circle	56097.06	100
9	JFM (Overlapping) Working Circle	56097.06	100
10	Forest Protection (Overlapping) Working Circle	56097.06	100

1.8.2. Owing to reorganization of the Forest areas, merging the part areas of erstwhile East, West and South Divisions formed the Present East Melghat Division. However, the areas are continued to be worked under the same Working Circles that were prescribed in the earlier plans. Teak Plantation Working Circle is carved out from the suitable SCI Working Circle areas.

1.8.3. The SCI areas are largely concentrated in Jarida Range, part in *Ghatang* Range (*Tawra* F.S.) and part in *Anjangaon* Range (*Khongda* F.S.). Teak Plantation Working Circle is distributed in *Jarida* and *Ghatang* Range. Bamboo overlapping Working Circle is distributed in *Jarida* and *Ghatang* Ranges. Range wise Distribution of Working Circles and their areas are given in the **Appendix No. XVIII** of Vol. II of this plan.

Table 1.4.
Selection-cum-improvement Working Circle

Range	Total (ha.)
Jarida	14203.41
Ghatang	4365.87
Chikhaldara	-
Anjangaon	1551.68
Total	**20120.96**

Table 1.5.
Teak Plantation Working Circle

Range	Total (ha.)
Jarida	3941.16
Ghatang	1500.56
Chikhaldara	-
Anjangaon	-
Total	**5441.72**

Table 1.6.
Improvement Working Circle

Range	Total (ha.)
Jarida	-
Ghatang	-
Chikhaldara	-
Anjangaon	4795.75
Total	**4795.75**

Table 1.7.
Afforestation Working Circle

Range	Total (ha.)
Jarida	-
Ghatang	-
Chikhaldara	-
Anjangaon	7835.53
Total	**7835.53**

Table 1.8.
Protection Working Circle

Range	Total (ha.)
Jarida	-
Ghatang	6942.41
Chikhaldara	10960.69
Anjangaon	-
Total	**17903.10**

Table 1.9.
Bamboo (Overlapping) Working Circle

Range	Total (ha.)
Jarida	18833.94
Ghatang	12102.87
Chikhaldara	-
Anjangaon	-
Total	**30936.81**

Table 1.10.
Wildlife (Overlapping) Working Circle

Range	Total (ha.)
Jarida	18144.57
Ghatang	12808.84
Chikhaldara	10960.69
Anjangaon	14182.96
Total	**56097.06**

Table 1.11.
JFM (Overlapping) Working Circle

Range	Total (ha.)
Jarida	18144.57
Ghatang	12808.84
Chikhaldara	10960.69
Anjangaon	14182.96
Total	**56097.06**

Table 1.12.
Protection (Overlapping) Working Circle

Range	Total
Jarida	18144.57
Ghatang	12808.84
Chikhaldara	10960.69
Anjangaon	14182.96
Total	**56097.06**

Table 1.13. NTFP
(Overlapping) Working Circle:

Range	Total
Jarida	18144.57
Ghatang	12808.84
Chikhaldara	10960.69
Anjangaon	14182.96
Total	**56097.06**

SECTION 1.9. BLOCKS AND COMPARTMENTS: The Reserved Forests of the division is distributed in 261 compartments. In addition to this the Ex-*Jahagir* Forest of 9 villages and *Chinchona* 'C' Class Forests are with S. No's. The areas transferred to forest department, as part of compensatory afforestation are also bearing S. No. only. The details of the Reserves and their areas are given in the Chapter 1 of part 1 of this draft plan.

Table No. 1.14
Table Showing Distribution Of Forest Compartments
Under Various Working Circles

Area-specific Working Circles	Reserved Forests	Protected Forests	Total number of Compartments
Selection-cum-improvement Working Circle	115	-	**115**
Teak Plantation Working Circle	28	-	**28**
Improvement Working Circle	20	-	**20**
Afforestation Working Circle	18 (Ex-*Jahagir* 9 villages) (*Chinchona* 'C' class 1 village)	-	**18**
Protection Working Circle	80	-	**80**
Total	**261**	**-**	**261**

SECTION 1.9. PERIOD OF PLAN:

1.9.1. This plan was initially sanctioned 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 Protection 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 Chief Conservator of Forests (Territorial) *Amravati* Circle.

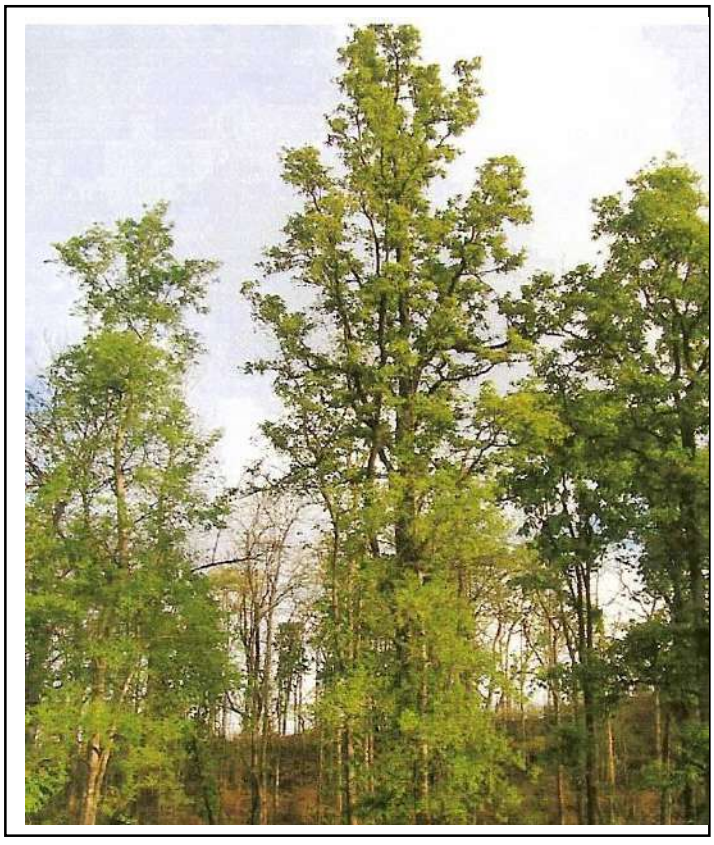
The Principal Chief Conservator of Forests (Production and Management), Maharashtra State, Nagpur supported the supplementary instructions based on proposal from Chief Conservator of Forest (T), Amravati. The said review was taken up by the State Level Committee in its meeting held on 25/09/2014, when the Chief Conservator of Forests (T), Amravati presented the PWPR. It was decided by the State Level Committee that the PWPR prepared for East-Melghat should be modified in the form of Mid-Term Review report and it should be sent with the extension proposal as mentioned above for onward transmission to GoI for approval as there is no need to go for preparation of next Working Plan when the existing system is giving the desired result so that balance X coupes i.e. Coupe Number XI-XX may also be worked accordingly.

TPWC RANGE- JARIDA, ROUND-KHARI, BEAT - TEMBRU,
COUPE- I COMPT. NO. 380,
LATITUDE- N21.4416.7'', LONGITUDE-E077'27'10.5" (1)

TPWC RANGE- JARIDA, ROUND-KHARI, BEAT - TEMBRU,
COMPT. NO. 380(P), COUPE NO- III,
LATITUDE- N21.44'17'', LONGITUDE-E77 26'58.7"

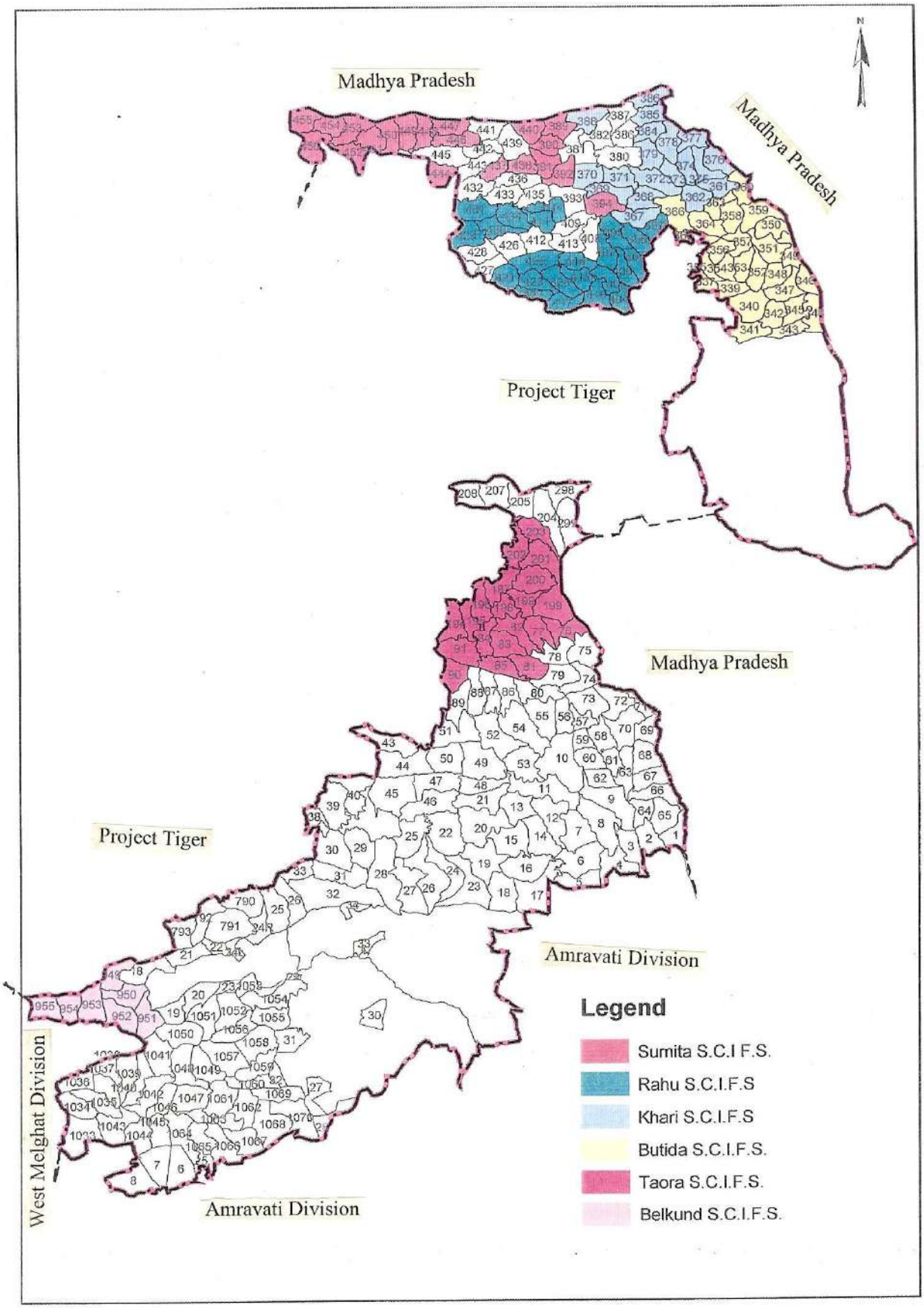
SELECTION CUM IMPROVEMENT W.C.

Teak Forest of Taora F.S. of Ghatang Range of Compt. No.198



Teak Forest of Compt. No. 431
Showing The Best Site Quality Of East Melghat Division

Selection cum Improvement Working Circle of East Melghat Division



CHAPTER-II

SELECTION CUM IMPROVEMENT WORKING CIRCLE

SECTION 2.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

The details of Coupe-wise area and results of operations are summarised as under :-

Table No. 2.1.

(Area in ha.)

S. No.	Coupe No.	Year	Total Area	Area not tackled due to being within 10 km from the PA	Yield cu.m. per ha.		
					Teak	Non Teak	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	I	2006-07	971.20	362.37	3.859	1.781	5.640
2	II	2007-08	864.96	362.98	4.210	0.798	5.008
3	III	2008-09	830.21	426.88	3.443	0.748	4.191
4	IV	2009-10	894.67	245.25	4.858	0.484	5.342
5	V	2010-11	1201.54	425.25	0.918	0.096	1.014
6	VI	2011-12	1013.74	317.41	3.533	0.133	3.666
7	VII	2012-13	850.01	258.33	3.203	0.198	3.401
8	VIII	2013-14	930.73	270.10	1.054	0.066	1.120
9	IX	2014-15	882.02	425.81	3.977	0.494	4.471
Total			**8439.08**	**3094.38**	**29.055**	**4.798**	**33.853**

2.1.1. It may be seen that the yield from Non-Teak species is almost insignificant, whereas that from Teak species ranges from almost 1 Cum/ha to 5 Cum/ha. However, considering the special objectives of management, the prominent objective is to obtain big size timber and to increase the stocking of Teak and other valuable species with assistance of natural regeneration stipulated by the artificial regeneration.

2.1.2 Regarding areas under category "D"

This area has been divided into two categories namely D1 and D2. D1 area is supposed to contain more than 625 seedling/ha. However, it has been observed that practically no such area is available in this category. The classification in to D1 and D2 area is also difficult to explain to the lower level field staff. Almost entire area is without adequate regeneration. Thus the area other than A,B,C category be construed as "D" area, where Natural Regeneration should be encouraged by Natural Regeneration techniques as per the existing prescriptions. It may also be highlighted that the Principal Chief Conservator of Forests (Production and Management) vide his letter No. D-14/WP/NR&AR/ (13-14)/ 721, Dt. 25th October, 2013 **(Appendix- LXXI)** has issued detailed guidelines in respect of Natural Regeneration techniques. The same may be adopted henceforth.

The completely open patches of at least 6 ha size should be optimally utilized by planting shade intolerant local species, preferably Teak.

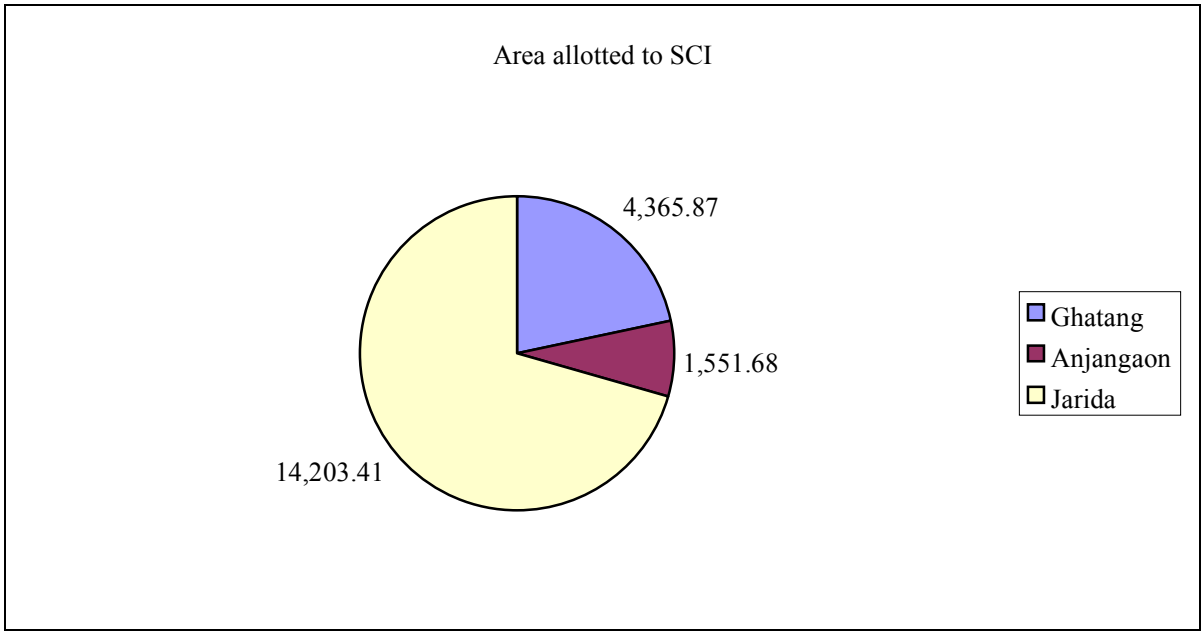
2.1.3. As indicated in the Table above, almost 37% of area has not been tackled at all on the ground of following within 10 Kms. from the boundaries of National Parks and Sanctuaries. Within the remaining area, which has been worked under these working circles, it has been observed that wherever canopy has been opened, the regeneration of teak and its associates has been improved. Thus, operations prescribed should be continued as per the Schedule given in the present plan.

SECTION 2.2. : GENERAL CONSTITUTION

2.2.1. The Selection Cum Improvement Working Circle includes areas of this division, which were worked under SCI in the last plan. The area details are as under.

Table No 2.2.
Table Showing The Distribution Of Areas Range wise

Sr. No.	Range	Total Area (ha.)	Area allotted to SCI (ha.)	Compt. (Nos.)	Remarks
1	*Chikhaldara*	10,951.23	-	-	*Bahadur's plan*
2	*Ghatang*	12,808.84	4,365.87	19	*Sinha's pan*
3	*Anjangaon*	14,182.96	1,551.68	7	*Thengdi's plan*
4	*Jarida*	18,144.57	14,203.41	89	*Sinha's plan*
	Total	**56,087.60**	**20,120.96**	**115**	



The forests under SCI are capable of producing large size timber, poles and firewood. The site quality of the forest is generally of site quality III, having crown density more than 0.4 .

SECTION 2.3. : GENERAL CHARACTER OF VEGETATION:

2.3.1. The forests of **East *Melghat* Division belong** to "Southern Tropical Dry Deciduous Forests" 5A/C1a type and mostly belonging to site quality III. Site Quality III occurs on hill slopes whereas **quality II/III occurs along the drainage of the valleys**. The density and quality is found to improve in valleys and along nallas.

2.3.2. Generally the crop is a mixture of all age classes with crop density varying 0.4 to 0.7. The crop is mostly of seed origin, having straight and sound bole. Density wise (number of stems per ha.) mature and middle girth classes predominate.

2.3.3. Teak is the dominant species constituting 50% of the forests. At places, patches of pure teak can also be seen. The associates of teak are *lendia, haldu, ain, tiwas, kalam, khair, salai, dhawda, dhaman, tendu, mango, jamun, karu* etc. Where moisture in the soil is high species such as *arjun, mango, jamun* etc., have high proportion. Proportion of *tiwas* increases on flat hill tops. Lantana as a weed is present in the entire tract. The shrubs in the area consist of *murudphal, bhandar, nirgudi, khirsali, baibarang, gurguti, gokharu, pithodi* etc. The grass species found are *pochati, gondhali, kusal, sainar* etc.

Status of Regeneration:

2.3.4. Forest Resources Survey Unit, Amravati, collected the regeneration data. The results are tabulated as below.

Table No. 2.3.
Table Showing The Status Of Regeneration of Teak And Miscellaneous Species

Species	R1	R2	R3	Total r
Teak	16.98	46.40	8.92	54.93
Non teak	232.22	213.62	33.72	380.24
Total	250.20	260.02	42.64	435.17

R1= 0.3M to 1.0 M, R2 = 1.0 M to 3.0 M, R3= 3.0M and above (M-height of the plants in Meters)

2.3.5. From the above data it is inferred as below.

1) Recruitment of Teak and Misc. species is 13% and 87% respectively.
2) 14% of the recruitment of teak is establishing. Whereas 7% that of Misc. species is establishing.

2.3.6. Regeneration of Teak is scanty. Regeneration of miscellaneous species is moderate but only 7% of miscellaneous species 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 its establishment is fairly better than miscellaneous species. Due to hacking, trampling and grazing of miscellaneous species, few plants are establishing. Because of lantana, regeneration of teak is scanty. In the valleys, where moist conditions are occurring, *Mahul* climbers are noticed.

SECTION 2.4. : 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 and rapid run off of rainwater through soil and moisture conservation measures taken up on the basis of watershed models and conservation of existing forests on the fragile and ecologically sensitive slopes.

SECTION 2.5. : COMPARTMENTS AND FELLING SERIES:

2.5.1. Total 115 compartments have been allotted to this working circle. They are divided into 6 felling series having 20 coupes in each of them. The average area of the coupe is 170ha. Coupe boundaries will be mostly natural features, so that boundary demarcation problems will be minimized.

Table No. 2.4.
Table Showing Number Of Felling Series and Compartments and Their Areas Range wise

Range	No. Of Compts SCI	No. Of Felling Series	Area under SCI(ha)
Ghatang	19	1	4,365.87
Anjangaon	7	1	1,551.68
Jarida	89	4	14,203.41
Total	**115**	**6**	**20,120.96**

Table No. 2.5.
Table Showing The Distribution Of Area Felling Series wise

Range	Name of Felling series	Area of Felling series	Compartments included
Ghatang	*Taora*	4365.87	76,77,81 to 85, 90, 91, 194 to 203 (19 Compts)
Anjangaon	*Belkund*	1551.68	949 to 955 (7 Compts)
Jarida	*Butida*	4012.65 16.60	337, 339, 340 to 360, 363 to 366 (27 Compts)
	Khari	3033.53	361, 362, 367 to 379, 384 to386, 388 (19 Compts)
	Rahu	4031.80	395 to 397, 401,404 to 407,410,411, 414 to 417, 421 to 425, 429 to 431, 434. (23 Compts)
	Sumita	3125.43	389 to 392, 394, 437,438,440, 444,446 to 456 (20 Compts)
Total		**20120.96**	**115**

SECTION 2.6. : ANALYSIS AND VALUATION OF CROP

(i) Stock Mapping: The stock maps of the P. P. *Joshi*'s working plan were updated by using satellite imageries, enumeration data and by ground truth verification. Table 2.6 shows the abstract of results of stock mapping for the areas allotted to this Working Circle. Of the total forest allotted to this Working Circle Teak forest covers 79% of area. Teak plantation forms only 1.1%. Mixed forest is 10.91%. Blanks, cultivation, under stocked and not stock mapped areas are 8.9% of the total area.

(ii) III Quality is predominant in this forest. The extent of forest is 16,437 ha. Out of this teak is 65.9% and Mixed forest is 7.7%.

(iii) Age and Density: The crop is a mixture of all age classes. The middle and mature girth classes predominate. The crop density varies from 0.4 to 0.7. Around 73.49% of area is above 0.4 density. The blank and under stocked areas existing in the compartments have also been included in the working circle.

(iv) 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 0.36ha. **The results of enumeration** are given in the statements I, II, III and IV of **Appendix No. XV** Volume II of this plan. Abstract of growing stock under various girth classes is given in the table no.2.8 . The data reveals that 42% is teak and *Lendia* is 4.76%. *tiwas, sajad* and *haldu* having 2% each. Overall the growing stock is less than the Normal growing stock, the details are shown in the table 2.8b. Forest type wise site qualities and their area distribution are given in the table no.2.6a and crown density wise area distribution is given in the table no. 2.6b.

Table No 2.6a
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	II	5.5366	0.03
	III	13475.3737	69.30
	IVa	1256.8493	6.46
	IVb	633.5228	3.26
	Total	**15371.2824**	**79.05**
Mixed	III	1778.5885	9.15
	IVa	211.9504	1.09
	IVb	131.1419	0.67
	Total	**2121.6808**	**10.91**
Salai	III	4.8127	0.02
	IVb	5.7152	0.03
	Total	**10.5279**	**0.05**
Old Plantation	-	210.0299	1.08
	Grand Total	**17713.521**	**91.10**
Under stocked	**-**	1319.1207	6.78
Not stock mapped	**-**	411.5986	2.12
	Total	**19444.2403**	**100**

Table No 2.6b
Table Showing Crown density data obtained with the help of satellite imagery

Category	Area in ha.	% to the total area of the working circle	Remark
Well stocked	14784.4676	73.49	
Understocked	4393.2502	21.83	
Blank	239.3605	1.23	
Waterbody	4.8492	0.02	
Others	22.3129	0.11	
Total	**19444.2403**	96.63	
Area of W.C.	**20120.96**	100	
Difference	**676.719**	3.36	

Table No. 2.7.
Table Showing Enumeration Data Of Number Of Trees Per Ha In SCI

Period of Enumeration Oct 2002 to Jan 2003 **Total area covered - 25644.89 ha**
Area enumerated_240.84 ha **Intensity of Sampling_ 1%**

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	29.08	18.33	7.72	67.87	31.11	18.01	96.95	25.73
2	31/45	24.00	15.12	6.37	43.34	19.87	11.50	67.34	17.87
3	46/60	19.18	12.09	5.09	26.53	12.16	7.04	45.71	12.13
4	61/75	19.33	12.18	5.13	21.11	9.68	5.60	40.44	10.73
5	76/90	19.30	12.16	5.12	17.43	7.99	4.63	36.73	9.75
6	91/105	19.50	12.29	5.17	14.16	6.49	3.76	33.66	8.93
7	106/120	13.54	8.53	3.59	10.23	4.69	2.71	23.77	6.31
8	above120	14.76	9.30	3.92	17.48	8.01	4.64	32.24	8.56
Total		**158.69**	**100.00**	**42.11**	**218.15**	**100.00**	**57.89**	**376.84**	**100.00**

(v) Analysis of growing stock: Teak in various higher girth classes (46-75 onward) has shown an increase in number due to conservation efforts. Whereas lower girth classes has shown decrease in number as compared to *Sinha*'s plan. It is attributed due to poor recruitment and no establishment of teak regeneration. The number of miscellaneous trees/ha has increased marginally in all girth classes, compared to Shri *Sinha*'s plan period.

Overall the growing stock has improved from 290 trees/ha to 376.8 trees/ha. But around 32.2 trees/ha are there in the harvestable girth class and above showing that excessive tree numbers than the required one. By removing the surplus and better management practices shall yield recruitment in the lower girth classes. Girth class wise distribution of basal area and its graph also shows that lower girth classes are having less basal area and surplus in the higher girth classes. The deficit of basal area in lower girth classes shall be improved by adopting better management interventions.

Table No. 2.8a
Table Showing Comparative Statement Of Number Of Trees Enumerated Recently Versus Enumeration Results Of *Sinha*'s Plan

Sr. No.	Girth Class cm.	Teak stems/ha		Non teak stems/ha		Total No. of stems/ha	
		Current Enumeration record	Sinha's plan	Current Enumeration record	Sinha's plan	Current Enumeration record	Sinha's plan
1	2	3	4	5	6	7	8
1	15/30	29.08	35.55	67.87	40.00	96.95	75.55
2	31/45	24.00	27.19	43.34	28.27	67.34	55.46
3	46/60	19.18	18.07	26.53	11.30	45.71	36.37
4	61/75	19.33	18.50	21.11	15.56	40.44	34.06
5	76/90	19.30	17.14	17.43	11.07	36.73	28.81
6	91/105	19.50	15.74	14.16	8.39	33.66	24.13
7	106/120	13.54	11.71	10.23	5.10	23.77	16.81
8	Above 120	14.76	13.11	17.48	5.07	32.24	20.18
Total		**158.69**	**157.01**	**218.15**	**123.76**	**376.84**	**290.771**

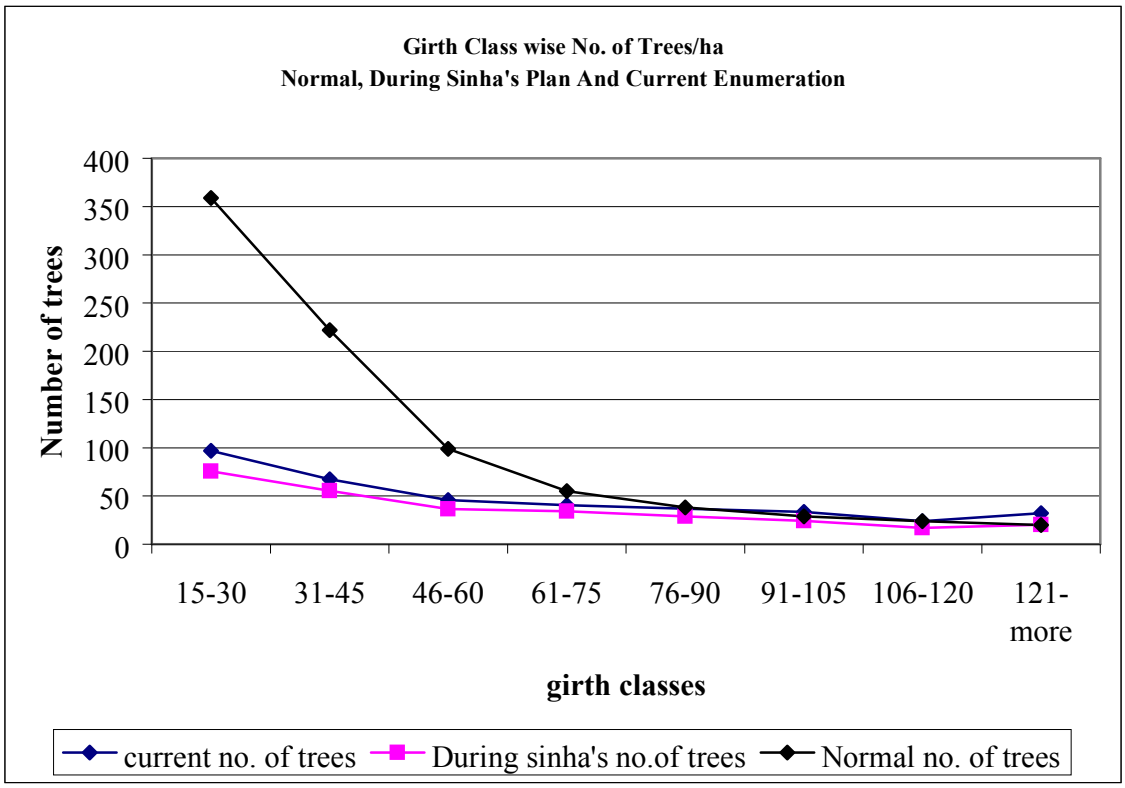
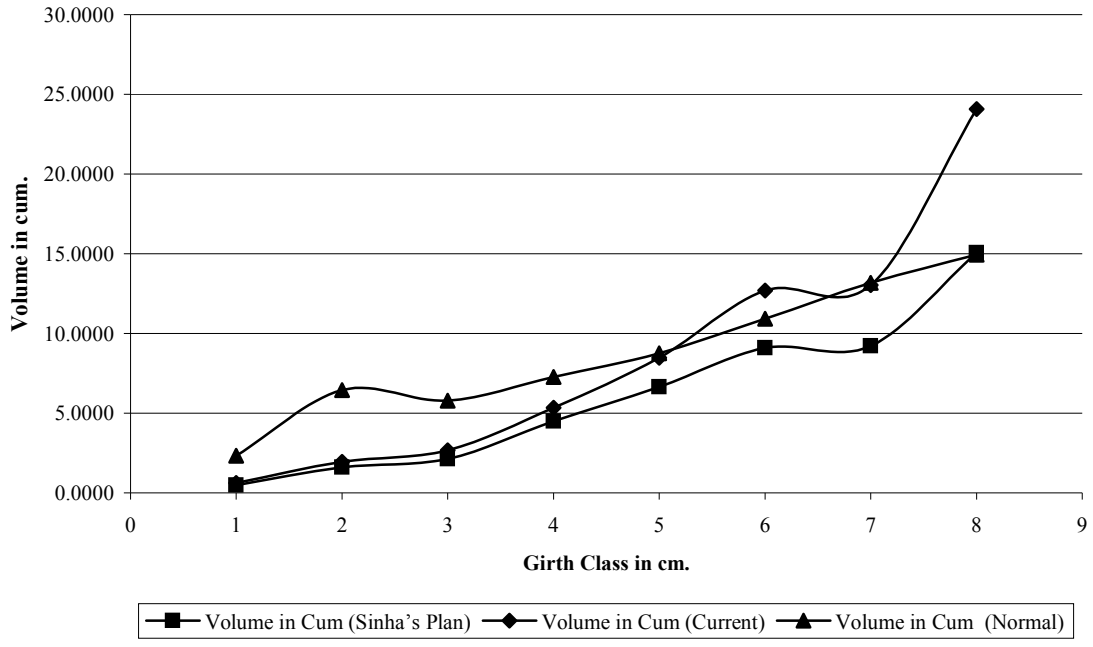


Table No. 2.8b
Table Showing Growing Stock
(Current, Sinha's Plan Enumeration Results and Normal Growing Stock for Site Quality III)

Girth Class in cm	Current No. of Trees	Sinha's No. of Trees	Normal No. of Trees	Mid-girth	B. A. / tree in sq. m.	Volume in Cum./ tree	B. A. (Current) in sq. m.	Volume in Cum (Current)	B. A. (Sinha's Plan) in sq. m.	Volume in Cum (*Sinha's* Plan)	B.A. Normal in sq. m.	Volume in Cum (Normal)
15-30	96.95	75.55	359	22.5	0.004	0.007	0.3905	0.6302	0.3043	0.4911	1.4461	2.3335
31-45	67.34	55.46	222	37.5	0.0112	0.029	0.7535	1.9529	0.6205	1.6083	2.484	6.4380
46-60	45.71	36.37	99	52.5	0.0219	0.059	1.0025	2.6740	0.7976	2.1276	2.1711	5.7915
61-75	40.44	34.06	55	67.5	0.0363	0.132	1.4661	5.3381	1.2348	4.4959	1.9939	7.2600
76-90	36.73	28.81	38	82.5	0.0542	0.231	1.9891	8.4663	1.5602	6.6407	2.0579	8.7590
91-105	33.66	24.13	29	97.5	0.0756	0.377	2.546	12.6898	1.8252	9.0970	2.1935	10.9330
106-120	**23.77**	**16.81**	**24**	**112.5**	**0.1007**	**0.549**	**2.3937**	**13.0378**	**1.6928**	**9.2203**	**2.4169**	**13.1640**

The table for growing stock its graph shows that larger volume is accumulated in the higher girth classes as compared to Normal distribution particularly above 90cm. girth classes. It also clearly shows that there is a deficiency in the volume till the girth classes of 76-90 cm.

