



Government of Maharashtra

**The
Working Plan
of
Nagpur Forest Division
(Nagpur Circle)**

Volume – I

Period

2015-16 to 2024-25

**By
P. Kalyan Kumar, IFS
and
T.K.Choubey, IFS**

**Office of the Conservator of Forests (Working Plan)
Near Govt. Printing Press, Zero Mile
NAGPUR**



Government of Maharashtra

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NAGPUR



सत्यमेव जयते

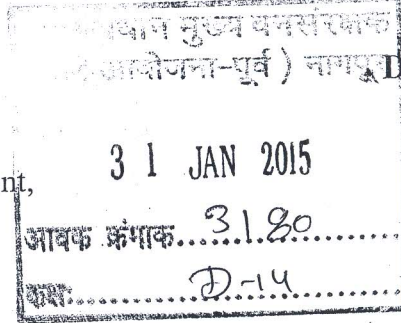
भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS
& CLIMATE CHANGE

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File No. 12-4/2000(FOR)/081

To,

The Principal Secretary,
Revenue and Forest Department,
Govt of Maharashtra,
Mantralaya,
Mumbai-400032.



Dated : 19/01/2015

Sub. : Working Plan proposal for Nagpur Forest Division written by Shri Kalyan Kumar (IFS) and Shri T.K. Chaube (IFS) for the period of 2015-16 to 2024-25.

Ref. : PCCF (P&M) letter No. Desk-14/WP/Nagpur/1132/2014-15 dated 20.12.2014.

Sir,

With reference to the above mentioned subject, I am directed to convey the approval of the Central Government to the said working plan in accordance with the powers vested under Forest (Conservation) Act, 1980 and subject to the following conditions:

1. The currency of the Working Plan shall be for a period of 10 years i.e. from 2015-16 to 2024-25.
2. The orders of Hon'ble Supreme Court in the matter of Godaverman Therumalkpad Vs Union of India in W.P. (Civil) No. 202/95 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
3. Further, in compliance with orders of Hon'ble Supreme Court's dated 22.09.2000, the Government of Maharashtra shall ensure that regeneration of forests is commensurate with felling carried out under this working plan.
4. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with felling. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.
5. Following the directions of the Hon'ble Apex Court in their order dated 22.09.2000, a Core group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with felling.

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16/01/15

6. Instruction/directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MoEF, New Delhi.
7. No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.
8. Standard silvicultural operation under the strict supervision of Assistant Conservator of Forests and above will be allowed to improve the health of growing stock while executing the prescriptions of the Working Plan. Selection felling shall not be allowed in working circle other than selection cum improvement working circle.
9. Prescriptions of micro plans for JFM (if made) should not deviate from the broad framework/guidelines of the working plan and shall be in accordance with various orders of Hon'ble Supreme Court.
10. Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/future years to compensate this removal.
11. No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval of the Central Government under Forest (Conservation) Act, 1980, However, deviations of positive nature i.e. out of turn plantation carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.
12. Growth statistics of regeneration, record of its survival will be appended in Working Plan from time to time.
13. Midterm review of Working Plan shall be undertaken after five years so as to make any changes, if needed to meet the objectives, with the approval of Regional Office, Bhopal.
14. The exploitable girth of tree species and period of felling cycle shall not be lower than the approved in previous working plan.
15. In the vicinity of Nalas and water bodies felling shall not be undertaken.
16. Felling shall not be undertaken near the known resting places of wild animals.
17. Removal of dead and diseased trees will be undertaken under the supervision of an officer not below the rank of Assistant Conservator of forests.
18. All kind of felling including that of dead and diseased trees and for granting of right and concession as well as all illicit felling should be compiled along with the estimation of their stand volumes as per the same volume table used for the assessment of growing stock. This report shall be prepared annually working circle and compartment wise by the territorial DFO and shall be submitted to the C.F, Working Plan for this purpose within 02 months of the end of control year. Such removal shall be accounted for against the prescribed felling yield of the relevant year.


16/6/15

19. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the prescription of Working Plan.
20. Status of rare, endangered and near extinct species shall be monitored closely and adequate measures will be taken for their protection and conservation.
21. Execution of Working Plan shall be in conformity with the National Forest Policy.
22. A definite plan has to be made remove encroachment and plant the vacated area by planting suitable local species.
23. Eco-tourism shall be undertaken on sustainable basis. No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed for public. Such sites will be declared Plastic free zones and these eco-tourism sites will be managed by the forest department as per the prescriptions of the working plan.
24. Demarcation and consolidation of Forest Boundaries will be done adequately.
25. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.
26. Exotic species should not be planted in Plan areas.
27. Proper mechanism has to be put in place to control grazing & fire. Proper fire plan shall be prepared and executed meticulously
28. Attempts shall be made to grow trees outside forest areas to meet the local demand of small timber, fuel wood & fodder.
29. All the left over mandated chapters, appendices and maps will be added in Working Plan.
30. Proper mechanism is to be place in an adequate manner that such NTFPs are collected in sustainable manner.
31. While managing forest provisions of the Biodiversity Act, 2002 shall be fully complied.
32. Information on status of natural regeneration, demand and supply, socio-economic survey and regeneration survey will be added in Working Plan.
33. The exploitable girth in silvicultural improvement working circle will not be less than that of Shri S.S. Mishra and Shri Jarnail Singh (2004-05 to 2013-14)'s Working Plan for stands of similar nature. Only 50% of normal yield will be harvested as per the direction of Government of India.
34. No felling except standard silvicultural operations will be done in other Working Circles.
35. Proper management Plan should be in place for areas under control of FDCM Ltd.
36. A chapter will be added to activities of Forest Development Corporation as required under chapter IV of Working Plan Code, 2004.

37. Efforts should be made to undertake artificial regeneration of local species in such a way that it serves both the purpose of biodiversity conservation and meeting the demand of fuel wood, fodder and timber.
38. Socio-economic survey is to be conducted within first year of implementation of plan and the same be appended with the Working Plan.
39. In view of proposed tall planting of seedling of 5 ft. height, the plantation may be taken up on experimental basis to judge success before undertaking large scale plantations.
40. Grassland will not be expanded at the expense of natural tree cover.
41. Mandatory Forest Protection (overlapping) working circle will be constituted and a chapter on it will be added in the Working Plan.
42. Cutback operations in SCI Working Circle other shall be undertaken as per standard norms.
43. Reference Map documents and appendices mandated in National Working Plan Code will be incorporated in the Working Plan.
44. The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented or relevant modification in the working plan is required so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy.

Yours faithfully,

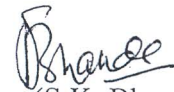


(S.K. Bhandari)

Chief Conservator of Forest (Central)

Copy to :

1. The Additional Director General of Forests (FC) Ministry of Environment and Forest Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003
2. The Principal Chief Conservator of Forests, Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
3. The Chief Conservator of Forests, (Working Plan), Govt. of Maharashtra, Nagpur.
4. The Divisional Forest Officer, Nagpur Forest Division, Nagpur.



(S.K. Bhandari)

Chief Conservator of Forest (Central)

16/01/15

GOVERNMENT OF MAHARASHTRA

NO. FDM-2015/CR NO. 92/F-2

Revenue & Forest Department

Mantralaya, Mumbai 400032

Date :- 7th April, 2015

**SUBJECT: APPROVAL OF WORKING PLAN OF NAGPUR FOREST
DIVISION WRITTEN BY SHRI KALYANKUMAR &
SHRI T.K. CHOUBE, IFS FOR THE PERIOD OF
2015-2016 TO 2024-2025**

MEMORANDUM :

The undersigned presents compliments to the Principal Chief Conservator of Forests (Production & Management) and, with reference to his letter No. Desk-14/WP/Nagpur/1132/2014-15, Dated 20.12.2014 on the above subject, is directed to convey the sanction of Government of Maharashtra to the working plan of NAGPUR FOREST DIVISION, Maharashtra State for the period of 2015-16 to 2024-25 prepared by SHRI KALYANKUMAR, IFS & SHRI T.K. CHOUBE, IFS.

The Government of India, Ministry of Environment and Forests has already conveyed its approval to the above said working plan vide its letter No. 12-4/2000(FOR)/081, Dated 19.01.2015 under certain conditions. These conditions should be strictly followed.

By order and in the name of the Governor of Maharashtra,

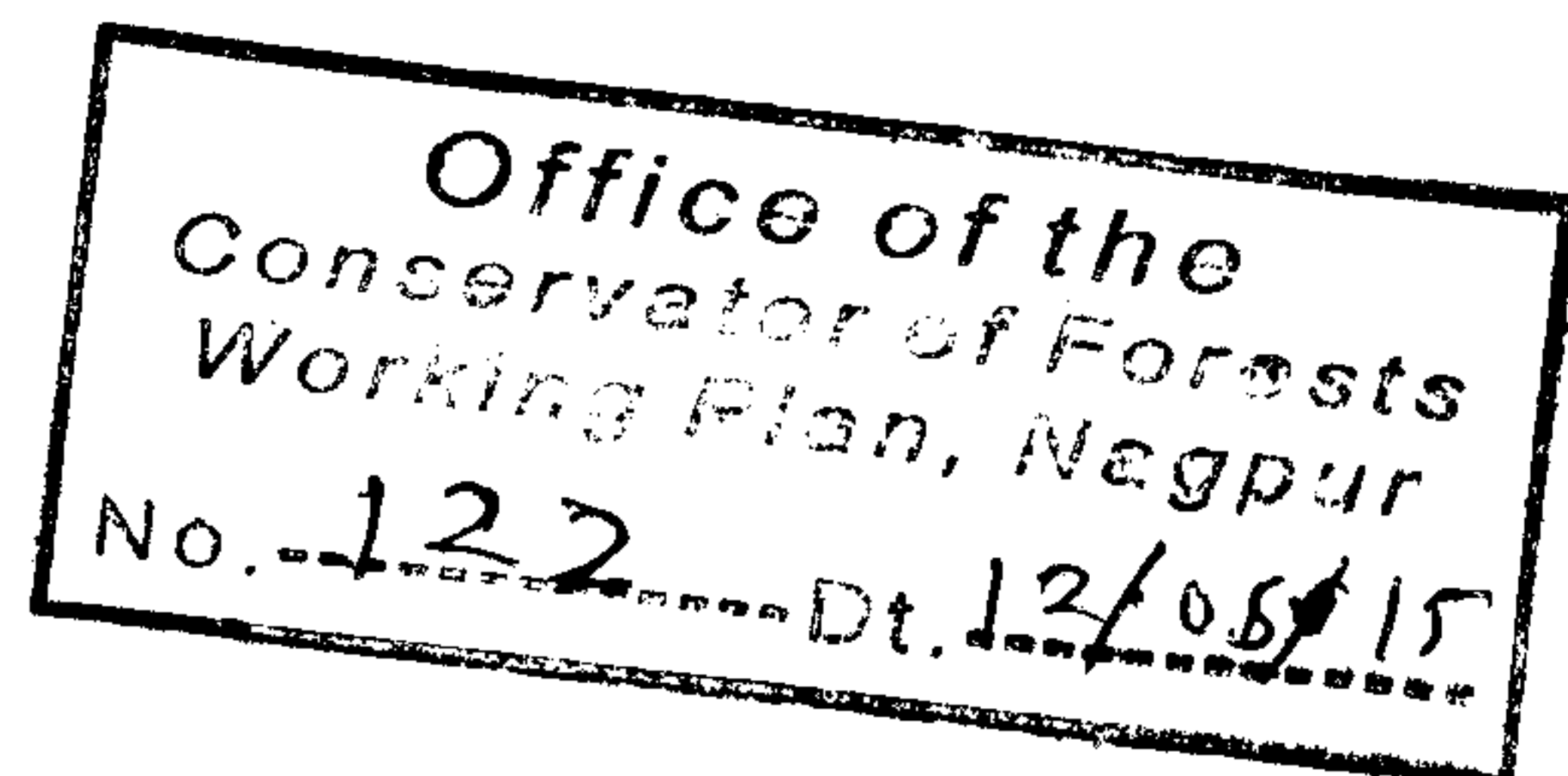
Yours Faithfully,


7/4/15
(D.L. THORAT)

Joint Secretary to the
Govt. of Maharashtra

To,

1. Principal Chief Conservator of Forests, (Production & Management)
Maharashtra State, Nagpur.
2. Additional Principal Chief Conservator of Forests (Working Plan Circle-East), Nagpur.
3. Chief Conservator of Forests, (Working Plan), Govt. of Maharashtra, Nagpur
4. Divisional Forest Officer, Nagpur Forest Division, Nagpur
5. Select File Desk F-2.



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(WP-East)

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FOREWORD

M. Karunakaran, IFS
APCCF (Working Plan-East)

The present working plan of Nagpur Forest Division as revised by Shri P. Kalyan Kumar, IFS envisages scientific management of forest areas of Nagpur Forest Division. Entire forest area has been divided into 4 Area specific and 5 Overlapping working circles. The four area specific working circles are-

- Selection cum Improvement,
- Afforestation,
- Grass and Fodder Resource Management and
- Urban Forest Working Circle

Urban Forest areas falling in the jurisdiction of Nagpur Municipal Corporation have a great potential to create awareness among the Urban masses. At the same time, these lands are vulnerable for non-forestry uses. Hence, to provide focus on such areas a separate Working Circle has been constituted as per the recommendations of the State Level Committee.

Wildlife management is occupying center stage of public conscience and is often seen as the Face of Forest Department. Keeping in view the importance of Wildlife in Nagpur forest division, a detailed chapter on "Wildlife (Overlapping) Working Circle" has been constituted. The spread of waterholes and the interventions required have been elaborately discussed.

I congratulate Shri P. Kalyan Kumar, IFS who has contributed whole heartedly in writing this Working Plan and his highly motivated team for accomplishing this assignment in the shortest possible time.

M. Karunakaran I.F.S.
APCCF (Working Plan-East), Nagpur



PREFACE

P. Kalyan Kumar, IFS
Conservator of Forest (Working Plan)

This Working Plan covers all the forest areas incharge of Nagpur forest division. It replaces the working plan of Shri. Jarnail Singh, & Shri. S.S. Mishra, for the period 2004-05 to 2013-14. Govt. of India vide letter no. 12-4/2000 (FOR)/1169 dated 19/6/2014 accorded approval for an extended period of one year.

The PWPR-I was prepared by Dr. S.H.Patil, IFS, the then C.C.F Nagpur Circle and was approved by the State level Committee on 1st & 2nd March, 2013. On the basis of the recommendations made by the SLC, the Draft Working Plan has been prepared by the undersigned. Draft Working Plan has been discussed and approved by the State level committee meeting on 25/09/2014 with some suggestions and recommendations. All the suggestions and recommendations have been incorporated in the final Draft Working Plan. The Part-I of Volume-I was prepared by my predecessor Shri. T.K.Choubey, IFS, CCF (Working Plan), Nagpur. Also, during his tenure Enumeration work of SOFR unit was monitored.

Enumeration of forest crop was done by the SOFR unit, Amravati. The analysis of the tree enumeration data was done with the help of software developed for the data analysis. Stock mapping was done by the staff of Nagpur Division. Data on remote sensing was obtained from Forest Survey of India.

During the preparation of this plan, the inputs from the field staff of Nagpur forest division (Forest Guard to DCF) have been duly considered. The stock maps and enumeration results were sample verified on ground by field visits in all the ranges of the division.

I express my deep sense of gratitude for the valuable inputs given by Shri. A.S.K. Sinha, IFS, PCCF (P & M) while preparing this plan. I am also thankful to Shri. M. Karunakaran, IFS, APCCF (Working Plan-East), Nagpur for his valuable guidance from time to time. My thanks are also due to Shri. Tembhurnikar, CCF (T), Nagpur for the cooperation extended to W.P. staff from time to time.

My words of appreciation to my team of Officers, Surveyors and support staff who relentlessly worked and extended their wholehearted support for timely completion of this Plan. I

am thankful to Shri. V.B.Patil, ACF, Shri. Malghane, RFO, Shri. Kshirsagar, RFO, Shri. M.B. Thote, Ranger Surveyor, Shri. S. V. Deshmukh, Surveyor, Shri. Gopi Nanore, Surveyor, Shri. H.R. Nasre, Surveyor, Shri.V.G.Gurao, Surveyor, all belonging to the Working Plan Dn. Nagpur for their untiring work in compilation & analysis of Data, allotment of coupes, felling series, tabulation and Digitization of maps with the help of GIS software.

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Conservator of Forests (Working Plan),
Nagpur

DRAFT WORKING PLAN OF NAGPUR FOREST DIVISION

EXECUTIVE SUMMARY

INTRODUCTION:

The forests of Nagpur forest division are under scientific management for the past 120 years. The first Working Plan for Nagpur division was written by Dobbs for the period 1895 to 1912. This is the Eighth Working Plan for the management of Nagpur forest and replaces the earlier Working Plan written by Shri. Jarnail Singh & Shri. S.S. Mishra for the period 2004-05 to 2013-14. This Plan has received extension for one year vide GoI's letter dated 19/6/2014. This Working Plan covers forest area of 1460.79 Sq. Km (RF-685.66 Sq. Km, PF-627.60 Sq. Km, Z.J-140.87 Sq. Km, Unclassed forest-0.21 Sq. Km and Non-forest land-0.87 Sq. Km)

The boundary of the Nagpur Division is co-terminus with the boundary of Nagpur district. The Nagpur Division extends over to 20° 35' to 21° 44' North as latitude and 78° 15' to 79° 40' East as longitude. The boundaries of the tract dealt with are given in Table below.

North	Chhindwara and Seoni Districts of Madhya Pradesh
East	Bhandara District of Maharashtra
South	Chandrapur and Wardha Districts of Maharashtra
West	Amaravati and Wardha Districts of Maharashtra

BASIS OF PROPOSALS:

This Working Plan is prepared for the scientific management of the Forests and Wildlife of Nagpur. The primary management objective for the Forests of Nagpur Division is to treat forests as per the requirement of site so as to optimise Growing Stock. Nagpur district has the distinction of harbouring four protected areas viz., Pench National Park, Mansingdeo Sanctuary, Umred Karandla Sanctuary and Bor/New Bor Sanctuary. Therefore, the territorial forest areas adjoining to these protected areas are rich in Wildlife including the flagship species "Tiger". Hence, Wildlife management and Conservation is an important focus area for management.

The existing policy framework of State and Central Government, various legislations governing Forest and Wildlife, Orders of Hon'ble Supreme Court of India and High Courts, Government Resolutions/Circulars/Notifications of the State Government etc have formed the basis of prescriptions of this Working Plan and are outlined below:

- a) National Forest Policy, 1988.
- b) National Wildlife Action Plan (2002-2016).
- c) National Forestry Action Plan
- d) Hon'ble Supreme Court's Orders in Writ Petition 202 of 1995 (Godavarman Thirumalpad Vs. Union of India).
- e) JFM circulars of State and Central Government.
- f) The Biological Diversity Act, 2002.
- g) The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.
- h) Other legislations governing forest and wildlife.

WORKING CIRCLES AND THEIR DISTRIBUTION: For the scientific management of forests, a compartment has been used as a unit of treatment. The allocation of compartments is based on preponderance of suitability to specific working circle. In all, 4 (Four) area-specific and 5 (Five) overlapping, working circles are prescribed. The areas have been allotted after analysing the enumeration data obtained from SOFR unit, Amaravati. The allocation of forest areas under various working circles of the current working plan has been mentioned below:

Sr. No.	Name of Working Circle	Area allocated (Ha)
1	Selection-Cum-Improvement	102566.12
2	Afforestation	21070.55
3	Grass and Fodder Management	7376.93
4	Urban Forest	1036.85
5	Miscellaneous area management (Zudpi and Unclassed area) under Miscellaneous Regulations	14029.06
6	JFM (Overlapping)	Entire area
7	NTFP (Overlapping)	Entire area
8	Old Teak Plantation (Overlapping)	4616.71
9	Bamboo (Overlapping)	22245.819
10	Wildlife (Overlapping)	Entire area

SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:

The areas capable of producing large timber, poles and firewood are allotted to this working circle. It predominantly includes areas which support straight bole and sound trees of both seedling and coppice origin. It includes 102566.12 ha of total area comprising of 63182.3 ha of Reserved Forests and 39383.9 ha of Protected Forests. It constitutes an area of 70 % of the total forest area of the division.

Special Objectives of Management:

The special objects of management of the forest areas under this Working Circle are as follows:

- i. To obtain sustained supply of medium to large-sized timber and poles.
- ii. To maintain mixed forest composition and High Forest character of the forest crop and improve density of stocking by tending existing natural regeneration.
- iii. To improve the proportion of valuable mixed tree species in the crop by suitable tending operations and providing growing space for naturally regenerated seedlings of such species.
- iv. To conserve the local bio-diversity.

Area allocation: Based on the results of the enumeration data and satellite imageries and existing stock map details, Compartments having density >0.4 and basal area more than 10 Sq.m per ha have been allotted to this Working Circle.

