



GOVERNMENT OF MAHARASHTRA

**The Working Plan
For
West Melghat Division
AMRAVATI CIRCLE**

For the period
2008-09 To 2017-18

**VOLUME – I
(Part I and II)**



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Foreword

The present Working Plan for West *Melghat* Division authored by, *S/Shri V.R.Tiwari, M. K. Rao and G.P.Garad* replaces the erstwhile Working Plans written by *S/Shri Shailendra Bahadur and B.S.Thengdi* for the major area and for the part by *Shri B.S.Thengdi*. As the present division came into existence in 1999, after re-organization of the areas under erstwhile South *Melghat* And West *Melghat* divisions, coupled with the unified control for the *Melghat* Tiger Reserve, the Working Plans of both divisions, which had expired, have been revised and put in the present form.

An overview of the results of past working and the data of statistics of growth and yield reveals that the forests have degraded during the last plan period. Hence the conservative approach for forestry management followed scrupulously by the planners in the past, keeping in view the fragility and sensitivity of *Melghat* forests in sustaining the unique ecological system in the region has been continued by the present Working Plan Officer. A new Chapter on Biodiversity has been added which not only highlights floral and faunal diversity of *Melghat* Forests but also incorporate important provisions of the Biological Diversity Act, 2002. The Silt monitoring stations proposed to be installed in each mini watershed, will help in assessing effectiveness of management. The added emphasis on the management of N.T.F.P. and Wildlife in the present Plan is likely to add impetus to this much needed conservation efforts in the forest area covered by the Working Plan.

Though the P.W. P. R. of the plan was approved prior to the issue of guidelines for Working Plans by Government of India, in view of the directives of the Honourable Supreme Court, the work of revision in the present Plan has been taken up keeping fully in view, the instructions contained in the guidelines and ensure that the Plan remains updated as per the operational policies and guidelines, in both letter and spirit. The Teak Plantation Working Circle proposed in the PWPR has been merged with SCI Working Circle after due consideration of fragility of *Melghat* Forests and analysis of the enumeration and regeneration data. Similarly the Afforestation Working Circle has been merged with the Improvement Working Circle, considering the similarity of crop composition in these Working Circles. The mandatory chapters on the Forest Protection, Wildlife, N. T. F. P. and J. F. M., will certainly bring more objectivity and focus in the management of forests covered by the Working Plan.

The enumeration data has been analyzed adequately and compared with the data recorded in the previous plan, which attach objectivity to the system for resource

survey. The pressure of over grazing and increased biotic interference in and around villages is also revealing and needs to be addressed adequately by the administration through the J. F. M. tool which is yet to establish its roots in the division. The need to tackle the biotic pressure through participatory management has been highlighted in the relevant chapter. The Village wise data of casual labourers, marginal labourers will help in better planning of works by the Division.

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

Nagpur,
Date: 11/03/2008

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

INTRODUCTION

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

The present West *Melghat* Division is formed by drawing and merging the part areas of erstwhile West *Melghat* Division and South *Melghat* Division. Accordingly *Dharni and Dhakna* Ranges were managed under *Shailendra Bahadur* and *B.S.Thengdi's* plan till 2002-03. The *Akot and Dhulghat* Ranges were managed under *B. S. Thengdi's* working plan till 2003-04. The present plan replaces the above two plans and will be in force for 10 years w.e.f. 2008-2009.

The Preliminary Working Plan Report prepared by *Shri G. P. Garad* 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 plan has been prepared. However, some changes have been proposed in the Working Circles mentioning in the PWPR. After analysis of enumeration results, a decision has been taken to merge Afforestation Working Circle with Improvement Working Circle as the crop composition and number of trees/ha. in both WCs are more or less same. Protected Forest (Area taken as compensatory lands) which have already been planted and needed improvement works are included in Improvement Working Circle. In addition, the area proposed to be managed as TPWC (overwood removal) has been merged with SCI Working Circle from which it was earlier carved out. The decision for merging was taken after consideration of pre-dominance of trees of seed origin in crop composition, analysis of regeneration data, the biodiversity consideration, and also the vicinity of Melghat Tiger Reserve to the Division. Old Teak Plantations will be managed as per prescriptions given under Plantation (Overlapping) Working Circle. The chapters of the Plan are prepared according to the National Working Plan Code-2004. Accordingly, 4 mandatory overlapping Working Circles are introduced. These are 1. Bamboo (Overlapping) Working Circle, 2. Wildlife (Overlapping) Working Circle 3. N.T.F.P. (Overlapping) Working Circle 4. Plantation (Overlapping) Working Circle. Chapters on JFM and Forest Protection has also been incorporated in the Plan. In addition to this, new chapters on Biodiversity, Socio Economic Survey, Five Year Plans are added to the Plan.

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

The computerized inventory management system evolved by *Shri Dhabekar ACF* has been used in analyzing the enumeration data obtained from the field by S.O.F.R. unit *Amravati*. The digitized maps have been generated by Geo-media Cell of this office.

I express my gratitude to RRSSC Nagpur, particularly Dr. A.O. Vargis, who helped us in interpretation of LISS III data.

I express my deep sense of gratitude for the valuable guidance and advice provided by *Shri. Jwala Prasad, P.C.C.F. Maharashtra State, Nagpur, Shri A.B.Bhangre,* and *Shri. A.K.Joshi Addl. P.C.C.F.(Production and Management)* and *Shri Ramanuj Choudhary & Shri. Ashok Sharma, C. C. F. W. P. Nagpur.* This plan is an output of their continuous guidance. *Shri. Ashok Sharma, C. C. F. W. P. Nagpur* regularly reviewed and guided us to make the plan in a presentable form. It was due to his continuous efforts, the plan was prepared in a short time.

I also express my gratitude to *Shri. Tasnim Ahmad,* and *Shri. S.D.Sontakke, C. C. F. (Territorial) Amravati* and *Shri P.R. Yeole,* and *Miss. Jayoti Banarji, D.C.F. West Melghat Division* and their staff, for their cooperation in providing the data and assistance required in the field.

I also express my sincere gratitude to *Shri. G.P.Garad* and *Shri. M.K.Rao* co-author of the plan and my predecessor for their efforts and contribution in writing PWPR and collection of valuable data required for plan.

Shri A.R.Tayde, Shri. S.V.Bedarkar, and *Shri. D.N.Jamodkar, R.F.Os. of Working Plans Division, Amravati* contributed immensely in formatting of chapters and preparation of appendices. In short they worked very hard and deserve special appreciation. In addition to them *Shri S. B. Dabhade, Ranger Surveyor, Shri Satish Mohakar and Shri Amardeep Giri Surveyors, Shri. Sanjay Khajurkar, F.G. and Shri Adesh Gajbhiye* worked hard, day and night to prepare the G.I.S. Project and appendices. I acknowledge and special appreciation to all the officers and staff for their contribution in the preparation of this working plan. The entire staff of this office worked untiringly and zealously.

Date : 07.02.2008.

Place : Amravati.

(V.R.Tiwari)

Conservator of Forests

Working Plan Division, Amravati.

Table Of Contents

S. No.	Subject	Page No.
i	Abbreviations Used In The Plan	i
ii	Glossary Of Local Terms Used In The Plan	ii
iii	Botanical And Local Names Of Plants	iii-ix

Part- I

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

CHAPTER – I **THE TRACT DEALT WITH**

Section 1	Name And Situation	1
Section 2	Configuration Of The Ground	2-3
Section 3	Geology, Rock And Soil	3-6
Section 4	Climate	6-8
Section 5	Water Supply	8-9
Section 6	Distribution And Area	9-11
Section 7	State Of Boundaries	11
Section 8	Legal Position	12-14
Section 9	Rights And Concessions	14-15

CHAPTER – II **FLORA, FAUNA AND BIODIVERSITY**

CHAPTER – IIA **FOREST FLORA**

Section 1	General Description And Condition Of The Forest	16-17
Section 2	Composition Of The Crop	17-24
Section 3	Status of Natural Regeneration.	24-25
Section 4	Injuries To Which The Crop Is Liable	25-34

CHAPTER – IIB **FOREST FAUNA**

Section 1	Description Of Fauna	35-36
Section 2	History of The Wildlife Management in General	37
Section 3	Legal Position	37-46
Section 4	Injuries To Wild Life	47-51
Section 5	Measures Adopted For The Protection Of Fauna	52

CHAPTER-IIC **BIODIVERSITY**

Section 1	General Description of Biodiversity	53
Section 2	Floral Diversity	53-58
Section 3	Faunal Diversity	58-66
Section 4	The Biological Diversity Act, 2002	66-71

CHAPTER-III **UTILIZATION OF THE PRODUCE**

Section 1	Agricultural Customs And Wants Of The Population	72-76
Section 2	Markets And Marketable Products	76
Section 3	Lines Of Export	76
Section 4	Method Of Harvesting	76-77
Section 5	Timber Depots	77-78
Section 6	Cost Of Harvesting	78
Section 7	Past And Current Prices	78-79

CHAPTER IV
THE SOCIO ECONOMIC SURVEY REPORT

Section 1	Forest Development Corporation of Maharashtra	80
Section 2	The Socio Economic Survey Report	80-83

CHAPTER V
FIVE YEAR PLANS

Section 1	Impact of Five Year Plan on Attainment of Management Objectives	84-90

CHAPTER VI
STAFF AND LABOUR SUPPLY

Section 1	Staff	91-95
Section 2	Labour	95-96

CHAPTER VII
PAST SYSTEMS OF MANAGEMENT

Section 1	General History of the Forests	97-107
Section 2	Past System of Management and their results	108-137
Section 3	Special Works of Improvement	137-142
Section 4	The Out Turn From The Forests	142-143
Section 5	Past Revenue And Expenditure	143

CHAPTER – VIII
STATISTICS OF GROWTH AND YIELD

Section 1	Statistics Of Rate Of Growth Of Teak	144-156
Section 2	Stock Mapping	156-158
Section 3	Enumerations	158-163
Section 4	Volume Tables	163-164
Section 5	Increment.	164-165
Section 6	Estimation of Yield	165

Part - II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER – I
BASIS OF PROPOSALS

Section 1	The National Forest Policy	166-170
Section 2	Functional Classification Of Forests	170-172
Section 3	Factors Influencing Objects Of Mangement	172-176
Section 4	General Objects Of Managenent	176-177
Section 5	Treatments Prescribed	177-180
Section 6	Analysis And Valuation Of The Crop	180-181
Section 7	Working Circles And Their Distribution	181-184
Section 8	Blocks And Compartments	184
Section 9	Period Of Plan	184-185

CHAPTER-II
SELECTION CUM IMPROVEMENT WORKING CIRCLE

Section 1	General Constitution	186
Section 2	General Character Of Vegetation	187-188
Section 3	Special Objects Of Management	188
Section 4	Compartments And Felling Series	188-189
Section 5	Analysis And Valuation Of The Crop	189-193

Section 6	Silvicultural System	194
Section 7	Felling Cycle	194
Section 8	Harvestable Girth	194
Section 9	Formation Of The Felling Series	194-195
Section 10	Regulation Of Yield	195-198
Section 11	Agency Of Harvesting	198
Section 12	Demarcation Of Coupes And Preparation Of The Treatment Map.	199-203
Section 13	Method Of Obtaining Regeneration	203-204
Section 14	Subsidiary Silvicultural Operations	204-205
Section 15	Other Regulations	205-207

CHAPTER – III **IMPROVEMENT WORKING CIRCLE**

Section 1	General Constitution	208
Section 2	General Character Of Vegetation	208-209
Section 3	Felling Series	209
Section 4	Blocks And Compartments	209
Section 5	Special Objects Of Management	209-210
Section 6	Analysis And Valuation Of The Crop	210-211
Section 7	Silvicultural System	211
Section 8	Rotation And Conversion Period	212
Section 9	Felling Cycle	212
Section 10	Agency Of Harvesting	212
Section 11	Regulation Of Yield	212
Section 12	Sequence Of Fellings	212
Section 13	Demarcation Of Coupes, Preparation Of Treatment map, Treatment Proposed And Marking Rules	212-215
Section 14	Subsidiary Silvicultural Operations	215-217
Section 15	Regeneration	217
Section 16	Other Regulations	217-219

CHAPTER – IV **PLANTATION(OVERLAPPING) WORKING CIRCLE**

Section 1	General Constitution	220-224
Section 2	Other Regulations	224

CHAPTER- V **BAMBOO (OVERLAPPING) WORKING CIRCLE**

Section 1	General Constitution	225
Section 2	Analysis And Valuation Of The Crop	225-226
Section 3	Special Objects Of Management	226
Section 4	General Character Of Vegetation	226
Section 5	Silvicultural System	227
Section 6	Cutting Cycle	227
Section 7	Cutting Series	227
Section 8	Calculation Of Yield	227-229
Section 9	Method Of Executing Cutting	229-232
Section 10	Identification Of Bamboos	232
Section 11	Bamboo Flowering	233
Section 12	Treatment Of Gregariously Flowered Areas	233-234
Section 13	Sequence Of Cutting	234
Section 14	Other Regulations	234

CHAPTER –VI
WILDLIFE (OVERLAPPING) WORKING CIRCLE

Section 1	General Constitution Of The Working Circle.	235-236
Section 2	General Status Of Flora And Fauna	236-238
Section 3	Special Objects Of Management	238
Section 4	Legal Status	238-239
Section 5	Method Of Treatment	239-241
Section 6	Other Regulations	241-242
Section 7	Eco Tourism	243-245

CHAPTER VII

**NON TIMBER FOREST PRODUCE (NTFP)
OVERLAPPING WORKING CIRCLE**

Section 1	General Constitution Of The Working Circle	246
Section 2	Non Timber Forest Produce Of The Tract	246-248
Section 3	Special Objects Of Management	248-249
Section 4	Ownership And Monopoly Procurement Of The NTFP	249-250
Section 5	Agencies For The Collection	250
Section 6	Methods Of Treatment	250-252
Section 7	Management of Tendu.	252-253
Section 8	Management of Moha.	253-258
Section 9	Gum	258-263
Section 10	Khair	263-264
Section 11	Myrobolans	265-266
Section 12	Lac	266
Section 13	Medicinal Plants	266-270
Section 14	Safed Musli	270-271
Section 15	Rusa Grass	271-272
Section 16	Research work.	272
Section 17	Other important principles and procedures.	273

CHAPTER VIII
JOINT FOREST MANAGEMENT

Section 1	Joint Forest Management	274-275
Section 2	Special Objects Of Management	275-276
Section 3	The Principles	276
Section 4	Status of JFM	276-278
Section 5	Potential Areas For The JFM Program	278
Section 6	Treatment Prescribed	278-279

CHAPTER IX
**FOREST PROTECTION (FIRE, ILLICIT FELLING,
ENCROACHMENT, ILLEGAL MINING , POACHING,
JHUMMING ETC.)**

Section 1.	Forest Protection.	280
Section 2	Special objects of Management	280
Section 3	Illicit Felling.	280-284
Section 4	Fire Protection.	285-288
Section 5	Grazing Regulation.	288-292
Section 6	Forest Encroachment.	293-295
Section 7	Poaching	295

CHAPTER-X
FININCIAL IMPLICATION

Section 1	Cost of the Plan.	296
Section 2	Cost Benefit Analysis.	296-298
Section 3	Financial Forecast.	298-299
Section 4	Source of Funding	299-300

CHAPTER-XI
MISCELLANEOUS REGULATIONS

Section 1	Petty Fellings	301-302
Section 2	Deviations	302-304
Section 3	Privileges And Concessions For Forest Produce	304-305
Section 4	Research Plots	305-306
Section 5	Roads, Paths, Bridges And Buildings	306
Section 6	Demarcation And Protection	307-311
Section 7	Demarcation, Preparation Of Treatment Map , Marking Of Coupes And Thinning Procedures	312-332
Section 8	AWS and Silt Monitoring Station.	332

CHAPTER XII
THE ESTABLISHMENT AND LABOUR

Section 1	The Establishment	333-334
Section 2	Labour Availability	334

CHAPTER – XIII
CONTROL AND RECORDS

Section 1	Control and Records	335
Section 2	Control Forms	235-236
Section 3	Compartment History	236-340

CHAPTER XIV
SUMMARY OF PRESCRIPTIONS

Section 1	Summary of Facts on Which Proposals are Based	341-342
Section 2	Future Management Discussed and Prescribed.	342-349
Section 3	Demarcation And Marking	349
Section 4	Treatment Types and Preparation of Treatment Map	349-351
Section 5	Common Treatment Prescriptions For Various Treatment Types	351-353
Section 6	Treatment In A- Type Areas	354
Section 7	Treatment In B- Type Areas	354
Section 8	Treatment In C- Type Areas	354-355
Section 9	Treatment In D- Type Areas	355-356
Section 10	Valuable Species For Retention	356-357
Section 11	Cut Back Operations	357
Section 12	Guidelines For Cleaning In The Sixth Year	357-358

I. ABBREVIATIONS USED IN THE PLAN

A.C. F.	Assistant Conservator Of Forests
A. P. C. C. F. (P & M)	Additional Principal Chief Conservator Of Forest, (Production and Management)
b. h.	breast height
C.A.I.	Current Annual Increment
C. F.	Conservator Of Forest
C. C. F.	Chief Conservator Of Forest
C. C. F. W. P.	Chief Conservator Of Forest, Working Plan
Cft.	Cubic feet
cm.	Centimeter
Comptt.	Compartment
Contd.	Continued
d. b. h. u. b.	diameter at breast height under bark
d. b. h. o. b.	diameter at breast height over bark
D.C.F.	Deputy Conservator Of Forest
Dn.	Division
F. R. H.	Forest Rest House
F. R. S. S.	Forest Resources Survey Scheme
F. S.	Felling Series
F. V.	Forest Village
g. b. h.	girth at breast height
G. I. S.	Geographical Information System
G. P. S.	Geographical Positioning System
Govt.	Government
G. O. I.	Government Of India
Ha.	Hectare
Inch.	Inches
J. F. M.	Joint Forest Management
Km.	Kilometer
m.	Metre
M ³	Cubic-metre
M. A. I.	Mean Annual Increment
Mah.	<i>Maharashtra</i>
No.	Number
N. T. F. P.	Non Timber Forest Produce
(p)	Part
P. B.	Periodic Block
P. C. C. F.	Principal Chief Conservator of Forest
P.W.D.	Public Works Department.
R. F. O.	Range Forest Officer
R. H.	Rest House
Rs.	Rupees
S. C. I.	Selection Cum Improvement
Sq.	Square
U.	Under
W. C.	Working Circle
W. L.	Wildlife
W. P.	Working Plan
W. P. O.	Working Plan Officer
Yrs.	Years

II. GLOSSARY OF LOCAL TERMS USED IN THE PLAN

<i>Balla</i>	A plateau
<i>Bidi</i>	A cigarette prepared by rolling dried leave generally of <i>Tendu</i> (<i>Diospyros melanoxylon</i>)
<i>Dahya</i>	Shifting cultivation.
<i>Doh</i>	A deep pond in a stream or river.
<i>Geru</i>	A paint prepared form red chalk.
<i>Lakh</i>	A hundred thousand.
<i>Mahout</i>	An Elephant driver.
<i>Murram</i>	A reddish hard soil.
<i>Padao</i>	A camping ground or a place where timber is collected for export.
<i>Raiyatwari</i>	A form of land tenure, applied to land in rayatwari Tenure and to villagers holding such land.
<i>Ramna</i>	A grass reserve.
<i>Satkata</i>	Miscellaneous trees.
<i>Shikar</i>	Hunting.
<i>Tahsil</i>	A part of civil district formed for administrative Purposes.

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
Amta, H. Apta, Bhosa M. Bhosai, K.	Bauhinia racemosa, Roxb	F
Amaltas, H.M. Bhanaka bongru	Cassia fistula, linn	F
Aonla, H. M. K.	Emblica officinalis, Gacrtm	V. A.
Anjan, M. H. K.	Hardwickia binata, Roxb	L. F. Dabida reserve
Arang, K. Barga, H.	Kydia calycina Roxb Syn. Eriolaena keriana ,W. and A	O.
Am H. K. Amba, M.	Mangifera indica , Linn	F
Ahl H. M.	Morinda tinctoria, Roxb	L. O
Amrra M., Katamba,	Spondias pinnata (linnf Kurz.). Syn. Spondias mangifera, willd.	V. R.
Ain, M., Saja H.	Terminalia alata, W. and A.	A
Achar H. Charoli M.	Buchanania lanzan, spreng Syn. Buchanania latifolia Roxb.	F
Babul, H.M. K.	Acacia nilotica, willd.	R
Bel. H. M. Bela K.	Aegle marmelos, Correa	F
Baru, K. Kusum M	Schleichera oleosa, { Lour) Oken Syn. Schleicheria trijuga, Willd	F
Bhirra, H. M. K.	Chloroxylon swietenia, D. C. L. A	Popatkgheda, Bod
Bhoti H. Bhondra-Dhaman M	Eriolaena hookeriana, W and A.	O
Baringa, K. Dhaman H. M.	Grewia tilifolia,	C
Bar H. Wad M ,Banyan, E.	Ficus bengalensis, Linn	F
Bhorsal, M. K.	Hymenodictyon excelsum, Wall	R
Bakain, H. M. K.	Melia azadirach, Linn.	V. R.
Bija, H. M.	Pterocarpus marsupium Roxb.	O
Bhilawa H. Biba M . Choso, K.	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. High hills
Kalashirish, M.	Albizzia lebbeck, Benth	O
Chapa, K.	Bauhinia Variegata, linn	L. F.
Char, M.	Buchanania lanzan, Spreng Syn. Buchananina latifolia, Roxb.	F
Chirohol, H. Chilla K.	Holoptelea integrifolia, X Planch.	O
Chakrej, K. Lendiya M	Lagerstroemia parviflora, Roxb.	V. A.
Chandan, H. M. K	Santalum album ,Linn.	V. R. Narnala Fort and adjoining
Chinch M. Chicha, K . Imli, H.	Tamarindus indica.	O
Chawar, K. Chaura, K.	Sterculia colorata, Roxb.	L. O. High hills
Dhaora, H. M. K.	Anogeissus latifolia, Wall .	V. A
Dahi- palas, M. Kassamar K	Cordia macleodii, H. F. and Th.	L. O.
Dhoban, H. M	Dalbergia paniculata, Roxb.	A
Dhaman, K.	Grewia orbiculata, Rotter.	V. R

Local Name	Botanical Names	Remarks
Dudhi, H.	Holarrhena antidysentrica, Wall .	F
Dudhi, H Dudiya K. Kuda M	Wrightia tinctoria, A Br.	V. R.
Dudhi H. Dudhari, K.	Wrightia tomentosa , Roem. And Sch.	V. R.
Gabdi, H . Gongal, Ganer,M.	Cochlospermum religiosum, D.C.A.	Dhulghat
Nagthada, Ganer,K.Pangara M	Erythrina suberosa, Roxb.	L. A.
Gular, H .	Ficus racemosa, L. Syn. Ficus glomerata. Roxb.	A.
Goraghoti, K.	Flacourtia indica, L Herit.	F.
Ghetu, K.	Xeromphis spinosa Raf. Syn Randia dumetorum, Lamk.	F.
Ghangru, K.	Xeromphis uliginosa Retz. Syn. Randia uliginosa, D. C.	O.
Ghatbor, M. K. Ghoti, K.	Zizyphus xylopyra ,Willd,	A.
Gondan, M. Lasora, H. Silu K	Cordia dichotoma, Forst. Syn. Cordia myxa, Linn.	V. R.
Hiwar, M.	Acacia leucophloea, willd.	L, O.
Haldu, H. M. K	Adina cordifolia, Hook, f	A and L. V. A.
Homba,M. K.	Miliusa tomentosa A.DC Syn Saccopetalum tomentosum ,H. f. and Th.	A.
Harra, H .Hilda, M.K. Hirda, M. K.	Terminalia chebula, Retz.	R
Jamrassi, H.M. Niru, K.	Elaeodendron glaucum, Pers.	O.
Jamun, H. Jambhul, M. Jambu K.	Syzygium cumini L Syn. Eugenia jambolana (Lam.),	L. A.
Jhan, K. Mokha H. M.	Schrebera swietenoides, Roxb.	A.
Khair, H. M. K.	Acacia catechu, Willd.	L. F. occurs In open dry Forest and frost Areas.
Kinhi, Pandhara shirish M.	Albizia procera, Benth .	O.
Khatua H, Katumba, K .	Antidesma diandrum, Roth.	R.
Keolar, H. Keolari, K. Kanchan M	Bauhinia purpurea, linn.	L. A.
Kachnar, H.	Bauhinia variegata, Linn.	L. F.
Semal, M. H. Khatsawar, M .	Bombax malabaricum, O C. Syn. Bombax ceiba, Linn.	O.
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.
Korelawar, K.	Ficus cunia, Ham.	R.
Korchi , K. Kutumbar M	Ficus hispida Linn.	R.
Kakar, H. Kekda.K	Garuga pinnata, Roxb.	A.
Kolya, K. Borya tiwas M	Glochidion velutinum Wight.	L. F. High hills.

Local Name	Botanical Names	Remarks
Kasmar, K. Shivan, M	Gmelina arborea, Roxb.	O.
Karanjalam, K. Chillor M	Holoptelea integrifolia, Planch.	O.
Kukum K. Shendri M	Mallotus philippensis, Muell.	O.
Kalam, M. Kuram, K. Kurumbo K.	Mitragyna parvifolia, Korth Syn. Stephgyne parvifolia, Korth.	F.
Kulu H. M. Karhai, H. M. Teklet K	Sterculia urens, Roxb.	A.
Kudal K. Kuthada, K.	Sterculia villosa, Roxb.	R.
Kalatetu, K. Padar M	Stereospermum personatum H. Syn. Stereospermum chelonoides	L.O.
Kahu, H. Kowa, K. Arjun M	Terminalia arjuna, Bedo.	L.A.
Thoar, K.	Trema orientalis, Bl.	O.
Limbori, K. Kadulimb M	Azadirachta indica, A Juss.	
Lawa, K.	Ficus glomerata, Roxb.	A.
Lokhanci, M.K.	Ixora parviflora, Vahl.	L.A.
Maharuk, H. M. Marukha, K.	Ailanthus excelsa, Roxb.	R.
Medsing, H.M.	Dolichandrone falcate, Seem	R.
Mohin, H.M. K. Moyan, H.	Lannea grandis, Engl Syn. Odina woodier, Roxb	A.
Maidalkri, H. Lenja K	Litsea glutinosa L Syn. Litsea sebifera pers.	R. Higher. Elevation.
Mahua, H. K. Moha, K.	Madhuca latifolia, Roxb macbride Syn. Bassia latifolia	F.
Nazarijot, K. Medshing M	Dolichandrone falcata seem	R.
Palas, H.M. Pharsa K.	Butea monosperma, Syn. Butea frondosa, Roxb.	L. A.
Phansi, M. Passi, K.	Dalbergia paniculata Roxb.	A.
Pakar, H. M. Pipri, K.	Ficus infectoria, Roxb.	O.
Pipal, H.M. Pipari, K.	Ficus religiosa, Linn.	
Phendra, M, Phetra M. Purputta K.	Gardenia turgida, Roxb.	O.
Phulangaty K.. Phalgatetu, K.	Oroxylum indicum, vent.	R.
Pinj, M.	Sterculia colorata, Roxb.	V. R.
Rawa chachu K.	Acacia lenticularis, Ham.	
Rounjha. H. Hiwar M Hinjara K.	Acacia leucophloea, Willd.	L. O.
Rivit, K.	Casearia graveolens. Dalz.	A.
Ruthu. K.	Ougeinia dalbergioides. Benth.	V. A.
Rohan M. Rohani K.	Soymida febrifuga, a Iuss.	O.
Sagon, H. Sag. Sagwan M. Sipna, K.	Tectona grandis. Linn.	V. A.
Siris, M. H. Chichola K	Albizzia odoratissima Benth.	O.

Local Name	Botanical Names	Remarks
<i>Sitaphal</i> H. K.	<i>Anona squamosa</i> . Linn.	L.F. occurs near <i>Khatkali</i>
<i>Salai</i> , H. M. K.	<i>Boswellia serrata</i> , Roxb	V. A.
<i>Shisham</i> , H. M.	<i>Dalbergia latifolia</i> , Roxb	O.
<i>Sisoo</i> , K. M.H.	<i>Dalbergia sisoo</i> , Roxb	
<i>Sejna</i> , H. K <i>Shewaga</i> , M.	<i>Moringa oleifera</i> , Lamk. syn. <i>Moringa pterygosperma</i> .	R.
<i>Shindhi</i> , M. <i>Sendhi</i> , K.	<i>Phoenix sylvestris</i> , Roxb.	R.
<i>Tendu</i> , H. <i>Tembru</i> , M. K. <i>Tembhurni</i> , M. K.	<i>Disopyros melanoxylon</i> , Roxb	F. and L. A.
<i>Thuar</i> , H.M.K.	<i>Euphorbia nivulia</i> , Ham	L. A. Rocky steep and Precipitous slopes.
<i>Tinsa</i> , H. <i>Tiwas</i> , M.	<i>Ougeinia dalbergioides</i> , Benth Sym. <i>Ougeinia oogeinensis</i> .	V. A.
<i>Thoar</i> , . <i>Thori</i> . <i>Turat</i> , K.	<i>Trema politoria</i> Planch	O.
<i>Tilwan</i> , H. K.	<i>Wendlandia exserta</i> .D. C	V. R.

B – Shrubs

Local Name	Botanical Names	Remarks
<i>Bhandar</i> , K.	<i>Colebrookia oppositifolia</i> , Smith	L. A.
<i>Baibarang</i> , H. <i>Brengeh</i> ,K. <i>Bharangeli</i> , K. <i>Wawding</i> M	<i>Embelia ribes</i> , roxb.	L. A.
<i>Kodabarangali</i> K <i>Wawding</i> M	<i>Embelia tsjerium-cottom</i> , burm.	
<i>Bharati</i> , M. K.	<i>Gymnosporia montana</i> , law	L. O.
<i>Bholari</i> , K. <i>Bhirhol</i> , H.	<i>Indigofera pulchella</i> , Roxb.	L. F
<i>Banda</i> , H. K.	<i>Loranthus scurrula</i> , linn	R
<i>Banda</i> , H. K.	<i>Loranthus longiflorus</i> , Desr	R
<i>Bhandar</i> , K.	<i>Pogostemon plectranthoides</i> Desf.	L. A.
<i>Bhandar</i> , K. <i>Karvi</i> M	<i>Carvia callosa</i> Syn. <i>Strobilanthes callousus</i> , nees.	L.V. A.
<i>Bankabas</i> , K.H. <i>Rankapus</i> M.	<i>Azanza lampas</i> Syn. <i>Thespesia lampas</i> ,	L. A.
<i>Bor</i> , M. K.	<i>Zizyphus jujuba</i> , Lamk Syn. <i>Zizyphus nummularia</i> W. and A.	L. F.
<i>Dhawan</i> , H. <i>Dhayati</i> , M. <i>Dhi</i> , K.	<i>Woodfordia floribunda</i> , Salisb. Syn <i>Woodfordia fruticosa</i> , Kurz.	L. A.
<i>Gwagar</i> , K.	<i>Hamiltonia suaveolens</i> .	L. F.
<i>Katakholsa</i> , K.	<i>Eranthemum roseum</i> <i>Daedalacanthus roseus</i> , T. Anders.	L. A.
<i>Karsali</i> , K.	<i>Nyctanthes arbortristis</i> , Linn..	L. A.
<i>Kawarka</i> , M.	<i>Loranthus longiflorus</i> , Desr.	R.
<i>Karsali</i> , K. <i>Parijact</i> M	<i>Nyctanthes arbortristis</i> , Linn.	L. A.
<i>Mekar</i> , K <i>Bharati</i> M	<i>Gymnosporia montana</i> , Benth.	L. O.
<i>Raimonia</i> M.H.K.	<i>Lantana camara</i> , Linn.	V. A.

Local Name	Botanical Names	Remarks
<i>Marorphal</i> , H. <i>Muradsheng</i> , M.	<i>Helicteres isora</i> , Linn.	A.
<i>Nirguri</i> , M. <i>Samalu</i> , K.	<i>Vitex negundo</i> , linn.	L. A.
<i>Pithondi</i> , M. K.	<i>Fluggea microcarpa</i> , Bl.	L. A.
<i>Ringnt</i> , K. <i>Ringani</i> M	<i>Solanum indicum</i> , Linn.	F.
<i>Tarwar</i> , K. M.	<i>cassia auriculata</i> , Linn.	L. F.

C-Climbers

Local Name	Botanical Names	Remarks
<i>Chilati</i> , M.	<i>Caesalpinia sepiaria</i> Roxb	L. F.
<i>Chameli</i> , H.	<i>Jasminum tuberosa</i> , Roxb	L. F.
<i>Chilatli</i> M. K.	<i>Mimosa rubicaulis</i> , Lamk.	L. F.
<i>Churni</i> , K.	<i>Zizyphus rugosa</i> , Lamk.	F. and L. A
<i>Gursakri</i> , H. <i>Ghordhaman</i> , M.	<i>Grewia flvescens</i> , Juss.	O.
<i>Jhau</i> , H M. K.	<i>Tamarix gallica</i> , Linn.	L. A.
<i>Lalgunchi</i> H.K. <i>Gunj</i> M	<i>Abrus precatorius</i> , Linn.	O.
<i>Palasvel</i> M	<i>Butia surpraba</i>	A
<i>Mahul</i> M	<i>Bahunia vahii</i>	V.A.
<i>Ghorvel</i> M	<i>Puraria tubuerosa</i>	A.
<i>Jujil</i> K	<i>Cissus repanda</i>	A.
<i>Ambtvel</i> M, <i>Kumbhela</i> K	<i>Cayratia auriculata</i>	A.
<i>Ranmogara</i> K, <i>Ranjai</i> M	<i>Clematis triloba</i>	A Higher elevations

D - Herbs

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

E- Grasses, Sedges and Bamboos

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

F - Plants grown as field crops

Local Name	Botanical Names
<i>Arhar</i> , H. Tur, M.	<i>Cajanus cajan</i> , Spreng.
<i>Betel vine</i> , E. Pan, H.M.	<i>Piper betle</i> , Linn.
<i>Channa</i> H,M. Gram, E.	<i>Cicer arietinum</i> , Linn.
<i>Cotton</i> E. <i>Kapas</i> , H, M.	<i>Gossypium herbaceum</i> , Linn.
<i>Jagni</i> , M. K.	<i>Guizotia abyssinica</i> , cass.
<i>Jwari</i> , H.M.K.	<i>Sorghum vulgare</i> , pers.
<i>Kodon</i> ,M.K.	<i>Paspalum scrobiculatum</i> , Linn.
<i>Kutki</i> , H.M.K	<i>Panicum miliare</i> , Lamk.
<i>Masur</i> , H.M.	<i>Ervum lens</i> Linn.
<i>Sawan</i> , K.	<i>Panicum crus-galli-frumentaceum</i> , Roxb.
<i>Bhuimug</i> M, <i>Mungphalli</i> H	<i>Arachis hypogaea</i>
<i>Mung</i> M.K.H.	<i>Vigna radiata</i>
<i>Barbati</i> MHK	<i>Vigna unguiculata</i>
<i>Dhan</i> M,	<i>Oryza sativa</i>
<i>Maka</i> H.M.	<i>Zea mays</i>
<i>Watana</i> , M, <i>Matar</i> , H	<i>Pisum sativum</i>
<i>Soybean</i> M	<i>Glycine wightii</i>

Part- I

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

Part - II

**FUTURE MANAGEMENT DISCUSSED
AND PRESCRIBED**

PART- I

CHAPTER 1

THE TRACT DEALT WITH

SECTION 1. NAME AND SITUATION

Location:

1.1.1. West *Melghat* Forest Division is situated in the North West of *Amravati* district of *Maharashtra* State and administratively it is under *Amravati* Forest Circle. Geographical coordinates are Latitude 21° 11' 16" to 21° 44' 4" North & longitude 76° 39' 51" to 77° 14' 24" East.

Area:

1.1.2.1. This plan covers an area of 59362.04 ha. The details are as under :

Area from erstwhile West <i>Melghat</i> Division	--	24400.61 ha.
Area from erstwhile South <i>Melghat</i> Division	--	33283.62 ha.
Areas of Compensatory Afforestation (P.F & RF)	--	1677.81 ha.

Total Area **59362.04 ha.**

1.1.2.2. The above areas were finalized as a result of reorganization of various forest divisions and *Melghat* Project Tiger in *Amravati* district in the year 1999. A statement showing area of old West *Melghat* Division, area transferred/received during reorganization and present area of West *Melghat* Division is given in **Appendix No. XXXVIII** of Vol. II. The head quarter of the West *Melghat* Division was shifted from *Chikaldara* to *Paratwada*.

Boundaries:

1.1.3 *Khandwa (Nimar)* District of *Madhya Pradesh* lies to North and to West. It is bounded by East *Melghat* Division and *Ambabarwa* Sanctuary & *Wan* Sanctuary of *Melghat* Tiger Project on South. The core area of Project Tiger is on East side of the Division. Small section of South-West boundary is shared with *Akola* and *Buldhana* Forest Divisions.

1.1.4. The tract is situated on the branch of *Satpuda* ranges to the South of *Tapti* River. *Narnala* Fort, now in ruins is situated along the southern spur of

Narnala hills is about 20 K.M. from *Akot*. Most of the area lies in *Dharni* Tahasil and part in *Chikhaldara* Tahasil.

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 2.5 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 that the area is bounded in north by *Tapti* river, which also flows as a state boundary between *Maharashtra* and *Madhya Pradesh*. The river *Sipna* flows on the eastern boundary of the *Dharni* range and *Melghat* Project Tiger. *Wan* Sanctuary, which is the catchments area of river *Wan*, separates *Akot* range from *Dhulghat* & *Dhakna* ranges. High Point is the highest elevation point; on *Akot-Harisal* road in compartment 956, elevations of the nearby hills is upto 1094 meters. The river *Pathar* rises in hills of this division. Terrain in *Akot* and *Dhulghat* ranges is hilly and having southern aspect in general. *Paratwada-Dharni* and *Akot-Harisal* are the two state highways passing through the area. A meter gauge railway line passing through the most western parts of the tract i.e. from *Dhulghat* range. *Dhulghat* (Rly) is main railway station on this line.

1.2.3. Compartments are laid-down from ridge to valley, thus, each compartment forming a mini watershed. There are number of small *Ballas* on the ridges of hills. But no *ballas* is as large in size as *Chikhaldara* or *Makhala* in East Melghat Division. Number of spur branches of from the main ridges towards north and south having narrow ridges known as *Ghod* and *Dhars*.

1.2.4. Most of the area in West *Melghat* Division has main east-west ranges though interrupted by series of hills and valleys. These hills gradually descend in west and north-west direction with an altitude 1094 meters in the east to 230 meters in north-west near *Tapti* river and 300 meters in west near *Darbara* river. *Dhulghat* range is having common boundary with *Buldhana* Division and *Nimar* district of *Madhaya Pradesh*. Best of forest occurs adjoining to Project Tiger area. Forest on fringes is having relatively low density due to immense biotic pressure.

1.2.5. From the main ridges the land slopes towards south and north steeply and irregularly through several minor ridges to plains of Amravati and Akola Districts. The altitudinal variation is 600 meters in the east and 150 to 200 meters in the west.

1.2.6. The main ridges of *Satpuda* hills cut the waters of Purna and *Tapti*. *Sipna*, *Gadga*, *Dolar*, *Darbara* and *Dewal* are the main tributaries of river *Tapti*. *Pathar* and *Wan* are the main tributaries of river *Purna*. The drainage map of the Division is given in **Appendix No. I** of Vol. II

SECTION 3. GEOLOGY, ROCK AND SOIL

1.3.1. The entire region consists of *Deccan* traps with occasional trap soil. In the past a volcano erupted on the west coast. Lava flows down to eastern side forming a *Deccan* plateau and basaltic composition of rocks. The lava flows are almost horizontal or with a very low dip (2 to 3 degrees) to the north.

1.3.2. In this region crest of the ranges attains an average elevation of 1000 meters. The highest elevation is about 1100 meters above MSL in compartment No. 956 near 'High Point' in *Akot* range.

1.3.3. The following are geological formation seen in these forests :

Sr.No.	Formation	Age
1	Purna alluvium laterite	Pleistocene
2	Deccan trap with intra trappen sediments	Lower Eocene to upper cretaceous
3	Lameta beds	Turonian
4	Gondwana	Permian
5	Metamorphic	Archaeans

1.3.4. The oldest formation comprising unclassified metamorphics are exposed on the southern margin of *Gondwana* sand stones forming a southern scarp of hills apparently brought up due to faults. 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 ferruginous matter. At *Bairamghat*, length of sandstones exposure is about 1800 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 Zeolite 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) Bouldary 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 along high ridges 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 or 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 *Tarubanda* 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. and at *Dabida* it reduces to 810 mm. Some of valleys perhaps receive up to 2500 mm. rainfall in a year. It, however, abruptly decreases towards the south of main ridges. Although the total annual rainfall 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 cold season received the least precipitation i.e. only 1 to 2 per cent occasionally a few showers are received in the month of December, January, March and May.

1.4.3. The rainfall data of *Dabida* station of Irrigation Department was collected and is given in **Table No.1.1**. It shows that the number of rainy days is decreasing the annual rainfall is also decreasing continuously, which is a worrying point.

TABLE NO. 1.1
The Rainfall Data Of *Dabida* Station

Year	Rainy Days	Rainfall in mm
1991	61	312.00
1992	81	1343.00
1993	88	1518.00
1994	87	1558.50
1995	60	1025.00
1996	120	489.90
1997	94	293.40
1998	19	897.00
1999	21	421.80
2000	37	585.84
2001	36	716.48
2002	39	610.00
2003	55	958.80
2004	41	619.50
Average	59.92	810.66

1.4.4. The **Appendix III** of Volume II gives the month wise data of rainfall during the last 14 years (from 1991 to 2004) for the rain-gauge station at *Dabida*. Also the Ombrothermic Diagram (a relation between month and volume of rainfall) is given in **Appendix No. IV** of Vol. II. A statements showing average monthly Relative Humidity Percentage data recorded at *Kharya* Station is given **Appendix No. V** of Vol. II.

Temperature:

1.4.5. The temperature, like the rainfall, varied considerably with the altitude. The higher hills plateau and valleys to the north of the main *Gavilgarh* ridge are very much cooler in summer than the southern foothills. The plateau and higher hills enjoys 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 severe 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.

1.4.6. 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.

1.4.7. The southern foothills are warm or even warmer than the *Berar* Plains and experience hot winds (38 ° C) in May and June.

1.4.8. 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.

1.4.9. There is no meteorological observatory in any part of the *Melghat*. But the records of temperature recorded at *Kharya* Station for the year 2004 are as given in **Table No.1.2**.

TABLE NO. 1.2

Table showing Mean Max. and Mean Min. Temperature at *Kharya* station

Cold season	Mean Daily Maximum Temperature	22.97° C
	Mean Daily Minimum Temperature	09.40°C
Hot Season	Mean Daily Maximum Temperature	39.88° C
	Mean Daily Minimum Temperature	16.49° C

1.4.10. As no regular temperature record is maintained for the stations in the tract, the monthly mean maximum and the minimum temperature for surrounding station *Kharya* is given in the **Appendix No. II** of Volume II of this Plan.

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 few perennial rivers 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. Even *Dharni* which is the main town, and is also Tahasil head quarters, faces a water scarcity in summer. Most of the villages have their water supply scheme created by *Maharashtra Jeevan Pradhikaran* but due to poor water sources and severe power cuts they also faces same problems. Ground water table has already gone down.

1.5.3. The Irrigation, Minor Irrigation, Local Sector Departments has constructed many village tanks, storage tanks, minor irrigation projects and other water conservation works. Still the water scarcity problem remains as it is. The existing wells and tanks (*Khodtale*) and waterholes are listed in **Appendix No. VI** and **VII** of Volume II respectively.

SECTION 6. DISTRIBUTION AND AREA

1.6.1. The total area of West *Melghat* Division is 59,362.04 ha, classified as under:

- (a) Reserved Forest covering an area of 53,822.73 ha spread over 09 Reserves (4-Reserves completely, 5 Reserves partly) 'A' Class forest area has been divided into 219 compartments.
- (b) Two blocks of Ex-*Jagir* forest of 3861.50 ha Reserved Forest divided into 16 compartments.
- (c) New RF (Sec 4) 202.10 ha, divided into 2 compartments.
- (d) Protected Forest 1475.71 ha, divided into 10 compartments.

The West *Melghat* Division consists of 4 Ranges. Their distribution on the Maps of Survey of India 1:50000 scale is given in the **Appendix No. IX** of Volume II of this Plan.

1.6.2. The distribution of area, reserve-wise, compartment-wise is given in **Table No.1.3.**

TABLE NO. 1.3
Reserve wise compartment wise distribution of area in West *Melghat* Division

Sr. No.	Name of the Reserve	Compartment Numbers Included in Reserve	Total Area of Compartment (in ha)	Total no. of compartments in the Reserve
1	<i>Tapti</i>	665 to 714	10869.40	50
2	<i>Bod</i>	715 to 719	1167.80	05
3	<i>Chitri</i>	720 to 733	2894.03	14
4	<i>Gugamal (P)</i>	933 to 937, 956 to 977, 982 to 984	6953.29	30
5	<i>Khirpani (P)</i>	1018 to 1032,	3669.38	15
6	<i>Rupagarh (P)</i>	1077 to 1080, 1082, 1083.	2491.80	06
7	<i>Dhulghat (P)</i>	1123 to 1129, 1137, 1146 to 1158, 1163 to 1214	19242.3	73
8	<i>Dabida</i>	1215 to 1234	4721.50	20
9	<i>Wan (P)</i>	1235 to 1238, 1240, 1241	1813.23	06
10	<i>Kot (Block)</i>	Kot, Kotha, Nanduri, Lawada, Jambu. (1283 to 1288)	1856.08	06
11	<i>Dhulghat (Block)</i>	Ranigaon, Kanjoli, Chondo, Palaskundi, Dhulghat. (1289 to 1298)	2005.42	10
12	<i>R.F.(New)</i>	Bhulori-1299	176.70	1
13	<i>R.F.(New)</i>	<i>Gaulandoh</i> -1300	25.40	1
14	<i>P.F.(New)</i>	Kharya-1301, Salai-1302, Bibamal-1303, Laktoo-1304, Sadrabadi-1305, Gaulandoh-1306, Rajpur-1307, Ranapisa-1308, Zilpi-1309, Nagzira-1310	1475.71	10
	Total		59362.04	247

Previously Ex-*Jagir* Forests were given temporary Compartment numbers from 1 to 17. New compartment numbers starting from 1283 to 1298 has been given to them. Compensatory land (received against diversion of forest land) at *Bhulori* and *Gaulandoh* are declared as RF and are given Compartment number 1299 and 1300 respectively. Compensatory lands in 10 villages are declared as Protected Forests and are given Compartment numbers starting from 1301 to 1310. A statement showing allotment of area of RF and PF with old and new compartment numbers are given in **Appendix No. XLVII** of Vol. II

TABLE NO. 1.4

Range wise distribution of Forest area in West Melghat Division

Sr.No.	Range	Reserved Forest Area in ha.	Protected Forest Area in ha.	Total Forest Area in ha.
1	<i>Dharni</i>	16964.01	043.00	17007.01
2	<i>Dhakana</i>	08826.80	904.64	09731.44
3	<i>Dhulghat</i>	18981.05	528.07	19509.12
4	<i>Akot</i>	13114.47	-	13114.47
	Total :	57886.33	1475.71	59362.04

SECTION 7. STATE OF BOUNDARIES

1.7.1. The total length of the external boundary lines of the Reserved Forests and Protected Forests of West *Melghat* Division is 480.439 km, out of which 49.521 km are natural features such as rivers, streams, ridges. The length of the Internal Boundary lines are 185.415 Km, of which 1.350 Km are natural features. A statement showing the extent of Natural and Artificial boundaries is given in **Appendix No. XXXIX** of Vol. II The external boundary along the State *Madhya Pradesh* is clearly demarcated with 13 meters (40') wide cleared lines with serially numbered pillars of wooden posts embedded in cairn of stones. Ex-*Jagir* forests are not demarcated on ground. New RFs and PFs, which are received as compensatory land are demarcated on ground. Since the reserves are spread over different divisions, it would be more appropriate to have demarcated boundaries along Range, Round and Beats.

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 divisions.

SECTION 8. LEGAL POSITION

1.8.1. The *Gugamal* reserve was originally constituted in 1876. These reserves and the remaining blocks of reserves were declared as “State Forest, Class A, Division II” by notifications issued under rule 8 of the *Berar* Forest Rules of 1871 or section 40 © of the *Berar* Forest Law of 1886, as amended by the *Berar* Forest Law Amendment Law of 1891, as shown in **Table No.1.5**.

TABLE NO. 1.5
Table Showing Reserve wise Gazette Notifications of West 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)
<i>Tapti, Bod, Chitri, Dhulghat, Wan, Khirpani, Rupagarh. Dabida</i>	H.R.O. No. 14 of 18 January 1889	C.P.6 No.612 of 6 July 1911	Constituted and declared as State Forest class A Dn II
<i>Gugamal.</i>	-	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”
<i>Kot (Block) (Ex-Jagir)</i> <i>Dhulghat (Block) (Ex-Jagir)</i>	H.R.O. Nos. 205 of 15th November 1883 & 213 of 22 July 1891.	H.R.O. No. 14 Of 18 January 1889 H.R.O. No. 14 Of 18 January 1889	First this Jagir Forest vested in the State Govt in 1951 on the enforcement of the Madhya Pradesh Abolition of Proprietary Rights Act 1950 handed over to Forest Department for management in 1951 constituted as protected forest under section 29 of IFA vide gazette Notification No.369-158-xi dated 21 Jan.1955. Notified under section 4 of IFA vide Govt. of Bombay Agriculture and Forest Depart. Gazette notification No. FLD-2559-13443-E dated 4 th sept. 1959 Declared as Reserved Forest under section 20 of the IFA 1927 vide Govt. of Mah. Gazette Notification No. RB-1-A WS. 441-90 dated 5 th March 1990.

1.8.2 A statement showing Afforestation (extent of land transferred to Forest Department) and Disforestation (the extent of land statutorily disforested under Section 27 of IFA, 1927) is given in **Appendix No. XXX** of Vol. II

1.8.3 The details of villages / survey numbers and area of Ex-Jagir Forest declared as Reserve Forests under Section 20 of Indian Forest Act, 1927 vide Notification dated 5th March 1990 is given in **Table No. 1.6** :

TABLE NO. 1.6
TABLE SHOWING VILLAGE/SURVEY NOS. OF EX-JAGIR FORESTS DECLARED AS RF

Sr.No.	Name of Village	No. of Survey numbers	Area
1	Kotha	2	267.47
2	Kot	7	405.29
3	Jamboo	4	547.09
4	Nanduri	6	307.63
5	Lawada	5	328.60
6	Ranigaon	117	1201.82
7	Kanjoli	11	71.93
8	Chendo	42	456.73
9	Dhulghat (Rly)	4	110.45
10	Palaskundi	1	164.49
	Total :		3861.50

1.8.4. In addition 1677.81 ha area received as Compensatory lands (**Appendix No. XXIX & LV** of Vol. II) has been declared as Reserved Forests and Protected Forests under Section 4 or Section 29 respectively of IFA, 1927.