Girthwise Distribution Of Volume in cum
(Current : Sinha's Plan : Normal)



SECTION 2.7. : SILVICULTURAL SYSTEM:

2.7.1. The Selection cum Improvement will be the Silvicultural System as was in the last plan. The main object of SCI will be to produce big sized timber. Natural Regeneration will be induced and encouraged through rigid fire protection, uprooting of lantana and grazing control.

SECTION 2.8. : FELLING CYCLE:

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

SECTION 2.9. : HARVESTABLE GIRTH:

2.9.1. Stem Analysis for Teak has been carried out, for site quality II/III tree. The CAI and MAI cuts at 106 years of age corresponding g.b.h. is 144cm. For quality III teak tree of *Dhulghat* Range in West *Melghat* Division, the CAI and MAI cuts at 88 years of age corresponding g.b.h. is 107 cm. *Dhulghat* area being close to East *Melghat* Division area, the data is utilized for East *Melghat* Division. Most of the teak crop belongs to quality III. Therefore to have conservative fellings, the harvestable girth shall be 120 cm. and 150 cm. for site quality III, IV and II/III, II areas respectively. The harvestable girth for the miscellaneous species *bija*, *ain, haldu, kalamb, dhavda*, and *salai* are fixed at 120cm. 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 2.10. : FORMATION OF THE FELLING SERIES:

2.10.1. There shall be 20 coupes in each Felling Series. The forests of this working circle have been divided into 6 felling series. Total coupes will be 6 x 20 = 120 Coupes in SCI working circle. Details are given in **Appendix No. XIX** Volume II of this plan.

SECTION 2.11. : REGULATION OF YIELD:

2.11.1. The annual yield shall be regulated by area. The coupes are neither equi-extent nor equi-productive but this will not affect the market price or the revenue. The felling cycle being 20 years the annual yield and revenue would not go down.

2.11.2. 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.

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

2.11.4.Enumeration: No. of teak trees as per the current enumeration are as under.

Table No 2.9.

Girth class cm.	No. of trees/ ha.
15/30	29.08
31/45	24.00
46/60	19.18
61/75	19.33
76/90	19.30
91/105	19.50
106/120	13.54
Above 120	14.76

2.11.5 Survival Percentage: The percentage of trees that will be reaching the harvestable girth will be calculated on the basis of no. 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 2.10.

Girth classes in cm		Tree no./ ha (de liocourt)	Survival percentage for reaching harvestable girth
VIII	15U30	29.08	55.74
VII	30U45	26.08	60.60
VI	45U60	23.40	65.87
V	60U75	20.99	71.60
IV	75U90	18.82	77.86
III	90U105	16.88	84.65
II	105U120	15.14	92.00
I	Above 120	13.58	100.00

2.11.6. 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 2.11

Girth classes	I	II	III	IV	V	VI	VII	VIII
Survival %	100	89.7	80.5	72.2	64.7	58.1	52.1	46.7
Proportionate Initial Availability	100	108.69	118.13	128.44	139.66	151.81	165.02	179.40
Fraction Surviving when reaching next class	-	0.92	0.92	0.92	0.92	0.92	0.92	0.92

Table No. 2.12.
Average Annual Recruitment (Rn)

Class	Tree reaching class I		Years in class		Average Annual recruitment (Rx)
	%	No.			
I	100	_	_	_	_
II	89.7	13.93	13	t_2	1.07 (R_2)
III	80.5	14.29	12	t_3	1.19 (R_3)
IV	72.2	14.65	11	t_4	1.33 (R_4)
V	64.7	15.03	9	t_5	1.67 (R_5)
VI	58.1	15.41	8	t_6	1.93 (R_6)
VII	52.1	15.80	8	t_7	1.97 (R_7)
VIII	46.7	16.21	8	t_8	2.03 (R_8)

v) Recruitment in Successive Cycle: -

Felling Cycle 20 years

Table No 2.13.
Recruitment in Successive Cycle

Felling Cycle Total	Total Recruitment During Felling Cycle (fRn)
1	$13R_2 + 7R_3 = 22.26$
2	$5R_3 + 11R_4 + 4R_5 = 27.26$
3	$5R_5 + 8R_6 + 7R_7 = 37.58$

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

$Rrn = ½[f R^{n.} an (R^n - R_x)]$
$Ran = fR^n - R_{rn}$
Where R^n = Average recruitment in that felling cycle in the nth cycle
f = Felling cycle
Ran = Available Recruitment in that n th felling cycle
R_x = Recruit in the class x

(a) 1st felling cycle: -

$Rr_1 = ½ [22.26 - 13 (22.26/20 – 1.07)]$
$= 10.87$
$Ran = fR^n - R_{rn}$
$Ra_1 = 20 \times 1.07 – 10.87$
$= 10.53$

(b) 2nd felling cycle: -

$R_{r2} = ½ [27.26 - 12(27.26/20 – 1.19)]$
$= 12.59$
$Ran = fR^n - R_{rn}$
$Ra_2 = 27.26 – 12.59$
$= 14.67$

(c) 3rd felling cycle: -

$Rr_3 = ½ [37.58 - 11 (37.58/20 – 1.33)]$
$= 15.77$
$Ran = Ran = fR^n - R_{rn}$
$Ra_3 = 37.58 – 15.77$
$= 21.81$

Table 2.14.

Cycle	**Accruing**	**1. Realizable 2. Accumulating**	**Hence Available in Cycle**
1	22.26	1. 10.87 2. 10.53 }2	10.87
2	27.26	1. 12.59 }2 2. 14.67 }3	23.12
3	37.58	1. 15.77 }3 2. 21.81	30.44 Stock in hands for next cycle

The availability in the first cycle is 16.21 + 10.87 = 26.99

(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	1.35	1.16	1.52
2 cycle	1.25	1.25	1.52
3 cycle	1.34	1.34	1.34

If stock in hand is liquidated in no of Cycles	Annual Realizable yield in cycle		
	1	2	3
1 cycle	27.00	23.20	30.40
2 cycle	25.00	25.00	30.40
3 cycle	26.80	26.80	26.80

Liquidation in cycle	At hand	Accruing	Total	Realizable	Total liquidated	Percentage liquidation	Balance
1 cycle	34.48	22.26	56.74	10.87	45.35	80%	11.39
2 cycle	34.48	49.52	84.00	33.99	68.47	82%	15.53
3 cycle	34.48	87.1	121.58	64.43	98.91	81%	22.67

Thus, if available stems at hand are liquidated in three felling cycles, sustainable yield will be available for 81% i.e. 81 out of 100 silviculturally available trees above selection girth can be marked for felling. On an average 26.87 trees/ ha. say 27 trees/ha will be available for felling per coupe.

Yield of 1.34 trees per ha is definitely realizable for 3 cycles.
Total prescribed yield for teak trees per ha = 1.34 x 20 = 26.87
50% of the Yield = 0.5 x 26.27 (if 50% retained)
= 13.14 trees per ha
= 13.14 x 0.985 cum
= 12.94 cum / ha / felling cycle
50% of the Yield = 0.647 Cum/ ha / year

SECTION 2.12. : AGENCY OF HARVESTING:
The coupes shall be worked either departmentally or through FLCS as per the requirement.

SECTION 2.13. : **DEMARCATION OF COUPES AND PREPARATION OF THE TREATMENT MAP:**

2.13.1. 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.

2.13.2. 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, fellings and protection. 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
(i) Areas with steep slopes i.e. more than 25^0 slope.
ii) Twenty meter wide strip on either side of the rivers or perennial watercourses or tanks.
iii) 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 25^0 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:**

In the entire 'D' category area, tending of the crop shall be carried out up to pre harvestable girth class by providing a spacement of $1/3^{rd}$ 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.

2.13.3. Treatments:

Area (A):
(i) The soil and moisture conservation treatment shall be as given in miscellaneous regulations.
(ii) *Bamboo, jamun, arjun, agave,* and grasses shall be planted along the *nallah* and river banks.
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) Natural regeneration is protected and tended.

Area (C):
This area does not need any planting, tending in the crop shall be carried out.

2.13.4. Marking Technique And Marking Rules:

(a) Marking Technique: This 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 close to the ground as far as possible and dressed.

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

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 $_{1/3}$ rd of the height of the trees retained.

IV) **Marking For Area 'D':**

(i) All climbers will be cut.

(ii) All dead, dying and malformed trees shall be marked for felling.

(iii) All pre-harvestable trees and harvestable trees will be enumerated separately.

Table No. 2.15

Site Quality	Pre-harvestable girth	Harvestable girth for Teak
II and II/III	135-150 cm.	150 cm. and above
III and IV	For Teak 105-120 cm	120 cm and above

Since growth data for misc. species is not available, harvestable girth 120 cm is prescribed for miscellaneous species.

(iv) The regeneration is protected from hacking by controlling the graziers for 5 years from the year of main felling of the coupe.

(v) No tree of pre harvestable girth class shall be marked for felling. The removal of a tree should not accelerate soil erosion.

(vi) 50% of the harvestable trees so enumerated shall be marked for felling, provided the no. of trees above harvestable girth are more than the no. of trees in the approach class.

(vii) If the no. of trees in approach class is less than those in the harvestable girth class then the no. equal to 50% of approach girth class trees shall be marked in the harvestable girth class.

(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) *Semal, kulu* and all edible fruit trees such as *mahua, tendu, awala, mango, jamun, char* 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 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.

(x) Tending of the "D" area crop, up to pre harvestable girth class shall be taken up.

Malformed Tree: *A tree with a badly shaped and defective stem occupying more space than its future value warrants. (a tree having less than 2M clear bole)*

SECTION 2.14. : METHOD OF OBTAINING REGENERATION:

2.14.1. 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. Mr. Troupe observed that weed-growth is one of the serious obstacle 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 suffer from desiccation, which needs mulching individually to reduce this effect.

2.14.2. 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, cutting and burning undergrowth completely. The seedlings, which spring up in abundance as a result of clearing and burning are to be weeded from the beginning itself and weeding requires to be continued for three years, till the plants are established. Hence, the weeding out of lantana will be carried out in favour of NR successively up to third year.

Even after the above operations, if NR is not satisfactory, on the slopes saucer shaped pits of 15x 15 x 15cm. will be prepared wherever light is available preferably on the periphery of the crowns of the trees on the ground. Pits will have a baffle wall on the down hill side to support the soil. Treated seeds of teak, germinated *ain* seeds and other misc. species will be sown and will be weeded thrice and mulched twice in a year until they get established. This work will be carried out during the CBO period and sowing will be done just before the onset of rains. The no. of pits is restricted to the extent of the shortage of NR.(625 seedlings/ha.)

(i) Coppice shoots interfering with NR when established should be removed.

(ii) The NR should be cleared off weeds within the diameter of 1 meter. Mulching should be done by spreading the twigs and debris to the extent of six inches layer, followed by a layer of leaves, burnt up material and a sufficient earth over it (about a ghamela). This will facilitate protection from fire, drips from the nearby overgrowth.

(iii) In case of NR of valuable miscellaneous species like *ain, haldu, tiwas,* etc. protection, weeding and soil working shall be carried out. The NR technique as given in the guidelines dated 25/10/2013 issued by the PCCF (P & M) **Appendix No. LXXI** may also be followed as per the requirement.

SECTION 2.15. : SUBSIDIARY SILVICULTURAL OPERATIONS:

2.15.1. 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 in the plantation area shall be cut out.
iv) All malformed, suppressed or damaged advance growth of teak up to 15 cm. girth shall be cut to ground level to obtain good seedling coppice.

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

i) All climbers will be cut.
ii) Lantana and *Hyptis suveolens* (Ranthulas) other growth of inferior species interfering or likely to interfere with
the reproduction of teak and other valuable species will be cut and removed.
iii) 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 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 shall be left shall be 1/3 rd of the height of the trees retained.
iv) Lantana and other growth of inferior species interfering or likely to interfere with the reproduction of teak and other valuable species will be cut back.
v) No tree of preharvestable girth shall be thinned.

SECTION 2.16. : OTHER REGULATIONS:

2.16.1. 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 remain sufficiently away from the stems of the trees and burning does 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.

2.16.2. 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.

2.16.3. 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.

2.16.4. The techniques of fire protection should be as per the paragraphs given in the Section 11.4 of Forest Protection (Overlapping) Working Circle.

2.16.5. As such the area being prone to fire hazard and NR 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.

Grazing Control: The areas of main felling shall remain closed for 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 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.

2.16.6. 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.

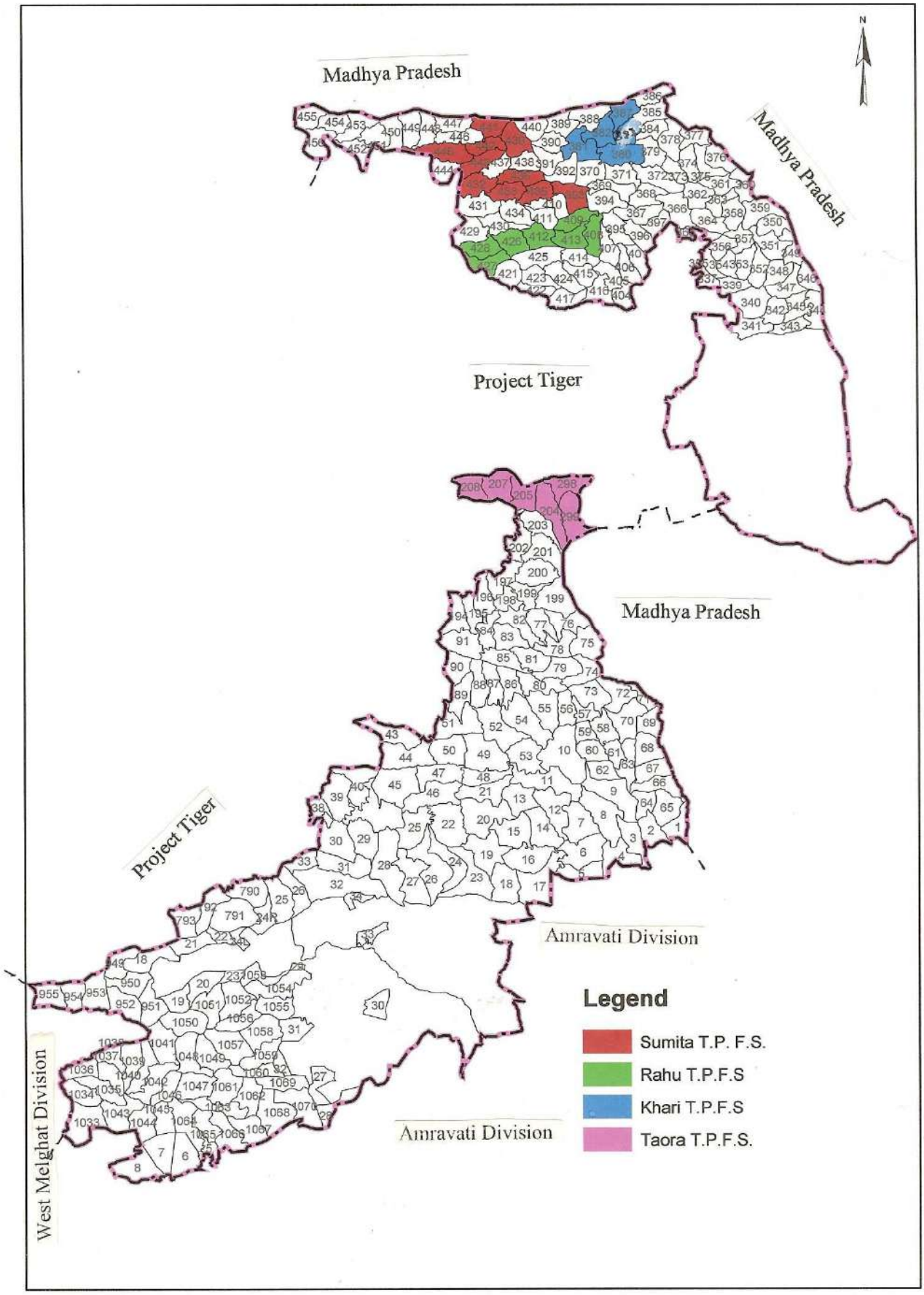
2.16.7. Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle.

TEAK PLANTATION WORKING CIRCLE

Congested Teak Plantation

Matured Teak Forest of T.P.W.C. of Compt. No. 409

Teak Plantation Working Circle of East Melghat Division



CHAPTER –III

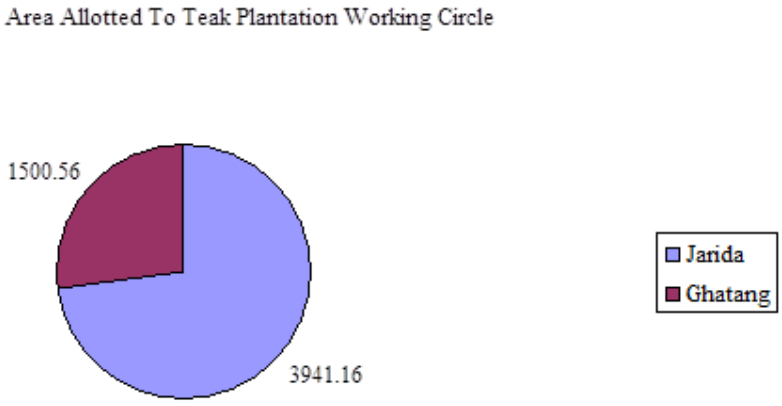
TEAK PLANTATION WORKING CIRCLE

SECTION 3.1. : GENERAL CONSTITUTION :

3.1.1. Predominantly teak bearing areas, which are deficient in NR and having matured crop have been put under this Working Circle. Part areas of the *Rahu, Khari, Sumita,* and *Tawra* Felling Series of S. C. I. Working Circle of Shri V. K. Sinha's plan are included in this Working Circle. Statement showing Range wise number of compartments and area allotted to the Working Circle is given below.

Table No. 3.1
Table Showing Area Allotted To Teak Plantation Working Circle

S. No.	Range	Area (ha)	Compartment Numbers.
1	*Jarida*	3941.16	22
2	*Ghatang*	1500.56	6
		5441.72	**28**



SECTION 3.2. GENERAL CHARACTER OF VEGETATION:

3.2.1. The tract dealt with under this Working Circle occurs on the slopes of hill ranges and the forests are generally of site Quality III, but patches of site Quality II, II/III are also occassionally noticed. Teak*, Lendia, Haldu, Ain, Tiwas, Kalam, Khair, Dhawda, Dhaman, Tendu* are the main species occurring in the growing stock. The proportion of Teak in the crop is nearly 50% and in patches it tends towards miscellaneous crop at higher altitudes. A few pure patches of Teak are also observed, at some places. Stocking is good. The crop is generally matured. The regeneration of all the species is poor and deficient, probably due to repeated fires and heavy grazing. Trampling of young seedlings by cattle, injuries due to fire and lantana infestation in the understorey have caused poor regeneration.

The crop has become irregular and unbalanced in the distribution of age and diameter classes. Population of light demanders in lower girth classes is very low and is likely to lead to domination of these high forests by *Bhirra* and *Dudhi* and their conversion to low value forests. The percentage of miscellaneous species has increased in the lower girth classes. The area is capable of clothing itself with good quality even aged high forests of teak except on the ridges where soil erosion has taken place.

SECTION 3.3. : SPECIAL OBJECTS OF MANAGEMENT:

3.3.1. To enrich and improve the quality and value of the growing stock by planting teak and tending natural regeneration of native species.

3.3.2. To introduce genetically superior plants of teak, by way of planting.

3.3.3. To convert the irregular forest into an even aged regular crop with all possible age gradations essential for optimum growth of the crop and to ensure sustained yield.

3.3.4. To meet increasing demand of valuable timber and the local demands of firewood, poles and bamboos.

3.4 GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

3.4.1 Given the present status of the crop, achieving the above mentioned objectives, is probably the most challenging task for the forest officers implementing the Working Plan. Probably, this is the only Working Circle where the highest level of experience, skill, judgment, innovation, patience, perseverance and dedication are required form the implementing officers. Here 'implementation' is not only restricted to merely following the prescriptions mechanically but also extends to minute observation of the results seen from each and every single silvicultural operation and to take all efforts to guide to crop to reach its final destination.

3.4.2. As prescribed in the Working Plan, the cutting is restricted only in "D" area. As an abundant precaution it has been prescribed that the cutting shall be limited to those grids which are found 'Fit' for removal followed by Teak planting. The fitness of the grids in "D" area for removal of over-wood, has been tested on the criteria laid down in para 3.13.7. for better understanding and clear perception of the methodology, the calculation sheet based on data collected in one of the compartment in this working circle has been enclose in **Appendix No. XXI**. Thus the crop has been regulated based on basal area.

3.4.3. The details of working till 2014-15 (Coupe no. IX) is summarised below.

(Area in ha.)

Sr. No.	Coupe No.	Year	Total Area in Ha.	Area could not be worked due to being within 10 km from PA	D Area as per Treatment Map	Area Planted in the subsequent year of felling	Yield cu.m. per ha.		
							Teak	Non Teak	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	I	2006-07	332.68	121.19	112.50	90.50	17.222	2.702	19.924
2	II	2007-08	298.94	104.77	91.00	91.00	14.377	1.955	16.332
3	III	2008-09	291.70	123.42	49.00	61.00	14.842	2.483	17.325
4	IV	2009-10	256.56	128.95	38.00	38	8.413	1.980	10.394
5	V	2010-11	272.68	181.21	10.75	20.75	9.972	2.129	12.101
6	VI	2011-12	252.47	178.13	23.00	23.00	6.642	0.837	7.479
7	VII	2012-13	262.20	87.00	27.00	27.00	4.647	0.590	5.237
8	VIII	2013-14	270.04	148.76	29.75	29.75	11.272	1.129	12.400
9	IX	2014-15	266.85	144.29	4.70	4.70	43.11	0.00	43.11
Grand Total			**2504.12**	**1217.72**	**385.70**	**385.70**	**130.497**	**13.805**	**144.302**

3.4.4. As seen from the Table above, out of 2504.12 ha that must have been tackled up to 2014-15. However, as much as 49% of area was not even considered for working on the pretext of being within 10 Km from the Melghat Sanctuary and Gugamal National Park. Out of remaining area, only 15% area falls in "D" category, where the actual felling and subsequent plantations have been taken up.

3.4.5. It pertinent to note at this point that the first Thinning, which is only mechanical, has been prescribed in the 7th year and second thinning will be due in 15th year and subsequent thinning shall be due after every 10 years. However, 1st thinning for coupe no. I and II which were due in the year 2012-13 and 2013-14 respectively, could not have been carried out as per the schedule. The probable reason may be that the Schedule given in Annexure LXIV shows the first thinning in the 11th year. In other words the Thinning schedule given in para 3.14.4 and the Schedule given in corresponding Annexure LXIV of the original plan do not match with each other. Therefore the yield data for the thinning are not available so far.

3.4.6. The thinning for coupe No. I and II will have to be taken up on priority, after obtaining sanction for deviation proposal, if required. In fact, the thinning operation is the most critical operation after clear-cutting an area. The strict adherence to the time schedule for thinning must be ensured by authorities at each single level. Needless to mention that Cut-Back and cleaning operations must also be religiously carried out. Fortunately both these operations have been duly taken care of so far. Thus it is recommended that each and every single silvicultural operation prescribed in the present Working Plan should be carried out strictly as per the time schedule laid therein. The 20 coupes laid down take abundant care of the operations till 2025-26, without prematurely and abruptly making any alteration. By doing so, all the area can be scientifically worked. Further at least 6 coupes spanning over 1705.04 ha can be tested on the criteria of two thinning and as many as 15 coupes spanning over 3810.12 ha area can have at least one thinning. Moreover, cleaning operations in at least 16 coupes shall be taken up.

3.4.7. The status of the artificial regenerations by way of teak plantation is as under.

Sr. No.	Comptt. Number	Coupe No.	Year of Plantation	Area in Ha.	Number of plants planted	Survival Count	Survival Percent	Survival Count as on
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	426	I	2007	28.000	67500	53450	79.19%	May-11
	380	I	2007	36.500	88750	68438	77.11%	May-11
	445	I	2007	26.000	65000	49970	76.88%	May-11
Total				**90.500**	**221250**	**171858**	**77.68%**	**May-11**
2	380	II	2008	13.000	30000	21775	72.58%	May-11
	445	II	2008	48.500	118750	63380	53.37%	May-11
	426	II	2008	29.500	73750	51171	69.38%	May-11
Total				**91.000**	**222500**	**136326**	**61.27%**	**May-11**
3	380	III	2009	26.000	65000	55250	85.00%	Oct-12
	432	III	2009	23.000	57500	46370	80.64%	Oct-12
	445	I	2009	17.000	42500	16150	38.00%	Oct-12
	426	I	2009	5.000	12500	8563	68.50%	Oct-12
Total				**71.000**	**177500**	**126333**	**71.17%**	**Oct-12**
4	412	IV	2010	5.000	12500	8049	64.39%	Oct-12
	380	IV	2010	9.000	22500	19125	85.00%	Oct-12
	432	IV	2010	24.000	60000	37400	62.33%	Oct-12
Total				**38.000**	**95000**	**64574**	**67.97%**	**Oct-12**
5	412	V	2011	10.750	26875	19000	70.70%	Oct-13
	393	V	2011	10.000	25000	14580	58.32%	Oct-13
Total				**20.750**	**51875**	**33580**	**64.73%**	**Oct-13**
6	381	VI	2012	9	22500	15075	67.00%	May-14
	393	VI	2012	14	35000	21530	61.51%	May-14
Total				**23.000**	**57500**	**36605**	**63.66%**	**May-14**
7	435 P	VII	2013	12.000	30000	18670	62.23%	May-14
	427 P	VII	2013	5.750	14375	8970	62.40%	May-14
	381 P	VII	2013	9.250	23125	19193	83.00%	May-14
Total				**27.000**	**67500**	**46833**	**69.38%**	**May-14**
8	381P	IX	2014	9.000	22500	19170	85.20%	Oct-14
	435P	IX	2014	20.750	51875	49760	95.92%	Oct-14
Total				**29.750**	**74375**	**68930**	**92.68%**	**Oct-14**

3.4.8. In fact the survival count is not the only indicator of the health and vigour of the crop. For comprehensive assessment, the average height data are also necessary. As per the Working Plan, the first thinning is prescribed in the 7th Year. The first coupe and 2nd coupe was worked in the year 2006-07 and 2007-08, respectively. The first thinning of these coupes was due in the year 2013-14 and 2014-15, respectively. However, as per the yield table data for Teak site quality III/IV, the perceivable yield that too only in terms of small wood is available only up to completion of 10 years. However, so far none of the coupes has completed 10 years. Thus, the results in terms of yield are not available for evaluation. It is due to this reason that the first thinning is proposed after 10 years and subsequent thinning after every 10 years.

3.4.9. Needless to mention the Artificial Regeneration by way of plantation needs utmost care because the clear felled area is susceptible to number of natural and biotic injuries e.g. insects, fire, lopping, grazing etc. The authorities at all level must ensure that the survival percent and general health of plantations should be factually reported so that corrective measures, if required, can be taken up in time. Moreover the observation of the inspecting officers should be religiously recorded in the Plantation Register.

3.4.10. It may be worth mentioning that the thinning prescribed for old plantation have not been carried out as per the schedule. An area of 277.10 ha out of 417.70 ha area was not worked on the pretext of falling in 10 Km Eco Sensitive Zone area within the National Park and Sanctuaries. It is pointed out that thinning serves the dual purpose of providing conducive ecological conditions for the remaining crop to grow faster and produce economical timber as well as provides pole size harvested material which can be made available to the local inhabitants for their bonafide needs. This will ensure their active participation in forest management in tune with the National Forest Policy-1988. In absence of thinning operations both the above mentioned purposes are unachievable and the very objective of long rotation timber crop such as Teak is defeated. Thus it is strongly recommended that being a totally scientific and silvicultural operation, without any commercial motive, thinning operations should not be sacrificed under the apprehension of Eco Sensitive Zone restrictions. Thinning, in fact is sometimes misinterpreted as felling which is totally unfortunate.

3.4.11. To have close supervision on thinning operations and subsequent health of the crop, it is recommended that the grid-wise data should be maintained through the GPS readings.

SECTION 3.5. : FELLING SERIES, BLOCKS AND COMPARTMENTS:

3.5.1. Since areas belong to erstwhile Selection Cum Improvement Working Circle, the names of the Felling Series are retained as such. The area has matured crop with sparse regeneration and the sites have enough potential to bear good teak crops. The forests are highly irregular and unbalanced in the distribution of age and diameter classes. A total of 28 compartments have been allotted to this Working Circle. They are divided into 4 felling series having 20 coupes in each felling series. The average area of each coup is 68 ha. Coupe boundaries have been laid mostly along the natural features.

Table No. 3.2
Showing Distribution Of Compartments To Various Felling Series

S.No.	Range	Felling Series	Compartment No.	Area in ha.
1	*Jarida*	*Rahu*	408,409,412,413,426,427,428	1308.71
2	*Jarida*	*Sumita*	393,432,433,435,436,439,441,442,443,445	1788.09
3	*Jarida*	*Khari*	380,381,382,383,387	844.36
4	*Ghatang*	*Tawra*	204,205,207,208,298,299	1500.56
			Total	**5441.72**

3.5.2. Compartment wise and site quality wise areas are given in the **Appendix No. XIX** of Volume II of this plan.

SECTION 3.6. : ANALYSIS OF CROP:

3.6.1. Stock maps of the P. P. Joshi's plans are updated with the help of satellite imagery and are verified with the enumeration data and ground truth verification. The abstract of results of stock mapping for the area allotted to this Working Circle is shown in the table 3.3. Of the total forest allotted to this Working Circle teak forest covers 90.98%. Mixed forest covers 2.99%. A total of 0.75% of the area is not stock mapped. 86.97% of the area is having site quality III (teak: 84.12%, Mixed: 2.85%). Satellite Imagery shows that 71.2% of the area is having more than 0.4 density forest. The area having more than 25 degree slope and 20 meter wide strip area on both sides of the nala is 1781.5ha.