General Character of the Vegetation:

The forests are mixed in nature and contain trees of all age classes. The crop predominantly consists of Teak crop and its associates. Proportion of Teak is about 28 percent. The major mixed species are Saja, Bija, Kalam, Haldu, Tiwas, Dhaoda, Garadi, Mowai, Rohan, Bhirra, Garadi, Lendia, Palas, Salai etc. In the fruit bearing species, Tendu, Moha, Char, Aonla, Bel, Harra and Beheda are the main species. Natural Bamboo is limited to few compartments. Bamboo plantations have come up very well. Kuda, Garadi, Decamali are the main species in the understorey. The crop is predominantly young to middle aged with occasional mature trees. The density of the crop is 0.4 to 0.8. The dominant site quality is IVA with some patches of site quality III and IVB occurring in patches.

Harvestable Girth: Harvestable girth for various important species, in SCI working circle, has been determined at maximum volume production as per the CAI & MAI curves in stem analysis exercises, carried out by the C.F Working Plan Nagpur during 2007. The details are given in the Table below:

TABLE SHOWING THE HARVESTABLE GIRTH FOR VARIOUS SPECIES:

Group	Species	Harvestable Girth
Group 1	Teak	135 cm. for quality III
		120 cm. for quality IV
Group 2	Ain, Bija, Haldu and Kalam.	135 cm for quality III
		120 cm.for site quality IV
Group 3	Dhaoda, Tiwas, Surya, Shisham, Rohan, Bhirra, Kasai, Mokha, Palas, Dhaman, Bhilawa, Chichwa, etc.	90 cm. for site quality IV
Group 4	Garadi, Lendia, Khair	45 cm for site quality IV
Group 5	Species protected from felling (Semal, Kullu, Beheda, Karai, etc. and all fruit trees)	No felling

FELLING CYCLE: Felling cycle has been fixed at 20 years**Yield Calculation:**

Yield is calculated by Smythie's Safe-guarding formula and is regulated by area. Average area of Coupe is 105 Ha. The expected average yield per hectare is 3.57cu.m. This may vary from coupe to coupe due to differences in growth conditions, distribution of selection girth trees and their silvicultural availability.

Other Prescriptions:

- Annual coupe will be demarcated and marked one year in advance.
- Treatment map would be prepared before marking.
- Marking shall be invariably inspected by an officer not below the rank of ACF.
- In the subsequent year after main felling, subsidiary silvicultural operations like Cut back operations (CBO) and Natural Regeneration (NR) works will be carried out.
- Annual coupe will be strictly protected from Grazing and Fire.

AFFORESTATION WORKING CIRCLE**GENERAL CONSTITUTION:**

The open forest areas having density less than 0.4 with sparse vegetation and inadequate natural regeneration and shrubby growth have been included in this Working Circle. Afforestation Working Circle (AFF) forms about 13% of the entire forest area of the division. It includes 21070.55 ha of the forest area comprising both the Reserved Forests to the extent of 4174.39 ha and Protected Forests to the extent of 16896.16 ha.

The following criterion has been applied for allocation of compartments to the AFF Working Circle:

- Compartments having large proportion of area under forest blanks.
- Compartments having poor quality open forests, which need to be afforested.
- Average Basal area of the crop is less than 3 Sq.M per ha.

SPECIAL OBJECTS OF MANAGEMENT:

The special objectives of management in this working circle are as follows:

- To restore the vegetative cover and of degraded and open areas and increase their productivity by site protection and tending of natural regeneration and rootstock, supplementing it with plantations, wherever, necessary.
- To check the loss of top soil by adopting suitable soil and moisture conservation measures and to increase the water absorption capacity of the soil.

- To actively involve Gram Panchayats and other village institutions like JFM committees in re-vegetating degraded areas.
- To improve the quantity and quality of fodder by planting fodder tree species and introducing superior and high yielding fodder grasses and legumes.
- **Felling cycle:** It is fixed as Ten years. The entire area of this working circle will be covered in a period of Ten years.
- **Regulation of yield:** No yield is prescribed for this working circle. Only hygienic felling are prescribed.

METHODS OF REGENERATION:

- Tending of Natural Regeneration and existing rootstock is prescribed to be given preference over plantations.
- Soil and moisture conservation works will be carried out as per requirement of site. Plantations shall be taken in the B-type and suitable areas. Choice of species is carefully selected as per site suitability and as far as possible tall seedlings which are at least 5 ft. height should be used for raising plantations.

AGENCY FOR IMPLEMENTATION: For the success of afforestation works, role of local communities is extremely important. Therefore, afforestation works under this working circle are to be entrusted to JFMCs as per area allotted to JFMCs and forest department should provide technical guidance. Quality seedlings shall be raised for Afforestation work.

GRASS AND FODDER RESOURCES MANAGEMENT WORKING CIRCLE

General Constitution:

The forests included under this working circle are-

- i. Areas under Grass and Fodder Resources Management Working Circle of previous plan found fit for inclusion.
- ii. Forest compartments having abundant open areas are allotted to this working circle. Areas allotted to this working circle have basal area less than 2 Sq.M per Ha.

General Character of the Vegetation

The forests put under this working circle contain degraded soils and are under heavy biotic pressure. They are therefore open (density ranges from 0.1-0.2) containing brushwood and bushes along with the grasses. Trees are stunted, malformed and hacked and are found scattered throughout. Main grass species found are Kusal, Bhurbhushi, Ghonad, Sheda, Marvel etc. Tree species found are Teak, Palas, Lendia, Bhirra, Ain, Bor, Dhawda, Movai, Salai, Char, Moha, Sitaphal, Rohan, Khair. Rantulasi and Tarota as weeds have invaded in some patches. There are other

herbs and shrubs also which are spreading fast as weeds in the areas which were used as pasture lands and grass lands in the past. Lantana has also invaded in large areas and in some places it has virtually replaced all other bushes, grass and fodder plants. The palatability of the vegetation and availability of the grasses from such areas has therefore drastically reduced.

Method of Treatment

- i) The coupe will be demarcated one year before the due date of closure and the period of the closure will be prominently displayed at the convenient places. Due intimation be given to local Gram Panchayat and JFM committee also.
- ii) In the closed coupe, works for facilitating improvement in grass and fodder productivity such as removal of weeds and woody growth will be taken up. Soil and moisture conservation works shall be taken up as per requirement of site.
- iii) Areas containing palatable natural grasses shall be closed to grazing and work of removal of weeds to facilitate these grasses to come up naturally will be taken up. It has been seen that as a result of protection to grasslands, a lot of shrubs invade the area as weeds resulting in reduction in grass production. Hence, removal of such weeds is suggested.
- iv) It is well established that grasses when young, that is, prior to their flowering are most nutritious (highest protein content) but management requirements are that they should be removed (grazed or cut) only after grass seeding. Grasslands developed as grass lands (permanent grasslands) are therefore to be allowed for grass cutting either after October or on rotational basis and 4 years after their establishment.
- v) Areas suitable for grass production shall be identified in due coupe. Soil working through deep ploughing is done to prepare the site. Grass seeds are broadcasted during early monsoon for germination and establishment. Such artificially regenerated grass areas shall be strictly closed for grazing for at least 3 years. JFMCs shall be actively involved in development of grass resources. Enclosures can be erected as per site conditions.

URBAN FOREST WORKING CIRCLE

This Working Circle comprises of forest areas falling within the jurisdiction of Nagpur Municipal Corporation. These areas will be managed with the following objectives:

- a) To secure the boundaries of urban forest areas through boundary demarcation.
- b) To create awareness in the urban masses about issues concerning Environment, Forest and Wildlife.

Forest area allotted to this Working Circle is 1036.85 ha. It comprises of Reserved Forest, Unclassed forest and Zudpi jungle. Broadly, the works proposed include Boundary Demarcation, Afforestation of open forest patches, Creation of Nature Awareness Centre, Timber Museum, Staff welfare activities etc.

BAMBOO (OVERLAPPING) WORKING CIRCLE

GENERAL CONSTITUTION:

Compartments with naturally occurring Bamboo and successful Bamboo plantations have been included in the Bamboo (overlapping) Working Circle. Total area extends over to 22245.819 hectares in 97 compartments forming 15.07% of division area.

GENERAL CHARACTER OF THE VEGETATION

Dendrocalamus Strictus is the main Bamboo species found in the tract. Bamboo crop is of both natural and planted. Katang bamboo (*Bambusa Arundinacea*) is found in small patches.

METHOD OF TREATMENT:

Each clump is prescribed to be treated as an independent entity for the treatment. Silvicultural system shall be the Culm selection system, each Culm to be treated as a stem. Clump cleaning is prescribed as an integral part of bamboo harvesting operation.

CUTTING CYCLE AND SEQUENCE OF CUTTING

Cutting cycle of 3 year duration is proposed for the bamboo harvesting.

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

General Constitution: This Overlapping Working Circle extends to the entire area of the Nagpur forest division which is co-terminus with the area of Nagpur district. All villages that are adjoining to the forest areas will be the focus areas for practicing Joint Forest Management.

Objectives:-

- To develop the degraded forest resources by promoting natural and artificial regeneration with active participation of the villagers. It also aims to provide effective protection.
- To strengthen local institutions for protection and conservation of forest and wildlife resources through people's participation.
- To empower village communities to play a crucial role in forest resource conservation as major stakeholders.
- To explore and evolve strategies to generate sustainable employment to local people.

Potential Areas for JFM:

The following areas will be suitable for JFM program.

- Areas prescribed under the Afforestation Working Circle.
- Areas under miscellaneous management, especially the zudpi jungles suitable for afforestation are proposed to be covered under JFM.
- Areas under Grass & Fodder resource management Working Circle are also proposed to be included for JFM works.
- Regeneration and protection of NTFP areas and collection, grading, value addition and marketability of various NTFPs in the division are proposed to be given focus through JFMCs.
- Villages which are adjoining to potential Eco-tourism sites are proposed to be included in JFM programme.
- All potential wildlife areas are to be included in either JFM or EDC programme as per provisions contained in Govt. Resolution.

Present Status of JFM in the division:

JFM concept has been introduced in this division in the year 1998 under the World Bank assisted Maharashtra Forestry Project. Initially, few villages were selected for JFM activities. At present, JFM approach has spread to 517 villages over 94310 ha of forest land in 13 forest ranges. Thus, 65 percent forest area of the division is managed through people's participation.

Reducing dependency on forests:

One of the important reasons for forest degradation is the dependence of local people for firewood and uncontrolled grazing from forests. Therefore, to reduce such dependence, Govt. of Maharashtra vide resolution of 10th July 2012 decided to distribute LPG connections and improved cattle to forest fringe villages. JFMC's have played a key role in implementing this scheme. In the division, so far, 1494 families spread over 48 JFM villages have benefitted from LPG connections.

THE WILDLIFE (OVERLAPPING) WORKING CIRCLE:

General Constitution of the Working Circle: Nagpur forest division has tremendous significance for wildlife conservation as the territorial areas adjoin protected areas such as Pench National Park, Mansinghdeo Wildlife Sanctuary, Umred-Karandla Sanctuary and Bor/New Bor Wildlife Sanctuary. These forests are important for corridor management between the P.As mentioned above and the adjoining territorial areas. Apart from functioning as crucial corridors, the territorial areas provide space for the spill over population of wildlife from the core zone of protected areas.

As per the Population Estimation of 2010, the division has recorded 8 Tiger and 9 panther.

Special Objectives of Management:

- 1) To ensure wildlife protection and conservation in the managed forests of this Division.
- 2) To ensure scientific management of wildlife in the managed forests by undertaking measures like habitat management, waterhole development and monitoring population of the wild animals.
- 3) To provide extra space for spill over population from adjoining protected areas.
- 4) To check wildlife trade and smuggling.
- 5) To generate awareness among local communities towards the need for biodiversity conservation.

Marking Reservations, Other Restrictions: The following prescriptions have been made: While marking of dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.

- While harvesting, at least 2 down hollow logs, of low commercial value, per hectare shall be reserved for shelter of wildlife.
- Tendu collection centres or labour camps shall not be allowed near water holes frequented by the large mammals or other important wildlife species. The labour camps shall be established away from areas of high wildlife density.

ECO-DEVELOPMENT, AWARENESS GENERATION AND ECO-TOURISM:

Effective protection and management of sensitive ecological and special habitat sites/areas is not possible without active involvement and support of village communities in the vicinity. Their help and support can only be ensured if their genuine needs and concerns are given due consideration by the department. If the people living around are poor and anguished, the objective in question cannot be achieved. Thus, to seek their willing support and goodwill it is proposed to undertake eco-development works by the Division in villages around these sites. The prominent water bodies and specific habitat sites in the Division are proposed as sites for creation of Eco-centres with facilities of nature interpretation and eco-tourism and to serve as centres for awareness generation and dissemination of issues and concerns of forestry and wildlife.

OLD TEAK PLANTATION (OVERLAPPING) WORKING CIRCLE

General Constitution: Teak and other plantations have been raised in Nagpur Forest Division in the past. Among these old plantations, Teak is the most valuable species;

it requires periodical cultural operations for its optimum commercial production on a sustained basis. All areas with old and successful Teak plantations to the extent of 4616.71 Ha spread over 174 sites are included under this Working Circle. The areas under Teak plantations are found scattered throughout the Division.

Special Objectives of Management: To maintain perpetual growth in the plantations throughout their growing phase by carrying out required suitable silvicultural operations.

Silvicultural Operations: The Silvicultural operations are the regular thinning's and the schedule is mechanical thinning in 11th Year followed by silvicultural thinning from 15th year onwards, every tenth year till the age of 65 year of formation of the plantation.

Agency of Harvesting: Thinning operations in Teak plantations is a technical work and require regular monitoring through recording and analysis of growth measurements periodically. Therefore, thinning works are to be executed by the Department.

NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

General Constitution:

This working circle covers the entire forest area of the division. Non-Timber Forest Produce (NTFP) plays a key role in the life and economy of communities living in and around forest. NTFP is mostly collected by the economically backward people living in and around forest areas. The tribal people have been conserving plant and crop genetic resources as well as the knowledge on their utility. The people living in forest mostly supplement their food with Leaves, tubers, flowers and fruits all year around. The medicinal plants play a key role in the health support systems in remote villages.

Availability of Non-Timber Forest Produce:

A sizeable portion of the forests of this division are of Mixed Forest type, supporting species of great NTFP value, namely, *Tendu, Mahua, Biba, Char, Kullu, Dhaoda, Beheda, Mowai, Khair, Salai, Aonla etc.* These trees are found scattered in the entire division and well mixed with other species. NTFP collection also generates employment opportunities. The important NTFPs found and collected in this tract are Mahua flowers, Mahua seeds, Tendu leaves, Dhaoda gum, Salai gum, etc.

Special Objectives of Management:

- i. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques.
- ii. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division.

- iii. To generate employment and improve the economy of the local people and thereby improving their socio-economic conditions.

NTFP database:

For building the database on NTFPs, it is prescribed that weekly markets will be surveyed extensively to find out the types of NTFPs coming from forest areas, their extent, purpose of utilisation, rate, chain and the agency of marketing and final destination. JFMCs being primary stakeholders should be involved in this important exercise.

MISCELLANEOUS REGULATION

BOUNDARY DEMARCATION

In order to keep the integrity of forest areas intact, strict vigilance over the forest boundary and periodic verification of the demarcation on the ground for the entire forest area has been prescribed. The un-demarcated areas have to be demarcated on priority within first three years of this Working Plan. Forest boundaries adjoining to Private lands shall be demarcated on priority.

THE SPECIAL OBJECTIVE OF MANAGEMENT

1. To maintain territorial integrity of forestlands in the division by delineating their boundaries by permanent pillar marks to act as psychological barriers.
2. To ensure effective protection of the forest resources of the entire division against adverse influences.

ABBREVIATION USED IN THE PLAN.

Aff.W.C.	Afforestation working Circle.
A.C.F.	Assistant Conservator of Forests.
AR/ANR	Artificial Regeneration/ Aided Natural regeneration
BCD	Biodiversity Conservation and Development.
BMC	Biodiversity Management Committee
BA	Basal area
b.h.	Breast height.
CAMPA	Compensatory Afforestation fund Management and Planning Authority.
C.A.I.	Current Annual Increment
CF	Conservator of forests.
CCF	Chief Conservator of Forests.
cm.	Centimetre.
cm³	Cubic centimetre.
Cum/m³	Cubic metre.
Comptt.	Compartment.
C.W.R.	Coppice-with-Reserve
CWLW	Chief Wildlife Warden
d.b.h.o.b.	Diameter at breast height over bark.
d.b.h.u.b.	Diameter at breast height under bark.
Dy.C.F/ D.C.F	Deputy Conservator of Forests.
D.F.O.	Divisional Forest Officer.
Dn.	Division
DPDC	District Planning and Development Council
E.G.S.	Employment Guarantee Scheme
FCA	Forest Conservation Act.
FDA	Forest Development agency.
FRA	Forest Rights Act.
FSI	Forest Survey of India.
F.D.C.M.Ltd	Forest Development Corporation of Maharashtra Limited.
F.L.C.S.	Forest Labourers Co-operative Society.
F.R.H.	Forest Rest House.
F.S.	Felling Series.
F.V.	Forest Village.
F.Y.O.	First Year Operations.
F.F&P	Fuel-wood, Fodder & Pasture
GPS	Global Positioning System.
GIB	Great Indian Bustard
g.b.h./GBH	Girth at breast height.
g.b.h.o.b.	Girth at breast height Over bark.
g.b.h.u.b.	Girth at breast height Under bark.
Ha.	Hectare

HoFF	Head of forest force .
IGF	Inspector General of Forests.
IWC	Improvement Working Circle
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
km	Kilometre.
MoU	Memorandum of understanding.
m.	Metre.
mm.	Millimetre
M.A.I.	Mean Annual Increment
M.F.P.	Minor Forest Produce.
MISC.	Miscellaneous
NGO	Non-Government Organization
NRF	New Reserved Forest.
NTFP	Non-Timber Forest Produce
NREGA	National Rural Employment Guarantee Act.
NREGS	National Rural Employment Guarantee Scheme.
PAs.	Protected Areas
PCCF	Principal Chief Conservator of Forest.
PESA	Panchayats (Extension to Scheduled Areas) Act.
P.B.	Periodic Block.
P & CAM	Protection & Catchment Area Management
P.F.	Protected Forests.
PWPR	Preliminary Working plan Report.
P.P.O.	Pre planting Operations.
R.F.	Reserved Forests.
R.F.O.	Range Forest Officer.
Rs.	Rupees.
SCI	Selection-Cum-Improvement
SMC	Soil and Moisture Conservation.
SC /ST	Scheduled Caste / Scheduled Tribe.
Sq.	Square.
S.Y.O.	Second Year Operations.
TCM	Trench cum mound.
T.Y.O.	Third Year Operations.
TILR	Taluka Inspector of Land Record .
W.C.	Working Circle .
WPO	Working Plan Officer
WLS	Wildlife Sanctuary

GLOSSARY OF LOCAL TERMS.

<i>Adjat species</i>	Miscellaneous species
<i>Bidi</i>	Handmade cigarette wrapped in Tendu leaf.
<i>Bir</i>	An area reserved to grow grass.
<i>Burad</i>	Person who makes mats, baskets etc. of bamboos
<i>Dholi</i>	Containers to store grain.
<i>Doh</i>	A deep pond in a river or stream.
<i>Geru</i>	Red ochre or red earth.
<i>Ghat</i>	A road with a steep gradient.
<i>Ghee</i>	Clarified buffalo-Milk, butter.
<i>Gully</i>	Channel
<i>Jagir</i>	An estate belonging to a Zamindar.
<i>Jagirdar</i>	The holder of Jagir.
<i>Jamindari</i>	An estate belonging to a Zamindar.
<i>Jhiras</i>	Temporary small wells dug in nalas during summer.
<i>Juar</i>	Cultivated millets (<i>Sorghum vulgare</i>).
<i>Kacha (roads)</i>	Temporary (roads).
<i>Kankar</i>	Lime nodules.
<i>Katha</i>	Catechu.
<i>Kharif</i>	Monsoon crop.
<i>KhasaraNo.</i>	Serial number given to any portion of land entered in land records
<i>Khories</i>	Valleys in between two hills or hillocks.
<i>Nista</i>	Land tenure system which existed in Vidarbha.
<i>Malki lands</i>	Lands belonging to private individuals.
<i>Mouza</i>	A village area.
<i>Murum</i>	A reddish hard soil.
<i>Naka</i>	Barrier on road for checking forest produce in transit.
<i>Nala</i>	A water course.
<i>Nistar</i>	Forest produce required for bona-fide agricultural or domestic needs
<i>Nistar Patrak</i>	Record of Nistar rights on Government Land.

Local and Botanical Names of Plants Occurring in Nagpur Forest Division.