TABLE NO. 1.7
TABLE SHOWING STATUS OF COMPENSATORY LANDS

Sr. No.	Name of Village	Survey No.	Area in ha	Legal Status	Sec. I.F.A. 1927	Date of Notification.
1	Gaulandoh	83	25.40	RF	Sec.4	21 st Sept 1990
2	Bhulori	51	77.29	RF	Sec.4	21 st Sept 1990
3	Bhulori	86	99.41	RF	Sec.4	21 st Sept 1990
4	Rajpur	107	150.00	PF	Sec.29	22 nd June 1993
5	Rajpur	131	25.00	PF	Sec.29	22 nd June 1993
6	Salai	129	200.00	PF	Sec.29	22 nd June 1993
7	Gaulandoh	135 (old 83)	22.87	PF	Sec.29	16 th May 1996
8	Laktu	74	50.00	PF	Sec.29	25 th June 1996
9	Laktu	1	100.00	PF	Sec.29	25 th June 1996
10	Sadrabadi	88	100.00	PF	Sec.29	25 th June 1996
11	Ranapisa	13	50.00	PF	Sec.29	25 th June 1996
12	Ranapisa	114	100.00	PF	Sec.29	25 th June 1996
13	Kharya	89	25.00	PF	Sec.29	25 th June 1996
14	Kharya	102	18.00	PF	Sec.29	25 th June 1996
15	Bibamal	83	150.00	PF	Sec.29	25 th June 1996
16	Gaulandoh	83	166.00	PF	Sec.29	25 th June 1996
17	Bibamal	68	65.54	PF	Sec.29	14 th Nov. 2005
18	Nagzira	2	23.52	PF	Sec.29	14 th Nov. 2005
19	Nagzira	17	136.00	PF	Sec.29	14 th Nov. 2005
20	Nagzira	2	22.28	PF	Sec.29	14 th Nov. 2005
21	Nagzira	2	3.15	PF	Sec.29	14 th Nov. 2005
22	Zilpi	24	15.40	PF	Sec.29	14 th Nov. 2005
23	Nagzira	2	13.16	PF	Sec.29	17 th Nov. 2005
24	Nagzira	2	4.96	PF	Sec.29	21 st Nov. 2005
25	Sadrabadi	88	37.83	PF	Sec.29	21 st Nov. 2005
	Total :		1677.81			

1.8.5. A Number of alternation and adjustments affecting the area of the Reserves have subsequently taken place. Full details of records in Form No.1,

Register of Reserved Forest, which also contains notification numbers under which they have been affected. The list of notification is given under **Appendix No.VIII** of Volume II of this plan. Also list of surveyed and un surveyed villages with total forest area as recorded in Talathi Form No. I (A) is given in **Appendix No. XI** of Vol. II. A statement showing villagewise details of RF and PF and changes in area during previous Working Plan period is given in **Appendix No. XIII** of Vol. II.

1.8.6 The Compensatory land received against diverted forest land at *Bhulori* and *Gaulandoh* are declared as RF under Section 4 of IFA, 1927. After due process of enquiry /settlement the State Govt. vide letter No. FLD-31/2006/CR-550/F-3 dated 4.4.2007 has approved issuing of notification under Sec.20 of IFA 1927 and has directed Divisional Commissioner, Amravati to publish notification in Gazette after re-verification of details of area and boundaries. **The process of re-verification is being done by the Chief Conservator of Forests (Territorial). The final notification is yet to be issued.**

1.8.7 A statement showing area identified as “Forest” within the dictionary meaning of forest in the Division is given in **Appendix No. XXXV** of Vol. II

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- anna –7- paisa 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. The forests are not burdened with any other rights.

1.9.3. The following concessions are, however, permitted:

- (i) The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of reversed 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 to their cattle and obtaining timber and other forest produce for their bonafide domestic use as were given to the erstwhile forest Villagers.
- (iii) Agriculturists of villages in the vicinity of the reversed forests are given certain quantity of timber bamboos for their bonafide domestic use at concessional rates from the coupes under working.

1.9.4. 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.XXV** of Volume II of this plan.

CHAPTER II
FLORA, FAUNA AND BIODIVERSITY

CHAPTER II A
FOREST FLORA

SECTION 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 IV, which improves in patches on loamy soil having good drainage. 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 2. COMPOSITION OF THE CROP

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

TABLE NO. 2.1
Table showing the classification of forest types of West Melghat Division

	Champion and Seth's Classification	Local sub-type
1	2	3
Group 5- Sub-group 5A I Climax type— (1) 5A/C1 (2) 5A/C1a (3) 5A/C1b (4) 5A/C-3 II Edaphic climax— 5/E-2 5/E-5 III Degradation State (1) 5/D S-1 IV Primary Seral type (1) 5/ 1 S 1	Tropical Dry Deciduous Forests Southern Tropical Dry Deciduous Forests Dry Teak bearing forest Very Dry Teak forest. Dry Teak Forest Southern Dry mixed deciduous Forest Boswellia Forests Butea Forests Dry Deciduous Scrub Forest Dry Tropical reverain Forest	 (i) Teak forest (ii) <i>Tiwas</i> forest (iii) Mixed forest (iv) <i>Salai</i> forests

2A.2.2. The factors influencing the composition and condition of the crop are so variable in *Melghat* that even in 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 *Gugamal*, *Chitri*, *Tapti*, *Dhulghat*, *Khirpani*, *Rupagad* reserves and *Dhulghat*, *Kot-Kotha* blocks (Ex-Jagir Forest) comprises all four ranges of West *Melghat* Division. It generally occurs between the elevations ranging from 300 m to 900 m. The extent of the forest is about 22250 ha.

2A.2.4. The general quality of the forest is of site quality IV. The forests of site quality III is found all along in *Gugamal* reserve, except along bigger steep slopes and plateau, which are covered with poor forests of IV-a or IV-b quality. The forests lying to the north of main ridge i.e. *Bod*, *Tapti*, *Chitri* reserves and *Dhulghat* and *Kot-Kotha* blocks are mostly of site quality IV-a and IV-b. The forests, lying to the south of the main ridge that of *Rupagarh* reserve, are also mostly of site quality IVa and IVb.

2A.2.5. The density of stocking is good throughout the area, best in the valleys and along moderate slopes. However, it degrades 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 40 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*) trees are mostly of young and middle age.

2A.2.8. *Haldu* (*Adina cordifolia*), and *Dhawada* (*Anogeissus latifolia*) are the main associates of *Teak* while *Saja* (*Terminalia tomentosa*) forms a fair proportion in low-lying areas. Other associates are *Lendia* (*Lagerstroemia parviflora*), *Kekad* (*Garuga pinnata*), *Kasai* (*Bridelia retusa*), *Kalam* (*Mitragyna parviflora*), *Dhobin* (*Dalbergia paniculata*), *Mokha* (*Schrebera swietenoides*), *Kahu* (*Terminalia arjuna*), *Bahera* (*Terminalia bellerica*), *Mahuwa* (*Madhuca latifolia*), *Amba* (*Mangifera indica*),

Bhilawa (*Semecarpus anacardium*), *Bija* (*Pterocarpus marsupium*), *Kulu* (*Sterculia urens*) and *Kusum* (*Schleichera oleosa*).

2A.2.9. The understorey consists of *Moyen* (*Lannea coromandelica*), *Tiwas* (*Ougeinia oogeinensis*), *Tendu* (*Diospyros melanoxylon*), *Dudhi* (*Wrightia tinctoria*), *Dhaman* (*Grewia tiliaefolia*), *Aola* (*Embllica officinalis*), *Salai* (*Bosewillia serrata*), *Achar* (*Buchanania lanzan*), *Shiwan* (*Gmelina arborea*), *Gongal* (*Cochlospermum religiosum*), *Ghot* (*Zizyphus xylopyra*), *Bhosa* (*Bauhinia recemosa*), *Aran* (*Eleaeodendron glaucum*), *Amaltas* (*Cassia fistula*), *Palas* (*Butea monosperma*), *Rohan* (*Soymida febrifuga*), *Khair* (*Acacia catechu*) and *Ber* (*Zizyphus mauritiana*).

2A.2.10. The shrub under growth is sparse except the area 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 *Dharni* range or where dense growth of grass exists. Some compartments specially high elevated areas are occasionally invaded by *Karvi* (*Carvia callosa*) and *Bhandar* (*Colebrookia oppositifolia*), Other shrubs that occur are *Muradsheng* (*Helicteres isora*), also known as *Teak* indicator. *Nirgudi* (*Vitex negundo*), *Khirsali* (*Nyctanthes arbortristis*), *Bankapas* (*Aznza lampas*), *Vavding* (*Embllica tsjerium-cottam*), *Gokharu* (*Tribulus terrestris*) *Pithondi* (*Fluggea microcarpa*).

2A.2.11. Many herbs rises on the onset of monsoon among which most common are *Safed Musali* (*Chlorophytum borivallianem*), *Shatavari* (*Asparagus recemosus*), *Ran Haldi* (*Curcuma psedomontana*), *Kali Musali* (*Curculigo orchiodes*), and *Kalalavi* (*Gloriossa superba*)

2A.2.12. Most common abundant grasses are, *Kusal* (*Heteropogan contortus*), *Pochati* (*Apluda mutica*), *Gondal* (*Themada triandra*), *Sainer* (*Sehima nervosum*), other grasses found are *Marvel* (*Dicanthium annulatum*), *Sheda* (*Ischaemum laxum*), *Pawanya* (*Ischaemum sulcatom*) and *Tikhadi* (*Cymbopogan martinii*)

2A.2.13. Many climbers occurs in this Division. *Mahul* (*Bauhinia vahilii*), *Palasbel* (*Butea superba*), *Chilati* (*Acacia pinnata*), *Jijul* (*Sissus rependa*), *Ambatvel* or *Jangli*

draksha (*Cayratia auriculata*), are amount large woody climbers. And other climbers are *Ranjai* (*Clematis triloba*), *Malkanguni* (*Celastrus panniculata*), *Herbel* (*Ventilago madraspatana*), *Gorbel* (*Pueraria tuberosa*).

2A.2.14 *Jangli Kela* (*Musa superba*) is found very scattered along the rocky hill sides and on slopes along the streams .

2A.2.15 *Haldu* (*Adina cordifolia*), is found where the crop is well stocked, generally at an elevation about 600 meters. *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 girth more than 75 cm. are generally rare, and if present are unsound and cranky. *Semal* (*Bombax ceiba*), *Bija* (*Pterocarpus marsupium*) and *Shisham* (*Dalburgia latifolia*) forms a negligible proportion in the crop.

2A.2.16 Natural regeneration of *Teak* (*Tectona grandis*) is somewhat deficient though small patches of reproduction are some times observed in the fully stocked forests. Regeneration of *Dhawada* (*Anogeissus latifolia*), *Lendia* (*Lagerstromia parviflora*) and *Saja* (*Terminalia tomentosa*) is fair, while that of the other species is generally scanty.

2A.2.17 Comparatively poorer and more open *Teak* forests of IV a & IV b quality having composition or crop almost the same as described under paras 2 A. 2.8 to 2 A. 2.13 are formed in parts of *Bod*, *Tapti*, *Chitri* and *Rupagarh* reserves. The percentage of *Teak* (*Tectona grandis*) in the crop is not more than 40 %. The density and quality of the crop improves in depressions on cooler aspects and along streams.

Tiwas Forests:

2A.2.18. 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 1000 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, *Lantana* 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*), *Aola* (*Emblia officinalis*), *Kumbhi* (*Careya arborea*), *Jamun* (*Syzygium cumini*), *Gular* (*Ficus glomerata*), *Semal* (*Bombax ceiba*), *Arang* (*Eriolaena hookeriana*), *Amaltas* (*Cassia fistula*), *Pakar* (*Ficus infectoria*), *Pangra* (*Erythrina subulatum*), *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.2.19. *Lantana*, *Bhandar*, *Karvi* (*Carvia callosa*) have invaded large areas to the exclusion of other under growth most of the tops of ridges and plateau in the *Akot* and *Dhulghat* ranges are under dense impenetrable *Lantana*. It is generally observed that grazing areas were invaded by *Lantana*. *Kusal* (*Heteropogon contortis*), *Sainar* (*Schima sulcatum*), *Gondel* (*Themada triandra*), grass is found in this type. *Tikhadi* (*Cymbopogon martinii*) grass is also found here and there and is generally of “Sofia” variety.

2A.2.20. Most of these high level plateau have been 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.2.21. Regeneration of *Teak* (*Tectona grandis*) is absent but *Tiwas* (*Ougeinia oogeinensis*) seedling and saplings are plentiful. Regeneration of other species is scanty.

Mixed Forests.

2A.2.22. This type of forests is found on the upper hills of *Rupagarh* reserve and

southern eastern parts of *Gugamal* reserves and practically whole *Khirpani* reserve. It also occurs in *Dhulghat*, *Dabida* reserves in the valleys. In *Bairagarh* reserve it occurs in patches interspersed with *Teak* forest. The site quality of forests is most IVa 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 i.e. a mixture of variety of species, prominent being *Tiwas* (*Ougenia oogeinensis*), *Dhaman* (*Grewia tiliafolia*), *Moyan* (*lannea coromendelica*) *Salai* (*Boswellia serrata*) *Ghatbor* (*Zyzyphus xylopyra*), *Sajad* (*Terminalia tomentosa*), *Shiwan* (*Gmelina arborea*), *Tendu* (*Diospyros melanoxylon*) *Kumkum* (*Mallotus philippensis*) etc. *Bhirra* (*Cholroxylon swietenia*) is very common along the hills in the fringes like near *Popatkhed*. *Teak* (*Tectona grandis*) is rare, however, it is found encroaching on the fringes where *Teak* forests adjoins this type. *Bamboo* are generally absent. The undergrowth varies considerably with the density. *Lantana* has invaded this type at many places, common grasses are *Gondel* (*Themada triandra*) and *Pochati* (*Apluda mutica*). Regeneration of tree species is scanty.

Salai Forest:

2A.2.23. Forest of this type is mostly found practically in whole of *Dhulghat*, *Dabida* and eastern parts of *Rupagarh* reserve. 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 *Dhawada* (*Anogeissus latifolia*), other being *Lendia* (*Lagerstroemia parviflora*), *Tiwas* (*Ougeinia oogeinensis*), *Moyan* (*Lannea coromendelica*), *Kekad* (*Gaurga pinnata*), *Mokha* (*Schrebera swietenoides*), *Palas* (*Butea monosperma*), *Aola* (*Embllica 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 45cm in girth. *Lokhandi* (*Ixora parviflora*) is common only along the stream.

2A.2.24. *Tikhari grass (Cymbopogon martini)* both “*Motia & Sofia*” varieties occur in this forest. “*Motia*” variety is in abundance in almost the whole of Akot. Dhulghat and Dhakna ranges.

2A.2.25. The climbers are very few and usually formed in shady moist situations along streams. The most common are *Palesbel (Butea superba)*, *Nagbel (Cryptolepis huchanani)* *Anantmool (Hemidesmus indicus)* and *Chilati (Acacia pinnata)*

Herbs

2A.2.26. Many herbs rises on the onset of monsoon, among which common are *Safed Musali (Chlorophytum tunberosum)*, *Shatavari (Asparagus recemosus)*, *Ran Haldi (Curcuma pseudomontana)*, *Kali Musali (Curculigo orchiods)*, *Kalalavi (Gloriosa superba)* many species of genus *Diaspora*.

Medicinal Plants:

2A2.27. Most of the herbs mentioned above are the main medicinal plants. Other important species are *Aola fruits, (Emblia officinalis)*, *Behada (Terminalia bellarica)*, *Talimkhana (Hydrophila scilli)*, *Muradseng (Helicters isora)*, *Biba (Semicarpus anacardium)*, tubers of *Dioscorea pentaphiylla* and *Garbel (Puerarua tuberosa)*, *Chitrak (Plumbago zeylanica)*, seeds of *Katchkuri*, *Hirda (Terminalia chebula)* is remarkably absent in this Division.

2A.2.28 *Jungalikela* is found very scattered along the rocky hillsides and on slopes along the streambeds.

2A2.29. *Lantana*, *Bhandar (Colebrookia oppositifolia)* and *Karvi (Carvia callosa)* have invaded large areas to the exclusion of other undergrowth. Most of the tops of ridges and plateau in the Akot and Dhulghat 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 (Themeda triandra)* 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.2.30. 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.

SECTION 3. STATUS OF NATURAL REGENERATION

2A.3.1. Overall Status of Natural Regeneration/ha in West *Melghat* Division is as under :

TABLE NO. 2.2
TABLE SHOWING STATUS OF NATURAL REGENERATION & ITS ESTABLISHMENT

Sr.N o.	Name of Species	R1 0.3 to 1.0 mt.	R2 1.0 to 3.0 mt.	R3 Above 3.0 mt.	Total	% of Regenera tion	Establishment %
1	Ain	12.49	10.12	0.98	23.59	3 %	4 %
2	Bija	0.81	0.22	0.00	1.03	0.13 %	0
3	Lendia	26.03	36.92	8.90	71.85	9 %	12 %
4	Shivan	0.12	0.07	0.05	0.24	0.03 %	21 %
5	Teak	60.44	109.53	38.80	208.77	27 %	19 %
6	Tiwas	9.88	6.00	0.60	16.48	2 %	3.6 %
7	Salai	0.03	0.15	0.05	0.24	0.03 %	21 %
8	Khair	3.29	6.00	1.91	11.20	1.5 %	17 %
9	Kalamb	2.17	1.14	0.19	3.49	0.45 %	5 %
10	Haldu	0.84	0.53	0.05	1.43	0.18 %	3.5 %
11	Behada	1.31	0.65	0.07	2.03	0.26 %	3.5 %
12	Bel	1.63	1.02	0.19	2.84	0.37 %	7 %
13	Kulu	0.12	0.21	0.00	0.33	0.04 %	0
14	Moha	0.29	0.45	0.09	0.83	0.10 %	11 %
15	Biba	0.10	0.31	0.00	1.03	0.05 %	0
16	Chinch	0.09	0.29	0.00	0.38	0.05 %	0
17	Dhawada	27.80	59.31	17.95	105.06	13.5 %	17 %
18	Charoli	2.36	5.08	3.25	10.68	1.5 %	30 %
19	Aola	4.70	3.65	0.31	8.65	1 %	3.5 %
20	Dhudhi	32.12	37.85	4.23	74.21	10 %	17.5 %
21	Palas	11.39	11.87	4.99	28.25	3.6 %	18 %
22	Others	121.41	87.97	12.86	201.62	26.04 %	6.38 %
	Total :	299.42	379.34	95.47	774.23	100.00%	

2A.3.2. It may be noted that regeneration of Important General Utility species such as *Teak*, *Lendia*, *Ain*, *Tiwas* & Special Utility species such as *Khair* is taking place, but it is not adequate. Also the percentage of establishment is low, may be due to uncontrolled grazing and incidental fires. The regeneration of species such as *Bija*, *Shivan*, etc are less probably due to less number of seed bearers and due to lopping for fodder.

2A.3.3. In M.F.P. regeneration is seen in *Dhawada*, *Char & Aola*. However, it is inadequate in *Beheda*, *Moha*, *Biba* etc. This may also be due to less number of seed bearers. Regeneration in *Kulu* is also inadequate which may be due to practising unscientific methods for extraction of gum, resulting in damages to the standing trees, resulting ultimately to decrease in the number of *Kulu* trees considerably.

SECTION 4. INJURIES TO WHICH THE CROP IS LIABLE

2A.4.1. The most significant menacing agencies causing considerable damage to the forest are Fire, Illicit cutting, Encroachments and Grazing. Next to it is *Lantana*, Strong wind (Cyclone), Drought and Frost.

Fire:

2A.4.2. Surface Fires are of common occurrence in the Melghat Forest. Almost whole of *Dharni*, *Dhakna*, and *Dhulghat* Ranges and *Khatkali* round of *Akot* Range are sensitive from point of view of forest fires. A statement showing damage due to fire is given in **Appendix No. XV(b)** of Vol. II. Highly combustible undergrowth consisting of dense mass of dried grass dry twigs and *Lantana* a tiny spark can trigger off a conflagration in a short time. Rapid development in communication also increased the threat of this menace. Also the increased vested interests on the local people made this problem more difficult. On the contrary forest staff is not equipped with modern communication system. Non availability of sufficient vehicles, trained staff, often results in great damage to the forest. Probe through past records also reveals that the field staff is not very serious in recording the damage by this menace. Even the wireless medium of communication is not fully utilized to tackle this problem.

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 February 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 month of March.
3. To get good growth of grasses the *gaolis* set fire to the forest in the month of May.
4. To trace the Antlers of *Sambar* the local people set fire to the forest in the month of May.
5. The night torches used by local peoples in the night to travel from village to village also cause fires in the forest.
6. Some times to take revenge of forest officials some people set fire to the forest.
7. Some times to prevent the bear attacks local peoples set fire to the forest.

Illicit Cutting :

2A.4.3. Menace of illicit cutting is also increasing day by day because of improved communication networks and increased demand of forest produce in the market. Therefore, Melghat forest, once a compact block of sparsely populated area, became vulnerable to illicit cutting also. Almost all the beats, except Vastapur and Zira beat of Akot Range and East Wan beat of Dhulghat Range are sensitive to illicit felling. In West Melghat Division organized gang from Hiwarkhed and Adgaon(bk) town of Akola district and Nimar district of M.P. regularly raids the forest of Akot, Dhulghat and Dhakna ranges. The beats on outer fringes of Akot, Dhulghat and

Dhakna range recorded major losses in quantity and amount. Even in *Dharni* range which is a compact block forest and naturally protected by river *Tapti* on Western side and compact block of Project Tiger on the eastern side, interior most beats like *Bhondilawa*, *Padidum*, *Bulumgavhan* recorded considerable losses. It shows the great demand of timber and fire wood in town like *Dharni* and villager most of them are *Korkus* consume major portion of the forest produce. It was believed that the local tribals do not indulge in the illicit felling; this was proved wrong in the recent cases of illicit cutting recorded in *Dharni* range. This all resulted in boosting the division's name on the top of the list for losses by illicit cutting in whole Maharashtra State, A statement showing loss due to illicit cutting is given in **Appendix No. XV (a)** of Volume II. Also a statement showing loss due to illicit cutting of *Tendu* trees is given in **Appendix No. XXIII** of Volume II.

Encroachments :

2A.4.4. In long past the residents of tract were having a shifting cultivation practice. To break this tradition Govt. has given them the land ownership called as "*Pattas*" and tried to confined them to particular area. But because of increase in population the demand of land increased. Certain organizations like "*Samaj Karanti Aghadi*" and some misguided people also encouraged the tribals for the fresh encroachments. Khatkali beat in Akot Range is most affected. Record of encroachment cases reveals that cases which have to be settled by the Govt. G.R. of 1979 were not finally decided till today. This ambiguity situation also encourages the tribals for the fresh encroachment. A statement showing list of encroachers in the Division is given in **Appendix No. XLIII** of Volume II. This tendency of encroachment of forest lands results in bitter animosity between forest staff and tribals. Many times forest staff trying to evict the encroachment was attacked and accused of atrocity cases. The area under dispute is not clearly demarcated. Moral of the staff need to be boosted for eviction of encroachment and prevention of further encroachments. Legal Actions against the organization like "*Samaj Karanti Aghadi*" is to be taken up at higher levels, so as to keep the harmony between lower level staff and tribals intact. The forest staff must be trained to take the help of JFM committees in eviction and prevention of the encroachments.

Grazing:

2A.4.5. The entire forests of this Division are liable to damage from grazing. The *Ex-Jagir* 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, is therefore, unfit for cultivation. All forests in this division are hilly. Main reason for heavy grazing is that the *Gawali* community, who are spread all over the area. They are having number of cattle especially buffaloes. They freely graze their cattle in the forest area. Therefore, the realistic calculations of grazing incidences do not give the true picture of the grazing pressure in this area. No grazier keeps grazing passes with him, while grazing the cattle. This also makes it impossible to counter-check the grazing incidences. Local people, especially *Gawalis*, feel that they can graze any number of cattle in the forests. Even many times forest staff is also not serious about the ill- effects of the heavy grazing. Now- a- days many agriculturist in *Berar* plains keeps their cattle especially non-milch cattle with the peoples residing in the forest area for four months of monsoon. Many *Kathiawadis* camp near to the forest area for four months of monsoon. They also eventually raid the area for grazing the cattle which results in heavy degradation of the forest. A statement showing damage due to grazing is given in **Appendix No. XV (b)** of Volume II. A statement showing number of cattle grazed and revenue realized is given in **Appendix No. XXII** of Volume II.

2A.4.6. 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.

2A.4.7. 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.4.8. The animals, mostly buffaloes, from *Dharni* 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 srtictus*). 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. Even trampling by the domestic cattles causes considerable damage to the forest. 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. Therefore, new grazing settlement and its effective implementation is need of the time.

Mining :

2A.4.9. Mining is prohibited in the forest area by the Act. There is no report of illegal mining/quarrying in the forest area.

Lantana:

2A.4.10. *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 *Semadoh* 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, there is hardly any compartment where *Lantana* is not found. 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 *Amadoh 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.4.11. 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 gives rise to shoots again which restock the area very soon. The areas around Dharni, which were set to fire and the coupes in which uprooting were tried for few years are as full of *Lantana* as ever.

2A.4.12. 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 *Akot*, *Dhulghat*, *Dhakna* and part of *Dharni* range.

2A.4.13. At present, *Lantana* is being removed under EGS with a view to prevent further spreading of *Lantana* into deeper forests. 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.4.14. *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 will any other undergrowth 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.

Flood :

2A.4.15 In rainy season, particularly during July, August & September, heavy rains give result to the flood. Generally such phenomenon occurs 2 to 3 times in a year; but damages to property and life is on lower side in *Melghat* due to high hill residential practices of local tribals. But flood affects the life of the *Melghat* due to road blocking by rivers and *nalas* and thus, results in delay in transporting. It also causes damages to low lying agricultural fields & forest area by causing heavy erosion of fertile soil & some times wild life and cattle are also get drowned in *nalas* and rivers.

Frost:

2A.4.16. Frosts occur in the valleys. Frost damage is caused in the low areas which are open, have either been once under cultivation or adjoining 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*), Waranga (*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.4.17. 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 Dudhi, Sambaalu, Pithondi, Baibrang, etc., and Kusal and Baru grasses.

2A.4.18. 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.

Drought:

2A.4.19. 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.

Erosion :

2A.4.20. The Melghat forests have undulating terrain and mostly precipitous slopes. These areas have very high rainfall and hence these are prone to soil erosion. This is accentuated by repeated & extensive fire incidents. These have contributed to rapid runoff. Soil map procured from MRSAC, Nagpur reveals that near about 9.6 % area of West Melghat forest division is having slight erosion, 13.3 % area having slight to moderate erosion, only 0.8 % area is having moderate erosion. While 54.5 % area is having moderate to severe erosion & 14.5 % area is having severe to very severe erosion.

Winds:

2A.4.21. 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.4.22. Attacks of *Teak defoliator* (*Hyblea puera*) and the leaf *skeletoniser* (*Eutectona 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.

Wild Animals:

2A.4.23. *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*, *Mahuwa*, *Amaltas*, *Bhilawa*, etc., near the base of the trees.

2A.4.24. 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.4.25. The damage by wild animals in *Melghat* forests, generally, is very little.

Drying of Teak

2A.4.26. Mortality of Teak trees, in all age groups young to middle age and mature crop has been observed in Dharni Range of West Melghat Forest Division. The dryness first affects the top of the tree and eventually spread to lower branches. The survey carried out by territorial Dy.C.F. shows that drying is occurring in all girth class between 30-45 cm to 151 cm & above, but incidences of drying is more in girth classes between 61-75 cm to 91-105 cm.

TABLE NO. 2.3

Table showing the Beat wise compartments in Dharni Range, where the Drying of Teak is noticed.

Round	Beat	Compartment Numbers affected	Remarks
Patiya	Patiya	665, 666, 667, 690 & 691	
Patiya	Gobarkahu	688, 689, 692, & 694	
Patiya	Dhakarmal	695, 696, 697 & 698	Affected to lesser extent.
Dharni	Kekdabod.	706	
Bairagad	Bhondilava	686	

High temperature, accompanied by non availability of moisture in the sub soil layer, especially in forest areas having shallow soil cover appears to be the major reason for mortality. The phenomenon does not appear to have been triggered by a pathogen. However, saprophytic fungi do make their appearance after afflicted trees dry up totally. The Deputy Conservator of Forests is in touch with TFRI, *Jabalpur* for determining cause of the drying. **Territorial Dy.C.F. shall carryout detailed survey to find out the extent/spread of this problem.**

CHAPTER II B

FOREST FAUNA

SECTION 1. DESCRIPTION OF FAUNA

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*) etc.
- 2) Herbivora:-** Four horned antelope (*Tetracerus quadricornis*), Sambhar (*Cervus unicolor*), Barking deer (*Muntiacus muntjac*), Spotted deer (*Axis axis*), Blue bull (*Boselaphus tragocambaelus*), Gaur (*Bos gaurus*), Common Langur (*Presbytis pileatus*), Indian Hare (*Lepus nigricollis*), Black buck (*Antelope cervicapra*) etc.
- 3) Omnivora:-** Civet cat (*Paradoxurus hermaphroditus*), Sloth bear (*Melursus ursinus*), Wild boar (*Sus scrofa*) etc.
- 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 (*Centropus 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. ,**Appendix No. LXXII** of Volume II gives list of Mammals, Reptiles, Fishes and Birds of *Melghat* forests.

2B.1.2.Census Data : - Census data of wild animals for the year 2001 and 2005 are given in **Table No.2.4 :**

TABLE NO. 2.4
Population Estimation for Wild Animals (Water Hole Count)

Name of Wild Animal	Average population Estimate	
	2001	2005
Gaur	08	-
Sambhar	36	22
Nilgai	23	12
Chital (Spotted deer)	24	33
Bhedki (Barking deer)	66	58
Chowsinga (Four horned antelope)	06	21
Macaque	230	102
Langoor	481	519
Toddy cat	08	06
Wild Boar	162	136
Ratel	01	0
Hyena	09	06
Wild dog	0	16
Sloth Bear	17	18
Jungle Cat	12	08
Porcupine	01	0
Hare	44	05
Jackal	26	06
Mongoose	15	01
Peacock	98	30
Jungle Fowl	157	38
Crested serpent Eagle	10	04
Flying Squirrel	06	01
Crested Hawk Eagle	01	00
Total :	1441	1044

2B1.3 The Population estimation of Tiger/Panther is given in the Table below:

TABLE NO. 2.5
TABLE SHOWING POPULATION ESTIMATES OF TIGER & PANTHER

Year	Tiger	Panther	UN	Total
2001	06	05	03	14
2005	01	01	-	2

SECTION 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 3. LEGAL POSITION

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

The Berar Forest Act, 1886 amended in 1891 provided under section 7(b) that forest produce includes the following when found in or brought from a forest:

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

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

2B.3.3. After the promulgation of the Indian Forest Act 1927, rules relating to wildlife regulations were framed under section 26(l) and 76(d). These were essentially to regulate hunting of wild animals and were given in the appendix VIII of MP Forest Manual Vol. II. Wild Birds and Animal Protection Act 1912 as amended in 1935 also ensured protection to certain animals and a check on hunting of others. Shooting block system of hunting was started from 1927. Under the provisions of the two Acts, the Conservator of Forests in consultation with the DCF concerned used to declare areas having abundant game as open to hunting. The DCF accordingly used to issue shooting permits, wherein the type of game and their number allowed to be hunted together with other relevant conditions were used to be mentioned.

2B.3.4. The Bombay Wild Animals and Wild Birds Protection Act, 1951 was extended to *Vidarbha* region from 1.6.1961. Though this Act did not propose a

significant change in the management of game in the Reserved and the Protected Forests, yet it incorporated following significant provisions:

1. Its provisions were also applicable 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.

DEVELOPMENTS AFTER 1972:

2B.3.5. At the national level, the Indian Board for Wildlife was constituted in 1952. Its main object was to devise ways and means for conservation of wildlife through co-ordinated legislative and practical measures and setting up of National Parks and Wildlife Sanctuaries. A comprehensive and unified National and State Park Act, 1971 was passed which provided for appointment of an Advisory Committee to advise in regard to the constitution and declaration of National Parks and Sanctuaries and formulation of policy for their administration and management. The Parliament then enacted the Wildlife (Protection) Act, 1972, which came into force in the State of Maharashtra with effect from 1st June 1973. With this, other Acts relating to any matter contained in this Act and in force in the State stood repealed. This Act as amended from time to time as well as the various regulations made under this Act and guidelines issued by the Central and the State Govt. provide for establishment of a network of national parks and sanctuaries representing various habitats and for giving protection to all type of wildlife in the state. These provisions also address issues relating to the management of wildlife

outside the protected areas. Following rules have so far been enacted under the relevant sections of this Act.

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

2B.3.6. Besides the above specific legal framework available for wildlife management, provisions contained in Indian Forest Act, 1927, Forest Conservation Act, 1980 and The Environment (Protection) Act, 1986 may go a long way in protecting and conserving the biodiversity of this division. Gugamal National Park is geographically located next to the division. Clearance under the Environment Protection Act, 1986 from environmental angle is required from the Govt. of India for any project (other than those relating to improvement of forests and particularly the projects relating to industrial Activities damaging the environment of these Protected Areas) including an industry located within 10 km from these PAs. Hence, such clearance is obligatory in case of many of the projects involving forestland of this division because large part of its forests is located in the vicinity of these protected areas.

SUMMARY OF WILDLIFE (PROTECTION) ACT. 1972

2B.3.7. The Wildlife (Protection) Act 1972 provides for effective protection and conservation of wildlife, that is, fauna as well as flora, total ban on hunting of wild

animals and severe restrictions on wildlife related trade. The Act has been amended from time to time and its amendments done in 1991 and recently in 2002 have brought far-reaching changes in it. Summary of salient features particularly the provisions regarding ban on hunting, restrictions on trade, powers and duties of forest officers and conservation of wildlife outside the protected areas is given below.

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

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

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

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

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

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

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

2B.3.14. The 2002 amendment to the Act has identified this problem and a new section '40A-Immunity in certain cases' has been inserted to provide another chance to such holders of captive animal/animal article etc. Declaration of Wildlife Stock Rules, 2003 have been promulgated to prescribe the time, form and the manner through which such declarations can be made and ownership certificates can be obtained even now. According to these rules, declaration under Section 40A could be done within 180 days from the date of coming into force of these rules. The CWLW shall, as far as possible, decide such cases within 6 months from the date of declaration.

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

Delegation of Powers to Forest Officers

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

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

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

- 1) Receive declaration of animal/ animal article and applications for different purposes under the Act. Also power to deal with matters ancillary to the above.
- 2) Deal with wildlife offences as well as their compounding.
- 3) Registration of arms license holder.
- 4) Power to make complaint in the court.
- 5) Power to grant permit for hunting of an animal other than specified in schedule I, which has become dangerous to human life and property.
- 6) Power to deal with a wild animal live or dead, which is a government property.

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

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

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

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

2B.3.21 Zoos have been brought under the purview of the Act. No zoo can operate without being recognized by the Central Zoo Authority and no new zoo can be established without obtaining prior approval of this authority. CZA has framed regulations providing elaborate procedure, norms and set of conditions under which a zoo can be established and run. A zoo under the Act means a facility where captured animals are kept for exhibition to the public and it also includes Circus (where such animals are used wholly or mainly for performing tricks) and rescue centers.

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

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

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

the purpose of population management from a specified area to other suitable places.

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

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

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

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

SECTION 4: 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 poison, to catch the fish of water bodies, by the tribals led to the death of wildlife which preyed upon the fish containing poisons. **This practice should be discouraged to save the wildlife by bringing awareness and also by providing the methodology to the tribes to extract plant based poisons.**

DISEASES TO WHICH WILDLIFE IS LIABLE

2B.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. A statement showing number of human beings attacked by wild life is given in **Appendix No. XXXVII** of Vol. II . The villagers sometimes indulge in poisoning the carcass to show vengeance and cases of electrocution of wild animals by the villagers to kill the animal suspected to have killed the cattle have also been reported. In such cases the persons involved in illegal killings of the wild animals do not have any intention of poaching or trade but such activities on the part of local people pose grave danger to animal populations in the forests. The 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. This is summarized below:

COMPENSATION FOR THE LOSS OF LIVESTOCK

2B.4.8. The scheme, which was introduced for the first time in 1971, covers the loss of Cow, Buffalo, Bullock, Sheep, Goat and other livestock (as per definition given under Section 2(18A)) due to attack of a Tiger, Panther or any other wild

animal. The present rates of compensation as per the GR No.WLP-1002/C.No.258/F-1 of 27.1.2003 are as follows and compensation is to be paid within 3 months.

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

The conditions to be fulfilled are:

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

COMPENSATION FOR THE INJURY TO AND LOSS OF HUMAN LIFE

2B.4.9. Introduced through GR dated 27.1.1986, the scheme covers death as well as injury including minor injury caused to any individual in an attack by a wild animal. Any such attack by Tiger, Panther, Sloth Bear, Bison, Wild Pigs, Wolf, Hyena, Jackal and wild dogs is covered under the scheme. Present rates of compensation have been fixed through GR No.WLP-1002/C.No.258/F-1, dt.17.1.2003 and dt.20.5.2003. These are as follows:

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

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

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

2B.4.10 The details of year wise poaching of wild animals and the compensation paid towards cattle kill/injury caused to human beings by wild animals is given below.

TABLE NO. 2.6
Table showing the cases of poaching of wild animals

Sr. No.	Year	Kind of wildlife	POR and Date	Place where offence occurred	Rasons of death	Name of offender	Remarks
1	1999-00	Tiger	206/21 Dt. 08-11-99	Comptt. No. 1138 & 1137	Poaching	Jagnnath Sadashiv Munde & other 5	
2	2000-01	Tiger	10/16 Dt. 05-05-2000	Comptt. No. 1020	Poisoning	Sitaramba Tanu Belsare & other	
		Sambar	25/8 Dt 14-05-2000	Comptt . No 1236	Poaching	Unknown	
3	2001-02	Wild Boar	14/17 Dt. 15-01-2002	Dharni Range	Poaching	Not traced	
		Hayena	42/18 Dt15-01-2002	Mandwa-Jutpani Road	Accident	Not traced	Investigati on under progress

		Tiger	16/16 Dt-5-5-2001	Akot	Poaching	Sitaramba Sanu Belsare	
		Sambar	13/9 Dt-29-6-01	Dharni	Poaching	Mangilal Bhar Mavskar	
4	2002-03	Sambar	22/1068 Dt. 15-03-2003	Comptt. No. 971	Poaching	Unknown	
5	2003-04	Chital	34/5 Dt. 22-5-2003	Dhulghat	Poaching	A.B. Sheikh	
6	2004-05	--	--	--	--	--	
7	2005-06	Langur	165/1 Dt. 29-7-2005	Dhakna	Poaching	Dajala Sinya Pawara	
		Langur	165/2 Dt-29-7-2005	Dhakna -	Poaching	Soma Anjya Pawara	
8	2006-07	Hayaena	177/2 Dt. 1-1-2006	Dhakna	Poaching	Not Traced	

TABLE NO. 2.7

**Table showing the compensation paid towards cattle kill/injury caused to
Human beings by wild animals**

Sr. No.	Year	No. of cattle killed	Compens ation paid (Rs.)	No. of human beings attacked		Compensation paid (Rs.)	
				Death	Injury	Death	Injury
1	2	3	4	5	6	7	8
1	1999-00	8	12275	0	0	0	0
2	2000-01	3	7500	0	0	0	0
3	2001-02	4	12000	0	2	0	80000
4	2002-03	0	0	0	0	0	0
5	2003-04	2	6000	0	0	0	0
6	2004-05	7	25500	0	2	0	2200
7	2005-06	17	70725	0	3	0	22500
8	2006-07	5	23250	0	7	0	23690

SECTION 5: MEASURES ADOPTED FOR THE PROTECTION OF FAUNA

2B.5.1. Until now silvicultural operations were given top priority compared to the wildlife protection measures. It appears that the measures prescribed in the Shri Shailendra Bahadur's and Thengdi's Working Plan for wildlife conservation have not been implemented in totality. However, the following measures are adopted to protect the wildlife in the area:

1. Immediate payment of compensation to the villagers for the cattle kills cases and towards the injury caused to human beings by wild animals.
2. Wildlife week celebrations to bring awareness amongst the masses regarding the significance of wildlife in the ecosystem.

CHAPTER II-C
BIODIVERSITY

SECTION 1. GENERAL DISCRIPTION OF BIODIVERSITY

2C.1.1 Melghat forest reserves has a considerable large expanse. Its richness in biological diversity and the potential of holding large number of flora and fauna is very unique in the Maharashtra state.

Biogeographic location :

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

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

SECTION 2. FLORAL DIVERSITY

2C.2.1. The reserve is very rich in floral value. Summary of various surveys carried out in the recent period in the Melghat area are given below.

TABLE NO. 2.8

Table showing summary of various botanical surveys carried out in Melghat Forests

Name of Survey	Tree	Shrub	Herbs	Grasses	Climber	Total
Flora or Melghat (Dr.M.A.Dhore)	90	99	343	84	32	648
Addition to flora of Melghat (By Dr.Prabha Bhogaonkar)	0	4	58	0	5	67
Survey by B.S.I. (Miss Aparna Watwe)	01	09	44	0	0	54
Total :	91	112	445	84	37	769

2C.2.2 As per the Technical bulletin No.I and No. VII (of MTR) 90 tree species, 103 shrub species, 401 herb species, 84 grass species and 37 climbers were identified in the area. Leguminaceae was the largest family. But, now it is divided in three independent families, (1) Mimoseae, (2) Caesalpinaceae and (3) Fabaceae. Therefore, Poaceae (Gramineae) is the largest family having 55 genera and 99 species. Further 54 species have been newly identified in Melghat reserve area during 2001 to 2002. The confirmation of these survey are awaited from Botanical Survey of India. This would make total 769 species of flora.

Forest Types :

2C.2.3 Melghat forests are Tropical Dry Deciduous forests of Central India. However, because of hilly terrain changes in basic rock structure, water availability etc. even within the limits of a compartment, there will be abrupt changes in the crop representing varied plant association. There are several valleys and cliffs, which remain wet for maximum period of the year. Due to protection given, plants are on their own to grow, reproduce, exchange their genes, evolve and adjust freely to their ecological niche. Biodiversity is expected to be high under such conditions. The maximum rainfall noted in Melghat is around 1500 mm with maximum 73 rainy days per year. Though summer months are dry, relative humidity is very high during monsoon. This offers a good opportunity for even temperate ephemeral species to grow during rainy season.

2C.2.4 The forest type is as per Champion & Seth's revised classification is described in Table No.2.1 of Chapter II.

Floristic :

2C.2.5 Pioneering work of identifying and describing varied floristic of Central Province & Berar was done by Witt (1916) and thereafter by R.I.Patel (1968).

2C.2.6 The first exhaustive work was published vide Technical bulletin No.I, a document named "Flora of Melghat Tiger Reserve" authored by Dr. M.A.Dhore and P.P.Joshi (1988), which describe 648 naturalized species, belonging to 398

generas of 97 families. The flora described 90 tree species, 343 herbs, 32 climbers, 99 shrubs, and 84 grass species. Out of these, 28 species has been described for the first time for the Vidarbha region.

2C.2.7 Further addition in this Biodiversity list was done vide Technical Bulletin No.VII named as “ Addition to the flora of Melghat” which was authored by Dr. Prabha Bhogaonkar and V.D.Dewarkar (1999). This re-exploration resulted in additions of 67 species to the earlier reports of Angiosperms. In all 10 genera, 44 species, one subspecies, one variety and two variations (total 48 taxa) 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 of 8 genera and 19 species.

2C.2.8 Later on 54 species were added to this by Dr.Aparna Watwe of B.S.I. Deharadun.

Floristic Distribution :

2C.2.9 The Floristic composition changes along with the altitude, from heights of Chikhaldara plateau to plains of Dharni, Jarida, and Churni and Rangubeli. These changes are conspicuous.

Trees :

2C.2.10 *Teak (Tectona grandis)* is the most dominant species. It surpasses all other component species in frequency and density. It is seen mixed in various proportions with other species. Even most valuable species like *Chandan (Santalum album)* have its appearance in the area. Presence of *Hirda (Terminalia chebula)* is seen in Jarida sector, whereas presence of *Bel (Aegle marmelos)* is seen in Rungubali area. *Kumkum (Mallotus philipensis)* is a high altitude species found over 500 meters above MSL. The high ridge moving east-west from Chikhaldara to Pirkheda have semi evergreen composition. Some of the tree species, which need special mention to biodiversity, are *Ailanthus triphysa*, *Sterculia villosa*, *Firmiana colerata*. Though no tree species from Melghat reserve is listed in Red data book of Indian plants but still some species are disappearing from the reserve eg. *Chandan*

(*Santalum album*), *Kulu* (*Sterculia urens*), *Bija* (*Pterocarpus marsupium*) *Biba* (*Semecarpous anacardia*), etc.

Bamboos :

2C.2.11 *Bamboo* (*Dendrocalamus strictus*) is wide spread species in the Melghat reserve and is often gregarious on hill slopes and in valleys. A sole patch of *Katang Bamboo* (*Bambusa bamboo*) lies near village *Semadoh* along river Sipna (C.No.105 and 106 now in MTR). Gregarious flowering occurred in the year 2000. Previous gregarious flowering of this patch on record was in the year 1952 i.e. 48 years back. Gregarious flowering of *Dendrocalamus strictus* also occurred in *Jarida* sector in the year 1980, *Rungubali* in the year 1997, *Semadoh* and *Kolkas* area in the year 2000. This has resulted in thick carpeting of *Bamboo* seedlings on the forest floor. No other *Bamboo* species has naturalized in the area.

Climbers :

2C.2.12 Woody climbers constitute an important category of life form in a forest community. There are in all 37 Climbers species identified in the reserve. But climbers which conspicuously occur in the reserve include *Palasvel* (*Butea superba*) *Mahulvel* (*Bauhinia valhii*), *Jujvel* (*Cissus rependa*) *Gorari* (*Milletia auriculata*), *Ambat vel* (*Cayratia auriculata*) etc. *Churni* or *Sakri* (*Zizyphus rugosa*), occurs at higher elevation in Chikhaldara & Makhala plateau. *Malkanguni* (*Celastrus paniculata*) is almost extinct from Western ghat and enlisted in Red Data Book is abundantly present in the area. Moist valleys of the reserve abounds in a variety of woody climbers.

Shurbs :

2C.2.13 There are 112 shrubs exists in the area. *Raimunia* (*Lantana camara*) is the most abundant shrub followed by *Karvi* (*Carvia callosa*) and *Bhandar* (*Colobrookia oppositifolia*). Berries of *Lantana* is common feed for Sloth bear and birds. Seeds of *Karvi* is fed to milch cattles by Gawali community to increase lactation.

Herbs :

2C.2.14 There are as many as 445 species of herbs occurs in the *Melghat* reserve. Almost all herbs have some medicinal property. Some of the herbs are used as supplementary diet also. The list of herbs which are used by the local residents is long but two species needs to be mentioned here are 1. ***Safed Musali (Chlorophytum borivilianum)*** and 2. ***Ceropegia oculata***. Tubers of both plants used by tribals as health vitalizer. **Both species are on the verge of extinction and already listed in the Red Data Book as rare species.** *Rantulsi (Hyptis suaveolens)* has also invaded large area of the reserve. It grows more gregariously, covering natural regeneration and reduces grazing ground, as it smoothers development of grasses. *Congress grass (Parthenium hysterophorus)* is also noticed mostly around human habitations. *Tarota (cassia tora)*, *Karvi (Carvia callosa)* are other species which have invaded large areas.

Grasses :

2C.2.15. Natural grassy opening are almost non existing in the hills of *Melghat*. They are mostly seen on the flat tops of the hills are locally called as “*Balla*”. In most of the grassy blanks, soil depth is less and is often associated with sheet rock underneath. Such opening would be man made such as deserted village (*Rith*) or deserted cultivation areas.

2C.2.16. The major grass associations which dominate the forest floor growth include *Kusali (Heteropogan contortis, Heteropogan ritche)*, *Pochati (Apluda mutica)*, *Gondel (Themade triandra)*, *Jondhali (sorghum centraversum)*, *Marvel (Dicanthian annulatum)* etc. Melghat Reserve is heavily grazed causing depletion in good fodder grass species.

Plant parasite :

2C.2.17 The flowering plant parasites occurring in the reserve includes *Amar vel (Cascuta reflexa, Cascuta chinensis)*, *Dendropathe falcata* etc. but the menace is negligible.

Aquatic plant :

2C.2.18 The number of aquatic and semi aquatics as a component of the flora of the reserve is limited. *Hydrilla verticillata* is common while *Drosera indica* (an insectivorous plant) occurs occasionally.

Orchids :

2C.2.19 Orchid flora of the reserve is varied and interesting. *Vanda roxburgii* is commonly occurring one variety. *Aerides maculosum*, very beautiful in flower, occurs mostly on *Mango (Mangifera indica)* trees in *Semadoh* locality.

Exotics :

2C.2.20 The introduced (exotic) species, which have adopted and grown luxuriously at Chikhaldara includes *Eucalyptus hybrid*, *Cryptomeria japonica*, *Pinus roxburgii*, *Pinus petula*, *Gravellea robusta*, *Cupressus sempervens*, *Alstonia scholaris*, *Dillenia indica*, *Michelia champaca*, Plantations of coffee (*Coffea arabica*) raised by Britishers on Chikhaldara plateau are more than 100 years old.

SECTION 3. FAUNAL DIVERSITY

2C.3.1 Melghat forest is also rich in faunal diversity. As many as 13 faunastic surveys were carried out in Melghat Tiger Reserve by the scientists of Western Regional Station of Zoological Survey of India, Pune. Interesting result are obtained in these surveys and as many as 753 species from Melghat Tiger Reserve have so far been recorded by the scientists. Though part of the collection still remains to be worked out for want of suitable specialist, still 16 faunal groups have been worked out in Melghat Tiger Reserve.

Non Chordates :

2C.3.2 Representation of the Non Chordate animals is very large. Some sporadic research papers/study papers are available.

Phylum- CLADOCERA (CRUSTACEA)

2C.3.3 The study of *Cladocera* was stimulated mainly by their importance in biological process of inland water and their significance as biological indicators particularly in palaeological studies. 29 species of this phylum are recorded by P.D. Rane of Zoological Survey of India, Pune.

Phylum- MOLLUSCA :

2C.3.4. The phylum Mollusca includes soft bodied animals which is protected by hard structure called “shell”. Fresh water Mollusca play significant role in aquatic ecosystem. A list of edible Mollusca was published by Subba Rao (1993). Some Mollusca such as *Lamellidens marginalis* are reported to produce pearls as in some part of India. Some shells are used for buttons and also help in manufacture of poultry food.

2C.3.5. In a survey of fresh water group Mollusca is a major group representing 23 species. The Snail (*Bellama bengalensis*) was common almost to every place. The genera *Thiara* and *Lymnanea* were also dominant. As many as 23 species has been reported by Zoological Survey of India, Pune.

Phylum – ARACHNIDA (F- ARANEAE -Spiders)

2C.3.6. The Fauna of family Araneae (Spiders) of Indian subcontinent has received comparatively more attention than any other arachnida groups known. 25 species of group has been reported from MTR by Mr. D.B. Bastawade Zoological Survey of India, Pune.

F- SOLIFUGAE (SCORPIDNIDA)

2C.3.7. The Arachnida fauna has fairly been studied by various persons after 10 extensive field explorations, 9 species of scorpions were reported by Mr. D.B. Bastawade of Zoological Survey of India, Pune.