Table No. 3.3 a
Table Showing The Results Of Stock Mapping

Forest Type	Site quality	Area in ha	% of area w. r. t. Total W.C.
Teak	II	64.4797	1.21
	III	4492.3844	84.12
	IVa	180.355	3.38
	IVb	121.4646	2.27
	Total	**4858.6837**	**90.98**
Mixed	III	152.0659	2.85
	IVa	3.1106	0.06
	Ivb	4.3695	0.08
	Total	**159.546**	**2.99**
Old Plantation	-	13.4879	0.25
	Total	**5031.7176**	**94.22**
Under stocked	**-**	268.3650	5.02
Not stock mapped	**-**	40.2684	0.75
	Total	**5340.351**	**100**

Table No. 3.3 b
Table Showing Crown density data obtained with the help of satellite imagery

Category	Area in ha.	% to the total area of the working circle	Remark
Well stocked	3874.4262	71.20	
Understocked	1416.1712	26.02	
Blank	44.0630	0.81	
Waterbody	0.1538	0.003	
Other	5.5368	0.10	
Total	**5340.3510**	98.14	
Area of W.C.	**5441.71**	100	
Difference	**101.359**	1.86	

3.6.2. Data collected from the enumeration showing the number of stems in various girth classes is given below.

Table No. 3.4
Table Showing Average Number Of Trees Per Hectare And Their Volumes
(Stem timber)

Species	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151/upn	Total
Teak V/tree- in Cu. M.	**0.005**	**0.033**	**0.080**	**0.142**	**0.240**	**0.420**	**0.640**	**0.900**	**1.06**	**1.36**	**2.908**
NonTeak V/tree in Cu.M.	**0.008**	**0.025**	**0.037**	**0.122**	**0.221**	**0.334**	**0.457**	**0.593**	**0.730**	**0.730**	**3.257**
No. of Teak Trees	**13.22**	**10.71**	**8.22**	**8.32**	**8.55**	**7.19**	**6.39**	**3.90**	**3.10**	**1.25**	**70.68**
Teak Vol. in Cu.M.	0.07	0.35	0.66	1.18	2.05	3.02	4.09	3.51	3.29	1.70	19.92
No. of Non Teak Trees	**62.34**	**33.15**	**17.45**	**13.97**	**11.18**	**9.35**	**6.53**	**3.70**	**3.94**	**2.17**	**163.79**
NonTeak Vol. in Cu.M.	0.50	0.83	0.65	1.70	2.47	3.12	2.98	2.19	2.88	1.58	18.91
No. of Teak + Non teak Trees	**77.88**	**45.28**	**26.47**	**23.55**	**21.60**	**19.02**	**15.44**	**9.96**	**9.01**	**4.21**	**252.28**
Teak + Non teak Volume	**0.56**	**1.18**	**1.30**	**2.89**	**4.52**	**6.14**	**7.07**	**5.70**	**6.16**	**3.28**	**38.83**

SECTION 3.7. : SILVICULTURAL SYSTEM:

3.7.1. Consistent with the objects of the management cited earlier, silivicultural system is removal of over wood, while retaining 20 fruit plants and 20 miscellaneous plants/ ha, followed by artificial regeneration of genetically superior species.

SECTION 3.8. ROTATION AND CONVERSION PERIOD:

3.8.1. Average site quality of the forest included in this working circle is III. To avoid any possibility of degradation of site, rotation not shorter than that of age of maximum volume production is suggested. The area fit for working will be covered in the first felling cycle i.e. 20 years.

SECTION 3.9. HARVESTABLE GIRTH:

3.9.1. Average crop girth of each grid in the coupe will be calculated based on the 100% enumeration of all the trees standing in the area. Only such grids which have forests of crop girths equal to or more than the value of Critical Crop Girth for that site quality and composition of species shall be considered to be mature and would qualify for the operation of removal of over wood for artificial regeneration by teak. The Critical Crop Girth will be the harvestable girth for that grid and it varies with site quality and composition of the crop.

SECTION 3.10. FELLING CYCLE:

3.10.1. The Felling cycle is fixed for 20 years.

SECTION 3.10. AGENCY FOR HARVESTING:

3.10.1. The coupes shall be worked departmentally.

SECTION 3.11. REGULATION OF YIELD:

3.11.1. The annual yield shall be regulated by area.

SECTION 3.12. SEQUENCE OF FELLING:

3.12.1. Year-wise by ranges, blocks and compartments for each felling series details are given in the **Appendix No. XIX** of Volume II of this plan.

SECTION.3.13. : DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:

Demarcation of Coupe:

3.13.1 The coupe shall be demarcated and marked one year in advance of its main working. However, first coupe will be marked in the same year. Coupe due for working shall be divided into suitable sections. The average size of a section shall be about 15 hectares. No section should be of less than 10 hectares or more than 20 hectares. The sections so formed should be convenient from all aspects including transport. Full use of existing roads, *nallas*, cart tracks should be utilized as far as possible in forming sections.

Preparation of stock map:

3.13.2. After demarcation, the whole area of the coupe shall be thoroughly inspected by the Deputy Conservator of Forest to ensure that the section lines have been properly laid and the width of coupe line and section line is as per prescriptions. Stock map for the entire coupe will be obtained in the 4" = 1 mile scale or other suitable scale from the geo-referenced management map prepared by the GIS cell and the same will be verified in the Coupe, for the features crown density, site quality, forest type and existence or otherwise of bamboo, if any changes are there they will be updated showing their boundaries on the map and the copy of updated map shall be sent to the GIS cell *Amravati*.

3.13.3. Compartment and Section boundaries shall be distinctly shown in the Stock map.

Preparation of Treatment map:

3.13.4. After the stock map has been prepared, section wise treatment map of the entire area will be prepared on graph paper in 1: 5000scale. The entire area of the coupe shall be divided into grids of size of 100 m x 100 m (1 ha.) after taking base line that should, as far as possible, run through the center of the section. The grids so made shall be duly numbered and pegs shall be erected at the corners of the grid. The gridlines shall be shown on the map. The following categories shall be demarcated grid wise.

I) **Area 'A': Protection Areas**

It will include the following areas.
i) Areas with slopes more than 25^0.
ii) Twenty meters wide strip of forest along both sides of main watercourse and well defined nalas. (These may form coupe lines/ section lines wherever possible).
iii) Heavily eroded areas.

The following areas shall be shown on the map if the extent of such area is 0.5 ha. or more.

II) **Area 'B': Blanks and Under stocked Area:** This will include areas with crown density less than 0.4 .

III) **Area 'C': Old Plantations:** This will include old Teak Plantations.

IV) **Area 'D' - Well Stocked Areas found fit for teak plantations.**

This will include areas with crown density more than 0.4 and with matured crop fit for Teak plantations. **Felling shall be carried out in these areas.**

No felling shall be carried out in the areas mentioned above except D category. Such areas shall be demarcated on the ground as well.

3.13.5. In the area of D category, the following information shall be recorded and maintained for each grid.

i) Average height of dominant mature teak trees, and if teak is absent, then *Bija, Haldu, Ain, Kalam, Semal*, Or *Dhawda*.(In case a tree of none of the above species is found in a quadrant, the quality class of the adjoining quadrant should be adopted.)
ii) 100 % species wise enumeration of the growing stock in uniform girth classes of 15 cm starting from 1 to15 cm. and classify each tree whether it is of coppice origin or seed origin and prepare an abstract of numbers of Teak coppice, Non teak coppice, teak and Non teak girth class wise for each grid.
iii) Average Basal area per hectare.
iv) Remarks about fitness of area for teak plantation (use symbol 'F', wherever the area is fit for canopy removal and symbol 'U' Wherever the area is unfit for teak plantation).

Treatments:

3.13.6. The following treatments are prescribed for the various types of areas

Area 'A':
(i). No tree is marked for felling except dead, whose removal shall not cause soil erosion.
(ii). Nalla bunding works shall be taken up as given in the Miscellaneous regulations.
Area 'B':
(i). No tree is marked for felling except dead, whose removal shall not cause soil erosion
(ii). Nalla bunding works shall be taken up as given in the Miscellaneous regulations.
(iii). Planting of teak will be carried out in this area on suitable patches.
Area 'C': The old teak plantations shall be thinned as prescribed in the section 3.16 of this chapter.
Area 'D': Fellings shall be limited to those grids which are found fit for removal, followed by teak planting. In the other grids tending shall be carried out as explained in the Para 13.7.50.

Determination of grids fit for Removal of Over wood:

3.13.7. First, average crop girth (o.b.) of the forest in the D category area referred to in **para 3.13.4.** shall be determined for each grid separately according to the following formula.

Girth (G) = πD ..... i.e. Circumference of a Circle

Basal Area (A) = $\pi D^2 / 4$

Average Crop Basal Area = $B / N = \pi D^2 / 4$

therefore D = $\sqrt{4B / \pi N}$

Crop girth = πD

= $\pi \sqrt{4B/ \pi N}$

= $2 \sqrt{\pi B/ N}$

= $3.54 \times \sqrt{B / N}$

Where "B" is average basal area per ha and "N" is average number of trees per ha in the crop excluding advance growth. The basal area may be measured with the help of wedge prism of suitable BAF (Basal Area Factor) or computed by summing up the cross sectional areas of the individual trees based on over bark girth measurements. Trees up to 30 cms, 45 cms, and 60 cms girth (o.b) in the Teak site quality up to III, II/III & II, and I/II & I respectively shall be treated as advance growth for the purpose and would not be considered for determining either the value of "B" or "N".

3.13.8. The average Crop Girth so computed shall be compared with the Critical Crop Girth (CCG) as given in the Table No. 3.5 given below. No grid shall be selected for the purpose of removal of over wood if its average Crop Girth (O.B.) is less than the Critical Crop Girths as given in Col. 5 of the Table in respect of areas of teak site quality mentioned against them in Col. 3 which correspond to the average height of dominant mature teak trees (and if teak is absent, then *Bija, Haldu, Ain, Kalam* Or *Semal*) in the crop as given in Col.2. These Critical Crop Girths relate to high forests only. The proportion of Teak, *Bija, Ain, Haldu* And *Kalam* in the crop, as mentioned in Col. 4, will be calculated after excluding the advance growth. Only such grids which have forests of crop girths equal to or more than the value of Critical Crop Girth for that site quality and composition of species shall be considered to be siliviculturally available and would qualify for the operation of removal of over wood. The same area shall be artificially regenerated by teak in the subsequent years. The values of the C.C.G. for sites of different site qualities and broadly classified compositions are given in the **Table 3.5.**

Critical Crop Girth (CCG) :-

Defination :- Productivity of a site can only be maintained in clear cutting system, if the crop girth of the forest to be clear cut is equal to or more than a particular value of crop girth may be called **Critical Crop Girth (CCG).** The CCG is unique for every site and composition.

In other words, if a crop having crop girth less than CCG is clear cut, the productivity of the site shall go down in proportion to the difference.

Table No. 3.5
Table Showing The Required Critical Crop Girth For Various Site Qualities

S.N.	Average height of dominant mature trees in the crop	Corresponding all India teak site quality	Proportion of teak, *bija*, *ain, haldu* and *Kalam* of seed origin in the crop	Critical Crop Girth
1	2	3	4	5
1	Upto 21 meters	Upto III	More than 40%	70 cms
2	Upto 21 meters	Upto III	Less than 40%	60 cms
4	21 to 27 meters	II/III/, II	More than 40%	85 cms
5	21 to 27 meters	II/III, II	Less than 40%	75 cms
7	Above 27 meters	I/II, I	More than 40%	110 cms
8	Above 27 meters	I/II, I	Less than 40%	95 cms

3.13.9. The minimum unit for giving separate treatment shall be 2 ha. If the area is less than 2 ha, it shall be given treatment as that prescribed to the surrounding areas. If it is more than 2 ha. it shall be treated as an independent unit.

Marking Rules:

3.13.10. In the grids shown on the Treatment Map found fit *interalia* as determined after applying the test contained in para **3.13.7.**, marking for felling the entire crop shall be done after *reserving*.

i) All young to middle aged fruit bearing trees of different species upto 20 trees/ha. If fruit trees are not available, the required number shall be completed from miscellaneous trees. For the purpose of retention, priority shall be given to established fruit trees preferably in 30 cms to 90 cms girth class. The trees so retained should be, as far as possible, uniformly spread over the area.
ii) Young to middle aged trees of *semal, khair*, rosewood and other superior miscellaneous species up to 20 trees/ha uniformly spread over the area. For the purpose of retention, priority shall be given to established trees preferably in 30 cms to 60 cms girth class.
iii) All *kullu, mahua, chinch* and mango trees irrespective of age *against felling throughout the area.*
iv) Site quality IV areas**.**

3.13.11. In addition, no marking for felling shall be done in all areas of coupe line and section lines containing existing forests shall be done where it is on the sides of watercourse of well-defined *nalas*. However at other places, improvement felling including removal of dead and hollow trees, and those, which are likely to fall, shall be done. Crooked and unsound advance growth of Teak shall be cut back.

3.13.12. No marking for felling shall be done in heavy water logged areas that are unfit for teak plantation. If the area is otherwise fit for planting, the blanks shall be planted with *arjun, ain* and other suitable species.

3.13.13. In the balance area, the grids having forests which fail to qualify the test contained in **para. 3.13.7.,** or otherwise found unfit for overwood removal (site quality IV area) but require tending shall be given the treatment as prescribed in the Chapter on Miscellaneous Regulations. In addition to this badly grown and unsound trees shall be marked for felling and the reproduction of intolerant species like teak, *bija, shisham, semal* and other superior miscellaneous species shall be freed from shade of Bamboo and other inferior trees. All climbers shall be cut.

3.13.14. Felling operations, removal of timber and firewood from the coupes shall be completed before the end of March so that subsequent PMW operations in the area can be started well in time as well as disturbance to wildlife can be minimized in the pinch period.

SECTION 3.14. SUBSIDIARY CULTURAL OPERATIONS:

3.14.1. These operations shall be carried out departmentally and shall include.

3.14.2. Cut back operations: These operations will be carried out departmentally in the following year of main felling .The following operations shall be carried out.

1) Climber cutting over entire area of the coupe.
2) Felling of all badly damaged or broken trees.
3) Cutting back of malformed advance growth of teak.
4) Freeing young growth of teak and other valuable species from interference of bamboos and other inferior species.
5) All stools will be cleared of felling debris.

3.14.3. Cleaning: A cleaning operation will be carried out in the 6th year commencing from the year of planting.

1) All climbers will be cut over entire area of the coupe, if necessary.
2) Damaged, malformed saplings, and coppice shoots will be cutback.
3) Fast growing inferior species and bamboo interfering or likely to interfere with reproduction of teak and other valuable species will be cut.
4) In thick patches of teak advance growth and established regeneration of other valuable species a spacing between sapling to be retained, should vary from 2 meter to 2.59 meter depending on the height of the sapling. Cleaning in plantation areas should be carried out as and when required depending upon the crop condition.

3.14.4. Thinning: The first thinning shall be carried out in the 10th year and the remaining thinning shall be carried out after every 10 years.

SECTION 3.15. ARTIFICIAL REGENERATION:

3.15.1. The area where overwood is removed as above will be planted with teak stumps (raised as far as possible from the seeds supplied by *Maharashtra* Forest Seed Center or certified seed or from known source in order of priority)in the first rains after the main felling. The technique of planting teak and the spacement shall remain the same as followed in the past for raising teak plantations in the areas.

3.15.2. All sections shall be visited in the second rains after the felling to carry out operations related to weeding, climber cutting and cleanings (Including removal of all coppice growth originating from the old stumps.) as may be necessary. Casualty replacement be carried after first weeding.

3.15.3. The plantation shall be visited in the fourth and seventh year and there after at suitable interval after the main planting to carry out cleanings and thinnings as per schedule.

SECTION 3.16. OLD TEAK PLANTATIONS:

3.16.1. The successful Teak Plantations taken up under various previous working plans and the teak plantations to be taken under this plan are included in this section. Therefore area of old Teak Plantations are not in a consolidated patch and they are spread over entire division. The area under old Teak Plantations is as given below.

Table No.3.6
Table Showing Range wise Area under Old Teak Plantations

S. No.	Range	Area (in ha)
1	*Jarida*	155.50
2	*Ghatang*	262.20
3	*Chikaldhara*	-
4	*Anjangaon*	-
Total		417.70

General Character Of Vegetation:

3.16.2. Teak plantations taken up during previous plan periods are considered successful. But due to non adherence to the prescriptions of cleaning and thinning schedules in the past to these plantations, the overall health of the stand do not conform to the required rate of growth in terms of girth/volume and the form of the stem. It needs immediate management intervention to have timely operations of thinnings.

Hence all the old teak plantations shall be thinned in the first 3 years of working plan so that growth and volume parameters can be brought to the levels mentioned in the stand and yield table. The year wise schedule and plantations to be thinned is given in the **Appendix No. XX** of Vol. II. The site quality of the plantation varies from II to III.

Blocks And Compartments:

3.16.3. The list of old teak plantations, its compartment number and Range is given in the **Appendix No. X** of Volume II of this plan.

Special Objects Of Management:

3.16.4. The main objectives of Teak Plantation is to have the teak crop with growth parameters comparable to those in the Yield Table for Teak Plantation and thus producing maximum growth in volume and value of the stand. Due to non-compliance of the prescriptions in the past, the objectives have not been achieved. So the objectives of the management are:
(1) To maintain the density of stocking (measured in cubic volume) of the stand at such levels which produces optimum annual increment and that the increment produced is deposited on selected individuals.
(2) To improve the crop by carrying out required thinning operations so as to achieve growth parameters comparable to those in the yield table for teak plantations.

Analysis And Valuation Of The Crop

3.16.5. Stock Maps: All old teak plantations have been shown on stock map.

3.16.6. Density:- crop is fully stocked in general.
3.16.7. Enumeration: 100 % enumeration shall be carried out to assess the extent of thinning.

3.16.8. Age And Site Quality: Successful Plantations raised during 1950 to 2000are included. The site quality varies from II to III.

Cleaning:

3.16.9. A cleaning in a younger crop is made to remove any growth that interfers with the proper development of stems of the principal species. It is essential to remove the undergrowth for better aeration and to facilitate the deposition of all accruable annual increment only on the potential individuals. The cleaning of plantation shall include the removal of bushes, invading species like *dudhi, lendia* except *amaltas, d*amaged or badly shaped poles/trees, climbers (climbers shall be cut at ground level and at breast height).

3.16.10. Site Quality Determination: The plantation shall be traversed by the marking officer in parallel lines 20Mts. apart and the height of dominant trees along the lines of every 20Mt. shall be estimated. Site Quality is determined with the help of table showing Top height by the Site Quality and age, which was given in the miscellaneous regulations. The Site Quality class boundaries are drawn on the map and demarcated on the ground by putting a coal tar band at breast height.

3.16.11. Selection and demarcation of the sample plots: Sample plots as per following rules shall be laid in each site quality area, and at least one sample plot shall be laid in every section of the plantation. The sample plots shall be representative of the crop. The following rules are followed.

1. No sample plot shall be selected on the edge of the crop.
2. On slopes presenting a wide range of elevation or in crops offering a variety of aspects and soils, several sample plots judiciously distributed should be selected.
3. The shape of the sample plot should be a long rectangle.
4. The boundary of the sample plot should be clearly marked by blazing the trees.
5. The sampling intensity shall be a minimum of 3% of the total area.

Enumeration of the crop in the sample plots:

3.16.12. All the trees including coppice, miscellaneous and dead one, in the sample plot are enumerated and tabulated girth class wise (girth classes shall be as per Stand Table).

3.16.13. Determine the basal area per hectare by using wedge prism at several points and find out the average basal area per hectare.

Computation of Actual Growing Stock and Application of Yield and Stand Tables:

3.16.14. Compute the growing stock per hectare by using the local volume table and enumeration data collected from the sample plots. The computed average basal area per hectare shall be compared with the figures contained in the Yield Table in respect of that site quality and age. If the actual basal area measured exceeds, then it would suggest the need of thinning in the crop necessitating the removal of basal area to the extent that exceeds the basal area given in the Yield table. If it equals or falls short, then it would indicate that no thinning is needed to the crop.

3.16.15. Thinning shall be carried out keeping in view the distribution of stems per hectare in various girth classes as contained in the stand table (main crop) for that particular site quality and Notional age.

3.16.16. Prepare the comparative chart showing the girth class wise distribution of stems of the sample plot for each site quality and stand table and identify the surplus or deficits in the number of stems, in each girth class.

Marking:

3.16.17. The detailed procedure of marking and thinning is given in the **section 13.7** of miscellaneous regulations and the same is followed. **All the old teak plantations shall be thinned in the first 3 years of working plan so that growth and volume parameters can be brought to the levels of Notional age of the stand and yield table as early as possible. There afterwards, thinnings shall be carried out at an interval of 10 years.**

If the age of any plantation is not known for any reason a suppressed tree will be felled and age shall be determined by counting the annual rings and accordingly thinning shall be carried. If any teak plantation is existing in the area and if it is not recorded in the working plan for any reason, thinning shall be carried out in the first three years of working plan.

The term Notional age mentioned in clause 3.16.15 refers to the age rounded to next multiples of 5 years as contained in the stand table of relevant teak site quality corresponding to the crop girth calculated from per tree mean basal area of the given crop.

Inspection of Marking:

3.16.18. The inspecting officer shall measure the basal area per hectare of the crop by point sampling method only for the retained trees in the plot (excluding the marked trees for felling) and it is verified with the Yield table. If the residual basal area per hectare tallies with the Yield table, it s considered that marking was done properly.

Maintenance of the Records:

3.16.19. All the data collected, tabulated is maintained separately in a register for every plantation, which shall be used in the further thinnings**.** Thinnings are carried out in the multiples of every ten years till the age of 60 years. Thinning is generally carried out between November and February.

Agency For Execution:

3.16.20. All the operations will be carried out exclusively by the department under the strict supervision of the Deputy Conservator of Forest.

SECTION 3.17. OTHER REGULATIONS:

3.17.1. Fire Protection Measures: All along the inner edge of the section line a strip of 5 mt. shall be left at the time of planting for maintaining it as fire line.

3.17.2. Grazing: The entire coupe including the coupe lines and section lines shall remain closed to grazing for ten years from the year of planting. **Fire protection and Grazing control shall be done through FPC/JFMC subject to the condition that the money assigned for fire protection will go to them after assuring that the area is effectively protected. Proper strategy shall be worked out by DCF.**

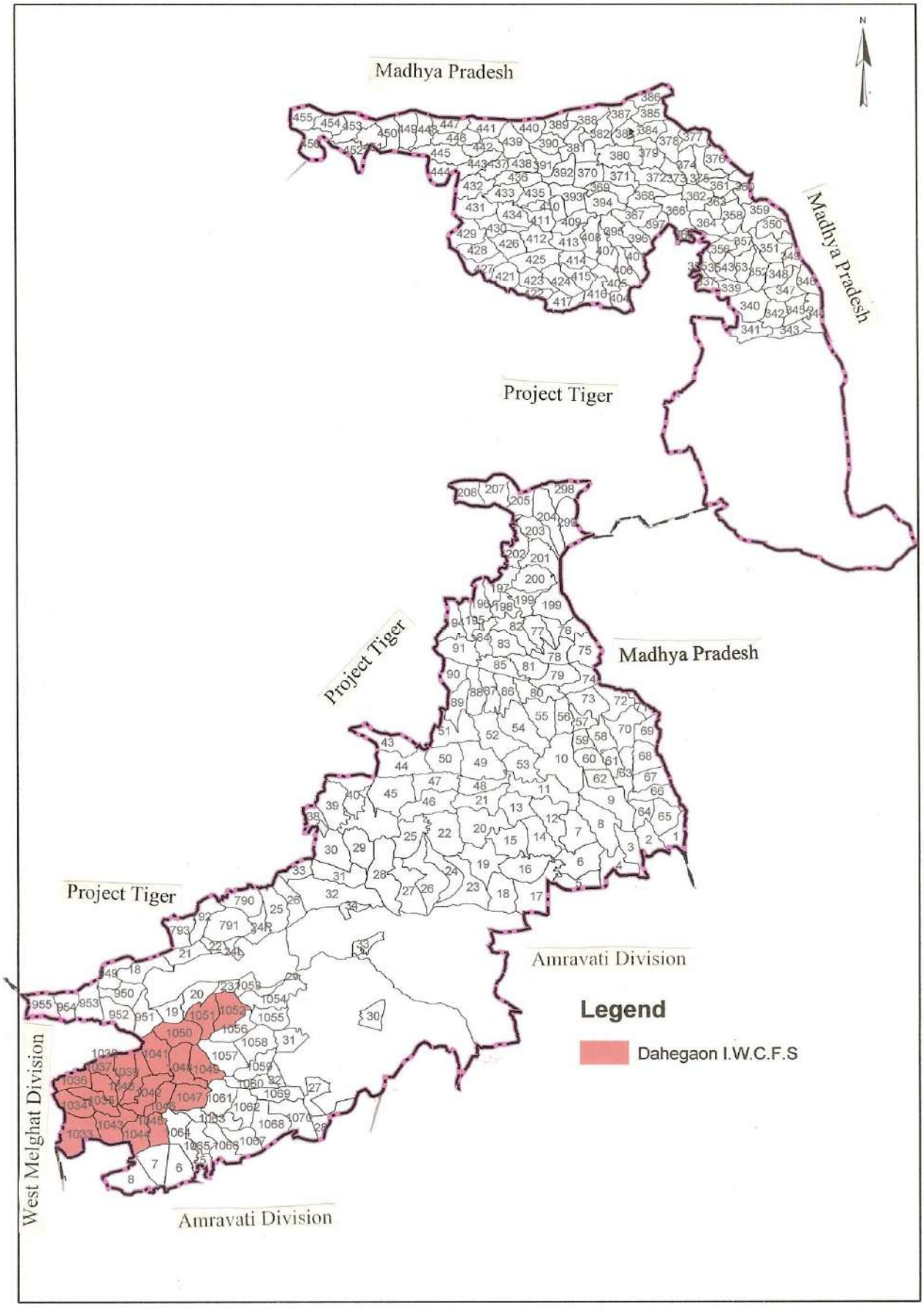
3.17.3. Collection of seed of any species shall not be permitted from the strip of forest left standing in and around the coupe i.e. on the coupe lines and the section lines.

IMPROVEMENT WORKING CIRCLE

**Forest of Improvement W.C. of Dahegaon F.S.
of Anjangaon Range Showing Teak Forest**

Dahegaon F.S. Showing Salai Forest On The Ridges

Improvement Working Circle of East Melghat Division



CHAPTER – IV

IMPROVEMENT WORKING CIRCLE

SECTION 4.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

4.1.1. As per the present Working Plan, the prevalent site quality is IVB but it improves to III in deep valleys. The general condition is very dry and the crop is open. The area assigned is restricted to only Anjangaon Range to the extent of 4795.75 ha..

The growing stock consists mostly of inferior miscellaneous species. Very few matured trees are available in the growing stock for harvesting. Hence there is 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. Around 35-40% of the area is open. The upper reaches and steep slopes will be protected so that grasses can come up in these areas.

4.1.2. In absence of specific pattern of crop and in view of predominantly open patches the objective of management are though termed as special in section 4.5 but the details of these objectives indicate their generic nature. As a result, the silvicultural operations prescribed are almost entirely generic in nature. This fact is reflected in para 4.11.1 which reads as under.

4.1.3. The details of afforestation works carried out in this working circle are as follows.

Year	Felling Series / Coupe No.	Compt. Number	Area planted (ha)
(1)	(2)	(3)	(4)
2006-07	--	-	0.00
2007-08	--	--	0.00
2009-10	--	--	0.00
2010-11	Dahegaon V	1047	15.00
2011-12	--	--	0.00
2012-13	Dahegaon VII	1033	25.00
2012-13	Dahegaon VII	1033	25.00
2013-14	Dahegaon VIII	1043	25.00
2014-15	Dahegaon IX	--	--

4.1.4. It appears as if during the first 3 years, this Working Circle could not get much focus, probably because of entire attention might have been devoted towards Teak Plantation Working Circle and Selection cum Improvement Working Circle.

4.1.5. In absence of much silvicultural operations carried out in this working circle, no specific comments are offered except that Natural Regeneration works prescribed in para no. 4.15.1 should be carried out as per the guidelines issued by Principal Chief Conservator of Forests (Production and Management), Maharashtra State, Nagpur vide letter no. Desk-14/WP/NR&AR/(13-4)/ 721, Dt. 25/10/2013 **(Appendix No. LXXI)**. Apart from this, the soil moisture conservation works like gully plugging and nala bunding by means of loose boulder structure as per the design given in **Appendix No. XXIII** should be taken up.

4.1.6. Since the area is already devoid of vegetation, therefore to reduce the dependency of local inhabitants for firewood, the scheme of LPG/Biogas distribution on subsidized basis, which is in force vide Government Resolution number FDM-2012/Prs.Kra 4/ F-2, Dt.10 July, 2012 should be effectively implemented in the villages in the vicinity of this area.

SECTION 4.2. GENERAL CONSTITUTION:

4.2.1. 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.

4.2.2. This Working circle also includes the areas belonging to the precipitous slopes. As far as possible a continuous block of such forests have been included.

4.2.3. The areas included in this Working Circle were worked under Improvement Working Circle in P.P. *Joshi*'s Plan. The area details are given in the table below.

Table No. 4.1
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	Comptts. Nos.
Anjangaon	14182.96	4795.75	33.81	--	20
Total =	**14182.96**	**4795.75**	**33.81**	**100**	**20**

SECTION 4.3. GENERAL CHARACTER OF VEGETATION:

4.3.1. In general, the forests of this Working Circle are inferior both in quality and composition. The prevalent quality is IVb. The predominant species is teak, whereas in refractory patches it is *salai,* which grew almost pure .The common associates are *dudhi, phansi*, *lendia, dhaora*, *palas, ain, bhirra, tiwas, moyen, kakad, khair, mokha* etc. Patches of teak were observed on the moderate slopes and in the valleys. The site quality improves to III in deep valleys. Steep slopes, upper reaches are either under-stocked or denuded, at many places underlying rock were exposed. The density is generally 0.4- 0.6. Bamboo is by and large absent. Natural Regeneration of Teak is restricted to some suitable places like gentle slopes, where soil depth is good. In few patches, NR of *Kalam, Dhaora, Bhirra, Dudhi* and *Palas* is abundant. The general condition is very dry and the crop is open and full stocking is found only on relatively small area. The natural regeneration of *salai* is practically absent. *Parijat, Sambalu (Nirgudi), Tarota* and *Ran-Tulas* undergrowth is common. Lantana occurs at some places in competition with other undergrowth.

SECTION 4.4. FELLING SERIES:

4.4.1. 20 Compartments have been allotted to this working circle. The area has been kept under Dahegaon Felling Series having 20 coupes.

Table No. 4. 2
Table Showing No. Of Compartments Allotted To Working Circle

Range	No. of Comptts.	Area in ha.
Anjangaon	20	4795.75
Total	**20**	**4795.75**

SECTION 4.5. BLOCKS AND COMPARTMENTS:

4.5.1. The area of the working circle belongs to *Dahegaon* Block of Compartment no. 1033 to 1052. The areas of the compartment and their site qualities are given under **Appendix No. XIX** of Volume II of this plan.

SECTION 4.6. SPECIAL OBJECTS OF MANAGEMENT:

4.6.1. 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 4.7. ANALYSIS AND VALUATION OF THE CROP

4.7.1. Age: The crop is generally young to middle aged.

4.7.2. Stock Mapping: Existing stock maps were updated with the help of satellite imageries and verified with enumeration data.