Local Name	Botanical Name	Family
A. Trees		
Amaltas/Bahawa	<u>Cassia fistula</u> , (L.)	Caesalpinaceae
Apta / Kachnar	<u>Bauhinia racemosa</u> , (Lamk.)	Caesalpinaceae
Aonla	<u>Phyllanthus emblica</u> , (L.)	Euphorbiaceae
Aran	<u>Cassine glauca</u> , (Rottb.)	Celastraceae
Arjun / Kahu	<u>Terminalia arjuna</u> , (Roxb.) W & A	Combretaceae
Ain	<u>Terminalia tomentosa</u>	Combretaceae
Babul / Babhool	<u>Acacia nilotica</u> (L.)	Mimosaceae
Bad/Wad	<u>Ficus benghalensis</u> (L.)	Moraceae
Behada	<u>Terminalia bellerica</u> (Gaertn.) Roxb.	Combretaceae
Bel	<u>Aegle marmelos</u> (L.) Correa.	Rutaceae
Bhirra	<u>Chloroxylon swietenia</u> (Roxb.) DC	Rutaceae
Biba/Bhilawa	<u>Semecarpus anacardium</u> (L.F.)	Anacardiaceae
Bija	<u>Pterocarpus marsupium</u> , (Roxb.)	Fabaceae
Bistendu	<u>Diospyros montana</u> , (Roxb.)	Ebenaceae
Bor/Ber.	<u>Ziziphus mauritiana</u> , (Lamk.)	Rhamnaceae
Char/Chironji	<u>Buchanania lanzan</u> (Spreng.)	Anacardiaceae
Chichwa	<u>Albizia odoratissima</u> , (Lf.) Bth	Mimosaceae
Chinch/Imli	<u>Tamarindus indica</u> ,(L.)	Caesalpinaceae
Datrangi/Desipapdi	<u>Ehretia laevis</u> , (Roxb.)	Ehretiaceae
Dhaman	<u>Grewia tiliifolia</u> , (vahl.)	Tiliaceae
Dhaora/Dhawada	<u>Anogeissus latifolia</u> , (R.Br. ex. DC)	Combretaceae
Dhoban	<u>Dalbergia paniculata</u> , (Roxb.)	Fabaceae
Garari.	<u>Cleistanthus collinus</u> , (Roxb.) Bth. ex. Hook. F.	Euphorbiaceae
Ghogar	<u>Gardenia latifolia</u> , (Soland.)	Rubiaceae
Ghoti/Ghot	<u>Ziziphus xylopyra</u> , (Sedgw) Sant	Rhamnaceae
Gogal/Gongal	<u>Cochlospermum religiosum</u> , (L.)	Chochlospermaceae
Gular/Umber	<u>Ficus glomerata</u> ,(Roxb.)	Moraceae

Local Name	Botanical Name	Family
Haldu	<u>Adina cordifolia</u> , (Roxb.) Hook.F	Rubiaceae
Hiwar	<u>Acacia leucophloea</u> willd	Mimoseae
Hirda/Harra	<u>Terminalia chebula</u> , (Retz.) Wild	Combretaceae
Jambhul/Jamun	<u>Eugenia jambolana</u> , (L.) Skeels	Myrtaceae
Kala karai	<u>Casearia elliptica</u> , (Wild.)	Samydaceae
Kalaphetra	<u>Randia uliginosa</u> , (DG)	Rubiaceae
Kakad	<u>Garuga pinnata</u> , (Roxb)	Burseraceae
Kakai	<u>Flacourtia indica</u> , (Burm. f.)	Flacourtiaceae
Karai	<u>Miliusa velutina</u> , (Dunal)	Anonaceae
Kalam/Mundi	<u>Mitragyna parvifolia</u> , (Roxb)	Rubiaceae
Karanj	<u>Pongamia pinnata</u> , (L.) Pierre	Fabaceae
Kateain/Kasai	<u>Bridelia retusa</u> , (L.) spr.	Euphorbiaceae
Katsawar/Semal	<u>Bombax ceiba</u> , (L.)	Bombaceae
Khair	<u>Acacia catechu</u> , (L.F.) Wild	Mimosaseae
Khirni	<u>Manilkara hexandra</u> , (Roxb.)	Sapotaceae
Kullu/Kulu	<u>Sterculia urens</u> , (Roxb.)	Sterculiaceae
Kumbhi	<u>Careya arborea</u> , (Roxb.)	Lecythidiaceae
Kusum	<u>Schleichera oleosa</u> , (Lour.) oken.	Sapindaceae
Lendia/Lenda	<u>Lagerstroemia parviflora</u> , (Roxb.)	Lythraceae
Lokhandi	<u>Ixora arborea</u> , (Roxb.) ex.Sm	Rubiaceae
Maharukh	<u>Ailanthus excelsa</u> , (Roxb.)	Simaroubaceae
Medsing	<u>Dolichandrone falcata</u> , (Seem.)	Bignoniaceae
Moha/Mahuwa	<u>Madhuca indica</u> (Gmel)	Sapotaceae
Mokha	<u>Schrebera swietenoides</u> , (Roxb.)	Aristolochiaceae
Moyen/Mowai	<u>Lannea coromandelica</u> (Hout.) Merr.	Anacardiaceae
Neem	<u>Azadirachta indica</u> , (Juss.)	Meliaceae
Padar	<u>Stereospermum suaveolens</u> (DC)	Bignoniaceae
Palas	<u>Butea frondosa</u> (Lam.)Taub	Fabaceae
Pangara	<u>Erythrina variegata</u> (L.)	Fabaceae
Rohan	<u>Soyimida febrifuga</u> (A.Juss.)	Meliaceae
Sag/Sagwan/Teak	<u>Tectona grandis</u> , (L.F.)	Verbenaceae
Saja/Ain	<u>Terminalia tomentosa</u> , W & A	Combretaceae

Salai	<u>Boswellia serrata</u> , (Roxb.ex. Colebr)	Burseraceae
Shisham	<u>Dalbergia latifolia</u> , (Roxb.)	Fabaceae
Shiwan/Siwan	<u>Gmelina arborea</u> , (Roxb.)	Verbenaceae
Sindi/Chhindi	<u>Phoenix sylvestris</u> , (Linn)	Arecaceae (Palmae)
Siras (Black)	<u>Albizzia lebbek</u> , (L.) Bth.	Mimosaseae
Siras (White)	<u>Albizzia procera</u> , (Roxb.) Bth.	Mimosaseae
Sissoo	<u>Dalbergia sissoo</u> (Roxb.)	Fabaceae
Sitaphal	<u>Annona squamosa</u> , (L.)	Annonaceae
Subabul	<u>Leucaena leucocephala</u> (L.)	Mimosaseae
Surya	<u>Xylia xylocarpa</u> , (Roxb)	Mimosaseae
Tendu	<u>Diospyros malanoxylon</u> (Roxb)	Ebenaceae
Tiwas/Tinsa	<u>Ougeinia dalbergioides</u> , (Roxb.)	Fabaceae
Tondri	<u>Casearia tomentosa</u> , (Roxb.)	Samydaceae
Umber	<u>Ficus glomerata</u> , (L.)	Moraceae
Wandra/Bainsa	<u>Salix tetrasperma</u> , (Roxb)	Salicaceae
Warang/Baranga	<u>Kydia calycina</u> , (Roxb.)	Malvaceae
White kuda/Satkuda/ Kuda	<u>Holarrhena anthidysentrica</u> (Wall)	Apocynaceae

B. Shrubs

Aal	<u>Morinda citrifolia</u> , (Linn.)	Rubiaceae
Adulsa	<u>Adhatoda zeylanica</u>	Acanthaceae
Ardanda	<u>Caparis zeylanica</u>	Capparaceae
Bharati	<u>Maytenus emarginata</u> , (Wild)	Celastraceae
Bhawarmal/ Bain Champa	<u>Hamiltonia suaveolens</u> , (Roxb.)	Rubiaceae
Dekamali	<u>Gardenia gummifera</u> (L.F.)	Rubiaceae
Dudhi/Kalakuda	<u>Wrightia tinctoria</u> , (Roxb)	Apocynaceae
Gautri/Gaturli	<u>Grewia hirsuta</u> (Vahl, symb.)	Tiliaceae
Ghaneri/Ulta	<u>Lantana camera</u> , (Linn.)	Verbenaceae
Gudvel	<u>Tinospora cordifolia</u>	Menispermaceae
Isharmul/saapsan	<u>Aristolochia indica</u>	Aristolochiaceae

Local Name	Botanical Name	Family
Jilbili/Dhayti	<u>Woodfordia fruticosa</u> , (Kurz)	Lythraceae
Kaladhotra	<u>Datura metel</u> , (Linn)	Solanaceae
Karwand	<u>Carissa arandus</u>	Apocynaceae
Katekoranti	<u>Barleria prionites</u> , (Linn.)	Acanthaceae
Katumber/Auadumber	<u>Ficus hispida</u> , (Linn)	Moraceae
Kharata	<u>Dodonaea viscosa</u> , (Linn.)	Sapindaceae
Pandhra Kuda	<u>Holorrhena antidysentrica</u>	Apocynaceae
Parijat	<u>Nyctanthes arbor-tristis</u> , Jacq.	Nyctanthaceae
Murudsheng	<u>Helicteres isora</u> , (L.)	Sterculiaceae
Neel	<u>Indigofera tinctoria</u> , (Linn.)	Fabaceae
Nirgudi	<u>Vitex negundo</u> , (L.)	Verbenaceae
Phetra (Safed)	<u>Gardenia turgida</u> , (Roxb)	Rubiaceae
Rui	<u>Calotropis procera</u> , (AitI) R. Br.	Asclepiadaceae
Sagargota	<u>Caesalpinia bonducella</u>	Caesalpinaceae
Shatawari	<u>Asparagus racemosus</u>	Liliaceae

C. Herbs

Aghada/Apamarg	<u>Achyranthes aspera</u>	Amaranthaceae
Ambuti/Tipani	<u>Oxalis corniculata</u>	Oxalidaceae
Anantmul	<u>Hemidesmus indicus</u>	Periplocaceae
Bhui Aonla	<u>Phyllanthus niruri</u>	Euphorbiaceae
Dudhivel/Govrrdhan	<u>Euphorbia hirta</u>	Euphorbiaceae
Divali	<u>Tephrosia hamiltonii</u> , (Drumm)	Fabaceae
Gajargawat	<u>Parthenium hysterophorus</u> (Linn)	Asteraceae
Gokru	<u>Tribulus terrestris</u> (Linn)	Zygophyllaceae
Gokukata/Talimkhana	<u>Hygrophilla auriculata</u>	Acanthaceae
Hamata	<u>Stylosanthes hamata</u> (L.)	Caesalpinaceae
Kamarmodi	<u>Tridax procumbens</u> (Linn)	Asteraceae
Pivla dhotra	<u>Argemone mexicana</u> (L.)	Papaveraceae
Pivili tilwan	<u>Cleome viscosa</u> (Linn)	Cleomaceae
Rantulasi/Bantulasi	<u>Hyptis suaveolens</u> (Linn)	Lamiaceae
Rantur	<u>Atylosia scarabaeoides</u> , (L.)	Fabaceae
Isapghol/Aspghol	<u>Plantago ovata</u>	Plantaginaceae

Local Name	Botanical Name	Family
Kamal	<u>Nelumbo nucifera</u>	Nymphaeaceae
Kamuni	<u>Solanum nigrum</u>	Solanaceae
Kali Musli	<u>Curculigo orchioides</u>	Hypoxidaceae
Kal megh	<u>Andrographis paniculata</u>	Acanthaceae
Lajwanti	<u>Mimosa pudica</u>	Mimosaceae
Ranhalad	<u>Curcuma aromatica</u>	Zingiberaceae
Rantambaku	<u>Lobelia nicotianaefolia</u>	Lobeliaceae
Sarpagandha	<u>Rauwolfia serpentina</u>	Apocynaceae
Tarota	<u>Cassia tora</u> , (Linn)	Caesalpiniaceae
Waghnakhi	<u>Martynia annua</u> , (Linn)	Martyniaceae

D. Bamboos and Grasses

Bans/Bamboo	<u>Dendrocalamus strictus</u> , (Roxb)	Poaceae/ (Gramineae)
Bhurbhusi	<u>Eragrostic tenella</u> , (L.)	Poaceae/(Gramineae)
Dab/Dabat/ Phulya	<u>Imperata cylindrica</u> , (Beauv)	Poaceae/(Gramineae)
Diwartan	<u>Andropogon pumilus</u> , (Roxb)	Poaceae/(Gramineae)
Hariyalli/Doob	<u>Cynodon dactylon</u> , (Prs)	Poaceae/(Gramineae)
Gadasheda	<u>Chrysopogon fulvus</u> , (Spr)	Poaceae/(Gramineae)
Ghonad	<u>Themeda quadrivalvis</u> (L.), O.ktze	Poaceae/(Gramineae)
Fuler	<u>Arundinella setosa</u> , (Trin)	Poaceae/(Gramineae)
Katanbahari/Kusara	<u>Aristida funiculata</u> , (Trin. et. Rupr)	Poaceae/(Gramineae)
Katang bamboo	<u>Bamboosa arundinacea</u> , (Willd)	Poaceae/(Gramineae)
Khas	<u>Vetiveria zizaniodes</u> , (Linn) Nesh	Poaceae/(Gramineae)
Kusal	<u>Heteropogon contortus</u> , (Linn)	Poaceae/Gramineae)
Marvel (Small)	<u>Dichanthium annulatum</u> , (Forssk)	Poaceae/(Gramineae)
Marvel (Big)	<u>Dicanthium aristatum</u> (Poir)	Poaceae/(Gramineae)
Mushan	<u>Iseilema laxum</u> (Hack)	Poaceae/(Gramineae)
Paunia	<u>Sehima sulcatum</u> (Hack)	Poaceae/(Gramineae)
Phulkia/Ponai	<u>Apluda mutica</u> , (Linn)	Poaceae/(Gramineae)
Sabai / Sum	<u>Ischaemum angustifolium</u> (Hack)	Poaceae/(Gramineae)
Sheda	<u>Sehima nervosum</u> (Rottl.)	Poaceae/(Gramineae)
Tikhadi	<u>Cymbopogon martinii</u> (Roxb.)	Poaceae/(Gramineae)

E. Climber

Local Name	Botanical Name	Family
Aradphari/harduli	<u>Olax scandens</u> , (Roxb.)	Olacaceae
Chilati	<u>Mimosa hamata</u> (Willd)	Mimosaseae
Dhimarwel/Malkagni	<u>Celastrus paniculata</u> (Willd)	Celastraceae
Dhudhi/Bokadwel	<u>Cryptolepis buchananii</u> , R. & S.	Periplocaceae
Nagwel/Pan	<u>Piper betle</u> (L.)	Piperaceae
Eruni	<u>Zizyphus oenoplia</u> , (L.) Mill	Rhamnaceae
Gunj/Raktvel	<u>Abrus precatorius</u> , (L.)	Fabaceae
Gulvel	<u>Tinospora cordifolia</u> , (Willd)	Menispermaceae
Kanjikuri	<u>Mucuna pruriens</u> , (L.) D.C.	Fabaceae
Khadyanag/ Langali	<u>Gloriosa superba</u> , (L.)	Liliaceae
Khobarvel/Anantmul	<u>Hemidesmus indicus</u> , (L.) Ait.	Periplocaceae
Kukudranji	<u>Calycopteris floribunda</u> , (Land)	Combretaceae
Mahulbel	<u>Bauhinia vahlii</u> , (Wand. A)	Caesalpiniaceae
Nasbel	<u>Millettia extensa</u> , (Bth.) Baker	Papilionaceae
Papri Lalbel	<u>Vantilago denticulata</u> , (Willd)	Rhamnaceae
Palasvel	<u>Butea superba</u> (Roxb)	Fabaceae
Piwarvel	<u>Combretum ovalifolium</u> (Roxb)	Combretaceae
Ramdaton	<u>Smilax macrophylla</u> ,	Smilacaceae
Vasanvel	<u>Cocculus hirsutus</u> , (L.) Diels.	Menispermaceae

F. Parasites & Saprophytes

Amarvel	<u>Cuscuta reflexa</u> , (Roxb)	Cuscutaceae
Scabra	<u>Stylosanthes scabra</u>	Leguminoceae
Bandha/ Bandh	<u>Vanda tessellata</u> , (Roxb)	Orchidaceae

The Common and Zoological Names of Animals and Birds Commonly Found in the Nagpur Forest Division

Common Name	Zoological Name

A. Animals

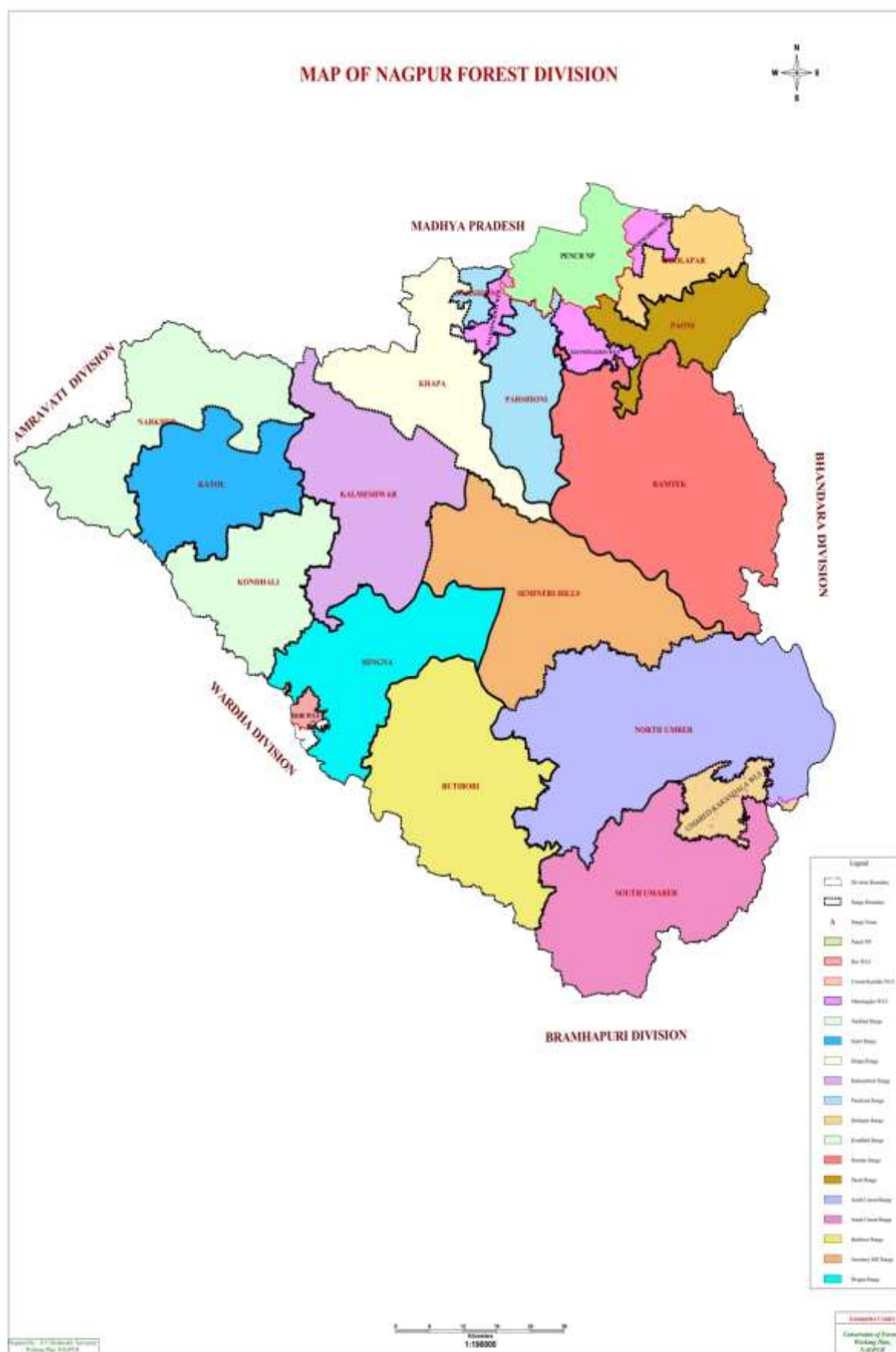
Tiger	<u>Panthera tigris</u>
Panther	<u>Panthera pardus</u>
Striped Hyaena	<u>Hyaena hyaena</u>
Wild dog	<u>Cuon alpinus</u>
Jackal	<u>Canis aureus</u>
Fox	<u>Vulpes bengalensis</u>
Leopard cat	<u>Felis bengalensis</u>
Jungle cat	<u>Felis chaus</u>
Nilgai	<u>Boselaphus tragocamelus</u>
Sambhar	<u>Cervus unicolor</u>
Cheetal	<u>Axis axis</u>
Barking deer	<u>Muntiacus muntjak</u>
Wild boar	<u>Sus scrofa</u>
Sloth bear	<u>Melursus ursinus</u>
Four horned antelope	<u>Tetracerus quadricornis</u>
Langur	<u>Presbytis entellus</u>
Three striped Palm squirrel	<u>Funambulus palmarum</u>
Porcupine	<u>Hystrix indica</u>
Rufous Tailed Hare	<u>Lepus nigricollis ruficaudatus</u>

B. Birds

Painted sand grouse	<u>Pterocles indicus</u>
Common sand grouse	<u>Pterocles exustus</u>
Peacock	<u>Pavo cristatus</u>
Grey jungle fowl	<u>Gallus sonneratii</u>
Grey partridge(Francolin)	<u>Francolinus pondicerianus</u>
Black breasted quail	<u>Coturnix coromandelica</u>
Indian bustard quail	<u>Turnix suscitator</u>
Blue rock pigeon	<u>Columba livia</u>

Common Name	Zoological Name
Purple wood pigeon	<u>Columba punices</u>
Common Crane	<u>Grus grus</u>
Sarus crane	<u>Grus antigone</u>
Dove (spotted)	<u>Streptopelia chinensis</u>
Ring(Collared) dove	<u>Streptopelia decaocto</u>
Cotton teal	<u>Nettapus coromandelianus</u>
Lesser Whistling teal	<u>Dendrocygna javanica</u>
Vulture	<u>Sarcoyps calvus</u>
Indian White Backed Vulture	<u>Gyps bengalensis</u>
Brown wood Owl	<u>Strix leptogrammica</u>
Brown fish owl	<u>Ketupa zeylonensis</u>
Eurasia Eagle Owl	<u>Bubo bubo</u>
Pied kingfisher	<u>Ceryle rudis</u>
Jungle babbler	<u>Turdoides striatus</u>
Black drongo	<u>Dicrurus macrocercus</u>
Blue jay (Nilkantha), Indian roller	<u>Coracias bengalensis</u>

MAP OF NAGPUR FOREST DIVISION



PART – I

CHAPTER-I

THE TRACT DEALT WITH

1.1 INTRODUCTION:

This working plan of Nagpur Forest Division deals with all the forest areas of the Nagpur district excluding the forest areas which have been transferred to the Pench National Park, Mansinghdeo Wildlife Sanctuary, New Bor Wildlife Sanctuary, UmredKarandala Wildlife Sanctuary and to Forest Development Corporation of Maharashtra (FDCM Ltd.). The total forest area of the division is 1460.79sq km. It constitutes 14.60percent of geographical area of the district, which extends over to 10,022sq km.