Phylum-CHILOPODA –(F-SCOLOPENDCIDAE)

2C.3.8. The centipede taxonomy is less studied in the world, except few monographic accounts. 15 species of the phylum has been reported by B.E.Yadav of Zoological Survey of India, Pune.

Phylum-INSECTA-

2C.3.9 Phylum Insecta is the largest phylum of the animal kingdom. Number of species occurs in Melghat Forests.

Order-ODONATA

2C.3.10. Dragons and Demsal flies as they are aptly described, Odonates form the most noticeable insects while on flight as well as at rest. 24 species are recorded for the first time in Melghat by P.P.Kulkarni & M.Prasad of Zoological Survey of India, Pune.

Order-ORTHOPTERA

2C.3.11. Grasshoppers are the insects placed in the order Orthoptera. Their fore wings are narrow and leathery but hind wings are membranous, large, placed folded under the forewings, when not in use. Most of the Orthoptera are coloured bright green, yellow, orange, red, brown or grey with mixture of these colours in degree and patches. Orthoptera are most abundant during monsoon rains or immediately after rains. 37 species of Orthoptera are recorded in Melghat area out of which 13 species are recorded for the first time from Maharashtra State by P.P.Kulkarni and M.C.Shishodia of Zoological Survey of India, Pune.

Order-HEMIPTERA

2C.3.12. The aquatic and semi aquatic groups of insects represents significant diversity. The inventory of this order for Melghat area comprises of 20 species as reported by the G. Thirumalai & R.M. Sharma of Zoological Survey of India, Pune.

Order-DIPTERA

F- CICIDOMYIIDAE (Gallmidges)

2C.3.13. The name Gallmidge comes from the ability of the larvae to produce structural abnormalities or galls on various organs of plants. Inventory of this order DIPTERA for Melghat Tiger Reserve comprises of 15 species as reported by R.M.Sharma of Zoological Survey of India, Solon (H.P.)

Order-LEPIDOPTERA (Rhopalocera & Grypocera)

2C.3.14. Lepidoptera, a highly visible invertebrate group and an important faunal component has always attracted the attention of Naturalists. They are ideal for field studies and their various ecological requirements make them excellent indicators of environmental change. There are 45 species recorded in Melghat Tiger Reserve under 36 genera and 8 families, by R.M.Sharma of Zoological Survey of India, Solon (H.P.)

Phylum – CHORDATA

2C.3.15 *Melghat* exhibits rich faunal diversity. It is practically impossible to cover all the groups in one communication. Therefore more emphasis is given on Phylum CHORDATA.

Class - PIECES

2C.3.16. The main ridges of Gavilgarh hills in Melghat forms the watershed of *Tapti* and *Purna* rivers which drains the tract of Melghat towards North and South respectively. Hence, Melghat forest tract is bestowed with number of streams which harbour luxuriant aquatic fauna. However, most of the streams dry up after November-December. Nevertheless *Tapti*, *Sipna* and *Gadga* retains water throughout the year in their numerous perennial and semi-perennial water holes. Earlier M.G.Gogte (1988) reported preliminary list of 19 fish species.

2C.3.17. 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, Pune, the list has gone upto 96 species under 52 genera belonging to 19 families.

Class – AMPHIBIA

2C.3.18. Hill streams draining into major river of Melghat 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.3.19. There are 8 species of frogs and toads reported by Satish S. Kamble of Zoological Survey of India, Pune.

Class – REPTILIA

2C.3.20 The habitat of Melghat 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) found in MTR

Sr.No	English Name	Scientific Name	Local Name
1	Crocodile	Crocodilus palustris	exj
2	Pythons	Genus Pythons	vtxj

Class – AVES

2C.3.21. The Melghat area has a variety of avian fauna. The vegetation of area is of Southern Tropical Dry Deciduous Forests. The most dominant element of this forest is *Teak*. Climbers and herbaceous flora is also rich in this forest community. This has supported the insect fauna of this reserve and in turn the avian community. The inventory of birds of the reserve is given in the technical

bulletin No. XXIV of October 2003 of MTR with the heading CHECK LIST OF BIRDS containing 265 species. The list of birds found in Melghat is given in Appendix No. LXII

2C.3.22. List of important birds mentioned in various Schedules of Wildlife (Protection) Act 1972 which are found in MTR :

List of Birds in Schedule I (Part III) found in MTR

Sr.No.	English Name	Scientific Name	Local Name
1	Forest spotted owlet	Athene blewitti	jkufiaxGk
2	Red Headed Falcon	Falco chicquera	Ykky MksD;kpk efyZu
3	Peregrine Falcon	Falco peregrinus	cghVh llk.kk
4	Indian Peafowl	Pavo cristatus	eksj
5	Indian White backed vulture	Gyps beghalensis	'kqHkzikBh fx/kkM
6	Indian longbilled vulture	Gyps indicus	ykac pksphps fx/kkM
7	Osprey or Fish eating eagle	Paudo haliaetus	eRI x:M

List of Birds Schedule II (Part II)

Sr.No.	English Name	Scientific Name	Local Name
1	Grey Jungle Fowl	Gallus sonneratii	jk[kh jkudksacMk

Some birds recently Cited in the MTR are as follows:-

Sr.No.	English Name	Scientific Name	Local Name
1	Forest spotted owlet	Athene blewitti	jkufiaxGk
2	Black capped kingfisher	Haleyon pileata	dkG;k Vksihpk [kaM;k
3	Malbar pied hornbill	Anthracosceros caronatus	dcjk eyckj /kus'k

Red Data Book Species:

Sr.No	English Name	Scientific Name	Local Name	Status
1	Lesser Kestrel	Falco naumanni	ygku dsLV ^a sy	
2	Forest spotted owlet	Athene blewitti	Jku fiaxGk	CR
3	Painted stork	Mycteria leucocephala		LR
4	Oriental white Ibis	Thereskiorns melanocethalus		LR
5	Red headed Vulture	Sarcogyps calvus		LR
6	Indian long billed Vulture	Gyps indicus		CR
7	Pale Harrier	Circus macrourus		LR

LR-Lower Risk, CR-Critically Endangered

Class – MAMMALIA

2C.3.23. Most important class of phylum Chordata is mammalia which consists of very important species of primates and carnivore from the various surveys carried out in Melghat M.S. Pradhan of Zoological Survey of India, Pune has reported 80 species of mammals in Melghat Reserve.

2C.3.24 List of mammals found in Melghat forests, 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	Black buck	Antelope cervicarpa	dkGohV
2	Four horned antelope	Tetracerus quadricornis	pkSflaxk
3	Gaur/Indian bison	Bos gaurus	jkuxok
4	Indian wolf	Canis lupus	ykaMxk
5	Leopard/Panther	Panthera pardus	fccV;k
6	Leopard cat	Felis bengalensis	ok?kkVh
7	Mouse deer	Moschiola meminna	filksjh gfj.k
8	Indian pangolin	Manis crassicaudata	[koY;k ekatj
9	Ratel/Honey badger	Mellivora capensis	pkanh vLoy
10	Sloth bear	Melursus ursinus	vLoy
11	Tiger	Panthera tigris	ok?k

Schedule II (Part I)

Sr.No.	English Name	Scientific Name	Local Name
1	Common langur	Presbytis entellus	okuj
2	Rhesus macaque	Macaca mulatta	yky rksaMkps ekdM
3	Wild dog/Dhole	Cuon alpinus	jkudq=k@<ksy

Schedule II (Part II)

Sr.No.	English Name	Scientific Name	Local Name
1	Common palm civet or Toddy cat	Paradoxurus hermaphroditus	mn~ekatj
2	Small Indian Civet	Viverricula indica	toknh ekatj
3	Flying Squirrel	Rutufa indica	mM.kkjh [kkj]
4	Jackal	Canis aureus	dksYgk
5	Indian grey mongoose	Herpestes edwardsii	eaqxwl
6	Indian ruddy mongoose	Herpestes smithii	eaqxwl
7	Jungle cat	Felis chaus	jkuekatj
8	Otter	Lutragale perspicillata	ikuekatj

Schedule III

Sr.No.	English Name	Scientific Name	Local Name
1	Barking deer	Muntiacus muntjak	Hksdj
2	Chital	Axis axis	fprG
3	Hyaena	Hyaena hyaena	rMI
4	Nilgai/Bluebull	Boselaphus tragocamelus	fuyxk;
5	Sambar	Cervicarpus unicolor	lkacj
6	Wild pig	Sus scrofa	jkuMqDdj

Schedule IV

Sr.No.	English Name	Scientific Name	Local Name
1	Black Napped Hare	Lepus Nigricollis	llk
2	Five Stripped Palm Squirrel	Funambulus Pennantii	[kkj]
3	Indian porcupine	Hystrix indica	lkGhanj

Red Data Species of class Mammalia			
1	Tiger	Panthera tigris	Endangered
2	Black buck	Antelope cervicapra	Vulnerable
3	Dhole	Cuon alpinus	Vulnerable
4	Sloth Bear	Melursus ursinus	Vulnerable

Above description shows Melghat Reserve is unique in biodiversity. And it is need of the time to conserve it for posterity .

SECTION 4. : THE BIOLOGICAL DIVERSITY ACT, 2002

2C.4.1The 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 read to the long term decline of the biological diversity there by maintaining its potential to meet the needs and aspirations of present and future generations.

Regulations to Access to Biodiversity.

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

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

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

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

Sec 4. No person shall, without the previous approval of the National Biodiversity Authority, transfer the results of any research relating to any biological resources occurring in, or obtained from, India for monetary consideration or otherwise to any person who is not a citizen of India or citizen of India who is non-resident as defined in clause (30) of section 2 of the Income-tax Act, 1961 or a body corporate or organization which is not registered or incorporated in India or which has any non-Indian participation in its share capital or management.

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

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

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

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

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

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

Sec 6.(1) No person shall apply for any intellectual property right, by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the National Biodiversity Authority before making such application.

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

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

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

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

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

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

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

Provided that the provisions of this section shall not apply to the local people and communities of the area, including growers and cultivators of biodiversity, and *vaid*s and *hakim*s, who have been practicing indigenous medicine.

Biodiversity heritage sites

Sec37. (1) Without prejudice to any other law for the time being in force, the State Government may, from time to time in consultation with the local bodies, notify in

the Official Gazette, areas of biodiversity importance as biodiversity heritage sites under this Act.

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

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

Constitution of Biodiversity Management Committee

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

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

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

2C.4.3 So far the committees as mentioned above have not been constituted. **These committees may be formed as early as possible for the effective conservation of the biodiversity of Melghat.** Melghat Reserve is a compact block of forests. For administrative and various management purposes it is divided in

different parts. Flora and Fauna is almost same in all parts. Specific data for floral and faunal diversity of West Melghat Division is not available. Therefore available data of Melghat Project Tiger has been used to describe the biological diversity.

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, some of which were forest villages till 1970. The tract is surrounded by *Rayatwari* areas in the northwest and *Berar* plains adjoin the southern boundary. These villages are mostly inhabited by *Korkus*, except some villages in *Dhulghat* range, which are mostly occupied by *Gaowlis*, *Rathya*. There are 19 ex-forest villages. In addition to this in 9 villages Ex-jagir forest is spread. These Ex-forest villages (**Appendix. No.XXXI** of Vol.II) 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 are 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. Gaowali: 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 non-agricultural season. Grazing pressure from *Gaowali'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 Act 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. A statement showing the name of villages included in *Gram Panchayat* are given in **Appendix No. XVII (b)** of Volume II. 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 Act is specified in the Schedule. *Tendu*, *Aapta*, *Bamboo* have been excluded from the purview of this Act 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, *Tiwas*, *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 *Dharni* range and Northern parts of *Akot* range. *Bamboo* is required for roofs of houses, for mats, baskets, and fencing and for *Bamboo* gardens. The requirements of the *Burad* people are met through *nistar*. However, all the people collect the *Bamboo* illegally from the forests without passes.

3.1.16. Rusa Grass: *Rusa Grass* is another commercially important commodity of this area and occurs all over. *Motia* variety which has higher percentage of geraniol is found mostly in *Akot* and *Dhulghat* ranges of the Division.

3.1.17. Tendu leaves: *Tendu* leaves used in wrapping *bidis* is an important Minor Forest Produce collected in April/May which provide employment to local population.

3.1.18. Mahul Fibre is used for ropes and *Mahul* leaves for plates.

3.1.19. Grass is used for thatching and fodder purposes.

3.1.20. Grazing for cattle. Villagers on the outskirts of forest send their cattle for daily grazing in the forest.

SECTION 2. **MARKETS AND MARKETABLE PRODUCTS**

3.2.1. *Paratwada, Anjangaon and Akot* have 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*, *Aaonla*, *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*, *Akot* 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. *Moha* flowers and fruits, *Hirda* and gum are being harvested through Tribal Development Corporation.

3.4.2. Departmental harvesting is carried out in case of timber and firewood in main felling and thinning coupes. Presently timber coupes are harvested through FLCS. *Bamboo* harvesting has been carried out either departmentally or through contractors.

3.4.3. *Tendu* is harvested by Licensees as per Modified Lump Sum Policy with ceiling on upper limit. As per Govt. Resolution No.MFP-2104/CR 67/F-1

dated 28.02.2006, the royalty received after deducting the expenditure on collection is to be distributed as bonus to the laborers involved in collection of *Tendu* leaves from 2006 season.

3.4.4. Logging Unit: Before reorganization only one Logging Unit existed at *Dharni*. After the reorganization of the Divisions, the logging unit at *Akot*, established in 1964-65 was transferred from South *Melghat* Division to West *Melghat* Division. However, both these logging units are not functional at present. The following vehicles are available with the logging unit:

Table No. 3.1

Table Showing the Livestock, Equipments, and Machineries of M. L.U.

Particulars	Working	Written off	Under repair	Total
01. Trucks	-	4	5	9
02. Tractors	-	4	4	8
03. Elephant	1	-	-	1

3.4.5. Tractors are used for dragging and local transport. Trucks are used for transport of timber to sale depots. Felling of trees is carried out by using saws.

3.4.6. Machinery: Lathe machine, Drill machine, Grinding machine, Hand Drill, Nozzle machine are available and are in good condition but not in use at present. Power Chain Saws were used earlier but withdrawn from the service for want of spare Chain Saws.

SECTION 5. TIMBER DEPOTS

3.5.1. During the period of *Stein's* plan, the timber depot was established at *Akot*. During *Sharma's* plan, *Akot* depot continued to serve as main clearing depot for Government timber. On the eve of reorganization of administrative units, another timber depot was opened at *Dharni* in 1964. At present *Dharni* and *Akot* are main depots 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.

3.5.2 There is only one privately owned saw mill in *Dharni* Range of the Division. (**Appendix No. XXXVI** of Vol. II)

SECTION 6. COST OF HARVESTING

3.6.1. Wage board rates for harvesting of timber for the year 2007-08 are given in the **Appendix XVIII** of Volume II. The calculated average cost of harvesting of timber other than depreciation is Rs.700/- per cubic-meter.

SECTION 7. PAST AND CURRENT PRICES

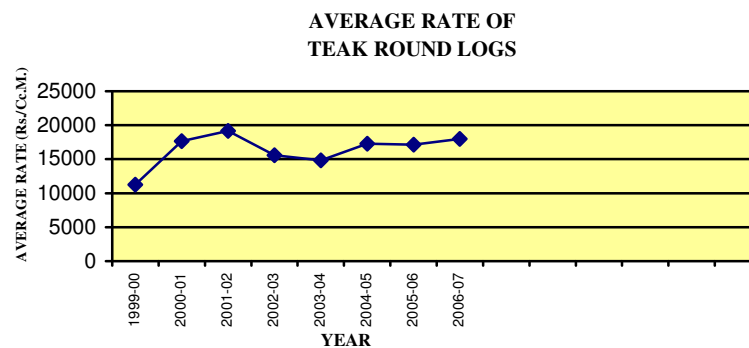


TABLE NO. 3.2
Table Showing Average Price Obtained For
Teak Round Logs In Different Auctions (Rs.)

Year	Average Rate	Year	Average Rate
1999-00	11240	2003-04	14819
2000-01	17634	2004-05	17301
2001-02	19176	2005-06	17151
2002-03	15574	2006-07	17943

3.7.1. Average prices obtained for *Teak* timber for all girth and length classes during auctions at *Dharni* and *Akot* depots has been compiled and are shown as above. Over the years, the price of *Teak* has steadily gone up. The Average Price of *Teak* timber in 99-2000 & 2000-01 was around Rs.14500/-, 2001-02 to 2003-04 it was around Rs.16500/- and 2004-05 to 2006-07 it was around Rs. 17500/- per cubic meter. Grade wise rates obtained for the year 2006

are given in **Table No. 3.3** to have a fair understanding on the *Teak* quality wise rates.

TABLE NO. 3.3
Average Price Obtained For Teak and Other Species Round Logs per Cu.Mt. In The 2006
Auction at Dharni & Akot Depot

Species	Grade1	Grade2	Grade3	Grade4	Grade5	Grade6	Average
Dharni Depot							
Teak	-	-	22828	18500	12500	-	17943
Teak-POR	-	-	-	16885	11933	7164	12905
Non Teak	-	-	-	-	-	-	-
Akot Depot							
Teak	-	-	-	-	-	-	-
Teak-POR	-	-	-	19647	13142	7872	13553
Non Teak	-	-	-	-	4103	3462	3782

3.7.2. A statement showing market rate of *Teak* at central depot is given in the **Appendix No. XIX** of Volume II.

CHAPTER IV
THE SOCIO ECONOMIC SURVEY REPORT

SECTION 1. FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA

4.1.1. The entire area of the West *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 West *Melghat* Division is spread over *Dharni taluka* of *Amravati* District except 5 villages of *Chikhaldara taluka*. Hence, Socio-economic Survey report of *Dharni taluka* is given. The total population of *Dharni taluqa* as per 2001 census is 1, 47,086, of which 100% live in rural areas (1991 census total population is 1, 13,454). The population is spread over 152 villages. The literacy rate of the area is 49.20%. The census data shows that Approx. 34000 population was added in the last 10 years indicating the fast growth of population. The Scheduled Castes and Scheduled Tribe populations form about 4.42 % and 75.57 % of the total population of the *Dharni taluqa* respectively as per the census of 2001. A statement showing village wise household, population etc. is given in **Appendix No. XVII (a)** of Volume II.

4.2.2. The density of population of the *Dharni taluqa* is 101 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 961 women for every 1000 men in the *Dharni taluka*, which is more than the state average of 922.

4.2.3. The abstract of the cattle census figures are given in **Table No.4.1a** and **Table No. 4.1b**.

TABLE NO. 4.1a
Cattle census of *Dharni Taluqa* (1997)

Cattle	Goats	Buffaloes	Bulls/Bullocks	Cows	Others	Total
No.	16806	7466	33770	22910	959	81911
Percentage	20.52	9.11	41.23	27.97	1.17	100

TABLE NO. 4. 1b
Cattle census of Dharni Taluqa (2003)

Cattle	Goats	Buffaloes	Bulls/ Bullocks	Cows	Total
No.	37,136	10,278	37,559	15,763	100736
Percentage	36.86	10.20	37.30	15.64	100

The 1997 Livestock Census estimated domestic cattle population in the *Dharni taluka* to be 81, 911. (Goats 20.52%, Cows 27.97%, Bull/Bullocks 41.23% and Buffaloes 9.11%) As per 2003 Livestock Census estimated domestic cattle population of *Dharni taluka* is 1,00,736 (excluding sheep ,horses and others).The percentages are Goats 36.86%, Cows 15.64 %, and Bulls/bullocks 37.30%,buffaloes 10.20%.This shows an increase in goat population from 16806 to 37136 ,which is around 120%. In the same period population of cow has decreased from 22910 to 15763,decrease of 31%.Population of bull/bullocks has increased from 33770 to 37559 ,increase of 11% and that of buffaloes from 7466 to 10278 ,increase of 38%.The overall increase in cattle population is approx. 23% between 1997 to 2003. All the cattle graze in the forest area, in addition to them the cattle of *Akot* and other *talukas* 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.

4.2.4. Land use pattern of the *Dharni taluka* is as given in **Table No.4.2.**

TABLE NO. 4.2
Land use pattern of the Dharni taluqa

Geograp hical area (ha)	Forest area (ha)	Non- agricultural area (ha)	Agricultur al Land (ha)	Waste land (ha)	Grazing land (ha)	Others (ha)
1,46,300	65,828 *	4,738	58,970	5,085	10,637	1,042

* As per available records.

4.2.5. Approx. 45 % of the total geographical area is under forest. The *Dharni taluqa* includes West *Melghat* Division area as well as Tiger Project area (total 152 villages). The average yield/ha is very low compared to national average. (Paddy: 656 kg, Wheat:1084 kg, Jowar:1399 kg, Bajra:513 kg,).Out of 58,970 ha only 671 ha is under irrigation. Only 1,167 irrigation wells are present. Of them, some are not functioning. All these indicate poor agricultural practices and poor productivity of the area. There are 26132 families in the *taluka* and the average land holding comes around 2.44 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 *Dharni*, *Akot*, *Akola*, *Parathwada* and *Burhanpur*. 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 *hettis*, which are shifted 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 *Chitri*, *Lawada*, *Daranmahu*, *Patiya*, *Bulumgavan*, *Dhulghat* and *Duni* but now they have settled in the entire *Dharni* taluqa. Many of them maintain two houses one in plains and one in the forest areas.

4.2.6. 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 Act the ownership of the M.F.P. found in the Government lands in the scheduled area, excluding the National Parks and Sanctuaries, shall vest with 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 Act is specified in the schedule. *Tendu*, *Apta*, *Bamboo* have been excluded from the purview of this Act and still remain the property of the State Government.

4.2.7. 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.

CHAPTER V
FIVE YEAR PLANS

SECTION 1. IMPACT OF FIVE-YEAR PLANS ON ATTAINMENT OF MANAGEMENT OBJECTIVES

5.1.1. As the total forest area in the tract dealt with is to the tune of 45 % of total geographical area and has presence of very dense forests, silvicultural operations in the tract were always at the top priority. Earlier forestry sector was the only sector providing the employment to the people. All the silvicultural operations, timber extraction and afforestation works were executed with the money made available in the non-plan. Gradually the grants under non-plan were reduced hence proposals were submitted to obtain contingency funds and the trend continued for the last four years. But even these funds being less compared to the requirements and as they are released at the fag end of the financial year all the working plan operations could not be carried out properly, hence the management objectives could not be attained fully. The other EGS sources cannot be utilized because most of the forestry operations were not recognized, as many of them are not measurable one. There is a need to appraise the Government for the early release of funds for forestry operations as they are time bound operations as well as revenue generating activities. So that, the health of the forest can be maintained in perpetuity.

5.1.2. First Five-Year Plan (1951 To 1956): West *Melghat* Forest Division was not a separate unit during this period. The impact of implementation of the plan had little bearing on the plantation activities. For the old reserve forests, A. H. Stein's plan was operative till 1955. A. H. Stein's plan operations started from July 1, 1936. Due to lack of NR the prescriptions of these plans were not strictly implemented. The prescriptions of this plan did not suit *Melghat* conditions and were not strictly adhered to.

During this Five-Year Plan period Teak Plantation was taken up under General Utility Timber Scheme.

Table No. 5.1

Plantation Areas Covered During First Five Year Plan Under Different Schemes:

Teak Plantations	Bamboo Plantations	Other Plantations
9.585	-	-

5.1.3. Second Five Year Plan (1956-1961): Just like the first five-year plan period the tract dealt was not having separate identity. A. H. Stein's plan for reserved forests was in operation till 1956. Sharma's plan for reserved forests was implemented in the tract. Revised Stock Maps were prepared for the *Melghat* forest.

During Second Five-Year Plan period Plantations taken up are as under:

Table No. 5.2

Plantation Areas Covered During Second Five Year Plan Under Different Schemes:

Teak Plantations	Bamboo Plantations	Other Plantations
44.509	-	18.80

5.1.4. Third Five-Year Plan (1961-1966): West *Melghat* Forest Division was not a separate unit till 1963-1964. It came into existence during 1964-1965. Sharma's Plan (1956-74) prescriptions were implemented from 1956 onwards. Forests lands were allowed to be given to villagers for cultivation for getting agricultural crop. But fortunately the population being low no major impact of disforestation was felt here. Silvicultural operations were the main concern of management.

During Third Five-Year Plan period Teak Plantations were taken up under General Utility Timber Scheme as under:

Table No. 5.3.

Plantation Areas Covered During Third Five Year Plan Under Different Schemes:

Teak Plantations	Bamboo Plantations	Other Plantations
18.205	20.232	10.116

5.1.5. Post Third Five-Year Plan (1966-1969): Sharma's plan continued during this Five Year Plan. The tract was under severe drought condition and people were reeling under deep poverty and the major concern was to provide

work and civic amenities to the people. Foresters were compelled to follow the dictum of nature vis. a vis. people's demand.

During This period Teak Plantations under General Utility Timber Scheme were taken up.

Table No. 5.4.

Plantation Areas Covered During 1966-69 Under Different Schemes:

Teak Plantations	Bamboo Plantations	Other Plantations
96.321	48.559	545.693

A quick communication system to combat fire menace was considered necessary and scheme under the **five-year plan** was prepared for establishing wireless stations in the *Melghat*.

According to the scheme, wireless network in West *Melghat* Division 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*.

Mobile units: These mobile units are on the vehicles of (1) CCFAC (2) DCF West *Melghat* (3) DFO vigilance.

Besides this permission for installing another Twenty-Four permanent and Twelve Mobile Sets for entire *Melghat* Forest was sought from the Government of India. It was decided by a mutual understanding that Conservator of Forest, Amravati Circle and field Director, Project Tiger, will manage the wireless network in *Melghat* jointly. The Repeater station was started at, *Dharni and Dhakna*.

5.1.6. Fourth Five Year Plan (1969-1974): Sharma's plan continued during this Five Year Plan. Forest Villages were brought under Revenue Department and onus of development of these villages shifted to revenue department. People began to alienate from forest department. The perception about forest department changed over night. Forest department was looked upon as an obstacle in the path of development as most of the land was with forest department and enhanced the trend of encroachment upon forestland for nonforestry purposes. It got momentum due to prevailed political and local

conditions. During Fourth Five-Year Plan period Teak Plantations and Bamboo Plantations were taken up as under:

Table No. 5.5.

Plantation Areas Covered During Fourth Five Year Plan Under Different Schemes:

Teak Plantations	Bamboo Plantations	Other Plantations
120.234	24.046	227.023

5.1.7. Fifth Five Year Plan (1974 - 1979): Shri P.P. Joshi's plan from 1974-75 were in operation for reserved forests.

During Fifth Five-Year Plan period Teak Plantations, under General Utility Timber Scheme, Bamboo and other Plantations under various schemes were taken up as under:

Table No. 5.6.

Plantation Areas Covered During Fifth Five Year Plan Under Different Schemes:

Plan			Under EGS	
Teak Plantations	Bamboo Plantations	Other Plantations	Bamboo	Other
170.00	65.00	32.50	--	--

5.1.8. Annual Plan (1979-1980) And Sixth Five Year Plan (1980-85): After the *Janata* Party rule in the Center in 1979, the Five-Year plan was followed by annual plan. The impact was not appreciable. During this period, the decision was taken to regularize the encroachments upon forestland from 1/4/1972 to 31/3/1978. It created an atmosphere that encroachment on forestland is bound to be regularized in due course of time. P. P. Joshi's plan for reserved forests was implemented. During 1981-82 period Teak Plantation over 91 ha. area was taken up in the present West Melghat Division under General Utility Timber Scheme. During Sixth Five-Year Plan period Teak Plantations under General Utility Timber Scheme and Bamboo Plantations were taken up as under:

Table No. 5.7.

Plantation Areas Covered During Sixth Five Year Plan Under Different Schemes:

Plan			Under EGS	
Teak Plantations	Bamboo Plantations	Other Plantations	Bamboo	Other
292.12	--	6.00	60.00	--

5.1.9. Seventh Five Year Plan (1985-90): During this Five year Plan there was no Working Plan in force. New Working Plan was in process. In the absence of New Working Plan P. P. Joshi's Plan prescriptions continued till 1988. Felling was banned as Working Plan period was expired. Other silvicultural operations and protection works continued along with Massive Afforestation Program under E. G. S. This period experienced tremendous development in case of infrastructure development. The remote areas were begun to be connected through all weather roads. Various schemes under Special Components scheme and Special Action plan were launched.

During Seventh Five-Year Plan period Teak Plantations under General Utility Timber Scheme and Bamboo Plantations were taken up as under.

Table No. 5.8.

Plantation Areas Covered During Seventh Five Year Plan Under Different Schemes:

Plan			Under EGS	
Teak Plantations	Bamboo Plantations	Other Plantations	Bamboo	Other
242.00	220.00	50.00	365.00	325.00

5.1.10 Post Seventh Five-Year Plan (1990-1992) : During this period there was no working plan in operation. New working plan was under preparation.

During this period teak plantations and miscellaneous plantations were taken up as under.

Table No. 5.9.

Plantation Areas Covered During Post Seventh Five Year Plan Under Different Schemes:

Plan			Under EGS	
Teak Plantations	Bamboo Plantations	Other Plantations	Bamboo	Other
192.00	--	355.40	--	75.00

5.1.11. Eighth Five-Year Plan (1992-1997): During this Five-Year Plan new Working Plan by *Shailendra Bahadur* and *B.S.Thengdi's* for West Melghat Division from 1993-94 to 2002-03 came into force. The working plan for entire forest areas of the tract was under operation.

During Eight Five-Year Plan period *Teak* Plantations *Bamboo* Plantation and *Miscellaneous* Plantations were taken up as under.

Table No. 5.10.

Plantation Areas Covered During Eighth Five Year Plan Under Different Schemes:

Plan (including World Bank Forestry Project) Plantations			Under EGS	
Teak Plantations	Bamboo Plantations	Other	Bamboo	Other
20	833.58	836.00	955.00	690.00

5.1.12. Ninth Five-Year Plan (1997-2002): 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, *Melghat* Project Tiger H.Q. *Amravati* and rest of the area was reorganized into East *Melghat* Division H.Q. Chikhaldara and West *Melghat* Division H.Q. at *Paratwada*. South *Melghat* Division was transferred to wildlife wing as Division III of *Melghat* Tiger Project along with the staff and areas except Akot and Dhulghat ranges (which are attached to West *Melghat* Division) and *Anjangaon* range (attached to East *Melghat* Division).

Prescriptions of existing plans continued during ninth Five Year Plan. *Shailendhra Bahadur* and *B.S.Thengdi's* Plan for West *Melghat* Division (1993-94 to 2002-2003) for *Dharni* and *Dhakana* Ranges, *B.S. Thengdi's* Plan for South *Melghat* (1994-1995 to 2003-2004) for *Akot & Dhulghat* Range. State Government had started various schemes in consonance with Central Government schemes. Forest Department was one of the implementing agencies. Forestry sector was also augmented through World Bank added Forestry Project.

During ninth Five-Year Plan period *Teak* Plantations, *Bamboo* Plantation and *Miscellaneous* Plantations were taken up as under:

Table No. 5.11.

Plantation Areas Covered During ninth Five Year Plan Under Different Schemes

Plan (including World Bank Forestry Project) Plantations			Under EGS	
Teak Plantations	Bamboo Plantations	Other	Bamboo	Other
40	1518.00	672.12	1597.48	300.00

5.1.13. Tenth Five-Year Plan (2002-2007): Prescriptions of existing plans continued during Tenth Five year Plan. [*Shailendra Bahadur & B.S.Thengdi's* Plan for West Melghat Division (1993-94 to 2002-2003) for *Dharni* and *Dhakna* Ranges, B.S. *Thengdi's* Plan for South *Melghat* (1994-1995 to 2003-2004) for *Akot* and *Dhulghat* Ranges. In the year 2004-05, Govt. of India sanctioned scheme under National Afforestation Programme (NAP) (First phase) to be implemented by Forest Development Agency. The scheme is being implemented in 26 villages, in which 1300 ha area is to be planted. In the year 2006-07, Government of India sanctioned another proposal under National Afforestation Programme (NAP) (Second Phase), in which 625 ha area is to be planted in 25 villages. During tenth Five Year Plan period, Teak Plantations, Bamboo Plantation and Mixed Plantations are taken up as under :-

Table No. 5.12.

Plantation Areas Covered During Tenth Five Year Plan Under Different Schemes

Plan Plantations			Under EGS	
Teak Plantations	Bamboo Plantations	Other	Bamboo	Other
10	25.00	79.70	850	-

There is shortage of funds for forest development activities with the state Government. However, some funds are available under E.G.S./M.R.E.G.S. for *Lantana* removal and Discontinuous (staggered) Contour Trenches (D.C.T.) works in forest area.

5.1.14. Eleventh Five-Year Plan (2007-2012): The new working plan for present West Melghat Division is being prepared and is expected to be implemented from 2008-2009 onwards.

Table No. 5.13.

Plantation Areas Covered During Eleventh Five Year Plan Under Different Schemes

Plan (including FDA) Plantations			Under EGS	
Teak Plantations	Bamboo Plantations	Other	Bamboo	Other
-	260.00	570.00	-	-

CHAPTER – VI
STAFF AND LABOUR SUPPLY

SECTION 1. STAFF

6.1.1. 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*.

6.1.2. 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.

6.1.3. 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.

6.1.4. 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* Division vide Govt. Resolution No. FDM/1084/4577/F-2 dated February 25, 1986.

6.1.5. 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.

6.1.6. A large number of staff was added to different cadre. The post of Range Forest 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.

6.1.7. Three Assistant Conservator of Forest, who are Class-I officers, assists the Divisional Forest Officer now known as Deputy Conservator of Forests.

Out of three Assistant Conservator of Forests, one Assistant Conservator of Forest is at *Paratwada* Head Quarter, one Assistant Conservator of Forest is in charge of *Dharni* and *Dhakana* ranges and another Assistant Conservator of Forest stationed at *Akot* is in charge of *Akot* and *Dhulghat* ranges. 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. Out of 8 Range Forest Officers, four are in charge of territorial ranges, one Mobile Squad Range Forest Officer, Head Quarter *Dharni*, one E.G.S. Range Forest Officer, Head Quarter *Dharni*, and two Depot Officers, one each at *Akot* and *Dharni*.

6.1.8. West *Melghat* Division is reorganized vide *Maharashtra* Govt. Resolution No. WLP-1094/PK.211/F-1 dated April 26, 1999. The H.Q. of West Melghat Division was shifted from *Chikhaldara* to *Paratwada* w.e.f. May 1, 1999.

6.1.9. The existing organization of ranges, rounds and beats showing distribution of compartment is given in **Appendix XLI** of Volume II.

6.1.10. The present strength of staff as on June 30,2007 is given under **Table No.6.1.** for *West Melghat* Division and **Appendix No. XIV** of Volume II enlists the names of Divisional Forest Officers who were in charge since 1964.

Table No. 6.1
Staff Position in West Melghat Division

Sr. No.	Name of Post	No. of Post/ posts				
		Sanctioned	Permanent	Temporary	Filled	Vaccant
Class I-						
1	Deputy Conservator of Forests	1	1	-	1	-
2	Assistant Conservator of Forests	3	2	1	3	-
Class I-Total		4	3	1	4	-
Class II-						
3	Range Forests Officer	8	5	3	8	-
Class II-Total		8	6	2	6	2
Class III						
4	Foresters	32	27	5	26	6
5	Forest Guards	81	61	20	71	10
6	Chief Accountant	1	1	-	-	1
7	Accountant	9	7	2	9	-
8	Clerks	16	11	5	15	1
9	Store keeper	1	1	-	-	1
10	Steno Typist	1	1	-	1	-
11	Surveyor	2	2	-	2	-
12	Wireless Operator	5	2	3	-	5
13	Electrician	1	1	-	1	-
14	Statistician	1	1	-	1	0
15	Truck Driver	20	16	4	9	11
16	Tractor Driver	8	4	4	4	4
17	Mechanic	4	3	1	2	2
18	Assistant Mechanic	2	2	-	2	-
19	Lathe man	1	1	-	-	1
20	Mahavat	2	2	-	1	1
21	Armed Police Constable	1	1	-	1	-
22	Radio Mechanic	2	2	-	1	1
23	Wire less Sub-Inspector	1	1	-	-	1

24	Mast-Laskar	1	1	0	1	-
25	Road Roller Driver	2	2	0	-	2
26	Van Driver	1	1	0	1	0
Class III Total		195	151	44	148	47
Class IV -						
27	Daftari	1	1	-	1	-
28	Peon	5	4	1	4	1
29	Watchman	5	5	-	5	-
30	Dak Runner	1	1	-	1	-
31	Mali	3	3	-	3	-
32	Waterman	1	1	-	1	-
33	Sweeper	1	1	-	-	1
34	Truck Cleaner	19	16	3	13	6
35	Tractor Cleaner	7	7	-	6	1
36	<i>Khalashi</i>	1	1	-	1	-
37	<i>Chara</i> Cutter	1	1	-	1	0
38	Messenger	1	1	-	1	0
	Class IV -Total	46	41	5	37	9
Total						
39	<i>Vanmajoor</i>	40	-	40	40	-
	Total	86	41	45	77	9

6.1.11. In addition one post of Forest Settlement Officer, two Revenue Inspectors and one each *Awalkarkoon*, Clerk, Driver & Peon were sanctioned under plan scheme of Survey, Settlement & Demarcation. All these posts were lapsed hence the deputation staff has been adjusted into respective departments.

SECTION 2. LABOUR

6.2.1. 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. A statement showing village wise population, Agricultural labours population, Casual labour population and Marginal labour

population is given in **App. No. XVII of Vol. II**. The *Akot* Range constituted of forest area of *Chikhaldara* Taluka of *Amravati* Distt. and it includes only 4 villages of *Chikhaldara* Taluka namely, *Menghat*, *Khatkali*, *Zingapur* and *Ahad*. Most of the villages around the *Akot* forest falls in *Akot* Taluka of *Akola* Distt. The *Akot* Range is facing problem as the laborers registered under MREGS in *Akot* Taluka of *Akola* district can't be provided work by the Forest Deptt. in forests which falls in *Chikhaldara* Taluka of *Amravati* district. However, this restriction is not applicable to the departmental works.

6.2.2. At present 138 *Vankamgar* are on muster rolls. They execute watch and ward operation of the plantations and assist in patrolling of forest area along with regular staff. The wage rates are by annually revised as per the Labor Department directions. The present wage rates per months are as follows: for unskilled labors Rs.2102 /- and semiskilled Rs. 2302/- skilled labor Rs.2502 /-.w.e.f.1.7.07.

CHAPTER VII
PAST SYSTEMS OF MANAGEMENT

SECTION 1. GENERAL HISTORY OF THE FOREST:

7.1.1. The tahsil along with the rest of Berar came under British rule in 1853 by assignation from the *Nizam of Hyderabad*. 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 livelihood 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.

7.1.2. 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.

7.1.3. 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 1884 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.

7.1.4. 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/-

7.1.5. 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.

7.1.6. 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.

7.1.7. 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*.

7.1.8. 1865-1868- 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 *taluka* 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.

7.1.9. 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.

7.1.10. In the year 1870-1875 - Sir Dietrich Brandis visit to *Berar* bore speedy results. In 1871 the *Berar* Forest Rules were published. It defined, 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 *taluka* 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.

7.1.11. The restrictions imposed on the felling of timber and bamboos in the unreserved forests 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 protection, 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.

7.1.12. Sir Dietrich Brandis, 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 *taluka* 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

7.1.13. 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 Melghat. 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.

7.1.14. 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 selfcontained 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.

7.1.15. 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.

7.1.16. 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.

7.1.17. 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).

7.1.18. 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

7.1.19. 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.

7.1.20. 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, 1898 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 under 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 1892.

7.1.21. 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.

7.1.22. Between 1905-1914 by the year 1905 the C-III forests of the *taluka* 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.

7.1.23. 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 meteorological 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

7.1.24. 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 Buldhana division for the sake of economy was incorporated within the Akola division as part of the **West Berar division**.

7.1.25. With the introduction of Mr. Dunbar-Brander's working plan in 1915 the forests of Melghat were distributed between eight Ranges namely, *Chikhaldara*, *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**.

7.1.26. 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 Chitri reserve to improve the boundary.

7.1.27. 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.

7.1.28. 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 Melghat Division and West Melghat Division. South Melghat 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 Melghat Division.

7.1.29. The Head Quarter of East Melghat was shifted from Amravati to Chikhaldara and Head Quarter of West Melghat was shifted from Chikhaldara to Paratwada. The present West Melghat Forest Division consists of Dharni, Dhakna, Dhulghat and Akot Ranges.

SECTION 2. PAST SYSTEMS OF MANAGEMENT AND THEIR RESULT

(A) Period Before 1893:

7.2.1. 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 preservation days were carried out over a portion of Bairagarh 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:

7.2.2. A working plan covering the whole of *Bairagarh* and *Gugamal* reserve as then constituted was originally drawn 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 were 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.

7.2.3. 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 Chikhaldara 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.

7.2.4. 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:

7.2.5. 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:

7.2.6. 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:

7.2.7. 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**.

7.2.8. 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 worked under improvement felling. The felling were carried out in two distinct stages, namely the felling of marketable trees by purchases of rated 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.

7.2.9. 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, 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.

7.2.10. 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.

7.2.11. 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**.

7.2.12. 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.

7.2.13. 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 Series and the coupes having been found to be inconveniently 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**.

7.2.14. In the year 1927-28, the Bamboo Working 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 Improvement 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 Popatkhedha 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:

7.2.15. 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.

7.2.16. 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.

7.2.17. 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 silviculture 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.

7.2.18. 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 upto 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*.

i) *Bamboo*, the removal of which was necessary were 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 clear felled 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 be 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

7.2.19. 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.

7.2.20. 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.

7.2.21. 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 compartment were stopped because a number 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.

7.2.22. 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**.

7.2.23. Bamboo Working Circle: The exploitation of bamboo was generally done from bamboo coupes of the year on rated passes except 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.

7.2.24. 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:

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

7.2.26. This Working Plan covered the whole of the forest areas in but it 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 description of these forests were written in detail for each compartment. Occurrence of *Lantana* was also indicated.

7.2.27. The following Working Circles were formed:

Table No 7.1
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

7.2.28. 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.

7.2.29. 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.

7.2.30. 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 area liable to frost damage were to be approached and treated continuously.

7.2.31. 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.

7.2.32. 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 were 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.

7.2.33. 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.

7.2.34. 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.

7.2.35. 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 retained 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. However, 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.

7.2.36. 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 unsuppressed 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 to be 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 undergone 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,

7.2.37. Miscellaneous Working Circle: This working circle included the remaining minor forest and the two blocks of 'C' class forests. These forest 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.

7.2.38. 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 were to be maintained for the indirect benefits.

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

7.2.39. 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.

7.2.40. 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:

7.2.41. 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.

7.2.42. 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 coupes was not implemented. The forests in fact need further rest and strict protection from 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 from fire was suggested.

(G) P. P. Joshi's Plan 1975-76 to 1984-85 :

7.2.43.1. 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 areas of *Chikhaldara*, *Tarubanda* and *Akot* ranges. In this division 11 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*, *Aola* 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 upto 90u105 cm.

Stocking Before And After P.P. Joshi's Plan

Enumeration on 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	59.98	53.38	38.46	31.57	25.91	15.05	8.42	5.99	8.32	247.08
After	61.81	54.24	42.71	37.36	32.23	15.32	7.75	4.18	3.08	258.68
Inc {-}	1.83	0.86	4.25	5.79	6.32	0.27	(-)0.67	(-)1.81	(-)5.32	11.6

In general cultural operations have not been done meticulously.

Coppice With Reserve Working Circle: It covered areas of *Chikhaldara*, *Dharni*, *Tarubanda*, *Akot* and *Wan* ranges under this Working Circle. *Teak* was to be main

species, followed by *Shisham*, *Bija*, *Tiwas*, *Saja* and *Dhaora*, *Semal* and *Kulu* was not to 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:

However the above prescriptions of CWR appears 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 slight 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 *Dhulghat*, *Wan* and *Akot* ranges. 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 pretext 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, in the *Chikhaldara* range. The area allotted to this working circle formed the network 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 Silvicultural 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.

Miscellaneous Working Circle: The unworkable forests (due to remoteness the situation) of *Dhulghat, Wan, Akot* and *Chikhaldara* ranges were included in this Working Circle. Hence no regular working was prescribed and areas will be given rest to reboise naturally.

Bamboo Overlapping Working Circle: The *Bamboo* bearing forests of *Dharni, Tarubanda, Wan, Akot* and *Chikhaldara* were included in this Working Circle. 3 cutting Series (*Dolar, Dhargarh, Koktoo* and *Koha*) with 3 years cutting cycle were prescribed.

Rusa Grass Working Circle: The areas of *Chikhaldara, Akot, Wan* and *Dhulghat* ranges were included in this 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.

7.2.44. 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 1-34, out of which 1 to 17 are allocated to West **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.

(H) Shailendra Bahadur and B.S.Thengdi's Plan for West Melghat Division from 1993-94 to 2002-2003

7.2.45. In this plan the following ranges were included :

1) *Dharni* 2) *Dhakna* 3) *Tarubanda* 4) *Chikhaldara* 5) *Chourakund* 6) *Harisal*

At the time of reorganization in May 1999, area of *Tarubanda*, *Harisal*, *Chourakund* and Part area of *Dhakna* ranges were merged with *Melghat* Project Tiger area. The area of *Chikhaldara* range was merged with East *Melghat* Division. The present West *Melghat* Division include only area of *Dharni* range and remaining area of *Dhakna* range.

Shailendra Bahadur and B.S.Thengdi's Plan had following working circles.

(1) Selection Cum Improvement Working Circle

Entire area of *Dharni* and *Dhakna* ranges were allotted to S.C.I. Working Circle. The emphasis was on obtaining regeneration from selective Felling. And thus, harvestable girth of 120 cms at breast height was prescribed. A Felling cycle of 20 years was prescribed and 7 Felling Series were formed. The area of coupes were to be classified as A (Protected area), B (Blank or under stocked area), C (Patches having pole crop) and D (Well stocked area) type areas. Planting of Bamboo (6m X 6m) Jamun, Arjun, Agave and grasses (3m X 3m) along the nalas and river banks along with soil and moisture conservation works were prescribed in A type areas. In B type areas, plantation of *Teak* and miscellaneous species at a spacing of (2m X 2m) along with soil and moisture conservation works were prescribed. In C type areas, no planting was prescribed. The D type areas were further classified into D1 and D2 types. D1 area containing adequate seedlings regenerations (625 seedlings or more per ha.), D2 area not containing adequate regeneration (less than 625 seedlings per ha.). In D1 area no planting was prescribed. Whereas in D2 area, supplementing of natural regeneration by artificial regeneration to the extent by which natural regeneration falls short of 625 plants per ha. was prescribed. Here the emphasis of regeneration was on natural

regeneration. Similarly no marking was to be done in A and B type area. In B type areas, cutting back of live high stump was suggested. In C type areas, thinning of pole crops to bring spacing to 1/3rd of the crop height was to be carried out. In D areas, harvesting of dead trees along with 50% of trees of harvestable girth i.e.120cm were prescribed. Fruit trees were reserved against Felling, cutting of climbers were to be carried out.

Results: The Working Plan prescribed very conservative fellings but under marking of coupe was carried. This could be observed from the average yield of 0.455 cum/ha obtained against the prescribed yield of 3.817 cum/ha (Table 7.6) 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 were taken up, but their growth is far from satisfactory. Guidelines, outlined in the Plan for the treatment map preparation were not followed properly.

Felling Series	Coupe Working
Chitri	Done except in coupe No. X
Patiya	Done except in coupe Nos I, II, X
Bod	Done except in coupe Nos VIII, IX, X
Rajdehi	Done except in coupe Nos VII, IX, X
Dharni	Done except in coupe Nos VII, VIII, IX, X
Dolar	Done except in coupe Nos II, III, IV, V, VI, VII, VIII, IX, X.
Mogarda	Done except in coupe Nos II, III, V, IX, X.

Out of 70 coupes which should have been worked during the Plan period, coupes working was done only in 42 (70-28) coupes. The remaining 28 coupes could not be worked out either as they were either unworkable or transferred to Project Tiger area due to reorganization

(2) Protecting Working Circle

Entire area of *Chikhaldara* range was allotted to Protection Working Circle. These areas are now transferred to East *Melghat* Division during reorganization done in May 1999.

(3) Bamboo Overlapping Working Circle

The bamboo bearing areas 5097.60 ha. of *Dharni* range was included in this overlapping working circle. These areas were divided into two cutting Series namely 1) *Patiya* and 2) *Dharni*. A cutting cycle of 3 years had been fixed. Scientific harvesting of bamboo clumps was prescribed to obtain sustainable yield.

Result of Operation : *Bamboo* harvesting had been carried out regularly except in the year 2000-01. The yield of long *Bamboo* varied from approximately 23,000 to 1,32,000, the average yield being 75,000. The expected annual yield was approximate 2,15,000 However, the actual yield was about 35% of expected yield. Though harvesting of bamboo was done regularly but clumps were not worked as per prescription and cutting rules were not strictly adhered to. This led to reduction in yield of bamboo and deterioration of bamboo clumps.

(4) Miscellaneous Working Circle

The Un-classed Forests, which were transferred to the Division as compensatory lands under Forest Conservation Act 1980, were included in Miscellaneous Working Circle. These lands were to be planted and action for declaration of these areas as Reserved Forests under section 20 of Indian Forest Act , 1927 were to be taken.

Result of Operation : Plantations has been carried out on these lands Action for declaration of area as RF /PF is completed for 1677.81 ha.

(5) Wild Life Overlapping Working Circle

Water and soil conservation works were to be given highest priority. Though no specific work was carried out. However, 7 "*Khod -Tale*" were dug in *Dharni* Range in 2001-02, which may be useful to wildlife. The census report shows reduction in number of herbivora and carnivora.

(I) B.S.Thengdi's Plan for South Melghat Division from 1994-95 to 2003-2004

7.2.46 In this plan the following ranges were included

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

During reorganization, which took place in May 1999, *Anjangaon* range was merged with East *Melghat* Division. Major part of *Somthana* and *Wan* ranges were transferred to *Melghat* Project Tiger. *Akot* and *Dhulghat* ranges and part area of *Somthana* and *Wan* has been merged with present West *Melghat* Division. The plan had following working circles:

(1) Selection Cum Improvement Working Circle

Entire area of *Akot* range was allotted to S.C.I. Working Circle. The emphasis was on obtaining regeneration from selective felling. And thus harvestable girth of 120 cms at breast height was prescribed. A felling cycle of 20 years was prescribed and 7 felling series were formed. The area of coupes were to be classified as A (Protected area), B (Blank or under stocked area), C (Patches having pole crop) and D (Well stocked area) type areas. Planting of *Bamboo* (6m X 6m) *Jamun*, *Arjun*, *Agave* and grasses (3m X 3m) along the nalas and river banks along with soil and moisture conservation works were prescribed in A type areas in B types areas plantation of *Teak* and miscellaneous species at a spacing of (2m X 2m) along with soil and moisture conservation works were prescribed. In C type areas no planting was prescribed. The D type areas were further classified into D1 and D2 types. D1 area containing adequate seedlings regenerations (625 seedlings or more per ha.), D2 area not containing adequate regeneration (less than 625 seedlings per ha.). In D1 area no planting was prescribed. Whereas in D2 area, supplementing of natural regeneration by artificial regeneration to the extent by which natural regeneration falls short of 625 plants per ha. was prescribed. Here the emphasis of regeneration was on natural regeneration. Similarly no marking was to be done in A and B type area. In B type areas cutting back of live high stump was suggested. In C type areas thinning of pole crops to being spacing to 1/3rd of the crop height was to be carried out. In D areas harvesting of dead trees along with 50% of trees of harvestable girth (i.e.120cm) were prescribed. Fruit trees were reserved against Felling, cutting of climbers were to be carried out.