Table No 4.3a
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	IVa	157.5486	3.38
	IVb	1882.3981	40.44
	Total	**2039.9467**	**43.82**
Mixed	III	6.1271	0.13
	IVa	380.1958	8.17
	IVb	1147.5834	24.65
	Total	**1533.9063**	**32.95**
Salai	IVa	4.7374	0.10
	IVb	718.6737	15.44
	Total	**723.4111**	**15.54**
Old Plantation	-	84.0846	1.8
	G. Total	**4381.3487**	**94.12**
Under stocked	**-**	269.4113	5.79
Not stock mapped	**-**	4.2008	0.09
	Total	**4654.9608**	**100**

Table No 4.3a
Table Showing Crown density data obtained with the help of satellite imagery

Category	Area in ha.	% to the total area of the working circle	Remark
Well stocked	3050.5371	63.61	
Under stocked	1572.7846	32.79	
Blank	29.3459	0.61	
Water body	-	0.00	
Other	2.2931	0.05	
Total	**4654.9608**	97.06	
Area of W.C.	**4795.75**	100.000	
Difference	**140.7892**	2.94	

4.7.3. Density: Generally it is more than 0.5 along with scattered natural blanks, barren patches and under stocked areas. Of the total area allotted to this working circle 63.61% of the area is having more than 0.4 density and 33% of the area is under stocked. The area has thorny scrub vegetation intermingled with tree species in the 'C' class forest area.

4.7.4. Enumeration: The detailed results of enumeration are given in the **Appendix No. XV** of volume II of this plan. The comparative statement of tree numbers in various girth classes of P. P. Joshi's Plan and current plan are given in the table 4.4.

Table No. 4. 4
Table Showing Comparative Statement Of Number of Trees/Ha

Girth class	Number of trees/ha as per *P.P. Joshi*'s Plan enumeration		Number of trees/ha as per current enumeration	
	Teak	**Miscellaneous**	**Teak**	**Miscellaneous**
15u30	19.27	41.44	42.64	54.09
30u45	18.56	42.24	30.56	40.28
45u60	13.89	33.29	19.40	29.18
60u75	9.30	25.76	16.34	24.79
75u90	5.58	19.06	10.10	18.37
90u105	2.18	10.13	5.92	10.73
105u120	0.87	5.16	3.29	7.24
120u135	0.42	2.92	1.38	3.29
135 and above	0.20	1.92	1.08	1.96
Total	**70.27**	**181.92**	**126.74**	**189.24**
Percentage	**27.86**	**72.14**	**40.11**	**59.89**

4.7.5. Percentage of teak has increased from 27.86 to 40.11. Whereas percentage of miscellaneous species has come down from 72.14 to 59.89. The number of miscellaneous species per hectare remained more or less same. **Overall the growing stock has improved marginally from 252.15 trees/ha of P.P.Joshi's plan period to 315.98 trees/ha.**

SECTION 4.8. SILVICULTURAL SYSTEM:

4.8.1. The growing stock consists mostly of inferior 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. Around 35-40% of the area is open. The upper reaches and steep slopes will be protected so that grasses can come up in these areas.

SECTION 4.9. ROTATION AND CONVERSION PERIOD:

4.9.1. Since we are resorting to improvement fellings only, there is no need for fixing the harvestable girth.

SECTION 4.10. FELLING CYCLE

4.10.1. Felling cycle is fixed as 20 years. Marking for improvement of the crop shall be carried out.

SECTION 4.11. AGENCY OF HARVESTING:

4.11.1. The coupes shall be worked departmentally.

SECTION 4.12. REGULATION OF YIELD

4.12.1. As the felling is meant for improvement of the crop, it is not necessary to prescribe yield regulation.

SECTION 4.13. SEQUENCE OF FELLING:

4.13.1. The sequence of coupes and compartment numbers is given in the **Appendix No. XIX** of volume II.

SECTION 4.14. DEMARCATION OF COUPES, PREPARATION OF TEATMENT MAP, TREATMENT PROPOSED AND MARKING RULES

4.14.1. Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

4.14.2. Preparation of Treatment Map: It will be prepared by RFO and verified by ACF. 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 25^0 slope or more and 20 meter strip on both sides of the rivers or *nala*s.

2. Type 'B'- Under stocked Areas: Blanks and under stocked patches (crown density below 0.4) exceeding 2 hectare in extent.

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. The area will be further divided into two classes:
Type - D1: Areas having adequate regeneration (625 seedlings or more per hectare)
Type - D2: Areas having inadequate regeneration.

4.14.3. 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) Plantation of teak and miscellaneous species at a spacing of 2m. x 2m. shall be followed on suitable sites.

3. Area 'C':
This area does not need any planting. But the crop is tended to provide a space of $1/3^{rd}$ height of the trees to be retained.

4. Area 'D':
D1 -This area does not need any planting.
D2- The natural regeneration of this area need to be supplemented by artificial regeneration to the extent by which natural regeneration fall short of 625 per hectare.
Tending of the crop shall be carried out to provide a spacing of at least $1/3^{rd}$ height of the tree retained to facilitate the growth of trees.

4.14.4. Marking Rules: The following marking rules are laid down.

1. Type 'A' Area:

No marking will be carried out.

2 Type 'B' Area:

(i) All dead, dying and diseased 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, dying, diseased and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling.
ii) In patches not less than 0.5 ha. in extent and having teak reproduction and valuable NTFP reproduction in seedling stage, heavy openings will be made in the middle canopy by cutting miscellaneous growth to induce the growth of Natural Regeneration..
iii) The existing established teak reproduction up to 20c.m., in girth at breast height will be freed by marking over wood for removal
iv) Malformed advance growth of teak up to 30c.m. in girth will be cutback. The over wood and inferior species likely to interfere with the coppice growth will be marked for felling.
v) Thinning, marking will be carried out in favour of teak and other valuable species
vi) No fruit bearing tree shall be marked for felling.

SECTION 4.15. SUBSIDIARY SILVICULTURAL OPERATIONS:

4.15.1. The Subsidiary silvicultural operations include (1) Cleaning and (2)Thinnings.

4.15.2. Cleaning: cleaning shall be carried out in the sixth year of felling and the operations will be as given in para. **3.15.1.2.**

4.15.3. Thinning: Thinning shall be carried out in the eleventh year. Trees shall be provided a space of 1/3 rd height of the trees retained.

SECTION 4.16. REGENERATION:

4.16.1. Natural Regeneration: The NR will be protected against fire and animals. TCM or other kind of fencing may be established.

4.16.2. Choice of species: Teak 50% Misc. 50%, (*Khair, Aonla, Sitaphal, Bhirra*,etc.,) will be planted. Soils suitable for bamboo plantation shall be taken up exclusively for bamboo.

4.16.3. Method of Planting:
The planting model approved by the competent authority will be implemented

4.16.4. Pre-Planting And Planting Operations: The pre-planting and planting operations as approved by the competent authority shall be carried out**.**

SECTION 4.17: OTHER REGULATIONS

4.17.1. 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 remain sufficiently away from the stems of the trees and burning does 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.

4.17.2. 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.

4.17.3. 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.

4.17.4. The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

4.17.5. 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 15 th February to 15 th June on 24 hour duty on suitable area basis.

4.17.6. 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 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.

4.17.7. Soil Conservation Works: 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. The design is given in the **Appendix No. XXIII**. 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.

4.17.8. 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.

4.17.9. 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.

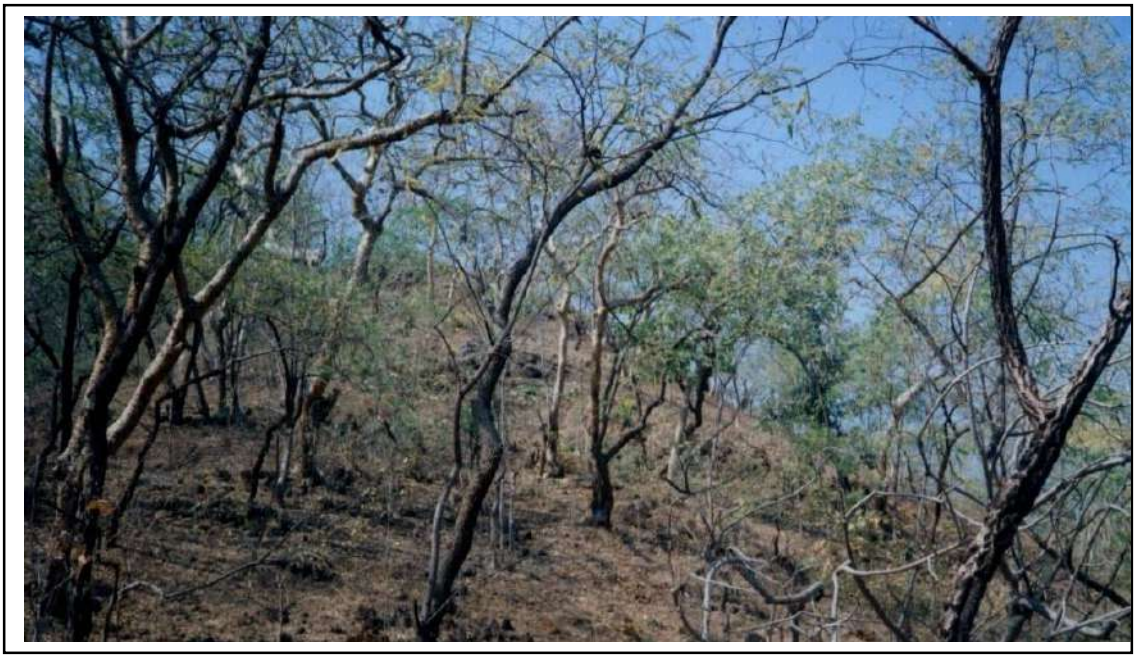
4.17.10. By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests.

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

4.17.12. 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.

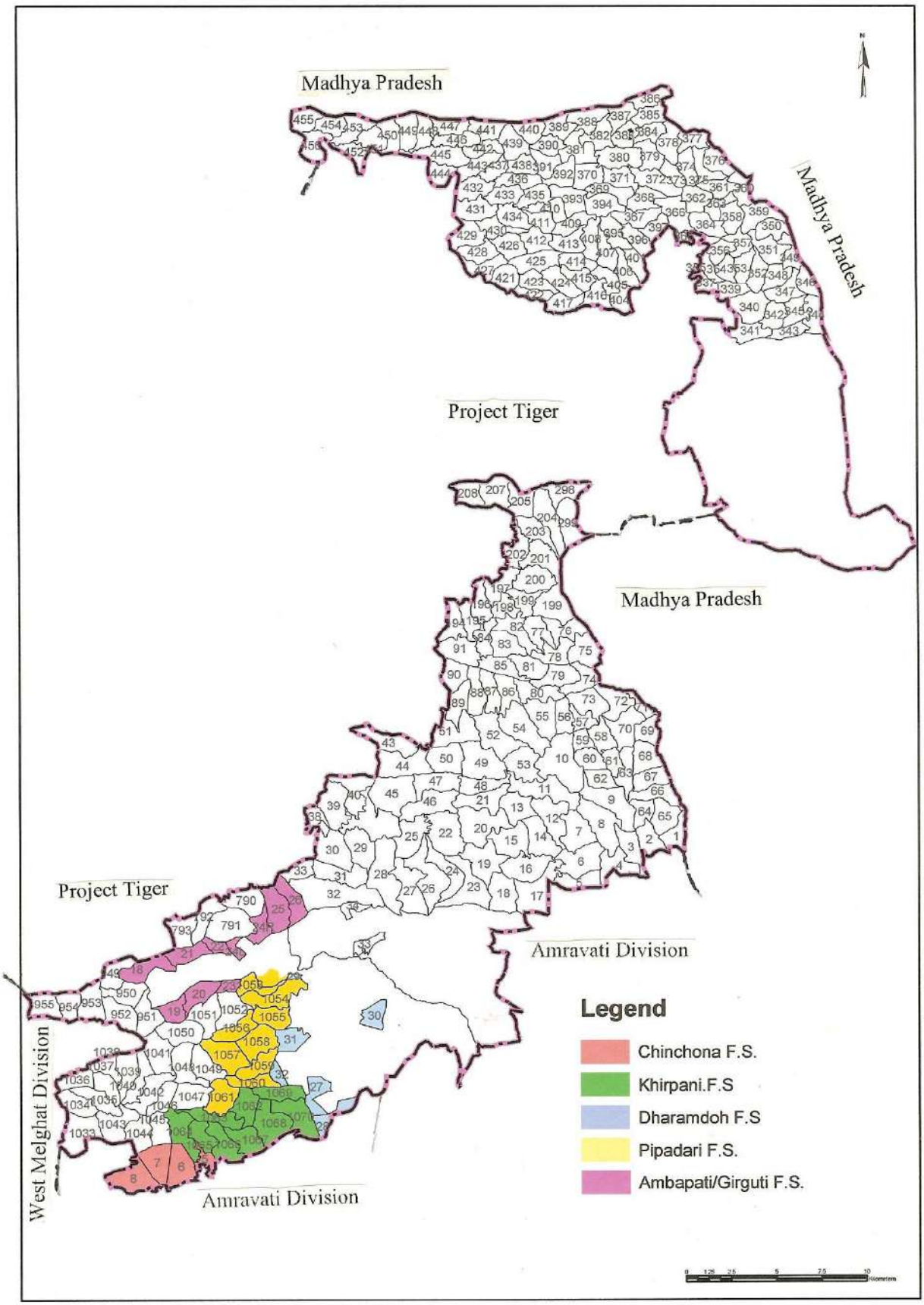
AFFORESTATION WORKING CIRCLE

Forest of Afforestation W.C. of Khirpani F.S. of Anjangaon Range
Showing Ex-Jahagir Forests of Chauryamal



Comptt. No.1067 Of A.W.C Showing Well Stocked Patches

Afforestation Working Circle of East Melghat Division



CHAPTER - V

AFFORESTATION WORKING CIRCLE

SECTION 5.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

5.1.1. This working circle is also restricted within Anjangaon Range extending to 7835.53 ha. The area is highly degraded and eroded with poor moisture retention capacity. The basic objective is to restore the vegetative cover by tending operations associated with Soil and Moisture Conservation works. No harvesting has been prescribed. The details of plantations and SMC works carried out in this working circle are as follows.

Year	Coupe No.	Compt.No.	Area planted
2006-07	I	Chinchona Sr.No.6, 1063	44.00
2007-08	II	Chinchona Sr.No.6	35.00
2008-09	--	--	0.00
2009-10	--	--	0.00
2010-11	V	Girguti Sr.No. 7 Ambapati Sr.No. 7,	55.00
2011-12	VI	Pipadari Sr. No. 7, Chinchona Sr.No.6	76.98
2012-13	VII	1055, Dharamdoh Sr.No. 2	40.00
2013-14	VIII	1054	30.00
2014-15	IX	--	0.00
Total			**280.98**

Soil and Moisture Conservation Works

Year	Coupe no.	Compartment number / Sur. No.	Nature of Work	Expenditure incurred (Rs.)
(1)	(2)	(3)	(4)	(5)
2006-07	I	Kundi Sr. no. 1	L.B.S.	33098
2007-08	II	Kundi Sr. no. 1	L.B.S.	42358
2008-09	III	--	Nil	Nil
2009-10	IV	1058	L.B.S.	50583
2010-11	V	1060	L.B.S.	190000
	V	1070 / 1068	L.B.S.	117064
	V	1035	L.B.S.	320000
2011-12	VI	1034	L.B.S.	176958
2012-13	VII	1035	L.B.S.	81630
2013-14	VIII	1065 / 1067	L.B.S.	37000
2014-15	IX	1051 (Chinchona)	2 Cement Plugs, 1 Gabian Structure	11,67,000

Note- 1) LBS → Loose Boulder Structures 2) The amount in column (5) indicates the relative extent to which the works could be taken up.

5.1.2. The silvicultural operations prescribed are generic in nature, with no felling or thinning operations. Only CBO and cleaning is prescribed.

5.1.3. Considering the poor soil structure, heavy erosion and absence of vegetative cover, the only best suited local species is the Neem. It is for this reason bush sowing of Neem before monsoon is prescribed. However, this vital and important prescription doesn't appear to have been followed. It is suggested that under the paucity of funds, bush sowing of Neem should be adopted on large scale, wherever feasible.

5.1.4. To provide means of livelihood to the local people, the cultivation of marketable medicinal plants, which can be suitably be cultivated under the local conditions may also be tried. Short gestation species which have reasonable market in Amravati or other linkages around may be tried on experimental basis. The National Medicinal Plantation Board provides funds on 100% financial assistance for medicinal plant cultivation. All such efforts with soil conservation measure prescribed can produce wonderful results in this less productive and difficult terrain.

SECTION 5.2. GENERAL CONSTITUTION:

5.2.1. Highly degraded and eroded areas with poor moisture ret ention capacity are included in this working circle. In view of these factors dieback phenomenon is very common and repeated measures to afforest these areas could not bring in desired results. These areas were managed under Improvement Working Circle in the previous Working Plans and Afforestation Working Circles during B. S. Thengdi's Plan.
The details of Area are as under:

Table No. 5.1
Table showing Area of afforestation Working Circle

Sr. No.	Name of the Range	Total Area	Area under AWC ha.	% w.r.t. Range area	% w.r.t W. C area
1	Anjangaon	14182.96	7835.53	55.24%	
	Total	**14182.96**	**7835.53**	**55.24%**	--

SECTION 5.3. GENERAL CHARACTER OF VEGETATION:

5.3.1. The 'C' Class forests of *Chinchona* block is almost devoid of tree-growth. In most of the areas, sheet rock is exposed. There are some patches of open and stunted crop consisting of species like *bhirra, salai, dhaora, dudhi, lendia, khair, bhosa, Palas and lokhandi*. Bushes of *bharati, nirgudi*, and *khirsali* are found scattered. Whereas in Ex-*Jahagir* forests southern aspect is devoid of tree growth but northern aspect is having fair tree growth. The rest of the forests are also composed of deciduous species such as *salai*,
dhaora, moyen and with poor quality teak and *saj*. The forests are mostly understocked. The under growth is formed by dense grasses usually *pochati, sainar, kusal, gondhali, rusa* and *jangli tulsi*. Overall the crop is young to middle aged. In general site quality is IV. Natural regeneration of *bhirra* and *dudhi* is satisfactory whereas it is deficient for
other species.

SECTION 5.4. FELLING SERIES:

5.4.1. The entire area of this Working Circle has been divided into five Felling Series. It includes the Ex-*Jahagir* forests and erstwhile 'C' Class forest of *Chinchona* village.

5.4.2.Formation Of Coupes: There shall be 20 coupes nearly of equal Area in each Felling Series. The details are given in **Appendix No. XIX** of Volume II of this plan.

SECTION 5.5. BLOCKS AND COMPARTMENTS:

5.5.1. The compartments allotted to different Felling Series and their areas are shown as below.

Table No. 5.2
Table Showing Compartments/S. No. Allotted to Different Felling Series

Sr. No.	Range	Name of Felling Series	Compt. No./ S.No. / Village Name	Area in ha.
1	*Anjangaon*	*Pipadari*	1053 to1061	2027.38
		Khirpani	1062 to 1070	2201.88
		Chinchona	S. No. 5 to 8	958.30
		Girguti-Ambapati	*Tekadi, Nagziri, Jamli, Girguti, Ambapati, Kundi*	1580.55
		Dharamdoh	*Chauryamal, Sakri, Chikhalpati, Dharamdoh, Satti-Ruipatha*	1067.42
			Total	**7835.53**

SECTION 5.6. SPECIAL OBJECTS OF MANAGEMENT:

5.6.1. The special objectives of management of this Working Circle are as under:

1. To restore the vegetative cover of these degraded and open areas, primarily by tending of existing natural regeneration and rootstock and supplementing it with plantations, wherever necessary.

2. To check soil erosion by suitable soil and moisture conservation measures.

SECTION 5.7. ANALYSIS AND VALUATION OF THE CROP:

5.7.1.Stock Mapping: Crown density mapping of the area was carried with the help of the satellite imageries and the same was verified with ground truth verification. Majority of the area is under site quality IV.

5.7.2. Age and Density: Age varies from young to middle. Of the total area allotted to this working circle 46.5% of the area is having more than 0.4 density and remaining area is under stocked.

5.7.3. Enumeration: Since 50% of the area is well stocked, enumeration was carried out in all compartments allotted to this Working Circle except the 'C' Class and Ex- *Jahagir* forests. The results shows that young girth classes are predominant and teak is around 50% of the growing stock.

Table No. 5.3
Table Showing No. Of Trees/Ha Girth Class Wise In The Afforestation Working Circle (Pipadari F. S. And Khirpani F. S.)

Species	15/30	30/45	45/60	60/75	75/90	90/105	105/ 120	120/ 135	135/ 150	>150	Total
Teak	79.4	49.2	28.9	14.3	6.1	2.9	1.2	0.3	0.4	0.1	170.9
Misc.	97.4	46.1	30.5	20.6	16.7	10.2	5.8	3.3	2.1	0.2	232.9
Total	**176.8**	**95.3**	**59.4**	**34.9**	**22.8**	**13.1**	**7.0**	**3.6**	**2.5**	**0.3**	**403.8**

Table No 5.4
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	III	56.5733	0.75
	IVa	362.312	4.78
	IVb	2843.3393	37.50
	Total	**3262.2246**	**43.02**
Mixed	III	255.772	3.37
	IVa	62.6	0.82
	IVb	2518.3033	33.21
	Total	**2836.6753**	**37.41**
Salai	IVa	11.1818	0.15
	IVb	273.5164	3.61
	Total	**284.6982**	**3.75**
Old Plantation	-	545.0144	7.19
	Total	**6928.6125**	**91.37**
Under stocked	**-**	425.1214	5.61
Not stock mapped	**-**	229.2095	3.02
	Total	**7582.9434**	**100**

Table No 5.5
Table Showing Crown density data obtained with the help of satellite imagery

Category	Area in ha.	% to the total area of the working circle	Remark
Well stocked	3646.3041	46.54	
Understocked	3549.6572	46.81	
Blank	371.3399	4.74	
Waterbody	8.3740	0.11	
Other	7.2681	0.09	
Total	**7582.9434**	96.78	
Area of W.C.	**7835.53**	100.00	
Difference	**252.5866**	3.22	

SECTION 5.8. SILVICULTURAL SYSTEM:

5.8.1. The area will be regenerated with suitable species. No harvesting is prescribed in this Working Circle. Tending of existing rootstock, saplings, coppice shoots and poles, supplemented by plantations, are prescribed as the main activities in this Working Circle.

5.8.2. Old plantations, which have failed in the past, shall not be taken up again under fresh plantation scheme unless reasons of failure are examined and addressed.

5.8.3. Since these areas are close to habitations fuel and fodder availability will be met through plantation of fuel wood and fodder species and by involving people in their management.

5.8.4. The areas of this Working Circle are, primarily, in bad shape. Inadequate subsoil moisture, highly compact soil structure and heavy biotic pressure are the main limiting factors for the establishment of seedlings in this area. Top soil has been washed away and as a result vast areas do not have even adequate soil depth to support tree crop.

As a consequence a large chunk of these areas lay bare without any significant vegetation. Hence, intensive soil and moisture conservation works and tending of existing rootstock have been proposed to be give priority over to plantation. In addition, concept of Ecological index has been proposed for deciding the number of seedlings to be planted per hectare, over the traditional method of planting based only on soil depth zonation approach.

Ecological Index of a site gives us an idea as to number of plants which could be sustained per hectare on a particular site depending upon the various locality factors of the area. It is based upon the climatic and edaphic conditions prevailing in the area and is determined by the formula, as follows.

$$\text{Ecological Index} = \frac{P \times D}{Tr \times EPT}$$

Where	P	=	Annual Precipitation in m.m.
	D	=	Number of rainy days in a year
	Tr	=	Range of maximum temperature averages
	EPT	=	Potential evapo-transpiration in m.m.

There is no need for planting more seedlings per ha than those could be sustained on a particular site. The emphasis is to grow the optimum number of seedlings per hectare, which should grow into a healthy future stock with little mortality. Ecological Index for these areas is proposed to calculate on the basis of data of *Ghatang* station to determine the number of seedlings to be planted per hectare in these areas. A sample calculation of the Ecological Index has been shown in **Appendix No. XXIV.** of Volume II of this plan.

SECTION 5.9. CHOICE OF SPECIES:

5.9.1. The choice of species will depend upon soil type, its depth, drainage and local requirements. However, indigenous species of small timber, firewood and fodder will be preferred. In suitable areas *Khair, charoli, kullu, Moha, Bhirra, Lendia,* teak and indigenous edible fruit and flower yielding trees of local economic importance like *Sitaphal, Aola, Biba, Hirda, Beheda, bor* will be planted. *Ficus* species shall be planted at the rate of two trees per ha for wildlife. Bamboo shall be planted in suitable areas. Where the local requirement is for fuel, short rotation species like *Acacia senegal* and *Acacia catechu* etc. shall be considered in preference to other species. Grass development may be taken up in areas where demand for grass or grazing is excessive. In such areas plantation of tree species may be taken up only if the local people through JFM are willing to protect it from fire and grazing.

SECTION 5.10. REGULATION OF YIELD:

5.10.1. Since most of the area is degraded, no yield is expected. However, the small timber and firewood removed during the tending operations shall be given to the members of Forest Protection Committee if they take up the responsibility of protection of the forest area or as per the provisions contained in G.R. dated 25/4/2003.

SECTION 5.11. IMPLEMENTING AGENCY:

5.11.1. Coupes shall be worked departmentally.

SECTION 5.12. DEMARCATION OF COUPES AND PREPARATION OF TREATMENT MAP AND TREATMENT PROPOSED:

5.12.1. Demarcation: Demarcation of first and second coupes shall be done in first year of operation. Barring first coupe rest of coupes will be demarcated one year in advance.

5.12.2. Preparation of Treatment Map: Basic treatment map shall be obtained from GIS, which will show steep areas having slopes more than 25^0, a 20 meter wide strip area of nallas, eroded areas, the under stocked areas, old teak plantation & good dense forest lands. The R.F.O. shall verify and update the Treatment Map and is again verified by A.C.F. concerned.

1. 'A' Type of area-Protection Areas: It includes the following areas:
i). Areas with steep slopes i.e. more than 25^0 .
ii). Twenty meter wide strip on either side of the watercourse.
iii). Excessively eroded areas.

2. 'B' Type of area- Under stocked Areas: It includes areas with crown density less than 0.4 but exceeding 2 ha. in extent at one place.

3. 'C' Type of area- Pole Crop: It includes patches of well-grown pole crop of teak and other species suitable for retention as a future crop. The patch shall not be less than one hectare in extent.

4. 'D' Type of area- Well Stocked Areas It includes areas with crown density more than 0.4.

5.12.3. Treatments Proposed: The following treatments to various categories of the areas are prescribed.

1. 'A' Type area-Protection Areas: The following operations shall be carried in the A- type areas.
i) Gully plugging and loose boulder structures except continuous contour trenches shall be taken up as described in the **Appendix No. XXIII** of Vol. II of this plan.
ii) Seed sowing of *Khair, Neem, Chandan* and other local species shall be carried in the bushes with the help of the regular forest staff.
iii) Stakes of *Ficus, Pangra, and Salai* shall be planted on suitable sites.
IV) No tree of any kind is permitted to fell and in suitable patches afforestation will be taken up.

2. 'B' Type of area-Under stocked Areas: Measures shall be taken up to induce natural regeneration supplemented by artificial regeneration.
i). Rooted stock will be tended.
ii). Seeds of suitable species like neem and *Chandan* will be sown in the bushes through *Vanmajoors* and *baramahi* labourers available in the beat. In fact the beat guard shall carry these seeds each day he visits forest at the onset of monsoon and carry out seed sowing in bushes and degraded areas.
iii). Suitable area shall be planted with species as given in Para 5.8.
iv). Malformed trees shall be cut back.
v). Singling of multiple coppice shoots shall be carried out wherever needed.
vi). Soil shall be dug in the form of circular trenches around the periphery of crowns encircling *Salai, Dhawda, Tendu, Bhirra, Tiwas* and *Kulu* trees, to encourage root suckers.
vii) Soil and moisture conservation works shall be taken up in the area by constructing cement plugs and loose boulders in the nallas.
viii) All high stumps shall be cut as close to the ground as possible and dressed.

3. 'C' Type of area: The pole crop shall be thinned to the 1/3rd of the height of trees to be retained.

4. 'D' Type of area: Only hygienic felling shall be carried out. Dead, dying, suppressed, crooked trees shall be marked for felling provided its removal shall not cause soil erosion after retaining 2 dead trees/ha. and all other operations except planting shall be carried out as given in the B type of area treatment.

SECTION 5.13: REGENERATION:

5.13.1. The artificial regeneration in suitable areas shall be resorted. Where reboisement is resorted in an area, the factors responsible for the failure of plantations shall be ascertained and addressed before planting. Main reasons for failure of plantations are excessive grazing, improper choice of species, and poor soil depth. Natural regeneration and coppice regeneration are supplemented by artificial regeneration. It is found that plantations of *Khair* & Teak are doing much better than other species. Regeneration of Bhirra is observed.

Artificial Regeneration:

5.13.2. The planting model shall be as per standard technique giving due consideration to the ecological index and site requirements and it is prepared after calculating the Ecological Index and approved by the C.C.F. (Territorial).

5.13.3. The planting shall be taken up in the next year of main working. Seeds used for raising nursery should be collected from the known source or from seed unit of FDCM. Seeds used should be of good quality.

5.13.4. For grass development area shall be ploughed and sown with seeds of grasses like Paonia, *Sheda*, *and Dinanath* etc. Areas suitable for *Rusa* grass shall be identified and plantations shall be raised by involving JFM Committees. In bushes seeds of neem and chandan shall be sown before the on set of monsoon.

SECTION 5.14. SUBSIDIARY SILVICULTURAL OPERATIONS:

5.14.1. The following works shall be carried out in the next year of felling and in the subsequent years.

5.14.2. Cut Back Operations: It shall be carried out in the next year of felling.

(i). All standing trees and live high stumps marked for felling but not felled shall be felled.
(ii). All trees damaged, which are not likely to recover, shall be felled.
(iii). All climbers shall be cut.
(iv). Dressing of stumps shall be carried out.

5.14.3. Cleaning: In the 6th year commencing from felling following operation shall be carried out.
i) All climbers will be cut.
ii) Lantana and other growth of inferior species interfering or likely to interfere with the reproduction of teak and other valuable species shall be cut and removed.
iii) Coppice shoots of teak shall be removed if NR and AR are successful, otherwise coppicers are reduced to one well grown shoot.
iv) The established advanced growth of teak and other valuable species will be spaced out suitably.

SECTION 5.15: OTHER REGULATIONS:

5.15.1. Fire protection measures and grazing protection measures shall be taken up as given in the Section 16 of the SCI Working Circle.

5.15.2. Fire Protection: Main working coupes shall be rigidly fire protected for a period of five years from the year of main felling. The local Forest Protection committee shall be assigned this work.

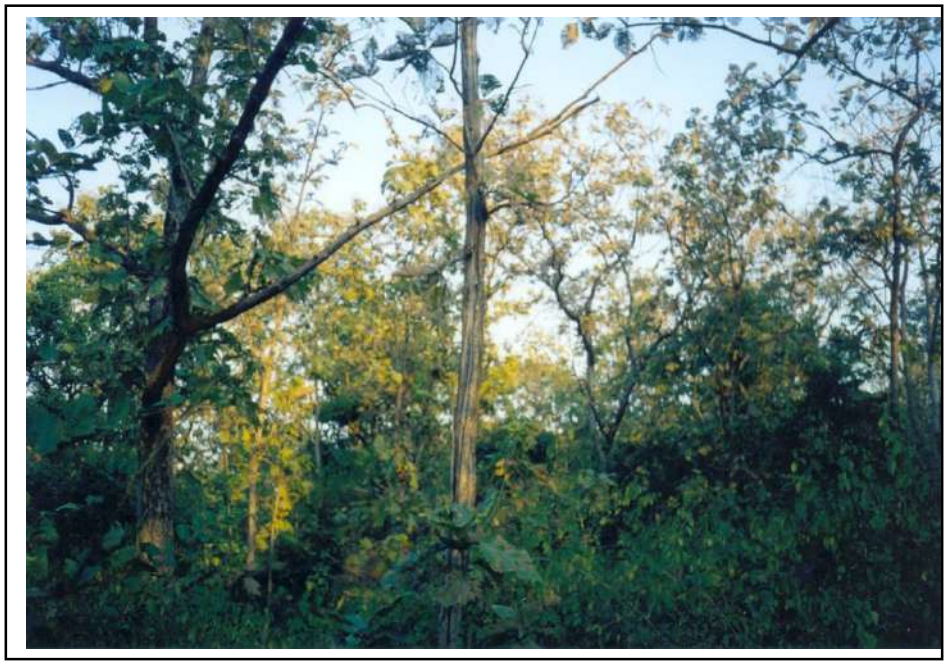
5.15.3. Grazing: Areas of main working coupes shall remain closed for grazing for a period of five years from the year of planting.