The forest areas included in this working plan is 1460.79 sq km, out of which 685.668sq km are the Reserved Forests, 627.601 sq. km. are the Protected Forests and 140.872sq km are the Zudupi Jungles and 0.219sq km as the un-classed forest lands&0.870 sq. km. Non-forest land taken over under FCA 1980. The ShriJarnail Singh &Shri S.S. Mishra's working plan for these forests has in 2013-14, leading to its revision. The Division constitutes a compact forest block in North-eastern part while in the remaining areas of the Division, forests patches are found scattered and interspersed with non-forest areas.

1.2 NAME AND SITUATION:

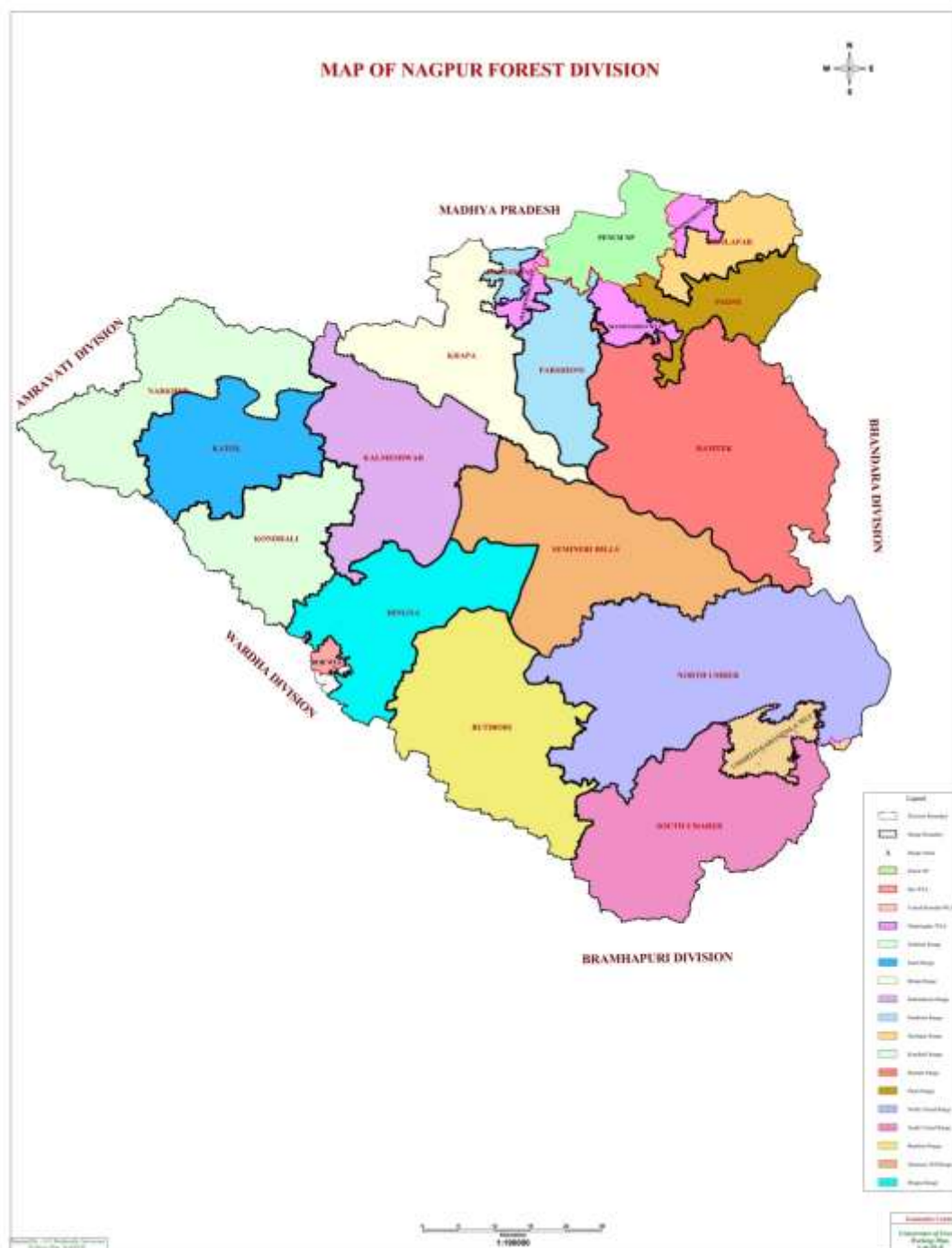
The boundary of the Nagpur Division is coterminous with the boundary of the Nagpur district. The Nagpur Division extends over to 20° 35' to 21° 44' North as latitude and 78° 15' to 79° 40' East as longitude. The boundaries of the tract dealt with are given in Table No.1 below.

TABLE No.1

North	Chhindwara and Seoni Districts of Madhya Pradesh
East	Bhandara District of Maharashtra
South	Chandrapur and Wardha Districts of Maharashtra
West	Amaravati and Wardha Districts of Maharashtra

The map showing all ranges as on today has been given in App.No. I

MAP OF NAGPUR FOREST DIVISION



1.3 CONFIGURATION OF THE GROUND:

The forests are widely spread and mainly situated on hilly slopes surrounded by cultivated plains. The majority of forest areas in the Division are plain and undulating, whereas, West and North-east portions are hilly. Altitude in the Division varies from 274 meters to 652 meters above Mean Sea Level. The highest point falls in the Narkhed Range along the boundary with Madhya Pradesh. Major hill ranges of the Division are the Satpura Range, the Ambagarh Hills and the Pilkapar Hills. Southern fringes of the Satpura Range extend to the Nagpur District. This range is narrow in the West while it widens towards the East. The Ambagarh Hills having famous Ramtek temple are located to the South of Satpura hills. The Pilkapar Hills, consisting of low hills in the western part, continues towards South-east part of Umrer after cutting off the valley of Nand on its southern side, and crosses the Katol Tahsil from North to South.

The Division is well drained and falls in the catchments of the Wardha and the Wainganga rivers. Jam, Kar and Vina rivers drain the western part before draining into the Wardha river. Southern part of Umrer Tahsil is drained by Nand river, which meets Vena and ultimately drains into the Wardha river. Pench and Kanhan drain the central part and Koilar joins them at Kamptee. Thereafter, Kanhan flows at boundary of Kamptee and Kuhi Tahsils and drains into the Wainganga river. Nag and Amb drain Umrer and Kuhi Tahsils. Nag joins Kanhan, while Amb drains directly into the Wainganga river. Bhiwapur Tahsil is drained by Mau, which flows along the North and eastern boundary of the division and discharges into the Wainganga river. Sur after flowing along Ramtek Tahsil also drains into the Wainganga river.

1.4 GEOLOGY, ROCK AND SOIL:

GEOLOGY & ROCK: Ancient crystalline rock mainly consisting of gneiss and granulate occupy North-east portion, and a 25-km wide East-west stretch in North-central part of the division. The Deccan Trap volcanic flow lies in western and southern parts of the division. In addition, a large number of sedimentary rock formations including some coal bearing beds are also found, which have been shown in Table No.2.

TABLE No. 1.2**Rock formations in Nagpur District (Source: The Geological Survey of India)**

Geological formation	Rock assemblage	Geological Period
Alluvium	Soil, Kankar and Laterite	Recent.
Deccan Trap	Volcanic flow with partings of sedimentary rocks like limestone and sandstone	Upper cretaceous Eocene
Lameta	Conglomerate, Sandstone, limestone and clay	Upper cretaceous
Gondwana super group	Dark brownish and Grey sandstone	Permian
Sausar group		
(i)Bichua formation	Crystalline lime stone and dolomite	Middle
(ii)Junewani Formation	Muscovite-biotite schist and dolomite	Proterozoic
(iii)Chorbaoil formation	Quartzite & quartz	-----do-----
(iv)Mansar formation	Muscovite-biotite schist with manganese ores	-----do-----
(v)Lohangi formation	Calc-gneisses and black manganiferous marble with some manganese ores	-----do-----
(vi)Sitasaongi formation	Quartz-muscovite schist feldspar-muscovite schist and intercalated quartzite	-----do-----
Geological formation	Rock assemblage	Geological Period
Sakoli group	Chlorite-muscovite schist and middle phyllite(undifferentiated)-proterozoic	
	a. Chlorite schist with andalusite porphyroblast	Middle
	b. Chlorite schist with choritetoid porphyroblast	Proterozoic
	c. Chlorite schist with magnetite	
	d. Phyllite	-----do-----
	e. Chlorite schist with chloritoid,stsuroilite garnet	-----do-----
	f. Rutile-quartz-tourmaline-moscovite schist with kyanite,	-----do-----

	dumortierite or sillimanite g. Bioyiye gneisses, granulite and biotite aplite	-----do----- -----do-----
Granite gneiss	Granite, quartzite, amphibolites and granite gneiss	Archean lower proterozoic

The Tirodi-biotite gneiss, streaky gneiss consisting of Hornblende gneiss and amphibolites, is found in the central part. Northern part has a fairly wide East-west stretch of banded and foliated crystalline rocks. Manganese bearing rocks are found in the Sausar group. Metamorphosed rocks of the Sakoli group are located in the southern part. These rocks are intruded by tourmaline-garnet-muscovite granite. The Sakoli group, at places, has indications of base metals and Tungsten mineralization near Bhiwapur and Agargaon in Umrer Tahsil, respectively.

The Deccan Trap occupies almost half of the division and gives rise to characteristic plateau-type hills separated by broad valleys in West and Southwest. The Trap is a thick pile of basaltic flow sometimes up to 60 km thick with sedimentary Inter- Trappean beds of limestone, and sandstone deposited during breaks in volcanic activities. Trap basalt is usually dark grey compact and fine grained rock with clinkery surface and irregular to sub-rounded blocks. Laterite capping tops the Trap zone areas at places.

Conglomerates and sandstone of the Vindhyan super-group are exposed over a stretch of about 3 (three) kilometres in southern part of the Dongal ridge South of Tama and around Deni in Umrer Tahsil. Narrow and disconnected stretch of exposed fossiliferous sandy and gritty lime stones constituting the well known Lameta beds are found at about 40 km south-east of Nagpur and about 10 km north-west of Umrer. These are succeeded by the Deccan Trap volcanic flows. Towns of Kamptee and Umrer have coal bearing sandy-clayey rocks belonging to the Godwana super-group. Many important coal-fields of the Central India are yielding coal from these beds. Alluvium with thickness up to 30 meter at places occupies the Wainganga basin.

MINERAL DEPOSITS: Nagpur district is well known for its minerals of economic importance. In addition to coal, clay and building stones, major minerals in the district include manganese, copper and tungsten ores.

Coal occurs near Kamptee and Umrer in the Barakar rocks of the Gondwana supergroup. Coal found here is of low non-coking grade having high moisture content. However, it is quite useful for steam generation; and is used in two major thermal power stations, namely, the Koradi and Khaperkheda in the district. This coal is also supplied to the Indian Railways and to some steel plants, primarily, for steam generation.

Clay deposits are associated with the Kamthi formation of the Gondwana Supper-Group. Estimated clay reserve is 1.2 million tonnes. It is used for manufacturing pipes and stoneware, and one such unit is at Kanhan. Kamthi sandstone yields good building stones and a number of quarries are located at Silewara and Bokhara. Trap basalt is also used for road metal, concrete aggregate and blocks. Marble of the Sausar Group extracted near Koradi and Kandri is used for lime production and marble chips.

About 55 known deposits of manganese ore having 3.33 million tonnes of recoverable ore is found in 50 km. long and 17 km. wide stretch in Ramtek Tahsil. The known sites include Gumgaon, Ramdongri, Kodegaon, Kandri, Satak, Mandi, Lohdongri, Kachurwahi, Waregaon, Bhandarbodi, Manegaon, Maudekasa and Hiwara. A part of the extracted ore is used for manufacturing ferromanganese in a plant at Kanhan. Most of the mined ore is consumed in various steel plants within the country while a small part is exported also.

Copper mineralisation had occurred along contact zone between quartzite and phyllite of Sakoli group near Pular and Parsori in Umrer Tahsil. Tungsten bearing Wolframite and schists in chloritic schists of Sakoli group is found at Agargaon in Umrer Tahsil over a belt of 1400 meter. Gold is found in Bluish-grey quartz veins in Sakoli formation. Stream sands near Mokhabardi and Kolari in Umrer Tahsil also have grains of gold.

1.5 SOIL TYPES: Soil types in the division are strongly influenced by the dominant underlying rock types - the ancient metamorphic rocks and the Deccan Trap. The metamorphic rocks are found in Ramtek, Deolapar, Parseoni, Khapa, Kuhi and north east of North Umrer ranges. The Archean rocks produce a variety of soils. Slow decomposition and small soil movement produces rich 'Kankar' soil, but rapid disintegration and much flux produces coarse and sandy soil. Alluvium derived from this rock is never stiff as the fine particles of sand prevent the blocking of the soil pore space. Alluvium in metamorphic zone is very good for the

tree growth. Soil is mostly sandy-loam, which is eminently suited to the tree growth.

Deccan Trap is found in Narkhed, Kondhali, Hingna, South Umrer ranges and in the parts of North Umrer range. Soils derived from the Trap differ on the basis of the compactness of the source rock. Two kinds of Trap rocks are distinguishable. Compact, hard and homogeneous type. Such rocks weather very slowly and process of soil formation is extremely slow. These soils can support poor quality tree growth. Other rocks are softer basalt exfoliating in concentric flakes. It decomposes rapidly yielding fine yellowish brown loamy soil capable of supporting valuable tree crop. Finer soil grains and decomposed organic matter are gradually washed away and deposited in the lower sheltered regions forming '*Regur*' patches or black cotton soil. This is a fine-grained dark soil, which varies greatly in colour, consistency and fertility. It becomes highly adhesive when wet and contracts to an unusual extent under influences of heat and drought. Being clayey in nature, '*Regur*' is highly hygroscopic, that is, absorbs large quantity of moisture when it is dry and the soil particles begin to swell at the saturation point reducing considerably the soil pore space. This causes water logging. Although this soil is chemically rich, it is not always suited to raise plantation unless the drainage is good. For instance, good forests on such soils can be seen along streams with vertical cutting. Presence of kankar (calcareous content) in '*Regur*' generally indicates high alkalinity and such soil are less suitable for growth of vegetation. The proportion of $\text{SiO}_2/\text{RiO}_2$ in such soils is very high and these soils also have high dispersion constant. Sand and silt are the products of physical weathering and clay is the product of chemical weathering and it is clay which determines the quality of soil like high water holding capacity, acidity etc.

The inter-trappean formation disintegrates into fertile loam capable of supporting good forest growth. The soil derived from Lametas does not seem to be influencing the vegetation. Micaceous schists of Sakoli series produce rich loam that supports valuable mixed forests of the division. Laterite, a vesicular mixture of hydrated oxides of iron and aluminium, is found at some places. After weathering, it retains much moisture in the wet seasons and dries quickly in the dry period. Hence, it is generally poorly suited for teak growth.

1.6 CLIMATE: Nagpur has hot and dry climate with distinct three seasons: summer, rainy and winter seasons. The summer starts from mid-February and continues till onset of the monsoon in the middle of June. April and May are very hot and day temperature may soar up to 45° C. For instance, in the year 1998 the

maximum temperature was 46.8° C in the month of May and the minimum temperature was 6.60C in the month of December. Rains start in the middle of June and continue up to the end of September. Few showers are common in October and November. The winter starts from the end of November and lasts till mid-February. Diurnal temperature range is maximum during March and minimum during August. Very hot summer adversely affects vegetation growth more so because of highly radiating exposed quartzite and basalt in the tract. The statement showing monthly variation of temperature for the last ten years has been given in **Appendix No. II**

1.7 RAINFALL AND HUMIDITY: The rainy season generally starts from the second week of June and continues up to the end of September every year. About 85 percent of rainfall is received during the summer monsoons. Maximum rainfall, about 29% of the total, is received during the month of August. The average annual rainfall in the division is about 1,100 mm. Rainfall is usually higher on ridges of the Satpura in (Deolapar ~1200 mm), Ramtek and Parseoni ranges, and gradually decreases towards the west. Rainfall in Katol is about 869.95 mm. The number of rainy days varies from 59 to 82 per annum. The statement showing detail of monthly rainfall data in Nagpur District for the last ten years has been given in Appendix No. III. It is mostly the south-west monsoon originating in Arabian sea. Winter rains are negligible. The relative humidity is the highest in the month of August, generally, decreases till the month of April, thereafter, it begins to increase again with the onset of the summer monsoon.

1.8 FROST, DROUGHT AND WIND: Although rare, the frost occurs occasionally in Khapa, Parseoni, Deolapar and Ramtek ranges, along the Pench River and other low lying areas. Occurrence of frost causes injuries to the young forest crop especially that of teak, lendia and garari. Some frost damage to young growth in low-lying patches has been recorded in 1928-29, 1936-37, 1942-45 and 1945-46. The damage is less as the tropical species have an adaptation to pass into dormant phase during the winter.

The worst damage to the forest crop due to drought was occurred in 1939-40 and 1941-42. Mature and established crops are seldom affected by drought. However, natural regeneration and the young crops are affected severely due to lack of soil moisture, that is, physiological dryness and increased probability of occurrence of forest fires.

The winds are generally moderate, but occasional storms occur in the pre-monsoon period. Six months from October to March experience North-easterly wind, and the months of April to September have South-westerly wind.

1.9 WATER SUPPLY: High temperature, existence of only a few perennial rivers and quick draining off of the rainwater causes acute water scarcity in the division during the summer months. It is estimated that rainfall more than 5 cms per day usually results in surface runoff. Drinking water in many villages is supplied by tankers. However, construction of many dams, both big and small, has eased out the situation to some extent over a large area. The Forest Department has also built many anicuts and tanks in the forest areas. The statement showing the list of existing tanks & wells in the division have been given in Appendix **No. IV**

There are many dug-wells and bore-wells to tap the groundwater. Depth of dug-wells varies from 12 to 15 meters, and their yield is 45,000 - 1,00,000 litres per day. Most of the wells, however, go dry after March. Bore-wells are generally 50 to 60 meters deep, and have yield in the range of 11,000 - 75,000 litres per day. Metamorphic rocks have good groundwater storage with well-defined water table, but the groundwater in the Deccan Trap zone is confined to joints and sheeted zones along the flow contacts and the bole beds. Interconnected vesicles in vesicular: basalt may make such rocks permeable and good aquifer.

1.10 DISTRIBUTION AND AREA

RESERVED FORESTS : The total Reserved Forests (RF) in the undivided Nagpur division was 1,87,191.55 hectare in 72 blocks, till 1959, when the Wardha division was carved out by transferring 52,657.33 hectares in 217 compartments of the Reserved Forests. The balance Reserved Forests with the Nagpur Division at that time was 1,27,881.55 hectares, in 497 compartments. These Reserved Forests are often referred as Old Reserved Forests (ORF). Subsequently, 11,270.71 hectares of the Protected Forests was notified as Reserved Forests during 1977-78. These forests are, referred as, the New Reserved Forests (NRF) has been given in Appendix No. V. The net balance Reserved Forests in the charge of Nagpur Division constitute 685.668 in 336 compartments and is given in Table No.3. The area 2640.45 ha. of Gorewada and Ambazari has been notified in 1990 under section 4 of IF A, 1927. This has been constituted into 10 compartments.