Results : In absence of coupe control forms, no comments can be offered regarding actual yield of *Teak* timber as against projected yield. The prescriptions given in the Plan were not strictly followed due to paucity and unavailability of timely grants. The expected regeneration were not obtained.

(2) Improvement Working Circle

Two Felling Series of Improvement Working Circle were constituted in *Dhulghat* Range one was *Patulda* and other was *Dabida*. Some area of *Wan* felling series of *Wan* Range is transferred to *Dhulghat* Range after reorganization in May 1999. Procedure prescribed in this working circle is as follows :

Coupes were to be demarcated in one year advance. Marking of trees for felling were not prescribed. However, in B type areas live high stumps were to be cut back. In C type area, thinning were prescribed. In D type area, climber cutting and cutting of coppices interfering with established artificial or natural regeneration were to be carried out. Treatment map to be prepared by R.F.O. and verified by A.C.F. for the purpose of raising plantations and protection.

- A) Protection areas consisting of patches over 45 degree slope or more than 20 meter width on both sides of the rivers or perennial nala.
- B) Blanks and under stock patches (density below 0.4) upto the slopes of 45 degree exceeding 2 ha. in extent.
- C) Patches of young well grown pole crop of valuable species such as *Teak*, *Shisham*, *Bija*, *Sajad*, *Bhirra*, *Dhawda*, *Salai* etc extending 0.4 ha. in extent.
- D) Areas containing crop density more than 0.4 ha. were divided into two classes.
 - i) Areas containing adequate seedling regeneration i.e. more than 625 seedling per ha.
 - ii) Areas not containing adequate regeneration i.e. less than 625 seedling per ha.

Following treatments were prescribed for different areas as classified above :

- A) Soil and moisture conservation works, and planting of *Bamboo*, *Jamun*, *Arjun*, *Agave*, and grasses along nala and river banks were to be carried out.
- B) Soil and moisture conservation works and planting of *Teak* and miscellaneous species at a spacing 2m X 2m. were prescribed.

C) No treatment were prescribed.

D) (i) No treatment were prescribed.

(ii) Natural regeneration were to be supplemented by artificial regeneration to the extent by which natural seedling fall short of 625 per ha.

Result: The prescriptions of the Plan were not followed strictly either due to paucity of funds or due to unavailability of grants in time. Cutting of live high stumps and thinning were not carried out as prescribed. The crop did not improve as per expectation. As no Felling of trees were prescribed , hence yields were not expected.

3) Afforestation Working Circle: - Four Felling Series were formed in *Dhulghat* range namely 1) *Jampani* 2) *Talai* 3) *Mothakheda* 4) *Biroti*. Main objective of this working circle was to re-vegetation of highly eroded and degraded lands. The approach here was through SMC works, thus, recycling of nutrients and conservation of moisture, planting of suitable species in the optimum number and reduction in the evapo-transpiration rate etc. The area of working was to be demarcated one year in advance. In A type areas, no trees were to be marked. In B type areas, marking of trees for felling were not prescribed except dead trees and live high stumps. In C type areas cleaning and thinning were prescribed. In D type areas fruit yielding and flowering trees were reserved against Felling. Two dead trees per ha. were to be retained. The areas were classified as follows:-

A) Protection areas consisting of patches over 45 degree slope or more than 20 meter width on both sides of the rivers or perennial nala.

B) Blanks and under stock patches (density below 0.4) upto the slopes of 25 degree exceeding 2 ha. in extent.

C) Patches of young well grown pole crop of valuable species such as *Teak*, *Shisham*, *Bija*, *Sajad*, *Bhirra*, *Dhawda*, *Salai* etc exceeding 2 ha. in extent.

D) Areas containing crop density more than 0.4 ha. at least 2 ha. in extent were divided into two classes.

i) Areas containing adequate seedling regeneration i.e. more than 625 seedling per ha.

- ii) Areas not containing adequate regeneration i.e. less than 625 seedling per ha.

Following treatments were prescribed for different areas as classified above.

- A) Soil and moisture conservation works, and planting *Bamboo*, *Jamun*, *Arjun*, *Agave*, and grasses along nala and river banks were prescribed.
- B) Soil and moisture conservation works and afforestation were to be carried out according to ecological index.
- C) No treatment prescribed.
- D) (i) No treatment prescribed.
- (ii) Natural regeneration were to be supplemented by artificial regeneration to the extent by which natural seedling fall short of 625 per ha.

Natural Regeneration is secured by intensive fire protection and control of weed like *Lantana*.

Artificial regeneration were to be done over the area after taking into account Ecological Index (**Appendix No. LIX** of Vol. II) calculated as below:

$$\text{Ecological Index} = \frac{P \times D}{Tr \times Ept}$$

Where

- P = Annual precipitation in mm.
- D = No. of rainy days in a year.
- Tr = Range of Maximum temperature averages.
- Ept = Potential Evapo-transpiration in mm.

In the plantations local species were to be planted in such a way that it tends towards natural spatial distribution. However, species of more economical importance were to be preferred.

Result: Artificial regeneration to some extent were carried out, though not in sequence of coupes due for working. The results of plantations are just ‘average’ and not very encouraging. The concept of Ecological Index were not followed and standard

plantation model were adopted. Cutting of live high stumps and thinning were not carried out. Detailed comments can't be made in absence of control forms.

SECTION 3. SPECIAL WORKS OF IMPROVEMENT

7.3.1. 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.

7.3.2. 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 Chitri and Zapnadeo were fire protected by early burning and remaining areas were not protected owing to the poor qualities of the forest.

7.3.3. 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.

7.3.4. 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.

7.3.5. 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%.

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

7.3.7. Establishment of wireless station in the forest:

7.3.7.1. The incidence of fire in *Dharni*, *Dhulghat* 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.

7.3.7.2. 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.

7.3.7.3. The Wireless Advisor to Government of India, New Delhi, has allotted frequency of 77.05 MHZ and 77.30 MHZ to forest department.

7.3.7.4. 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 public 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, *Gorai Road, Borivali Mumbai-92* has accepted the proposal for establishing wireless communication at the above 3 places with the condition of providing identification marking on the masts.

7.3.7.5. 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) C.C.F. Amravati Circle (2) D.C.F. West Melghat (3) D.F.O. Vigilance.

7.3.7.6. Besides that the permission for installing another Twenty-Four **permanent and Twelve Mobile Sets** for entire forest has been sought from the Government of India. It was decided that the wireless network in the *Melghat* would be managed jointly by Chief Conservator of Forest (Territorial) *Amravati* Circle and Field Director, Project Tiger. The Repeater station has been started at *Chikhaldara*.

7.3.7.7. The wireless station works on hourly basis between 8.00 to 20.00 hours, however during fire season, during March 1, to June 15, work round the clock.

7.3.8 Plantations: Most of the plantations were raised around 100 years back in Sipna valley in West Melghat Division. These plantations were mostly of *Teak*. A number 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 1961 to 2007, plantations that were taken up are given in the **Appendix No. XXXIV** of Vol. II of this plan. Presently there are two central nurseries at *Bori (Dharni Range)* and *Dhulghat (Dhulghat Range)* which provides saplings for plantation purpose (**Appendix No. XL** of Volume II)

7.3.9 During Shailendra Bahadur, & B.S. Thengdi's Plan (1993-94 to 2002-03) for West Melghat Division and B.S. Thengdi's Plan (1994-95 to 2003-04) for South *Melghat* Division, large scale plantations (Bamboo & Mixed) have been done under Plan/Non-Plan and EGS, though not strictly in the coupes due for working.

Table No 7.3

Table Showing Area Of Plantations Raised During Bahadur & Thengdi's Plan Period

Year	Plantations			
	Teak (ha)	Bamboo (ha)	Mixed (ha)	Total (ha)
1993	-	430.0	165.0	595.0
1994	-	-	185.0	185.0
1995	-	385.0	476.0	861.0
1996	-	823.6	350.0	1173.6

1997	-	703.0	225.0	928.0
1998	-	890.0	275.0	1165.0
1999	40.0	384.5	250.0	674.5
2000	-	733.0	167.2	900.2
2001	-	405.0	55.0	460.0
2002	-	420.0	28.7	448.7
2003	10.0	425.0	10.0	445.0

7.3.10. Staff Quarters were constructed under World Bank Sponsored Maharashtra Forestry Project between 1993-94 to 1999-2000.

Table No 7.4

Range	No. of Quarters		
	Type I	Type II	Type III
Dharni	4	2	1
Dhulghat	1	-	-
Dhakna	3	1	-
Akot	-	-	-
Total :	8	3	1

7.3.11. Construction RCC Pillars on outer boundary of forests had been carried out between 2004-05 to 2006-07 length covered by RCC Pillar is given range wise in **Table No.7.5.**

Table No 7.5

R.C.C.Pillars Boundary Demarcation in West Melghat Division.

Range	Length of boundary demarcation by RCC Pillar (in kms)	Number of Pillars	
		Big	Small
Dharni	55.535	578	991
Dhulghat	100.000	688	1093
Dhakna	28.560	185	393
Akot	-	-	-
Total :	184.095		

However, it is observed that RCC pillars are not very effective as it is easily broken by unscrupulous elements for iron rods and not visible from a distance. Therefore, policy of fixing of RCC pillars on sensitive outer boundary needs reconsideration.

7.3.12 Improvement Of Road Network: No new forest road was constructed during the *Sailendra Bahadur & Thengdi's* Plan period. List of existing forest roads is given in **Appendix No. XII** of Vol. II.

7.3.13. 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 *Dharni* and *Dhulghat*.

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

7.3.15. Water Sources: The list of existing wells, and tanks (*khodtale*) and waterholes is given in **Appendix No. VI & VII** of volume II.

7.3.16 Status of JFM, Community involvement and FDA in the Division:

Joint Forest Management Committees have been constituted in 64 villages and an area of approximately 18,000 ha. have been assigned to these JFMC for management. A statement showing list of villages in which JFM committees have been formed and area assigned to the committees is given in **Appendix No. LVII** of Vol. II. Though efforts are being made to get the community involved in forest protection, the response is not very encouraging. FDA has been constituted in the Division and 2 projects comprising of total 51 villages has been sanctioned (under NAP) by GOI. Total 1925 ha area is to be planted under NAP by involving JFMC. So far 650 ha area has been planted under FDA.

SECTION 4: THE OUTTURN FROM THE FORESTS

7.4.1. The **Appendix No. XXVII** of Vol. II showing outturn of Timber and Fire wood is given in the volume II. The **Appendix No. XXIV** of Vol. II gives outturn and revenue realized by Tendu leaves. The **Appendix No. XXVI** of Vol. II gives details of *Bamboo* harvesting and revenue realized departmentally and supplies made to *Burad* community. Similarly **Appendix No. XXVIII** of Vol. II gives details of *Bamboo* harvesting by non Government agencies. 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 year 1993-94 and minimum production was achieved in the year 2001-02 and 2003-04. 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 0.4555 Cum/ha. on an average was obtained which is less than the prescribed assured yield of 3.817 Cu.m/ha for the SCI areas.

Table No 7.6

Table Showing Coupe Wise yield of Teak And Non Teak For The SCI Coupes Of 2000-01

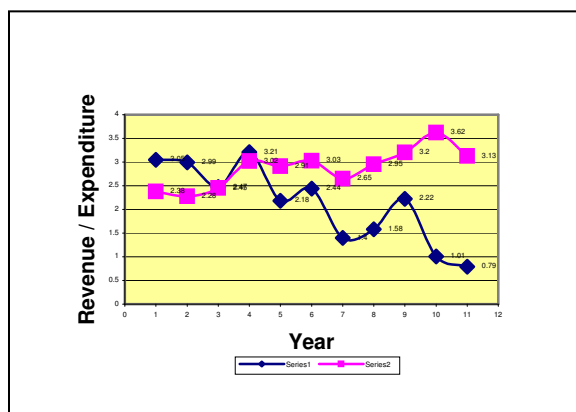
Sr.No.	Coupe No.	Area of the Coupe	Yield of Teak (Cu.M.)	Average yield/Ha.	Yield of Non Teak (Cu.M.)	Average yield of Non Teak/ha.
1	VIII Ahad	100.00	31.514	0.315	NA	-
2	VIII Menghat	159.57	5.390	0.337	NA	-
3	VIII Rajadehi	246.284	165.284	0.671	NA	-
4	VIII Mogarda	212.90	64.337	0.302	NA	-
5	VIII Chitri	244.76	196.551	0.803	NA	-
6	VII Patiya	147.00	89.118	0.606	NA	-
7	VII Popatkhedda	125.00	10.599	0.848	NA	-
	Total	1235.514	562.793	0.4555	NA	-

SECTION 5: PAST REVENUE AND EXPENDITURE:

7.5.1. 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 West Melghat Division are given in the **Appendix No. XXI** of Volume II of this plan.

TABLE NO.7.7

TABLE SHOWING PAST REVENUE & EXPD.



Year	Revenue (Crores)	Expenditure (Crores)
1996-97	3.05	2.38
1997-98	2.99	2.28
1998-99	2.47	2.45
1999-00	3.21	3.02
2000-01	2.18	2.91
2001-02	2.44	3.03
2002-03	1.40	2.65
2003-04	1.58	2.95
2004-05	2.22	3.20
2005-06	1.01	3.62
2006-07	0.79	3.13

CHAPTER -VIII

STATISTICS OF GROWTH AND YIELD

SECTION 1. STATISTICS OF RATE OF GROWTH OF TEAK

8.1.1. Stem analysis: During revision of this Plan stem analysis was carried out in December 2006, by selecting 4 representative *Teak* trees of seedling origin for site quality III in the compartment No.686 of *Bhondilava* Beat and 731 of *Bori* Beat of *Dharni* Range. The result of Stem analysis is given in **App. No. XX** of Vol. II. The height of the trees were between 21.84 m to 23.44 m. The growth details are given below :

Table No.8.1
Table Showing Age Height Parameters Of Stem Analysis Of Teak

Site Quality: III

Division: W.Melghat

Age	ht. of section in m.
0	1.37
7.00	4.24
16.00	7.24
20.00	10.24
36.00	13.24
49.00	16.24
76.00	19.24
86.00	22.24

The above table shows that till 16 years the growth in height is sluggish. There afterwards it picked up and continued till 50 years. Later the growth slows down. Between 16 to 20 years age it had put up the maximum height.

Table No.8.2
Table showing age volume parameters of Stem analysis of Teak
Site Quality: III

Division: W.Melghat

Age	Volume in Cum.
0	0.0000
10	0.0163
20	0.055
30	0.112
40	0.188
50	0.300
60	0.465
70	0.650
80	0.870
90	0.942

Volume growth is sluggish till 10 years. There afterwards it has picked up till 80 years. The volume growth slowed down after 80 years age.

Table No.8.3

Table Showing CAI/MAI Of Teak Stem Analysis Species: Teak (*Tectona grandis*)

Site Quality: III

Division: W.Melghat

Age	MAI in cum.
0	0.0000
10	0.0016
20	0.0027
30	0.0037
40	0.0047
50	0.0060
60	0.0077
70	0.0093
80	0.0109
90	0.0105

Age	CAI in cum.
0	0.0000
10	0.0037
20	0.0057
30	0.0076
40	0.0112
50	0.0165
60	0.0185
70	0.0220
80	0.0072

MAI is very low during the first decade, later it has increased during 20- 80 years at the rate of 0.0013 cum./decade. Similarly, CAI growth is very low during first decade; during 10-70 yrs the rate is 0.0030 cum./decade afterwards the rate has fallen down gradually.

Table No.8.4
Stem Analysis Curve VI: Twice Bark Thickness (B.T.)
Species:Teak (*Tectona grandis*)

Site Quality :III

Division: W.Melghat

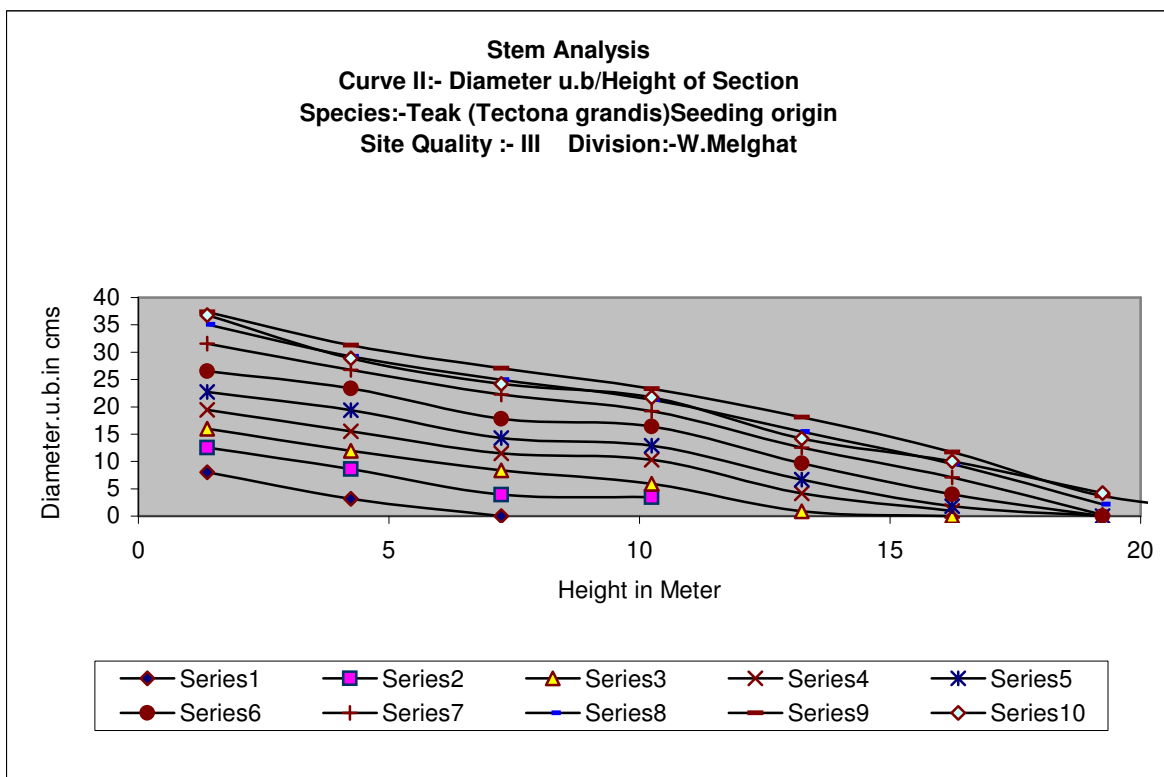
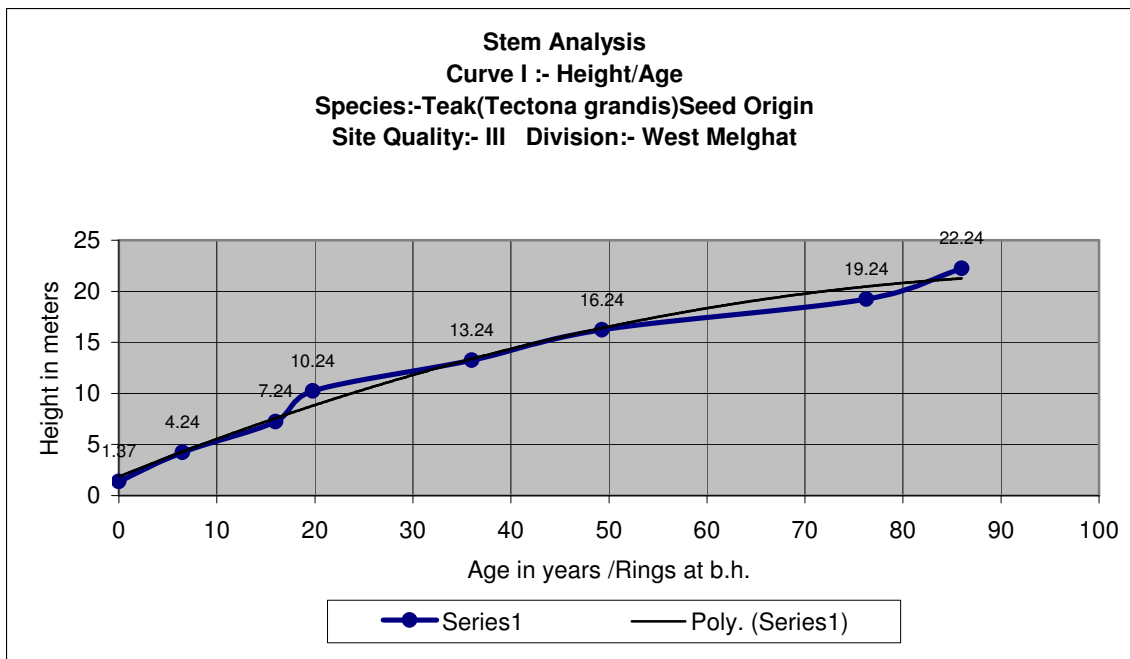
D.U.B. in cm.	2xB.T. in cm.
0	0
05.23	1.43
14.00	1.88
25.65	2.00
35.97	2.45
40.88	2.20

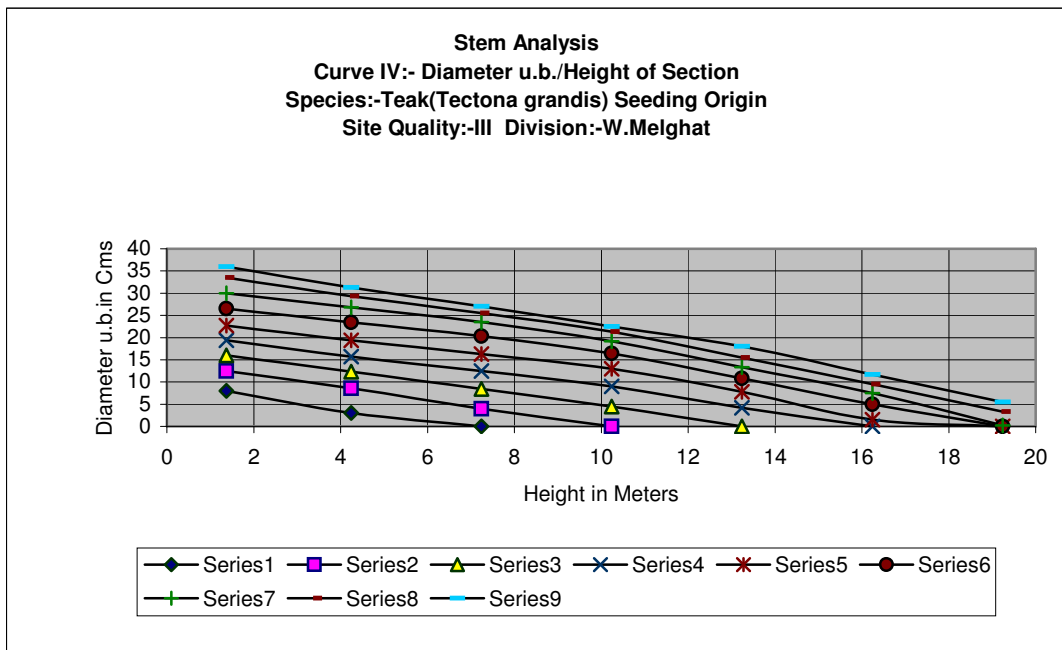
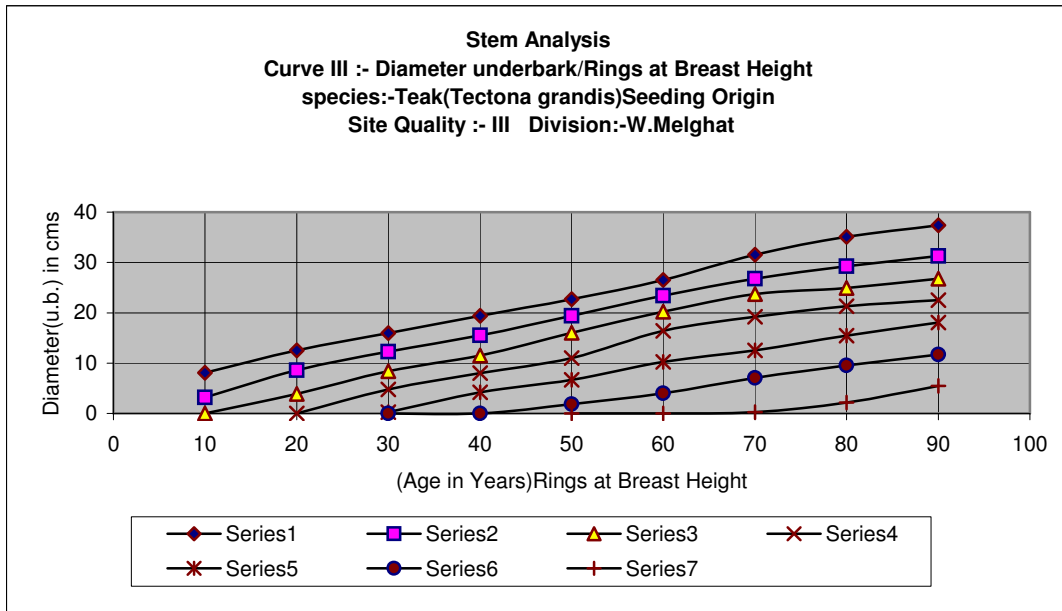
As the field measurements are taken over bark corresponding bark thickness needs to be taken into account.

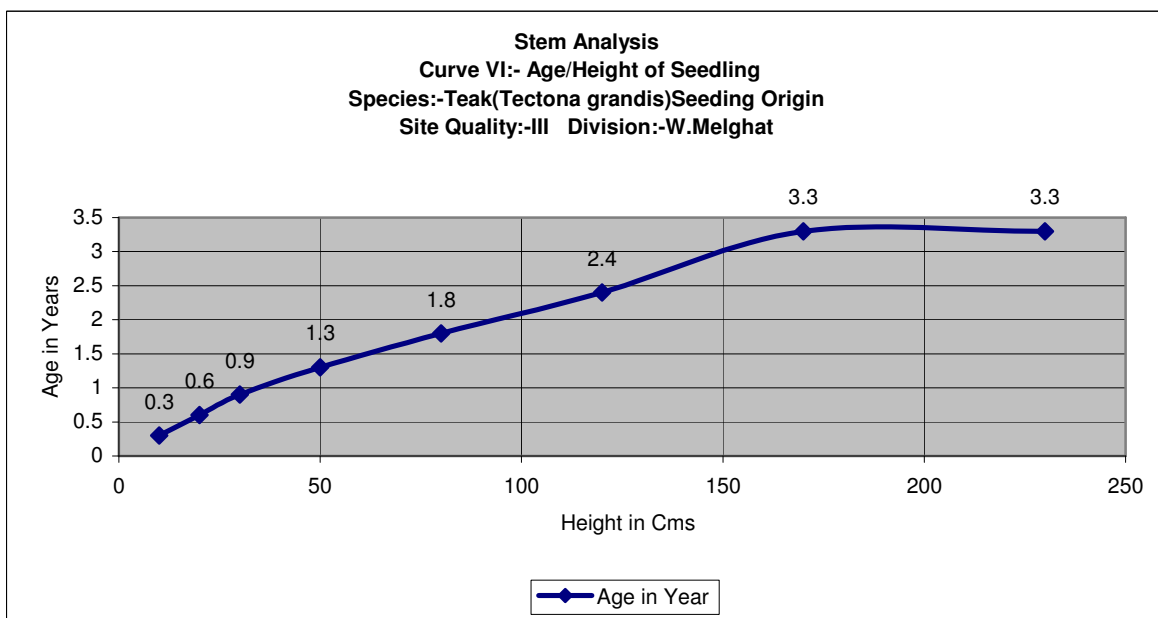
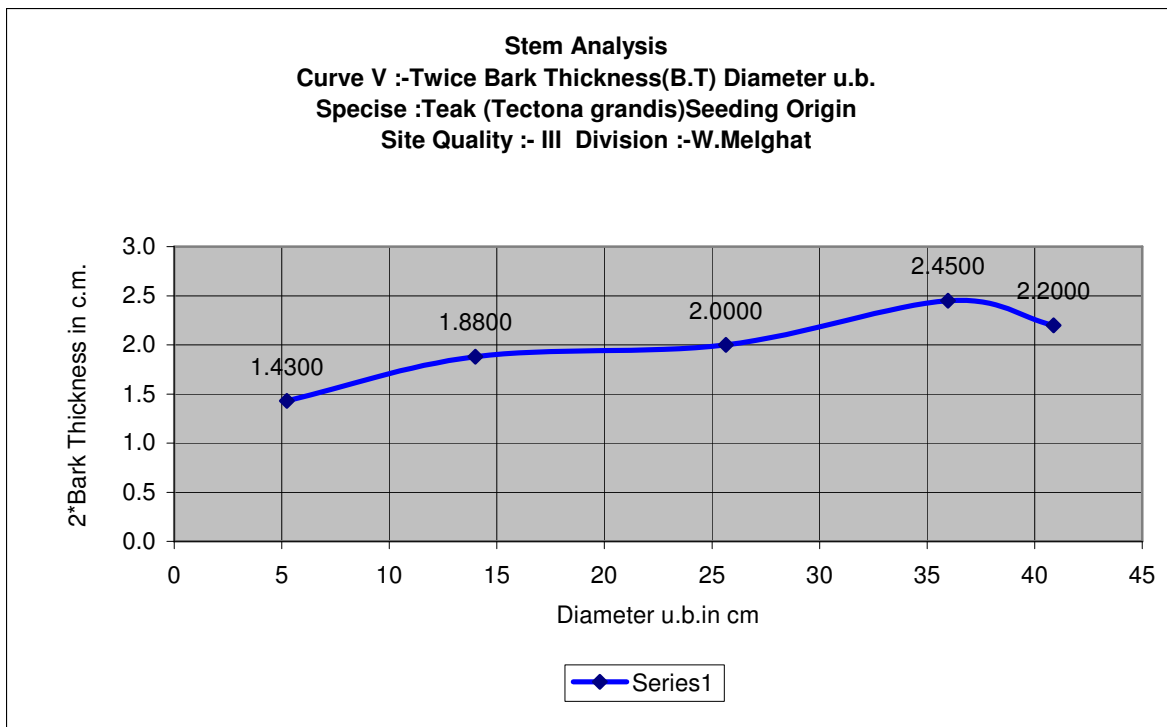
8.1.2. It is evident from the graphs that the age of culmination at which CAI & MAI intersect each other is 82 years (3 yrs. correction made from seedling data). The corresponding girth is 113 cm. The data is reproduced as under:

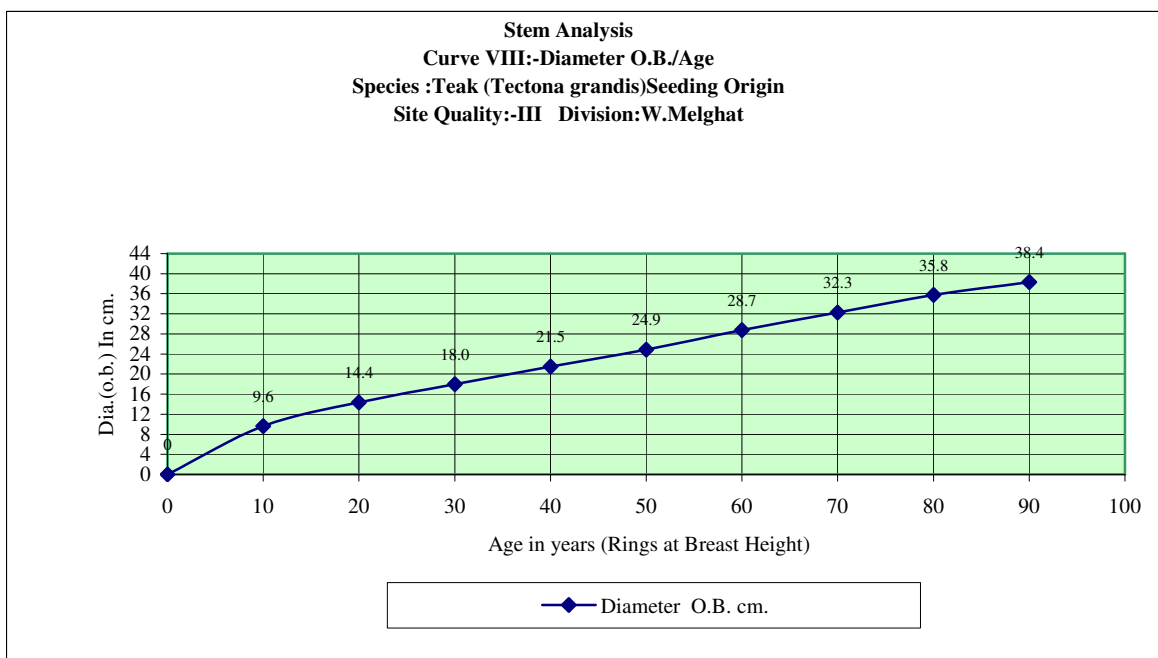
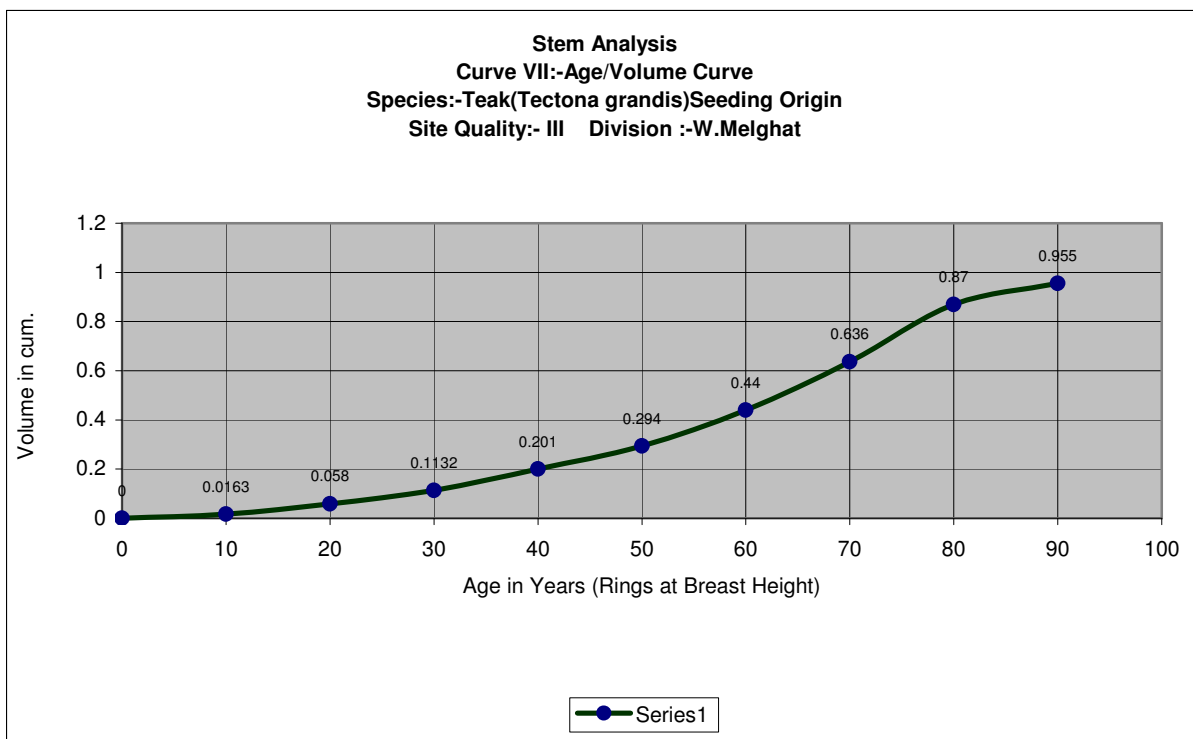
Table No. 8.5
Table Showing Stem Analysis Of Teak For Site Quality – III

Age in years	D.B.H. (O.B.) in cm	G.B.H. (O.B.) in cm	Ht. In Mt.	Volume per tree cum	MAI Cum/year	CAI Cum/year
10	9.6	30.16	6.00	0.0163	0.0016	0.0020
20	14.35	45.09	8.75	0.0580	0.0029	0.0050
30	18.00	56.56	12.00	0.1132	0.0038	0.0065
40	21.50	67.55	14.50	0.2010	0.0050	0.0080
50	24.87	78.14	17.00	0.2940	0.0059	0.0110
60	28.73	90.27	18.75	0.4400	0.0073	0.0165
70	32.28	101.43	19.75	0.6360	0.0091	0.0215
80	35.80	112.49	20.50	0.8700	0.0109	0.0190
90	38.35	120.49	21.00	0.9550	0.0106	-









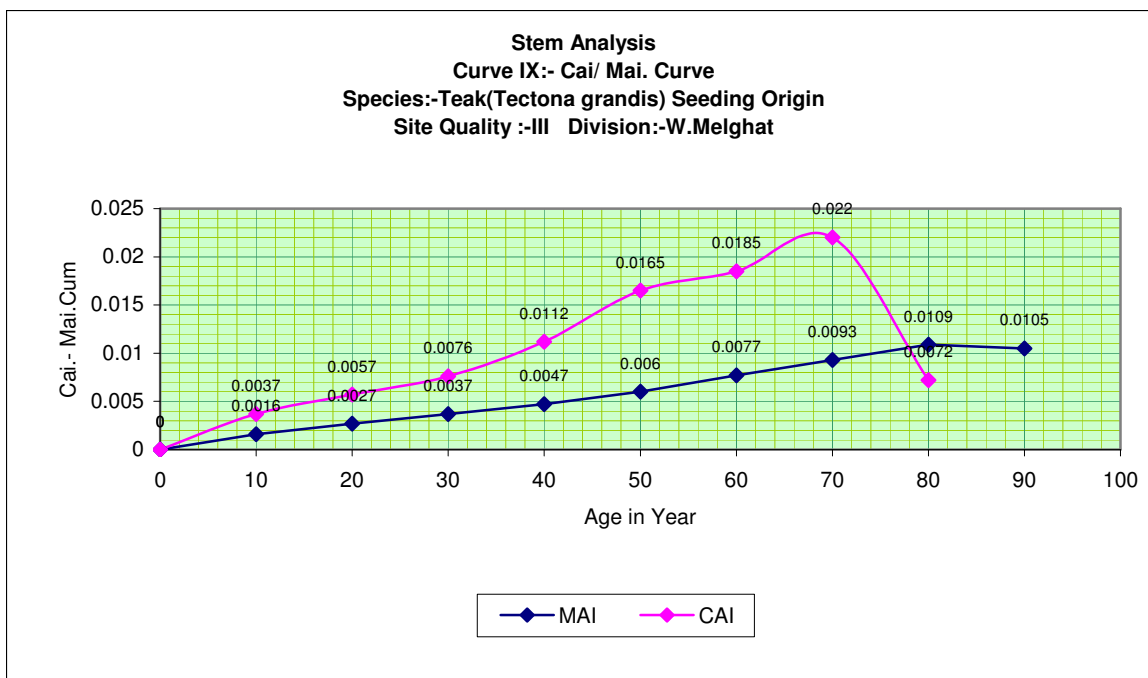
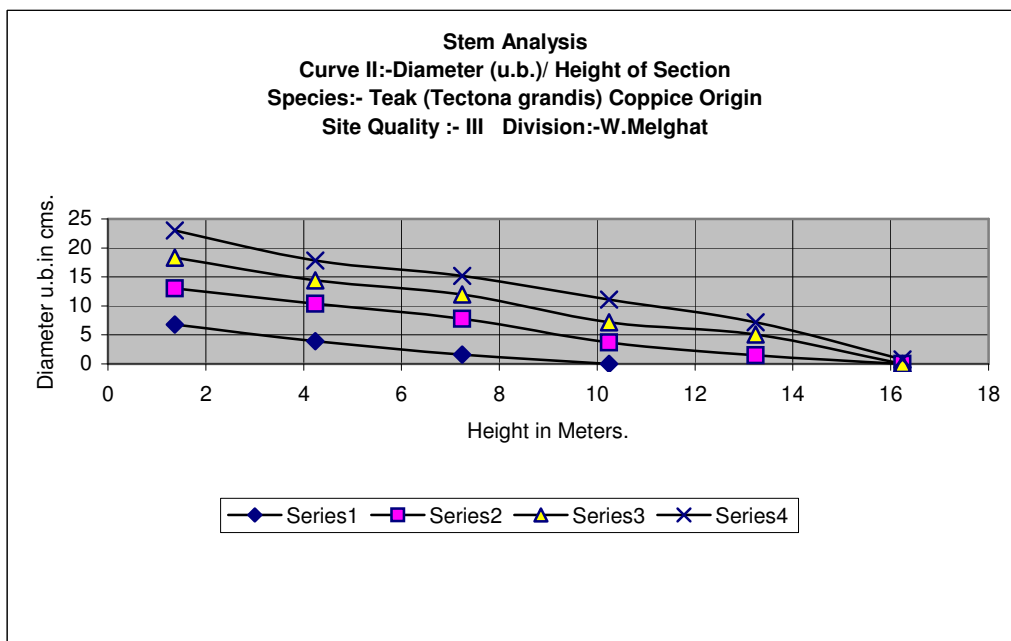
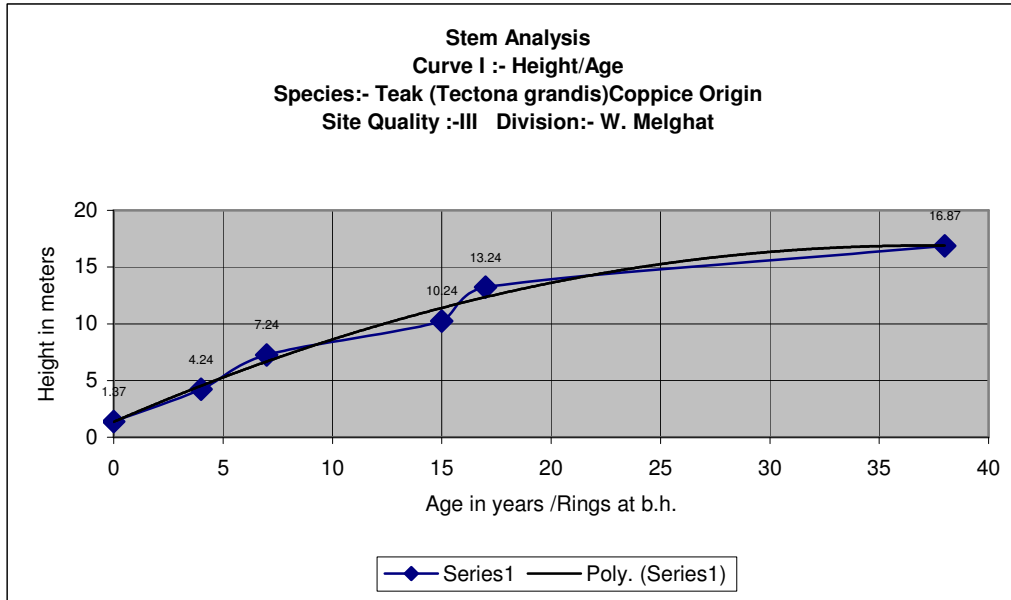


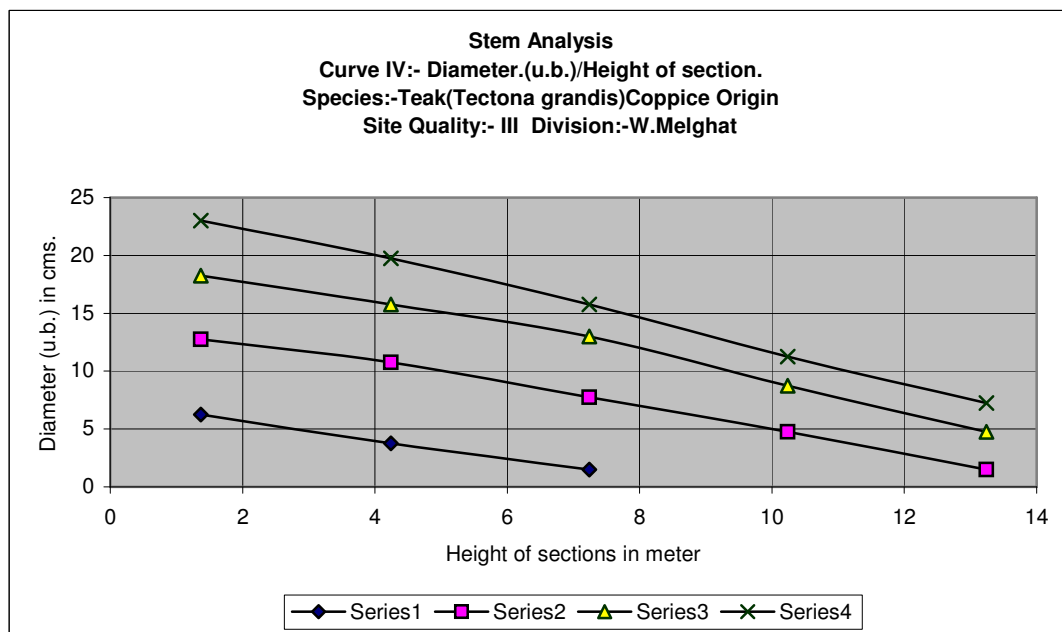
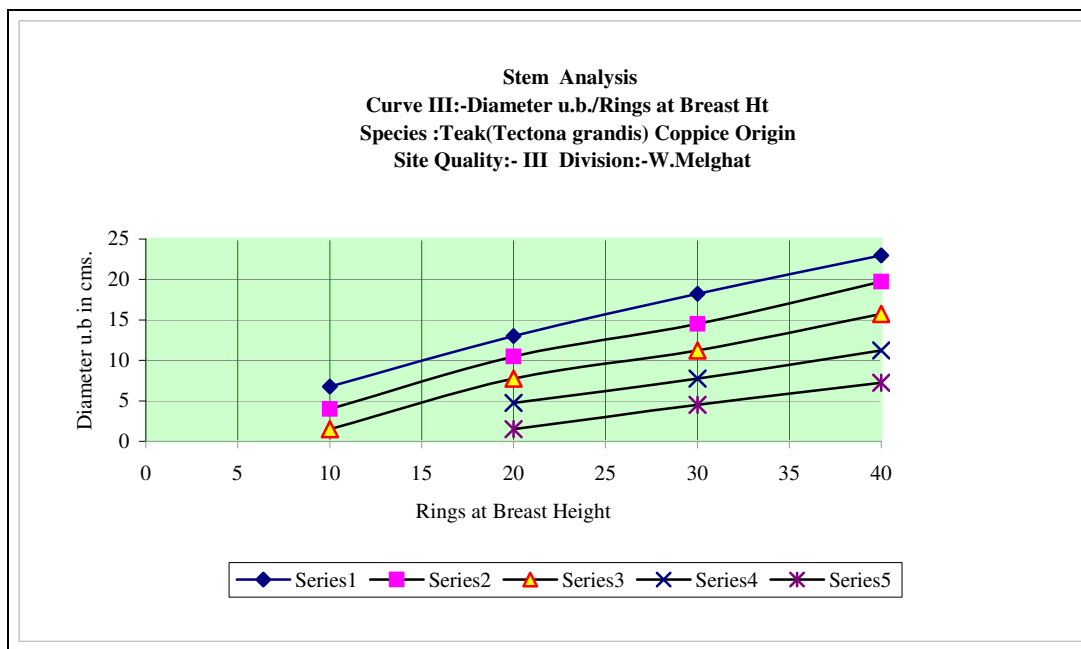
Table No. 8.6

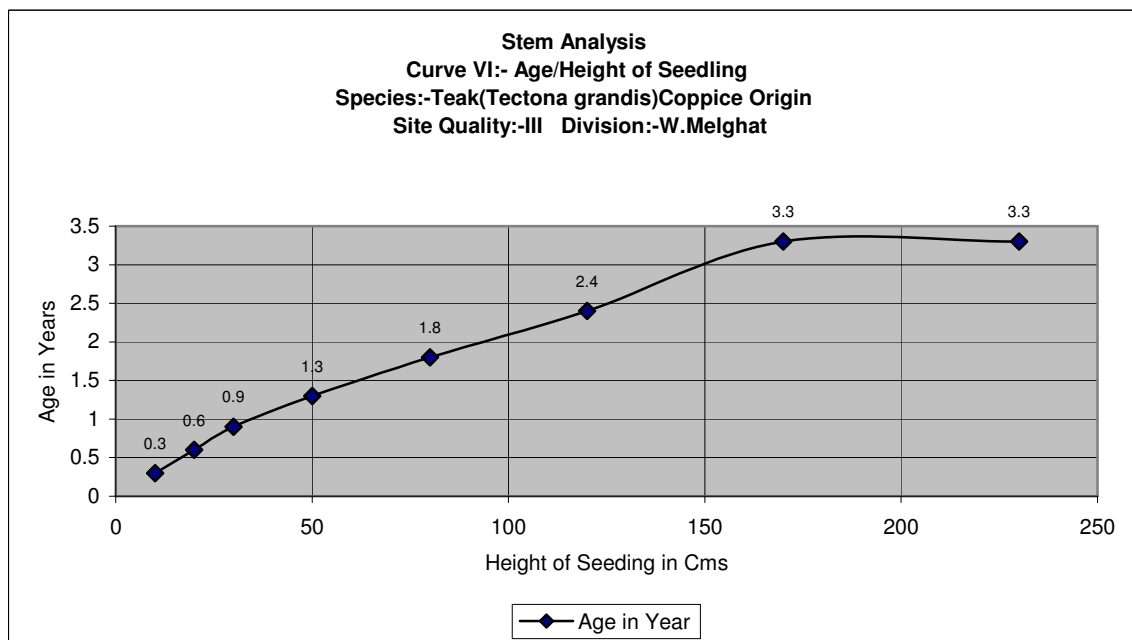
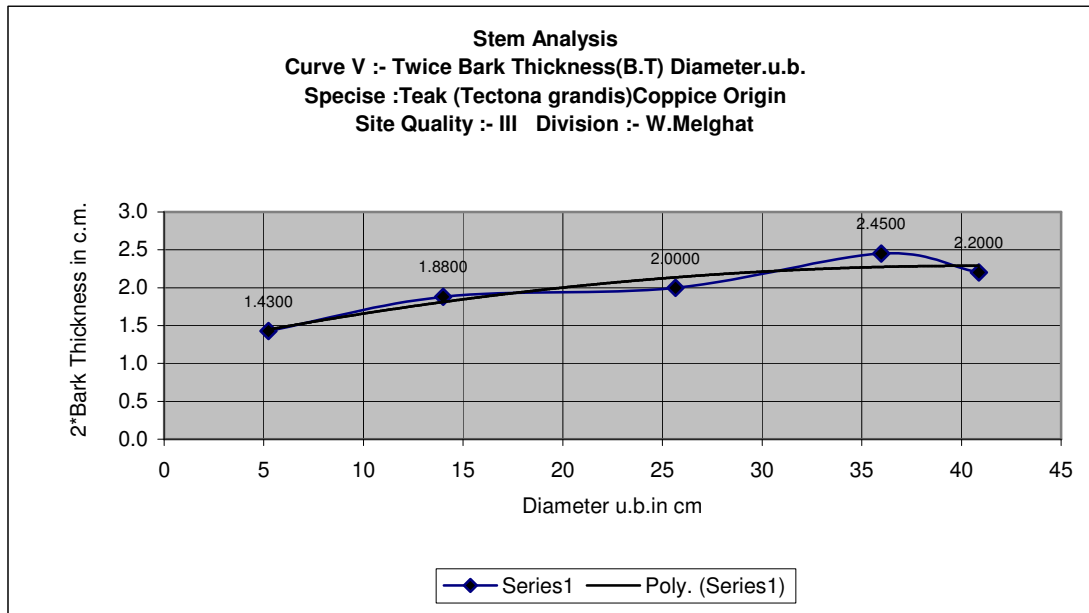
No. of years required to cross the Girth Class.