5.15.4. Soil Conservation Works: Gully plugging and *nala* bunding works shall be taken up. Cement plugs or earthen *bandhara* be taken up on a large scale to preserve moisture for a longer period, simultaneously the catchment areas of the cement plugs/ earthen *bandhara* shall be treated with loose boulder structures, so as to prevent siltation in the dams. The design is given in the **Appendix No. XXIII**. In addition to this contour stone bunding 60 cm x 30 cm size shall be taken up on the slopes to prevent soil erosion, where boulders are not available agave suckers in 2 rows will be planted, all along the contours at a contour interval of 50 meters.

5.15.5 Peoples Participation: Protection of planted area shall be assigned on sharing basis of returns as per the Govt. G. R. to the JFM.

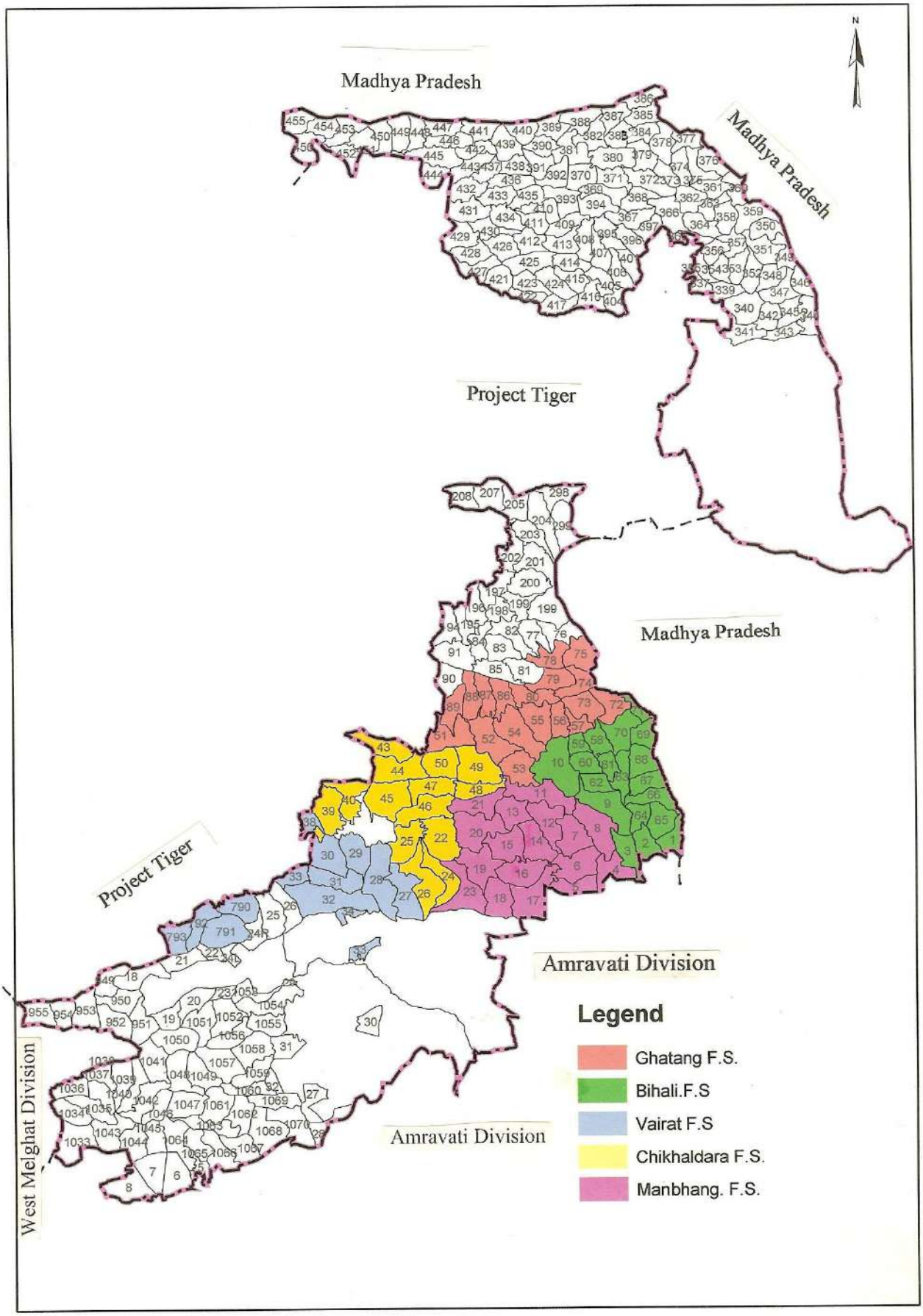
PROTECTION WORKING CIRCLE

Protection W.C. Of Chikhaldara Range Compt. No.50
Showing Grasses In The Upper Reaches



Protection W.C. Of Ghatang Range
Showing Good Teak Forest Of Compt. No. 62

Protection Working Circle of East Melghat Division



CHAPTER - VI

PROTECTION WORKING CIRCLE

SECTION 6.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

6.1.1. Almost 1/3rd of the area of the Division comes under this working circle which predominantly consists of precipitous slope of Chikhaldara and Ghatang Range. The main objective of the management is to maintain and improve the adequate vegetation and to preserve the soil on slope. It is because of the nature of terrain, only hygienic and improvement felling is prescribed to facilitate the growing stock without causing soil erosion duly supplemented with Natural and Artificial Regeneration.

6.2.1. The details of the plantations taken up is as under.

Year	Coupe No.	Compt. Number	Area planted (ha)
(1)	(2)	(3)	(4)
2006-07	--	--	0.00
2007-08	--	--	0.00
2008-09	--	--	0.00
2009-10	--	--	0.00
2010-11	V	15,44,9	75.00
2011-12	VI	51,46, 32,38	115.00
2012-13	--	--	0.00
2013-14	--	--	0.00
2014-15	--	--	0.00

6.3.1. Apart from this, the removal of Lantana (*Lantana aculeate, Lantana camara*) which has infested the area all over has been removed to some extent under MREGS. The details are as under.

Sr. No.	Year Of Working	Felling Series	Compartment no	Coupe No.	Area where Lantana removal has been taken up (ha)
(1)	(2)	(3)	(4)	(5)	(6)
1	2010 - 11	Ghatang	--	--	--
2		Bihali	67	VII	25.00
3		West Bihali	9	VI	25.00
4		Masondi	43	VII	25.00
5		Bhulori	63	VII	25.00
6		Chikhldara	44	V	100.00
7		Vairat	--	--	--
8		Manbhanga	--	--	--

6.4.1. The Lantana has not only encroached upon this working circle but also has shown its menace almost across the division. It is one of the major causes of poor regeneration of tree species in the area. Unfortunately the scheme of removal of Lantana has been discontinued under MREGS. The same may be revived to ensure the smooth flow of funds required for this purpose. The grazing control as prescribed in para 6.14.2 should be effectively implemented.

6.5.1. The unique feature of this working circle is that it is divided only in 10 coupes unlike the other ones which have been divided into 20 coupes. It is therefore recommended that after completion of works in 10 coupes the same cycle should be repeated till 2025-26 with the same sequence of operations and regulations.

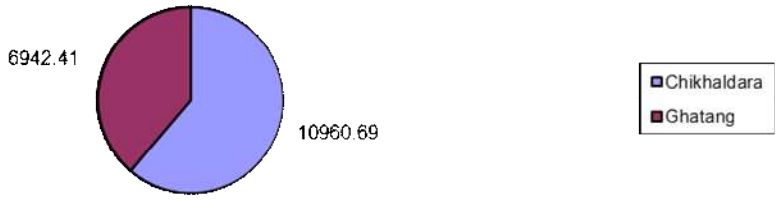
SECTION 6.2. GENERAL CONSTITUTION:

6.2.1. This working circle includes the area belonging to the precipitous slopes of the *Chikhaldara* and *Ghatang* Range. The main ridge of Gawilgarh hills, falling in *Chikhaldara* Range and Behali area in *Ghatang* Range is included in this working circle. Similarly areas with lesser slopes but prone to erosion due to poor stocking and biotic pressure have also been included in this W.C. There are numerous other steep areas, which could have been included in this Working Circle but had to be excluded, as they are inextricably intermingled with compact blocks of other type of forests, demanding a separate treatment. In the earlier plans these areas were worked under different working circles.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	*Chikhaldara*	10960.69	10960.69	100	61.36
2	*Ghatang*	12808.84	6942.41	54.20	38.64
	Total	**23769.53**	**17903.10**	**--**	**100.00**

Pie Diagram Showing Area Allotted To Protection Working Circle



SECTION 6.3. GENERAL CHARATER OF VEGETATION:

6.3.1. The site quality of the forest is generally IVa and IV b. In some parts quality III dry teak forests with isolated small patches of mixed dry deciduous forests near water bodies and springs are also observed. The density and quality increases on cooler aspect and along the streams. Teak is the dominant species. The other species found with Teak are *dhaora, moyen, tiwas, kumbhi, lendia, kakad, mango, jamun, amaltas, pokar, bhirra* etc. Some old Eucalyptus plantations in small patches are also observed. The crop varies to a large extent in composition. The tree growth is usually stunted and badly formed around *Chikhaldara* area. Bamboos are generally absent but they are observed in the compartments of northern part of *Ghatang* Range. Lantana is very common in the tract.

SECTION 6.4. SPECIAL OBJECTS OF MANAGEMENT:

6.4.1. The area allotted to this working circle form the headwork of important watercourses, traversing the tract of *Melghat*. The need is to conserve these forests for the indirect benefits they confer in the prevention of the denudation, the protection of stands of commercial timber and the preservation of the water regime. 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, and to study their population dynamics.

SECTION 6.5. ANALYSIS AND VALUATION OF THE CROP:

6.5.1. The density of the stocking is generally good. The areas between *Chikhaldara* and *Ghatang* are understocked with intermittent patches of good forest. The regeneration is very scanty in the areas of *Chikhaldara* Range. The under growth is mostly lantana. The crop is middle aged. Bamboos are found in the compartments of northern *Ghatang*. Southern parts of *Ghatang* Range and *Chikhaldara* Range are containing teak as main species in the growing stock. The associates of Teak are *ain, tiwas, dhawda, tendu* etc.

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	II	9.6237	0.05
	III	2307.0926	12.89
	IVa	3990.5412	22.44
	IVb	5729.2641	32.22
	Total	**12036.5216**	**67.68**
Mixed	III	341.4341	1.92
	IVa	82.1397	0.46
	IVb	699.5167	6.31
	Total	**1123.0905**	**8.69**
Salai	III	10.0171	0.06
	IVb	0.8761	0.004
	Total	**10.8932**	**0.064**
Old Plantation	-	61.1476	0.34
	G. Total	**13231.6529**	**74.41**
Under stocked	**-**	3336.4953	18.76
Not stock mapped	**-**	1214.9013	6.83
	Total	**17783.0495**	**100**

Table No 6.3
Table Showing Crown density data obtained with the help of satellite imagery

Category	Area in ha.	% to the total area of the working circle
Well stocked	13443.1215	75.13
Under stocked	3930.9236	21.97
Blank	385.9536	2.17
Water body	14.3908	0.80
Other	8.6600	0.05
Total	**17783.0495**	99.38
Area of W.C.	**17893.64**	100.000
Difference	**110.905**	0.62

SECTION 6.6. COMPARTMENTS AND FELLING SERIES:

6.6.1. The areas allotted to Protection Working Circle has been divided into 5 felling series each containing 10 coupes. The statement of compartments allotted to this Working Circle and Felling Series is given in **Table No. 6.4.**

Table 6.4
Table Showing Compartments Allotted To Different Felling Series

Sr. No.	Felling Series	Comps/ Survey no.s allotted	Total compt. allotted	Area (ha)
1	*Manbhang*	4 to 8, 11 to 23, *Bhilkhed*	18 compts + 1s.no.	4084.91
2	*Chikhaldara*	24 to 26,39,40,43 to 50	13 compts	3206.13
3	*Bairat*	27 to 33, 790 to 793 Survey No. 33 and 34 *Kulangana* Ex-*Jahagir*	12 compts+ 2 s. no's	3669.65
4	*Ghatang*	51 to 57, 72 to 75, 78 to 80, 86 to89	18 compts.	3446.74
5	*Bihali*	1,3,9,10, 58 to 71	19 compts.	3495.67
Total			**80 compts + 3 s. no.'s**	**17903.10**

SECTION 6.7. SILVICULTURAL SYSTEM:

6.7.1. Improvement Fellings supplemented with artificial regeneration is prescribed.

SECTION 6.8. FELLING CYCLE:

6.8.1. The Felling Cycle is fixed for 10 years.

SECTION 6.9. REGULATION OF YIELD:

6.9.1. No yield regulation is prescribed.

SECTION 6.10. AGENCY FOR HARVESTING:

6.10.1. The coupes shall be worked departmentally.

SECTION 6.11. TREATMENT PROPOSED:

6.11.1. The main object of the management is to maintain and improve the adequate vegetative cover and to preserve the soil on the slopes. However hygienic and improvement fellings are prescribed in the areas to facilitate the growth of growing stock as well as to meet the local needs of the people without causing soil erosion. Essential cultural operations like climber cutting and removal of dead, dying and malformed trees shall be carried out. Improvement fellings supplemented with artificial regeneration is prescribed. Collection of minor forest produce like *mahua* flower and fruit, *char, bel, tendu*, gum, etc is permitted to the local tribes/villagers for their bonafide use.

6.11.2. 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 *vanmajoors,* Beat Guards. Where soil depth is poor, grass seeds shall be broadcasted followed by closure for grazing.

SECTION 6.12. DEMARCATION OF COUPES AND PREPARATION OF TREATMENT MAP:

6.12.1. Demarcation: Except for 1st coupe in the sequence of working of this draft plan period, coupes will be demarcated one year in advance of the main felling as given in the chapter XI, Miscellaneous Regulations of this plan. But 1st coupe will be demarcated in the first year of operation and main felling work will be in the same year where as in other coupes it will be in the following year.

6.12.2.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) The area having steep slopes i.e. more than 25°.
(b) Eroded areas or areas liable to erosion.
(c) 20-meter wide strip on either side of water courses.
(d) The area shall be protected completely, no felling of any kind of live tree 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 2 ha. more in extent are included in this category. The area is protected to encourage and nurture the natural regeneration.

(i) All dead and malformed trees shall be marked for felling after retaining two dead trees/ha.
(ii) All but one vigorously growing coppice shoot per stool provided seedling regeneration of any tree species is absent.
(iii) All high stumps will be cut to the ground level and dressed.

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 and the trees shall be spaced out to one third of the height, of the trees retained. .

4.Type D - Well Stocked Areas: The forest areas having more than 0.4 density are included in this category. The following operations will be carried out:

(i) All dead trees except two per ha will be marked for felling.
(ii) All high stumps shall be cut.
(iii) Coppice shoots shall be reduced to one per stool provided seedling regeneration of any tree species is absent.
(iv) Tending of the growing stock shall be carried out to facilitate the growth of the growing stock**.**

SECTION 6.13. REGENERATION:

6.13.1. Natural Regeneration: The treatment given in the para 2.13.2 of Chapter II be followed to induce the natural regeneration. In addition to this soil is dug in circular trenches around the periphery of the crowns of *tiwas, tendu, dhaora, bhirra* and *salai* to obtain root suckers. This operation is carried out preferably before the onset of rainy season. Area containing good natural regeneration will be identified in the coupe and marked on the treatment map.

6.13.2. 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 *ain, lendia, mowai, salai, kusum, char, aonla, beheda,* etc., shall be sown. Vanmazoors and Beat Guards shall carry out seed sowing.

SECTION 6.14. SUBSIDIARY SILVICULTURAL OPERATIONS:

6.14.1. Cut Back Operations: Cut Back Operations will be carried out in the next year of the felling in the area. (a) All badly damaged trees not likely to recover will be cut. (b) All climbers, which are not of ecological and economical values, will be cut.

6.14.2.Cleaning: Cleaning will be carried out, during the Sixth year of the felling. The operations are as below.
(a) All climbers, which are not of ecological and economical value, shall be cut.
(b) Coppice shoots, if required, shall be reduced to one per stool.
(c) Inferior growth which may interfere with the teak or miscellaneous species of choice will be removed.
(d) Damaged and malformed poles will be cut back.

SECTION 6.15. OTHER REGULATIONS:

6.15.1. Fire Protection: The prescriptions given in the SCI Working Circle shall be followed.

6.15.2. Grazing Control: No grazing shall be allowed in protection forests. In case of emergent situation the rotational grazing may be allowed. 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 protected forests should not exceed one cattle unit for 10 acres.

Soil And Moisture Conservation Works:

6.15.3. On the steep slopes, neither CCT nor DCT works be carried out to prevent soil erosion. Loose boulder 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.

CHAPTER – VII

BAMBOO (OVERLAPPING) WORKING CIRCLE

SECTION 7.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

7.1.1. Though it is overlapping working circle covering an area 30230.84 ha (almost 54% of the total area of the division), its actual extent is limited to only 2 ranges namely Jarida and Ghatang. The estimated area under Bamboo is 9579.13 ha. The predominant species is *Dendrocalamus strictus.* The scientific procedure of Bamboo working is almost standardised in Maharashtra state.

7.1.2. It is worth mentioning at this point is that the bamboo in Rahu, Sumita, Butida and Khari was traditionally used to be given to M/S Ballarpur Paper Industries Limited (BILT) on long term agreement basis. M/S MILT has extracted such Bamboo till around 2004. However, no continuous commercial extraction by a single Non-Government agency has taken place since then.

7.1.3. Change in legal positions and policies in respect of bamboo and minor forest produce:-

It is worth to mention that almost entire East Melghat Division is comprises in the scheduled area in Amravati District of Maharashtra State. The Scheduled Areas have been notified vide notification No. 521 dated 02.12.1985 issued by the Hon'ble President of India. The Parliament enacted the Provisions of Panchayat (Extension to Scheduled Area) Act 1996 in the year 1996 with the objective to provide for extension of the provisions of the Part IX of the Constitution relating to the Panchayats to the Scheduled areas. Section 4 of the said Act enlists the exceptions to Part IX of the Constitution. Section 4(m)(ii) is relevant in the present matter, which read, as under:-

4. *Notwithstanding anything contained under Part IX of the Constitution, the legislature of a State shall not make any law under that part which is inconsistent with any of the following features namely ----*
(a) ----------
(b) ----------

(m) While endowing Panchayats in the Scheduled Area with such powers and authority as may be necessary to enable them to function as institutions of self government, a state legislature shall ensure that the Panchayats at the appropriate level and the Gram Sabha are endowed specifically with ----------
(i) ----------
(ii) with the ownership of Minor Forest Produce.

(b). However, the terms 'Minor Forest Produce' has not been defined in the PESA. In the year 1997, the State Legislature enacted the Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce Regulation of Trade (Amendment) Act, 1997, wherein the term 'Minor Forest Produce' was defined as those forest produce, which were specified in the Schedule appended to Chapter II in the said Act. The said Schedule contained as many as 33 forest-produce other than bamboo. The provision was also laid down in Section4(1) to vest the ownership of minor forest produce found in the Government lands in Scheduled areas (excluding the National Parks and Sanctuaries) in the Panchayat within whose jurisdiction such area falls.

The said Act has been amended vide Notification No.3/Bamboo- MFP/741 dated 19.08.2014 issued by the Hon'ble Governor of Maharashtra, in exercise of powers vested with him under para 5(1) of Scheduled 5 of the Constituition whereby the word Minor Forest Produce has been defined as under-

"Minor Forest Produce" includes all non-timber forest produce of plant origin including bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu or kendu leaves, medicinal plants and herbs, roots, tubers and the like."

(Note – The definition is as at par with what has been given in the FRA 2006)

(c) The extent of ownership over minor forest produce has been clarified in Section 4(2) of the Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce Regulation of Trade (Amendment) Act, 1997, which reads as under-

"4(2) for removal of doubts it is declared that the ownership of the Minor Forest Produce shall not include the ownership of the land or trees in that Panchayat area and the same shall be governed by the provisions of the Indian Forest Act, 1927."

7.1.4. It may be pointed out that the Indian Forest Act, 1927 does not differentiate between the minor and major forest produces, for the reason that instead of ownership, it lays emphasis on protection of forest produce, wherever it is found. By the said amendment, applicable in the scheduled area, the Bamboo no more remains a tree in the scheduled area and specifically becomes a minor forest produce. However ouside the scheduled Area, its status is still "Tree" and "Timber" as per section 2(6) of Indian Forest Act 1927.

The Hon'ble Governor exercising his powers under Paragraph 5(1) of the 5th Schedule to the Constitution of India has further modified the provisions of Indian Forest Act in respect of the scheduled areas, by inserting Section 28A in the Indian Forest Act, which reads as under:-

28A. (1) Notwithstanding anything contained in this Act, the transit permits, in relation to transportation of minor forest produce in the Scheduled Areas referred to in Clause (1) of article 244 of the Constitution of India shall be modified and given by the Panchayats at the appropriate level and Gram Sabha or a committee thereof.

(2) All decisions for the collection and sale of minor forest produce in the Scheduled Areas, and the sharing of all sale proceeds shall be taken by the Panchayats at the appropriate level and the concerned Gram Sabha.

Explanation.- For the purposes of Chapter III A, --

(i) "minor forest produce" in Scheduled Areas shall have the same meaning as assigned to it in the Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act, 1997,

(ii) "Gram Sabha" shall have the same meaning as assigned to in Chapter III A of the Mahrashtra Village Panchayats Act."

With the above said amendments, two major changes have taken place on the ground- (1) Being Scheduled Area, the Bamboo comes under the ownership of Panchayats and Gram Sabhas are no more under the ownership of the State Government or Forest Department; (2) All the decisions for the collection of the sale and the sharing of sale proceeds, shall henceforth be taken by the concerned Panchayat and Gram Sabha and not by the Forest Department.

The State Government has declared policy for extraction of Bamboo, whereby the Gram Sabha and the Panchayats can harvest Bamboo either on their own or with the help of the Forest Department by taking resolution to that effect. In either of the cases, the Bamboo has to be worked as per the working plan in confirmity with the Section 5(1) of the Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce Regulation of Trade (Amendment) Act, 1997.

However, the above said policy is applicable for the year 2014-15. The policy for the upcoming years is yet to be decided by the State Government. However, assuming the very fact that the Bamboo working has to be done strictly in accordance with the working plan prescriptions, no change in cutting prescriptions are being suggested.

7.1.5. Bamboo is a fast growing species and can cater to the livelihood needs of local inhabitants to a large extent. The only requirement for optimal Bamboo harvest is the scientific working which is automatically taken care of, when it is carried out under the supervision of Forest Department. However, it has observed that in the past major thurst has been laid down on the commercial harvesting (extraction of long bamboo) of bamboo without paying the desired attention towards the maintenance of hygine of bamboo clumps which requires regular cleaning operation. From the silvicutural point of view, definitely the latter operation desires more attention. This has resulted in congestion in and consequent drying of clumps with dead culmns almost everywhere. This phenomenon will definitely attract the forest fires over extensive area which is inherently fire-prone. Thus the hazard of non-working of Bamboo clumps will cast its shadow over the entire forest area and will jeopardise the entire biodiversity of the region.

From this point of view, where almost 54% of the forest division is covered by Bamboo, the silvicultural operations need to be followed with utmost caution and punctuality. Special funds must be provided under CAMPA or suitable schemes for tending of Bamboo clumps to bring them into normal state of health. Efforts must also be taken to explore the avenues to tap grants under National Bamboo Mission, for Bamboo working.

SECTION 7.2. GENERAL CONSTITUTION:

7.2.1. This is an overlapping working circle covers all bamboo bearing forests occuring in other Working Circles. The Range wise distribution of the area is as under:

Table No.7.1
Table Showing Range wise Distribution of Area Allotted to Bamboo (O) Working Circle

Sr. No.	Range	Area of Range (ha)	Area allotted W.C.		% w.r.t. Range/ Division Area	% w.r.t. W. C. Area
			Comptts	Area(ha)		
1	*Ghatang*	12808.84	59	12102.87	94.48%	40.03%
2	*Jarida*	18144.57	111	18127.97	95.65%	59.97%
3	*Chikhaldara*	10951.23	--	--	--	--
4	*Anjangaon*	14182.96	--	--	--	--
	Total	**56087.60**	**170**	**30230.84**	**53.89**	**100%**

Compartments allotted to this Working Circle are given in the **Appendix No. XXV** of Volume II of this plan.

SECTION 7.3. : ANALYSIS AND VALUATION OF THE CROP.

7.3.1. Stock mapping: Stock-mapping was not carried out during the current exercise of the plan. However Stock-map details available with P. P. Joshi's Plan have been used after due verification through data available from enumeration. Density slicing of the stocks and forest types had been verified through the data generated from the satellite imagery of the period Dec.2003.

7.3.2. Enumeration: The enumeration of Bamboo was done along with the survey of other species occurring in the area, as per Random Start Systematic Line Plot Sampling Model. Clumps were counted in three categories, i.e.

a) Healthy (having at least 8 mature culms)
b) Degraded (containing less than 8 mature culms),
c) Dead.

Few randomly selected live clumps were counted for culm analysis.

7.3.3. It was observed that bamboo clumps density per ha varies from compartment to compartment and within the compartment number of culms varies from clump to clump. Hence 1 % detailed survey for bamboo clumps and bamboo culm analysis was carried in Ghatang Range. The results are as under.

Table No7.2
Table Showing No. Of Clumps In Sample Plot

Range	Compt No.	Felling Series	Total No of Clumps	No. of Mature Clumps	Total No of Culms	Degraded Clumps	Total No of Culms	Dead	Total No of Culms
Ghatang	80	*Ghatang*	176	149	1201	27	103	-	
	89	*Ghatang*	61	48	229	6	15	7	52
	83	*Tawra*	42	41	1685	1	5	-	
	75	*Ghatang*	41	11	287	30	103	-	
	200	*Tawra*	30	6	137	18	74	6	
	201	*Tawra*	60	18	222	37	131	5	
		Total	**410**	**273**	**3761**	**119**	**431**	**18**	
		%		**67%**	*	**29%**	*	**4%**	

SECTION 7.4. SPECIAL OBJECTS OF MANAGEMENT:

7.4.1. The special objects of management constituting this working circle are;

(i) To meet the local needs of the people.
(ii) To ensure sustained yield of bamboo.
(iii) To restore bamboo crop as under story on the principles of conservation of ecosystem and optimum land use of forests.

SECTION 7.5. GENERAL CHARACTER OF THE VEGETATION:

7.5.1. The main species found here is *Dendrocalamus Strictus*, which occurs almost all over the area. The good sites are located mostly on the riverbanks with alluvial deposits.

SECTION 7.6. SILVICULTURAL SYSTEM:

7.6.1. Culm Selection System: The silvicultural system adopted for the Working Circle is selective removal of dead and mature culms from mature clumps will be the harvested accordingly. Retention of at least **8 green mature culms** per clump is prescribed.

SECTION 7.7. CUTTING CYCLE:

7.7.1. Harvesting will be carried out in three year cutting cycle; hence, each cutting series is divided into three annual coupes. Coupe laying has been done keeping in view the occurrence of bamboo area.

SECTION 7.8. CUTTING SERIES:

7.8.1. To make work centers well distributed so that disturbance is localized and administrative control can be affected better six (6) series have been identified viz. Taora, Butida, Khari, Sumita, Rahu, and Ghatang. Their boundaries are coterminous with those of felling series of selection working circle and protection working circle. Bamboo area of cutting series is given in **Appendix No. XXV** of Volume II.

Table No. 7.3
Table Showing Range wise Area Under Bamboo

Sr. No.	Range	Total area allotted to working circle Range wise (ha)	Comptts having Bamboo	Area under Bamboo (ha)	% w.r.t. Range area	% w.r.t W.C. area
1	*Ghatang*	12808.84	59	2412.13	18.83%	25.18%
2	*Jarida*	18144.57	111	7167.00	39.53%	74.82%
	Total =	**30936.81**	**170**	**9579.13**	**58.36%**	**100%**

SECTION 7.9. CALCULATION OF YIELD:

7.9.1. Since eight green mature culms are to be retained in first cutting cycle irrespective of clump size, a difference, in the yield from first cutting cycle and that of rest of cutting cycles is expected. Yield in first cutting cycle is calculated by the following formula.

Y_f = n [{0.5 r (c + 1) + m + d – 8) + {m. D}]

Where

Y_f = average Yield of culms per unit in first cycle;
n = number of healthy clumps per unit = 8.7;
r = rate of recruitment (mean current year culms) = 3.04;
c = cutting cycle in years always an integer = 3;
m = mean mature culms = 8.84,
d = mean dead culms = 2.41, and
D = number of dead clumps per unit = 2.41.

In subsequent cutting cycles formula used is as follows:

Y_s = r . c . (n + tw + T I)

Where

Y_s = average yield of culms per unit in subsequent cutting cycles;

r, c, and n as noted above;

w = numbers of degraded clumps per unit;

t = transition fraction for degraded clumps;

I = number of immature clumps per unit = 12.34; and

T = Transition fraction for immature clumps = 0.3.

Average annual production

H = $(A \times c / P) [Y_f + Y_s (P/c - 1)]$

Where P is period of plan =10 (years); and

A is area of current coupes.

For this plan above formula can be simplified as:

Y_f = $[n \{2r + m + d - 8\} + \{m. D\}]$

Y_s = $3r (n + 0.25 w)$

H = $0.3 (Y_f + 2.33 Y_s)$

7.9.2. Above formulae involve following assumptions. Some of them are questionable but limited data on behaviour of crop does not allow better approximation.

1. Average rate of recruitment is not significantly different from assured rate of recruitment, which is assumed to be equal to mean current year recruitment.
2. Enumeration data is from the year preceding start of harvesting.
3. Decay and loss of culms by natural or man made causes does not exceed the margin left by harvesting factor.
4. Dead clumps in following cutting series are going to be negligible.
5. Dead clumps could retain only mature culms. Current year and dead culms decay out.
6. Number of first year culms will seldom exceed eight.
7. Transition fraction during the cycle is negligible. Almost all the transition will take place in one cycle.
8. Once transition has taken place the culm production pattern will not be different from other healthy clumps.

Table No. 7.4
Table Showing Average Annual Production (In No. Of Culms) Per Hectare Of Coupe During Plan Period

No of Plots	Mature culms	Degraded culms	Dead culms	Counted no.of clumps	1st yr	Total culms	Dead culms	Y_f culms	Y_s culms	H culms
105	8.84	12.34	4.14	361	3.38	13.51	2.41	399.57	116.86	201.55

9. It works out to 6.43 lakh culms per year out of which 1.28 lakh long bamboo and 0.85 lakh bamboo bundles.

10. Since the sampling intensity used here is 1% only and keeping in view previous yield a general reduction of 50% in the yield has been prescribed.

Practical Yield (i) long *bamboo* = ½ x 1.28 = 0.64 lakh

(ii) *Bamboo* bundles = ½ x 0.85 = 0.42 lakh

SECTION 7.10. METHOD OF EXECUTING CUTTING:

7.10.1 Demarcation: The coupe due for working will be demarcated as prescribed in Misc. Regulation. Each compartment will make one section and all recording will be compartment wise unless the D. C. F. directs otherwise. No harvesting will be allowed within 50 metres of special wildlife habitat zones such as caves, overhangs, springs and perennial water holes other than flowing streams. Such areas shall be marked as prescribed in Misc. Regulation.