TABLE No. 1.3
Statement showing RF in Nagpur Forest Division (in ha)

S.N.	Range	Round	Beat	RF	
				No.of Comp	Area
1	Narkhed	4	17	23	4327.39
2	Katol	4	18	14	3085.21
3	Kondhali	6	25	32	6107.81
4	Hingna	9	32	45	8050.13
5	Butibori	5	22	20	4060.61
6	S.Hills	11	21	1	67.41
7	Kalmeshwar	3	9	14	2441.89
8	Khapa	4	15	12	2328.68
9	Paoni	5	19	35	7904.43
10	Deolapar	5	23	51	11102.93
11	Parseoni	4	18	27	4660.41
12	Ramtek	4	17	16	2780.6
13	N.Umred	7	30	25	6004.59
14	S.umred	8	32	21	5644.7
	Total	79	298	336	68566.79

1.10.02 PROTECTED FORESTS : Consequent to the abolition of the proprietary rights in 1951, the ex-proprietary forests were taken over by the Government. Subsequently, 97,492.228 hectares of the ex-proprietary forests in 594 villages was handed over to the Forest Department and declared as the Protected Forests in 1955. A total of 2,784.06 hectares of the Protected Forests was deforested for various purposes in different villages during 1970-73. As described above 11,270.71 hectare of the Protected Forests in 72 villages were declared as the Reserved Forests in 1977-78. The balance area of the Protected Forests in this division is 362.73 sq.km km, distributed in 594 villages of the division have been organized in 437 compartments. The net Protected Forests in the charge of Nagpur Division have been given in Table No.4. The matter relating to regulation of removal of forest produce and grant of licenses etc. for such removal by local people from these protected forests is provided in the Bombay Protected Forests (Vidarbha Area) Rules, 1959. The statement showing protected forest in Nagpur Division has been given in Table No.3 as well as in the **Appendix No. X**

TABLE No. 1.4
Statement Showing PF in Nagpur Forest Division (in ha)

S.N.	Range	Round	Beat	PF	
				Comp	Area
1	Narkhed	4	17	46	4891.79
2	Katol	4	18	35	5838.52
3	Kondhali	6	25	61	7079.44
4	Hingna	9	32	35	5801.80
5	Butibori	5	22	30	5982.41
6	S.Hills	11	21	0	0
7	Kalmeshwar	3	9	13	1544.69
8	Khapa	4	15	24	3118.98
9	Paoni	5	19	18	2449.75
10	Deolapar	5	23	25	2545
11	Parseoni	4	18	24	3358.48
12	Ramtek	4	17	28	4923.4
13	N.Umred	7	30	54	9335.76
14	S.umred	8	32	44	6402.94
	Total	79	298	437	63272.96

ZUDUPI JUNGLE: The Revenue Department has transferred 14,516.74 hectares of Zudupi Jungles in 621 villages to the division for management. The of Range-wise list of Zudpi Jungles in the division has been given in the are given in Volume II of this working plan.

Non forest areas received under FCA for Compensatory Afforestation the Division is 293.48 ha in lieu of forest areas diverted from the division for various non-forestry purposes. The details of such non forest area received in the division are given in Volume II of this working plan.

Areas Transferred to the Wildlife Division: Total forest area, falling in the Pench National Park, Mansinghdeo Wildlife Sanctuary, New Bor & Umred Karandala Wildlife Sanctuary measuring 27,347.91 hectares, has been transferred to the Wildlife wing. The Pench National Park has 25,220.45 hectares of the Reserved Forests in 90 compartments and 118.44 hectares in one compartment of the Protected Forests. Similarly 1,590.62 hectares the Reserved Forests, in 10 compartments; and 418.40 hectares the Protected Forests in 5 compartments, falls

in the Bor Wildlife Sanctuary. The details of range-wise areas transferred to the Wildlife wing & FDCM Ltd. have been given in Table No.5 & 6. The statement showing the list of areas transferred to Wildlife wing has been given in the **Appendix No. XI.**

Table No. 1.5

Net Forest Area of Division included in this Working Plan (in ha)

S.N.	Range	Gross area of Nagpur Division	Area Transferred to FDCM	Area Transferred to Wildlife	Net Area of Nagpur Division
1	Narkhed	10666.36	0	0	10666.36
2	Katol	10512.82	0	0	10512.82
3	Kondhali	13480.85	0	0	13480.85
4	Hingna	17776.89	0	3220.68	14556.21
5	Butibori	13346.47	504.47	0	12842
6	S.Hills	2474.16	0	1909.59	564.57
7	Kalmeshwar	5515.22	0	0	5515.22
8	Khapa	9476.39	2662.02	452.29	6362.08
9	Paoni	22868.15	8081.52	4370.41	10416.22
10	Deolapar	41237.733	0	27562.143	13675.59
11	Parseoni	23301.1	6560	8217.59	8523.51
12	Ramtek	13015.14	1529.72	3127.43	8357.99
13	N.Umred	29420.31	4432.08	7179.58	17808.65
14	S.umred	26736.05	7377.25	6561.34	12797.46
	Total	239827.64	31147.06	62601.053	146079.53

Areas Transferred to F.D.C.M. : In accordance with of years 1978 and the 1980 Government Resolutions, 24,067.53 hectares of the Reserved Forests in 85 compartments was transferred to the Forest Development Corporation of Maharashtra Limited (FDCM) vide Principal Chief Conservator of Forests' letter No.773 dated 05/12/95. Later, Government Resolution dated 23/07/97 shows that 3,132.64 hectares of Reserved Forests in 12 compartments and 12,091.09 hectares of Protected Forests in 44 compartments, thus 15,223.73 hectares of additional forest areas is to be transferred to FDCM (No. FDC/10941 case/578/ F-5). Therefore, 39,302.16 hectares forest area, including, 27,028.74 hectares of the Reserved Forests in 96 compartments; and 12,273.42 hectares of the Protected Forest in 47 compartments has been earmarked for transfer to FDCM. The details of range-wise areas transferred to Wildlife & the FDCM Ltd. have been given in

Table No.6. Area transferred to the Wildlife wing & FDCM Ltd (Table No.6) has been shown for the purpose to maintain area statistics of this division. The statement showing the list of areas transferred to FDCM Ltd has been given in the **Appendix No. IX.**

Table No. 1.6
Area transferred to FDCM Ltd., Nagpur and Wildlife wing (in ha)

Range	FDCM					Wild Life				
	RF		PF		Total	RF		PF		Total
	No.of Comp	Area	No.of Comp	Area	Area	No.o f Comp	Area	No.o f Comp	Area	Area
Narkhed	0	0	0	0	0	0	0	0	0	0
Katol	0	0	0	0	0	0	0	0	0	0
Kondhali	0	0	0	0	0	0	0	0	0	0
Hingna	0	0	0	0	0	16	2814.49	4	406.19	3220.68
Butibori	0	0	1	504.47	504.47	0	0	0	0	0
S.Hills	0	0	0	0	0	7	1881.66	0	27.93	1909.59
Kalmeshwar	0	0	0	0	0	0	0	0	0	0
Khapa	9	2662.02	0	0	2662.02	2	452.29	0	0	452.29
Paoni	29	8081.52	0	0	8081.52	16	4370.41	0	0	4370.41
Deolapar	0	0	0	0	0	101	27430.298	2	131.845	27562.143
Parseoni	22	6560	0	0	6560	26	8217.59	0	0	8217.59
Ramtek	6	1529.72	0	0	1529.72	9	2187.71	5	939.72	3127.43
N.Umred	0	0	18	4432.08	4432.08	5	998.37	24	6181.21	7179.58
S.umred	19	3923.54	14	3453.71	7377.25	8	2152.33	17	44409.01	6561.34
Total	85	22756.8	33	8390.26	31147.06	190	50505.148	148	12095.905	62601.053

AREA FOR MANAGEMENT BY THE NAGPUR DIVISION : The remaining forest area after excluding areas transferred to FDCM Ltd and the Wildlife wing is 146079.51 ha. It has been distributed in 336 compartments of Reserved Forests and 437 compartments of the Protected Forests alongwith Zudupi Jungles in about 647 villages of the division. The details of net forest areas available with the Nagpur Division and its range-wise distribution are given in **Table No.5 & 6** and the range-wise distributions of various types of forest areas in the division have been given in Table No.7.

TABLE No. 1.7**Range-wise Area statement of Nagpur Forest Division (in ha.)**

Range	Round	Be at	RF		PF		Zudpi Jungle		Unclass Forests		Non Forest Land		Total
			Com	Area	com	Area	Villages	Area	Sur.No	Area	Sur No	Area	Area
Narkhed	4	17	23	4327.39	46	4891.79	76	1447.18	0	0	0	0	10666.36
Katol	4	18	14	3085.21	35	5838.52	53	1589.09	0	0	0	0	10512.82
Kondhali	6	25	32	6107.81	61	7079.44	23	287.5	0	0	2	6.08	13480.85
Hingna	9	32	45	8050.13	35	5801.8	41	704.28	0	0	0	0	14556.21
Butibori	5	22	20	4060.61	30	5982.41	99	2779.51	0	0	7	19.47	12842
S.Hills	11	21	1	67.41	0	0	42	475.23	17 Nar a Ag ar	21.93	0	0	564.57
Kalmeshwar	3	9	14	2441.89	13	1544.69	61	1521.48	0	0	4	7.16	5515.22
Khapa	4	15	12	2328.68	24	3118.98	58	914.42	0	0	0	0	6362.08
Paoni	5	19	35	7904.43	18	2449.75	6	62.04	0	0	0	0	10416.22
Deolapar	5	23	51	11102.93	25	2545	8	27.66	0	0	0	0	13675.59
Parseoni	4	18	27	4660.41	24	3358.48	31	504.62	0	0	0	0	8523.51
Ramtek	4	17	16	2780.6	28	4923.4	48	603.37	0	0	21	50.62	8357.99
N.Umred	7	30	25	6004.59	54	9335.76	81	2468.3	0	0	0	0	17808.65
S.umred	8	32	21	5644.7	44	6402.94	20	746.46	0	0	0	0	12797.46
Total	79	298	336	68566.79	437	63272.96	647	14131.14	17	21.93	34	83.33	146079.53

1.11 BLOCKS AND COMPARTMENTS :

Reserved forests of the division, except compartment No. 716 to 789, are divided into 48 blocks numbered 1-19,25-30,32-34,36-39,41- 48, 2A, 7A, 10A, 26A, 31A, 33A, 42A and 68A. These blocks except the block 68A have been marked on "4 inch =1 mile" scale topo-sheets. Block 68A was declared as the Reserved Forests in 1939. (Appendix 1.9a) In 1934, the forest blocks were permanently divided into 497 compartments with numbers 1 to 38,60 to 96, 276 to 313 and 331 to 714. One compartment numbered 715 of Seminary Hills was added in 1939. The Reserved Forests constituted in 1977-78 were divided into 74 new compartments bearing numbers 716 to 789. Compartment number 399 was completely disforested in 1952. The missing compartment numbers pertain to Wardha division, which was a part of Nagpur division, till its formation as an independent unit in the year 1959. The area of Gorewada and Ambazari has been constituted in to 10 compartments bearing numbers 790 to 799.

Earlier the Protected Forests had 484 compartments. Compartment numbers 172 and 173 were made the Reserved Forests, and compartment numbers

318 and 446 were disforested. Net area under the Protected Forests is 82861.55 hectares. Jwala Prasad's Plan divided the Protected Forests areas into 480 compartments by clubbing survey numbers of the Protected Forests from adjacent villages. This plan proposes to assign a distinct compartment number to the Protected Forests of each village. Area of 2 villages (Dhawalapur-mal & Pardi - rithi) has been constituted as compartments having numbers 485 & 486.

Map prepared during Jwala Prasad's Working Plan transferred the Protected Forests boundaries on 4" = 1 mile topo-sheets from village maps of "16 inch = 1 mile" scale with the help of pantograph. Isolated patches of protected forests have been shown on separate sheets. The present plan has endeavoured to prepare digital database of the entire forest area in the GIS (Geographical Information System) environment. This includes digitisation of cadastral maps (village maps) of the protected forest area (of the 594 revenue villages).

1.12 ADMINISTRATIVE UNITS

For administrative convenience the ranges, rounds and beats were reorganised in 1982 and the entire division has been divided into 14 Ranges, 79 Rounds and 298 Beats. Range-wise distribution of forests in the division are given in the Table No.7 as well as in the Appendix No.X.

DISFORESTATION PRIOR TO 1980: Over an area of 10098.57 ha of Reserved Forest in Nagpur Division has been disforested prior to 1980, which has been given in the Appendix No. XI and 2826.47 ha of Protected Forest has been disforested in Nagpur Division prior to 1980, which has been given in the **Appendix No. XI**. Area of Forest villages measuring 2113.18 ha disforested and transferred to Revenue department has been given in the Appendix **No XII**.

1.13 AREAS DIVERTED FOR NON- FORESTRY PURPOSES UNDER FCA 1980

Forest areas under FCA 1980 for non-forestry purposes after 1980 have been given in the Appendix No. XIII. The total area of such forestland is 3855.17 ha under 170 projects, out of which Government of India has finally approved 130 projects involving 4403.19 ha and has principally approved 40 projects involving 360.49 ha. In lieu of this, 2813.19 ha of non-forest and 1041.98 ha Zudpi jungle have been made available to the division. Abstract of such areas is given in the **Table No.8** below.

Table No. 1.8**Project under FCA 1980 of Nagpur District: As on 27/08/2013**

Sr. No.	No.of project	Forest land under various project(in ha)	Compensatory lands for various project(ha)			Remarks
			Zudpi Jungle	NFL	Total	
1	130	4403.195	675.38	2811.6	3486.98	Final Sanctioned projects.
2	40	360.4941	366.6	1.59	368.19	Final Sanctioned projects.
Total	170	4763.689	1041.98	2813.19	3855.17	

1.14 STATE OF BOUNDARIES

The total length of the of external boundaries of the Reserved Forests in the division is 1804.01 km, of which 105.461 kms of the external boundary follows the permanent natural features. The remaining boundary is demarcated by artificial lines, 12 meters wide cleared and cut-strips; and marked by pillars at suitable intervals. All pillars have been serially numbered in anti-clockwise direction. If the boundary line is shared by other forest areas, centre of this width lies on the boundary, otherwise, the entire width lies within the Reserved Forest. The NRF do not have well-defined demarcation by pillars, at a number of places.

The total length of the boundary line of the Protected Forests extends over to 5,374.978 km. The boundaries of the Protected Forests have not been demarcated and maintained properly. Records of survey and demarcation done in 1958, as mentioned in the previous plan, are not available. These areas require survey and demarcation by fix boundary marks on priority basis to ensure the integrity and protection of the tracts under the Protected Forests. The statement showing natural & artificial boundaries have been given in the Appendix No. XIV. The position is likely to improve now as the fixation of permanent boundary marks on the outer boundary of the forests has been given a priority in the light of the directives given by the Hon. Supreme Court in the writ petition No.202/95 and 171196.

1.15 LEGAL POSITION

The forests of Nag pur district were declared as the 'Reserved Forests' and the 'Protected Forests' under the provisions of the Indian Forest Act, Chapter VII of 1878 as well as under the provisions of Indian Forest (Protection) Act, 1927. The relevant notifications, to this effect, have been listed, as follows:

A. RESERVED FORESTS

1. Notification no. 917 (b) dated 24/11/1879
2. Notification no. 116 dated 11/13/1887
3. Notification no. 1585 dated 3/4/1893
4. Notification no. 1193 dated 7/3/1893
5. Notification no. 2629 dated 30/5/1895
6. Notification no. 700-562-XI dated 18/7/1939 (Compartment 715)
7. Notification no. FLD-3470/6975/F-2 dated 23/11/1977 notified 11,270.71 hectares of Protected Forests in 72 villages as the Reserved Forests.

B. PROTECTED FORESTS

Notification No. FLD-3057-853-XI dated 4/6/1955 declared the ex-proprietary forests taken over by the government as the Protected Forests.

C. Section 4 Notifications

The position regarding section 4 notification for the non-forest and Zudpi jungle lands made available to the division as indicated under para 1.14.01 are as follows:

Notification No. FLD:-34901143390/CRI011F-3, dt. 25.10.1990 has been issued for Ambazari and Gorewada forests area 2640.45 ha. Proposals for notification under section 4 for Zudpi jungle (14516.74 ha) has been sent by the Deputy Conservator of Forests, Nagpur through following letters:

1. Desk-13/Survey/3365, Nagpur, dt. 26.09.03
2. Desk-13/Survey/3401, Nagpur, dt. 29.09.03
3. Desk-13/Survey/4157, Nagpur, dt. 29.10.03
4. Desk-13/Survey/4928, Nagpur, dt. 02.12.03
5. Desk-13/Survey/4950, Nagpur, dt. 04.12.03
6. Desk-13/Survey/6131, Nagpur, dt. 31.01.04
7. Desk-13/Survey/6145, Nagpur, dt. 03.02.04
8. Desk-13/Survey/6987, Nagpur, dt. 20.03.04

Non-forest land of 293.48 ha is yet to be notified.

1.16 RIGHTS AND CONCESSIONS

A. RESERVED FORESTS

No rights in the Reserved Forests have been recognized, except right to way and access to water. There is no commutation of nistar or paidawar in the Nagpur Forest Division. Various concessions have been granted to the agriculturists and to other local inhabitants by the erstwhile Government of Madhya Pradesh and Government of Maharashtra, from time to time. The following concessions were permitted to the local inhabitants in the past.

The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of the Reserved Forests in accordance with the grazing rules in force.

Agriculturists of villages in the vicinity of the Reserved Forests have been provided with the facility of certain quantity of timber, bamboo and firewood for their bonafide domestic use at concessional rates from the coupes under working. None of these concessions is a legal right and these may be withdrawn by the government if the need so arises.

But after the enactment of "**The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights), Act 2006**" all the rights, recognized under this Act, have to be respected and granted to the eligible persons and communities after following all the legal formalities.

B. PROTECTED FORESTS

Before abolition of the proprietary rights, the rights and concessions were governed by the 'Wazib-ul-arz' - a village record for settlements; showing the survey numbers and areas set apart for each particular purpose. The Central Province Land Revenue Code 1917, in section 202, provided punishment for violation of the recorded customs. After enacting of the Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahala, Alienated Lands) Act, 1950 (Act I of 1951), all communal and other wastelands became property of the Government. In order to distinguish between the rights existing on such lands, the Madhya Pradesh Land Revenue Code, 1957 prescribed preparation of the 'Nistar Patrak' and 'Wazib-ul-arz' for every village. The Nistar Patrak deals exclusively with management and use of the government land while the Wazib-ul-arz deals with community and

customary use over private land. The nistar patraks are applicable to all the Protected Forests in the division.

The nistar inquiry had been conducted in Nagpur district during 1954-1956, and this inquiry included villages having the Protected Forests. The nistar officers had formed 'grazing zones' and 'nistar zones' by clubbing together surplus villages with deficit villages while self-sufficient villages had been treated as individual zones. Villages assigned to particular zone can exercise their nistar rights within that zone only. The classification of the villages into surplus, deficit or self-sufficient for the exercise of nistar rights was made on the following basis:

1. A village having tree clad area equal to half the occupied area was considered to be self-sufficient.
2. A village having trees clad area more than half the occupied area was considered to be surplus village.
3. A village having tree clad area less than half the occupied area considered to be a deficit village.

GRAZING CONCESSIONS

For the purpose of forming grazing zones, each head of cattle in the cotton-jowar tract should have 0.2 hectare grazing area and that in other tracts it should have 0.4 hectare, was taken as the basis. Villages in which the grazing lands are less than the above requirement was clubbed with the neighbouring village in which such area exceeds the above standard. In villages, where grazing lands was just sufficient for the needs of the cattle of that village, no rights for persons residing in other villages to graze their cattle have been recognised unless already recorded in the 'Wazib-ul-arz. '

Villages clubbed as above constituted a grazing zone. The clubbing of the villages was done in such a way that the villagers were not required to take cattle to a distance longer than the distance, which the cattle can easily cover in a day. Within a specific zone all persons are at liberty to graze their cattle free until, otherwise, ordered by the Collector.

The directives contained in the Madhya Pradesh Land Reforms Department's memorandum no. 1290-1227-XXVIII, dated 4th September 1953 prohibited grazing by sheep and goats in forests meant for production of big timber and even in the forest areas where villagers generally exercise their nistar rights. This ban was because while grazing in the forests, these animals also uproot seedling regeneration of the important species. However, subsequent directives

from the Government had allowed grazing by sheep in specified areas but continued complete prohibition on grazing by goats. Following norms of concessional grazing were prescribed under the Protected Forests (Vidarbha Area) Rules, 1959:

1. Cultivators-2 plough cattle per plough plus 4 others including one she-buffalo.
2. Agricultural artisans and labourers –
4. cattle including one she-buffalo;

Provided further that all animals in excess of those specified in 5;

Provided that a calf under one year shall not be counted;

Provided further that all animals in excess of those specified in clauses (a) and (b) shall be charged at such rates as the State Government may from time to time sanction in this behalf.

OCCUPATIONAL NISTAR

In the nistar patraks, the occupational rights of the Kumbhars, Chambaras, Gondas, Mahars, Pradhan and Lohar communities have been recorded and recognised in several villages and their entries are found in the 'wazib-ul-arz' - the village instrument prepared for each village. The nistar is required by the villagers for bona fide domestic and agricultural purposes. Forest nistar generally includes timber of certain species and sizes for agricultural implements, houses and cattle sheds, fire woods, bamboo, thatching and fodder grasses, fencing material, bark, fibre, minor minerals and paidawar i. e. edible fruits, flowers and roots, honey wax, etc. The rights and concessions are governed by the provisions made in the Nistar Patrak for each village. Generally, agriculturists and agricultural labourers are entitled to kinds of forest produce given in the following paras, for their nistar either free of charge or at concessional rates fixed by the Collector, from their nistar zones only.