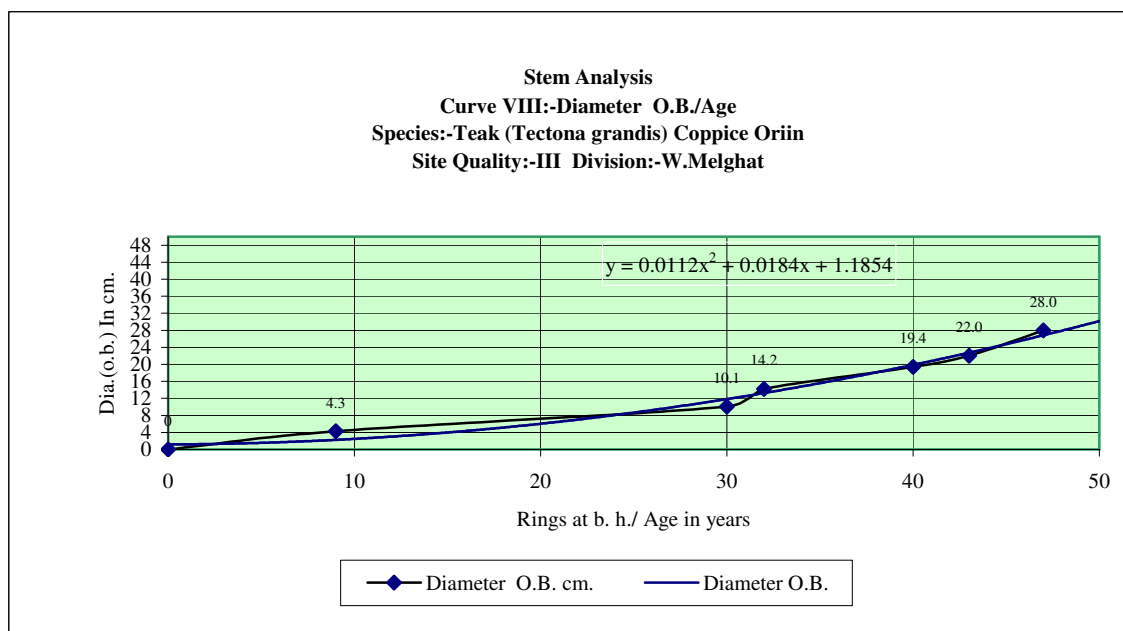
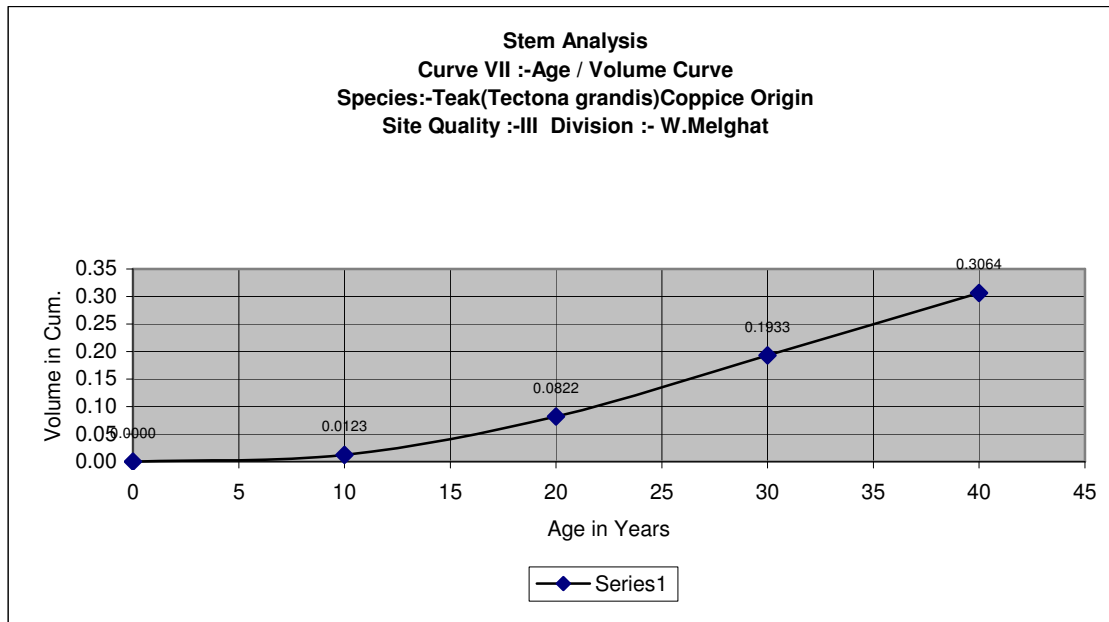
Girth Class cm	Mid girth cm	SITE QUALITY III	
		Age in years	Years required to cross to the class
15-30	22.5	7	--
		--	8
30-45	37.5	15	--
		--	12
45-60	52.5	27	--
		--	17
60-75	67.5	44	--
		--	9
75-90	82.5	53	--
		--	13
90-105	97.5	66	--
		--	14
105-120	112.5	80	--
		--	15
120-135	127.5	95	--

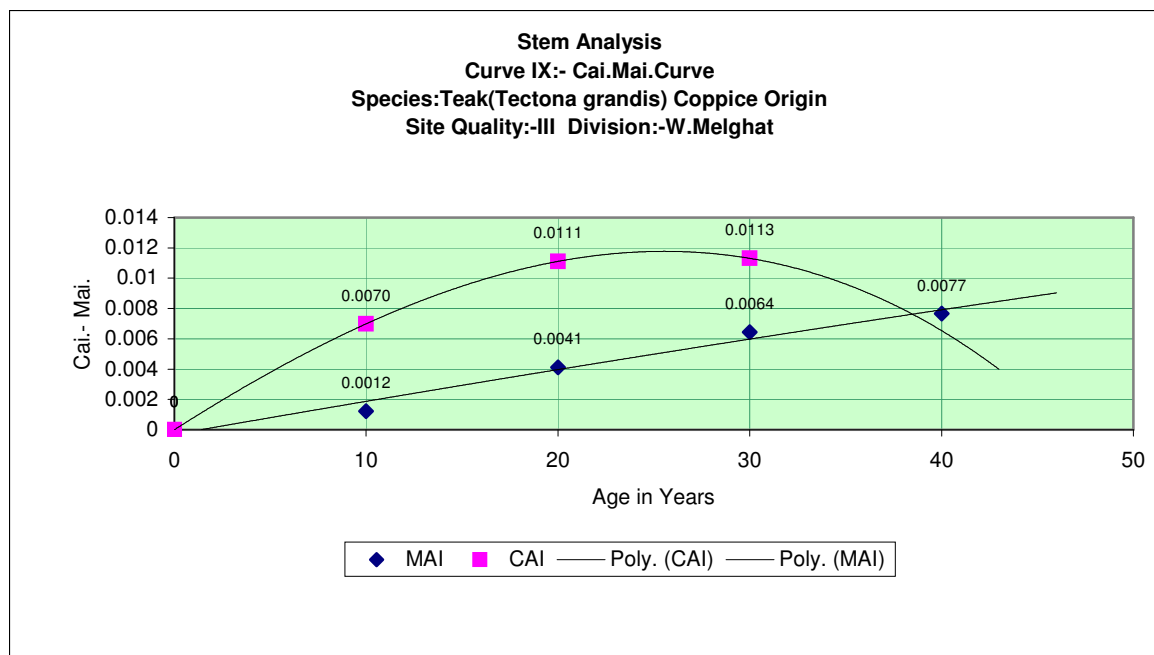
8.1.3 Stem analysis was also carried out for one representative *Teak* tree of coppice origin for site quality III. It is evident from graph the age of culmination at which CAI & MAI curves intersect each other is 42 yrs (3 yrs correction made from seedling data). The corresponding girth being 69 cm.











SECTION 2. STOCK MAPPING:

8.2.1. Reserved Forests of the Division were stock mapped for the first time in the year 1935 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. Updating stock maps were done in 235 compartments out of 247 compartments of the Division at the time of the revision of the current working plan. The result of stock mapping are given in the **Appendix No. XLVI**. The stock maps have been digitized in the GIS cell of Amravati Working Plan Division. **App. No. XLIV** of Vol. II gives statement showing difference between notified area and digitized area.

8.2.2. The satellite imagery of LISS III of 12th December 2004 was used to classify the forest patches according to density as revealed in the Normalized Density Vegetation Index (NDVI) mapping. The results of stock mapping are given in **Table No.8.7**.

Table No.8.7
Table Showing The Results Of Stock Mapping obtained from digitized maps.

Forest Type	Site Quality	SCIWC	IWC	Total Area in ha.	% to the total area
Teak	III	9115.44	232.39	9347.83	15.03
	IVa	6685.01	1394.51	8079.52	12.99
	IVb	3758.84	1067.13	4825.97	7.76
	Total	19559.29	2694.03	22253.32	35.77
Mixed	III	970.96	824.70	1795.66	2.89
	IVa	4359.53	3366.02	7725.55	12.42
	IVb	1738.43	976.30	2714.73	4.36
	Total	7068.92	5167.02	12235.94	19.67
Salai	III	79.46	0	79.46	0.13
	IVa	1737.00	5972.30	7709.30	12.39
	IVb	332.07	2033.15	2365.25	3.80
	Total	2448.53	8005.45	10153.98	16.32
Old Plantation	-	1186.65	867.70	2054.35	3.30
Under stocked	-	3452.70	1127.06	4579.76	7.36
Not Stock mapped	-	219.70	1458.11	1677.81	2.70
Cultivation	-	2646.04	2148.13	4794.17	7.70
Blank	-	2015.92	2095.86	4111.78	6.61
Water body	-	270.83	80.21	351.04	0.56
	Total	38568.58	23643.57	62212.15	100

Table No.8.8
Table Showing Crown Density Data Of West Melghat Division

Category	SCI	IWC	Total	% of area w.r.t. total Notified area
Well stocked	12396.80	8188.20	20585.00	34.68
Under stocked	18572.90	10171.80	28744.70	48.42
Blank	728.10	804.50	1532.60	2.58
Water body	168.30	13.80	182.10	0.31
Others	6223.70	4153.00	10376.70	17.48
Total	38089.80	23331.30	61421.10	103.47
Area of W.C.	37734.78	21627.26	59362.04	100
Difference	355.12	1704.04	2059.16	3.47

Teak forest constitutes 35.80 % of the total area and *Mixed* forest constitutes 19.70 % and *Salai* constitutes 16.30 % of the total area. Majority of the area falls under site quality IV. Of the total area 11223 ha is site quality III and 33421 ha area falls under site quality IV. The crown density analysis of the satellite imagery shows that 35 % of the area is well-stocked or having more than 0.4 crown density and 48 % of the area is under- stocked or having crown density between 0.1 to 0.4.

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

All India Teak Site Quality Table

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

SECTION 3. ENUMERATION:

8.3.1. The enumeration of trees and the regeneration survey of the forest crop in the Division were carried out by Forest Resources Survey Scheme Unit, *Amravati* and Working Plan Division, *Amravati* during Dec 2002 to April 2003. The sampling design was systematic line-plot survey and the intensity of sampling was 1 (one) percent. The total plots in which enumeration carried out was 1543.

8.3.2. 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).

8.3.3. 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 and given in **Appendix No. LXXII** of Volume II.

8.3.4. 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. XLIX** and Species distribution in various working circles is given in **Appendix XLV** of Volume II of this plan.

8.3.5. The total stocking (i.e. all trees put together) for Selection Cum Improvement Working Circle is 217 per hectare. The species of General Utility form around half the stock, the most prominent species being *Teak*. The total per hectare of *Teak* trees is 90. Moreover the percentage of *Teak* trees to the total stocking 42. Moreover the percentage of big sized *Teak* trees (say trees above 90 cm in girth) to total *Teak* trees about 12 percent. Out of other species only *Lendia*, *Salai* and *Tiwas* are stocked a little better. *Tiwas* does not attain big size. These trees are generally under 75 cm girth. The percentage of *Tiwas* trees above 75 cm in girth to the total *Tiwas* is only about 9.

In Thengdi's Working Plan areas in SCI Working Circle are grouped into 13 F.S. Under the present system of Selection Working, the exploitable girth for *Teak* trees is 120 cm. The number of *Teak* trees above 120 cm girth are 2.48 per ha and the *Teak* trees in approach class (i.e. 105 U 120 cm) are 3.08. The percentage of *Teak* trees above 120 cm girth is 2.75 percent of the total *Teak* stock. The percentage of *Teak* stock in girth class 15-30 cm is about 32.11 to total *Teak* stock. The trees enumerated during Bahadur and Thengdi's Plan showed total of trees/ha above 60 cm to be 48.25 where as the current enumeration, it is only 29.33.

In Improvement Working Circle (of Thengdi's Plan) the total growing stock is 173 trees per ha out of which *Teak* trees are about 67 (i.e. about 39 per cent of the total stock). Other species like *Dhawada*, *Lendia* and *Salai* form the small percentage to total stocking being 13.75%, 8.38% and 7.94 % respectively.

In Afforestation Working Circle (Thengdi's Plan) the total growing stock is 173 trees per ha out of which Teak trees are about 66 (i.e. about 38 % of total stock) Other species like Dhawada, Lendia, and Salai form the small percentage to the total stock being 10.88%, 5.84 %, and 9.57 % respectively.

CROP GIRTH:

8.3.6. The crop girth, which has been calculated on the basis of the enumeration data, is 70 cm. for the forest allotted to the Selection Working Circle. It corresponds to the age of 45 years. Following table shows crop girths, their corresponding ages and basal areas for the enumerations taken up under various plans.

Table No. 8.9
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	62	40	7.87
Shri Shailendra Bahadur & Thengdi's plan	51	28	6.22
Current Plan	70	45	5.81

NORMAL GROWING STOCK:

8.3.7. 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.

8.3.8. 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 8.10**.

Table No. 8.10
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

8.3.9. 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*.

8.3.10. 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.

8.3.11. 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 8.11**. Existing growing stock figures are for size classes; hence the average is also given.

Table No. 8.11

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	7	28.95	28.95	10 15	41 29	68 37
30 U 45	15	18.57	20.21	20 25	21 17	24 18
45 U 60	27	13.29	14.10	30 35	14 12	15 12
60 U 75	44	10.10	9.85	40 45	11 10	10 9
75 U 90	53	8.16	6.87	50 55	9 8.5	8 7
90 U 105	66	5.50	4.80	60 65	8 7.5	6.5 6
105 U 120	80	3.08	3.35	70 75	7.2 6.7	5.5 5.2
120 U 135	95	2.48	2.34	80	6.2	4.9
Total	--	90.13	90.47	--	208.1	236.1

8.3.12. 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.

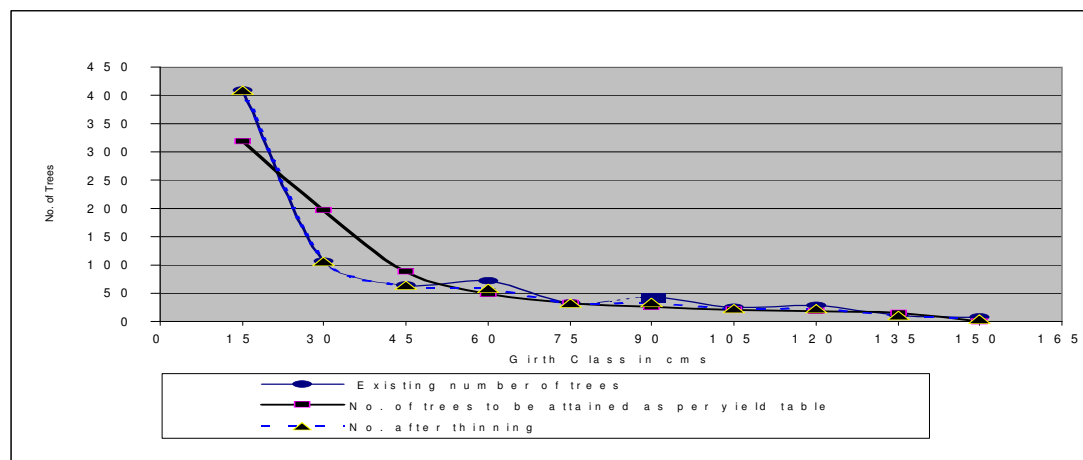
Table No. 8.12

Table Showing Management Intervention To Attain Number Of Trees As Per Yield Table
Average Site quality III with rotation 135 cm.

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	409	319	+90	0	409
16-30	106	197	-91	0	106
31-45	64	88	-24	0	64
46-60	72	49	23	13	59
61-75	33	33	0	0	33
76-90	44	26	18	10	34
91-105	25	21	04	2	23

106-120	28	18	10	5	23
121-135	11	15	-4	0	11
136-150	8	0	8	4	4
Total	800	766	34	34	766

Tending



SECTION 4. VOLUME TABLES

8.4.1. The Local Volume Table (Round Timber) for Teak site quality III as prepared during stem analysis, which was carried out for preparation of this Plan is given in the **Table No. 8.13**. The volume tables for miscellaneous species are also given below in the **Table No.8.14**.

TABLE NO 8.13

Table Showing Volume Table (Round Timber) For Teak (Site Quality III):

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.013
2	30/45	0.040
3	45/60	0.090
4	60/75	0.240
5	75/90	0.340
6	90/105	0.560
7	105-120	0.870
8	120-135	0.965

Table No. 8.14
Table Showing Local Volume Tables (Round Timber) 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
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. INCREMENT

8.5.1 The increment behavior of the crop can be assessed only by repeated inventories of the crop. In absence of such data the following method was, therefore, adopted to get a fair idea. The CAI put on by each Age/Size class was totaled and then divided by 16 (for Growing Stock Model only) to get the annual increment of a normal forest. For actual increment of the existing growing stock (SCI WC) the number of trees of in each size class was multiplied by the CAI for that class. The total gave the CAI of the whole crop. The following table gives the summary:

Table No. 8.15
Annual increment per/ha in M³

Estimated growing stock of F.S.	Plantation Teak Yield Table Model	Natural Teak Yield Table Model.
0.657	1.06	1.18

Apparently the increment figures compares well. But the normal growing stock increment is, however from a larger number of trees. The existing number of trees per ha. are less than 50 per cent of the normal growing stock. If prorata reduction on the basis of number of trees is made, the models show an increment roughly 0.75 M³ for plantation and 0.73 M³ for a natural crop models. The average of these i.e. 0.74 M³ appears to be a more rational figure 0.74 M³ increment represents 2.5 per cent annual increase for the existing growing stock of all the felling series.

8.5.3 The felling cycle is of 20 years. The annual yield in the form of increment over one hectare would work out to $(0.657 \times 20) = 13 \text{ cum /ha.}$

SECTION 6. ESTIMATION OF YIELD:

8.6.1. 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 No. 8.16
Table Showing Commercial Yield On Clear Felling Per Hectare

Girth-class Cm.	East <i>Melghat</i> Division				West <i>Melghat</i> 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	10.7 0
Total	322.6	48.16	121.4	15.77	245.2	17.21	319.2	43.9 3
Grand Total	No. of trees				564.4			
	Volume				63.93			

PART II
CHAPTER 1.
BASIS OF PROPOSAL

SECTION 1. THE NATIONAL FOREST POLICY

1.1.1. The National Forest Policy was first enunciated in 1894 and was revised in 1952, after independence. It was again revised in the shape of the National Forest Policy 1988, 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 12 mega biodiversity countries of the world. Conservation of biodiversity is directly linked with conservation of ecosystem and thus with water and food security.

1.1.6. 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.

NATIONAL FORESTRY ACTION PROGRAMME (NFAP):

1.1.7. 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.

1.1.8. Major Programmes of NFAP are given below:

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

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

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

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

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

SECTION 2. FUNCTIONAL CLASSIFICATION OF FORESTS

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

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

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

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

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

Miscellaneous forests:

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

1.2.7. Remaining areas needed for other purposes.

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

1.2.8. Tree Forest: This type of forest includes the better quality forests, capable of producing large sized timber having site quality III and IV. They have been worked under SCI Working Circle. 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 continue to be worked under SCI working circle.

1.2.9. Minor Forest : This type of forests includes the forests capable of producing 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 Afforestation W.C. under the previous plans. This forest will be

continued to be managed under Improvement W.C. 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 West Melghat Division

Category	Area in ha.			Percentage
	R.F.	P.F.	Total	
Tree Forest	37691.78	43.00	37734.78	63.57
Minor Forest	20194.55	1432.71	21627.26	36.43
Total	57886.33	1475.71	59362.04	100.00

SECTION 3. FACTORS INFLUENCING OBJECTS OF MANGEMENT

1.3.1. 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.

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

1.3.3. A 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 the Melghat. The topographical and biological biodiversity need to be taken care of while working these forests.

1.3.4. 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.

1.3.5. 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.

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

1.3.7. The whole tract 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:

1.3.8. 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 268 Tigers in Maharashtra, 55 - 60 i.e. about 20 to 22 % occur in Melghat forest only.

Catchments to 'Tapi ' and 'Wan ' rivers:

1.3.9. The Reserve forms a very important catchment to *Tapi* and *Wan* river systems with important tributaries like *Dolar*, *Sipna*, *Gadga* rivers. The *Gadga* River, which originates from *Eastern Part of Koha* 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

1.3.10 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 80 species of mammals and several species of reptiles, butterflies and insects. The reserve is also very rich in avifauna with 265 species of birds including the recently rediscovered Forest Spotted Owlet (*Athene belwitii*).

Rare endemic flora typical of Western Ghats and north Himalayas:

1.3.11 More than 769 naturalised species are listed in the flora of Melghat. It includes 91 tree species, 112 shrub species, 445 herb species, 37 climbers, and 94 grass species. The flora shows a combination of floristic elements from Western Ghat and *Satpura*, with many endemic species.

Rich in avifauna:

1.3.12. 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:

1.3.13 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 *Dhakna* 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 Narnala fort in and around:

1.3.14 To the north of Akot, about 20 Kms, stands hill fort Narnala; which is a monument of antiquity. The fort is having main entrance through four gates viz. the Delhi Darwaza, the Akot Darwaza, the Sirpur Darwaza & the Shahanur Darwaza. There are twenty two tanks on the fort, six of which

still holds water all around the year. The Sakkar Talao, Burhanuddin Tomb, Ambar bangla or Rani mahal, Pretty mosque & nine yard canon are the some places to visit on the fort. Being a part of the Wild Life Division, Akot, Narnala is a sanctuary having the area of 12.35 Sq.kms. The protection camp & wireless base station of Wild life Division, Akot is on the fort for monitoring protection activities. Needless to mention that the Melghat area has a viable population of Tiger, which has 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

1.3.15. 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 4. GENERAL OBJECTS OF MANAGEMENT

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

1. To preserve forest cover on hill slopes, along streams, watercourses and water bodies in order to prevent soil erosion and to check siltation in tanks; and

to maintain their essential protective and life support functions, including, regulation of the water regime and to maintain ecological balance. To preserve the catchments of rivers originating from Melghats, which forms the lifelines of the people of *Amravati*, *Akola* and *Buldhana* 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 sustainable yield of forest produce and other forest values 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 5. TREATMENTS PRESCRIBED

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

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

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

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

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

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

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

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

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

1.5.10. 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.

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

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

1.5.13. 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.

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

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

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

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

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

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

SECTION 6. ANALYSIS AND VALUATION OF THE CROP

1.6.1. The first stage analysis of forest crop is based on the species and tree girth distribution obtained from the enumeration data. It shows that the number of trees/ha has decreased in all W.Cs. A comparative statement of enumeration of Bahadur & Thengdi's Plan and current Plan for SCI W.C. are given below. Trees of important species such as Teak, Khair, Lendia, have shown decrease in number as well as volume. Though the number of trees/ha. of species such as Ain, Tiwas, Kalam, has decreased there is slight increase in the volume of these species. Species such as Shivan, Haldu, and Salai, shows increase in number as well as in volume. It is observed that on an average there is decrease in volume to the extent of 0.676 Cu.m./ha./yr

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

Sr. No.	Name of Species	Enumeration during Bahadur and Thengdi's plan		Enumeration during Current plan		Difference	
		No. of Trees /ha.	Volume in Cu.Metre	No. of Trees/ha.	Volume in Cu.Metre	No. of Trees /ha.	Volume in Cu.Metre
1	2	3	4	5	6	7	8
1	Ain /Sajad	5.34	1.559	4.01	1.575	- 1.33	+ 0.016
2	Lendia	11.21	1.293	8.57	1.127	- 2.64	- 0.166
3	Sivan	0.022	0.018	0.537	0.072	+ 0.515	+ 0.054
4	Teak	147.01	29.981	90.15	19.137	- 56.86	- 10.844
5	Tiwas	4.09	0.297	3.36	0.343	- 0.73	+ 0.046
6	Haldu	2.09	0.436	2.79	0.554	+ 0.70	+ 0.118
7	Kalam	3.54	0.389	2.45	0.466	- 1.09	+ 0.077
8	Khair	4.10	0.074	2.76	0.170	- 1.34	- 2.590
9	Salai	3.58	1.674	7.88	4.264	+ 4.30	+ 2.590
	Total	180.972	35.821	122.507	27.708	- 57.818	- 8.113

1.6.4. Compartments having sufficient dense tree cover and mature trees fit for harvesting are allotted to the Selection-cum Improvement (SCI) Working Circle. This working circle is expected to produce timber and firewood.

1.6.5. 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.

1.6.7. Bamboo patches are dispersed in the Division, but mainly found in the northern parts of *Dharni* Range and part of *Akot* Range. Compartments having more than 5 bamboo clumps per hectare are included in the Bamboo (Overlapping) Working Circle.

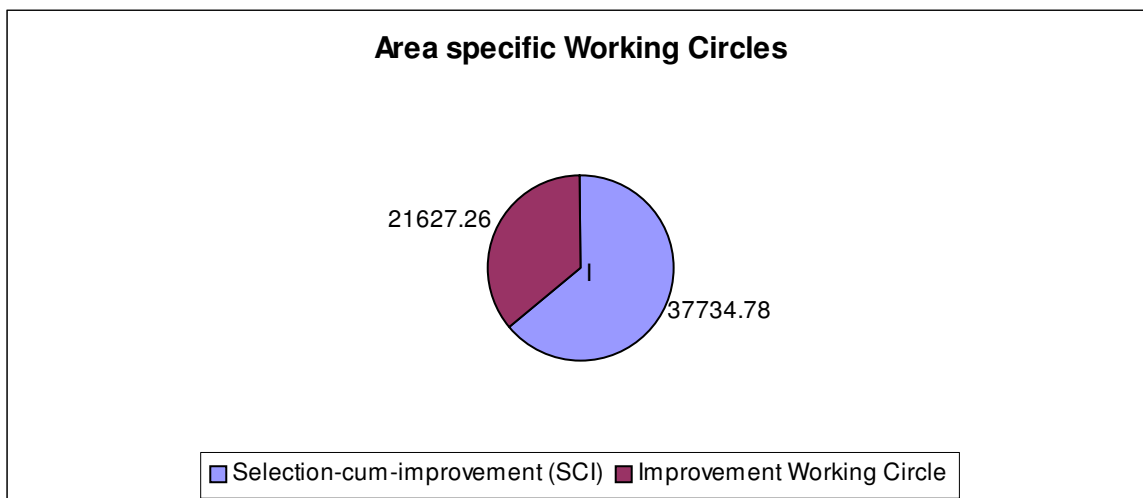
SECTION 7. WORKING CIRCLES AND THEIR DISTRIBUTION

1.7.1. For the purpose of formation of working circles, compartments have been used as unit for distribution. The allocation of compartments is based on preponderance of suitability to a specific working circle. Thus, two area-specific and four overlapping working circles are prescribed. The details of the range wise compartments allotted to Working Circles, and their areas are given in the **Appendix XLVIII** of Volume II of this plan.

Table No. 1.3

Table Showing Distribution of forest areas in various working circles

Sr. No.	Area-specific Working Circles (Ha.)				
	Name of Working Circle	Area of RF (ha)	Area of PF (ha)	Total area (ha)	Percentage
1	Selection-cum-Improvement (SCI) Working Circle	37691.78	43.00	37734.78	63.57
2	Improvement Working Circle	20194.55	1432.71	21627.26	36.43
	Total :	57886.33	1475.71	59362.04	100.00



Sr. No.	Overlapping Working Circles (Ha.)				
		RF	PF	Total	Percentage
1	Plantation (Overlapping) Working Circle	1200.88	-	1200.88	2.07
2	Bamboo (Overlapping) Working Circle	25361.87	-	25361.87	42.72
3	Wild Life (Overlapping) Working Circle	57886.33	1475.71	59362.04	100.00
4	NTFP (Overlapping) Working Circle	57886.33	1475.71	59362.04	100.00

Chapters on JFM and Forest Protection also incorporated.

1.7.2. Owing to reorganization of the Forest areas, merging the part areas of erstwhile West and South Divisions formed the Present West Melghat Division. However, the areas are continued to be worked under the same Working Circles that were prescribed in the earlier plans.

1.7.3. The SCI W.C. areas are largely concentrated in Dharni and Akot Range, partly in Dhakna Range and the Improvement W.C. are largely concentrated in Dhulghat Range and part in Dhakana Range. Bamboo (Overlapping) Working Circle is distributed in Dharni and Akot Ranges. Range wise Distribution of Working Circles and their areas are given in the **Appendix XLVIII** of Vol. II of this plan.

Table No.1.4.
Selection-Cum-Improvement Working Circle

Range	Reserved Forest (ha.)	Protected Forest (ha)	Total (ha.)
<i>Dharni</i>	16964.01	43.00	17007.01
<i>Dhakna</i>	7613.30	-	7613.30
<i>Dhulghat</i>	-	-	-
<i>Akot</i>	13114.47	-	13114.47
Total	37691.78	43.00	37734.78

Table No. 1.5.
Improvement Working Circle

Range	Reserved Forest (ha.)	Protected Forest (ha)	Total (ha.)
<i>Dharni</i>	-	-	-
<i>Dhakna</i>	1213.50	904.64	2118.14
<i>Dhulghat</i>	18981.05	528.07	19509.12
<i>Akot</i>	-	-	-
Total	20194.55	1432.71	21627.26

Table No 1.6
Plantation (Overlapping) Working Circle

Range	Reserved Forest (ha.)	Protected Forest (ha)	Total (ha.)
<i>Dharni</i>	334.184	-	334.184
<i>Dhakna</i>	-	-	-
<i>Dhulghat</i>	575.468	-	575.468
<i>Akot</i>	291.228	-	291.228
Total	1200.880	-	1200.880

Table No 1.7.
Bamboo (Overlapping) Working Circle

Range	Reserved Forest (ha.)	Protected Forest (ha)	Total (ha.)
<i>Dharni</i>	14930.84	-	14930.84
<i>Dhakna</i>	-	-	-
<i>Dhulghat</i>	582.70	-	582.70
<i>Akot</i>	9848.33	-	9848.33
Total	25361.87	-	25361.87

Table No 1.8.
Wildlife (Overlapping) Working Circle

Range	Reserved Forest (ha.)	Protected Forest (ha)	Total (ha.)
<i>Dharni</i>	16964.01	43.00	17007.01
<i>Dhakna</i>	8826.80	904.64	9731.44
<i>Dhulghat</i>	18981.05	528.07	19509.12
<i>Akot</i>	13114.47	-	13114.47
Total	57886.33	1475.71	59362.04

Table No 1.9
NTFP (Overlapping) Working Circle:

Range	Reserved Forest (ha.)	Protected Forest (ha)	Total (ha.)
<i>Dharni</i>	16964.01	43.00	17007.01
<i>Dhakna</i>	8826.80	904.64	9731.44
<i>Dhulghat</i>	18981.05	528.07	19509.12
<i>Akot</i>	13114.47	-	13114.47
Total	57886.33	1475.71	59362.04

SECTION 8. BLOCKS AND COMPARTMENTS

1.8.1. The Reserved Forests of the Division is distributed in 237 compartments. In addition to this the Protected Forest are distributed in 10 compartments. The details of the Reserves and their areas are given in the Chapter 1 of part 1 of this Plan.

Table No. 1.10
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	155	1	156
Improvement Working Circle	82	9	91
Total	237	10	247

SECTION 1.9. PERIOD OF PLAN:

1.9.1. This plan is for 10 years from the year of approval. The operations, however, have been prescribed for a period of 20 years. Mid-term review of the prescriptions of the plan is proposed in the 5th year of its implementation, on

receipt of the proposal from the CCF (Territorial) *Amravati* Circle. The Additional Principal Chief Conservator of Forests (Production and Management), *Maharashtra* State may issue necessary supplementary instructions on aspects not covered in the plan.

CHAPTER-II

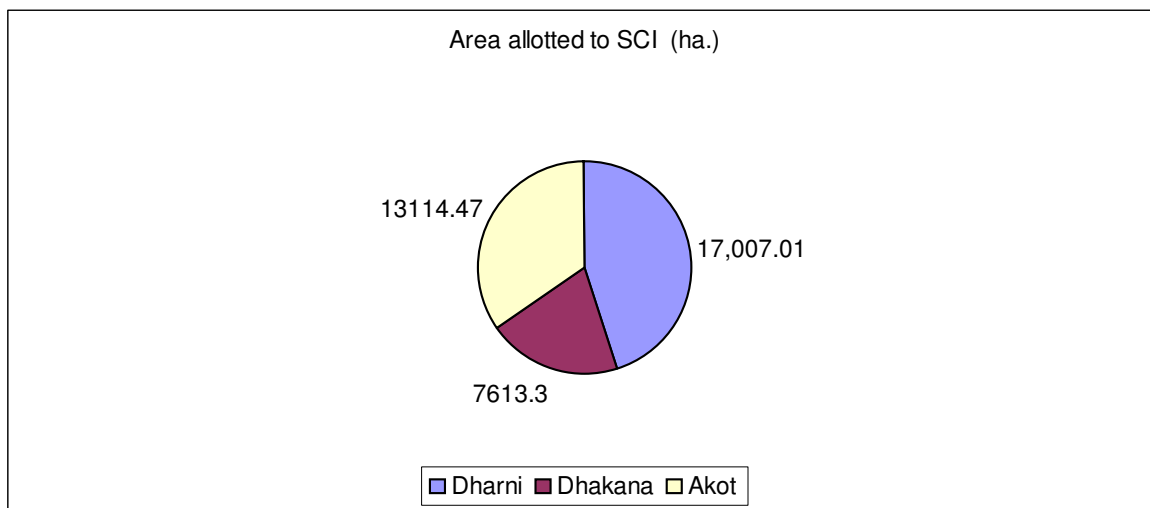
SELECTION CUM IMPROVEMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

2.1.1. The Selection Cum Improvement Working Circle includes areas of the Division, which were worked under SCI in Bahadur and Thengdi's Plan. These areas were worked under Coppice with Reserve Working Circle, during P.P.Joshi's Plan. The area details are as under.

Table No 2.1
Table Showing The Distribution Of Areas Range wise

Sr. No.	Range	Total Area (ha.)	Area allotted to SCI (ha.)	No. of Comptts. included	Remarks
1	<i>Dharni</i>	17,007.01	17,007.01	77	<i>Bahadur's plan</i>
2	<i>Dhakna</i>	9,731.44	7613.30	28	<i>Bahadur's plan</i>
3	<i>Dhulghat</i>	19,509.12	-	-	<i>Thengdi's plan</i>
4	<i>Akot</i>	13,114.47	13114.47	51	<i>Thengdi's plan</i>
	Total	59,362.04	37734.78	156	



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 IV, having crown density more than 0.4.

SECTION 2: GENERAL CHARACTER OF VEGETATION

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

2.2.2. 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, except in Ex-Jagir Forest areas of Kot, Kotha, Nanduri, Jambu etc. where crop is appeared to have been affected adversely. Density wise (number of stems per ha.) young and middle girth classes predominate.

2.2.3. *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*, *Jamun*, *Karu* etc. Where moisture in the soil is high species such as *Arjun*, *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*, *Pithondi* etc. The grass species found are *Pochati*, *Gondhali*, *Kusal*, *Sainar* etc.

Status of Regeneration:

2.2.4. Forest Resources Survey Unit, Amravati, collected the regeneration data. The results are tabulated as below(per hectare) :

Table No. 2.2
Table Showing The Status Of Regeneration of Teak And Miscellaneous Species

Species	R1	R2	R3	Total R
Teak	37.32	59.99	16.34	113.65
Non Teak	248.33	295.06	43.80	587.19
Total	285.65	355.05	60.14	700.84

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)

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

- 1) Recruitment of *Teak* and Miscellaneous species is 16.20% and 83.79% respectively.
- 2) 14.37% of the recruitment of *Teak* is establishing. Whereas 7.45% that of Miscellaneous species is establishing.

2.2.6. Regeneration of *Teak* is inadequate. Regeneration of Miscellaneous species is fairly satisfactory but only 7.45% 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 *Teak* establishment is fairly better than Miscellaneous species. Due to hacking, trampling and grazing of Miscellaneous species, few Miscellaneous plants are establishing.

SECTION 3: SPECIAL OBJECTS OF MANAGEMENT

The special objects of management are:

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

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SECTION 4: COMPARTMENTS AND FELLING SERIES

2.4.1. Total 156 compartments have been allotted to this working circle. They are divided into 13 Felling Series having 20 coupes in each of them. The average area

of the coupe is 145 ha. Coupe boundaries will be mostly natural features, so that boundary demarcation problems will be minimized.

Table No. 2.3
Table Showing Number Of Felling Series And Compartments And Their Areas Range wise

Range	No. Of Compts included	No. Of Felling Series	Area under SCI(ha)
<i>Dharni</i>	77	5	17007.01
<i>Dhakna</i>	28	2	7613.30
<i>Dhulghat</i>	-	-	-
<i>Akot</i>	51	6	13114.47
Total	156	13	37734.78

Table No. 2.4
Table Showing The Distribution Of Area Felling Series wise

Range	Name of Felling series	Area of Felling series	Compartments included
<i>Dharni</i>	<i>Patiya</i>	3096.26	665 to 667, 688 to 698, (14 compts)
	<i>Rajadehi</i>	4453.19	668 to 687 (20 compts)
	<i>Dharni</i>	3362.95	699 to 714, 1301 (17 compts)
	<i>Chitri</i>	4926.81	720 to 733, 1299, 1283, to 1288 (21 compts)
	<i>Bod</i>	1167.80	715 to 719 (5 compts)
<i>Dhakna</i>	<i>Mogarda</i>	5652.90	1164 to 1167, 1192 to 1195, 1198 to 1208, (19 compts)
	<i>Dolar</i>	1508.30	1157, 1158, 1163, 1209 to 1214 (9 compts)
<i>Akot</i>	<i>Ahad</i>	2171.53	982 to 984, 1018 to 1023, (9 compts)
	<i>Menghat</i>	2116.65	1024 to 1032, (9 compts)
	<i>Khatkali</i>	2521.60	956 to 966, (11 compts)
	<i>Popatkhedda</i>	2415.09	967 to 977, (11 compts)
	<i>Somthana</i>	2491.80	1077 to 1080, 1082, 1083, (6 compts)
	<i>Belkund</i>	1397.80	933 to 937 (5 compts)
Total		37734.78	156

SECTION 5: ANALYSIS AND VALUATION OF CROP

2.5.1 Stock Mapping: The stock maps of the area were updated. **Table No. 2.5 a** 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 51% of area. Old plantation forms only 3 %. Mixed forest is 18.4% Salai forest is 5.6 %. Blanks, cultivation and not stock mapped areas are 22 % of the total area.

2.5.2 IV Quality is predominant in this forest. The extent of forest is 18,611 ha. Out of this Teak forest is 56% and Mixed forest is 33%, Salai forest is 11 %.

Table No 2.5 a
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	III	9115.44	23.77
	IVa	6685.01	17.43
	IVb	3758.84	9.80
	Total	19559.29	51.00
Mixed	III	970.96	2.53
	IVa	4359.53	11.37
	IVb	1738.43	4.53
	Total	7068.92	18.43
Salai	III	79.46	0.21
	IVa	1737.00	4.53
	IVb	332.07	0.87
	Total	2148.53	5.60
Forest Type	Site quality	Area in ha	% area w. r. t. Total W.C.
Old Plantation	-	1186.65	3.09
	Grand Total	29963.39	78.13
Under stocked	-	3452.70	9.00
Cultivation		2646.04	6.90
Blank		2015.92	5.26
Waterbody		270.83	0.71
	Total	38348.88	100.00

2.5.3 Age and Density: The crop is a mixture of all age classes. The young and middle aged girth classes predominate. The crop density varies from 0.4 to 0.7. Around 33% 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. The crown density data obtained with the help of satellite imagery is given in **Table No. 2.5 b.**

Table No 2.5 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
Well stocked	12396.80	32.55
Understocked	18572.90	48.76
Blank	728.10	1.91
Waterbody	168.30	0.44
Others	6223.70	16.34
Total	38089.80	100.00
Area of W.C.	37734.78	
Difference	355.02	

2.5.4 Enumeration: 100 % enumeration was carried out in 1% of the total area by laying sample plots of 60m x 60m i.e. 0.36 ha size at the intersection of grids 600m apart. Each sample plot represented corresponding area of 0.36ha. **The**

detailed results of enumeration are given in the Statements I, II, III, IV and V of **Appendix No. XLV** Volume II of this plan. A summary of results of enumeration in SCI W.C. is given in **Table No. 2.6**. Abstract of growing stock under various girth classes is given below. The data reveals that 42% is *Teak* and *Lendia* is 3.95%. *Tiwas* 1.55 % , *Sajad* 1.85 % and *Haldu* 1.29 %. Overall the growing stock is less than the Normal growing stock, the details are shown in the **Table 2.7a**. Distribution of *Teak* and non *Teak* trees in various girth classes, felling series wise is given in **App.No. XLIX(b)**

Table No. 2.6
Table Showing Enumeration Data Of Number Of Trees Per Ha In SCI West Melghat Forest

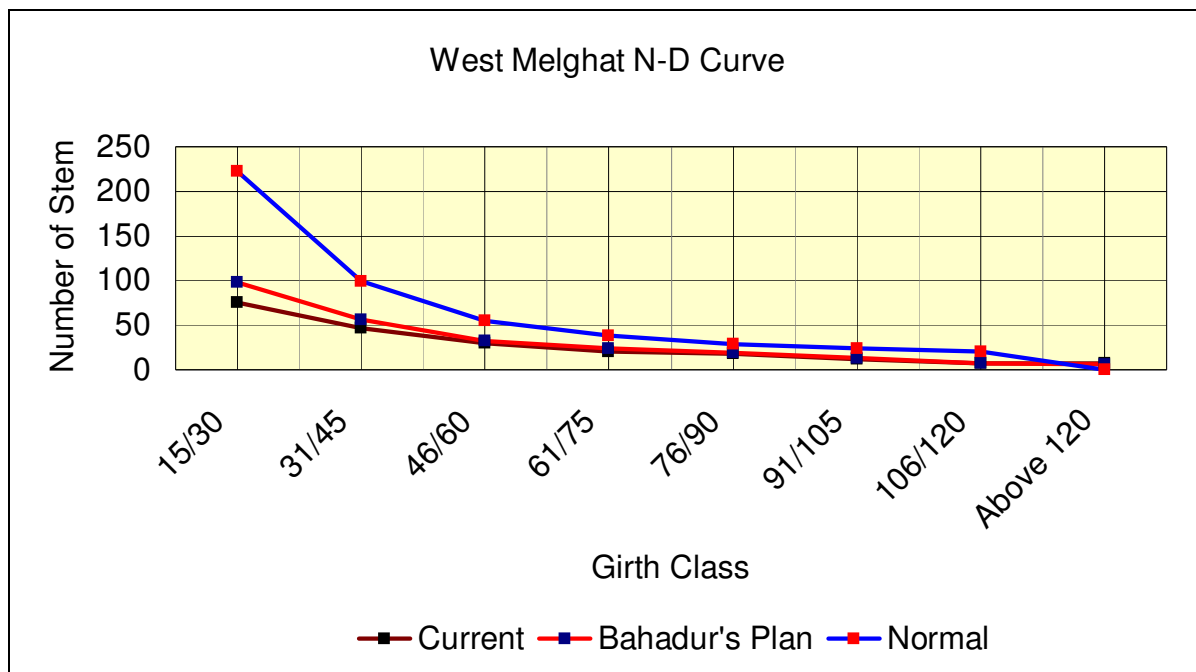
Period of Enumeration Dec 2002 to April 2003
Area enumerated 372.69 ha
Sampling 0.998 %

Total area covered 37339.00 ha
Intensity of

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	28.95	32.12	13.40	46.46	36.93	21.40	75.41	34.79
2	31/45	18.57	20.60	8.60	27.73	22.11	12.81	46.30	21.40
3	46/60	13.29	14.75	6.15	16.84	13.40	7.76	30.13	13.92
4	61/75	10.10	11.20	4.67	10.57	8.44	4.90	20.67	9.56
5	76/90	8.16	9.05	3.77	9.30	7.40	4.30	17.46	8.06
6	91/105	5.50	6.11	2.54	6.36	5.04	2.92	11.86	5.46
7	106/120	3.08	3.42	1.42	4.22	3.32	1.92	7.30	3.35
8	above120	2.48	2.75	1.15	5.12	4.05	2.35	7.60	3.50
Total		90.13	100	41.71	126.60	100	58.29	216.73	100

Table No. 2.7 a
Table Showing Comparative Statement Of Number Of Trees Enumerated Recently Versus Enumeration Results Of Bahadur's Plan

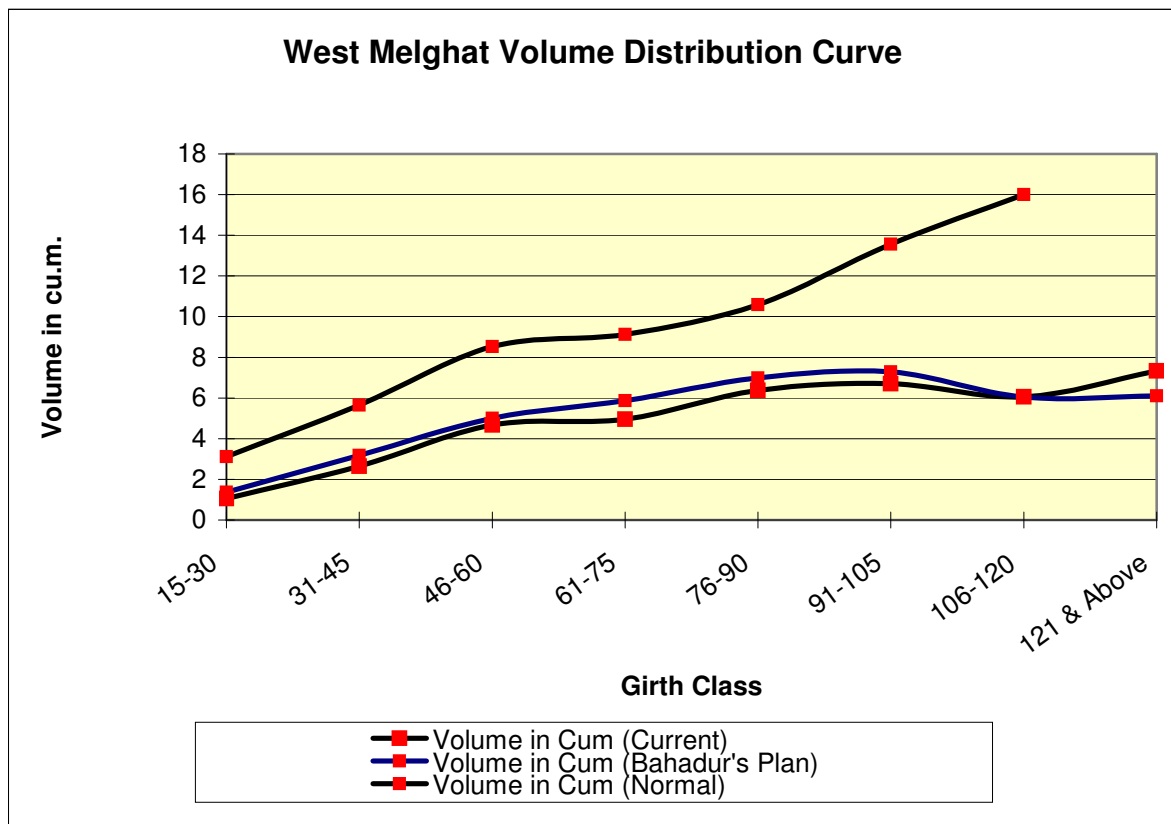
Girth Class	Current Plan	Bahadur's Plan	Normal
15/30	75.41	97.89	222
31/45	46.30	55.84	99
46/60	30.13	32.25	55
61/75	20.67	24.46	38
76/90	17.46	19.16	29
91/105	11.86	12.90	24
106/120	7.30	7.27	20
Above 120	7.60	6.32	0
Total :	216.73	256.09	487



2.5.5. (v) Analysis of growing stock: *Teak* in various girth classes has shown decrease in number from 147.74 to 90.13 per/ha. It is attributed due to poor recruitment and less establishment of *Teak* regeneration. The number of miscellaneous trees/ha has increased marginally in all girth classes except 15/30, compared to enumeration done during Shri *Bahadur* & *Thengdi* 's Plan period. Overall the growing stock has decreased from 256.09 to 216.73 trees/ha. Approximately 7.56 trees/ha are in the harvestable girth class. By removing the surplus and better management practices shall yield recruitment in the lower girth classes. The objective of the management is to have normal distribution of trees and basal area in various girth classes by adopting better management interventions.

Table No. 2.7 b
Table Showing Growing Stock
(Current, Bahadur's Plan Enumeration Results And Normal Growing Stock for Site Quality III)

Girth Class in cm	Current No. of Trees	Bahadur's plan	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. (Bahadur's Plan) in sq. m.	Volume in Cum (Bahadur's s Plan)	B.A. Normal in sq. m.	Volume in Cum (Normal)
15-30	75.41	97.89	222	22.5	0.004	0.014	0.30164	1.05574	0.39156	1.37046	1.4461	3.108
31-45	46.36	55.84	99	37.5	0.0112	0.057	0.519232	2.64252	0.625408	3.18288	2.484	5.643
46-60	30.13	32.25	55	52.5	0.0219	0.155	0.659847	4.67015	0.706275	4.99875	2.1711	8.525
61-75	20.67	24.46	38	67.5	0.0363	0.24	0.750321	4.9608	0.887898	5.8704	1.9939	9.12
76-90	17.46	19.16	29	82.5	0.0542	0.365	0.946332	6.3729	1.038472	6.9934	2.0579	10.585
91-105	11.86	12.90	24	97.5	0.0756	0.565	0.896616	6.7009	0.97524	7.2885	2.1935	13.56
106-120	7.30	7.27	20	112.5	0.101	0.830	0.7373	6.059	0.73427	6.0341	2.4169	16.6
121 & Above	7.60	6.32	0	127.5	0.129	0.965	0.9804	7.334	0.81528	6.0988	0	0
	216.79	256.09	487				5.791688	39.79601	6.174403	41.83729	14.7634	67.14



The table for growing stock shows that there is a deficiency in the volume in all the girth classes.