The coupe due for working will be demarcated by giving three geru bands at 15 cm. intervals on the trees selected at suitable interval along the periphery of the coupe. The lower band will be at the breast height.

7.10.2. Cutting Prescriptions: The following cutting prescriptions are prescribed.

1. No working shall be carried out at slope more than 45 degree.

2. Harvesting shall be limited to October to March i. e. by the end of winter when the culms are almost devoid of starch and attracts less insect borer.

3. All dead clumps shall be clear felled. All flowered clumps after seed shedding shall be clear felled.(dead clump means all culms are dead and current recruitment of bamboo is not noticed).

4. Decaying, broken or damaged culms containing less than 3 meters of healthy part in the lower portion as well as twisted and dead culms will be removed irrespective of the size of the clump. All coppice shoots coming from earlier cut culms shall be removed. These cleaning operations will be carried out irrespective of output of green culms.

5. The height above the ground level at which the culms are cut shall not be below the second node and in any case higher than 30 cms. from ground level.

6. All debris and cut branches of culm shall be removed at least 2 meters away from the clump.

7. All current year i.e. less than one year old culms shall be retained.

8. A mature clump consists of 8 mature culms. Culms in excess of eight will be removed subject to retention of mature green culms, which include previous year culms equal to current year culms. Removal shall take place in order of maturity. Harvestable culms are exploited in such a way so that retained culms are evenly spread and spaced in the clump.

9. Culms on the periphery of clump will not be removed except when absolutely necessary to facilitate working in the interior portion of the clump. Working will be on traditional horseshoe pattern. The leading exterior culms may not be cut under any circumstances, even if these are malformed, as their retention is in the interest of outward growth of rhizome and clump and to support new culms. In order to make all portion of the clump accessible for marking the clear felling in the form of a wedge shall not be more than one meter wide all around. The depth and width at the narrow end of the wedge should be less than 2 meters wide all around. Working in this belt will be strictly according to the above rules.

10. Height of cutting is of no importance for the further culm formation. However, the height at which the culms shall be cut, must not be lower than 15 cm. and more than 45 cm. from the ground level., and in any case, not higher than second internode and lower than first internode. In the wildlife rich area, two culms in each clump should be cut at 3 rd to 4th internodes to provide forage to wild animals.

11. A clump will be distinguished as an independent clump where its periphery is easily discernible from adjacent clumps irrespective of its spacing. When differentiation is not possible, two clumps within one-meter distance will be regarded as one.

12. A congested clump though rare, shall be cleared of congestion; the removal will be carried out from one side in the interior portion.

13. Use of sharp instruments will be insisted upon during cutting to avoid splitting.

14. Climbers infesting bamboos shall be cut.

15. Removal of any part of bamboo clump or its rhizome is prohibited.

16. Whenever a coupe could not be worked in a particular year it may be worked in a particular year it may be worked in the following year if urgent need of bamboo production is felt. But retention of green mature culms shall be increased to minimum of thirteen so that culms are available for working after two years only. Working shall never be done when coupe is due for harvesting the following year.

17. No felling shall be carried out in flowered clumps. R. F. O will immediately report bamboo flowering to the D. C. F.

18. In the event of gregarious flowering or patch flowering affecting more than half of the clumps in a coupe regular harvesting shall be stopped. All dead clumps shall be clear felled after they have shed their seeds. Disposal of such bamboos should be expeditiously arranged.

SECTION 7.11. IDENTIFICATION OF *BAMBOOS*:

7.11.1. Since the marking of *bamboo* is highly selective, it is essential to distinguish, a current year or a previous year or a mature culm from each other.

7.11.2. Current Year: - Culm sheath is present on lower half of the culm, branches are present throughout the length of the culm and bloom is present abundantly and comes off easily.

7.11.3. Second Year: - Culm sheath is absent, branches are present practically at all nodes, white bloom is patchy and comes off easily.

7.11.4. Third Year: - Culm sheath is absent, branches are present practically at all nodes, white bloom is absent and replaced by blackish gray.

SECTION 7.12. BAMBOO FLOWERING:

7.12.1. Bamboo flowering has taken place during the year 1979-80 in an area of 18,487 ha of *Jarida* Range. Though Regeneration has established bamboo has not grown up to the exploitable size due to high density of bamboo clumps. Hence there is a need to reduce the no of clumps from the existing to 125 /ha.

7.12.2. Later in the year 1999-2000 gregarious of *Bambosa bamboo* was observed over an area of 18444.74 ha of *Ghatang* Range of *Tawra* Cutting Series. At present exploitation of dead bamboos is under progress at the time of preparation of the plan. Bamboo regeneration was observed in patches restricting to inaccessible slopes only. Even in those patches, clump formation is yet to take place. There is a need to protect these areas from grazing and fire. Suitable Fire Scheme will be prepared and executed by the Deputy Conservator of Forest, East *Melghat* Division, till clump formation takes place. Regeneration patches will be shown in the maps compartment wise and their areas will be recorded while preparing the Fire Protection Scheme.

SECTION 7.13: TREATMENT OF GREGARIOUSLY FLOWERED AREAS

7.13.1. After a gregarious flowering and subsequent death of old bamboos, the profuse regeneration of bamboo comes up. It takes nearly 8 years for new regeneration to reach the harvestable size, but often it takes considerably more time. Natural Regeneration of bamboo will be dealt as below.

7.13.2. The areas where clump formation has not yet completed:

1. The area should be thoroughly gone over and 80 cm diameter foci at the rate of 250 per ha should be formed distributed evenly over the whole area.
2. All the rank growth and even bamboo seedlings around the foci formed above and up to a distance of 1.5 m all around from each focus should be cleared so that the growth of the bamboo seedlings in the selected foci is not hampered. If this is not done, it will lead to switchy growth.
3. All climbers within and around the foci up to 1.5 m should be completely removed.
4. The whole area should be strictly protected from fire and grazing.
5. In area where clump formation has commenced, but the crop is yet immature for harvesting.
6. The 250 foci / ha initially established may be reduced to 125/ha well distributed over the whole area retaining only foci containing promising switchy culms.
7. From the selected foci, all badly grown twisted and otherwise damaged culms should be removed.
8. All climbers within and around the foci up to a distance of 1.5 m should be completely removed.
9. The tree overtopping or likely to overtop the bamboo clump may be thinned.
10. he whole area should be strictly protected from fire and grazing.

7.13.3. Crop age above 8 years:

1. When the crop age is 8 years, the clump formation is normally completed and clumps are mature enough for harvesting. The treatment during this period will be of the nature of harvesting-cum- tending. The felling rules already prescribed in the earlier paragraph, will be applied here.

SECTION 7.14. SEQUENCE OF CUTTING:

7.14.1 Sequence of cutting is shown by Cutting Series in the **Appendix No. XXV** of Volume II of this plan.

SECTION 7.15. OTHER REGULATIONS:

7.15.1. Fire Protection: Bamboo bearing areas shall be protected against fire.

7.15.2. Grazing Control: Young recruits of bamboo shall be protected from grazing and trampling by suitable method.

CHAPTER –VIII

WILDLIFE (OVERLAPPING) WORKING CIRCLE

SECTION 8.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

8.1.1. An area of 22316.83 ha. in the East Melghat Division has been included in buffer zone of Melghat Tiger Reserve vide notification No. WLP-2010/CR-139/F-1 dated 29.9.2010. Therefore prescriptions for buffer zone as mentioned in Tiger Conservation plan of Melghat Tiger Reserve shall be applicable for this area.

SECTION 8.2. : GENERAL CONSTITUTION OF THE WORKING CIRCLE:

8.2.1. 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 specially 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.

8.2.2. Further the areas outside the designated protected areas also harbour 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.

8.2.3. The tract dealt with is around *Melghat* Sanctuary and *Gugamal* National Park. *Melghat* forests has at its heart the Melghat Tiger Reserve that harbours 75 tigers 90 leopards and a number of other species. This is the first Tiger Reserve declared in the state in 1973 and is one of the prestigious wildlife areas of the country. Extending over an area of about 2000 Sq. kms. It is the largest Tiger Reserve in the state and shelters 40% of the tiger population of the state. The area also forms the base for the *Satpuda* landscape and belongs to one of the biodiversity rich areas of the world. The Reserve is constituted of a *Gugamal* National Park, *Melghat* sanctuary and the buffer area surrounding the sanctuary. The tract covered under the present plan is around the Tiger Reserve area bordering east of Melghat Sanctuary and Gugamal National Park, which are parts of the Reserve. In order to ensure that a healthy and congenial buffer is available to the spillover population of the Tiger Reserve and also to ensure that the local population and their cattle do not trespass the tracts of the wildlife habitat meant for the wild animals in the Reserve area which might result in increased man-animal conflict. It is essential that suitable steps be taken up in the areas surrounding the Tiger Reserve to provide adequate protection, food and shelter to the wildlife in the area as well as to take measures, which reduce dependency of the local people on the resources of the protected areas. Keeping this necessity in the mind, Wildlife (overlapping) Working Circle is constituted.

8.2.4. The wildlife is spread over the entire tract. Hence, an overlapping wildlife working circle includes all the ranges as given in the table below.

Table No. 8.1
Showing Range wise area allotted to Wildlife (overlapping) Working Circle

Sr.No.	Range	Range area in (ha.)	Area in W.C. (ha.)
1	*Jarida*	18144.57	**56097.06**
2	*Ghatang*	12808.84	
3	*Chikhaldara*	10960.69	
4	*Anjangaon*	14182.96	
Total of Division		**56097.06**	

SECTION8.3. GENERAL STATUS OF FLORA AND FAUNA:

8.3.1. The tract dealt with surrounds Melghat Tiger Reserve. It is in a continuous patch except between *Ghatang* and *Jarida* Ranges, which is interspersed by multiple use area of Melghat Tiger Reserve. Nevertheless, ample numbers of wild animals are found in these forests. Now a days these forests areas are in proximity to human settlements and forest areas are close to agricultural areas and also the approaches to these forest areas have become more convenient due to network of roads both *pucca* and *kaccha* roads. Before the reorganization of the divisions, most of the forest areas were under buffer zone of Project Tiger. These areas also suffer from acute water scarcity during summer season. Wildlife in these areas is under tremendous pressure because of biotic interference such as lantana and grazing and resulting invasion of lantana. The use of urea rather than plant poision, to catch the fish has become a major threat to the survival of wildlife in the area. These factors have resulted in depletion of wildlife. Since reorganization of the division has taken place in the year 1999, the census data earlier to 2001 cannot be compared.

8.3.2. The wild animals noticed in the tracts are:

1) Carnivora:-Tiger (*Panthera tigris*), Panther (*Panthera pardus*), Hyena (*Hyaena hyaena*), Jackal (*Canis aureus*), Indian Fox, (*Vulpes bengalensis*), Jungle cat (*Felis chaus*), Indian wild dog (*Cuon alpinus*).

2) Herbivora:- Four horned antelope (*Tetracerus quadricornis*), Sambhar (*Cervus unicolor*), Barking deer (*Muntiacus muntjac*), Spotted deer (*Axis axis*), Blue bull (*Boselaphus tragocamelus*), Gaur (Bos gaurus), Common Langur (*Presbytis pileatus*), Indian Hare (*Lepus nigricollis*), Black buck (*Antilope cervicapra*).

3) Omnivora:- Civet cat (*Paradoxurus hermaphroditus*), Sloth bear (*Melursus ursinus*), Wild boar (*Sus scrofa*).

4) Aves: - Apart from the common birds the following avi-fauna are observed: -

Pea fowl (*Pavo cristatus*); grey jungle fowl (*Gallus sonneratii*); Painted partridge (*Francolinus pictus*); Common quail (Conturnix); Crow pheasant (*Centrupus sinensis*); yellow legged green pigeon; gray tit; pond heron; cattle egret; crested serpent eagle; Golden backed woodpecker (*Dinopium bengalensis*); Black drongo (*Discrurus adsinillis*); kingfisher; small kingfisher, Long Billed Vulture and White Backed Vulture.

8.3.3. The floral species, with their botanical names found in the tract have been listed in the Glossary of Terms of this Draft Plan. The tract dealt with has been the natural habitat of a variety of wild animals. The numerical strength present has reduced mainly due to excess biotic interference. The description of the flora of the tract is given in the Chapter II of Part I.

SECTION 8.4. SPECIAL OBJECTS OF MANAGEMENT:

8.4.1. 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 of Tiger Reserve.
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 regulate traffic and 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 8.5. LEGAL STATUS:

8.5.1. 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 8.6. METHODS OF TREATMENT:

8.6.1. To address the needs of wildlife in the area, following methods of treatment are recommended.

8.6.2. General:

1. Occurrence of all rare endemic and endangered wild animals as per schedules appended to Wild Life Protection Act 1972, like Tigers, Leopards, Sloth bears, Black bucks, *Chousingha, Sambhar, Gaur*, 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 tigers, leopards, sloth bears Will be dealt by the concerned officers on priority basis.

8.6.3. 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 affected 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 p^h 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.

5. The breeding sites of Long billed Vulture and White Backed Vulture at *panchbol* and *Bheemkund* sites, access shall be prevented from tourists and their population shall be monitored regularly and the breeding sites shall be kept free from noise within a radius of 500Mts.

8.6.4. Habitat Development:

1. Existing waterholes will be desilted after the monsoon to augment the water supply during the pinch period.

2. Suitable sites for the development of new waterholes, percolation tanks and cement bandharas etc., should be located and developed.

3. Meadows, salt licks, dense 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 given in the sections for marking rules in other Working Circles shall be followed.

8.6.5. 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 are explained 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.

8.6.6. Estimation of wild animal populations:

Estimation of wildlife will be carried out every year by using water hole count method for herbivores and omnivores and carnivore survey has to be carried out based on the guidelines issued by the National Tiger Conservation Authority from time to time.

SECTION 8.7. OTHER REGULATIONS:

8.7.1. Area will be strictly and effectively fire protected.

8.7.2 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.

8.7.3. 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.

8.7.4. Measures to reduce the cattle number are given top priority by encouraging the stall feeding and by strict implementation of the grazing policy. 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.

8.7.5. 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.

8.7.7. Prepare a database in the 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.

8.7.8. Centrally sponsored scheme "protection of wildlife outside protected area" be implemented in the area by sending a proposal to the Central Government.

SECTION 8.8. : ECO TOURISM:

8.8.1. 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.

8.8.2. 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".**

8.8.3. 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. The tours and programmes be organized jointly with the *Melghat* project Tiger for better coordination and implementation.

8.8.4. *Chikhaldara* Wildlife Museum And Nature Viewing Area Near *Vairat*: tourism area can be opened at *Chikhaldara* to cater increasing eco tourism needs in that area. Extent of this area would be 6.67 sq km. This area would also be developed in order to facilitate tourism visitation.

8.8.5. Eco-Tourism Attractions In *Chikhaldara* For Wildlife Viewing: Apart from these, there exist places, which have tremendous tourist potential as well as great conservation values. However, these happen to be outside the existing Melghat forest. Nevertheless, visitors thronging these places may be tapped for motivating them about nature conservation with special reference to Melghat forest by adopting suitable interpretive strategies. Similarly, places like Bhimkund, Panchbol which have tremendous conservation value with respect to Long billed Vultures, also sunset point, *Dharkhora*, *Devi* point which is the origin of *Chandrabhaga* river all with East Melghat Forest Division. The picturesque nature along *Ghatang-Khamla-Kukru-Doma* road is quite enticing. Part of the stretch including the beautifully located *Kukru* forest rest house lies in MP State. Well-designed eco-tourism routes may be worked out in coordination with the counter parts in forest department of MP State. Such places need to be given specialised attention by ensuring preservation of their originality and potential in wildlife conservation as well as from eco-tourism point of view.

8.8.6.Trekking Programs: *Melghat* is a trekker's paradise. Trekking routes are available connecting each of the camping sites. It is advised to have trekking groups of up to 15 persons only. The challenging trek routes are quite safe. However, services of at least one guide (for a group of 5 person) should be compulsory. The guides will be paid as per prevailing rates. He will be paid extra for night halt. Each trek route will have a handout giving details of the important points en route.

8.8.7 Nature Trails: Small nature trails either guided or self-guided of 2 km to 10 km length may be established near all camping sites and also near accommodation facilities. The distance will depend upon the age class and interest of the tourist. Trails would be laid along fascinating sites like waterfalls, (*Bakadari* near *aad nadi*), demonstration plots, panoramic viewpoints etc. The guide service will be compulsory. Fee will be charged for guide service. Forest staff members could also act as guides. Each nature trail will have a handout with particulars of points of interest, en route etc.

8.8.8. Elephant Rides: Elephant ride has a great demand. These elephants are presently used for protection activity in remote areas. Hence it will be improper to use them wholly for tourism.

8.8.9. Hides / Watch Towers/Machans: Hides and watch towers provide good wildlife sighting experience Many hides and watch towers have been already established. Few more can be established. Small groups of up to 6 persons could be permitted to use hides and watch towers. Guide will be compulsory for a group of 3 or less persons. *To and fro* charges for vehicle, if needed, will be charged separately. The tourists will be responsible for their own safety. They should not litter the area with non-biodegradable materials. Similarly, *machans* at few prospective and safe points would be offered for stay for a limited duration during night hours.

8.8.10. Visits to Other Places of Tourist Interest: There are many places of tourist interest like forts at *Gawilgarh* (*Chikhaldara*) and *Narnala* (*Shahanur*), *Mahadeo* temple near *Dhargad,* ruins of *Khatkali* and demonstration plots. These could be organised from camping sites with pre-arrangements. The services like vehicle or guides will be charged accordingly. Handouts for each of the places of tourists may be prepared to enrich the tourist experience.

CHAPTER –IX

NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

SECTION 9.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

9.1.1. The term Minor Forest Produce (MFP) however has not been defined in PESA but has been defined in the Maharashtra Transfer of Ownership of Minor Forest Produce Act 1997 wherein Minor Forest Produce are listed in the schedule given therein. The list of Minor Forest Produces is as under:-

1. Mahuwa flower.
2. Mahuwa fruits.
3. Gum
4. *Terminalia chebula* (Hirda)
5. *Buchanania lanzan* (Charoli)
6. *Emblica officinalis* (Awala)
7. *Terminalia belerica* (Behada)
8. Seeds of *Azadirachta indica* (Neem)
9. Seeds of *Pongamia pinnata* (Karanj)
10. Seeds of *Cassia fistula* (Amaltas)
11. *Tamarindus indica* (Linn.)
12. Tamarind seeds
13. Lac of *Butea monosperma* (Palas Lac)
14. Lac of *Schlelchera oleota* (Kusum)
15. Seeds of *Jatropha carcus* (Vanerand)
16. Tajada / *Pauda Clerodenleron* (Phlomidis)
17. Nirmali/Kapi
18. Guggul.
19. Bapehi seeds.
20. Kunchla kar.
21. Shikakai
22. Reatha
23. *Semecarpus anacardium* (Biba)
24. Gunj Seeds
25. Broom grass.
26. Mango seeds.
27. Wawding.
28. Huphall.
29. Cut grass and fodder.
30. Honey
31. Palas leaves.
32. Sitaphal.
33. Cashew nuts—except those grown by Forest Development Corporation of Maharashtra Limited.

The Hon'ble Governor of Maharashtra in exercise of powers vested with him under Para 5(1) of the fifth Schedule to the Constitution of India has modified the said Act, whereby the term "MFP" has been defined in line with the definition contained in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. The definition read as under:-

"Minor Forest Produce" includes all non-timber forest produce of plant origin including bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu or tendu leaves, medicinal plants and herbs, roots, tubers and the like."

(iii) Vide the same Notification, the Indian Forest Act, 1927 has also been modified to the extent of Scheduled Area such that the definition of the word 'Tree' in Sec.2(7) has been modified deleting the word "Bamboos, Stumps, Brushwoods and Canes".

(iv) Hon'ble Governor, exercising the same power has further modified the Indian Forest Act, 1927 for the schedule areas vide Notification No.35528, dated 30/10/2014, whereby a new Section viz. Sec. 28A has been inserted in the Act in respect of Scheduled Areas. As per the said provisions –

(1) The Transit Permits in relation to transportation of Minor Forest Produce in the Scheduled Areas shall be given by Panchayats at appropriate level and the Gram Sabha or a Committee thereof and ;

(2) All decisions for the collection and sale of Minor Forest Produce in the Scheduled Areas and sharing of sale proceeds shall be taken by the Panchayat at appropriate level and the concerned Gram Sabha.

With such major changes in legal provisions in respect of Scheduled Areas, the spectrum of the rights enjoyed by the local people has widened significantly.

9.1.2. The State Government vide notification PRI-2010/CR 130/PR-2/ Dt. 04/03/2014 has framed the rules named as Maharashtra village Panchayat (Extension to scheduled areas) (PESA Rules) 2014. Chapter IX of these rules contains the provisions in respect of Minor Forest Produce in scheduled areas. The existing provisions of working Plan stand modified to the extent of provisions contained in these rules.

With the above said ammendment the entire range of non timbrer forest produce (Minor Forest Produce) found in the forest areas, except National Park and Sanctuaries have come under the ownership of Gram Sabhas and Panchayats at the appropriate level.

Genuine precsriptions for circle non-timber forest produce (legally defined as minor forest produce) for example Tendu, Moha, Gum etc. have been given the present working plan. These prescriptions shall be followed while harvesting both by Forest Deparment and the Panchayats and Gram Sabha, in absense of specific palns at Panchayats or at Gram Sabha level

SECTION 9.2: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

9.2.1. This is an overlapping working circle covering the entire forest area of the tract dealt with. Thus the total forest area included in this working circle is 56087.60 ha.

SECTION 9.3: NON-TIMBER FOREST PRODUCE OF THE TRACT:

9.3.1. There are numerous Non- timber Forest Products available in this tract and are found in almost all ranges with varying extent. These natural products contribute sizeable revenue to the State exchequers as well as generate employment to local people during their lean season. These natural products play an important role in the rural economy of tribals and help maintain their health.

9.3.2. The important Non- Timber Forest Products, found in this tract are *Moha* flower and seeds, *Tendu*, *Myrabolons*, *Kulu* gum, *Salai* gum and *Dhaoda* gum, *lac*, *safed musli Aola, charoli, Hirda, Beheda,, Bel, Amba,* Grass etc. The girth class wise distribution of stems per hectare is given below.

Table No.9.1
Table Showing Species And Girth Class Wise Distribution Of NTFP Trees / Ha In East Melghat Division

S. No.	Species	Count of Comptt.	15/ 30	31/ 45	46/ 60	61/ 75	76/ 90	91/ 105	106/ 120	121/ 135	135/ 150	151>	Total
1	*Tendu*	175	6	1.8	0.7	0.3	0.2	0.1	0	0	0	0	9.1
2	*Ahl*	23	2.2	1.9	1.2	0.5	0.4	0	0	0	0	0	6.2
3	*Bel*	90	1.5	1	0.8	0.6	0.5	0.2	0.1	0	0	0	4.8
4	*Beheda*	138	1.3	0.8	0.4	0.3	0.2	0.1	0.1	0.2	0.2	0.1	3.8
5	*Hirda*	12	1.9	1.2	0.5	0.1	0.5	0.9	0.4	0.1	0	0.1	5.7
6	*Aola*	151	2.5	2.1	1.6	1.3	0.9	0.5	0.2	0.1	0.1	0	9.3
7	*Charoli*	132	0.8	1.2	0.8	0.9	0.8	0.7	0.4	0.1	0.1	0	5.7
8	*Biba*	58	1.3	0.7	0.7	0.6	0.5	0.3	0.3	0.1	0	0	4.4
9	*Moha*	99	0.5	0.7	0.5	0.5	0.7	0.7	0.4	0.4	1.0	0.7	6.0
10	*Kulu*	9	0.3	0	0.6	0.3	0.3	0.3	0.5	0.5	0.3	0	3.1
11	*Dhaora*	186	5	1.9	1.7	1.9	1.7	1.3	0.9	0.3	0.5	0.1	15.4
12	*Salai*	91	0.5	0.5	2	3.5	5.1	4.6	3.3	1.8	1.0	0.2	22.5
13	*Khair*	79	2.2	1.6	1.0	0.8	0.5	0.2	0.1	0	0	0	6.4
14	*Kusum*	112	1.4	0.9	0.4	0.4	0.3	0.3	0.3	0.1	0.2	0	4.4
15	*Amba*	5	4.4	3.3	1.1	1.1	0	0	0	0	1.1	1.1	12.2

SECTION 9.4. SPECIAL OBJECTS OF MANAGEMENT:

9.4.1. 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 monitor and improve stocking of NTFP species in the forest areas.

2. To enhance collection of NTFP through improved collection techniques.

3. To enhance economic returns to local communities by training them in value addition techniques and marketability of various NTFPs in the Division.

9.4.2. 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.

9.4.3. 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.

9.4.4. 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.

9.4.5. 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.

9.4.6. Compartments having promising regeneration areas of NTFP species shall be identified and tended to remove congestion in the crop.

9.4.7. Considering site suitability and local needs; NTFP species shall be given due place (10 to 15%) in various plantation schemes.

9.4.8. Except dead, diseased and specifically provided for, no NTFP trees shall be marked for felling during the coupe working under various working circles.

Management of *Tendu:*

9.4.9. 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.

9.4.10. This tract has potential to yield 3350 standard bags of *tendu* leaves amounting to annual revenue of the division about Rs.33.3 lakhs (year 2003).

9.4.11. Forests of the Protection Working Circle as well as A type areas in other working circles shall be excluded from *Tendu* units. The Deputy conservator of Forests shall accordingly organize the *Tendu* units.

9.4.12. Pruning of young *Tendu* plants does help in increasing the leaf yield. Pruning in the compartments may be allowed at 3-year interval. However, felling of *Tendu* trees or branch lopping for leaf collection shall be prohibited and dealt with firmly.

9.4.13. *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.

9.4.14. Maintainance and improvement of *tendu* in the forest crop composition is proposed by ensuring regeneration of *tendu* and by protection.

9.4.15. Singling of shoots and soil working around *tendu* seedlings is prescribed in the plantation and rootstock areas to promote the growth of *tendu* seedlings along with the annual coupe working in the area-specific working circles.

9.4.16. 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.

Management of *Moha:*

9.4.17. *Moha* collection: *Moha* trees were found in 99 compartments during the enumeration. The villagers in the tract have local system for allocation of collection rights of *moha* flowers and fruits. In view of traditional approach of allocation of collection rights by the local communities. It is advised to number the *moha* trees and document the trees allocated to each moha collector.

9.4.18. *Moha* regeneration: NR of *moha* shall be provided by dibbling of *moha* seeds in the plantaions and by carrying out weeding and soil working along with other planted seedlings during coupe operations of area specific working circles.

9.4.19. 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.

9.4.20. *Moha* is prescribed to be included in the list of species prescribed in various area specific working circles.

***Moha* Flower:**

9.4.21. i) Use And Nutritive Value: *Moha* flower is a rich source of sugar, vitamins and calcium. The flower, in its ripe form, has almost 73% sugar and is, therefore, even a better medium for fermentation than grapes. Moha flower is eaten raw or cooked. This is also eaten after frying or baking into cakes. More usually, the corolla tubes, after removing the stamens, are boiled for about 6 hours and left to simmer until water evaporates completely. The odour disappears as a result of cooking and the material becomes soft and jelly like. It is eaten with rice, tamarind, grains or other food or as sweetmeat. Dried *moha* flower is also boiled with rice and mixed with wheat flour and this provides a wholesome food. After drying, it becomes valuable food additive to diet. Moha flower is largely used in the preparation of distilled liquor also. This liquor is actually the beer of India having strong smoky foetid odour, which disappears on aging. It is reported to excite gastric irritation and produce other adverse effects. Redistilled and carefully prepared liquor is good quality without having adverse effects and closely resembles to Irish Whisky. The corollas were in the past, exported, to France for distillation of cheap brandy. However, the French Government in order to protect their home industry prohibited the import of the same. Subsequently, it was imported by Europe for feeding pigs.
ii). *Moha* spirit prepared by distillation of liquid containing fermented *moha* flowers is the most important alcoholic drink in many of the areas. It makes a potent drink and efforts are required to be made to refine it in modern distilleries. The flower is also used for the preparation of certain kinds of non-alcoholic food drink by some tribes. The flower is also used for the preparation of vinegar. *Moha* having appreciable proteins and vitamins has valuable nutrition content.
iii) Syrup of good quality is prepared from the corollas by extraction with hot water clarification with activated charcoal and evaporation under vacuum. The syrup with very high sugar content (61%) has a golden yellow colour with the odour of fresh flower. It is a substitute for honey. Apart from human consumption, *moha* flower offers an excellent food to the livestock and wild animals as well.
iv) Nutrition analysis of flower showed digestible crude protein 3.08 %, total digestible nutrients 73.7% and starch equivalent to 53.1 %. The flesh of animals particularly of pigs, fed on *moha* flowers, acquires a delicate flavour.

***Moha* Fruit:**

9.4.22. i) Use And Nutritive Value: A ripe fruit has cream coloured epicarp, which is edible. Moha berries were eaten raw or cooked. Cattle, sheep, goats, monkey and parrots also eat them. They have medicinal value as well. Fruit fallen on the ground are easily attacked by insects and ants thus becomes unfit for human consumption.
ii) The *moha* seed oil. Forest tribes for cooking purpose, as illuminance and hair oil, use a thick oil light yellow in colour and extracted from the seeds. It is also used in the manufacture of soaps, particularly, laundry chips. In many areas it is also used as an adulterant for 'Ghee' for which it is clarified with butter mark to mask the disagreeable colour. The oil finds use in medicines also.
iii) Crude oil has a deep colour, high acidity, unpleasant odour and bitter taste. Refining and hydrogenation yield product similar to mutton tallow or cocoa butters. Oil having acid value below 13 may be refined by treatment with caustic soda and that with higher acid value is extracted with alcohol and further treatment with alkali. Refined oil finds use in the manufacture of lubricating grease and fatty alcohol. The oil is also used for candles, as batching oil in Jute Industry and as a raw material for the production of stearic acid.
iv) The yield of oil from the seeds depends on the efficiency of the equipment employed for crushing them. It is 20-30% of the weight of the kernels when crushed in *'ghanis'*, 34-37% in expellers and 40-48% when extracted by solvents.
v) *Moha* oil shall have a set of characteristics. For this purpose ISI standards have been prescribed which are as below.

Table No. 9.2
Table Showing Moha Oil Properties:

Sr. No	Characteristics	Grade		
		I	II	III
1.	Moisture and insoluble impurities% by mass max.	0.10	0.25	0.50
2.	Color in a ¼ in a cell on the Loviband scale expressed are; Y + 5R not deeper than.	0.20	30	50
3.	Refractive index at 40° C	1.459	to	1.460
4.	Sp.gravity at 90°F /30°C	0.862	to	0.875
3.	Saponification value	187	to	196
6.	Iodine value	58	to	70
7.	Unsaponification matter % by mass	2.0	3	3.0
8.	Acid value max	0.5	20.0	>20

9.4.23. 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 below.

Table No. 9.3
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.	136 - 150	13.30	2.75
3.	151 - 175	13.00	3.80
6.	176 - 190	13.00	4.00
7.	206 - 220	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). The rates of royalty in Rs/Qtl. Of Moha flower and seed as decided by the Government for the years, 95-96 to 1999-2000 is Rs.3/quintol.

iii) As per the tree enumeration carried out by FRSS Amravati, the number of Moha trees/ha having gbh > 45 cm is 4.9 . On the basis of the study mentioned above expected yields of flower and seed come to 42.4 kg/ha and 8.55 kg/ha respectively. Estimated yield for East *Melghat* Division forest area is 2377.19 tons and 955.92 tons respectively. However, the phenological character of the species is that flowering and fruiting generally occur alternate years or twice in three years.

9.4.24. 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.

9.4.25. Market: Moha flower and seed come under Monopoly Act and so the collection of *moha* flower and seed is carried out by people and p urchased by the TDC. It would be better to involve the industries using the moha in the procurement through FPC, so that better price can be made available to the collectors.

9.4.26. 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.