SMALL TIMBER AND POLES

According to the zone arrangement made by the Nistar Officers, the villagers are entitled to obtain their nistar requirements of small timber and poles from the available material from the forests included in a particular zone either free or on payment up to a certain quantum fixed by the Collector. In order to meet the demand of the cultivators of the villages which were not included in the zone, the nistar officers have prescribed that in the event of supply being in excess in a

particular zone after meeting the demand of zone villages, the excess could be given to persons outside the zone on payment at the rates fixed by the Collector

TIMBER FOR CONSTRUCTION OF NEW HOUSES FROM EX-PROPRIETARY FORESTS

Madhya Pradesh Government through their Memo No. 2525/650/C.R. (Land Reform Department) dated 29/10/1956, decided that timber for construction of new houses can be supplied to the agriculturists on a certificate issued by the Revenue Officer, on the concessional rates equal to half the market rates.

SUPPLY OF SALAI WOOD IN MARRIAGE CEREMONIES

Several communities use green salai poles as kham, adam and thuni in marriage ceremonies. The villagers are permitted to remove their requirement up to the maximum limit of two trees on permits.

Firewood, bamboos and other usufructs: Removal of firewood from Khasra numbers, set aside for meeting the nistar requirements, have been permitted free of cost as per rights recorded in Nistar Patrahs to the prescribed extent for bona fide use of the assigned villages.

Dry bamboo is allowed to be removed free from the ex-proprietary forests for bona fide nistar needs. Green bamboo is permitted on payment of the prescribed royalty. Where thorns are not available, removal of brushwood such as lops and tops of the felled trees and bamboo are permitted. Where removal of thorns and brushwood is allowed free of cost or at nominal rates, the existing practice continues. Bark, fibre and roots are allowed to be removed where it is customary to allow their removal for cordage.

Moha, achar, tendu or other edible fruits, flowers and roots are allowed to be removed free of cost from all over the forests for domestic consumption. The removal however, is permitted by head loads only. This concession however does not include harra, lac, rosha grass, tendu leaves and gums as they are not included in nistar but villagers are allowed to collect these forest produce found in their land in a protected forests. These provisions are contained in the Protected Forests (Vidarbha Area) Rules, 1959.

As regard occupational nistar, ghont; fruits and dhaora leaves are allowed to be removed by the charmakers free of charge. They are also allowed to remove the bakkal and kahu bark on nominal payment from trees marked for felling.

In the Nistar Patrak of each village the khasara numbers set-aside for nistar and grazing are recorded. The details regarding quantum of nistar, period during which it is to be allowed, payment if any to be made, etc. are generally not given in the nistar patraks. The Protected Forests are no longer in a position to meet most of the nistar requirements of the people because of unsustainable exploitation, illicit removal and heavy grazing in the past. Most forest areas have been severely degraded, and need immediate rehabilitation to restore their health and productivity. Much of these forests have been encroached because the outer boundary of the forests are not clear.

Misuse of right in reserved forests is covered under section 24(2) of IFA, 1927, read with section 77 and in protected forests under section 33 of IF A, 1927 and under section 167 of Maharashtra Land Revenue Code, 1966.

CHAPTER – II

FLORA & FAUNA

2.1 COMPOSITION AND CONDITION OF THE CROP

The forests of Nagpur division belong to the Sub Group SA - Southern Tropical Dry Deciduous Forests as per the revised classification of 'Champion and Seth'. Underneath this main sub group, considerable local variations occur depending primarily upon the edaphic factors such as parent rock and consequent soil types; topography of the tract and the past treatment provided to these forest crops. The aspect also plays an important part in determining the character of the vegetation in the hilly areas. In the hilly tracts, the western and northern slopes are generally better stocked than the eastern and the southern slopes. This is because the moist conditions exist for a longer period in such tracts. The geology, soil type and depth also plays an important role in determining the composition and quality of the forest crops. The biotic factors like grazing and fires also contribute to the variations in the crop composition; leading to forest degradation in many areas of the Division and seriously damaging the natural regeneration of tree species and other micro flora.

Table 2.1. Forest types found in the Nagpur Division
(Champion and Seth's classification)

Type Notation	Notation	Type description
Group 5		Tropical Dry Deciduous forests
Sub-group 5A		Southern Tropical Dry Deciduous Forests
Climate types	5A/ci	Dry Teak bearing Forests.
	5A/cia	Very Dry Teak Forests
	5A/cib	Dry Teak Forests
	5A/c-3	Southern Dry Mixed Deciduous Forests
Edaphic types	5/E-2	Bosewellia Forests
	5/E-4	Hardwickia Forests
	5/E-5	Butea Forests
Degradation stages	5/D S1	Dry Deciduous Scrub Forests.
	5/D S2	Dry Savannah Forests
Primary serial type	5/ISI	Dry Tropical Riverain Forests.

Teak is predominantly found as pure crop in North Umred, South Umred, Hingna, Katol Kondhali and Narkhed ranges as well as in parts of the Paoni, Parseoni, Deolapar and Ramtek ranges. Mixed forests with scattered teak are found in Ramtek, Khapa, Kuhi, Deolapar, North Umred and Parseoni ranges. Teak is a calcicolous plant growing well in soil rich in CaCO₃. Teak is a best example of a migratory plant species following the deposition of lime.

The crop mainly ranges from young to middle aged with some matured trees and is of uneven ages in character and composition. They are rich in floral diversity. The site quality varies from III to IVa, but areas of site quality IVb are also found in some patches. Within the main crop type, local variations can be seen. The main reasons for these variations are the biotic and edaphic factors. Teak is found in alluvial soils along nalas and rivers in patches of Reserved Forests and in few Protected Forests. Teak is present in almost all ranges with varying degrees, but in some patches of Ramtake, South Umred, Hingna, Katol, Kondhali and Narkhed Ranges, it forms a pure crop. Density of the mixed forest varies from blank patches to 0.7. Natural regeneration of almost all species is found but is far from adequate and varies from place to place depending upon the intensity of fire and grazing damage. Areas of Protected Forests adjoining to villages have scrub and scanty forests and mostly thorny species like Babul, Chilati, Khair are found. Most of the forest lands near villages are highly degraded due to regular hacking of the trees and over grazing. Some of these forests are rich in root stock and can be reclaimed only by protecting and tending the root stocks. MFP species like Tendu, Kullu, Salai, Dhaoda, Char, Aonla and medicinal plants, form a major component of the vegetation.

Soils derived from different geological formations viz. the metamorphic rocks and the Deccan Trap; varies in chemical composition and structure and, thereby, strongly influences the quality, density and composition of forest vegetation cover they supports. The different forest types found in the division based on distinct geological formation are given, as under;

A. FORESTS IN THE METAMORPHIC ZONE

The forest areas falling in the metamorphic zone of this division support, the following, types of forests;

1. Good quality teak forests.
2. Good quality mixed forests interspersed with teak.

3. Poor quality mixed forests with scattered teak; the local variations (edaphico-biotic)

found within this subtype are given, as follows;

- (a) Bhirra forests . ..
- (b) Garari forests
- (c) Rohan forests
- (d) Moha and Palas forests
- (e) Mowai forests

B. THE FORESTS IN THE TRAP ZONE

The forest areas falling in the Trap zone of this division support, the following, types of forests:

- 1. Good quality teak forests.
- 2. Poor quality teak forests.
- 3. Mixed forests; comprising of the following types due to local (edaphico-biotic) variations in the forest tracts of this zone;
 - (a) Ain forests.
 - (b) Kalam forests.
 - (c) Salai forests.

2.2 DRY TEAK BEARING FORESTS

Three distinct types of Teak forests can be recognized:

- 1. Good quality teak forests in the metamorphic zone,
- 2. Good quality teak forests in the Trap zone and
- 3. Poor quality teak forests in the Trap zone

1. GOOD QUALITY TEAK FORESTS IN THE METAMORPHIC ZONE

These forests are found in the Parseoni, Paoni, Ramtake and Deolapar ranges where the soil is sandy loam, deep and well drained. As the conditions are favorable for the growth of teak, it forms about 20-60% of the stocking. The site quality of the crop varies from IVa to II; as the top height is varies 13 m to 24 m. The density of the crop varies from 0.6 to 0.8. The over-wood consists of teak, ain, tendu, dhaora, bija, salai etc. The middle storey consists of khair, ghot, achar, gararai, ghoghar, karai, etc. Bamboo is also found in a few compartments in Parseoni & Deolapar ranges. The under-wood consists of neel, muradsheng, kharasi, etc. The common climbers found are piwarbel, mahulbel, palasbel, malkagni, ramdatun, etc. Metamorphic rocks like granite, gneiss, schistose, limestone carry high proportion of teak because they are associated with limestone.

2. GOOD QUALITY TEAK FORESTS IN THE TRAP ZONE

This type of forests is mainly found in the southern part of South Umred range. Teak is the predominant species forming about 40 to 80% of the stocking of the forest crops. The density varies from 0.4 to 0.7 and the top height varies from 10 m to 18 m. The site quality of the crop is primarily IVa and IVb. The common associates of teak found in these forests are ain, dhaora, tendu, salai and mowai. The soil is black cotton and gets waterlogged during the rainy season. The trees mainly found in the middle storey are ghot, achar, aonla and dhaman. Trap is a natural home of the teak.

3. POOR QUALITY TEAK FORESTS IN THE TRAP ZONE

This type of forest is found mainly in Kondhali, Narkhed, Hingna; and part of South Umred ranges. The forest tracts in these ranges constitute refractory areas having shallow soil layer, which are prone to heavy grazing and frequent fires. The quality of the forests is mainly IVb. Teak is the predominant species consisting about 50 to 70 percent of the crop. The density of the crop varies from 0.4 to 0.6. The main associates of teak in the over-wood are dhaora, lendia, ain, movai, bhirra, achar, bel, etc. The common shrubs found are zilbili, bharati, kharasi, ber and neel. The main climbers found in such areas are chi/ati and eroni. Usually such soils are either very dry or very moist. The post climax changes in such soils have resulted in poor growth of teak.

2.3 THE MIXED FORESTS

The mixed forests may be divided into the following 2 categories: (A) Mixed forests with scattered Teak in the Metamorphic Zone. (B) Mixed forests in the Trap Zone.

(A) MIXED FORESTS WITH SCATTERED TEAK IN THE METAMORPHIC ZONE

The forests are composed mainly of miscellaneous species and teak occurs scattered or in patches spread throughout the crop. These types of forests are found in Khapa, Parseoni, Deolapar and Ramtek ranges. The over-wood consists of ain, lendia, dhaora, rohan, garari, bhirra, salai, bel, aonla, etc. The site quality varies from III to IVa/IVb; whereas density of the crop varies from 0.4 to 0.8. The state of regeneration is far from satisfactory in the areas adjoining the villages. The underwood consists of khair, ber, ghot, dikamali, gogal, etc. The main shrubs are

bharati, zilbili, kharasani and nee!. The common climbers found are piwarbel, ramdatun, chilati and mahul. The local variations (edapho-biotic) types found within this sub type are given, as follows:

BHIRRA FORESTS

Bhirra is the main species found in the areas where the soil is shallow, sandy and arid. The common associates of bhira are lendia, dhaora and garari. The forest crop is generally of IVb quality. It is common in plateaux.

GARARI FORESTS

Large patches of garari are found in the Reserved Forests, north of Bhakari in Deolapar range; and also in the Protected Forests of Manegaon, Bandra and Chawri villages. It also occurs as under-storey in the Teak and Mixed forests in Deolapar range and also in the Protected Forests of North Umrer and Kuhi ranges. The site quality of these forests is generally found to be IVb.

ROHAN FORESTS

In the forest tracts, where the soil is calcareous and coarse, Rohan has been found to grow well. Good patches of Rohan are found in some eroded areas of Deolapar and Ramtek ranges, as well. The usual associates found are bel, mowai, bhirra and dhaora; while bharati and zilbili occurs as the undergrowth. It is mainly found in water logged areas containing lime.

(B) MIXED FORESTS IS THE TRAP ZONE

These forests are mainly confined to the areas having poorly drained clayey soil. The over-wood consists mainly of ain, dhaora, tendu, lendia, moha, mowai, bhirra, rohan, salai etc, whereas, the under-wood comprises of mainly Kharasi, bharati, zilbili and kuda. The density of the forest crops varies from 0.2 to 0.5; and the site quality is IVb. The local variations (edaphic) found within this sub type are given, as follows;

AIN FORESTS

Ain is found to thrive in the low-lying areas with heavy soil, where drainage is poor due to the presence of clay. The site quality of forests in such patches is generally poor. These forests are found in the Reserved Forests of Dhamangaon, Dhighori and Amghat felling series of South Umrer range as well as

in the Protected Forests of Lohara, Pandhartal, Sedeshwar, Kachalkuhi, Nandra in South Umrer range and Tekadi and Salaimendha in North Umrer range.

EDAPHIC TYPES

5/E 2 - SALAI FORESTS

In these forests salai forms the over wood and sometimes well grown medium to large trees occur on the flatter tops of the hills. It is generally 12m to 15m in height and 1.2 m to 1.8 m in girth. The only species that equalize it, in size, is kullu. In these forests salai is found with ghogal, dhaora, kullu, lendia, mowai and aonla. This type occurs on a variety of rocks, particularly, on the crystalline rocks and sometimes lateritic rocks as well as on the trap. The soil is shallow and dry and usually consists of boulders or pebbles. Hill tops, ridges, spurs and the well-drained plateaus are the usual sites. Reproduction of salai in such forests has been found to be scanty and, often, non-existing.

5/E 4 - ANJAN FORESTS

This type is found in small patches in the forest areas of the Seminary Hills where anjan is the predominant species. The soil is hard and gravelly overlying the trap rock formation. The other species occurring with it are teak, salai and shisham. Most of the anjan trees are middle-aged to mature; and the regeneration of these forests is found to be scanty or absent.

5/E5 - P ALAS FORESTS

This sub-type is found in the stiff badly drained very dry clayey soils and particularly in black cotton soils in the ill-drained flats and depressions. On the flat ground this sub-type presents a savannah appearance; with scattered stunted and malformed trees or thickets standing over the short grass or the bare ground.

2.4 SCRUB FORESTS

5/D S I - DRY DECIDUOUS SCRUB FORESTS

It consists of a low broken soil cover of shrubby growth 3m to 6m high, including some trees species reduced to similar conditions usually having many stems emerging out from the base. The grass occurs throughout in these forest tracts. In this type, two sub-types have been distinguished.

DRY TEAK SCRUB FORESTS

In these forests teak is found in the crooked and stunted form, due to maltreatment of the crop as a consequence of unregulated felling, lopping, grazing and fires. Here teak is associated with ain, bhirra, palas, etc.; with bharati being the thorny species. Such types of forests are found at several places in the Protected Forests of Kondhali and Narkhed ranges mainly on the badly eroded hillsides. Surface boulders are usually found exposed in such areas.

DRY MIXED SCRUB FORESTS

A considerable variety of degenerated forests could be included in this type. These forests are the result of long continued maltreatment, of which excessive grazing and repeated cutting are the chief factors. These forests usually grow under heavy grazing conditions. Ain, dhaora, lendia are the most common species found in the Protected Forests of Jabalpani, Tarana, Wag, Sonpuri, Ruyad, Mandhal, Weltur, Kitodi, Makheburdi, Salai-mendha villages. The other associates are tendu, moha, palas, hiwar, khair, ber, ghoti, bhirra, etc. The trees hardly reach the height of 6 metre in such areas. The other sub types found in this type are Palas, khair, dhaoda in the Protected Forests of Masalkund and Bhiwapur village. Ain, garari, salai and mowai are found in the Protected Forests of the Devlikala village.

5/D S2 - DRY SAVANNAH FORESTS

These are usually open forests and the trees stand far apart singly or in small groups in the heavy grasses. The trees have very short stems and are usually crooked, unsound and hollow. Thorny shrubs are also of common occurrence in these forests. This type of forests is found in the Protected Forests of Kuhi and North Umrer ranges. The grass-birs at Champa and pasture areas at Matkazari are the typical examples. These forests are also found in the Protected Forests of Bhijpur, Sasegaon, Salesawari. Tuthanbori, Barwha, Borda, Salwa, Haladgaon, Bodkhipeth, Kharbi and Pratapgarh villages of the Kuhi range.

PRIMARY SERAL TYPE- 1S1- DRY TROPICAL RIVERAIN FOREST

These forests consist of an irregular over-wood of greater height than the climax Dry Deciduous Forests. The trees are of larger size and are found in narrow strips along the hilly section of the larger streams; and the strips become widened as the valleys get broader. Soils are sandy, often overlying more or less impervious rock formation, liable to be temporarily submerged during monsoon period and

usually retain adequate water supply during most of the year. Arjun (*Terminalia arjuna*) is found in the over-wood and it is associated with a few species found in the underground such as Kalam, Palas, Imli (*Tamarindus indica*), Sitaphal (*Anona squamosa*), Karan} (*Pongamia pinnata*), Jamun (*Syzygium cumini*), Aam (*Mangifera indica*) etc. At places, *Tamarix diocia* is found as a shrub.

2.5 REGENERATION STATUS.

In the Metamorphic Zone coppice regeneration of teak, lendia, garari, bhirra, aonla, dhaman, khair, palas, ghot and baranga is satisfactory, while that of ain, dhaora, tendu and tins a is inadequate. The seedling regeneration of teak, in the better quality areas of metamorphic zone, occurs in patches while in the trap zone it is quite inadequate and occurs singly and scattered in the well-drained areas. Teak regeneration is found satisfactory in good quality areas of metamorphic zone.

Seedling regeneration of lendia, ain, dhaora, bhirra and gongal, is fairly satisfactory and occurs well distributed over most of the areas in the metamorphic zone except areas heavily grazed and contain thick growth of shrubs, climbers, grasses and areas severely eroded. Seedling reproduction of bhirra is particularly noticeable in the sandy and open areas of metamorphic zone. In trap zone areas where teak is tending to be pure, seedling regeneration of teak and other species is absent and the coppice regeneration is also inadequate to restock the area.

TEAK & ROCK

Teak is the predominant timber species found in the region and is associated with many species of varied importance and it is usually associated with metamorphic (calcareous, crystalline phyllite, schist's and granite gneiss) rocks and Deccan trap (sills, dykes, flows, inter-trappean beds). It's associated with rocks of volcanic origin as they are rich in calcium. Teak is absent from sedimentary rocks due to leaching of calcium from such rocks. Chemical properties rather than structural geology of soils are more important for the teak to grow. Teak is usually absent from sandstone belt and therefore trap-Gondawana line is a perfectly separates teak and non-teak vegetation. Teak is present in such alluvium deposits while are rich in lime. The trap in this region contain 46.4% felspar. It is found growing best in it pH between 6.5 to 7.5 but subsoil acidity is not a dominating factor for the presence of teak. Teak is a calcium accommodating plant. It is found doing well in soils with high SiO₂/R₂O₃ ratio, a high dispersion coefficient and high moisture retention. It is replaced by *Lagestromia parviflora* in the swampy conditions, and by *Xylea xylocarpa* in lateritic soils.

2.6 INJURIES TO WHICH CROP IS LIABLE

The forests are subjected to injuries caused by a number of factors. They can be classified as injuries caused by man, wild animals and parasites as well as by factors like frost, drought, fire, etc.

A. DAMAGE BY THE MAN

Man causes primarily, the following, two types of injuries. **Illicit Cutting:** The illicit cutting of forests for timber, poles and firewood is a major factor causing serious problems of protection of forests throughout the division. It is heavy in areas adjoining the inhabited pockets of the division. The main consumption centres are Nagpur, Hingna, Kamptee, Katol, Umrer, where construction activities consumes the major share. Due to phenomenal increase in timber price of teak and other commercial species, inter-state illicit transport of timber and other forest produce from the division is a major challenge to deal with. Demand for firewood has also increased due to the increase in population compounded by the lack of an alternate and economical sources of energy. Increase in network of roads in forested tracts has further compounded the problem. During tendu season cutting and lopping of tendu trees is a common practice to enable easy collection of leaves. In addition to timber, illicit felling of bamboo has also increased due to the increase in population of Burads, who earn their livelihood by making bamboo mats and other bamboo articles. As a consequence, bamboo clumps have become malformed and deteriorated leading to poor culms growth and slow clump formation. Illicit felling has become a major cause for the deterioration of forests and depletion of the growing stock in the inhabited regions of the division. The illicit cutting has led to a serious deterioration of forest. The extent of illicit cutting during the last 10 years is given in the **Appendix. No. LII.**

Encroachment: There have been large scale clearances of the forests in the past for encroachment with a purpose to get agricultural crops. The State Government has issued orders vide GR No. LENII078/3483/G-1, dated 27.12.1978 and FLDI1079/1366/F-3, dated 12/09/1979 to regularize all the encroachments on forest lands done during the period from 01.04.1972 to 31.03.1978. This has increased the tendency of people to encroach upon the forest land with a hope that in future also such encroached lands will be regularized by the Government. Generally the Reserved Forest boundaries are better demarcated, but boundaries of the Protected Forests and the unclassified forests are often in poor conditions. Poorly demarcated boundaries encourage encroachments because encroachments

in such cases may remain undetected for much longer period. The problem of encroachment is more on Protected Forests, as they are adjoining the cultivation and villages and there is no proper demarcation at most of the places. Though, the tendency of encroachment has been checked to a large extent because of the Forest (Conservation) Act, 1980. The forest guards and foresters need to be made more sensitive about the forest encroachment, and special drive for evicting forest encroachments is required.