SECTION 6. SILVICULTURAL SYSTEM

2.6.1. The Selection system will be continued as was followed in the last plan. Improvement felling will also be carried out. 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. However this will be supplemented by artificial regeneration wherever required.

SECTION 7. FELLING CYCLE

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

SECTION 8. HARVESTABLE GIRTH

2.8.1. Stem Analysis for *Teak* has been carried out, for site quality III tree. The CAI and MAI cuts at 82 years of age corresponding g.b.h. is 113 cm. Most of the teak crop belongs to quality IV. Therefore to have conservative fellings, the harvestable girth shall be 120 cm. for site quality III, IV. The harvestable girth for the miscellaneous species *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. The CAI and MAI curves for coppice origin *Teak* trees intersects at 42 years of age corresponding to 69 cm girth at breast height. The Forests originating from Coppice is low in stature and is full of poorly formed trees. As high Forest is intended to be raised *Teak* trees of Coppice origin over the girth of 75 cm at breast height will be felled. However, this is subject to the cap of 50% yield prescribed in Section 10. If yield is increasing beyond the prescribed limit then mature *Teak* trees of seed origin will be retained in preference to *Teak* trees of coppice origin.

SECTION 9. FORMATION OF THE FELLING SERIES

2.9.1. There shall be 20 coupes in each Felling Series. The forests of this working circle have been divided into 13 Felling Series. Total coupes will be $13 \times 20 = 260$

Coupes in SCI Working Circle. Details are given in **Appendix No. LI** Volume II of this plan.

SECTION 10. REGULATION OF YIELD

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

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

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

2.10.4 Enumeration: Number of *Teak* trees as per the current enumeration are as under.

Table No 2.8

Girth class cm.	No. of trees/ ha.
15/30	28.95
31/45	18.57
46/60	13.29
61/75	10.10
76/90	8.16
91/105	5.50
106/120	3.08
Above 120	2.48

2.10.5 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 2.9

Girth classes in cm		Tree no./ ha (De Liocourt)	Survival percentage for reaching harvestable girth
VIII	15U30	28.95	8.08
VII	30U45	20.21	11.58
VI	45U60	14.10	16.60
V	60U75	9.85	20.76
IV	75U90	6.87	34.06
III	90U105	4.80	48.75
II	105U120	3.35	69.85
I	Above 120	2.34	100

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

Fraction Surviving while Reaching Next Class:

Table No 2.10

Girth classes	I	II	III	IV	V	VI	VII	VIII
Survival %	100	69.85	48.75	34.06	23.76	16.60	11.58	8.08
Proportionate Initial Availability	100	142.85	204.08	291.54	416.49	594.99	849.98	1214.26
Fraction Surviving when reaching next class	-	0.70	0.70	0.70	0.70	0.70	0.70	0.70

Table No. 2.11
Average Annual Recruitment (R_n)

Class	Tree reaching class I		Years in class		Average Annual recruitment (R _x)
	%	No.			
I > 120	100				
II 105-120	69.85	2.15	15	t ₂	0.14 ((R ₂))
III 90-105	48.75	2.68	14	t ₃	0.19 (R ₃)
IV 75-90	34.06	2.78	13	t ₄	0.21((R ₄))
V 60-75	23.76	2.40	9	t ₅	0.27(R ₅)
VI 45-60	16.60	2.20	17	t ₆	0.13(R ₆)
VII 30-45	11.58	2.15	12	t ₇	0.18(R ₇)
VIII 15-30	8.08	2.34	8	t ₈	0.30(R ₈)

v) Recruitment in Successive Cycle: -

Felling Cycle 20 years

Table No 2.12
Recruitment in Successive Cycle

Felling Cycle Total	Total Recruitment During Felling Cycle (fR _n)
1	15R ₂ + 5R ₃ = 3.05
2	9R ₃ + 11R ₄ = 4.02
3	2R ₄ + 9R ₅ + 9R ₆ = 4.02

vi) Realizable Recruitment in Successive Cycles: -

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

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

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

f = Felling cycle

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

R_x = Recruit in the class x

(a) 1st felling cycle: -

$$\begin{aligned} R_{r1} &= \frac{1}{2} [3.05 - 15 (3.05/20 - 0.14)] \\ &= 2.8625/2 = 1.4312 \end{aligned}$$

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

$$R_{a1} = 20 \times 0.14 - 1.4312 = 1.3688$$

(b) 2nd felling cycle: -

$$R_{r2} = \frac{1}{2} [4.02 - 14(4.02/20 - 0.19)] = 1.933$$

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

$$R_{a2} = 4.02 - 1.933 = 2.087$$

(c) 3rd felling cycle: -

$$\begin{aligned} R_{r3} &= \frac{1}{2} [4.02 - 13 (4.02/20 - 0.21)] \\ &= 2.0685 \end{aligned}$$

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

$$R_{a3} = 4.02 - 2.0685 = 1.9515$$

Table 2.13

Cycle	Accruing	1. Realizable 2. Accumulating	Hence Available in Cycle
1	3.05	1. 1.4312 2. 1.3688 } ₂	1.4312
2	4.02	1. 1.933 } ² 2. 2.087 } ₃	3.3018
3	4.02	1. 2.0685 } ³ 2. 1.9515	4.155 Stock in hands for next cycle

The availability in the first cycle is 2.34 + 1.432 = 3.772

(vii) Annual Realizable yield in cycle

Table No. 2.14

If stock in hand is liquidated in no of Cycles	Annual Realizable yield in cycle		
	1	2	3
1 cycle	0.1886	0.1650	0.210
2 cycle	0.177	0.177	0.210
3 cycle	0.188	0.188	0.188

If stock in hand is liquidated in no of Cycles	Annual Realizable yield in cycle		
	1	2	3
1 cycle	3.772	3.300	4.200
2 cycle	3.540	3.540	4.200
3 cycle	3.760	3.760	3.760

Liquidation in cycle	At hand	Accruing	Total	Realizable	Total liquidated	Percentage liquidation	Balance
1 cycle	2.34	3.05	5.39	1.4312	2.695	50 %	2.695
2 cycle	2.34	7.07	9.41	4.733	4.705	50 %	4.705
3 cycle	2.34	11.09	13.43	8.888	6.715	50 %	6.715

Thus, if available stems at hand are liquidated in three felling cycles, sustainable yield will be available for 50 % i.e. 50 out of 100 silviculturally available trees above selection girth can be marked for felling. On an average 3.772 trees/ ha. say 4 trees/ha will be available for felling per coupe.

Yield of 0.188 trees per ha is definitely realizable for 3 cycles.

Total prescribed yield for *Teak* trees per ha, per cycle = $0.188 \times 20 = 3.76$

= 0.5×3.76 (if 50% retained)

= 1.88 trees

= 1.88×0.985 cum

= 1.852 cum

If all the coupes allotted to W.C. are worked then we can expect average annual yield of *Teak* to be approximately 3500 Cum.

SECTION 11. AGENCY OF HARVESTING:

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

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

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

2.12.2. Treatment Map: Soon after the demarcation of the coupes and sections a treatment map will be prepared by R.F.O. and it will be verified by the A.C.F. and D.C.F. for the purpose of raising plantations, felling and protection. Treatment map will be prepared on graph paper in 1:5000 scale. The entire area of the coupe shall be divided into grids of size not bigger than 100 M X 100 M (1 ha.) after taking the base line that should as far as possible run through center of coupe. The trace of the coupe map will show the contours along with important features like nala, streams. A statement showing tentative A, B, C and D type areas in each compartment (prepared using satellite imagery) is given in **Appendix No. LXX** of Volume II.

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

I) Area 'A': Protection Areas

It will include the following areas:

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

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

A3 Highly eroded areas:

II) Area 'B': Blanks and Under stocked Areas: (In patches of 2 ha. or more) This will include areas with crop density less than 0.4 up to the slope of 25° but exceeding 2 ha. in extent at a place.

III) Area 'C': Pole crops and Old Plantation Areas: (In patches of 1 ha. or more) This will include patches of young well-grown pole crop of Teak and other valuable

species such as *Shisam*, *Bija*, *Ain*, *Bhirra*, *Dhaora*, *Salai*, etc. exceeding 1.0 ha in extent.

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

This will include areas with crop density more than 0.4. In the entire area, tending of the crop shall be carried out up to 60 cm. girth classes by providing a spacing of 1/3rd height of the tree to be retained to facilitate the growth of standing trees. Preference for *Teak* shall be given while retaining the trees in the tending.

2.12.3. Treatments:

Area (A): (i) The soil and moisture conservation treatment shall be given as mentioned in Miscellaneous Regulations.

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

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

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

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

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

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

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

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

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

2.12.4. Marking Technique And Marking Rules:

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

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

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

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

- (i) All dead trees after retaining 2 dead trees per ha. shall be marked for felling.
- (ii) All live high stumps will be cut as close to the ground (15 cm to 25 cm above ground) and dressed.
- (iii) Malformed seedlings will be cut back to induce coppice growth.
- (iv) The established multiple coppice shoots and poles will be reduced to one per stool retaining the vigorous one originating from the side bud, provided no seed origin plant is available in the vicinity.

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

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

IV) Marking For Area 'D':

- (i) All climbers ,except Malkanguni (*Celastrus paniculata*), will be cut.

(ii) All dead (after retaining 2 dead trees/ha) shall be marked for felling. Also 2 stag trees per ha will be retained for purpose of Wild Life Management. All live high stump will be cut as close to the ground as possible and dressed. All malformed trees shall also be marked for felling.

(iii) The multiple coppice trees will be marked to reduce the number to one coppice per stool retaining the most promising one. Care shall be taken to ensure that coppice originating from callus shoots are not retained.

(iv) No tree shall be marked for felling unless it is silviculturally available; no *Teak* trees (seed origin) in pre harvestable girth class i.e. (105 U 120 cm) shall be marked for felling. The removal of a tree should not accelerate soil erosion.

(v) If the no. of trees in approach class is more than in the harvestable girth class then the no. of trees equal to 50% of harvestable girth class, shall be marked for felling in the harvestable girth class, subject to yield regulation prescribed in para 2.8.1 and 2.10.6.

(vi) If the no. of trees in approach class is less than those in the harvestable girth class then the no. of trees equal to 50 % of approach girth class trees shall be marked for felling in the harvestable girth class, subject to yield regulation prescribed in paras 2.8.1 and 2.10.6.

(vii) Care shall be taken for retention of 50% of healthy trees of each species in harvestable girth class. This will prevent tendency of field staff to preferentially mark teak and other valuable species instead of miscellaneous species.

(viii) Removal of trees from harvestable girth classes shall be first of highest girth and then next below and so on so that over-matured trees are given preference for removal.

(ix) *Bija, Shisam, Semal, Kulu* and all edible fruit trees such as *Mahua, Tendu, Awala, Mango, Jamun, Char, Bel, Biba, and Behada* etc will be reserved against felling. Religious trees such as ficus etc., shall be retained.

(x) *Teak* trees of coppice origin above 75 cm girth at breast height shall be marked for felling. The Deputy Conservator of Forests (Territorial) shall ensure that *Teak* trees of seed origin are not marked by mistaking it as that of coppice origin and shall give a certificate to this effect.

(xi) Felling will be done after demarcation of coupes and marking of trees and due certification by the Competent Authority as per rules.

(xii) The undesirable undergrowth, which is preventing or likely to prevent the development of seedling regeneration of the desired species, will be removed.

(xiii) Tending of the “D” area crop, up to 45 cm. girth class shall be taken up.

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

SECTION 13. METHOD OF OBTAINING REGENERATION:

2.13.1. The NR is the best source for getting growing stock, provided available NR is well protected and tended. The NR has grazing, fire and weed growth as its worst enemies amongst many such things. Mr. Troupe observed that weed-growth is one of the serious obstacles to the establishment of NR. In these forest areas, NR of *Teak* has suffered from fire as observed by die-back phenomenon depending upon incidences and extent of fire occurrences. In deciduous forests *Teak* seedling suffers from desiccation, which needs mulching individually to reduce this effect.

2.13.2. Inducement Of Natural Regeneration:

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. The order of priority for retention & protection of NR will be *Bija*, *Shivan*, *Behada*, *Moha*, *Biba*, *Kulu*, *Teak*, *Lendia*, *Ain*, *Tiwas*, *Khair*, *Dhawda*, *Char*, and *Aola*.

2.13.3 ARTIFICIAL REGENERATION :

Area (A) : No planting shall be done. However in case of nala and river banks planting of bamboo at espacement of 6m x 6m and Jamun, Arjun, Grasses, Agave, etc., at espacement of 3m x 3m should be undertaken.

Area (B) :- In these areas plantation shall be undertaken at the Silviculturally prescribed espacement.

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

Area (D) :- This area does not need any planting. Bamboo under planting shall be undertaken in the areas (B), Area (C), Area (D), to facilitate putting up of desired increment to growing stock and improve production capacity of the growing stock, including older plantation in Bamboo overlapping area. Bamboo under planting at 6m x 6m spacing shall be undertaken in the 4th year from main felling.

SECTION 14: SUBSIDIARY SILVICULTURAL OPERATIONS:

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

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

i) All standing trees marked for felling but not felled shall be felled.

ii) All damaged trees, which are not likely to recover, shall be cut back.

Damaged bamboo clumps shall also be cut back.

iii) All climbers except *Malkanguni* in the plantation area shall be cut out.

iv) All malformed, suppressed or damaged advance growth of teak up to 30cm. Girth shall be cut to ground level to obtain good coppice.

v) All coppices arising from stumps of mature trees or felled tree of coppice origin shall be cut back.

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

i) All climbers except *Malkanguni* 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 will be cut and removed.

iii) Coppice shoots of teak will be removed if NR and AR are successful; otherwise shoots will be cut and reduced to one well grown shoot.

iv) The established advanced growth of teak and other valuable species will be spaced out suitably.

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

i) All climbers except *Malkanguni* 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 averagespacing between poles to 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 trees of above 60 cm g.b.h. shall be thinned.

A statement showing the sequence of CBO, Cleaning and Thinning is given in **App. No. LII** of Vol. II

SECTION 15: OTHER REGULATIONS:

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

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

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

2.15.1.3. The techniques of fire protection should be as per the paragraphs given in the Section 9.4 of Chapter on "Forest Protection"

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

2.15.1.5. Grazing Control: - The areas of main felling shall remain closed to grazing for a **period of 5 years**. Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. Lopping of trees such as *Bija*, *Shivan*, *Ain* etc shall be prohibited. 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.

2.15.1.6. Soil Conservation Works: Gully plugging and nala bunding works will be taken up. **However Contour Trenching Works (CCT/DCT) shall not be taken up as it exposes soil which accelerates the soil erosion.** 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.LVIII**. In addition to this contour stone bunding 60 cm x 30 cm size will be taken up on the slopes to prevent soil erosion, where boulders are not available agave suckers in 2 rows will be planted.

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

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

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

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

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

CHAPTER – III

IMPROVEMENT WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION

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

3.1.2. The area under Improvement Working Circle in *Thengdi's* plan have been continued under Improvement Working Circle. In addition, the areas under Afforestation Working Circle in *Thengdi's* Plan and Compensatory Afforestation areas have been included to be managed under Improvement Working Circle. 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.

3.1.3. The areas included in this Working Circle were worked under Improvement Working Circle and Miscellaneous Working Circle in P.P. *Joshi's* Plan. The area details are given in the **Table No. 3.1.**

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

Range	Total area of Range in ha.	Area under IWC in ha.	% w. r. t. Range Area	% w. r. t. W. C. area	No. of Comptts. included
<i>Dhakana</i>	9731.44	2118.14	21.77 %	9.79 %	12
<i>Dhulghat</i>	19509.12	19509.12	100 %	90.21 %	79
Total =	29240.56	21627.26	73.96 %	100 %	91

SECTION 2. GENERAL CHARACTER OF VEGETATION

3.2.1. In general, the forests of this Working Circle are inferior both in quality and composition. The prevalent quality is IV. 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 0.3- 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. *Parijat*, *Sambalu (Nirgudi)*, *Tarota* and *Ran-Tulas* undergrowth is common. Lantana occurs at some places in competition with other undergrowth.

SECTION 3. FELLING SERIES

3.3.1. Total 91 Compartments have been allotted to this working circle. The area has been kept under 8 Felling Series having 20 coupes in each of them. The compartment allotted to different felling series and their areas are shown **Table No. 3.2.**

Table No. 3. 2
Table Showing Compartments Allotted To Working Circle

Range	Name of F.S.	Comptts Nos. Allotted to WC	Area in ha.
Dhulghat	Wan	1123 to 1127, 1235 to 1238, 1240, 1241 = 11 Comptt.	3113.73
	Mothakheda	1128, 1129, 1137, 1146 to 1150, 1153 = 9 Comptt.	2604.99
	Patulda	1151, 1152, 1169 to 1176, 1196 = 11 Comptt.	2610.60
	Dabida	1177 to 1191 = 15 Comptt.	3924.81
	Ranigaon	1289 to 1298 = 10 Comptt.	2005.42
	Biroti	1215 to 1222. 1224 = 9 Comptt.	2171.88
	Jampani	1223, 1225 to 1234 = 11 Comptt.	2549.62
Dhakna	Bibamal	1154 to 1156, 1168, 1197, 1300,1302 to 1310 = 15 Comptt.	2646.21
Total		91 Comptt	21627.26

SECTION 4. BLOCKS AND COMPARTMENTS

3.4.1. The area of the working circle belongs to *Dhakna* and *Dhulghat* ranges. The areas of the compartment and their site qualities are given under **Appendix XLVI** of Volume II of this plan.

SECTION 5. SPECIAL OBJECTS OF MANAGEMENT

3.5.1. 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 6. ANALYSIS AND VALUATION OF THE CROP

3.6.1. Age: The crop is generally young to middle aged.

3.6.2. Stock Mapping: Existing stock maps were updated.

Table No 3.3 a
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	232.39	1.05
	Iva	1394.51	6.29
	Ivb	1067.13	4.81
	Total	2694.13	12.14
Mixed	III	824.70	3.72
	Iva	3366.02	15.17
	Ivb	976.30	4.4
	Total	5167.02	23.29
Salai	IVa	5972.30	26.92
	Ivb	2033.15	9.16
	Total	8005.45	36.08
Old Plantation	-	867.70	3.91
	G. Total	16734.20	75.43
Under stocked	-	1127.06	5.08
Cultivation	-	2148.13	9.68
Blank	-	2095.86	9.45
Water Body	-	80.21	0.36
	Total	22185.46	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
Well stocked	8188.20	35.10
Under stocked	10171.80	43.60
Blank	804.50	3.45
Water body	13.80	0.06
Other	4153.00	17.80
Total	23331.30	100
Area of W.C.	21627.26	
Difference	1704.04	

3.6.3. 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 35.10% of the area is well stocked and 43.60% of the area is under stocked.

3.6.4. Enumeration: The detailed results of enumeration are given in the **Appendix No. LVII** of volume II of this plan. The comparative statement of tree numbers in various girth classes of Bahadur & Thengdi's Plan and current plan are given in the **Table No. 3.4.**

Table No. 3. 4
Table Showing Comparative Statement Of Number of Trees/Ha

Girth class	Number of trees/ha as per Bahadur & Thengdi's Plan enumeration Result.		Number of trees/ha as per current enumeration	
	Teak	Miscellaneous	Teak	Miscellaneous
15u30	51.99	33.68	25.20	46.32
30u45	40.92	33.33	15.04	18.38
45u60	25.88	21.72	9.88	10.01
60u75	18.12	15.51	7.04	7.43
75u90	12.92	13.54	4.90	5.50
90u105	8.05	9.22	2.60	6.11
105u120	5.15	6.98	1.64	4.97
120u135	1.94	3.37	0.61	3.04
135 and above	2.07	3.08	0.35	2.65
Total	167.04	140.43	67.27	105.74
Percentage	54.32	45.68	38.88 %	61.12 %

3.6.5. The number of trees/ha have decreased from 307.47 (Bahadur & Thengdi's Plan) to 173.01 (Current Plan) as per enumeration results. Percentage of *Teak* has decreased from 54.32 to 38.88 whereas percentage of miscellaneous species has increased from 45.68 to 61.12.

SECTION 7. SILVICULTURAL SYSTEM

3.7.1. 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 40-45% of the area is open. There is a need to improve these areas in to well stocked areas through artificial regeneration. The upper reaches and steep slopes will be protected so that grasses can come up in these areas.

SECTION 8. ROTATION AND CONVERSION PERIOD

3.8.1. Since we are resorting to improvement fellings only, there is no need for fixing the harvestable girth.

SECTION 9. FELLING CYCLE

3.9.1. Felling cycle is fixed as 20 years. Marking for improvement of the crop shall be carried out.

SECTION 10. AGENCY OF HARVESTING

3.10.1. The coupes shall be worked departmentally. Preference will be given to the JFM Committees wherever the forest area is allotted for joint management to Village Committees.

SECTION 11. REGULATION OF YIELD

3.11.1. As the felling is meant for improvement of the crop, it is not necessary to prescribe yield regulation.

SECTION 12. SEQUENCE OF FELLING

3.12.1. The sequence of coupes and compartment numbers is given in the **Appendix No. LII** of volume II.

SECTION 13. DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP, TREATMENT PROPOSED AND MARKING RULES

3.13.1. Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

3.13.2. Preparation of Treatment Map: It will be prepared by RFO and verified by ACF. Treatment Map will be prepared on graph paper in 1 : 5000 scale. The entire area of the coupe shall be divided into grids of size not bigger than 100m x 100m (1ha.) after taking the base line that should as far as possible run through center of the coupe. The trace of the coupe map will show the contours along with important features like *nala*, streams, old plantation,

etc. A statement showing tentative A, B,C, and D type areas in each compartment (prepared using satellite imagery) is given in **App. LXX** of Vol. II., the area will be classified as follows.

1. Type 'A'- Protection Areas:

I) **Area 'A': Protection Areas** It will include the following areas

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

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

A3 Highly eroded areas.

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.

3.13.3. Treatments Proposed: The various treatments proposed are as under:

1. Area 'A': (i) The soil and moisture conservation shall be as given in Miscellaneous Regulation.

(ii) Planting of *Bamboo*, *Jamun*, *Arjun*, *Agave* and grasses along the nala and river bank shall be carried out. Seed sowing of *Khair*, *Lendia*, *Kusum*, *Bhirra*, and other local species and also stake planting of ficus species, *Pangara*, *Salai*, etc. in suitable are shall be carried out.

(iii) 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 Silviculturally prescribed spacing shall be followed.

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

3. Area 'C':

This area does not need any planting. But the crop is tended to provide a space of 1/3rd height of the trees to be retained.

4. Area 'D':

This area does not need any planting. Tending of the crop shall be carried out to provide a spacing of at least 1/3rd height of the tree retained to facilitate the growth of trees.

3.13.4. Marking Technique & Marking Rules:

(a) Marking Technique: All trees above 60 cm girth will be enumerated.

Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons of markings such as mature, dead, malformed, Live high stump, singling of coppice shoot etc. will be recorded. Marking technique has been discussed in the chapter, “Miscellaneous Regulations”.

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

1. Type 'A' Area: No marking will be carried out.

2 Type 'B' Area:

(i) All dead trees after retaining 2 dead trees per ha shall be marked for felling. 2 stag trees/ha will be retained for the purpose of Wild Life Management.

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

(iii) All malformed advance growth of *Teak* and other coppiceable species 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 originating from side bud, 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 1/3rd height of trees retained.

4. Type 'D' Area:

- i) All dead and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling. Care shall be taken to ensure that coppice originating from callus shoots are not retained.
- ii) The undesirable undergrowth, which is preventing or likely to prevent the development of seedling regeneration of desired species will be removed.
- iii) Tending of crop up to 45 cm girth class shall be taken up.
- iv) Malformed advance growth of *Teak* and other coppiceable species up to 30c.m. in girth will be cutback.
- v) *Bija, Shisam, Semal, Kulu* and all edible fruit trees such as *Mahua, Tendu, Awala, Mango, Jamun, Char, Bel, Biba, Behda*, etc will be reserved against felling. Religious trees such as *figus* etc., shall be retained.

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

SECTION 14. SUBSIDIARY SILVICULTURAL OPERATIONS

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

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

- i) All standing trees marked for felling but not felled shall be felled.
- ii) All damaged trees, which are not likely to recover, shall be cut back.
Damaged bamboo clumps shall also be cut back.
- iii) All climbers except *Malkanguni* in the plantation area shall be cut out.
- iv) All malformed, suppressed or damaged advance growth of teak up to 30cm. Girth shall be cut to ground level to obtain good coppice.
- v) All coppices arising from stumps of mature trees or felled tree of coppice origin shall be cut back.

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

- i) All climbers except *Malkanguni* 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 will be cut and removed.
- iii) Coppice shoots of teak will be removed if NR and AR are successful; otherwise shoots will be cut and reduced to one well grown shoot.
- iv) The established advanced growth of teak and other valuable species will be spaced out suitably.

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

- i) All climbers except *Malkanguni* 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 averagespacing between poles to 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 trees of above 60 cm g.b.h. shall be thinned.

3.14.5 A statement showing sequence of CBO, Cleaning and Thinning operations is given in **Appendix No. LII** of Volume II.

SECTION 15. REGENERATION

3.15.1. Natural Regeneration: The NR will be protected against fire and animals. TCM or other kind of fencing may be established.

3.15.2. 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.

3.15.3. Method of Planting:

The planting model approved by the competent authority will be implemented

3.15.4. Pre-Planting And Planting Operations: The pre-planting and planting operations as approved by the competent authority shall be carried out.

SECTION 16. OTHER REGULATIONS

3.16.1. 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.

3.16.2. 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.

3.16.3. To ensure effective protection from fire the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The Village Forest Protection Committees will be formed and fire protection will be done through the village protection committee.

3.16.4. The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

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

3.16.6. 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. Lopping of trees such as *Bija* ,*Shivan* ,*Ain*, etc shall be prohibited. 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.

3.16.7. Soil Conservation Works: Gully plugging and *nala* bunding works will be taken up. However Contour Trenching Works (CCT/DCT) shall not be taken up as it exposes soil which accelerates the soil erosion. Cement plugs or earthen *bandhara* be taken up 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.LVIII**. In addition to this contour stone bunding 60 cm x 30 cm size will be taken up on the slopes to prevent soil erosion, where boulders are not available agave suckers in 2 rows will be planted.

3.16.8. 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.

3.16.9. 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.

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

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

3.16.12. 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.

CHAPTER – IV
PLANTATION (OVERLAPPING) WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION

4.1.1 This overlapping Working Circle includes old Teak Plantations in the Division.

4.1.2. 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. The area of old Teak Plantations are not in a consolidated patch and they are spread over entire Division, except in Dhakna Range. The area under old Teak Plantations is as given in **Table No. 4.1**.

Table No.4.1
Table Showing Range wise Area under Old Teak Plantations

S. No.	Range	Area (in ha)
1	<i>Akot</i>	291.228
2	<i>Dharni</i>	334.184
3	<i>Dhulghat</i>	575.468
4	<i>Dhakna</i>	-
Total		1200.880

General Character Of Vegetation:

4.1.3. 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 thinning. Hence, the old Teak plantations (mentioned in **Appendix No. XXXIV**) 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 LIII** of Vol. II. The site quality of the plantation varies from III to IV.

Blocks And Compartments:

4.1.4. The list of old *Teak* plantations, its compartment number and Range is given in the **Appendix XXXIV** of Volume II of this plan.

Special Objects Of Management:

4.1.5. 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

4.1.6. Stock Maps: Most of the old teak plantations have been shown on stock map.

4.1.7.. Density:- Crop is fully stocked in general.

4.1.8. Enumeration: 100 % enumeration shall be carried out to assess the extent of thinning.

4.1.9. Age And Site Quality: Successful Plantations raised during 1961 to 2003 are included. The site quality varies from III to IV.

Cleaning:

4.1.10. A cleaning in a younger crop is made to remove any growth that interferes 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*, damaged or badly shaped poles/trees, climbers except *Malkanguni* (climbers shall be cut at ground level and at breast height).

4.1.11. 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 **Appendix No.LXXI (A)**. The Site Quality class boundaries are drawn on the map and demarcated on the ground by putting a coal tar band at breast height.

4.1.12. 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 Plantation.
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:

4.1.13. 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).

4.1.14. 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:

4.1.15. 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.

4.1.16. 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 age.

4.1.17. 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:

4.1.18. The detailed procedure of marking and thinning is given in the **section 11.7.44 to 11.7.48** of Miscellaneous Regulations and the same is followed. **The old Teak plantations mentioned in App. No. LIII(a)** of Vol. II 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 as early as possible. There afterwards, thinnings shall be carried out at an interval of 10 years, as per schedule is given in **App. No. LIII(b)** of Vol. II. 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.

Inspection of Marking:

4.1.19. 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 is considered that marking was done properly.

Maintenance of the Records:

4.1.20. 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. The detailed procedures of thinning are given in the Para **2.14.1** and proformas to tabulate the data are given in the **Appendix No. LXV** of Volume II.

Agency For Execution:

4.1.21. All the operations will be carried out exclusively by the department under the strict supervision of the Deputy Conservator of Forest.

SECTION 2. OTHER REGULATIONS

4.2.1. Fire Protection Measures: All along the inner edge of the section line a strip of 5 meter shall be left at the time of planting for maintaining it as fire line.

4.2.2. 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.**

4.2.3. 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.

CHAPTER – V
BAMBOO (OVERLAPPING) WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION

5.1.1. This is an overlapping working circle covers all *Bamboo* bearing forests and successful *Bamboo* Plantations in the Division. The Range wise distribution of the area is as under:

Table No.5.1
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 Area	% w.r.t. W. C. Area
			No. of Comptts included	Area(ha)		
1	<i>Dharni</i>	17007.01	69	14930.84	87.79%	58.87
2	<i>Dhulghat</i>	19509.12	2	582.70	2.98%	2.30
3	<i>Akot</i>	13114.47	34	9848.33	75.10%	38.83
4	<i>Dhakna</i>	9731.44	-	-	-	-
	Total	59362.04	105	25361.87	42.72%	100%

Compartments allotted to this Working Circle are given in the **Appendix LIV** of Volume II of this plan.

SECTION 2. ANALYSIS AND VALUATION OF THE CROP

5.2.1. Stock mapping: Stock-mapping was carried out during the current exercise of the plan. However the *Bamboo* overlapping areas have not been shown on the stock map. The extent of *Bamboo* overlapping areas mentioned in *P.P.Joshi's* plan has been taken into consideration.

5.2.2. 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 four categories, i.e.

- a) Current year bamboo
- b) Previous year bamboo
- c) Rest of the bamboo
- d) Dead bamboo.

5.2.3. Bamboos were found in 162 plots out of 1256 plots in which enumeration was carried out. All bamboo clumps in 20 m X 20 m Plot size were counted for culm analysis. 261 clumps were counted in 162 plots and analysed.

Table No. 5.2
Table Showing Felling series wise No. of clums/ha and details of culms.

Name of F.S.	No. of clump/ha	Distribution of clumps in a culm				
		Current year Bamboo (n1)	Previous year Bamboo (n2)	Rest year Bamboo (r)	Total Bamboo	Dead Bamboo (d)
Patiya	11.33	6.39	8.16	8.39	22.94	4.86
Dharni	9.34	4.57	5.88	7.00	16.45	1.89
Khatkali	5.10	9.34	8.92	15.75	34.01	2.92
Average	8.59	6.77	7.65	10.38	24.47	3.22

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. The result of enumeration for *Bamboo* clumps and *Bamboo* culm analysis are given in **Table No. 5.2**.

SECTION 3. SPECIAL OBJECTS OF MANAGEMENT

5.3.1. The special objects of management constituting this working circle are

- (i) To meet the needs of the local 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 4. GENERAL CHARACTER OF THE VEGETATION

5.4.1. 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 5. SILVICULTURAL SYSTEM

5.5.1. Culm Selection System: The silvicultural system adopted for the Working Circle is selective removal of dead and mature culms from mature clumps. Retention of at least **8 green mature culms** per clump is prescribed.

SECTION 6. CUTTING CYCLE

5.6.1. 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. CUTTING SERIES

5.7.1. To make work centers well distributed so that disturbance is localized and administrative control can be affected better Three (3) series have been identified viz. *Patiya*, *Dharni* and *Khatkali*. Bamboo area of cutting series is given in **Appendix LIV** of Volume II.

Table No. 5.3
Table Showing Range wise Area Under Bamboo

Sr. No.	Range	Name of felling Series	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	Dharni	Dharni BFS	7381.19	35	2162.20	43.40%	29.10%
2	Dharni	Patiya BFS	7549.65	34	2931.40	44.39%	29.77%
3	Dhulghat	Khatkali BFS	582.70	2	40.00	3.00	2.30%
4	Akot	Khatkali BFS	9848.33	34	1894.80	75.10%	38.83%
	Total =		25361.87	105	7028.40	42.72	100%

SECTION 8. CALCULATION OF YIELD

5.8.1. 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.

$$\text{Yield of green Bamboo} = \frac{(n2+r) - 8}{3} \times c/\text{ha.}$$

3

$$\text{Yield of dead Bamboo} = \frac{d \times r}{3}$$

n2 = Previous year Bamboo, r = Rest year Bamboo, d= Dead Bamboo

5.8.2. 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. 5.4
Table Showing Average Annual Production (In No. Of Culms) Per Hectare Of Coupe During Plan Period

Name of felling Series	Area of Felling Series	Yield from 1 st cycle			Yield from IInd cycle	Yield of Bamboo in Ist cycle	Yield of Bamboo in subsequent cycles
		1 st Year	II nd year	III rd year	IVth year onward		
Patiya	7549.45	50.64	50.64	50.64	32.29	3,82,304	2,43,772
Dharni	7381.78	21.07	21.07	21.07	15.19	1,55,534	1,12,128
Khatkali	10431.03	33.29	33.29	33.29	28.33	3,47,248	2,95,511
Total Yield						8,85,086	6,51,411

The following example will illustrate the procedure of yield calculation :

Example : Patiya 1st cycle Green $\frac{8.16+8.39-8}{3} \times 11.33 = 32.29$ culm/ha.

Dead $\frac{4.86 \times 11.33}{3} = 18.35$ culm/ha.

Total Green + Dead Bamboo = 50.64 culm/ha.

Thus yield in 1st cycle = 50.64 x 7549.45 = 382304

Yield in 2nd cycle= 32.29 x 7549.45 = 243772

The total expected yield of Long Bamboo = 6, 50,000

Bamboo bundles = 10000

SECTION 9. METHOD OF EXECUTING CUTTING

5.9.1 Demarcation: The coupe due for working will be demarcated as prescribed in Miscellaneous 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 Miscellaneous 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.

5.9.2. 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 3rd 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 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 10. IDENTIFICATION OF *BAMBOOS*

5.10.1. 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.

5.10.2. 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.

5.10.3. Second Year: - Culm sheath is absent, branches are present practically at all nodes, white bloom is patchy and comes off easily.

5.10.4. Third Year: - Culm sheath is absent, branches are present practically at all nodes, white bloom is absent and replaced by blackish gray.

SECTION 11. BAMBOO FLOWERING

5.11.1. In the year 1999-2000 patch flowering of Bamboo was observed over an area of 5061.20 ha of *Dharni* Range. Also Bamboo flowering observed in the year 1998 in compartment numbers 968 and 969 of *Akot* range and in the year 2006-07 in compartment no. of 1235 of *Dhulghat* range. 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, West *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 12: TREATMENT OF GREGARIOUSLY FLOWERED AREAS

5.12.1. 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 :

5.12.2. 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. The whole area should be strictly protected from fire and grazing.

5.12.3 Crop age above 8 years:

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 13. SEQUENCE OF CUTTING

5.13.1 Sequence of cutting is shown by Cutting Series in the **Appendix LIV** of Volume II of this plan.

SECTION 14. OTHER REGULATIONS

5.14.1. Fire Protection: Bamboo bearing areas shall be protected against fire.

.14.2. Grazing Control: Young recruits of Bamboo shall be protected from grazing and trampling by suitable method.

CHAPTER –VI
WILDLIFE (OVERLAPPING) WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

6.1.1. National forest policy 1988 and National Wildlife Action Plan 2002 aims at conserving and preserving the valuable natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country. The action plan emphasizes the necessity for the restoration of degraded wildlife habitats outside the protected areas in the following terms **“Forest management should take special care of the needs of wildlife conservation and forest management plans should include prescriptions for this purpose. It is especially essential to provide for ‘corridor’ linking with the protected area in order to maintain genetic continuity between artificially separated sub sections of migrant wildlife”**. The Wildlife (Protection) Act 1972 also emphasizes protection of wildlife in general and rare and endangered species in particular.

6.1.2. 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.

6.1.3. The tract dealt with is around *Melghat* Sanctuary and *Gugamal* National Park. *Melghat* forests have at its heart the *Melghat* Tiger Reserve that harbours 60 Tigers 95 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 20 to 22 % 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 west and south 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.

6.1.4. 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. 6.1
Showing Range wise area allotted to Wildlife (Overlapping) Working Circle

Sr.No	Range	Range area in (ha.)	Area in W.C. (ha.)
1	<i>Dharni</i>	17,007.01	59,362.04
2	<i>Dhakna</i>	9,731.44	
3	<i>Dhulghat</i>	19,509.12	
4	<i>Akot</i>	13,114.47	
Total of Division		59,362.04	

SECTION 2. GENERAL STATUS OF FLORA AND FAUNA

6.2.1. The tract dealt with surrounds *Melghat* Tiger Reserve. *Dhulghat*, *Dhakna* and *Akot* Ranges are interspersed by Gugamal National Park and *Melghat* Sanctuary as well as Narnala Sanctuary. *Dharni* range 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 poison, 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. The population estimation of Tiger and Panther is given in the Table below :

Table No. 6.2
Table showing population estimates of Tiger and Panther

Year	Tiger	Panther	Unknown	Total
2001	06	05	03	14
2005	01	01	-	2

Figures are tentative, subject to finalization by the expert committee.

6.2.2. The wild animals noticed in the tracts 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)* etc.

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 (Antelope cervicapra)* etc.

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

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 (Centropus sinensis); Yellow legged green pigeon; Gray tit; Pond heron; Cattle egret; Crested serpent eagle; Golden backed woodpecker (Dinopium bengalensis); Black drongo (Discurus adsinillis); Kingfisher; Small Kingfisher, Long Billed Vulture and White Backed Vulture* etc.

6.2.3. The floral species, with their botanical names found in the tract have been listed in the Glossary of Terms of this 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 3. SPECIAL OBJECTS OF MANAGEMENT

6.3.1. 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 4. LEGAL STATUS

6.4.1. 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 5. METHODS OF TREATMENT

6.5.1. To address the needs of wildlife in the area, following methods of treatment are recommended :

6.5.2. General:

1. Occurrence of all rare endemic and endangered wild animals as per schedules appended to Wildlife (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.

6.5.3. Protection:

1. Regular patrols and vigilance shall be carried out to prevent illegal snaring, trapping, killing and hunting of wild animals and rare plants. It will be effected through protection huts and squads of labour, mobile squads, check *nakas* and inspecting officers and with the active cooperation of the villagers.

2. Strict checking at the checking *nakas* shall be effected to check or prevent illicit transport of forest produce and wildlife.

3. The rewards to the informer with respect to wildlife offence cases are given immediately. Secret fund for the informers shall be established with the approval of the Government.

4. Specific sites, which are frequented by wild animals, will be protected from biotic interference. The waterholes, which are frequently visited by wild animals, will be excluded from grazing by making a special mention of such areas in the grazing permit. Such areas should be kept under constant vigilance and the pH of the water shall be monitored weekly. The labor 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 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.

6.5.4. Habitat Development:

1. Existing waterholes will be desilted/maintained/repared after the monsoon to augment the water supply during the pinch period. Action will be taken for artificial supply of water, whenever needed.

2. Suitable sites for the development of new waterholes, percolation tanks and cement bandharas etc., should be located and developed. Efforts shall be made for making available water, either naturally or artificially, every 5 sq.km.

3. Meadows, salt licks, dens, caves, nests used by wild animals shall be identified and given complete protection from biotic interference.

4. At the selected important places blocks of salt lick will be kept, particularly near waterholes.

5. Fruit bearing and shelter trees, which are necessary to the wildlife will be planted on suitable sites. 1% of total planting stock may consist of species like ficus, Zizypus etc.

6. The prescriptions given for the wild life given in the sections for marking rules in other Working Circles shall be followed.

7. The detailed plan of action shall be got approved by the Chief Wild Life Warden.

6.5.5. 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.

6.5.6. Estimation of wild animal populations:

1. Estimation of wildlife will be carried out every year by using water hole count method for herbivores and omnivores and pugmark analysis method for Tigers and Leopards during first week of May.
2. Permanent line transects shall be laid out and wildlife related incidences will be recorded and monitored through these transects. One transect at least in every beat covering different habitats will be laid. These transects should be visited at least once every year and pellet counts, scat encounter rates be done on these transects.
3. These prescriptions shall be explained to the field staff and shall be followed strictly.

SECTION 6. OTHER REGULATIONS

- 6.6.1. Area will be strictly and effectively fire protected.

6.6.2 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.

6.6.3. 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.

6.6.4. Measures to reduce the cattle number are given top priority. The person, who comes forward to reduce their unproductive cattle shall be encouraged by giving rewards and also preference be given to him while selecting the beneficiaries of any Government scheme.

6.6.5. 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.

6.6.7. Prepare a database of occurrence and status of all the plants and animal species with the help of the Botanical Survey of India and the Zoological Survey of India and also with the tie-ups with *Amravati* University.

6.6.8. Centrally Sponsored Scheme “Protection of Wildlife Outside Protected Area” be implemented in the area by sending a proposal to the Central Government. The scheme details are appended in **Appendix No. LX** of Volume II of this plan.

SECTION 7. ECO TOURISM

6.7.1. 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.

6.7.2. 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”**.

6.7.3. 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.

6.7.4. Eco-Tourism Attractions : There exist places like *Narnala* Fort and *Wan-Ambabarva* Sanctuary, *Popetkheda* Tank, *Shiv* Cave Temple at *Dhargad*, Nature Interpretation Center and Camping site at *Gullargath* and *Harisal*, *Amner* Fort on the bank of river *Gadga* which have tremendous tourist potential as well as great conservation values. However, these happen to be **outside the existing West Melghat Division area**. 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, '*High Point*' which is origin of *Pathar* river is in West *Melghat* Forest Division. The picturesque nature along *Dharni-Harisal-Akot* road is quite enticing. 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.

6.7.5. 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.

6.7.6 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. Nature Trails exist between, *Mahadeo* Cave Temple (Dhargadh) to *Narnala* and *Narnala* to *Gullargath* 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.

6.7.7. 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. Elephant rides can also be conducted for wildlife viewing. Charged rides could be extended to nearby camping tourists.

6.7.8. 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.

6.7.9. Visits to Other Places of Tourist Interest: There are many places of tourist interest like forts at *Bairagad*, *Ranika Mahal (Narnala)* and *Narnala Fort (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 –VII
NON-TIMBER FOREST PRODUCE (OVERLAPPING)
WORKING CIRCLE

SECTION 1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

7.1.1. 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 59,362.04 ha.

SECTION 2. NON-TIMBER FOREST PRODUCE OF THE TRACT

7.2.1. MINOR FOREST PRODUCE (MFP)

There are numerous Non- Timber Forest Produce available in this tract and are found in almost all ranges with varying extent. These natural produce contribute sizeable revenue to the State exchequers as well as generate employment to local people during their lean season. These natural produce play an important role in the rural economy of tribals and help maintain their health.

7.2.2. The important Non- Timber Forest Produce, found in this tract are *Moha* flower and seeds, *Tendu*, *Kulu* gum, *Salai* gum and *Dhaoda* gum, *lac*, *Aola*, *Charoli*, *Beheda*, *Bel*, etc. The girth class wise distribution of stems per hectare is given in **Table No. 7.1**.

Table No.7.1
Table Showing Species And Girth Class Wise Distribution
Of NTFP Trees / Ha In West Melghat Division

Sr. No	Species	No. of Comp.	15/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151& up	Total T
1	Tendu	224	3.25	0.75	0.36	0.14	0.09	0.05	0.04	0.01	0.01	0.01	4.69
2	Bel	44	0.21	0.17	0.12	0.06	0.02	0.01	0.00	0.01	0.00	0.00	0.60
3	Beheda	138	0.30	0.17	0.07	0.07	0.02	0.02	0.03	0.03	0.03	0.02	0.75
4	Aola	190	1.16	0.80	0.62	0.44	0.26	0.12	0.03	0.02	0.00	0.00	3.46
5	Charoli	189	0.89	0.90	0.59	0.37	0.22	0.13	0.06	0.02	0.01	0.00	3.18
6	Biba	158	0.06	0.10	0.05	0.03	0.02	0.01	0.00	0.01	0.00	0.00	0.28
7	Moha	104	0.17	0.17	0.14	0.12	0.12	0.08	0.08	0.05	0.09	0.09	1.11
8	Kulu	30	0.04	0.01	0.00	0.00	0.01	0.01	0.02	0.00	0.00	0.00	0.10
9	Dhaora	208	16.78	4.78	2.88	1.97	1.28	0.67	0.29	0.09	0.04	0.02	28.75
10	Salai	207	0.20	0.26	0.60	1.97	5.31	5.13	4.47	2.59	1.28	0.31	22.04
11	Khair	152	1.24	1.00	0.45	0.16	0.07	0.01	0.00	0.00	0.00	0.00	2.94
12	Kusum	108	0.27	0.12	0.06	0.07	0.08	0.07	0.03	0.03	0.01	0.01	0.71

7.2.3. MEDICINAL PLANTS:

7.2.4. The tract is rich in variety of medicinal plants which are used for curing various ailments by the local people. Medicinal plants occupy an important position in the socio- cultural, spiritual and medicinal arena or local villagers/tribes. Their sustainable management and harvesting can conserve bio-diversity, sustain human and environmental health, generate employment and earn foreign exchange by promoting exports.

7.2.5. The importance of medicinal plants and their uses are now world wide felt need of humanity. Even World Health Organization (WHO) is concerned about this. These plants are not only necessary for maintaining the environmental balance and biodiversity, but also they are looked upon as the future source of medicare of humanity. As most of the resources are still to be explored and their proper uses are yet to be brought to the knowledge domain of the people at grass roots and acceptable level. But the present methods of extraction of medicinal plants in the tract are not conducive for future

conservation. The methods of non-destructive harvesting are also not known to the common people.

7.2.6. For sustainable and ecological development of medicinal plants it has been realized that medicinal plants conservation in the tract need to be intensified. Field surveys and studies are required at micro level for in situ conservation. The present inventory of Forest Resources Survey Scheme (FRSS) Units is at macro level and does not give true picture. The timing of surveys of resources by FRSS is after rainy season. It is not appropriate for NTFP survey. By the time surveys are conducted most of the herbaceous plants disappear due to their life cycle. Also mere identification of species does not suffice. Survey should be exhaustive and at the appropriate time with respect to NTFP species, which are annual and have short life cycle. This needs to be done by the territorial field staff.

SECTION 3. SPECIAL OBJECTS OF MANAGEMENT

7.3.1. As per the National Forest Policy-1988, the development of Non Timber Forest Produce is one of the basic objectives for the forest management. Consistent with the above policy, the special objectives of management are as follows:

1. To manage NTFP and medicinal plants scientifically and to utilize the existing potential optimally and thereby, to enhance the productivity of these species potential optimally and thereby, to enhance the productivity of these species.
2. To take measures for conservation and sustainable use of the species identified as NTFP.
3. To generate employment for providing work to the local people and thereby improving their socio-economic conditions.

4. To provide better and improved quality of life of tribals through inclusion of traditions which support and link their life styles into sustainable harvest and use of NTFP.
5. To identify and conserve the forest areas rich in NTFP and medicinal plants.

SECTION 4. OWNERSHIP AND MONOPOLY PROCUREMENT OF THE NTFP

7.4.1 Parliament has enacted a law “The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996 (Act No.40 of 1996)”. The said Act, provides for endowing by the States, the Panchayats in the Scheduled Areas, with such powers and authority as may be necessary to enable them to function as institution of self Government. It further provided that a State Legislature should ensure inter-alia, that the Panchayats at the appropriate level and the Gram sabhas are endowed specifically with the ownership of minor forest produce.

7.4.2 Government. of Maharashtra has enacted a law “Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act, 1997 and has amended Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No.45 of 1997)”, vide which ownership of 33 MFP specified in the Schedule, found in the Govt. land has been transferred to the Panchayats. The MFP’s included in the Schedule are (1) Mahuwa flower, (2) Mahuwa fruits, (3) Gum, (4) Hirda, (5) Charoli, (6) Awala, (7) Baheda, (8) Neem seeds, (9) Karanj seeds, (10) Amaltas seeds, (11) Tamarindus indica, (12) Tamarind seeds, (13) Lac of Butea monosperma, (14) Lac of Schleicheria oleosa, (15) Seeds of Jatropha carcus, (16) Takada/Pauda Clerodendron phburidis, (17) Nirmali/Kapi, (18) Guggul, (19) Bapchi bee, (20) Kunchala kari, (21) Shikakai, (22) Reetha, (23) Biba, (24) Gunj seed, (25) Broom grass, (26) Mango seed, (27) Wawding, (28) Baphali, (29) Cut Grass and fodder, (30) Honey, (31) Sitaphal, (32) Cashew nuts.

7.4.3. Panchayats are to strictly adhere to the prescriptions contained in the Working Plan with regards to the harvest of Minor Forest Produce. In the areas

not covered under the Working Plan the Panchayats are to adhere to the rules made, with regard to the harvesting of Minor Forest Produce, by the Chief Conservator of Forests of the concerned circle.

SECTION 5. AGENCIES FOR COLLECTION

7.5.1. The *Maharashtra Tribals' Economic Condition (Improvement) Act, 1976* empowers the State Government to enforce monopoly procurement of certain goods including the NTFP in the Tribal Sub-Plan Areas. The Maharashtra Tribal Development Corporation (TDC) serves as the Chief Procurement Agent. List of items covered under the monopoly procurement vary among talukas and from year to year. This procurement provision is binding and therefore to be carried out accordingly.

7.5.2. In case of the remaining NTFP, the Deputy Conservator of Forests shall decide the agency for collection in accordance with the applicable rules and the policies of the department. In view of the National Forest Policy directives, local village communities should have the first charge over the NTFP collection.

SECTION 6. METHODS OF TREATMENT

7.6.1. Modifications according to legal provisions: Since legal provisions are not very explicit, it is recommended that treatments prescribed in the following paragraphs be modified according to the legal directives issued by the State Government from time to time. Traditionally 22756 ha forest area is under influence of villages for collection of NTFP.

7.6.2. Fire Protection measures: Collection of NTFP is often associated with forest fire, because the villagers set fire around the NTFP-yielding trees for clearance of leaf litter and undergrowth. Fires are also caused by agents of *Tendu* contractors to get better flush of *Tendu* leaves. If left unattended, such

fires spread into forests as forest fires. To control and prevent forest fires, following measures shall be adopted :

1. The village *panchayats* and JFMCs shall be involved in awareness generation program to control forest fires. Villagers should be encouraged to ensure that such cleaning do not end up as forest fire.

2. In case of forest fire, legal action should be taken up against the defaulters. Strict vigilance is necessary during the months of March-April to check the spread of fires in time during *Tendu* season.

7.6.3. Training for NTFP collection: Training programs for proper NTFP collection, value addition and marketing will be organized in each round to help ensure their sustainable harvest and use. The Education Circle should prepare and oversee the training modules. Considering the potential of NTFPs such as Moha, Gum and Lac etc, attention shall be given as given Tendu collection for non-destructive harvesting, value addition and marketing of these NTFPs. The potential yield of NTFPs is given in the **Table No. 7.2**.