Gum:

9.4.27. Use And Value: *Kulu* (Sterculia urens), *Dhawra* (Anogeissus latifolia) and *Salai* (*Boswellia serrata*) gums are the main sources of gum production in this tract. These are used in medicines, chemicals, cosmetics and food industries. *Salai* gum is mostly used as incense and is said to be used in the Indian medicines for rheumatism and nervous diseases. It has the possibility of becoming an important substitute for imported Canada balsam, used as mounting media in the preparation of microscopic slides. 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. *Dhawra* gum is very good for the preparation of many food items. It is mostly used in the preparation of sweets. So it is in great demand before *Diwali*. *Jaipur*, *Udaipur* and *Jodhpur* are the big markets for consumption.

9.4.28. 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.

9.4.29. Soil Working of Gum Yielding trees:

i) Digging of 30cm deep trench encircling *kulu, dhawra 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.

9.4.30. Yield: The study of 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.

9.4.31. 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 boll 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.

9.4.32. 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. 9.4
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.**

9.4.33. 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 less price 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.

9.4.34. Formation Of Units And Coupes: Range is the unit. Each unit will be divided into three annual coupes details of which will be given in **Appendix No. XXVI** of Volume II of this plan. The working cycle will be of three years.

9.4.35. 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.

9.4.36. 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.

9.4.37. YIELD: So far no study has been conducted to know the yield of fruits for trees of such species.

9.4.38. 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.

9.4.39. **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.

9.4.40. Management of lac: 1. *Lac* Collection: The *lac* collection is not in practice in East Melghat 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. The lac is collected by the people. It provides additional source of income to the local farmers and provide employment opportunity to landless poor in the area.

9.4.41. 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.

9.4.42. Medicinal Plants: The important medicinal plants found in this division are *Asparagus racemosa, Chlorophytum tuberosum, Equisetum sp., , Hygrophila auriculata, Bauhinia diffusa, Terminalia bellerica, Terminalia chebula, Emblica officinalis, Soymida febrifuga, Solanum violaceum, Gloriosa superba, Plumbago xeylanica Cassia absus, Holarrhena antidysenterica, Hemidesmus indicus, Helicteres isora, Evolvulus alsinoides, Vernonia cineraria.*

9.4.43. Management of Safed Musli: Safed musli *(Chlorophytum Borivilianum* Family – *Liliaceae*) **:** A herb with linear leaves appearing on the ground with the advent of summer rains. Flowers are white in colour. It is a perennial with fleshy roots/root-tubers.

Common Name	**:**	Safed Musli.
Location	**:**	Basin of Khandu
Part Used	**:**	Tuberous Root

SECTION 9.5. RESEARCH WORKS:

9.5.1. 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. Identification of medicinal plants in the field shall be taken up for study immediately with the help of the ethno botanists.

SECTION 9.6. OTHER IMPORTANT PRINCIPLES AND PROCEDURES:

9.6.1. As per modifications vide Section 28A in Indian Forest Act, 1927, in respect of Scheduled Area, the decision for disposal of Minor Forest Produce (MFP) shall now be taken by the Panchayats at appropriate level and Gram Sabha. The actual procedure shall be governed by the policies formulated by the State Government in this regard from time to time.

CHAPTER X

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION 10.1. : GENERAL DISCRIPTION OF RESULTS OF CURRENT PLAN :

10.1.1. The State Government has issued detailed guidelines given in the Government Resolution No. FDM-2011/CR-100/F-2 Dated 5.10.2011 and No. FDM-2011/CR-100/F-2 Dated 22.12.2011 whereby it has been envisaged to implement the JFM activities through convergence of different departments.

SECTION : 10.2. JOINT FOREST MANAGEMENT:

10.2.1. 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 in the working plan. Hence, separate Working Circle has been constituted for this purpose.

10.2.2. 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.

The state Government vide G.R. No. FDM-2011/ CR-100/F2 dated 05/10/2011 has further amended the provision related to the JFM whereby all the JFM committees have been brought under the umbrella of the Gramsabha under section 49 of Maharashtra Village Panchayat Act.

Thus the JFM committed have now attained the legal status and are part of the concerned Gramsabha.

10.2.3. 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.

10.2.4. 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 10.3. : SPECIAL OBJECTS OF MANAGEMENT:

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 10.4. : COMPARTMENTS AND FELLING SERIES:

10.4.1: As the execution and implementation of the prescriptions under this working Circle are totally dependent on the willingness of the villagers, neither the compartments are allotted nor the felling series are formed. The micro plan prepared for the area allotted to a particular village or joint forest management committee shall be in consonance with prescriptions given for that area under this draft plan. Any deviation from the plan requires sanction of the competent authority.

SECTION 10.5. : THE PRINCIPLES:

10.5.1. 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 10.6. : STATUS OF JFM:

10.6.1. As of now total of 74 JFM committees have been constituted and are functioning.

The FDA for East *Melghat* Division was registered with Asst. Charity Commissioner vide Reg. No.161/2002, dated28-3-2002.

SECTION 10.7. : POTENTIAL AREAS FOR THE JFM PROGRAM:

10.7.1. The forest areas closer to the villages are included in this Working Circle. It includes the areas of Improvement Working Circle, Afforestation Working Circle and a few areas of Selection cum Improvement Working Circle. It includes degraded as well as good forest areas.

SECTION 10.8. : TREATMENT PRESCRIBED:

10.8.1. 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:

10.8.2. While formulating micro-plans, silvicultural management, maintenance of forest boundary, removal of forest encroachments and control over illicit cutting should receive high priority and it should be ensured that the Micro Plan does not contain anything which is contrary to the provisions of Working Plans and the existing guidelines and Acts and rules for management and protection of forests.

10.8.3. 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 casts and locally backward groups.

10.8.4. 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.

10.8.5. 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.

10.8.6. The area kept under SCI, IWC, Afforestation Working Circle are essentially for forest and bio-diversity conservation and for forest productivity. However, 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.

10.8.7. It will therefore be advisable to assign different categories of forests to a JFM village and fix a scale for dependences on each category of forests. Such aspects will have to be elaborated in each micro-plan and micro-plans so formulated shall be the basis of implementation of JFM programme. The current status of JFM committees is given in **Appendix No. XXVII**

CHAPTER XI

FOREST PROTECTION (FIRE, ILLICIT FELLING, ENCROACHMENT, ILLEGAL MINING, POACHING, JHUMMING ETC.) OVERLAPPING WORKING CIRCLE

SECTION 11.1. : GENERAL CONSTITUTION OF FOREST PORTECTION (OVERLAPPING) WORKING CIRCLE:

11.1.1. This is an overlapping Working Circle covering the entire forest area of the tract dealt with. Thus the total forest area included in this working Circle is 56097.06 ha. The National Working Plan Code prescribed this Working Circle as a mandatory Working Circle in the Working Plan. The activities of certain organizations are encouraging the tribals to encroach the forestland leading to attacks on the staff particularly in *Anjangaon* Range. The forests are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated the constitution of this Working Circle. Illicit felling, grazing, encroachments, poaching and fires are the major causes for the damage of the forests.

SECTION 11.2. : SPECIAL OBJECTS OF MANAGEMENT:

11.2.1. The special objectives of management are;

1. To enforce the Indian Forest Act 1927, Wildlife Protection Act 1972 as amended from time to time for the effective control of Illicit felling, grazing, encroachments poaching and fires.
2. To develop the database to monitor various offence cases in a systematic manner.
3. To raise the morale of staff and to strengthen their hands and capabilities to face the challenge and threats from organized groups, which encourage encroachment and attack forest staff on duty.

SECTION 11.3. : ILLICIT FELLING:

11.3.1. The State Government vide G.R. No. TRS-04/2014/PK72/F-6 dated 13/08/2014 **(Appendix No. XXVIII)** has issued guidelines for forest protection. The same guidelines should be followed scrupulously. Apart from this the Chief Conservator of Forest, Amravati vide order No. 377 dated 31/12/2014 has issued instruction for the methodology to be adopted for beat checking **(Appendix No. LXXII)**

SECTION 11.4. : FIRE PROTECTION:

11.4.1. 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.

11.4.2. Fires are of common occurrence. Due to highly combustible undergrowth consisting of dense grasses and dry lantana, a tiny spark can trigger off a conflagration in a short time. Lantana, when dry, is extremely combustible. It throws up a huge flame, which scorches the leaves and bole of trees completely. The splinters of lantana go high up and are blown across wide area, which make fire fighting very difficult. The high speed of hot winds during summer, combined with the hilly configuration accelerates the spread of fire easily when it occurs and engulfs vast areas before it can be brought under control only by counter firing. Owing to lantana undergrowth the fires rise to a height of 4-6 m. The height of the flame, thick lantana undergrowth, steep slopes and distances of the village are the main impediments in putting off the fire. The fire spreads rapidly before the arrival of the staff. It would be dangerous to put off fire manually in such high-rise flames. 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:

11.4.3. Class-I (Complete Fire Protection): The Class-I fire control areas include all felling coupes (six years) of SCI and Teak Plantation Working Circle, Improvement 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).

11.4.4. 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 as well as any other areas, which deserve the protection in the opinion of the CCF (T).

11.4.5. Class-III (General vigilance): The remaining forest areas (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:

11.4.6. 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.

11.4.7. 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 trained as a high priority item. The scheme shall be implemented sincerely during the fire season.

11.4.8. Areas deliberately burnt for silviclutural 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.

11.4.9. All the Class-I and Class-II areas will have external fire lines and internal fire lines dividing the forest area into convenient blocks.

11.4.10. 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.

11.4.11. The group of firewatchers shall immediately rush to the site and extinguish fire as soon 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.

11.4.12. 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.

11.4.13. The cutting of fire lines shall be completed by December. Fire tracing (burning) shall be completed by February15, and thereafter burning should require permission of the Deputy Conservator of Forests and physical presence of a gazetted officer.

11.4.14. 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 rage 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.

11.4.15. Negligence in the fire protection shall be taken as dereliction of duty. The supervisory officers shall extensively verify fire control measures.

11.4.16. 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. Tactical use of Section 79 of the Indian Forest Act, 1927, should be used to control fire.

11.4.17. 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.

11.4.18. 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.

11.4.19. Standard widths of fire lines are prescribed in the **Table 3.2.**

Table 3.2
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 11.5. : GRAZING REGULATIONS

11.5.1. The entire forests are liable to damage from grazing except the interior areas, which are away from the villages. The 'C' class forest is heavily grazed. In fact, there is hardly any grass left in this block and they only serve as exercise grounds for the cattle. These areas are very undulating and the soil is very poor and are, therefore, even unfit for cultivation. The 'A' class forests adjoining the *Berar* plains are very hilly, and the upper slopes are steep. The grazing is, therefore, confined to the lower hills and the calculated incidence does not give the true picture of the grazing pressure here, while a large inaccessible area of the units remains un-grazed. A realistic calculation of grazing incidence is required.

11.5.2. The forests on the plateau in *Chikhaldara* range 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.

11.5.3. The grazing incidence figures are misleading as the erstwhile forest 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.

11.5.4. The animals, mostly buffaloes, from *Chikhaldara* and some *rayatwari* villages, and some cattle from Berar plains are grazed from cattle camps, locally known as *hettis* in the interior of forests in the hot season. During this hot weather grazing after the depletion of grasses, grazers start lopping green foliage, especially of Ain *(Terminalia tomentosa),* Bhosa *(Bauhinia racemosa),* Kusum *(Schleichera oleosa),* Karkha *(Bridelia retusa),* Dhaman (*Grewia tiliaefolia),* Kahu (*Terminalia arjuna)*, Salai *(Boswellia serrata),* Ghatbor (*Zyzypus xylocarpa*) and Bamboo *(Dendrocalamus stictus)*. 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. The problem of migrated cattle is severe in *Anjangaon* Range, which needs utmost attention to control the grazing.

11.5.5. 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.

11.5.6. 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. **(Appendix No. XXIX).** No grazing beyond carrying capacity shall be permitted.

11.5.7. 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.

11.5.8. 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.

11.5.9. Maximum admissible grazing incidence according to the current policy has been shown for various working circles in **Table 3.3.** A systematic survey of fodder availability is recommended during the plan period in each round.

11.5.10. 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 be engaged in the implementation of grazing regulations.

11.5.11. 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 3.3.
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)			
Selection-cum-Improvement	Tree forest	1.2	
Improvement	Tree forest	1.2	
Afforestation	Open forest	0.8	After plantations
Miscellaneous	Minor forest	0.8	Except plantations
Protection	Protection forest	4.0	Permanent

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.

11.5.12. Fodder development on the community lands and translocation of surplus cattle may be encouraged.

11.5.13. 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.

11.5.14. Hacking and felling of young plants and big trees be dealt seriously and offenders shall be prosecuted.

11.5.15. 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.

11.5.16. The Grazing Settlement Report for Melghat areas need revision since the reorganization of the divisions and wildlife areas led to the distribution/splitting of the then grazing units. Hence new Grazing Settlement Report shall be prepared as early as possible to avoid conflicts among the villages for grazing purpose.

11.5.17. Based on the provisions given under grazing rules 1968, the grazing settlement report has been prepared. There are 101 villages in the East Melghat Division. According to cattle census 2006 there are 13,735 cattles are reported in Chikhaldara taluka. The population of sheep and Goat are not considered. Each buffalo is considered 02 cattle unit, each cow, bull is considered 01 cattle unit and each calf is considered as 0.5 cattle unit. In tree forest area 1.2 ha. per cattle unit is considered i.e. SCI, IWC areas. In protected forests 4.00 ha. per cattle unit is considered i.e. PWC area. An area of 0.8 ha. per cattle unit is considered for IWC area. Accordingly 14 grazing units are identified over the entire division. The details of the various grazing unit, area, name of the village, carrying capacity etc. is given in **Appendix No. XXX.**

SECTION 11.6. : FOREST ENCROACHMENT:

11.6.1. Certain organizations like samaj kranti aghadi started encouraging the tribals to encrozch upon the forestland leading to tensions between the staff and tribals. The staff was attacked and the accused are also prosecuted leading to bitter animosity between the tribals and staff. 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. A few cases of clearance of the forest growth for cultivation are booked in some parts of *Anjangaon* Range.

11.6.2. The encroachment problem is more prevalent in the *Anjangaon* Range and *Jarida* Range and mostly made for agricultural purposes. The eviction operations led to animosity between the villagers and foresters.

11.6.3. 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.

11.6.4. 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.

11.6.5. The entire area in the Division is reserved forest. The amended provisions inserted of Section 26(4) and 26(5) Indian Forest Act 1927 must be used effectively to evict the encroachments.

11.6.6. All external boundaries shall be demarcated with concrete pillars.

11.6.7. All sensitive and important boundaries and wherever disputes are there, be surveyed and concrete pillars be laid immediately.

11.6.8. The concerned RFO shall execute the eviction order

11.6.9. To prevent the tendency of encroachments, improved crop techniques be propagated in the problem villages to enhance the crop productivity with the help of Agricultural Department.

The process of recognition and vesting of forest rights under the FRA Act, 2006 is still underway. The Collector must ensure that the final decision of the District Level Committee with regard to the acceptance or rejection of claims are communicated to the DCF and the CCF (T), Amravati immediately, so as to safeguard the interest of genuine right holder on the land, along with eviction of ineligible encroachers and prevention of fresh encroachments.

CHAPTER XII

FINANCIAL IMPLICATIONS

SECTION. 12.1. COST OF THE PLAN:

12.1.1. The cost of preparing this plan is worked out by summing the expenditure incurred form 1999-00 to 2004-05 that amounts to 30.14 *Lakhs*, including the cost of enumeration works carried out by SOFR unit, *Amravati*. The cost of plan per hectare worked out is about 53.74 rupees, only.

SECTION. 12.2. COST-BENEFIT ANALLYSIS:

12.2.1. 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 12.1 (Proceedings of the Indian Science Congress, 1980).

Table 12.1
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 in 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

12.2.2. 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.

12.2.3. Hence, intangible benefits accruing from East *Melghat* Division, having over 56087 ha of well-stocked forests @ of 2.60Lakhs per ha, are worth Rs.145827 Lakhs per year.

12.2.4. Tangible Benefits: The tangible benefits accruing from forests is can be computed in economic terms from various goods and services ensuring from forests. The estimation/forecast of timber, poles, fuel wood, *bamboo, 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.

12.2.5. In this Plan, major yield of wood will be obtained from the Teak Plantation Working Circle and SCI Working Circle. Improvement Working Circle may contribute in the form of small timber, fuel and teak beats, to some extent. In other Working Circles, felling of mature trees has not been prescribed. The yield from thinning old plantations as well as congested pole crop has not been considered.

12.2.6. Estimated future annual yield and revenue, as part of the tangible benefits derived from the forests, has been given in Table 12.2. The abstract of tangible benefits and costs as a result of this plan is given as follows;

Annual estimated expenditure for the prescribed operations	=	197	Lakhs
Annual estimated revenue from the forest, including, statutory taxes	=	1126	Lakhs
Annual intangible benefits as above	=	145827	Lakhs
Total benefits accrue from forests of E. Melghat Division per annum	=	146953	Lakhs

Cost-Benefit Ratio is 197 Lakhs : 146953 Lakhs
Or 1 : 746

Thus, the above Cost-Benefit Ratio favors the scientific management of forests, as prescribed, in this Working Plan.

SECTION. 12.3. FINANCIAL FORECAST

12.3.1. The norms used for the financial forecasting are given in Table 12.3. Forecast for the implementation of this plan is given in the **Appendix No. XXXI** of Vol. II of the plan.

Table12. 3.
Rates used for estimating expenditure for the working plan prescriptions
(Daily wage rate Rupees 70.00)

Sr. No.	Particulars of work	Unit of work	Man days/ unit	Labour component in %	Amount/ Rupees
1	Demarcation and Marking	Hectare	4.50	90%	315.00
2	Singling of coppice shoots, etc.	Hectare	1.00	96%	70.00
3	Soil and moisture conservation				
	Gully plugging (nala bunding)	Cu.m.	0.92	96%	64.40
	Long contour trenches (CCT)	Meter	0.085	96%	5.95
4	Coupe working				
	Timber harvesting	Cu.m.	9.50	75%	665.00
	Firewood extraction	Stacks	3.50	80%	245.00
	Long Bamboo	No.	0.06	80%	4.20
	Bamboo bundles	No.	0.12	80%	8.40
5	Removal of wind fallen				
	Timber	Cu.m.	9.50	75%	665.00
	Fuel	Stacks	4.50	80%	315.00
6	Thinning	Cu.m.	9.50	75%	665.00
7	Cutback Operations	Hectare	6	96%	420.00
8	Cleaning	Hectare	8	96%	560.00
9	Afforestation/plantation				
	Fencing including live hedge	Hectare	43	85%	3010.00
	Planting & sowing on fencing	Hectare	2	75%	140.00
	PPO/PYO (including fencing)	Hectare	60	85%	4200.00
	FYO (First year operations)	Hectare	95.10	77%	6657.00
	SYO (Second year operations)	Hectare	40.90	92%	2863.00
	TYO (Third year operations)	Hectare	20.70	93%	1449.00
	4th YO (Fourth year operation)	Hectare	15.15	93%	1060.50
	5th YO (Fifth year operations)	Hectare	15.15	93%	1060.50
10	Bamboo planting				
	PPO/PYO (including fencing)	Hectare	64.50	90%	4515.00
	FYO (First year operations)	Hectare	34.65	90%	2425.50
	SYO (Second year operations)	Hectare	20.77	93%	1453.90
	TYO (Third year operations)	Hectare	16.53	93%	1157.10
11	Maintenance				
12	Road	Km.	38	95%	2660.00
13	1/5th boundary demarcation	Km.	7	80%	490.00
14	Fire protection length	Km.	6.5	96%	455.00
	Fire protection area	Hectare	1	96%	70.00
15	Joint Forest Management				
	Awareness generation	Village	12	20%	840.00
	Micro plan preparation	Village	88	50%	6160.00
	Supplementary development	Village	14.00	75%	98000.00
16	Training for NWFP collection	Round	30.00	50%	2100.00
17	Wildlife habitat improvement	Round	20.00	75%	1400.00
18	Fixing boundary pillars	Km.	70.00	30%	4900.00

CHAPTER XIII

MISCELLANEOUS REGULATIONS

SECTION 13.1. PETTY FELLINGS (IRREGULAR HARVESTING):

13.1.1. Restriction on Petty Fellings (Irregular Harvesting): Irregular harvesting of timber, firewood and other NTFPs is prohibited, except in the following cases:

13.1.2. 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.

13.1.3. 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.

13.1.4. 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.

13.1.5. 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 13.2. DEVIATION:

13.2.1. The format of Deviation Statement is given below.

Table No. 13.1
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	

13.2.2. 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.

13.2.3. 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.

13.2.4. 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:

13.2.4. 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 13.3. PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE:

13.3.1. 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. The following forest produce to be given to the local inhabitants as *nistar* as per due process.

13.3.2. Bamboo: There are large number of *Burads* families in the district who prepare bamboo mats and other articles to earn their livelihood. Bamboo is required for agriculture purposes as well. Taking into consideration their long pending demand for supply of bamboo at *nistar* rates, Government of *Maharashtra* have issued resolution no. ABS-1095/C/no. 128/f-9 dated 3-th May 1997 for the supply of bamboo to the above-mentioned people at *Nistar* rates. As per this resolution 1500 bamboo per family per year are to be given at *Nistar* rates, to be sanctioned by the **Chief Conservator of Forest** in consultation with the District Collector, to the registered *Burads* families who depend on bamboo for their livelihood as well as to the institutes which give training for preparing articles out of bamboo. The bamboo depots will be increased as per the availability of bamboo to meet the requirement of the people.

13.3.3. 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 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 13.4. RESEARCH PLOTS:

13.4.1. It is necessary to emphasize the fact that experimental and sample plots and their demarcated surrounds are under the complete control of the Silviculturist and are thus excluded from all operations prescribed in the Working Plan.

13.4.2. At present there is no experimental or sample plot within the territory of East *Melghat* Division. But the research wing identified one plus haldu tree. It exists in the compartment number 81 of *Ghatang* range. During the working of the coupe plus tree and other five identified *haldu* trees for comparison purpose shall not be marked for felling.

SECTION 13.5. ROADS, PATHS, BRIDGES AND BUILDINGS:

13.5.1. The division has a network of different types of roads as given **Appendix No. XXXII** of Volume II of this plan. The division shall maintain comprehensive records for all roads passing through the forest area.

13.5.2. The Public Works Department of the state government of the *Zilla Parishad* maintains large number of roads passing through the forest area. Some stretch has been permanently transferred to the department. Proper records of these roads must be maintained on priority basis.

13.5.3. Forestry operations and forest protection should determine the priority for maintenance of the forest roads.

13.5.4. Unwarranted up-gradation of the forest roads shall be discouraged, but necessary culverts shall be constructed for forest protection purpose.

13.5.5. The list of buildings in charge of the division is given in the **Appendix No. XI** 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. Although a number of buildings were constructed under the *Maharashtra* Forestry Project, more residential buildings are required in the field, especially, in the interior locations. 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 Management (Overlapping) Working Circle.

SECTION 13.6. DEMARCATION AND PROTECTION:

13.6.1. 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 and un classed forests, as per $1/5^{th}$ boundary demarcation scheme. The $1/5^{th}$ boundary demarcation scheme is given in **Appendix No. XXXIII** of Volume II, of this plan.

13.6.2. **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:

13.6.3. 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.

13.6.4. The land records such as maps of disforested areas and unclassed forests shall be maintained and updated.

13.6.5. Lack of legal protection to the un classed forests shall be rectified by immediate notification declaring such areas as the Protected Forests and initiating the reservation process.

13.6.6. 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 form the same malady. 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:

13.6.7. 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 334.793 kilometers out of which natural boundary is 60.764 km. The external artificial boundary will require permanent demarcation.

13.6.8. The Principal Chief Conservator of Forest has approved, on 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.

13.6.9. 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.

13.6.10. Some of the forest staff shall be trained at the training institutes of the Land Records Departments, and are 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.

13.6.11. 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 13.6.20. The traditional demarcation work will be checked at least once a year.

13.6.12. Demarcation of the internal forest boundaries: Internal boundaries between compartments shall be demarcated using traditional stones cairn, earthen cairn of standard wooden pillar (Paragraph 13.6.20.). 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.

13.6.13. 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.

13.6.14. 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.

13.6.15. 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.

13.6.16. 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.

13.6.17. The Range Forest Officer, Mobile Squad will co-ordinate cross-checking of compartment inspection certificates.

13.6.18. 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.

13.6.19. 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.

13.6.20. 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. Interspace 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.

13.6.21. 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

13.6.22. 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.

13.6.23. 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.

13.6.24. 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 13.7. : DEMARCATION, PREPARATION OF TREATMENT MAP AND MARKING OF COUPES.

13.7.1. Demarcation OF Coupe: The annual coupes for the harvesting and tending operations shall be demarcated in 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.

13.7.2. Format for the Coupe Demarcation Certificate is, as follows, (Form No. 3.1).

Form No. 3.1

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 C/s of the ACF
Date:

Demarcation Of Coupes:

13.7.3. 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 form the coupe.

13.7.4. Selected trees above 45 cm gbh, 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 tat 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. 13.2
Table Showing List of trees on the coupe boundary

S.N.	Name of species	GBH (OB)	Remarks
1			
2			
3			

13.7.5. No tree bearing coupe demarcation bands shall be marked for felling.

Demarcation Of Sections:

13.7.6. For effective monitoring and control of the harvesting operations, each coupe marked for felling in SCI and Improvement Working Circles 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.

13.7.7. 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:

13.7.8. 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.,

13.7.9. 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:

13.7.10. Immediately, after completion of demarcation of the coupe, RFO shall prepare the Treatment map of the coupe as prescribed earlier, clearly showing the various Treatment-type areas in the coupe. The concerned ACF will verify the treatment map and make corrections, if necessary, before the submission to the DCF for approval.

13.7.11. 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.

13.7.12. 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.

13.7.13. 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.

13.7.14. After the approval of treatment map, marking of trees for harvesting shall be carried out as per prescriptions given in respective working circles. 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.

13.7.15. 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.

13.7.16. 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.

13.7.17. Following trees, in addition, will bear digit serial numbers both at BH (breast height) and at the base.

i) All trees of Teak, *bija, shisham, ain, tiwas, haldu, kalam, dhaora* and *siwan*, of 45 cm and above girth at b.h (ob).

ii) Trees of all other species, of and above, 60 cm girth at b.h.

13.7.18. The remaining trees marked will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series.

13.7.19. 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

13.7.20. 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. 13.3
Table Showing Format for marking of trees for harvesting

Tree Digit No.	Serial No. Coal tar	Name of species	GBH (OB)	Remarks

13.7.21. 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:

13.7.22. 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.

13.7.23. 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.

13.7.24. 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.

13.7.25. It is prescribed to follow watershed management approach viz. The ridge-to-valley approach for carrying out soil and moisture conservation woks. The contour trenching and gully plugging/check dams, as given under, have been prescribed to constitute the major component of these works.

13.7.26. Continuous Contour Trenching:

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^{o} 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.

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 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. 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.

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:

13.7.28. 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.

13.7.29. 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.

13.7.30. 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 by soil working and mulching around them, as prescribed in guidelines for rootstock management.

13.7.31. Plantation in working circles: Plantations in the working circles will be taken up as under. The PPO/PYO (pre-planting operations) shall be taken up in the year of coupe working, while the seedling planting and other FYO (first year operations) activities shall be carried out in the following year. 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.

13.7.32 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.

13.7.33. 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 and site and bamboo seedlings should be planted at six-meter interval (6m x 6m). Care should be taken to avoid planting of seedlings directly under the canopy of existing trees or established saplings.

13.7.34. 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.

13.7.35. Pit digging: Pits of size, preferably, 30 cm^3 for planting of non-teak species and 45 cm^3 sides for bamboo planting 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. Pits for bamboo planting shall be half filled during the refilling using topsoil from the heap.

Planting:

13.7.36. Planting of teak stumps: Crowbar planting of teak stumps shall be carried out within one week after the first monsoon shower.

13.7.37. Poly-pot or root-trainer planting: Seedling planting shall be completed within a fortnight after the first monsoon shower.

13.7.38. Bamboo planting:

i) Bamboo planting shall be completed within a fortnight after the first monsoon shower. Preferably, two-year-old bamboo seedlings with well-developed rhizomes of thumb thickness shall be planted. If stone mulching is feasible in the area, the pits should be refilled up to the ground. Otherwise, the ball of the earth and rhizome of the seedling shall be covered with soil and almost half of the pits should be left unfilled for reducing wild boar damage.
ii) Clonal rhizome multiplication method is proposed for bamboo propagation.

Subsequent planting operations:

13.7.39. 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.

13.7.40. First year operations in bamboo plantations: The first weeding, casualty replacement and the second weeding should be carried out as described in the preceding paragraph. Stone mulching should also be carried out with the second weeding in bamboo plantations as a safeguard against the wild boar damage.

13.7.41. 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.

13.7.42. Second year operations in bamboo plantations: The first weeding should be done in the first week of August, and it should include maintenance of the stone mulching in the bamboo plantations.

13.7.43. 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:

13.7.44. 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 braking the canopy. Thinning is chiefly concerned with promoting good growth in the stems that are retained.

13.7.45. 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.

13.7.46. 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.
(a) Trees with normal crown development and good stem form.
(b) Trees with defective stems of crowns, e.g.:
    (1) Trees with crown space cramped by neighboring trees,
    (2) Badly shaped old advance growth,
    (3) Trees with forked leader and similar defects
(c) 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.
(d) 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 ¾ 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 ½ to 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.

13.7.47. 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 ½ 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 introducing 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 of that locality. 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.

13.7.48.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.
(iii) 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.
(iv) 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.

13.7.50. Tending Procedure for Old Plantations: For this, the figures from the Yield Table and from the Stand Table in respect of relevant site quality and age shall be reproduced as provided in **Appendix No. XXXIV** of Volume II, and girth class wise comparison of number of stems actually present with that required as per Stand Table shall be done. 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 (of course, provided that the actual total), 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* (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.

Tending in the Unfit Grids: After comparing girth class wise population of stems in the grids failing to qualify the test given in 3.13.8 with that table given in the 13.4 for that site quality and maximum girth, excess population in each girth class shall be removed in the following order; Non teak coppice, Teak coppice, Inferior injali, Superior injali, Teak, after reserving all trees of edible fruit bearing species in addition to kulu, rosewood and semal.

Table No. 13.4

Table Showing Site quality wise number of trees for various maximum girths in cm. allowed to be attained in the crop

Girth Classes (cm.)	Site Quality					
	II		II/III	III/IV	III	IV
	Max girth (cm.)					
	150	135	150	120	120	120
U15	214	238	236	397	359	475
16U30	154	171	163	215	222	232
31U45	87	96	85	93	99	91
46U60	49	54	48	53	55	53
61U75	33	36	31	37	38	38
76U90	24	27	23	29	29	29
91U105	19	21	19	23	24	21
106U120	16	17	16	20	20	12
121U135	13	15	14	0	0	
136U150	12	0	12	0	0	0
151U165	0	0	0	0	0	0
166U180	0	0	0	0	0	0
Total	621	675	647	867	846	951
Volume/ha	86.753	78.113	86.808	62.684	66.866	55.325

Harvesting And Disposal:

13.7.51.Agency for harvesting: The coupes shall be worked departmentally. However bamboo coupes shall be worked as per the government decision. Estimation of bamboo yield should be based on actual enumeration carried out a year prior to the beginning bamboo harvesting.

13.7.52. 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.

13.7.53. 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. Burads, the bamboo artisans, prefer green bamboo, and hence, necessary arrangement shall be made to reduce the period between bamboo cutting and delivery to the Burad communities. Each registered Burad family is entitled up to 1,500 bamboos per year at the nistar rate fixed by the Chief Conservator of Forests in consultation with the District Collector. 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 The Forest Land Record:

13.7.54. 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 affect will be recorded annually in the Form 1 Register during the month of June.