The hunger for land is a main cause of forest encroachments carried out by the local inhabitants by clearing the forests, primarily, for agricultural purposes. Regularization of encroachments in the forest areas in past has served as motivation for encroachments upon forest areas in anticipation of regularization sometimes, in future. Enactment of the Forest Conservation Act, 1980 and its strict implementation, however, has reduced this tendency, to an extent. The state government through the Resolution No. PWR-1196/2961171L-2 dated 181111997 has delegated the power of summary eviction of encroachment in forest areas to the forest officials of the rank of the Assistant Conservator of Forests and the Deputy Conservator of Forests.

Moreover, boundaries of the Protected Forests have not been well demarcated, at most of the places. As a result, the problem of encroachment in the Protected Forests has become a thorny issue for the Department. Thus, prevention, detection and eviction of encroachment in forest areas in time cannot be ensured due to lack of proper demarcation of these areas with permanent marks. The encroachment on forest land after 1978 is given below in the **Appendix No. LVI.**

DAMAGE BY DOMESTIC & WILD ANIMAL: Cattle population is much in excess of the carrying capacity of the forest area. Continuous and heavy grazing adversely affects natural regeneration, plantations and the soil conditions. Chital and Nilgai cause damage by nibbling the young seedlings, and Wild Boars dig up the rhizomes of bamboo. Damage caused by uncontrolled grazing is heavy due to large cattle population. The grazing incidence, as prescribed in the Grazing Policy of 1968 of Government of Maharashtra is not followed. Moreover, the Protected Forests have Nistar rights for grazing and they have so far not been worked under any scientific forest management. Due to this the Protected Forests are more vulnerable to heavy grazing. Even large numbers of goats are also seen grazing in the forest. Continuous and heavy incidence of grazing not only prevents regeneration of tree species but also the plantations and young regeneration obtained during the period of closure is lost soon after the areas are open to grazing. In areas with clayey soil, the trampling by cattle results in compaction of

soil and reduction in the soil aeration. In sandy soils heavy grazing results in accelerated erosion and denudation. Due to over grazing the wild animals also suffer due to scarcity of fodder in the forest.

Grazing by sheep and goat is highly damaging to the flora as well as the soil. These animals not only browse the foliage of plants and grasses but also uproot and eat away the roots and rhizomes of the grasses as well as the bark of the young plants, leading to exposure of the soil and drying of saplings. The illegal grazing by goats and sheep is already in practice and if it goes uncontrolled it will lead to irreversible degradation of forest leading to severe scarcity of fodder in the forests. The degradation of forest will not be limited only to the flora and fauna but it will degrade the land itself, as the single biotic factor contributing to the desertification is the uncontrolled grazing in general and grazing by herds of sheep and goats in particular

The damage by wild animals in Nagpur Division is, generally, very little. Chital and Nilgai, which are found all over the division, browse young seedlings and coppice growth. Some damage is caused by wild boars, by digging the roots of young plants and bamboo rhizomes. Monkeys cause some damage to fruit trees, Sissoo seedlings and succulent bamboo culms.

Due to the manifold increase in the population of the cattle, which is very much in excess of the carrying capacity fixed by the grazing settlement, the pressure on the forests has increased to an alarming proportion. The nistar rights granted in the malgajari forests continued even after these forests were declared as the Protected Forests and hence the scenario in the Protected Forests is more severe as compared to the Reserved Forests. As a result of continuous and heavy grazing beyond sustainable limits, the soil gets compacted, which adversely affects the survival and growth of natural regeneration as well as plantations.

DAMAGE BY INSECTS, PARASITES AND CLIMBERS: The attack by defoliator (*Hyblaea puera*) and skeletonizer (*Hapalia macharalis*) is of common occurrence in forest tracts having substantial percentage of teak. It is estimated that such insect attack causes 10% loss of increment. *Hyblaea puera* is a teak defoliator and it attacks forests of this region during the period of July and August i.e. during the rainy season. The attack is more severe in teak plantations. The teak trees practically become leafless. However new leaves soon emerge and remain on the tree up to November i.e. more than usual period of their existence on a tree and it

has been observed in some experiments that the acquired longevity of leaves compensates loss due to attack of defoliator and hence net loss is insignificant.

Mortality caused by termite in weaker plants is observed in some parts of the division. Parasite called Banda (*Loranthus longiflora*) can be seen in some trees specially Achar, Hiwar, etc. Climbers like Chilati, Palasbel, Bokadbel, Yeruni, Kukutranj and Mahurbel entwine saplings or trees and damage by strangulating the plants. Damage due to fungi is un-assessed.

The use of chemicals for the control of these insects is not feasible because of the short life cycle of these insects and extensive areas where teak forests exist. Biological control is advised and may be more effective. The parasites that feed on these insects are harbored on the following tree species.

1. *Anogeissus latifolia*,
2. *Careya arborea*
3. *Cassia fistula*,
4. *Garuga pinnata*
5. *Grevia telifolia*
6. *Helicteres isora*,
7. *Lagestroemia parviflora*
8. *Xylia xylocorpa*,
9. *Terminalia tomentosa*

Hence, the above species should be retained in considerable number in the teak forests. *Vitex Negunda* is the alternate host of above two pests.

Teak skeletonizer usually attacks during the end of rainy season i.e. around September. Because of this reason, loss due to skeletonizer attack is also not very significant. However, such damage on the growth of the teak has not been quantified.

Termite attack has also been observed in some parts of the division, leading to the mortality in the weaker plants. The fallen logs of *Terminalia tomentosa* are attacked by the insect called *Aeolesthes holosericea* usually in the month of June and July. The insects attack the bark and hence as a protection the logs should be debarked kept in the open. *Terminalia tomentosa* as well as *Terminalia bellerica* is attacked by the insect *Sinoxylon anale* and *S. crassum* of family Bostrycidae (powder pest beetles that convert starchy sapwood into powder like substance); *Aeolesthes holosericea* of family Cerambycidae (insects that make a large tunnel

inside the sapwood as well as heartwood), *Sphenoptera kombicernis* of family Buprestidae (insects that convert sapwood into powder and *Platylabus solidus* of family Platypodidae (the insects damage timber by making black stem pin holes into it). The beetles however do not attack logs. The felled logs of *Adina cordifolia* (Haldu) is attacked by *Xylotrechus smei*. Very less number of pest species attacks Jamun. *Lymexylonid* borer and *Atractocerus reversus* attack Salai logs. In this attack, the insect makes a long sinuous tunnel inside the logs. Bija logs are attacked by *Xylotrechus smei* and *Chrysobothrus* species but logs are not attacked if they are debarked. *Xylotrechus smei* and *Sepalus hypocritia* attack Maharukh logs. The phenomenon of dying back of leading and lateral shoots of teak is noticed mainly due to attack of insect called *Aelcides ludificator*. *Zanzera coffeae* attacks the young leaf of teak. Termites attack the collar of the small seedlings of teak. They also attack seedlings of Dhawada and Aonla. Dhawada is also attacked by bark eating caterpillars of *Inderbela quadrinotata*. Leaves of *Garuga pinnata* and *Ficus glomerata* are attacked by gall insects. Teak in nursery attacked by the white grub called *hototrichus serrata*. Fungal attack is also very common. The fungus usually enters through the damaged branches or through roots and usually destroys heartwood. Fungal attack is not common in softwood species. The affected tree does not die but is uprooted due to the wind pressure. *Polyporus gilvus* attacks the sapwood of *Dalbergia sissoo*, *D. latifolia*, *Acacia arabica*, Katha, bija, siris (*A. procera*) and it causes white rot. In this fungal attack, heartwood is affected in a limited way. *Ganoderma lucidum* attacks *Dalbergia sissoo*, neem and *Acrocarpus fraxinifolius*. It being a root parasite attacks the tree through roots. The roots become brittle and leaves turn yellow. The other species of *Ganoderma*, *G. applanatum* attacks usually the dead logs but few living trees of species like *sissoo*, babul, bamboo and Jackfruit are also attacked by this fungus. It renders the wood spongy. Such affected tree becomes lighter and is thrown away by wind. *Fomes rimosus* attacks Beheda, ain, dhawda and lendia. It is a facultative (opportunistic) parasite and enters the tree through injury. Only the heartwood is affected.

In very dry locality, teak develop hollowness at base while may go even upto 2-4 meter in height in heart wood and is caused due to decay active by *Fomes lividus* and *Polyporus Zonates*.

Parasite plant, bandh (*Loranthus longiflora*) was found on some trees especially achar, hiwar, etc. The common climbers found are Chilati, Palasbel, Bokadbel, Yeruni, Kukutranj and Mahurbel. The damage is caused by strangling of

trees when they entwine a sapling or a tree. If climbers are not cut in the initial stages. They cause deterioration in the value of trees.

DAMAGE BY DROUGHT, FROST, WIND AND HAILSTORMS:

Lowering of the water table caused by scanty or irregular rainfall cause drought like conditions and damage seedlings, saplings and occasionally young trees. Damage due to drought is not common. However, some damage to the young natural regeneration and plantations is caused in the year in which the rainfall is irregular or scanty. The scanty rainfall results in occasional dying of bigger trees which are severely damaged by fire. Strong winds during pre-monsoon or monsoon period cause uprooting of trees all over the forest area. Occasionally hail storms damage the fruit crops of Moha and Char. Hailstorms in the month of April and May cause damage to tendu leaves making them unfit for bidi making.

DAMAGE BY FIRE: The incidences of fire are very common in Nagpur Division due to deciduous nature of forests that provide a large quantity of combustible matter in the form of dried leaves, grasses and twigs. Considerable damage is caused by scorching heat, which kills the saplings, seedlings, ground flora and micro-fauna. Surface organic matter, which is the source of nitrogen to the plants, is destroyed in fire. However phosphorus, alkaline salts and alkaline oxides are returned to the soil. Alkaline ash containing higher percentage of these salts and oxides neutralizes the acidity of soil. High temperature causes breaking up of colloidal clay complex leaving an inert material which has less moisture retention capacity. Besides such burnt soils become stiff and this leads to increased surface water runoff. The silicate gel, which is available in soil, is burnt leading to lateralization of such sides. Protozoan organisms are also killed in the fire. Repeated fires lead to reduced aeration.

All most all incidences are man-made. Tendu contractors set fires during tendu season to obtain profuse flush of leaves on the tendu shoots. Villagers also set fires to clear under growth under the Moha and gum-yielding trees to facilitate collection of moha flowers and gum. Sometimes, villagers also set fire to get good flush of grasses. Such fires if left unattended spread to the adjoining forest areas. The statement showing the area burnt has been given in the Volume II of this working plan.

Soil Erosion: Soil erosion is noticed all over the forest areas of division. The top layer of soil which stores organic matter, and nutrients, on which plants feed, is lost in this process. It decreases the soil fertility, lower the sub-soil water level and water holding capacity of the soil.

Sheet erosion in plains and gully erosion on slopes is moderate in most of the areas of the forest. But it is increasing at an alarming rate in forest all over the division. The erosion has increased due to excess harvesting of coupes without soil conservation works in the subsequent year of felling, excessive grazing and repeated fires.

CHAPTER - III

UTILIZATION OF THE PRODUCE

3.1 AGRICULTURE CUSTOMS AND WANTS OF THE POPULATION

Gond prince of Deogad kingdom, Bhakt Buland, founded Nagpur in the early 18th century in the Chhindwara district. He tried to change the life of Nagpur as his new capital after seeing the advantage of civilized life of Delhi. His successor Chand Sultan too continued the work of Bhakt Buland. Disputes regarding succession arose with the death of Chand Sultan in 1739.

Maratha governor of Berar, Raghuji Bhonsle, tried to restore his elder son to the throne, and the control of Nagpur slowly passed on from the Gonds to the Marathas. Later Nagpur became the capital of the Bhonsles. Bhonsles lost to the British and Nagpur came under British influence in 1817. Raghuji III died without leaving any heir in 1853. As a result, the city came under the full control of British under Lord Dalhousie's Doctrine of Lapse.

Nagpur became the capital of the Central Provinces of India in 1861. With the advent of the Great Indian Peninsula Railway (GIP) in 1867, its development spurred as a trade Centre. 3.1.04 After Indian independence, Nagpur became the capital of Madhya Bharat state (C.P. and Berar). In 1960, the Marathi majority Vidarbha region was merged with the new state of Maharashtra and Nagpur was designated the second capital of Maharashtra state, alternating with Bombay as the seat of the Maharashtra state legislature.

After independence, it served as the capital of Madhya Pradesh till 1956, when reorganization of states was undertaken on language basis. Berar region was attached to Bombay State; and the Nagpur city lost its stature as a capital city. Subsequently, Maharashtra state was formed on 15t May 1960 and the Nagpur City was provided the stature of second capital of the State. The Nagpur district has been named after the name of Nagpur city. Nag river originates in the western part, and flows through the middle, of the city but because of the disposal of city wastage and effluents into it, the river is highly polluted and has practically lost its character.

3.1.06 Nagpur is also known for its strategic location as the central point of the country viz. the city of Zero Mile. It is well connected with other major cities of the country through an elaborate network of roads, rails and Airways.

The boundary of the Nagpur Forest Division is coterminous with the boundaries of Nagpur district. It extends over to 10,022 sq. km. as the Geographical Area, forming 3.23 percent of Maharashtra State; of which the forest areas extend over to about 2765 sq km; forming about 21.95% of its Geographical Area.

As per Socio-Economic Survey Report (March 2012) of Nagpur District, the population of Nagpur district as per 2011 census is 46,63,224; of which, 68.30 % live in the urban area while 31.70 % live in the rural areas. It forms about 4.19 percent of the total population of Maharashtra State. The rate of increase for the last ten years since 2001 census is 14.40 percent. The scheduled castes and scheduled tribe populations forms about 17.12 % and 10.93% of the total population of the district respectively.

Table No.3.1.

Taluka Wise Breakup of the Population of Nagpur District(As per census-2011)

S.N	Taluka	Are (in sq km.)	Male Population	Female Population	Total population
1	Narkhed	711.92	75970	72010	147980
2	Katol	909.02	84093	79748	163841
3	Kalmeshwar	503.73	62948	59507	122455
4	Savner	655.14	118867	110746	229613
5	Parshiwani	935.41	83685	69535	153220
6	Ramtek	1141.56	80473	77438	157911
7	Mauda	608.22	72449	67567	140016
8	Kamptee	392.19	123636	113718	237354
9	Nagpur(rular)	645.6	157377	145286	302663
10	Nagpur(city)	217.17	1222610	1178811	2405421
11	Hingna	782.94	128795	113839	242634

The density of population of the district is 470 persons per sq. km, which is more than the State average (365 persons/sq km) as well as the national average (325 persons/sq km). As per census figures, there are 948 women for every 1000 men in the district, which is more than the state average of 925, in this regard.

The average literacy rate of the district is 89.52 percent, comprising 85.07 percent for women and 93.76 percent men, whereas, the literacy rate in the rural and urban areas is 82.81 percent and 92.61percent respectively.

For administrative purpose Nagpur district has been divided into 14 talukas, comprising around 1869 villages, including 312 as the uninhabited villages, organized into 13 Panchayat Simittees and 776 village Panchayats (Socio-economic Survey Report March 2012).

The 2007 livestock census estimated 9.94 lakhs domestic cattle in the district. Cows 22.23 percent and bulls 25.58 percent; buffaloes 7.28 percent; goats and sheep contribute about 43.68 percent and others around 1.23 percent of the domestic animals. Most of these cattle graze in the forests, leading to their degradation, particularly, in the forest areas in the vicinity of the villages. The statement showing taluka-wise break-up of live-stock population in Nagpur district has been shown in the **Table No. 3.2**

Table 3.2.
Taluka Wise Breakup of the Live - Stock Population in Nagpur District (As per 2007 census)

Sr. No	Taluka	Cows	Bulls	Buffaloe	Sheep	Goats	Horse	Others	Total
1	Narkhed	16317	15607	3863	1312	24048	7	239	61393
2	Katol	21413	18871	4218	106	28087	4	172	72871
3	Kalmeshwar	12879	13247	3846	1463	25686	0	851	57972
4	Savner	17783	17753	2331	795	37480	2	1551	77695
5	Parshiwani	10703	12203	2584	90	23764	1	369	49714
6	Ramtek	17653	16894	5224	59	28575	0	169	68574
7	Mauda	11611	16359	4709	0	21174	3	201	54057
8	Kamptee	6908	10203	3075	0	19426	6	2246	41864
9	Nagpur (rula)	11055	9531	7864	1	17990	46	77	46564
10	Nagpur(city)	6690	982	6092	169	24009	110	1735	39787
11	Hingna	10477	9389	4043	1740	18700	4	744	45097
12	Umred	15783	19964	6202	1109	24618	62	905	68643
13	Kuhi	8755	23484	2304	1266	24629	14	35	60487
14	Bhiwapur	7197	17205	1017	1058	17056	0	148	43681

Total	175224	201692	57372	9168	335242	259	9442	788399
Percent(%)	22.23	25.58	7.28	1.16	42.52	0.03	1.20	100.00

Land use pattern of the district reveal that about 71.60 percent of the total geographical area is suitable for the cultivation; and about 5.76 percent constitutes the grazing lands. In addition, around 11.25 percent area was not available for cultivation. In the year 1998-99, out of the 706 thousands hectares areas suitable for cultivation, only 544 thousands hectares (77.05 percent) were sown under various crops; of which around 11.19 percent area was under double cropping.

The main agricultural crops are Jowar, Wheat, Rice, Pulses, Cotton, Tur, Ground-Nut, Chillies, linseed and Oranges. The paddy is the main crop grown in the district. There are over ten (10) Agricultural Produce Marketing Committees where the agriculturists bring their excess material for sale. In the Tribal Sub-Plan Areas, as per the (Maharashtra Tribal Economic Conditions Upliftment Act (1956), the Government has declared monopoly over the purchase of food grains as well as the minor forest produce with the exception of Tendu. The Maharashtra Government has recently passed an Act. called Maharashtra Transfer of Ownership of M.F.P. in the Scheduled Areas and the Maharashtra M.F.P. (Regulation of trade) (Amended) Act, 1997 as Act. No. XIX of 1997 on 10th December 1997. According to section 4 of the Ordinance the ownership of the M.F.P. found in the Government lands in the scheduled areas, excluding the National Parks and Sanctuaries, shall vest in the Village Panchayats within whose jurisdiction such area falls. However the ownership of M.F.P does not include the ownership of land or trees in that Panchayat areas. The list of M.F.P covered under the ordinance is specified in the schedule. Tendu, Apata, Bamboo have been excluded from the purview of this ordinance and still remain the property of the State Government.

There are 1 major project, 15 medium projects and over 48 minor irrigation projects, in the district. In addition to this, works of several medium and minor irrigation tanks are in progress. In spite of this, the irrigation facilities in the district are not sufficient to meet the irrigation needs of the district. In the year 1998-99 around 15.92% of cultivated area was under irrigation. The total irrigation capacity of these projects is 2,47,823 ha, whereas, in the year 2000-01 only 58139 ha was brought under irrigation forming about 23.36 percent of the capacity.

There are over 7,73,170 households in the district, including 3,13,700 households in rural areas and in the 4,59,470 households in the urban areas. About 600 villages inhabit in the vicinity of the forest areas; and over 60 percent of the inhabitants of these villages depend on the forests to sustain their livelihood.

The rural population consists mainly of agriculturists and agricultural labourers such as mahars, gondhs, kunbis, telis, etc. The way of 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 medicinal purposes.

3.2 WANTS OF THE PEOPLE

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. Teak poles are used for centring purposes as well as for making houses, sheds etc.

TIMBER & POLES: There is a great demand of Teak timber and poles above 15 cm girth. It is required for construction purposes and for making furniture for households and business enterprises. The most preferred timber species is Teak. People need timber wood for construction purposes, agricultural implements and furniture. Teak is the most preferred timber species. Besides teak, other species such as Bija, Ain, Tiwas, Haldu, Kalam, Dhaora, Bhirra, Lendia, Garari, Siwan and Bamboos are also used. For the manufacture of cart Teak is preferred for the body; Tiwas, Ain, Dhaman, Tendu for shaft; Dhaoda, Bhirra for axle; Tiwas, Kusum or Kadu for naves. For agriculture implements such as plough Tiwas, Khair and Babul are preferred in that order. Dhaoda and Dhaman are used for axe handles. Demand is heavy in intensively cultivated plains of Ramtek, Saoner, Narkhed, Kondhali, Katol and Umred talukas. In hilly areas of Deolapar and Khapa demand is limited.