Table No.7.2

Table showing potential yield of NTFPs

Name of Species	No of Trees/ha	Yield Kg/Tree	Yield /ha (in Kg)	Total Yield (in Kg)	Value in Rs per Kg	Total Value of NTFP Rs in Lakh
Moha	0.77	9.96	7.67	4, 55,000	15.00	68.29
Dhawada	1.11	1.00	1.10	66,000	100.00	66.00
Kusum	0.71	3.00	2.13	1,26,000	100.00	126.00
Salai	13.78	1.00	13.78	8,18,080	40.00	327.00
Palas	4.00	3.00	12.00	4,74,896	60.00	284.93
Total	-	-	-	-	-	872.22

7.6.4. Documentation of NTFP collection: The Beat Guards shall send monthly reports to the Range Forest Officer on the quantity of NTFP collected in their beats. The Range Forest Officer shall compile and send the details to the Division office. The Division office shall compile the figures for each species for the Division with a view to monitor their collection and harvest, to sustainable limits.

7.6.5. Non-destructive collection of NTFP: Unless detrimental to the wildlife conservation and site conditions, sustainable harvesting of herbs, non-destructive removal of flowers, fruit and other medicinal parts may be permitted by D.C.F. after the approval of the C.C.F. territorial concerned.

7.6.6. Compartments having promising regeneration areas of NTFP species shall be identified and tended to remove congestion in the crop.

7.6.7. Considering site suitability and local needs; NTFP species shall be given due place (10 to 15%) in various plantation schemes.

7.6.8. Except dead, diseased and specifically provided for, no NTFP trees shall be marked for felling during the coupe working under various working circles.

SECTION 7. MANAGEMENT OF TENDU

7.7.1. Collection of *Tendu* leaves: *Tendu* is the prominent revenue generating NTFP of this tract. *Tendu* leaves are used for manufacturing *bidis*. The collection season of *Tendu* leaves is short, and is hardly a month, from the last week of April to the last week of May.

7.7.2. This tract has potential to yield 7000 Standard Bags of *Tendu* leaves amounting to annual revenue of the Division about Rs.42.94 lakhs. **App. No. XLII** of Vol. II gives list of *Tendu* units in the Division.

7.7.3. *Tendu* leaves collection is monopoly of the State Government under the Maharashtra Forest Produce (Regulation of Trade) Act, 1969. The *Tendu* leaf collection shall be carried out in the manner prescribed by the Principal Chief Conservator of Forests and the Government from time to time.

7.7.4. *Tendu* leaves collection is an income generating activity for most local and tribal villages in the region. The local village communities shall be gainfully

engaged on priority in *Tendu* collection in the Division to support their livelihood.

7.7.5. 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.

7.7.6. *Tendu* regeneration: In view of the importance of *Tendu* to support the livelihood of forest dwelling communities and its economic value for the region, sustainable management and use of *Tendu* is prescribed.

7.7.7. Maintenance and improvement of *Tendu* in the forest crop composition is proposed by ensuring regeneration of *Tendu* and by protection.

7.7.8. Singling of shoots and soil working around *Tendu* seedlings is prescribed in the plantation and rootstocked areas to promote the growth of *Tendu* seedlings along with the annual coupe working in the area-specific working circles.

7.7.9. Soil Working for *Tendu* trees: Digging of 30 cm deep trench encircling *Tendu* trees of diameter matching tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse suckers come out. Singling and tending shall increase the population of this species. The practice is proposed to regenerate areas deficient in *Tendu* species in stocking.

SECTION 8. MANAGEMENT OF MOHA

7.8.1. *Moha* collection: *Moha* trees were found in 104 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.

7.8.2. *Moha* regeneration: NR of *Moha* shall be provided by dibbling of *Moha* seeds in the plantations and by carrying out weeding and soil working along with other planted seedlings during coupe operations of area specific working circles.

7.8.3 Soil working of *Moha* trees: Digging of 30cm deep trench encircling *Moha* trees of diameter matching the tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *Moha* in stocking.

7.8.4 *Moha* is to be included in the list of species prescribed for planting in various area specific working circles.

7.8.5. *Moha* Flower:

7.8.6. 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.

7.8.7. *Moha* Fruit:

7.8.8. 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 is used by Forest tribes for cooking purpose, as illuminance and hair oil, use 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 given in **Table No. 7.3**.

Table No. 7.3
Table Showing Moha Oil Properties:

SrNo	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

7.8.9. Yield: The *Moha* yield data collected by the MVSS *Chandrapur* are given below :

i)Moha trees starts bearing flowers and fruits between 10th to 15th years of planting. A study with reference to the yield of *Moha* flowers and fruits has

been conducted by the MVSS, Chandrapur in comptt.No.195 in Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girths were selected for the purpose of this study. Results obtained are given in **Table No. 7.4**.

Table No. 7.4
Table Showing Yield Of Moha Flower And Fruits

Weight in Kg.			
Sr. No.	G. B. H. in Cm	Flower	Seed
1.	076 - 090	06.00	1.20
2.	091 - 105	10.00	1.00
3.	106 - 120	11.25	2.00
4.	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 yield obtained above is on lower side)

ii) As per the tree enumeration carried out by FRSS Amravati, the number of Moha trees/ha having gbh > 45 cm is 0.77/trees/ha. On the basis of the study mentioned above expected yields of flower and seed come to 9.96 kg/ha and 2.09 kg/ha respectively. Estimated yield for West *Melghat* Division forest area is 591.25 tons and 124.06 tons respectively. However, the phenological character of the species is that flowering and fruiting generally occur alternate years or twice in three years.

7.8.10. Formation Of Units And Coupes: The range shall be the unit of working for the purpose of this working circle. Since operation is to be carried annually throughout the area and so the unit will be the coupe in this case. Individuals are presently doing the collection of *Moha* flowers and seeds. Normally they confine themselves around their village only to collect *Moha* flower and seeds. As per latest Amendment to *Panchayati Raj* Act, the ownership of the Minor Forest Produce in Schedule Areas is vested with *Gram Panchayat*. The collection and disposal of produce is to be carried out by the *Gram Panchayat* as decided by the concerned *Gram Sabha*. Most of the tract is under Schedule Areas. Hence the collection and disposal of these Minor Forest Produces will be governed by the *Panchayat* concerned. In the Non-Scheduled

Areas, for large-scale operation, collection may be done either by FLCS or any other agency under terms and conditions as decided by the Government.

7.8.11. Market: Moha flower and seed come under Monopoly Act and so the collection of *Moha* flower and seed is carried out by people and purchased 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.

7.8.12. Other Regulations:

i). Compartment wise list of Moha trees shall be prepared and maintained at Beat, Round and Range levels.

ii) One of the important reasons of forest fire is the burning of leaf litter on ground under *Moha* trees by the people to collect *Moha* flower. Therefore, before the start of flower falling, the ground under the *Moha* tree crown shall be cleaned with the cooperation of villagers and *chaukidars*. This may be treated, as one of the most important duties of the Beat Guard, failure in it and occurrence of fire shall be viewed seriously.

iii) The measures for enhancing the production and productivity by local means shall be explored and taken up.

iv) The collection and removal of seeds/fruits shall not be more than 75% of production.

SECTION 9.GUM

7.9.1. 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.

7.9.2. Regeneration of Gum Yielding Trees: NR of **gum yielding trees** such as *Kulu*, *Dhawra* and *Salai* shall be provided soil working along with other planted seedlings during coupe operations of area specific working circles.

7.9.3. 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.

7.9.4. 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.

7.9.5. Use Of Ethephone To Increase Exudate Gum Yield:

i) Experimental tapping of gum from *Acacia Senegal* was carried out at Central Arid Zone Research Institute (CAZRI), ICAR India and study of the properties of the gum was made. An important finding of the CAZRI Scientists has been the observation, that gum exudation from most of the trees can be increased (nearly

doubled), by injecting the plant hormone Ethephone (2- Chloroethyl Phosphonic acid) into the tree.

ii) Ethephone, a plant growth regulator has been known to be a precursor of Ethylene, which accelerates the ripening of the fruits and increases ball opening in cotton plants. It was for the first time that the CAZRI Scientists have shown its effect on increasing gum yield from trees.

iii) While using Ethephone injection, it is not necessary to scar the tree trunk and exudation starts due to abscission of cellulose tissues of various sites of the tree. Increase in exudation of gum when ethephone is injected, suggests that the gum is a normal metabolic product in certain plants, which is already present as sap in gum ducts. When cellulose cells are broken due to ethephone, creating abscission of gum ducts at several points, gum ooze out at such points.

iv) It has been observed that this method causes minimum injury to the tree and exudation is not confined to a particular site (e.g. place of blazing of the stem) as in the case of conventional method of gum tapping.

v) Similar experiments shall be carried out in the field to have a fair understanding on the efficacy of Ethephone on gum yielding trees.

7.9.6. Tapping Rules: The rules for tapping, derived by the FRI, *Dehradun*, are as follows:

i) The tapping season will commence from November to end of May each year. No tree below 90 cm in girth will be tapped.

ii) Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.

iii) Only trees above 90 cm in girth at breast height will be tapped.

iv) Each tree will be tapped continuously for 3 years and will be given a rest for 3 years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.

v) The initial blaze of 20 cm wide and 30 cm in length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edge having 7.5 cm wide blade. The blaze is made 0.6 cm deep in the bark.

vi) Blaze may be made horizontally leaving approximately equal space between the blazes. The blazes should not have any loose fiber. The lower surface of the blaze should be slightly slopping outwards to avoid lodging of guggul in the blazed pocket in case initial blazing is done by edge.

vii) The *guggul* starts oozing out soon after blazes are made and may be collected initially after a month i.e. by about December when the blazes may also be freshened. Subsequent collections and freshening may be done at fortnightly up to May. Thus 12 freshenings may be required to be made during the year.

viii) In each freshening, the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm is increased on either side in width at the end of 12th freshening. This means that about 0.3 cm should be scraped off either side in width in each freshening.

ix) The lowest row of blazes will be at one meter above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 meter from the ground level. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.

x) The number of blazes to be made on each tree will depend on its girth at breast height as given in **Table No.7.5**.

Table No. 7.5
No Of Blazes On Each Tree

Sr. No.	Girth at breast height	Max. No. of blazes to be made on each tree
1.	0.9 m to 1.3 m	2
2.	1.3 m to 2.0 m	3
3.	2.0 m to 3 m	4
4.	Over 3 m	1 blaze for every 45 cm girth in addition to category 3 above

a) No fresh blaze will be made on the partially healed up surface or old wounds.

- b)** Each blaze will be in a shape of parabola with a 2.5 cm. wide base. The curved side of the parabola will be upwards and of height not more than 7.50 cm and the depth of the blaze will not exceed 0.6 cm in the wood.
- c)** At the end of the session, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10 cm x 12.5 cm x 0.6 cm in width, height and depth respectively.
- d)** Since the tapping is to be done continuously for three years the total height of the blaze at the end of three years of tapping will be 37.5 cm, the width and depth remaining the same.
- e)** In the second cycle i.e. in the 7th year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operation will be repeated till unblazed portion is fully covered.
- f)** The above measures shall be implemented in certain areas to imbibe new techniques to the gum collectors by training the people and by monitoring the progress periodically.

7.9.7. Grading: The collected gum is graded into three classes:
i) White, ii) Yellowish, iii) Black coloured.

White coloured gum fetches higher price in the market compared to yellowish and black gum. Yellowish gum fetches 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.

7.9.8. Formation Of Units : Range is the unit.

7.9.9. Agency: As per latest amendment to *Panchayati Raj Act*, the ownership of the Minor Forest Produces in Scheduled Areas is with *Gram Panchayat*. The collection and disposal of that is to be carried out by the *Gram Panchayat* as decided by the concerned *Gram Sabha*. Hence the collection and disposal of these Minor Forest Produces will be governed by the *Panchayat* concerned. In the Non-Scheduled Areas, for large-scale operation, collection may be done either by FLCS or other agency under terms and conditions as decided by the Government.

7.9.10. Market: There is monopoly purchase by TDC under the provisions of Monopoly Act. Besides, the export of raw or finished goods shall be explored.

7.9.11. Other Regulations:

i) The compartment wise list of such trees shall be prepared and maintained at Beat, Round and Range levels.

ii) Cleaning around the trees to facilitate gum collection and to avoid fire, shall be done.

iii) Gum producing trees shall be reserved from felling.

iv) A strict watch is necessary to enforce tapping rules and check unauthorized collection of gum and tapping during the period of rest.

SECTION 10.KHAIR

7.10.1 The *Khair* (*Acacia catechu*) tree is distributed more or less in all ranges of this Division. The composition of this species is 2 to 3 % among all tree species. As this is very valuable species, its proper use is essential to increase the productivity of the area and for that taking it under the purview of scientific management is must.

7.10.2 Properties of Khair : Khair is known to occur on granite, gneiss, schist, quartzite, basalt, trap, limestone, conglomerate and lateritic soils. It grows best

on porous alluvium composed of sand. It also occurs on black cotton soil. Khair is strong light demander. It is capable of growing in dry situations where almost every other species fails to survive. The tree coppices well upto moderate size and produces root suckers, particularly where the roots have been exposed. This character can be used for its propagation as has been suggested for Tendu Coppice shoots. However, it requires complete light for their development. Root and shoot cutting can also be used for the method of propagation.

7.10.3. The wood is very hard and heavy. The average weight at 12 % moisture is about 1010 kg/m³ (ranging from 880 to 1170). The specific gravity of khair is 0.875 Growth rings are formed and are fairly distinct, demarcated by a fine, interrupted line of parenchyma occasionally accompanied by somewhat larger vessels. The timber is very hard and strong, very sturdy and moderately tough. The sap wood is not durable. The heartwood is very durable and is described by Pearson, “ One of the most durable Indian Woods which is seldom, if ever attacked by white ants and fungi. “

7.10.4. Use of Khair : The khair heartwood is chiefly used for the production of Katha and cutch since very long time. It is also used for all kinds of agricultural implements and is excellent for making spokes and hubs of cart wheels.

7.10.5. Khair gum is considered to be of very good quality and it is a good substitute for gum Arabic. It is advisable that the *Khair* trees should be tapped for some years to obtain gum prior to felling for katha production.

7.10.6. The *Khair* is the species mainly of degraded miscellaneous forests. The number of stems/ha (*Khair*) and its distribution among different girth classes have been given in **Table No. 7.1**. The yield of *Khair* has not been estimated separately.

SECTION 11 MYRABOLONS

7.11.1. Myrabolons use : These NTFP is used in many ways. *Hirda*, *Beheda* and *Aonla* are most common amongst Myrabolons. These are of high medicinal value and are used in many Ayurvedic medicines. *Hirda* and *Beheda* are given to children in villages invariably for cold, cough and stomach disorder.

7.11.2. YIELD: So far no study has been conducted to know the yield of fruits for trees of such species. *Hirda* trees are virtually absent, as can be seen from the **Table No. 7.1.** *Aaola* and *Behada* constitute roughly 3.5 and 0.75 trees/ha respectively.

7.11.3. FORMATION OF UNITS AND COUPES: The range shall be the unit. Since working is annual and covers the entire area and so unit will also be the coupe.

7.11.4. AGENCY FOR HARVESTING: As per latest amendment to *Panchayati Raj Act*, the ownership of the Minor Forest Produces in Schedule Areas is with *Gram Panchayat*. The collection and disposal of that is to be carried out by the *Gram Panchayat* as decided by the concerned *Gram Sabha*. Hence the collection and disposal of these Minor Forest Produces will be governed by the *Panchayat* concerned. In the Non-Scheduled Areas, for large-scale operation, the units shall be given on lease. The lessee will collect the same as per the direction of the Deputy C.F. concerned. The lease period should be from 1st July to 30th June. Lease shall be given for one year by calling tender at Division or Circle level. On failure of tender, departmental harvesting can be thought of, provided marketing tie up is made with user industries.

7.11.5. Market: All probable industrial consumers shall be identified and quality grades be fixed and department shall act as a facilitator between JFMC and consumer.

7.11. 6. Other Regulations:

- i) The detailed list of such species shall be prepared and maintained at Beat, Round and Range levels.
- ii) These species shall be excluded from felling.

- iii) The collection and removal of seeds/fruits shall not be more than 75% of production.

SECTION 12. LAC

7.12.1 Management of lac: 1. Lac Collection: The *lac* collection is not in practice in West 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. It can provide additional source of income to the local farmers and can provide employment opportunity to landless poor in the area.

7.12.2. Formation of Lac units: The units for collection of lac are prescribed to be co-terminus with the range boundaries to ensure effective monitoring and control. Each unit prescribed to be sold for the period of five years.

- i) The local JFMCs and FLCS and other village bodies shall be given first opportunity of collection, failing which units may be sold on public auction.
- ii) The training in collection, grading and preliminary value addition will multiply the returns of people.
- iii) Obtaining brood lac and growing them on the *Kusum* trees in the first instance shall be carried out departmentally.

SECTION 13 MEDICINAL PLANTS

7.13.1 .Important Medicinal Plants : The important medicinal plants found in this Division are *Asparagus racemosa*, *Chlorophytum tuberosum*, *Equisetum sp.*, *Hygrophila auriculata*, *Boerhaavia diffusa*, *Terminalia bellerica*, *Emblica officinalis*, *Gloriosa superba*, *Plumbago xeylanica*, *Holarrhena antidysenterica*, *Hemidesmus indicus*, *Helicteres isora*, *Vernonia cineraria*. Detailed list of medicinal plant is given in **Appendix No. LXI of Volume II**. The plants found in Melghat forest and included in the Red Listed Medicinal Plants of Maharashtra (Source : FRLHT) are given in **Table No. 7.6**.

Table No. 7.6**Red Listed Medicinal Plants of Maharashtra (Source : FRLHT)**

Sr. No.	Name of Species	Common name
1	<i>Aegle marmelos</i>	Bel
2	<i>Drosera indica</i>	
3	<i>Celastrus paniculatus</i>	Malkanguni/Jotishmati
4	<i>Emblia ribes</i>	Wavading
5	<i>Chlorophytum borivillianum</i>	Safed Musali
6	<i>Oroxylum indicum</i>	Tetu/Shanuk
7	<i>Saraca asoca</i>	Sita Ashok
8	<i>Rauvolfia serpentina</i>	Sarpagandha
9	<i>Pueraria tuberosa</i>	Ghor bel
10	<i>Baliospermum montanum</i>	
11	<i>Embelia tsjeriam-cottam</i>	Wavading
12	<i>Gloriosa superba</i>	Kallavi
13	<i>Santalum album</i>	Chandan
14	<i>Terminalia arjuna</i>	Arjun

7.13.2 ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS

7.13.3 Methodology for studying the medical plants-Survey etc : In order to assess the potential of areas rich in medicinal plants the field surveys were conducted by FRSS of Amravati Also it conducted enumeration of 1 % of the entire tract for trees and shrubs. Enumeration of herbaceous plants and grasses could not be done as these species occur in monsoon season. It should be done by the territorial Division.

7.13.4. MANAGEMENT OF THE AREA:

7.13.5. Medicinal plants are mainly herbaceous, tubers, shrubs and some trees. Hence the management of medicinal plants is same as that of Non Timber Forest Produces. It is a new concept in forest management. Judicious utilization of medicinal plants need detailed studies about its occurrence, area, extent, phenology, production level and non destructive exploitation.

7.13.6 Method of Treatment: The involvement of Joint Forest Management Committees in conservation and management of medicinal plants to augment their income should be the basis of management. Division should facilitate the training for treatment of medicinal plants their product along with marketing.

Help of taxonomists of local science college or university should also be sought for identification of plants. Creation of market links and bank guarantees for sale of produce will lead to generating confidence for forest management. Methodology to be adopted should be as follows:

- I. Selection of suitable non-degraded areas where medicinal plant collections are already underway.
- II. Involvement of a competent local NGO for organizing the community.
- III. Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- IV. Joint management of forest sites by the local Forest Department and organized local communities. Assign specific forest areas to specific local village communities with clear delegation of responsibilities, privileges and full accountability. Proceeds of the harvest of medicinal plants to be shared under the JFM framework.
- V. Creation of market links for sale of produce at the outset of the programmes.
- VI. Building and strengthening community institutions for sustainable management.
- VII. Only such plants/parts of the plant specified for each species whose medicinal values are recognized should be collected e.g. fruits and seeds of *Neem* tree.
- VIII. Removal of plants or plant parts of species other than the specified ones shall be totally prohibited.
- IX. Lopping of branches to gather buds, fruits or leaves shall be totally prohibited.
- X. Fruits and seeds that have fallen to the ground alone are to be collected. May be the branches can be gently shaken to facilitate the shading of fruits and seeds.

- XI. For each medicinal plant/tree species about 1-2 % of the population shall be left as seed bearers for encouraging natural regeneration and also seed collection. These trees shall be numbered and ring marked and no collection shall be done from these seed bearers.
- XII. Species to be raised for use in Primary Health Care, trade in the RF/PF areas will be listed out category wise, well in advance to facilitate nursery operation. Information already generated on nursery and plantation techniques for the chosen species will be used for artificial regeneration.
- XIII. Based on the outcome of the survey of the vegetation, the proportion of medicinally important species shall be increased while taking up reforestation works under eco-restoration and water augmentation programmes.
- XIV. Tending of coppice shoots/root stocks of existing trees shall be taken up and the natural regeneration shall be encouraged.
- XV. Seeds/seedlings shall be sown/planted in the barren patches and in the weeded and soil worked areas around the tree saplings. Medicinal plant species of the nature of the climbers can be planted close to the naturally existing trees and shrubs or their natural hosts.
- XVI. If contour trenching is carried out, the species mentioned in the previous Para can be raised on the mounds in the first year and in the trenches during the next year when some silt gets deposited in them.
- XVII. At convenient contour intervals, say 30 m shrubs like *Kumari (Aloe barbensis)*, *Adulsa (Adhatoda vasica)*, *Nirgudi (Vitex negundo)* and *Vettiver (Vetiveria zizanioides)* can be raised as vegetative barriers along the contour. These species can also be planted along the RF boundary. This will incidentally facilitate demarcation of the RF from the buffer zone.
- XVIII. In the swamps, along the stream banks and on the water spread areas and aprons of check dams and percolation ponds, hydrophytes

like *Neerbrahmi* (*Bacopa monnieri*), *Vallarari* (*Centella asiatica*), *Vakhand* (*Acorus calamus*), *Arathi* (*Alphinia calcarata*), etc can be planted.

7.13.7 SUSTAINABLE HARVESTING OF MEDICINAL PLANTS: Information

suggesting norms for sustainable levels of harvest shall be worked out by the territorial Deputy Conservator of Forests after taking into consideration the results of vegetation survey and availability of medicinal plants species and the parts of the plant or tree used for medicinal uses. Untimely harvesting should not be permitted otherwise natural regeneration will be affected. In case where the roots/tubers/rhizomes or the specific plant parts are used in medicine, the natural regeneration of these species shall be ensured by leaving well distributed and adequate numbers of seed bearers. An alternative would be replant the area after harvest. Destructive collection should be prohibited. In some plants whose leaves are used for medicinal purposes, it is common practice to uproot the whole plant and therefore in such cases only the leaves should be allowed to be collected. In case of *Vettiver*, the roots alone are used in medicine. Since it is raised as a soil binder and vegetative barrier, harvesting can be taken up only when the slips establish, produce tillers and the clumps form a thick barrier. At this stage, leaving a strip of grass barrier on the uphill side tillers can be uprooted on down hill side. Similarly in case of *Cymbopogon* species leaves are to be harvested every quarter. On no account should the clumps be allowed to set fire to, to encourage tillering and development of new and young shoots. In this case if the clumps lie scattered, the harvesting will be done only once a year and that too well after the plants flower and seed dispersal has taken place.

SECTION 14. SAFED MUSLI

7.14.1 Management of Safed Musli: *Safed musli* (*Chlorophytum borivillianum*) 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: High point.(Akot range)

Part Used: Tuberous Root

7.14.2. *Safed musli* is collected and sold to the local traders, which is dried and debarked and sold in the Delhi market. Till 2 years back it used to fetch Rs. 600/kg. for dried material., Since it is an endangered species, all collections from the forest are illegal. Musli forming is a common activity in *Akot* and *Anjangaon* Tahsils of Amravati District.

SECTION 15. RUSA GRASS

7.15.1 General character of the Vegetation:

(i) Rusa grass (*Cymbopogan martinii*) is also known as “*Tikhadi*” occurs in two varieties viz. “*Motia*” and “*Sofia*” of which the “*Motia*” variety is valuable having more geraniol contents. These two varieties are morphologically quite similar, though an experienced eye can distinguish them in field from their appearance. In odor, however, they differ from each other. The grass is not gregarious in habit and is found in patches in open forests or dry sunny slopes.

(ii) Rusa grass is a perennial plant attaining a height of 1.5 m to 2.5 m. It is susceptible to frost. The aerial parts die in winter. The root stock sprouts in spring and by middle of October, the grass is in blossom. It does not stand water and prefers a dry, well drained soil of basaltic origin.

7.15.2 Special objects of Management. :

(i) Palma Rusa oil of commerce is obtained from the flowering tops and leaves of Rusa grass which is wildy occurring in West Melghat Forests. It is the source of finest commercial geraniol. ***Motia*** variety contains 80 % to 90 % geraniol where as ***sofia*** variety contains only 36 % to 66 %. It is extensively used in perfumery as a base and is being exported. It also have a medicinal value. It is therefore, necessary to introduce a scientific management for extraction of this valuable foreign exchange corner and also to increase its

proportion in the grasses. Thus the special objects of management are as follows.

1. Increase the proportion of Rusa grass and
2. To introduce scientific management for extraction of Rusa grass with a view to obtain maximum sustained yield. One Rusa grass plantation exists in present area of this Division.

Range	Year	Comptt.	Area in ha.
Dhulghat(Rly)	1972	1181	50.00

The system of distillation of oil from Rusa grass in the forest is already abandoned and should continue. Instead the grass should be sold out to established distillation plants.

SECTION 16. RESEARCH WORKS

7.16.1. There are so many Non Timber Forest Produce and Medicinal Plants in the forest which are unidentified and untapped. The efforts of the department shall be to explore them and manage them scientifically. The work of identification of medicinal plants and its estimated production shall be taken up. The proforma for collection of data is given in **Table No. 7.7.**

Table No. 7.7
Proforma for collection of NTFP and Medicinal Plants data

S.No.	Scientific Name	Local Name	Type of Plant	Part used	Area where found (ha)	Quantity per/ha.	Estimated harvest/ha.	Remarks.
1	2	3	4	5	6	7	8	9

7.16.2. Over 150 medicinal plants have been identified so far. This is not the exhaustive list of medicinal plants. It is open to add more names of such plants. Besides, identification and localization of the same in the field for future study. Innovation and research works should always be carried out and the same is recorded and reported properly so that it could be of use to the local population.

SECTION 17. OTHER IMPORTANT PRINCIPLES AND PROCEDURES

7.17.1. The following are important principles and procedures:

7.17.2. The annual estimates for collection of Non Timber Forest Produce and Medicinal Plants shall be made based upon the experience.

7.17.3. The Chief Conservator of Forests shall approve the annual estimates for the collection of NTFP.

7.17.4. The Range Forest Officer for the respective range shall issue the passes for collection of NTFP to the lessees and keep record of the collection etc.

7.17.5. The Non Timber Forest Produce and Medicinal Plants lease units shall have district boundaries.

7.17.6. NTFP collection estimates shall be based upon the inventories of forest resources.

7.17.7. Scheme shall be formulated for improving yields of Non Timber Forest Produce and Medicinal Plants e.g. plantations, protection against disease etc.

7.17.8. Measures shall be taken to maintain and improve the present output of the Non Timber Forest Produce and Medicinal Plants.

CHAPTER VIII
JOINT FOREST MANAGEMENT

SECTION 1. JOINT FOREST MANAGEMENT

8.1.1. Background Of The Joint Forest Management:

The National Forest Policy 1988 envisages massive people's movement for conservation of forest resources. Thus, the government of India advised state governments in June 1990 to involve local people in protection and development of forests. Participatory management strategy envisaged in forestry sector is known as Joint Forest Management (JFM). Therefore, instructions have been issued for incorporation of prescriptions of joint forest management in the working plan. Hence, separate Chapter has been incorporated for this purpose.

8.1.2. Government Resolution no. SLF-1091/199/F-11 dated 16th March 1992, this approach was adopted for degraded forest area of the State and new guidelines have been issued vide GR No.MSC/2000/C.No.143/F-2, dt.25.4.03.

8.1.3. Villagers themselves are required to voluntarily participate in the programme. Forest Protection Committee (FPC) is to be formed in each village. The members of the committee will help in protection and development of forests and they will receive in turn a share in the usufructs and output from the forest areas assigned to such committee. The JFM area will be managed according to the micro-plans prepared jointly by the Deputy Conservator of Forests and members of the FPC. These micro-plans shall contain the details of forest and village development. This has to be sustainable, should cater to aspirations of local communities and at the same time the silvicultural requirements of the forests are to be met properly.

8.1.4. Later, the Government of India advised the State Governments to take up the Joint Forest Management in well stocked forest areas on experimental basis

and accordingly guidelines dated 25.4.03 cited above have authorized the Forest Department in the State in this respect. Summary of guidelines is as follows:

1. Good forests within 2 km from a village are to be covered under the programme on experimental basis and stage-by-stage other villages containing good forests are to be brought under it.
2. JFM is to be implemented with the help of *Gram Panchayat* and forest produce available is to be provided on priority to meet bonafide local needs.
3. The village having non-forest land, which has agreed to participate in the programme, may be brought under the scheme.
4. Help of the institutions of local self-govt., NGO, environmental expert, if any available locally, may be solicited.
5. The scheme though does not intend to facilitate agriculture based professions but non-irrigated horticulture schemes in (private) wastelands may be encouraged, if approved in the micro-plan.
6. The program underlines conservation of forests and wildlife and therefore, any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

SECTION 2. SPECIAL OBJECTS OF MANAGEMENT

The special objects of management are as given below:

1. To rehabilitate and regenerate the degraded forest areas.
2. To check soil erosion.

3. To protect the forests and to utilize the degraded forest areas for productive purposes in order to meet the fuel, fodder and timber requirements of the people.

SECTION 3.THE PRINCIPLES

8.3.1. Following principles should be adhered to during the implementation of J.F.M. in any village.

1. Eco system Protection.
2. Participatory Democratic structure.
3. Open communication.
4. Gender Equity.
5. Community Responsibility.
6. Effective Conflict Resolution.
7. Traditional Rights and use.
8. Effective Monitoring and Advocacy

SECTION 4.STATUS OF JFM

8.4.1. The JFM in West *Melghat* Division was started in the year 1998-99 under *Maharashtra* Forestry Project. 9 Forest Protection Committee were formed in the phase-I, for which Micro-plans were prepared, approved but it was implemented in only four villages.

8.4.2. In the second phase F.P.C were formed in 25 villages. A scheme for F.D.A. under National Afforestation Programme (NAP) was prepared for the 26 villages and submitted to Government of India. The same was sanctioned vide Govt. of India's authentication No. CSS/FDA/205/04-05, dated 1.11.2004 for an outlay of Rs. 1,46,41,000. The first installment of Rs. 46,66,000 was sanctioned by Govt. of India vide letter cited above. The second installment of

Rs. 61,00,000/- was received vide Govt. of India's authentication No CSS/FDA/51/2006-07 dated 15.06.06. The activities to be taken up are as given in the **Table No 8.1.**

Table No. 8.1
Table showing activities under FDA (Phase I)

COMPONENTS				Sub Total		SMC	Fencing Awar, & Micro Pln.	EPA	Over head	G.Total
ANR		Bamboo								
Phy.	Fin.	Phy.	Fin.	Phy.	Fin.					
780	42.35	520	41.32	1300	83.66	12.55	8.37	33.46	8.37	146.41

8.4.3. In the year 2007, plantations on 650 ha. have been carried out under FDA. The balance 650 ha. plantations could not be carried out due to late receipt of fund. The same is expected to be carried out in 2008-09. In addition to the ongoing works under FDA, works through JFM committees are going on in one village under Special Centrally Sponsored Scheme and in 6 villages under the State JFM.

8.4.4. Another proposal has been submitted by the Division to GOI under FDA in the year 2006-07 for implementation of JFM in 25 more villages. The Government of India sanctioned the project under National Afforestation Programme vide authentication No. CSS/FDA/346/2006-07 dated 28.02.07 for afforestation on 625 ha in 25 villages at the cost of Rs. 38.06 lakh and released Rs. 17.22 lakh vide letter No NAEB 1.1.6/07-B-III dated 26.03.07.

Table No. 8.2
Table showing activities under FDA (Phase II)

COMPONENTS				Sub Total		SMC	Fencing	EPA	Awar, & Micro Pln.	Over head	G.Total
ANR		Bamboo									
Phy.	Fin.	Phy.	Fin.	Phy.	Fin.						
375	15.36	250	8.56	625	23.92	3.56	1.2	6.25	0.72	2.39	38.04

8.4.5. Further Govt. of *Maharashtra* decided to form FPCs in all the villages adjacent to forest, accordingly 34 more FPCs were formed. Out of 64 committees so far formed 26 FPCs are registered under Societies Act-1880 and

the remaining 36 are registered with Forest Department and 2 are yet to be registered. Approximately 18000 ha forest area has been earmarked for management through JFM committees. The details of JFM villages with compartment numbers and area assigned is given in **App. No. LVII.**

8.4.6. JFM envisages involvement of people in the Protection, Regeneration and Rehabilitation of degraded forests. However, involvement of people in the management of forest is poor. Hence all the staff needs to be trained in communication skills and work as a team to make the programme a successful one.

8.4.7. Thrust on NTFP activities be given, so that attachment to the forest can be increased.

SECTION 5. POTENTIAL AREAS FOR THE JFM PROGRAM

8.5.1. The forest areas closer to the villages are included in this Working Circle. It includes the areas of Selection Cum Improvement Working Circle and Improvement Working Circle. It includes degraded as well as good forest areas.

SECTION 6.TREATMENT PRESCRIBED

8.6.1. Based on the nature of work in the various Working Circles and local requirements, role of a JFMC will have to be identified and defined in the micro-plan. While doing that, following points may be taken into consideration:

8.6.2. While formulating micro-plans, silvicultural management, maintenance of forest boundary, and control over illicit cutting should receive high priority and it should be ensured that the Micro Plan prescription do not violate the silvicultural prescriptions of Working Plans, especially those related to sustainable forest management and regulation of yield of major forest produce. Approval of JFM microplans from Ministry of Environment and Forests is not necessary as they are covered by the macrolevel prescriptions of Working plan

of the Division. Any deviation from macrolevel prescription will require prior approval of the Regional CCF. All the micro plans, which are being implemented shall have to be amended in accordance with the prescriptions of present Working plan as per directions of GoI.

8.6.3. The micro-plans should be prepared in such a manner so as to ensure meaningful participation of all the stakeholders including disadvantaged groups like women, Scheduled Tribes, Scheduled Castes and locally backward groups.

8.6.4. Participatory methods, that is, PRA shall be used to adequately assess the needs and aspirations of the people. The FPCs should be used to address the concerns and apprehensions of all the groups.

8.6.5. The Forest Department should play only co-ordinating and catalytic role for the village development works recommended in the micro-plans and **should also involve other government agencies and Non-Government Organizations for efficient and effective execution of these works.** The FPC should execute actual works.

8.6.6. The area kept under SCI WC and IWC, are essentially for forest and biodiversity 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.

8.6.7. 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.

CHAPTER IX
FOREST PROTECTION
(FIRE, ILLICIT FELLING, ENCROACHMENT, ILLEGAL MINING,
POACHING, JHUMMING ETC.)

SECTION 1. FOREST PORTECTION

9.1.1. The forests are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated incorporation of this Chapter. This Chapter is incorporated as per provision of the National Working Plan Code. Illicit felling, grazing, encroachments, poaching and fires are the major causes for the damage of the forests.

SECTION 2. SPECIAL OBJECTS OF MANAGEMENT

9.2.1. The special objectives of management are :

- 1.** To enforce the Indian Forest Act 1927, Wildlife Protection Act 1972 as amended till 2003 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 3. ILLICIT FELLING

9.3.1. Illicit felling in the forest area is growing at an alarming rate. Illicit felling is observed near rayatwari villages particularly in *Dharni*, *Akot* and *Dhulghat* Ranges. Mostly Teak trees are felled for the domestic purposes. There are only 6 vehicles; 1 Tata Sumo, 2 Maroti Gypsi, 2 Mahindra Jeep and 1 Swaraj Mazda available for forest protection in the Division. Wireless base stations have been

established in the Division for better communication. Range wise details of existing base stations are given in **Table No. 9.1**.

Table No. 9.1

Table showing location of Base Stations

Name of Range	Location of Base Station.
Dharni	Dharni
Dhulghat	Dhulghat and Golai
Akot	Akot
Dhakna	-

In addition, the wireless facility exist at Dy. C.F.'s and R.F.O. Dhulghat's residential quarter. Also the vehicle of Dy.C.F. West Melghat is fitted with a mobile wireless set. Presently there are 4 check posts in the Division. They are located at Dharni and Bhokarbardi (Dharni Range), Baratanda (Dhulghat Range), and Popetkheda (Akot Range).

Faster communication including vehicle facilities, adequate defence capabilities, frequent training and establishment of forest stations at strategic places are recommended to control illicit felling and wildlife offences. Establishing intelligence network for this purpose is strongly recommended.

9.3.2. In addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should be taken up like efficient wood utilization and energy efficient alternatives like Community Kitchens of Hindustan Petroleum, Biogas, solar cookers, etc. The following general principles are prescribed for the effective protection of the forest :

9.3.3. Review the offence cases beat wise, every month.

9.3.4. Review the *varas*, *bevaras* offence cases monthly; efforts are made to find out the offenders in each *bevaras* case.

9.3.5. Every *varas* case having more than Rs.10,000/- worth forest produce/loss to the forest invariably is submitted to the court within the prescribed time.

9.3.6. Delay in the submission of charge sheets in the courts is viewed seriously.

9.3.7. Use IPC provisions, for the effective control of the illicit felling.

9.3.8. The data related to offence cases shall be analyzed with the help of the computers using the available software.

9.3.9. Monitor the occurrence of all the offence cases daily through wireless.

9.3.10. Reorganize the beats in such a way so that the average beat area shall be 500 ha.

9.3.11. Identify and list all the paths used for the transportation of illicit material.

9.3.12. Place effective patrolling squads at all-important routes to prevent the transportation of illicit material.

9.3.13. Emphasis shall be made to arrest and prosecute the offenders rather than seizing the material.

9.3.14. Use the provisions of rewards for gathering of information.

9.3.15. Provide regular training to the staff in submitting the charge sheets, preparation of *panchanamas* etc.

9.3.16. Plan in such a way to have young guards in the hyper sensitive areas.

9.3.17. Patrolling squads shall be not less than 10 in number to over come the group of offenders.

9.3.18. History sheets of all the offenders along with their photo and bio-data are maintained at Round Level, Range and Division Level.

9.3.19. Prepare the list of offenders, showing the offence cases involved by him, against the each offender.

9.3.20. Use Cr. P. C. 110 provisions with respect to habitual offenders.

9.3.21. Provisions of IPC 395 shall be used by registering the complaint in the police station for the offences wherein five or more than five offenders are involved. The DCF shall co-ordinate with the S.P. to see that stringent sections of IPC will be used in the F.I.R.

9.3.22. The provisions of the G.R. dated 8/5/2003 shall be implemented. If any difficulties are there be communicated to the Govt. with supporting data.

9.3.23. Sufficient funds for patrolling and honorarium of advocates be made available on top priority.

9.3.24. Efforts be made to appoint the forest counsel as directed by PCCF office.

9.3.25. Every stump in the forest be numbered with digit nail set both on the top of the stump as well as on the base.

9.3.26. Every beat guard shall maintain a register of stumps in the following proforma. Every stump is registered by a serial number followed by/ and year, for example, if tree number is 198/05. Here 198- is tree no. and 05- is year.

9.3.27. Every year from January 1, onwards start the new series.

9.3.28. After one year all the high stumps be dressed to ground level to obtain good coppice.

9.3.29. The supervisory officers, during the beat inspection, verify the registered stumps and unregistered stumps. The beat guard shall be held responsible for non-registering the illicit stumps.

9.3.30. Every Range and Division office shall maintain the Xerox copies of the judgments of all forest cases for the guidance and improvement purposes.

9.3.31. Sections of IPC having the trial jurisdiction of District Court be used in the complaints and in the FIR

9.3.32. Court duties be assigned to a special duty guard for each Range office and as well as Division office to monitor the dates and for timely communication to the witnesses.

9.3.33. Proposals for the wireless network shall be prepared in such a way that every part of the Division area becomes communicable.

9.3.34. Inter state co-ordination meetings with the authorities of M.P. Govt. shall be made, to arrest and prosecute the offenders of M.P who are involved in the offences of Maharashtra State.

9.3.35. Obtain the support of the local villagers in catching the offenders (JFM Committees)

9.3.36. The RFO shall collect the beat *khairiyat* report from each Forest Guard and Round Officer monthly and shall submit Range *khairiyat* report to the DCF every month.

9.3.37. All cases of violation of the Forest Conservation Act, 1980 shall be referred to the Regional CCF, Bhopal through Nodal Officer for prosecution purposes with respect to the Government officers involved in the cases.

SECTION 4. FIRE PROTECTION

9.4.1. 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.

9.4.2. 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 inspite of the handicaps.

Classification of fire control Areas:

9.4.3. Class-I (Complete Fire Protection): The Class-I fire control areas include all felling coupes (six years) of SCI and 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).

9.4.4. 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).

9.4.5. 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:

9.4.6. A fire protection scheme (**App.No.XLIX (b)**) 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.

9.4.7. 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.

9.4.8. Areas deliberately burnt for silvicultural reasons under the sanction of the Chief Conservator of Forests (T) shall be excluded from the fire protection scheme. Fire in such areas need not be reported unless spreads beyond such area.

9.4.9. All the Class-I and Class-II areas will have external fire lines and internal fire lines dividing the forest area into convenient blocks.

9.4.10. 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.

9.4.11. 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.

9.4.12. 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.

9.4.13. The cutting of fire lines shall be completed by December. Fire tracing (burning) shall be completed by February 15, and thereafter burning should require permission of the Deputy Conservator of Forests and physical presence of a gazetted officer.

9.4.14. 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 Range wise as far as possible shall be prepared in the beginning of the fire season and the same shall be used to depict the areas burnt every fortnight.

9.4.15. Negligence in the fire protection shall be taken as dereliction of duty. The supervisory officers shall extensively verify fire control measures.

9.4.16. 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.

9.4.17. 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.

9.4.18. 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.

9.4.19. Standard widths of fire lines are prescribed in the **Table No. 9.2.**

Table No. 9.2
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 5. GRAZING REGULATIONS

9.5.1. The entire forests are liable to damage from grazing except the interior areas, which are away from the villages. 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.

9.5.2. 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.

9.5.3. The animals, mostly buffaloes, 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, graziers 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* (*Zyzyplus xylocarpa*) and *Bamboo* (*Dendrocalamus strictus*). 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 *Akot and Dhulghat* Range, which needs utmost attention to control the grazing.

9.5.4. It is not uncommon to see goats grazing in forests. The goat grazing is prohibited because of their close level grazing in which the seedling or grass rhizome is uprooted.

9.5.5. The grazing shall be regulated as per guidelines of Grazing Policy 1968 of Maharashtra State issued vide Resolution No. MFP-1365/132211-Y dated December 6, 1968 and Grazing Rules issued vide No. MFP-1371/237035-Z dated November 3, 1973. However no grazing beyond carrying capacity shall be permitted.

9.5.6. 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.

9.5.7. 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.

9.5.8. Maximum admissible grazing incidence according to the current policy has been shown for various working circles in **Table 9.3**. A systematic survey of fodder availability is recommended during the Plan period in each Round.

9.5.9. 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.

9.5.10. The surplus cattle should be kept under regular watch, and villagers should be encouraged to adopt stall-feeding or other means to address mismatch between cattle-heads and fodder availability.

Table No. 9.3.
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	Minor forest	0.8	

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.

9.5.11. Fodder development on the community lands and translocation of surplus cattle may be encouraged.

9.5.12. 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.

9.5.13. The DCF shall carry out cattle census of each village during the winter season at the beginning of the plan period to find out the local cattle once for all and maintain record and passes shall be issued limited to those cattle subject to the availability of carrying capacity.

9.5.14. The passes shall show the compartment numbers meant for the grazing by writing clearly.

9.5.15. Hacking and felling of young plants and big trees be dealt seriously and offenders shall be prosecuted.

9.5.16. 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.

9.5.17. The Govt. had appointed Shri. A.G.Kalekar, Assistant Conservator of Forests as Grazing Settlement Officer for considering requirements of local people for sheep grazing vide G.R. dated 23.12.2003. Considering that there

are no sheep grazier in the Division and pressure of local cattle on forest, the demand of allowing sheep graziers from outside Division area was rejected. The Grazing Settlement Officer has submitted report to Govt. which was sanctioned vide G.R. No. MFP-2103/F.No. 135/F-1, dated 29.10.2007. As per survey carried out by the Grazing Settlement Officer the number of cattle (excluding Kathevadi cattle) are as under :

Table No. 9.4
Cattle population of West Melghat Division as per survey done by G.S.O.

Cow	Buffallo	Bull	Calf	BaffalloCalf	HeBuffallo	Total
11922	3979	15145	3310	1157	341	35854

Summery of Grazing Settlement Officer's Report is given in tabular form in **Table No. 9.5**

Table No. 9.5
Unit wise Number of Villages, Forest Area available for grazing, their carrying capacity and demand of grazing.

Unit No. & Name	Villages	Forest Area in ha	Area closed for grazing in ha.	Area available for grazing in ha	Carrying capacity in Cattle units	Demand in Cattle units.
1.Akot	24	13115	3972	9142	5485	4859
2.Dhulghat	22	19509	1018	18491	15409	13141
3.Dharni	38	17007	4746	12260	9575	9292
4.Dhakna	23	9731	2250	7481	6234	12602
Total :	107	59362	11986	47374	36703	39894

9.5.18. The carrying capacity of West Melghat Forest Division is 36703 Cattle Units. Cattle population of the Division is 35854. The cattle population of Dharni Taluka is 63600 (excluding goats). It requires 88650 ha. of forest for grazing purposes. Due to restriction/regulation of cattle grazing in Project Tiger Area, there is additional pressure on the forest of the Division. Considering that more area will be closed for grazing as implementation of Plan Progress there will be further reduction in area available for grazing. This will put additional pressure on forest. Hence it requires some measures to reduce the cattle numbers to save the regeneration of the forest.

SECTION 6. FOREST ENCROACHMENT

9.6.1. Certain organizations like Samaj Kranti Aghadi started encouraging the tribals to encroach 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 *Akot, Dhulghat and Dharni* Ranges.

9.6.2. The encroachment problem is more prevalent in the *Akot* and *Dhulghat* Ranges and mostly made for agricultural purposes. The eviction operations led to animosity between the villagers and foresters.

9.6.3. The causes of forest encroachment shall be examined thoroughly and addressed in a comprehensive manner. The boundary management and standard administrative guidelines will help to control encroachment.

9.6.4. Renewed and concentrated efforts on the part of Division staff is required to prevent new encroachment on forest land.

9.6.5. Small isolated patches of the forestland are often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.

9.6.6. The civil powers of eviction are entrusted with ACF and DCF vide Govt. Res. No. R and F.D/PWR/1196/296/CR.No.17/LII, dated 30-1-97. The procedures laid out in the Land Revenue Code shall be followed before the execution of eviction.

9.6.7. Habitual encroachers shall be prosecuted as per Indian Forest Act.

9.6.8. All external boundaries shall be demarcated with concrete pillars.

9.6.9. All sensitive and important boundaries and wherever disputes are there, be surveyed with DILR and concrete pillars be laid immediately.

9.6.10. All encroachments be listed with their names, age, residence, profession whether belongs to SC, ST, OBC/NT, extent of encroachment, S. No. and location of encroachment, village/block.

9.6.11. A Detailed report of the encroachment cases after 13.12.2005 be prepared for each encroacher and be submitted to ACF to obtain summary eviction orders, in a time bound program.

9.6.12. After the completion of due procedure of Land Revenue Code and after giving a reasonable opportunity of being heard to the encroacher, the ACF shall pass a summary eviction order if he satisfies so, quoting the findings.

9.6.13. The concerned RFO shall execute the eviction order.

9.6.14. If the encroachments in a village are more in number police protection be obtained for the operation.

9.6.15. Use of Cr. P. C. provisions like section 106 and 110 be used to obtain good character of offenders before *Tahsildar* and SDO respectively to smoothen the eviction operations as well as to prevent the tendency of future encroachments.

9.6.16. For the encroachments on the un-classed forests (though 7/12 shows clear possession of the Departments) FIR shall be lodged in the concerned police station for the prosecution.

9.6.17. 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.

9.6.18. Regarding encroachments before 13.12.05, action as given in The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and rules made there under be taken.

9.6.19. In the month of May, a drive for encroachment prevention be taken up in all the sensitive areas by taking meetings in the villages by *Dawandi* and distribution of leaflets and posters.

9.6.20. Keep a watch on all the sites meant for debris cleaning, ploughing etc., in the month of May, so that encroachments are removed even before the sowings.

9.6.21. A total of 739.51 ha. of encroachment was registered by the West Melghat Division upto 13.12.2005. The encroachments made earlier to 1978 are 456.12 ha. and balance 283.39 ha. encroachment were done between 1996-97 to 2005-06 (upto 13.12.2005). Strangely no offences of encroachment on forest land were recorded between 1978-79 to 1995-96. Of the encroachments done after 1996-97, 16.52 ha. had been evicted as per record provided by the Dy. C.F. The detailed list of encroachers is given in the **Appendix No. XLIII** of Volume II.

9.6.22. The actual encroachment may be much more than recorded by the Department. Now, action is required to be taken as per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and Rules made there under.

SECTION 7. POACHING

9.7.1. The issues related with poaching has been dealt in detail under Chapter on Wildlife (Overlapping) Working Circle.

CHAPTER X
FINANCIAL IMPLICATIONS

SECTION 1. COST OF THE PLAN

10.1.1. The cost of preparing this Plan is worked out by summing the expenditure incurred from 2005-06 to 2007-08 that amounts to 165 *Lakhs*, including the cost of stock mapping and enumeration works carried out by SOFR unit, *Amravati*. The cost of plan per hectare worked out is about 280 rupees, only.

SECTION 2. COST-BENEFIT ANALYSIS

10.2.1. 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 over a period of 50 years, by assigning notional values by using surrogate market techniques, as given in the **Table No. 10.1** (Proceedings of the Indian Science Congress, 1980).

Table No. 10.1
Table Showing Environmental Benefits Derived From A Medium Sized Tree 50 Years 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

10.2.2. 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.

10.2.3. Hence, intangible benefits accruing from West *Melghat* Division, having over 59362.04 ha of well-stocked forests @ of 2.60 Lakhs per ha, are worth Rs.154341 Lakhs per year.

10.2.4. 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.

10.2.5. In this Plan, major yield of wood will be obtained from the SCI Working Circle. Improvement Working Circle may contribute in the form of small timber, fuel and teak beats, to some extent. The yield from thinning old plantations as well as congested pole crop has not been considered. Yield from *Bamboo* working had been taken in to consideration for calculation of Tangible benefits.