13.7.55. Forest notification: Un classed forests (non-forest areas) transferred to the department for the compensatory afforestation shall be, immediately, proposed for notification as the Protected Forests, and the reservation process shall be initiated with the section notification.

13.7.56. 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 East *Melghat* Division to mark completion of the process.

13.7.57. Along with the reconciliation, the details of land grants (patta) issued on the forest land will also be made available to the East *Melghat* 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.*

13.7.58. 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 to the Chief Conservator of Forests, Working Plans *Nagpur.* The DCF and RFO of the East Melghat 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.

13.7.59. Awareness Programmes: Working Plan prescriptions can be better implemented if it's provisions are made known to the people through awareness programmes in the villages surrounding to the coupe due for working. So the following strategies are prescribed.

1. Explain the provisions of the various working circles of the Working Plan to the villagers and its implications.
2. Solicit cooperation of the people in protecting the regeneration in the coupes either by deploying their cattle in other areas or some other means, which is acceptable to the people.
3. Solicit the participation of the villagers in controlling injuries to the forest crop.
4. Organize periodic meetings monthly with the villagers for better understanding and to solve the problems amicably.
5. The Deputy Conservator of Forests shall make necessary budgetary provisions to implement the extension and awareness programmes, so that the objectives of the working plan can be achieved.
6. The prescriptions given at the end of the each working circle with respect to peoples participation and provisions related to grazing control and fire control shall be followed scrupulously with the active participation of the villagers.

CHAPTER XIV

THE ESTABLISHMENT AND LABOUR

SECTION 14.1. THE ESTABLISHMENT:

14.1.1. The range, round and beat reorganization is proposed for reduction of present beat average area from 1057 ha. to 675 ha. for better management, conservation and protection of forests. A proposal incorporating 6 ranges, 25 rounds and 83 beats has been submitted to the CCF (T) Amravati..

14.1.2. It has been observed that the division has inadequate staff for the implementation of the provisions of this Plan.

Table No. 14.1.
Table Showing No. Of Ranges, Rounds And Beats At Present And Proposed In The East Melghat Division

Particulars	Existing No.	Proposed No.
Ranges	4	6
Rounds	14	25
Beats	53	83

14.1.3. The details of existing Range, Round and Beats are given in **Appendix No. XXXV** 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.

14.1.4. 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 necessiate special efforts for the staff welfare programme. Sufficient facilities should be provided for quality education to the minor children of the field staff.

14.1.5. 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.

14.1.6. Trainingof 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.

SECTION14.2. LABOUR AVAILIBILITY:

14.2.1. 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 and bamboo harvesting etc.

14.2.2. Some scheduled adjustment should be sufficient for execution of the forestry operations. Temporary manpower shortage is experienced during the crop sowing period.

14.2.3. 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.

Buildings:

14.2.4. The accommodation is not satisfactory, as the existing buildings are not maintained properly, especially the field staff. Many residential quarters for the Forest Guards do not have residential facilities. Although a number of buildings were constructed under the Maharashtra Forestry Project, more residential buildings are required in the field, especially, in the interior locations. 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 Management (Overlapping) Working Circle.

CHAPTER – XV

CONTROL AND RECORDS

SECTION 15. 1. CONTROL AND RECORDS:

15.1. The following records shall be maintained in the division office:

i) Control Form
ii) Compartment History
iii) Plantation and Nursery Registers.
iv) Divisional Note Book.

SECTION 15. 2. CONTROL FORMS:

15.2.1. 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 itself, the Territorial Conservator, and the Deputy Conservator of Forest.

Formats Of Control Forms

15.2.2 Following are two formats of control forms:

15.2.3. 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.

15.2.4. 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.

15.2.5. The prescribed proforma of the control forms mentioned above are given in **Appendix No. XXXIV** of the Volume II of this plan.

15.2.6. 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 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 Conservator. The later 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 Conservator and the DCF for their record and the Working Plan Conservator will retain the third copy for his set of control forms.

15.2.7. The control forms should be submitted by the DCF to the Territorial Conservator on or before December 1 and the later should send them to the Working Plan conservator concerned on or before January each year.

i) **Coupe Control Form**
The format of coupe control form is as given in **Appendix No. XXXIV** of the Volume II of this plan.

ii) **Felling Control Form:**
The format of felling control is given in the **Appendix No. XXXIV** of the Volume II of this plan.

SECTION15.3. COMPARTMENT HISTORY:

15.3.1. The following forms (in two sets, one each for range and the division) are used for writing the compartment history for each compartment or sub-compartment;

CH Fom-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

15.3.2. Compartment Description:
The format CH Form-1 is given in the **Appendix No. XXXVI** of Volume II of this plan.

15.3.3. The description will be signed and dated by the WPO.

15.3.4. Compartment Enumeration:
The format is as given in **Appendix No. XXXVI** in the Volume II of this plan.

15.3.5. Trees Marked For Felling:
This form is to be filled by the DCF from time to time as the markings take place. The format is as given in **Appendix No. XXXVI** in the Volume II of this plan.
15.3.6. Compartment Outturn:

The format is as given in **Appendix No. XXXVI** in the Volume II of this plan.

15.3.7. Compartment History:
The format is as given in as given in **Appendix No. XXXVI** in the Volume II of this plan.

15.3.8. 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.

15.3.9. 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.

15.3.10. The principal information, which the DCF should record, is 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.

15.3.11. 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.

15.3.15. 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. XXXVII** 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. XXXVIII** of Volume II.

15.3.16. 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. XXXIX** of Volume II of this plan.

MAPS:

Digital database:

15.3.17. 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.

15.318. Maps: Maps are essential ingredients of forest management. All maps are updated, revised or new maps prepared.

15.3.19. 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.

15.3.20. 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:

15.3.21.

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:

15.3.22. 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 **Management Maps** show the boundary pillars with their numbers, the coupes, compartments, felling series, Working Circle, 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.

15.3.23. East *Melghat* 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.

15.3.24. The conservator of Forests (Territorial) and the 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.

15.3.25. Reference maps: the reference map on 1:2,50,000 scale, is provided along with the draft plan showing range boundaries, compartments, working circles, felling series, roads and other prominent reference features have been enclosed with the working plan.

15.3.26. 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 East *Melghat* Division division.

CHAPTER XVI

SUMMARY OF PRESCRIPTIONS

SECTION 16.1. FORMATION OF VARIOUS WORKING CIRCLES:

16.1.1. Selection cum improvement working circle: It includes better-stocked areas of *Jarida, Ghatang* and *Anjangaon* ranges. Felling cycle is 20 years. For yield regulation, the K.P. *Sagariya*'s modification of Smithies formula has been applied. Harvestable girth is 120c.m. for site quality III, IV areas and 150 cm. for site quality II and II/III areas. For miscellaneous species harvestable girth is 120 cm. All the fruit bearing trees are reserved against marking for felling. 80% of the available harvestable trees shall be harvested, as indicated in the yield regulation. No felling shall be made in the unworkable areas. It includes areas of more than 25degree slope, 20m wide strip of forest on either side of the *nala* and eroded and erosion liable areas. At least 2 dead trees shall be left in the field for wildlife purpose. In addition to this improvement fellings shall be carried out in all girth classes up to pre-harvestable girth class to facilitate the growth of growing stock.

16.1.2. Teak Plantation Working Circle: Predominantly teak bearing areas with matured crop and little regeneration are included in this working circle. Average crop girth is calculated to assess the maturity of the crop grid wise and accordingly fit and unfit grids will be identified. Such exercise shall be carried out only in 'D' category areas. Under stocked, Site quality IV areas, eroded and liable to erosion areas shall be excluded from the working. The average crop girth of a grid is compared to the Critical Crop Girth of the corresponding site quality and rotation and composition of the crop and if it exceeds then the grid is considered fit for canopy removal after retaining 20 fruit bearing trees and 20 miscellaneous trees followed by teak plantation. The old teak plantations were not thinned as per schedule resulting lot of congestion in the crop. Hence it is suggested to thin all the old plantations in the first three years itself so that the growth parameters of the plantations can be brought nearer to the figures of yield table. Later onwards, the thinnings shall be carried out at the age of 25, 35,45,55,65 years.

16.1.3. Improvement Working Circle: The areas, which require Improvement fellings have been included in this working circle. No main felling is prescribed, however improvement fellings to remove the congestion in the crop is prescribed. The gaps in the canopy shall be filled by taking up plantations in the area.

16.1.4. Afforestation Working Circle: These are the areas predominantly open or blanks with intermittent well-stocked patches. Plantations shall be taken up in the area simultaneously improvement fellings shall be carried in the well-stocked patches.

16.1.5. Protection Working Circle: The areas with steep slopes, which require protection, have been included in this working circle. Plantations in the open patches, seed sowings have been prescribed. There are certain well-stocked patches with gentle slopes. In these areas improvement fellings shall be carried out and small timber and poles obtained in the process shall be given to the villagers in the form of *Nistar*.

16.1.6. Bamboo (Overlapping) Working Circle: Compartments having good patches of bamboo have been included in this working circle. Felling cycle is 3 years and 6cutting series have been formed and each series will have 3 annual coupes and one coupe will be worked every year. Culm selection system is the silvicultural system in which 8 matured bamboos will be left in each clump.

In addition to this removal of congestion in the gregariously flowered areas shall be taken up. The bamboo clumps shall be protected from hacking by the grazers.

16.1.7. Wildlife (Overlapping) Working Circle: It is intended to protect the existing wildlife in the area as its numbers are dwindling by adopting better management practices like meadow development, anicut construction and maintenance de-silting of '*dohs*' etc., It is also proposed to set up task group to tackle the man animal conflicts for tranquilizing and capturing purpose.

16.1.8. NTFP (Overlapping) Working Circle: NTFP is the important livelihood to the people of this tract particularly in the lean season. Hence its availability has to be ensured so that income generation activities are continued. Increasing the regeneration of NTFP either by root suckers or by seed sowing is suggested. Facilitation in the marketing of NTFP, valued addition of NTFP is prescribed. Better tapping technique of gums is prescribed to maintain the trees for perpetuity.

16.1.9. JFM (Overlapping) Working Circle: To involve the local people in the protection and conservation of the forest this working circle has been constituted. JFM is yet to pick up momentum in this division. Grazing and fires are the major biotic interferences. It is suggested to address these problems by involving the local people to prevent fire and hacking by the graziers. The FDA formed in the division shall supervise the developmental activities taken up through JFM committees. It will ensure the smooth relations between the forest department and local villagers.

16.1.10. Forest Protection (Overlapping) Working Circle: The forests are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated the constitution of this working circle. Grazing and Fires are the major biotic interferences that are causing damage to the young regeneration. The measures need to be adopted in the field to address the problems are discussed in the relevant chapter. It will help to monitor and to assess the results in a more objective manner.

SECTION 16.2. DEMARCATION AND MARKING:

16.2.1. The annual coupes for the harvesting, tending operations and site specific treatment prescribed are to be demarcated, one year in advance, and each coupe shall be subdivided into four sections. The demarcation of coupes is described in the chapter of Miscellaneous Regulations.

16.2.2. Soon after the demarcation of annual coupe, the treatment maps as prescribed in the following paragraph shall be prepared, verified and got approved. After seeking approval of the treatment map marking of coupe shall be carried out. The detailed technique of marking has been described in the chapter of Miscellaneous Regulations. Preparation of treatment map and marking of coupe is prescribed to be done, preferably, in the year of demarcation to facilitate necessary checking and corrections, if any, in time.

SECTION 16.3. TREATMENT TYPES AND PREPARATION OF TREATMENT MAP:

16.3.1. 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 16.1.**

Table 16.1.
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	Open forests (density<0.4) with rootstock	2 hectare
Pole Crop and Old plantations	C1-type C2-type	Pole crop of the identified valuable species, suitable for retention as future crop, having density 0.4 or more and old plantations. Dense teak plantations.	1 hectare
Well-stocked area	D-type	Areas having density 0.4 and over	2 hectare

16.3.2. Distinct patches of the B, D-type areas shall have minimum area of 2 (two) hectare in extent. The minimum extent prescribed for the C-type areas is 1 (one) hectare. The A-type protection areas would be delineated irrespective of the patch size. Smaller patches proposed to be merged with the adjoining larger areas having similar crop conditions.

16.3.3. The treatment maps are proposed to show adequate natural regeneration areas (625 or above saplings seedlings) in the D-type; and areas suitable for planting bamboo, teak and mixed species in the B type area.

16.3.4. Delineation of various treatment type areas on treatment maps will adhere to the following general guidelines:

16.3.4.1. 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.

16.3.4.2. 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.

16.3.4.3. The A3-type (excessive erosion prone includes seasonally flooded areas and such pockets marked on the land use maps.

16.3.4.5. Natural regeneration would be considered adequate if at least 625 saplings/seedlings per hectare are present. The same criteria will be applied for the rootstock, and used for defining the B1-type.

16.3.4.6. 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.

16.3.5. 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.

16.3.6. The treatment map will bear date of inspection by the Range forest Officer and the Assistant Conservator of forests under their signatures.

16.3.7. 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 16.4. THE COMMON TREATMENT PRESCRIPTIONS FOR VARIOUS TREATMENT TYPES:

16.4.1. 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.

16.4.2. Soil and Moisture conservation works: Soil and moisture conservation works such as check-dams, Gully plugging, etc. shall be carried out as prescribed in the chapter of Miscellaneous Regulations.

16.4.3. 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.

16.4.4. 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.

16.4.5. 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. Poles having at least 2.50 meter of clean bole will be not be treated as malformed.

16.4.6. Climber cutting and shrub clearance: Climber cutting of *Chilati, Eruni, Mahulbel, Palasbel, Nagvel* and *Gunj* and shrub cutting of *Lantana, Rantulsi, Bharati*, *Nirgudi, Kuda, Kharasani* and *Phetra* 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.

16.4.7. Sixth-year cleaning: Cleaning operations are prescribed to be carried out in the entire coupe in the sixth year of coupe working.

16.4.8. 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.

16.4.9. Bamboo cleaning: Bamboo clumps in areas outside Bamboo (overlapping) Working Circle shall be cleaned in the manner described in Bamboo harvesting under Bamboo (overlapping) Working Circle.

16.4.10. 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.

16.4.11. 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.

16.4.12. 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 as below.

SECTION 16.5. TREATMENT IN A-TYPE AREAS:

16.5.1. Soil and moisture conservation: Gully plugging and other soil and moisture conservation works (except contour trenching), as described in the chapter of Miscellaneous Regulations shall be taken up.

16.5.2. 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.

16.5.3. Stake planting: In the A3-type areas, stakes of Ficus spc., *Pangara, Salai* or other suitable species will be planted at six-meter interval, on suitable sites along *nalas* and on riparian sites with the help of regular staff and forest labourers.

16.5.4. Harvesting prohibited: Harvesting of standing trees (live) 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 16.6. TREATMENT IN B-TYPE AREAS:

16.6.1. Rootstock management: Tending of rootstock in the B-type will be carried out. Necessary soil working and mulching will be carried out to promote rootstock growth.

16.6.2. Plantations: Suitable sites of the B-type areas shall be brought under the plantations. The choice of bamboo planting, mixed species plantations or teak-stump planting will depend upon objectives of the working circles and site suitability. All planting operations and subsequent operations should follow the guidelines for planting operations described in the chapter on Miscellaneous Regulations.

SECTION 16.7. TREATMENT IN C-TYPE:

16.7.1. 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.

16.7.2. 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 as in paragraph 16.7.5.

16.7.3. 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 16.8. TREATMENT IN D-TYPE:

16.8.1. Enumeration in annual coupes: Species and girth-class of all trees above harvestable girth and preharvestable girth are prescribed to be recorded for enumeration, where as in Teak Plantation Working Circle all trees are enumerated.

16.8.2. 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. Well-formed and vigorous trees will be preferred for retention. Species listed as valuable species given in the paragraph 16.8.1 will determine the order of priority for retention.

16.8.3. 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.

16.8.4. Tending of natural regeneration: Singling and spacing out will be carried out among seedling/saplings of teak and other valuable species listed in the following section for the rootstock management. Spacing operations should leave nearly 625 seedling/saplings per hectare. The existing natural regeneration should be encouraged by soil working and mulching around them in accordance with the guidelines for the rootstock management described in the relevant chapters.

16.8.5. 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.

16.8.6. 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 16.9. VALUABLE SPECIES FOR RETENTION:

16.9.1. Order of priority among desirable species for retention is prescribed as: *Tiwas, Shisham, Haldu, Teak, Bija, Saja, Kalam, Khair, Shiwan, Kasai, dhaora, Bhirra, Rohan, Mowai, Salai, Mokha, Dhaman, Bhilawa, Chichwa, Bhorsal* and *Lendia*.

16.9.2. 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.

16.9.3. 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.

16.9.4. 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. Poles having at least 2.50 meter of clean bole will be not be treated as malformed.

16.9.5. Tending of natural regeneration: All seedlings and saplings of valuable species more than 60 centimeters in height to leave nearly 625 saplings/seedlings per hectare at an average of 4 meter spacing. The natural regeneration present shall be assisted and encouraged by soil working and mulching around them, in the following manner.

16.9.6. First year operations: Weeds in one-meter diameter around seedling/saplings of valuable species should be cleared during the first week of July. Uprooted weed, grasses and leaf-litter should be mixed in the upper layer of soil as the organic mulch and facilitate loosening and aeration of the soil by worms and insects. One soil working should be carried out in October.

16.9.7. Second year operations: The soil working in October will be repeated in the following year. However, one scrape weeding of one-meter diameter should be carried out in the first week of August around the shoots of seedling coppice within the rootstock management area.

16.9.8. Third year operations: Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance should be repeated as third year operations.

SECTION 16.10. CUT BACK OPERATIONS (CBO):

16.10.1. Cut back operations are prescribed to be carried out in the year following the main felling, as per prescriptions given in subsequent paragraphs.

16.10.2. 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.

16.10.3. All trees damaged during the main coupe felling shall be marked for removal.

16.10.4. All left over multiple coppice shoots and poles shall be reduced to one per stool.

16.10.5. All newly risen coppice shoots shall be removed to encourage establishment of seedling regeneration.

SECTION 16.11. GUIDELINES FOR CLEANING IN THE SIXTH YEAR:

16.11.1. 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 plantation, which are treated so as per Evaluation code. Cleaning shall be carried as per prescriptions given in the following paragraphs.

16.11.2. 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.

16.11.3. It will include climber cutting, shrub clearance, dressing of high stumps. Extraction of marketable down logs should be carried out in the entire coupe. Cleaning of Bamboo clumps in areas outside Bamboo (overlapping) Working Circle shall be carried out.

16.11.4. 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.

16.11.5. 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.

CONSERVATOR OF FORESTS,
WORKING PLAN, AMRAVATI.
Uppar Wardha Colony Road,
Camp Amravati-444 602
Tel.No.0721-2662641, Fax.:2665844
E-mail:cfwp_amt@rediffmail.com

सत्यमेव जयते
महाराष्ट्र शासन

वनसंरक्षक.
कार्य आयोजना, अमरावती.
उर्ध्व अपर वर्धा प्रकल्प वसाहत मार्ग,
कॅम्प रोड, अमरावती -४४४ ६०२.
दूरध्वनी क्र.०७२१-२६६२६४१ फॅक्स-२६६५८४४.
ई मेल- cfwp_amt@rediffmail.com

Subject - Compliance of the suggestions of the State Level Committee on the PWPR of East Melghat Forest Division meeting held on 25/09/2014 and submission of DWPR.

No.Desk/02/ CF/WP/RS/ 134 / 2015-16
Amravati, Dated - 25 August, 2015.

To,

Additional Principal Chief Conservator of Forests,
Working Plan (East)
Ravi Nagar, Nagpur.

Reference - Your Office letter No.Desk-14/Wp/SLCmeeting/914, dated 15/11/2014.

* * * * *

PWPR of East Melghat Forest Division was presented in State Level Committee meeting held at "Van Sabha Gruh" Nagpur on 25th September, 2014. As per reference above the State Level Committee unanimously approved the PWPR and suggested that last working should be revised and resubmitted with the suggestion of the SLC members accordingly the final DWPR is submitted for favour of information and necessary action.

S.N.	Suggestions	Compliance
1.	Highlight the result / impact of 10 years working under different working circles.	Highlight of the impact / results of 10 years working is given in brief in chapter of each working circle.
2.	PWPR prepared for East Melght Division should be modified in the form of Mit-term Review Report and should be sent with extention proposal as mentioned above for onward transmission to GoI for approval.	This plan is the compliance of the same.
3.	Shri.S.K.Bhandari, CCF (Central) Regional Office, Bhopal suggested the Mid-term review and extension proposal of working plan in accordance with National Working Plan Code-2014.	Modification made by adding the chapter on Biodiversity, Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Right) Act 2006 and Maharashtra Transfer of ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act 1997 is incorporated in the plan.
4.	Justification of extention proposal paragraph 31 of Chapter 3 of National Working Plan Code-2014.	Compliance made in the Introduction.
5.	Chapter as per new items mentioned in Chapter-II of National Working Plan Code-2014.	Compliance made in new plan page no.11.

Encl. :- As above. (Revised Copy of DWPR)

Conservator of Forests,
Working Plan,
Amravati.

Copy submitted with compliments to The Principal Chief Conservator of Forests, (P&M). M.S. Nagpur for information.

The PWPR for East Melghat Forest Division was presented before the State Level Meeting on 25/09/2014 when it was discussed and approved to extend the current plan for next 10 Years The minutes of the meeting have been circulated vide PCCF (HoFF) letter No.Desk-14/WP/SLCmeeting/914/2014-15,Nagpur dt.15/11/2014.

(Yuvaraj S.)
Dy.Conservator of Forests,
East Melghat Forests Division,
Chikhaldara.

(Kiran Gitte)
Collector,
Amravati.

(Yuvaraj S.)
Conservator of Forests, I/c
Working Plan, Amravati.

(Sanjeev Gaur)
Chief Conservator of Forests,
(Territorial), Amravati.

(A.K.Mishra)
Add.Principal Chief Conservator of Forests,
(Personnel) Nagpur.

(Dr.Sunita Singh)
Add.Principal Chief Conservator of Forests,
(IT&P) Nagpur.

(Dr.P.N.Munde)
Add.Principal Chief Conservator of Forests,
(Subordinate Cadre) Nagpur &
Guardian APCCF, Amravati Circle.

(Shree Bhagwan)
Add.Principal Chief Conservator of Forests,
(Budget, Planning & Development)
M.S. Nagpur.

(Dr.S.C.Gairola)
Add. Principal Chief Conservator of Forests &
Nodal Officer, Nagpur.

(M.Karunakaran)
Add.Principal Chief Conservator of Forests,
Working Plans (East), Nagpur.

(A.S.K.Sinha)
Principal Chief Conservator of Forests,
(Production & Management)
Maharashtra State, Nagpur

(S.K.Bhandari)
Chief Conservator of Forests,
(Central)
Representative of GoI, Bhopal, (M.P.)

(Sarjan Bhagat)
Principal Chief Conservator of Forests,
(Wild life)
Maharashtra State,
Nagpur.

(Anil Kumar Saxena)
Principal Chief Conservator of Forests &
Head of Forest Force,
Maharashtra State, Nagpur.

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS
& CLIMATE CHANGE

Regional Office (WCZ)
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
E-mail: moefregionalofficenagpur@gmail.com

FILE NO. 12-5-2004 (FOR)/ 565 **Dated :** 3/ **/12/2015**

To,

The Secretary,
Revenue and Forest Department,
Govt of Maharashtra,
Mantralaya,
Mumbai-400032.

Sub: Working Plan – of East Melghat Forest Division written by S. Yuvaraj, IFSfor the period of 2016-17 to 2025-26.

Ref: (1) P.C.C.F. (P&M), M.S. Nagpur Letter No. Desk-14/WP/East Melghat/698 dated 4.9.2015.
(2) Govt. of Maharashtra Lr. No. FDM-2015/CR 285/F-2 dated 7/11/2015.
(3) P.C.C.F. (P&M), M.S. Nagpur Letter No. Desk-14/WP/East Melghat/1202 dated 22.12.2015.

Sir,

With reference to the above mentioned subject, approval of the Central Government is granted, to the said Working Plan in accordance with the powers vested under Forest (Conservation) Act, 1980 and subject to the following conditions:

1. The currency of the Working Plan shall be for a period of 10 years i.e. from 2016-17 to 2025-26. Necessary corrections may be made in the final copy of the Plan.

2. The orders of Hon' ble Supreme Court in the matter of GodavarmanThirumulkpad Vs Union of India in W.P. (Civil) No. 202/95 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon' ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.

3. Further, in compliance with order to Hon'ble Supreme Court's Order dated 22.09.2000, the Government of Maharashtra shall ensure that regeneration of forests is commensurate with felling carried out under this working plan.

4. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with felling. In the events of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/ shortfall is made up.

5. Following the directions of the Hon' ble Apex Court in their order dated 22.09.2000 , a Core group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with felling. Instruction/ directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MoEF, New Delhi.

6. Period of last Working Plan was up to 2015-16. Present Working Plan is approved from 2016-17. Intervening period will be considered as per the prescription of last working plan and whatever work has been carried out may be got regularized /will be considered as part of last working plan, after taking approval of the competent authority, wherever needed.

7. No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.

8. Standard thinning and silvicultural operations under the strict supervision of Assistant Conservator of Forests and above will be allowed as per norms to improve the health of growing stock while executing the prescriptions of the Working Plan.

9. Prescriptions of micro plans for JFM (if made) should not deviate from the broad framework /guidelines of the Working Plan and shall be in accordance with various orders of Hon'ble Supreme Court.

10. Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/ future years to compensate this removal.

11. No deviations shall be made from the prescriptions of Working Plan read with the conditions stipulated herein without prior approval of the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out of turn plantation carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government to time.

12. Midterm review of Working Plan shall be undertaken after five years so as to make any changes, if needed to meet the objectives, with the approval of Regional Office Nagpur.

13. The exploitable girth of tree species and period of felling cycle shall not be lower than the approved in previous working plan.

14. In the vicinity of Nalas and water bodies felling shall not be undertaken.

15. Felling shall not be undertaken near the known resting places of wild animals.

16. Removal of dead and diseased trees will be undertaken under the supervision of an officer not below the rank of Assistant Conservator of forests.

17. All kind of felling including that of dead and diseased trees and for granting of right and concession as well as all illicit felling should be compiled along with the estimation of their stand volumes as per the same volume table use for the assessment of growing stock. This report shall be prepared annually working circle wise and compartment wise by the territorial Sub- DFO and shall be submitted to the C.F, Working Plan for this purpose within 02 months of the end of control year. Such removal shall be accounted for against the prescribed felling yield of the relevant year.

18. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the prescription of Working Plan.

19. Status of rare, endangered and near extinct species shall be monitored closely and adequate measures will be taken for their protection and conservation.

20. Execution of Working Plan shall be in conformity with the National Forest Policies.

21. A definite plan has to be made to remove encroachment and plant the vacated area by planting suitable local species as per Government of India and Hon'ble Supreme Court Orders/Guidelines in the matter.

22. Eco-tourism shall/ may be undertaken on sustainable basis. No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed for public. Such sites will be declared Plastic free zones and these eco-tourisms sites will be managed by the forest department as per the prescriptions of the working plan.

23. Demarcation and consolidation of Forest Boundaries will be done adequately.

24. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.

25. Exotic species should not be planted in Plan areas.

26. Proper mechanism has to be put in place to control illegal felling, grazing &fire. Proper fire plan shall be prepared and executed meticulously.

27. Only 50% of normal yield, if silviculturally available ,will be allowed for removal in case of teak, Dhawada , Bhirra, Chichawa, Salai, Mowari, Rohan, Shiwan, Shisham, Surya, Kasai, Mokra, Palas, Dhaman, Bhilwara, etc. In case of haldu, Ain, Bija, Tiwas, Kalam, lendia, Garadi, Khair it will be 33% if silviculturally available.

28. A chapter will be added on activities of Forest Development Corporation as required under chapter IV of Working Plan Code, 2004.

29. Efforts should be made to undertake artificial regeneration of local species in such a way that it both serve the purpose of biodiversity conservation of meeting the demand of fuel wood, fodder and the timber.

30. Babul Ban, if any, will not be expanded at the cost of local species.

31. Lac cultivation, if any, will be practiced as per the provisions of Forest (Conservation) Act, 1980.

32. Documents and appendices mandated in National Working Plan Code will incorporated in the working plan.

33. Attempts shall be made to grow trees outside forest areas to meet the local demand of small timber, fuel wood & fodder.

34. All the left over mandated chapters, appendices and maps will be added in Working Plan.

35. Proper mechanism is to be place in an adequate manner that such case NTFPs are collected in sustainable manner.

36. Socio-economic survey is to be conducted within first year of implementation of plan and the same be appended with the Working Plan.

37. Grassland will not be expanded at the expense of natural tree cover.

38. While managing forests provisions of the Biodiversity Act, 2002 shall be fully complied.

39. Cutback operation shall be undertaken as per standard norms.

40. Prescriptions on Wildlife Management should be vetted by the CWLW and a certificate of the same be attached to the plan at the time of final printing.

41. No regularization of existing encroachment should be done without following due procedure. And an appendix may be added giving details of the encroachment of the forest area in the division.

42. Grazing to be properly regulated and grazing fee should be levied.

43. All the Unclassed Forest, Acquired CA areas and Acquired Private Forests should be notified as RF/PF in time-bound manner and be carried out at the earliest.

44. The area statement shown on page no. 7 of Vol.-I should be suitably rectified.

45. Range wise legal status wise area statement should be incorporated/reflected in Vol.-I.

46. Result of past system of management of present plan should be incorporated in Chapter VI of Vol.-I.

47. The Central Government reserves the right to review, modify, withdraw, this approval at any time if any of the conditions of approval are not implemented. Relevant modification in the working plan are required to be carried out so as to keep it is conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy from time to time.

Yours faithfully,

(Ashok Biswal)
Conservator of Forests(Central)

Copy to:

1. The Additional Director General of Forest (FC) Ministry of Environment and Forest Indira Paryavaran Bhawan, Jor Bagh , New Delhi, New Delhi-110003

2. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra , Van Bhawan, Ramgiri Road , Civil Lines, Nagpur-440001.

3. The Principal Chief Conservator of Forests (P&M) Van Bhawan, Civil Lines, Nagpur.

GOVERNMENT OF MAHARASHTRA

NO. FDM-2015/CR NO. 285/F-2
Revenue & Forest Department
Madam Kama Road,
Hutatma Rajguru Chowk,
Mantralaya, Mumbai 400032
Date :- 25 January, 2016

SUBJECT: APPROVAL OF WORKING PLAN OF EAST MELGHAT FOREST DIVISION WRITTEN BY SHRI.S.YUVRAJ,I.F.S. FOR THE PERIOD OF 2016-17 TO 2025-26.

MEMORANDUM :

The undersigned presents compliments to the Principal Chief Conservator of Forests (Production & Management) and, with reference to his letter No. Desk-14/ WP/East Melghat/1202/,Dated 22.12.2015 on the above subject, is directed to convey the sanction of Government of Maharashtra to the working plan of EAST MELGHAT FOREST DIVISION, Maharashtra State for the period of 2016-17 to 2025-26 prepared by SHRI.VINOD KUMAR,IFS & SHRI.G.P.GARAD,IFS & REVISED & UPDATED BY SHRI S.YUVRAJ, IFS.

The Government of India, Ministry of Environment and Forests has already conveyed its approval to the above said working plan vide its letter No. 12-5-2004(FOR) /565, Dated 03.12.2015 under certain conditions. These conditions should be strictly followed.

By order and in the name of the Governor of Maharashtra,

Yours Faithfully,

25/1/016

(D.L.THORAT)
Joint Secretary to the
Govt. of Maharashtra

To,

1. **The Principal Chief Conservator of Forests, (Hoff) Maharashtra State, Nagpur.**
2. **Principal Chief Conservator of Forests, (Production & Management) Maharashtra State, Nagpur.**
3. **Chief Conservator of Forests, (T), Amravati**
4. **Conservator of Forests, (Working Plan), Amravati**
5. **Select File Desk F-2.**