10.2.6. The abstract of tangible benefits and costs as a result of this plan is given as follows:

Annual estimated expenditure for the prescribed operations	=	242	Lakhs
Annual tangible benefit from the forest	=	1197	Lakhs
Annual intangible benefite as above	=	154341	Lakhs
Total benefits (both tangible and intangible) from the Forests	=	155538	Lakhs
Social Cost-Benefit Ratio is 242 Lakhs : 155538 Lakhs			
Or 1 : 643			

Thus, the above Cost-Benefit Ratio favours the scientific management of forests, as prescribed, in this Working Plan.

10.2.7 The Net Present Value (NPV) of forest of West Melghat Division has been assessed base on Govt. Reso. No. FLD-1002/CR 199/F-10, dated 17.12.2003 as given **Table No.10.2**.

Table No. 10.2
Table Showing Net Present Value (NPV) of Forest of West Melghat Division.

S.No.	Working Circle	Area (in ha.)	Rate (in lakh/ha.)	NPV (in crore)
1	S.C.I.	37,735	9.00	3,396.15
2	I.W.C.	21,627	7.76	1,678.25
	Total :	59,362	-	5,074.40

SECTION.3. FINANCIAL FORECAST

10.3.1. Expected annual expenditure for implementation of this plan is given in the **Appendix No. LXIII** of Volume II of the plan. This comes to Rs. 242 Lakh per annum. The details of expected annual revenue from implementation of the Plan are given in the **Table No. 10.3**. The total expected annual revenue is approximately Rs. 1197 Lakh.

Table No. 10.3
Table Showing Expected Annual Revenue of West Melghat Division.

Sr.No.	Working Circle	Particulars	Quantity	Rate in Rs.	Amount Rs. in Lakh.
1	SCI	Teak Timber	3500 cum	20000/- cum	700
2	SCI	Teak Stacks	7000 cum	800/- cum	56
3	SCI	Adjat Timber	3500 cum	7000/- cum	245
4	SCI	Adjat Fuel	7000 cum	400/- cum	28
5	IWC	Teak Timber	200 cum	20000/- cum	40
6	IWC	Adjat Fire Wood	5250 cum	400/- cum	21
7	Bamboo (O) WC	Long Bamboo	650000 Nos.	10/- per No.	65
8	Bamboo (O) WC	Bamboo Bundles	10000 bundles	20/- per bundles	2
9	NTFP (O) WC	Tendu	Lump sum	-	40
		Total :			1197

However, due to ban on tree felling within 10 km distance from National Park/Sanctuary by the Honorable High Court, the workable area in SCI Working Circle is restricted to 8548 ha. and in Improvement Working Circle to 1459 ha and the expected annual revenue may reduced to approximately Rs. 313 Lakh. Similarly the expected annual expenditure will be reducing to Rs. 178 Lakh.

The norms used for the financial forecasting are given in **Table No. 10.4.**

Table NO. 10. 4
Rates used for estimating expenditure for the working plan prescriptions
(Daily wage rate Rupees 80.00)

Sr. No.	Particulars of work	Unit of work	Man days/ unit	Labour component in %	Amount / Rupees
1	Demarcation and Marking	Hectare	4.50	90%	360.00
2	Preparation of Grid wise Treatment Map	Hectare	1.00	90%	80.00
3	Singling of coppice shoots, etc.	Hectare	1.00	96%	80.00
4	Soil and moisture conservation				-
	Gully plugging (nala bunding)	Cu.m.	0.92	96%	73.60
	Long contour trenches (CCT)	Meter	0.085	96%	6.80
5	Coupe working				-
	Timber harvesting	Cu.m.	9.50	75%	760.00
	Firewood extraction	Stacks	3.50	80%	280.00
	Long Bamboo	No.	0.06	80%	4.80
	Bamboo bundles	No.	0.12	80%	9.60
6	Removal of wind fallen				
	Timber	Cu.m.	9.50	75%	760.00
	Fuel	Stacks	4.50	80%	360.00
7	Thinning	Cu.m.	9.50	75%	760.00
8	Cutback Operations	Hectare	6	96%	480.00
9	Cleaning	Hectare	8	96%	640.00
10	Afforestation/plantation				
	Fencing including live hedge	Hectare	43	85%	3440.00
	Planting & sowing on fencing	Hectare	2	75%	160.00
	PPO/PYO (including fencing)	Hectare	60	85%	4800.00
	FYO (First year operations)	Hectare	95.10	77%	7608.00
	SYO (Second year operations)	Hectare	40.90	92%	3272.00
	TYO (Third year operations)	Hectare	20.70	93%	1656.00
	4th YO (Fourth year operation)	Hectare	15.15	93%	1212.00
	5th YO (Fifth year operations)	Hectare	15.15	93%	1212.00
11	Bamboo planting				
	PPO/PYO (including fencing)	Hectare	64.50	90%	5160.00
	FYO (First year operations)	Hectare	34.65	90%	2772.00
	SYO (Second year operations)	Hectare	20.77	93%	1662.00
	TYO (Third year operations)	Hectare	16.53	93%	1322.00
12	Maintenance				
13	Road	Km.	38	95%	3040.00
14	1/5th boundary demarcation	Km.	7	80%	560.00
15	Fire protection length	Km.	6.5	96%	520.00
	Fire protection area	Hectare	1	96%	80.00
16	Joint Forest Management				
	Awareness generation	Village	12	20%	960.00
	Micro plan preparation	Village	88	50%	7040.00
	Supplementary development	Village	14.00	75%	1120.00
17	Training for NWFP collection	Round	30.00	50%	2400.00
18	Wildlife habitat improvement	Round	20.00	75%	1600.00
19	Fixing boundary pillars	Km.	70.00	30%	5600.00

SECTION 4. SOURCE OF FUNDING

10.4.1 Non Plan/Plan Schemes: Works prescribed by the Working Plan will be done through the funds of Non Plan. They are mainly required for felling of coupes and subsequent silvicultural operations and operations to secure

adequate Natural Regeneration. If the NR is inadequate it will be supplemented by Artificial Regeneration. Also exploitation of *Bamboo* coupes will be done through this source.

10.4.2 FDA: Works like Entry Point Activity, creation and maintenance of plantations and soil and moisture conservation works etc. will be done through this funding source.

10.4.3 EGS/MREGS: Works like fire protection, soil and moisture conservation works and eradication of *Lantana* will be done through this source.

10.4.4. DRDA: Soil and moisture conservation works which can not be done under EGS works will be done through this funding source.

CHAPTER XI
MISCELLANEOUS REGULATIONS

SECTION 1. PETTY FELLINGS (IRREGULAR HARVESTING)

11.1.1 Felling for carrying out Stem analysis : The Deputy Conservator of Forests (Territorial) shall submit proposal for felling of trees for the purpose of Stem/Stump analysis (as required by Working Plan Officer) to the Chief Conservator of Forests (Working Plan), who shall accord sanction as per the provision of Para 84, of National Working Plan Code, 2004.

11.1.2. Restriction on Petty Fellings (Irregular Harvesting): Irregular harvesting of timber, firewood and other NTFPs is prohibited, except in the following cases:

11.1.3. 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.

11.1.4. 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.

11.1.5. 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.

11.1.6 Harvesting of dead fallen and uprooted trees in the storm:

Removal of dead, fallen firewood and trees uprooted by wind of storm from all parts of the forest, except the coupes due for working, shall be carried out in the following manner. Every year in the month of October each beat guard shall report the availability of dead, fallen firewood and trees uprooted by wind or storm to the concerned Range office. The Range Forest Officer shall estimate the availability of such material in each compartment and ACF concerned shall verify the same. If more than 2 (two) such trees per hectare is estimated, proper marking shall be carried out. Two dead and fallen trees are required for retention for wildlife conservation. Wood removal shall be carried out from the compartment after the approval of the Deputy Conservator of Forests. The details of material obtained from each compartment and revenue realized from it shall be entered in the respective Compartment History Form. Harvesting of dead and fallen firewood is governed by the *Nistar* privileges as admitted in the *Nistar Patrak* or directed by the Government from time to time. The *Nistar* holders are allowed to collect such material directly from the forests on rated passes or in the manner prescribed in the relevant directives.

No irregular harvesting, for the purpose of undertaking plantations/afforestation works under scheme outside the scope of this working plan shall be taken up in any of the forest areas under the Working Plan.

SECTION 2. DEVIATION

11.2.1. The format of Deviation Statement is given in **Table No. 11.1.**

Table No. 11.1
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	

11.2.2. 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.

11.2.3. 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.

11.2.4. 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:

11.2.4. The Government of India, the State Government, and IIFM-Bhopal are in the process of finalizing the criteria and indicators for monitoring and evaluation of Sustainable Forest Management. As and when these are finalized, the monitoring and evaluation of implementation of the working plan will be done accordingly.

SECTION 3. PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE

11.3.1. 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 :

11.3.2. 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.

11.3.3. Small Timber, Poles And Firewood: 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 4. RESEARCH PLOTS

11.4.1. 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.

11.4.2. At present there is no experimental or sample plot within the territory of West *Melghat* Division.

11.4.3 Research is required to be carried out to see the effect of annual working of *Bamboo* coupes on production and regeneration of *Bamboo* compared to present system of working once in three year. For this purpose a few plots of size 100 m x 100 m (1 ha.) to be selected in *Bamboo* (Overlapping) Working Circle and annual *Bamboo* harvesting is to be carried out in the plot. In the *Bamboo* clumps all current year *Bamboo* and 50% of second year *Bamboo* will be retained. The balance 50% of second year *Bamboo* and all third year *Bamboo* will be removed. Report of annual production and regeneration of new culms are to be kept, and the results should be compare with the plot of same size in which *Bamboo* working is done in three year cycle under similar condition. A

decision regarding annual working of *Bamboo* can be taken after getting the results of the research.

SECTION 5. ROADS, PATHS, BRIDGES AND BUILDINGS

11.5.1. The Division has a network of different types of roads as given **Appendix No. XII** of Volume II of this Plan. The Division shall maintain comprehensive records for all roads passing through the forest area.

11.5.2. 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.

11.5.3. Forestry operations and forest protection should determine the priority for maintenance of the forest roads.

11.5.4. Unwarranted up-gradation of the forest roads shall be discouraged, but necessary culverts shall be constructed for forest protection purpose.

11.5.5. The list of buildings in charge of the Division is given in the **Appendix X** 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 (Overlapping) Working Circle.

SECTION 6. DEMARCATION AND PROTECTION

11.6.1. 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 Protected Forests, as per 1/5th Boundary Demarcation Scheme. The 1/5th Boundary Demarcation Scheme is given in **Appendix No. LVI** of Volume II, of this plan.

11.6.2. 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:

11.6.3. 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.

11.6.4. The land records such as maps of disforested areas and unclassed forests shall be maintained and updated.

11.6.5. 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.

11.6.6. An extensive length of TCM (Trench-Cum-Mound) fencing has been dug up under various schemes for providing employment. However, the alignment was generally decided without proper survey and deviation from the forest boundary is quite common. TCM around plantations also suffer from the same 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:

11.6.7. 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 480.439 kilometers out of which **natural boundary** is 49.521 km. The external **artificial** boundary will require permanent demarcation.

11.6.8. The Principal Chief Conservator of Forest has approved, in May 2001, a demarcation model using a series of concrete pillars. This model as modified, till date shall be followed for the external boundary demarcation.

11.6.9. 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.

11.6.10. 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.

11.6.11. 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 11.6.20. The traditional demarcation work will be checked at least once a year.

11.6.12. Demarcation of the internal forest boundaries: Internal boundaries between compartments shall be demarcated using traditional stones cairn, earthen cairn of standard wooden pillar (Paragraph 11.6.20.). 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.

11.6.13. 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.

11.6.14. 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.

11.6.15. 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.

11.6.16. 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.

11.6.17. The Range Forest Officer, Mobile Squad will co-ordinate cross-checking of Compartment Inspection Certificates.

11.6.18. 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.

11.6.19. 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.

11.6.20. 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 $\frac{1}{2}$ (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.

11.6.21. 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 Plan maps and the digital database.

11.6.22. 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.

11.6.23. 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.

11.6.24. Colour wash on the boundary marks: The Beat Guard will be responsible for annual freshening of the pillar numbers, the compartment plates and the colour-wash of the boundary pillars shall be carried out in the month of September-October. He must submit details of work done in each compartment in his Annual Colour-Wash Report. The Round Officer will carry out sample checking of the report in the manner directed by R.F.O. Only material cost should be admissible for this purpose.

SECTION 7. DEMARCATION, PREPARATION OF TREATMENT MAP AND MARKING OF COUPES.

11.7.1. 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.

11.7.2. Format for the Coupe Demarcation Certificate is, as follows:

Form

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:

11.7.3. Annual coupe shall be demarcated by cutting and clearing of bushy undergrowth on 3 (three) meter wide line and by erecting pillars of posts up to 2 meter height in the middle part of the cut line at suitable intervals, so that one pillar shall be visible from the other one, except where the coupe boundary runs along streams, fire line or road. The pillars shall bear the coupe number, name of the felling series and the working circle on the side away from the coupe.

11.7.4. 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 tar band shall be at B.H. and the other coal tar band shall be 15 cm above it. Just below the lower coal tar band Tree serial number in Arabic shall be given on the side away from the area of the coupe. The band and serial numbers of such trees shall be maintained in the marking register, in the **Table No.11.2.**

Table No. 11.2
Table Showing List of trees on the coupe boundary

S.N.	Name of species	GBH (OB)	Remarks
1			
2			
3			

11.7.5. No tree bearing coupe demarcation bands shall be marked for felling.

Demarcation Of Sections:

11.7.6. 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.

11.7.7. 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:

11.7.8. 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.,

11.7.9. 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:

11.7.10. 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.

11.7.11. 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.

11.7.12. 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.

11.7.13. 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.

11.7.14. 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.

11.7.15. Marking shall be done under the close supervision of RFO and inspected by the ACF concerned. The DCF shall himself inspect majority of coupes to ascertain proper marking as per prescriptions of working plan as well as to guard against the excessive marking, if any. It shall be responsibility of CCF(T) to ensure that marking rules are scrupulously adhered to as there is increasing tendency of field staff to mark trees of *Teak* and other economically important species as it may potentially alter the forest composition in the long run.

11.7.16. 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.

11.7.17. All trees of 30 cm and above girth at b.h. (o.b.) in addition, will bear digit serial numbers both at BH (breast height) and at the base.

11.7.18. The remaining trees below 30 cm girth at b.h. (o.b.) will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series.

11.7.19. 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

11.7.20. 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. 11.3
Table Showing Format for marking of trees for harvesting

Tree Digit No.	Serial No. Coal tar	Name of species	GBH (OB)	Remarks

11.7.21. 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:

11.7.22. 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.

11.7.23. 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 by 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.

11.7.24. 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.

11.7.25. It is prescribed to follow watershed management approach viz. the ridge-to-valley approach for carrying out soil and moisture conservation works. The gully plugging/check dams, as given under, have been prescribed to constitute the major component of these works.

11.7.26. Contour trenching work shall not be taken up as it exposes soil which accelerates the soil erosion.

11.7.27. *Nala* Bunding and Check Dams:

i) The primary objective of *nala* bunding and check dams is to reduce the speed of run off water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the *nala* bed or from the dug up soil. No blasting shall be done for this purpose. Where sufficient boulders are not available other bioengineering structure such as brushwood may be used. In this Plan check dams of both the loose rubble for arresting silt and soil loss and earthen gully plugging (*nala* bunds) for moisture conservation and water harvesting are prescribed.

ii) The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions, local availability of suitable materials. LBS, Gabian structures may be constructed for preventing soil erosion. The streambeds more than 8 meters in width shall not be covered under the *nala* bunding. *Nalas* more than 8 meter wide at the top should normally require elaborate engineering structures for bunding, and therefore, such bunds should not be considered as part of the quantity prescribed here. Each of such *nala* bunds, if required, should be treated as an independent

project. A model Loose Boulder Structure for nala bunding is given in **App. No. LVIII** of Vol. II.

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:

11.7.28. 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.

11.7.29. 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.

11.7.30. 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 625 saplings per hectare at an average of 4-meter spacing.

11.7.31. 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 sixth and eleventh year of plantations. The extent of plantation should not exceed the prescribed staff norms.

11.7.32. 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, *figus*, *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. In areas also included in Bamboo (O) Working Circle Bamboo shall be preferred species for plantation.

11.7.33. 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.

11.7.34. 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.

11.7.35. Pit digging: Pits of size, preferably, 30 cm³ for planting of non-*Teak* species and 45 cm³ 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:

11.7.36. Planting of teak stumps: Crowbar planting of *Teak* stumps shall be carried out within one week after the first monsoon shower.

11.7.37. Poly-pot or root-trainer planting: Seedling planting shall be completed within a fortnight after the first monsoon shower.

11.7.38. 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:

11.7.39. 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.

11.7.40. 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.

11.7.41. 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.

11.7.42. 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.

11.7.43. 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:

11.7.44. 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.

11.7.45. 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 an 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.

11.7.46. 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 or 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 $\frac{3}{4}$ that of the tallest trees

- (a) Trees with normal crown development and good stem form.
- (b) Trees with defective crowns or stems.

III) **Suppressed Trees (s):** which reach only about $\frac{1}{2}$ to $\frac{5}{8}$ of the height trees, with their leading shoots definitely over-topped by their neighbors or at least shaded on all sides by them.

IV). **Dead And Moribund Trees (m):** This class also includes bent over and badly leaning trees usually of the whip type.

V). **Diseased Trees (k):** This class includes those trees which are infected with parasites to such an extent the their growth is seriously affected or that they are a danger to their neighbours.

- (a) Dominant.
- (b) Dominated and suppressed.

11.7.47. Thinning Methods:

General considerations: When a plantation is made, silvicultural requirements, particularly, the restoration or creation of a tree cover on 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, will be far greater than the final number at maturity, and somewhat irregular spacing is relatively unimportant as it can be adjusted in later thinning.

(1) **Mechanical Thinning:** There may be little objection to provide extra growing space by the mechanical removal of complete lines of plants, of every alternate plant subject to provision to cover cases of local gaps. Where spacing is irregular, the “stick” method used in natural regeneration is a possibility whereby one tree of every pair of adjoining tree is removed if the distance between them is less than a prescribed length.

- (i) This method is followed in *Teak* plantations for the first and less commonly for the second thinning. Each operation removes 50% of the original planting lines reducing the number of plants to $\frac{1}{2}$ in each operation. For instance, in case of 2 x 2 spacing, number of plants will reduce from 2500 to 1250 and then 625 per hectare and increasing the spacing from 2 m x 2m to 4 m x 4 m. It is usually provided that where there is a gap in the retained line an adjoining plant in the cleared line should be retained.
- (ii) This method is only practicable where casualties are very few and growth is both good and even under such conditions but it is out of question in poor or uneven plantations.
- (iii) It is not suitable for mixed plantations. However, in rare cases, similar operation may be done in mixed plantations where one species has been introduced essentially to help cover the ground quickly and its removal or cutting back is necessary in the interest of the major species.

(2) **Silvicultural Thinning:** Alternatively, thinning may be selective, the case for removal or retention being considered for each tree in turn, according to a set of rules drawn up for the purpose. This is the most usual procedure even where

additional checks are applied, being often described as a “silvicultural” thinning.

(3) **Thinning Schedule:** The other possibility is to be guided by thinning schedule which lay down the number of stems that should remain standing after thinning according to various criteria of dimensions, site quality and age viz. Stand Tables and Yield Tables 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.

11.7.48.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.
- (5) **Very very heavy thinning (E-grade):** For research purposes it has been found desirable to make ordinary thinning even heavier than the standard D-grade. It prescribed removal of more of the dominant stems even in class I (a), so that all retained have ample room for further development. It goes as far as possible within the rule for avoiding permanent gaps in the canopy.

11.7.49. Crown Thinning: This method of thinning looks first of all to the dominants, and removes such of them, beginning with the least promising individuals, as are hindering the development of the best individuals. Due regards are paid to obtaining as even a distribution of good dominants over the area as possible. It requires special skill and acumen in carrying it out.

(a) **Grades of Crown Thinning:** Only two grades of crown thinning have been standardized; they are defined as follows:

(1) **Light Crown Thinning (L C-grade):** This consists in the removal of dead, dying and diseased trees, with such of the defective, after them the better dominants, as are necessary to leave room for the further development of the best available trees evenly distributed over the area, i.e. classes V, IV, I (d), (c), many of I (b) and few of I (a) but not III and II. This is similar to D-grade ordinary thinning, but retains all III and II, and is not quite so heavy on I.

(2) **Heavy Crown Thinning (H C-grade):** This grade pays more attention to favour the best selected stems by removing all the remaining I (b) which can be taken without creating permanent gaps, and more of I (a), i.e. classes V, IV, I (d),(c), most of I (b), some of I (a) but not III and II.

(3) Crown thinning is well adapted to moderately shade-tolerant species in which the retention of the lower canopy presents no difficulty.

11.7.50.Tending Procedure: For this, the figures from the Yield Table and from the Stand Table in respect of relevant site quality and age shall be reproduced and girth class wise comparison of number of stems actually present with that required as per Stand Table shall be done. 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*, *Sema*, *Kulu* (of seed origin) shall not be marked for felling besides fruit bearing trees like *Aonola*, *Mahua*, and *Charoli* etc. for any reason whatsoever. They shall be retained in excess of the desired population of the growing stock.
- 4) Then *Teak* trees of seed origin would be taken up for marking.

iv) Keeping the principles as prescribed above in clauses, (i), (ii) and (iii), detailed instructions as to how many trees of *Teak*, non-*Teak* including coppice, if any, and *Teak* coppice shall be marked for felling and how many trees would constitute the residual crop after thinning shall be respectively recorded in items 10 and 11 of Form 3, and communicated to the marking officer by the Deputy Conservator of Forests in writing.

The number of trees/ha to be retained for various site qualities and corresponding rotations are given in **Table No. 11.4**.

Table No. 11.4
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					
	III		III / IV		IV	
	120	135	120	135	120	135
U15	359	319	397	353	475	422
16U30	222	197	215	191	232	206
31U45	99	88	93	83	91	81
46U60	55	49	53	47	53	47
61U75	38	33	37	33	38	34
76U90	29	26	29	26	29	26
91U105	24	21	23	21	21	18
106U120	20	18	20	18	12	11
121U135	0	15	0	15	0	3
136U150	0	0	0	0	0	0
151U165	0	0	0	0	0	0
166U180	0	0	0	0	0	0
Total	846	766	867	787	951	848
Volume/ha	66.866	75.089	62.684	71.765	55.325	52.289

Harvesting And Disposal:

11.7.51.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.

11.7.52. 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.

11.7.53. 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:

11.7.54. 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 effect will be recorded annually in the Form 1 Register during the month of June.

11.7.55. 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.

11.7.56. 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 West *Melghat* Division to mark completion of the process.

11.7.57. Along with the reconciliation, the details of land grants (patta) issued on the forestland will also be made available to the West *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*.

11.7.58. 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 West *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.

SECTION 8. AUTOMATIC WEATHER STATIONS (AWS) AND SILT MONITORING STATIONS

11.8.1 The rain fall and temperature data for Melghat tract is woefully lacking. Rainfall data for Dabida and temperature data for Kharya Station had been procured from Water Resources Department is used in the Working Plan. It is therefore recommended that AWS be installed at the sites given in **Table No.11.5** and local forest staff should be entrusted with monitoring of weather data.

Table No. 11.5
Table showing sites of proposed AWS

Range	Place
Dharni	Dharni Bariragad,
Akot	Akot Khatkali,
Dhulghat	Dhulghat
Dhakna	Bibamal

11.8.2 Silt Monitoring Stations shall also be established on all major *nalas* to regularly monitor the siltation rate and effectiveness of management practices being followed. One Silt Monitoring Station is to be installed for each mini-watershed (1500-5000 ha.)

CHAPTER XII
THE ESTABLISHMENT AND LABOUR

SECTION 1. THE ESTABLISHMENT

12.1.1. The Range, Round and Beat reorganization is proposed for reduction of present Beat average area from 1319 ha to 899ha for better management, conservation and protection of forests. A proposal incorporating 6 Ranges, 28 Rounds and 66 Beats has been submitted to the CCF (T) Amravati.

12.1.2. It has been observed that the Division has adequate staff for the implementation of the provisions of this Plan.

Table No. 12.1:
Table Showing No. Of Ranges, Rounds And Beats At Present And Proposed In
The West Melghat Division

Particulars	Existing No.	Proposed No.
Ranges	4	6
Rounds	13	28
Beats	45	66

12.1.3. The details of existing Range, Round and Beats are given in **Appendix No. XLI** 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.

12.1.4. Adequate education and health facilities are usually not available at the Beat and Round headquarters in the interior areas, and majority of the field staff keep their families at a different station. These conditions necessitate

special efforts for the staff welfare programme. Sufficient facilities should be provided for quality education to the minor children of the field staff.

12.1.5. 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.

12.1.6. Training of field staff and village communities, in collaboration with NGO's, is essential and will be proposed for NTFP's collection, grading and value addition mechanisms to upgrade their skill in NTFP's management.

SECTION 2. LABOUR AVAILABILITY

12.2.1. 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.

12.2.2. Some scheduled adjustment should be sufficient for execution of the forestry operations. Temporary manpower shortage is experienced during the crop sowing period.

12.2.3. Care should be taken to ensure adequate employment availability to the local people. The Forest Labour Co-operative Societies (FLCS) often engage large manpower of non-members in coupe working allotted to the Societies, and the proportion of the work done by the non-members should be recorded.

CHAPTER – XIII
CONTROL AND RECORDS

SECTION 1. CONTROL AND RECORDS

13.1. 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 2. CONTROL FORMS

13.2.1. Three permanent sets of these Control Forms will be prepared in the Working Plan Chief Conservator's office and distributed one set each to Working Plan Circle itself, the Territorial Chief Conservator, and the Deputy Conservator of Forest.

Formats Of Control Forms

13.2.2 Following are two formats of control forms:

13.2.3. 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.

13.2.4. 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.

13.2.5. The prescribed proforma of the Control Forms mentioned above are given in **Appendix No LXV** of the Volume II of this Plan.

13.2.6. 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 Chief Conservator through the Territorial Chief Conservator. After the entries have been checked and approved, the Working Plan Chief Conservator will first get his copy completed and then send the DCF's copy to the Territorial Chief Conservator. The latter will then complete his copy and finally return the DCF's set for deposit in the latter's office till next year. The Working Plan Chief Conservator will send three copies of Deviation statement to the PCCF for sanction. After the sanction, one copy each will be sent to the Territorial Chief Conservator and the DCF for their record and the Working Plan Chief Conservator will retain the third copy for his set of Control Forms.

13.2.7. The Control Forms should be submitted by the DCF to the Territorial Chief Conservator on or before December 1 and the latter should send them to the Working Plan Chief Conservator concerned on or before January each year.

i) Coupe Control Form

The format of Coupe Control Form is as given in **Appendix No. LXV** of the Volume II of this Plan.

ii) Felling Control Form:

The format of Felling Control Form is given in the **Appendix No. LXV** of the Volume II of this Plan.

SECTION 3. COMPARTMENT HISTORY

13.3.1. 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 Form-1 Compartment Description to be filled by the WPO

CH Form-2 Compartment Enumeration to be filled by the WPO

CH Form-3 Trees Marked for Felling to be filled by the DCF

CH Form-4 Compartment Out-turn to be filled by the DCF

CH Form-5 Compartment History to be filled by the DCF

13.3.2. Compartment Description:

The format CH Form-1 is given in the **Appendix LXVI** of Volume II of this Plan.

13.3.3. The description will be signed and dated by the WPO.

15.3.4. Compartment Enumeration:

The format is as given in **Appendix No LXVI** in the Volume II of this Plan.

13.3.5. 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 **LXVI** in the Volume II of this Plan.

13.3.6. Compartment Outturn:

The format is as given in Appendix No **LXVI** in the Volume II of this Plan.

13.3.7. Compartment History:

The format is as given in as given in Appendix No **LXVI** in the Volume II of this Plan.

13.3.8. 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.

13.3.9. 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.

13.3.10. 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.

13.3.11. 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.

13.3.15. 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 LXVII** 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. **LXVIII** of Volume II.

13.3.16. 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 **LXIX** of Volume II of this Plan.

MAPS:

Digital database:

13.3.17. 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.

13.318. Maps: Maps are essential ingredients of forest management. All maps are updated, revised or new maps prepared.

13.3.19 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.

13.3.20 Divisional Maps: 6 sets of Divisional Maps on 1:15,000 scale, have been prepared by GIS Cell, Amravati for distribution to Divisional and Range officers as follows:

Management Maps: 4 sets (2 cut and mounted +2 uncut and mounted)

Stock Maps : 2 sets (1 cut and mounted + 1 uncut and mounted)

These Maps are proposed to be distributed, as follows:

13.3.21 Working Plan Office will retain 2 sets of uncut and mounted maps, as given under, as the **Master sets**.

Management Maps: 1 master set (uncut and mounted)

Stock Maps : 1 master set (uncut and mounted)

The **Stock Maps** show the compartment boundaries, density, site quality, age classes, regeneration and other stocking details, including nature and composition of crop. The signs used in maps including colours is given in the **App. No. XXXIII** of Vol. II.

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.

13.3.22. West 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.

13.3.23. The Chief Conservator of Forests (Territorial) and the Chief Conservator of Forests, Working Plan each will be supplied 1 (one) set of the Management Maps on 1:50,000 scale, showing management details viz. Compartments, Working Circles, Felling Series, Range boundaries and other administrative details.

13.3.24. Reference Maps: The reference map on 1:2,50,000 scale, is provided along with the Plan showing Range boundaries, compartments, Working Circles, Felling Series, Roads and other prominent reference features have been enclosed with the Working Plan.

13.3.25. Grazing Maps: Two 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 West *Melghat* Division

CHAPTER XIV
SUMMARY OF PRESCRIPTIONS

PART I

SECTION 1. SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

14.1.1 Area of Plan : Total area of West Melghat Forest Division is 59362.04 ha. Range wise distribution of area is given in **Table No. 14.1**.

Table No. 14.1
Range wise distribution of area

Sr. No.	Name of Range	Area of R.F. (in ha.)	Area of P.F. (in ha.)	Total (in ha.)
1	Dharni	16,964.01	43.00	17,007.01
2	Dhakna	8,826.80	904.64	9,731.44
3	Dhulghat	18,981.05	528.07	19,509.12
4	Akot	13,114.47	-	13114.47
	Total :	57,886.33	1,475.71	59,362.04

14.1.2 Forest Type : As per Champion and Seth's classification the forest type is 5A/C1, Southern Tropical Dry Deciduous Forest.

14.1.3. Floral Diversity : In Melghat Forest total 769 species of plants have been reported so far which are given in **Table No. 14.2**.

Table No. 14.2
Floral Diversity of Melghat.

Trees	Shrubs	Herbs	Grasses	Climbers	Total
91	112	445	84	37	769

14.1.4. Faunal Diversity : Faunal diversity in Melghat Forest is given in **Table No. 14.3**

Table No. 14.3
Faunal Diversity of Melghat.

Pieces	Amphiba	Reptiles	Aves	Mammals	Total
96	08	54	265	80	503

14.1.5. Human Population : Human population of Dharni Taluka is 1,47,086 (2001 census)

14.1.6. Cattle Population: Cattle population of Dharni Taluka is given in **Table No. 14.4** (as per 2003 census).

Table No. 14.4
Cattle population of Dharni Taluka.

Goat	Buffaloes	Bull/Bullocks	Cows	Total
37,136	10,278	37,559	15,763	1,00,736

14.1.7. CAI/MAI CULMINATION FOR SITE QUALITY III: For Teak (seed origin) CAI/MAI culminates at the age of 82 years, corresponding to 113 cm. girth of bh. For Teak (coppice origin) it culminates at the age of 42 years corresponding to 69 cm. girth at bh.

14.1.8. Stock Mapping : Updating of old Stock Maps have been carried out. Stock mapping results are given in **Table No. 14.5.**

Table No. 14.5
Stock mapping results of West Melghat Division.

Teak	Mixed	Salai	Old Plantations	Under stocked	Cultivation	Balance	Water body	Not stock mapped
35.77 %	19.67 %	16.32 %	3.30 %	7.36 %	7.70 %	6.61 %	0.56 %	2.70 %

14.1.9. Enumeration Results : Enumeration results shows that there are 217 trees /ha in S.C.I. Working Circle and 173 trees/ha in I.W.C.

PART II

SECTION 2. FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

14.2.1 Functional Classification : Functional classification of West Melghat Forest is given in **Table No. 14.6.**

Table No. 14.6
Functional Classification of West Melghat Division.

S.No.	Type	Area (in ha)	Percentage
1	Tree Forest	37,734.78	63.57
2	Minor Forest	21,627.26	36.43
	Total :	59,362.04	100 %

14.2.2 Distribution of Area in Working Circles : Area of West Melghat Forest is distributed in Working Circles is given in **Table No. 14.7.**

Table No. 14.7
Distribution of Area in Working Circles

S.No.	Name of Working Circle	Area of R.F. (in ha)	Area of P.F. (in ha)	Total Area allotted (in ha)	Percentage
1	S.C.I.	37,691.78	43.00	37,734.78	63.57
2	I.W.C.	20,194.55	1,432.71	21,627.26	36.43
	Total :	57,886.33	1,475.71	59,362.04	100.00

Table No. 14.8
Distribution of Area in Overlapping Working Circles

S.No.	Name of Working Circle	Area of R.F. (in ha)	Area of P.F. (in ha)	Total Area allotted (in ha)	Percentage
1	Plantation (O)W.C.	1,200.88	-	1,200.88	2.07
2	Bamboo (O) W.C.	25,361.87	-	25,361.87	42.72
3	Wild Life (O)W.C.	57,886.33	1,475.71	59,362.04	100.00
4	N,T,F.P.(O)W.C.	57,886.33	1,475.71	59,362.04	100.00

14.2.3 Selection Cum Improvement Working Circles : It includes better stocked areas of Dharni, Dhakna, and Akot Ranges. Total area allotted to S.C.I. Working Circle is 37,734.78 ha. Range wise distribution of area is given in **Table No. 14.9.**

Table No.14.9
Range wise Distribution of Area in S.C.I. Working Circle

S.No.	Name of Range	Total Area of Range (in ha)	Area allotted to S.C.I. (in ha)	Comptt. included (Nos)	Felling Series
1	Dharni	17,007.01	17,007.01	77	5
2	Dhakna	9,731.44	7,613.30	28	2
3	Dhulghat	19,509.12	-	-	-
4	Akot	13,114.47	13,114.47	51	6
5	Total :	59,362.04	37,734.78	156	13

Silvicultural System : Selection System along with improvement felling. Natural Regeneration to be induced and encouraged, supplemented by Artificial Regeneration.

Felling Cycle : Felling cycle is 20 years.

Harvestable Girth : Harvestable girth is 120 cms for both *Teak* (seed origin) and other miscellaneous species. *Bija, Shisham, Kulu, Semal* and all fruit trees are reserved against felling. For *Teak* trees of coppice origin, harvestable girth shall be 75 cm.

Yield Regulation : For yield regulation the K.P. Sagariya's modification of Smithie's formula has been applied.

Agency of Harvesting : Departmental.

Enumeration : All trees above 60 cm. girth will be enumerated separately. Grid wise record of enumeration and marking will be maintained and for this purpose entire area of coupe shall be divided in to grids of size not bigger than 100 mt x 100 mt (1ha.)

Treatment Map : Treatment map will be prepared as given in Sec.14.4.

Marking Rules : If the number of trees in approach class is more than in the harvestable girth class then the number of trees equal to 50 % of harvestable girth class shall be marked for felling in the harvestable girth class. But if the number of trees in approach class is less than those in the harvestable girth class then the number of trees equal to 50 % of approach girth class shall be marked for felling in the harvestable girth class. All dead after retaining 2 dead trees per ha. and malformed trees, all live high stumps and all except one vigorous growing coppice shoot per stool will be marked for felling. *Teak* trees of coppice origin above 75 cm girth at breast height shall be marked for felling.

Expected Yield : Expected yield for *teak* timber is approx.3500 cu.m and Fuel wood approx.7000 cu.m per year.

14.2.4. Improvement Working Circle : Total area under this Working Circle is 21627.26 ha. Distribution of Range wise is given in **Table No. 14.10.**

Table No. 14.10
Range wise Distribution of Area in Improvement Working Circle

S.No.	Name of Range	Total Area of Range (in ha)	Area I.W.C. (in ha)	Comptt. (Nos)	Felling Series
1	Dhakna	9,731.44	2,118.14	12	1
3	Dhulghat	19,509.12	19,509.12	79	7
	Total :	29,240.56	21,627.26	91	8

Silvicultural System : No silvicultural system prescribed. Improvement felling assisted by Artificial Regeneration.

Felling Cycle : 20 years.

Agency of harvesting : Departmental.

Enumeration : All trees above 60 cm. girth will be enumerated separately. Grid wise record of enumeration and marking will be maintained and for this purpose entire area of coupe shall be divided in to grids of size not bigger than 100 mt x 100 mt (1ha.)

Treatment Map : Treatment map will be prepared as given in Sec.14.4.

Marking Rules : All dead after retaining 2 dead trees per ha. and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling.

14.2.5 Plantation (O) W.C. : Area of old Teak plantations from year 1961 to 2003 is 1200.88 ha. Distribution of Range wise area is given in **Table No. 14.11.**

Table No. 14.11
Table showing Range wise area under old Teak Plantation.

S.NO.	Range	Area (in ha.)
1	Akot	291.228
2	Dharni	334.184
3	Dhulghat	575.468
4	Dhkna	-
	Total :	1200.880 ha.

Treatment : Silvicultural operations like cleaning and thinning are prescribed.

14.2.6 Bamboo (O) W.C. : Total area under this Working Circle is 25361.87 ha. & is distributed as given in **Table No. 14.12.**

Table No. 14.12
Table showing Range wise area under Bamboo (O) W.C.

S.No.	Name of Range	Name of Felling Series	Total Area allotted to W.C. (in ha)	Area Under Bamboo (in ha.)	Comptt. (Nos) having Bamboo
1	Dharni	Dharni	7,381.19	2,162.20	35
2	Dharni	Patiya	7,549.65	2,931.40	34
3	Dhulghat	Khatkali	582.70	40.00	2
4	Akot	Khatkali	9,848.33	1,894.80	34
5	Total :		25,361.87	7,028.40	105

Silvicultural System : Removal of dead & mature culms subject to the retention of 8 mature culms per clump. In addition to this removal of congestion in the gregariously flowered area shall be taken up.

Cutting Cycle : 3 years.

Cutting Series : Three viz. Patiya, Dharni & Khatkali.

Method of executing cutting : Standard.

Expected Yield. : Approximately 6,40,000 Long Bamboos & 10000 Bamboo bundles per year.

14.2.7. Wild Life (O) Working Circle : Total area of West Melghat Division i.e. 59,362.04 ha. has been allotted to this Working Circle.

Treatment : Treatments prescribed are mainly Protection, Habitat Development supported by awareness .

Eco Tourism : The places which are having tourist potential may be given special attention by ensuring preservation of their originality in Wild Life conservation as well as from eco tourism point of view. This should be supplemented by trekking programmes on existing tracking routes.

14.2.8. N.T.F.P.(O) Working Circle : This Working Circle also comprises the entire area of Division which is 59,362.04 ha.

Minor Forest Produce (M.F.P.) : The important N.T.F.P. found in the Division is *Moha flowers, Moha fruit, Tendu, Kulu gum, Salai gum, Dhawda gum, Lac, Aola, Charoli, Behda, Bel, Khair* etc.

Medicinal Plants : The important medicinal plants found in this Division are *Musali (Chlorophytum tuberosum), Shatawari (Asparagus racemosa), Aola (Emblica officinalis), Behda (Terminalia belarica), Malkangni (Celastrus paniculatus)* etc.

Treatment : Following treatments are prescribed :

- a) Fire Protection Measures :** Village Panchayats and JMFCs shall be involved in awareness generation programme to control forest fires.
- b) Training for NTFP collection :** Training programmes for proper NTFP collection, value addition & marketing will be organized.
- c) Documentation of NTFP :** Beat guards shall send monthly reports to the R.F.O. on the quantity of NTFP collected in their Beats.
- d) Non destructive collection of NTFP :** Non destructive removal of flowers, fruits, and other medicinal parts may be permitted by Dy.C.F. after the approval of the C.C.F. Territorial concerned.
- e) Tending :** Tending shall be done to remove congestion in the crop.
- f) Planting :** NTFP species shall be given due place (i.e. 10 to 15 %) in various plantation schemes.
- g) Removal :** Except dead, diseased and specially provided for no NTFP trees shall be marked for felling.
- h) Soil Working :** Digging of 30 cm. deep trench encircling NTFP species is recommended.

Agency for Collection. : The Maharashtra Tribal Development Corporation (TDC), JFMC, FLCS and Forest Department are the agencies for harvesting.

14.2.9. JFM : There are 64 Forest Protection Committees. Total 18,120.68 ha. area has been assisted under JFM. Out of these 64 FPC 26 are registered under Society Act & 36 FPC are registered with Department.

F.D.A.: Phase I being implemented in 26 villages, physical target of plantation is 1300 ha., Phase II will be implemented in 25 villages, the physical target of plantation is 625 ha.

Treatment : Meaningful participation of all the stake holders while formulating micro plans, silvicultural management, maintenance of forest boundary and control over illicit cutting should be taken into consideration.

14.2.10. Forest Protection :

Illicit cutting and Fire: Almost all the Beats except Vastapur, & Zira Beat of Akot range and East Wan Beat of Dhulghat are sensitive to illicit cutting. Positions of illicit and fire sensitive Beats in West Melghat Division is given in **Table No. 14.13.**

Table No. 14.13
Table showing positions of illicit and fire sensitive beats in W.M.Division.

S.No.	Position of Beats	Illicit Cutting	Fire
1	Normal Beats	3	11
2	Sensitive Beats	8	14
3	Hyper sensitive Beats	34	20
	Total :	45	45

Grazing : Grazing position of Division as per G.S.O. Report is given in **Table No. 14.14.**

Table No. 14.14
Table showing grazing position of West Melghat Division.

Number of Village	Forest Area (in ha)	Area Closed for grazing (in ha)	Area available for grazing (in ha)	Carrying capacity in Cattle units	Demand in Cattle Units.
107	59,362	11,986	47,374	36,703	39,894

Encroachment : Area in Akot and Dhulghat Ranges are sensitive to encroachment. Position of encroachment upto 13.12.2005 is given in **Table No. 14.15.**

Table No. 14.15
Table showing position encroachment in West Melghat Division.

S.No.	Period	Area under encroachment	No. of encroachers
1	Before 1978	456.12 ha.	280
2	After 1978	283.39 ha.	197
	Total :	739.51 ha.	477

14.2.11. Financial Implications :

For Division Area

Annual estimated Expenditure = 242 Lakhs.

Annual estimated Revenue = 1197 Lakhs.

Area outside 10 km from N.P./Sanctuary

Annual estimated Expenditure = 178 Lakh

Annual estimated Revenue = 313 Lakh

SECTION 3. DEMARCATION AND MARKING

14.3.1. 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.

14.3.2. 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. 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 4. TREATMENT TYPES AND PREPARATION OF TREATMENT MAP

14.4.1. 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 No.14.16.**

Table No. 14.16.
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	B-type	Open forests (density<0.4) with rootstock	2 hectare
Pole Crop and Old plantations	C-type	Pole crop of the identified valuable species, suitable for retention as future crop, having density 0.4 or more and old plantations.	1 hectare
Well-stocked area	D-type	Areas having density 0.4 and over	2 hectare

14.4.2. 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.

14.4.3. In the treatment maps are proposed to show adequate natural regeneration areas in the D-type & areas suitable for planting *Bamboo*, *Teak* and *Mixed* species in the B type area.

14.4.4. Delineation of various treatment type areas on treatment maps will adhere to the following general guidelines:

14.4.4.1. 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.

14.4.4.2. 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.

14.4.4.3. The A3-type (excessive erosion prone includes seasonally flooded areas and such pockets marked on the land use maps.

14.4.4.5. 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.

14.4.4.6. 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.

14.4.5. 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.

14.4.6. The Treatment Map will bear date of inspection by the Range Forest Officer and the Assistant Conservator of Forests under their signatures.

14.4.7. 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 5. THE COMMON TREATMENT PRESCRIPTIONS FOR VARIOUS TREATMENT TYPES

14.5.1. 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.

14.5.2 Soil and Moisture Conservation works: Soil and Moisture Conservation works such as check-dams, Gully plugging, etc. shall be carried out.

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.

14.5.3 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.

14.5.4 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.

14.5.5 Climber cutting and shrub clearance: Climber cutting of *Chilati*, *Mahulbel*, *Palasbel*, *Nagvel* and shrub cutting of *Lantana*, *Rantulsi*, *Bharati*, *Kharasani* may be carried out wherever the operation is warranted for the development of tree crop. Cutting of climbers and shrubs should generally be

avoided for 20 meters from the forest edge along the roads. However no climber having medicinal value will be removed even if it is hindering tree growth.

14.5.6 Sixth-year cleaning: Cleaning operations are prescribed to be carried out in the entire coupe in the sixth year of coupe working.

14.5.7 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.

14.5.8 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.

14.5.10. 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.

14.5.11. 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.

14.5.12. 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 6. TREATMENT IN A-TYPE AREAS

14.6.1. Soil and Moisture Conservation: Gully plugging and other soil and moisture conservation works as described in the chapter of Miscellaneous Regulations shall be taken up.

14.6.2. 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.

14.6.3. 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.

14.6.4. 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 7. TREATMENT IN B-TYPE AREAS

14.7.1. Rootstock management: Tending of rootstock in the B-type will be carried out.

14.7.2. 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.

SECTION 8. TREATMENT IN C-TYPE

14.8.1. Thinning: Thinning of old plantations and pole crop will be carried out maintaining basal area per hectare and number 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.

14.8.2 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.

14.8.3 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 9. TREATMENT IN D-TYPE

14.9.1. Enumeration in annual coupes: Species and girth-class of all trees above 60 cm girth are prescribed to be recorded for enumeration.

14.9.2. 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 14.10.1 will determine the order of priority for retention.

14.9.3. 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.

14.9.4. 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.

14.9.5. 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.

14.9.6. 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 10. VALUABLE SPECIES FOR RETENTION

14.10.1. Order of priority among desirable species for retention is prescribed as: *Bija, Shivan, Behada, Moha, Biba, Kulu, Teak, Lendia, Ain, Tiwas, Khair, Dhawda, Char, and Aola.*

14.10.2 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 :

14.10.3. 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.

14.10.4. 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.

14.10.5. 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.

SECTION 11. CUT BACK OPERATIONS (CBO)

14.11.1. Cut back operations are prescribed to be carried out in the year following the main felling, as per prescriptions given in subsequent paragraphs.

14.11.2. 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.

14.11.3. All trees damaged during the main coupe felling shall be marked for removal.

14.11.4. All left over multiple coppice shoots and poles shall be reduced to one per stool.

14.11.5. All newly risen coppice shoots shall be removed to encourage establishment of seedling regeneration.

SECTION 12. GUIDELINES FOR CLEANING IN THE SIXTH YEAR

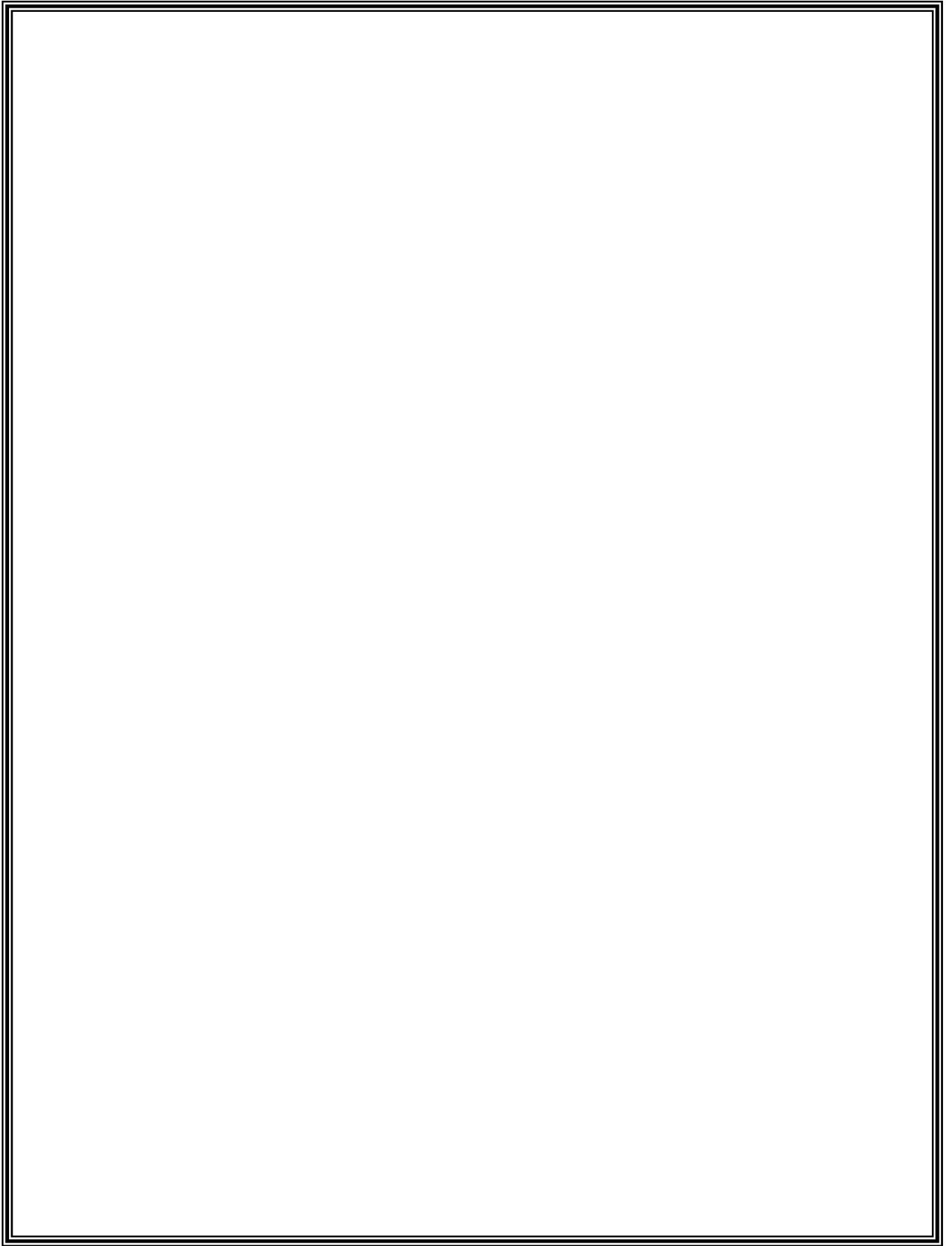
14.12.1. Clearing shall be carried out in the sixth year of the coupe working and in plantations in the sixth year of its formation. No cleaning is prescribed in the failed plantation, which are treated so as per Evaluation code. Cleaning shall be carried as per prescriptions given in the following paragraphs :

14.12.2. 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.

14.12.3. 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.

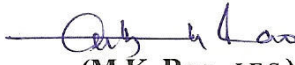
14.12.4. Coppicing of damaged and malformed saplings and singling of coppice shoots shall be carried out. All newly risen *Teak* coppice shoots shall be removed for the growth of seed origin plants.

14.12.5. 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.




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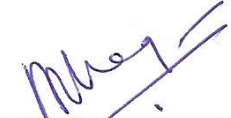

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