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. Dhaman is usually used for axe handles and semal for dugouts. Salai, Mowai and Semallogs above 45 cm are preferred for packing cases. Semal logs above 75 cm are also used in match industry.

FIREWOOD: The demand for firewood has greatly increased throughout the division. Large quantity of firewood is consumed in Nagpur and adjoining urban areas. Dhaora, khair, ain, garari and bhirra are the main species used as firewood in the division. Due to heavy demand, even the inferior firewood of soft wood species like salai, mowai and dhoban are also extracted to fulfill the demand. Due to increase in number of small Dhabas on highway and in small townships, it is a common site to see a lot of local people collecting firewood from the adjoining forest and selling it to these dhabas. Local people heavily depend on the forests for their firewood, which is the main source of household fuel. Women carrying head loads of firewood is a common sight. Mushrooming of small hotels along the main roads has created demand for illegal supply of firewood. Local villagers usually remove dry fallen firewood on rated passes. However, it is a common sight to see the local people bringing head loads of firewood each day without passes from the adjoining forest areas, many a times by cutting the live trees as well.

BAMBOO: Bamboo is generally available in the forests of Parseoni, Khapa, Ramtek, Paoni, Kalmeshwar and Deolapar ranges. Bamboos are in great demand, locally, for providing support to fruit laden branches in the orange gardens and also for making mats, baskets and dholis. They are also use for making roofs and walls of their huts as well as the cattle sheds by the local inhabitants. It is also used as scaffolding material. The local people use bamboo for a variety of purposes. Each family in villages under the nistar settlement is entitled to fifty bamboos at the nistar rates. Heavy demand for bamboos and the bamboo products provokes large-scale illicit cutting of bamboo.

GRAZING: The cattle population has gone up many times in recent times while the carrying capacity of forests has remained the same. As a result there is lot of illicit grazing in the forests. Even goats and sheep have been found grazing in the Reserved Forests. The demand for grazing is heavy in Kondhali, Narkhed , Hingna, Kuhi Butibori, Katol and South Umred ranges. The grazing incidences in these areas are far beyond their carrying capacity leading to their deterioration in the process. Many Kathiawadis people with their large herds of cattle also settle near the large water bodies in these areas and frequently graze their cattle unauthorized, both, in the Reserved Forests and the protected forests including the grass-birs and kurans of this division. Unauthorized grazing by the Kathiawadis and the local inhabitants is the main reason of deterioration of site conditions and carrying capacity of forest areas near the habitations. The issue requires a comprehensive strategy and approach for satisfactorily addressed, which is the sole cause for lack of regeneration and degradation of site conditions of majority of forest areas in this region.

NON TIMBER FOREST PRODUCE: The main NTFPs required by the villagers from the forests are Moha flowers and seeds, fruits, gum, bark, flowers, fibers, roots, leaves, thorns etc. Leaves of teak, palas, palasbel, mahul and mahua are used for various purposes such as for making donas, plates, patrabalis and covering the roofs of cattle sheds. The thorny branches of ber, bharati, babul, chilati, eruni, ghot, hiwar, kharasi etc. are used for fencing purposes to protect the crops from both the domestic and the wild animals. The vegetable growers use the thorny branches of dikamali and khakri as support for beans creepers. Cordage and lashing are made out from the bark of kuda, palas, mahul and piwarbel.

3.3 OCCUPATION AND INDUSTRIES:

Besides agriculture, many small occupations and industries in the villages and the urban areas depend on various type of forest produce harvested from the forests. Orange gardens in Narkhed, Katol, Kalmeshwar, Saoner and Hingna talukas extensively use small poles and bamboo for supporting fruit-laden tree branches. Bamboo baskets or soft wood packing cases are also required for packing the

oranges for transport to other areas. Similarly, Betal pans growers in Ramtek taluka need small poles or bamboo for spreading the climbers.

As the bamboos are confined to a few ranges in the division. It is not possible to fulfill the entire bamboo requirement of the people from the forests of Nagpur division.

Bidi making is an important small scale industry in this area. Kamptee and Nagpur are the important bidi manufacturing Centre's in the division. They depend solely on the forests areas to provide for the raw material- tendu leaves- required for wrapping tobacco. Moreover, tendu leaves collection is a main source of employment for rural poor and tribal living in the vicinity of forest areas.

There are over 522 sawmills in the Nagpur district which depend on the forests areas of the division for regular supply of timber. A large quantity of timber, mainly teak, is consumed by these sawmills and the furniture shops in the rural and the urban areas. Furniture industry and carpentry provide job opportunities to the hundreds of skilled carpenters engaged in furniture making, joinery works, house construction etc. In addition, veneer and plywood board industry requires good quality teak and other miscellaneous species from the forest areas of this division for their sustenance and balanced growth. These sawmills are increasingly being dependent on the material being brought from the private land holdings.

3.4 COLLECTION OF NON WOOD FOREST PRODUCE:

Some of the villagers, living nearby the forests, collect various NWFPs such as moha, charoli, gum, honey, roots, bark, leaves etc. and sell them locally. Firewood, bamboos and grass are also collected on rated passes and sold locally. Most of the dhabas along the highways and hotels and shops in rural areas use firewood as a fuel for their preparations. Collection of NWFPs constitutes a substantial part of the income of tribal populations and other inhabitants living in and around in the vicinity of the forest areas.

3.5 MARKETS AND MARKETABLE FOREST PRODUCE

Markets: The forests of Nagpur are rich in valuable timber species, like, teak, bija, saja, haldu, kalam, rohan, bhirra, dhaora etc. The various products such as timber, poles, firewood and bamboos, after extraction from the forest coupes are brought to the forest depots for sale by public auction. The timber and other forest produce is partly consumed locally and mostly exported to Mumbai, Pune, Chennai, Kolkata, Delhi, Raipur and other consuming centres in the country. For local supply Nagpur, Kondhali, Umred, Hingna, Katol, Saoner, Kamptee and Ramtek are the main market Centre's.

The major timber depots of Nagpur division are at Paoni, Nara, Sirmi, Ambazari, Umred and Seoni. In the forest depots the timber is arranged species-wise, in distinct girth and length classes for the purpose of formation of lots for sale. After formation of the lots, grading of lots in distinct quality classes is done by the senior officers in the rank of Assistant Conservator of Forests. Deputy Conservator of Forests proposes the upset price for each lot on the basis of the grading proposed by the Assistant Conservator of Forests and the prevailing market price.

Firewood and bamboos are also brought to these depots for sale by public auction. Indora is a major bamboo depot in the division. The nistar material is also supplied from these depots. The forests area of this division is, however, inadequate to meet the fuel wood, bamboo and other nistar needs of the people of the district.

Various NTFPs such as gum, moha fruits, charoli, amla etc. are sold in various weekly markets held throughout at various places in the division. Tendu leaves also find their way in the market centres in Gondia, Bhandara, Pune and other major cities in Maharashtra, Gujarat and Andhra Pradesh. The materials seized, as a result of offence cases, are usually sold at the temporary depots at the range or round headquarters.

TIMBER AND POLES: Teak wood is in the maximum demand due to its multiple utility and durability and material of any dimension is saleable. The timber and poles of Bija, Tiwas, Haldu, Saja, Chichwa, Shisham, Siwan, Dhaman, Khair,

etc. are also readily saleable. Due to steep rise in the prices of the teak and superior miscellaneous species, the species like Dhaora, Bhirra, Rohan, Kahu, Kusum and Kasai are also in demand. The softwoods species like Salai, Mowai, Semal, etc. are usually used for the purpose of making of the packing cases. Semal logs over 75 cm girth provide raw material for match making industry. Poles of Teak, Garari, Lendia and Dhaora are in demand; and are mainly used for making agricultural implements, rural housing, sheds etc. The production of timber in Nagpur Division for has been given in the **Appendix No. LXIV**

FIREWOOD: Due to increase in population, the subsistence need and market demand for firewood has gone up, over the years. Almost all the villagers in and around the forest areas entirely depend on firewood for their household energy needs. Small dhabas and hotels along main roads and in small towns also consume firewood to a large extent. The wood of species like Garari, Dhaora, Salai, Mowai, Palas and Dikamali is considered as good firewood because of their high calorific value. In the depots, fuel wood is normally stacked in beats of 2m x 1.20m x 1m dimension and sold in the open public auction. The average annual productive potential of the fuel wood in the Division is 30,500 cu m.

BAMBOO: Bamboo is mainly found in Khapa, Parseoni, Ramtek and part of Deolapar ranges. *Dendrocalamus strictus* is the main species found in the forests of this division. It is used by the burads for making mats, baskets, that as etc. During the year 1997-98 over 3,62,548 bamboos was harvested in the entire division.

TENDU LEAVES: Nagpur is a major tendu leaves producing division and earns substantial revenue for the state exchequer. There are 33 tendu units in the division having annual productive potential of over 56,200 standard bags amounting to over Rs. 8.00 crores revenue for the division per year. The total tendu collection during the last ten years & revenue realized has been given in the Volume II of this working plan. Tendu leaves collection and bidi making are the major employment generating occupations for the people in the division.

GRASS: The main grass species used as fodder in the division are paonia, sheda, marvel and mushan. Due to tremendous pressure of livestock on the adjoining forest areas the productive capacity of the forests for quality grasses have been

severely affected. The productivity of even the kurans and grass-birs has been seriously impaired due to excessive unregulated grazing by both the local and the kathiawadi cattle. The khus grass is usually used for making the mats which are used in coolers in summer.

MAHUA FLOWERS AND SEEDS: Mahua flowers and seeds are collected by the villagers who use them partly for their domestic consumption while the excess quantity is sold to supplement their incomes. The other NWFPs such as gum, lac, wax, honey, fruits, roots, bark, fencing material etc. are mainly collected by the villagers for their domestic bona-fide use. **3.5.12 MINERALS:** The Nagpur forests are rich in mineral deposits. Manganese, coal, dolomite are the important minerals found in the division. However, after the enactment of the Forest Conservation Act 1980, prior approval of Government of India is required for mining or quarrying in the forest areas. Instances of illegal quarrying have also been noticed in the division. The issue requires serious attention and focus of the department for its satisfactorily addressal.

3.6 LINES OF EXPORT

The division has very good network of rails and roads and are being used in transporting forest produce and movement of manpower in the division.

RAILWAY AND ROADS

The broad-gauge railway lines which pass through the division are Calcutta-Bombay via Raipur and Delhi-Chennai main lines as well as the Nagpur-Ramtek branch line. Three narrow gauge railway routes passing through the division are Nagpur-Nagbhir (Distt. Chadrapur) via Umrer and Nagpur-Chhindwara via Saoner. These railway lines help carry forest produce to various consumption centres both within the state and in the country.

3.6.03 The division is well connected by a network of 'National and State Highways' These are extensively used by timber merchants for transport of timber, firewood and other forest produce to the market places within the state and elsewhere in the country. There is a very good network of forest roads, metaled as well as fair-weather roads, throughout the division.

3.7 METHODS OF EXPLOITATION AND THEIR COST.

AGENCY FOR HARVESTING

With the abolition of the contractor system for timber harvesting vide Government Resolution R & F D No. FCT/1581193544-F-I dated 4.4.1981 forest coupes are worked either through the Forest Laborers Co-operative Societies (FLCS) or directly by the Forest Department by engaging local labor. Annual coupes of other subsidiary cultural operations are normally worked departmentally and the produce obtained is disposed of by public auction.

METHODS OF FELLING AND EXTRACTION

As per practice, the vogue in the Department, marking of the coupes due for working is done a year in advance. Estimates are prepared and approved by the competent authority as per due process before starting the coupe operations. The harvesting is normally undertaken after the rainy season.

Trees marked for felling are categorized as timber or fuel wood trees for the purpose of volume estimation of timber and fuel wood. The local volume tables are used for preparing the estimated volume of the timber and the fuel wood; expected to be harvested from the coupes. Chalk timber is sold separately.

The timber and pole wood trees are felled first; followed by firewood species. Saw is used for felling and conversion of timber while axe is used for fashioning purposes. After conversion of the felled trees into logs of merchantable sizes, their measurements are taken after carting to the jungle depot and are embossed at the butt end of the logs using digit nails. The volume read off from the ready reckoner along with the tree number and the log number are also embossed on the butt end.

The firewood is cut into billets of length 1.2 m and stacked as standard sized beats 2 meter long, 1.2 meter wide and 1 meter high. The beat stacks are normally formed in distinct girth classes. After taking entry in the jungle register, timber, poles and firewood are transported to the main sale depots. At the depots, the logs are measured again and assigned new serial numbers. The difference in two

measurements reconciled later to ensure the accuracy of the material produced in the coupes and transported to the sale depot.

3.8 COST OF HARVESTING

All the coupe operations ranging from coupe marking to the transport of forest produce are carried out at the rates fixed by the Wage Board, for the current year. While fixing the wage rates for harvesting operations, wages sanctioned by the Government of Maharashtra and cost of living allowance (Rahniman Bhatta) are also taken into consideration.

BAMBOO: The bamboo is extracted from the coupes departmentally using local workforce as per prescriptions of bamboo working. The rates for cutting, fashioning, stacking and transporting are fixed by the Wage Board.

TENDU LEAVES: Tendu leaves trade has been nationalized by Government of Maharashtra Act No. LVII of 1969. These are in total 33 tendu units in the division, which are sold on lump-sum basis by way of open tender. The rates of collection of tendu leaves and target are fixed by the Government. The collection charges for tendu leave on Govt. land and private land is fixed by Government. The tendu leaves after collection by the local villagers are purchased from them by the agents of the tendu contractor at the collection centers known as phadis. The leaves after drying and curing are packed in gunny bags. A bag containing 1000 pudas is known as a standard bag. Thereafter, the gunny bags are transported from the phadis to the approved go-downs for storage and subsequent transport to consumption centres.

The other NTFPs such as Gum, Sitaphal etc. are being sold by public auction. The Maharashtra Government has recently passed an ordinance called Maharashtra Transfer of Ownership of M.F.P in the Scheduled Areas and the Maharashtra M.F.P (Regulation of trade) Ordinance, 1997 as Ordinance No. XIX of 1997 on 10th December 1997. According to section 4 of the Ordinance the ownership of the M.F.P found in the Government lands in the scheduled areas, excluding the Nagar Panchayat and Samittee, shall vest in the Panchayat within whose jurisdiction such areas falls. However, the ownership of M.F.P does not include the ownership of land or trees in that Panchayat areas. The list of M.F.P covered under the ordinance is specified in the schedule. The species of state significance such as Tendu, Apata and Bamboo have been excluded from the purview of the ordinance.

GRASS: The grass from Grass birs, closed coupes and plantation areas are available on cutting basis. As per existing Government order annual lease of grass birs for removal of grass on cutting basis, is first offered to Gram-Panchayats, Co-operative societies and other Public Bodies at a price fixed by Forest Department considering current market trend and the availability of grass. The lease of grass birs which could not be disposed of in this way is sold by auction. Grass from the birs which could not be allotted to Societies or sold by auction is sold on rated passes. In the drought year the grass from grass birs is kept reserved under the order of the Collector and is cut and supplied to the drought affected areas. Due to excessive cattle pressure the site conditions of grass-birs have been deteriorated severely; and hence are not in position to meet the demand of the entire division as well as to fulfill objective of producing quality grass in their present shape.

3.9 PAST AND CURRENT PRICES

Due to the increase in construction activities coupled with increasing requirement for furniture items for house interiors the demand for timber is steadily going up. As the supply position is not commensurate with the demand, the price of timber has shown a steep rising trend, over the years.

CHAPTER - IV

STAFF AND LABOUR SUPPLY

4.1 STAFF

The present Nagpur Division constitutes a part of the original Nagpur Forest Division which was reorganized on 24.12.1959 by delineating the forest areas of Wardha district as a separate unit of forest management. It is coterminous with the district boundaries having its headquarters at Nagpur. It is headed by an officer in the rank of the Deputy Conservator of Forests. The statement showing the names of Dy. Conservator of Forests, Nagpur Division has been shown in **Appendix No. VI**.

Further reorganization of the Forest Department was done in 1981-82 with a view to remove unwieldiness of administrative charges by making them compact and manageable units for efficient administration. Government of Maharashtra vide its G R No FDN-1081/76/03-F-2, dated 11.6.1981 sanctioned reorganization of ranges, round and beats with effect from 1.9.1981. The new posts of accountants were created vide G R No FDM-1879/17-F-2 dated 11.6.81 and each range was provided with an accountant to cope with the increased quantum of work and to increase the efficiency in the range offices. One post of Junior Statistical Assistant was created in each Division vide Government Resolution No. FDM-I081/76710-F-2 dated 12.5.1981, to have timely and accurate statistical data needed for the formulation and implementation of forestry development programs and diversifying the forest management.

Jawla Prasad's plan (1990-1991 to 1999-2000 and extended up to 2003-2004) had also proposed bifurcation of the division into two - North Nagpur Division and South Nagpur Division. As per this proposal, the two divisions were to be formed as follows:

Designation	North Nagpur	South Nagpur
DCF	1	1
ACF	3	3
Ranges	8	7
Round	34	29
Beats	169	157
Mobile Squads	1	1
Depots	2	2

On the basis of recommendations made by the Tata Consultancy Services, administrative charges up to the Range levels have been further reorganized into two distinct categories, namely, the 'Protection charges' and the 'Development charges', since 2000. The objective is to optimize the workload at the Beat, Round and Range levels with a view to improve efficiency of performance and ensure accountability in the discharge of assigned duties and functions.

Nagpur Division has sanctioned strength of 1424 posts in total, including 1337 permanent posts and 87 temporary posts in the 26 designated categories, ranging from the Deputy Conservator of Forests to the Van Majoor. The details of the staff and the manpower, in the Division, as on date, are given in the **Table No. 4.1** below.

Table No. 4.1. Present staff position in the Nagpur Division

The Staff Position in Nagpur Forest Division							Statement showing sanctioned filled up & Vacant post in Nagpur Forest Division		
Sr. No.	Group	Designation	Pay Scale in Rs.	Permanent Posts	Temporary Post	Total	Sanctioned	Filled up	Vacant post
1	A	Dy.Conservator of Forests, Nagpur Forest Division, Nagpur	15600 -- 39100 Grade pay 7600/-	1	0	1	1	1	0
2	A	Astt. Conservator of Forests.	9300 -- 34800 Grade pay 5000/-	6	0	6	6	5	1
	Total	Group A	--	7	0	7	7	6	1
3	B	Range Forest Officer	9300 -- 34800 Grade pay 4400/-	13	2	15	15	14	1
4	B	Office Superintendent	9300 -- 34800 Grade pay 4400/-	1	0	1	1	1	0
	Total	Group B	--	14	2	16	16	15	1
5	C	Chief Accountant	9300 -- 34800 Grade pay 4200/-	1	0	1	1	1	0
6	C	Accountant	5200 -- 20200 Grade pay 2800/-	15	4	19	19	19	0
7	C	Senior Statistical Asst.	9300 -- 34800 Grade pay 4300/-	1	0	1	1	1	0

8	C	Surveyor	5200 -- 20200 Grade pay 2400/-	2	0	2	2	2	0
9	C	Clerk	5200 -- 20200 Grade pay 1900/-	21	9	30	30	27	3
10	C	Forester	5200 -- 20200 Grade pay2400/-	93	17	110	110	97	13
11	C	Forest Guard	5200 -- 20200 Grade pay 1800/-	300	38	338	338	322	16
12	C	Driver	5200 -- 20200 Grade pay 1900/-	6	0	6	6	6	0
13	C	Mini Train Driver	5200 -- 20200 Grade pay 1900/-	1	0	1	1	1	0
14	C	Mini Train Guard	5200 -- 20200 Grade pay 1900/-	1	0	1	1	1	0
15	C	Police	5200 -- 20200 Grade pay 1900/-	0	1	1	1	0	1
Total		Group C	--	441	69	510	510	477	33
16	D	Naik	4440 -- 7440 Grade pay 1600/-	1	0	1	1	1	0
17	D	Peon	4440 -- 7440 Grade pay 1300/-	3	2	5	5	5	0
18	D	Daftari	4440 -- 7440 Grade pay 1600/-	1	0	1	1	1	0
19	D	Chaukidar	4440 -- 7440 Grade pay 1300/-	10	4	14	14	12	2
20	D	Mali	4440 -- 7440 Grade pay 1300/-	2	4	6	6	6	0
21	D	Tractor Cleaner	4440 -- 7440 Grade pay 1300/-	2	0	2	2	1	1
22	D	Mini Train Cleaner	4440 -- 7440 Grade pay 1300/-	1	0	1	1	1	0
23	D	Khansama	4440 -- 7440 Grade pay 1600/-	1	2	3	3	3	0

24	D	Khansama cum Chaukidar	4440 -- 7440 Grade pay 1600/-	0	1	1	1	1	0
25	D	Safaigar	4440 -- 7440 Grade pay 1300/-	1	0	1	1	1	0
	Total	Group D	--	22	13	35	35	32	3
26	D	Vanmajur	4440 -- 7440 Grade pay 1300/-	853	3	856	0	0	0
	Total			853	3	856	0	0	0
	Total	Group A+B+C+D	--	1337	87	1424	568	530	38

4.2 LABOUR SUPPLY

The erstwhile forest villages, which were established with the object of supplying adequate and assured labor for the various forestry operations have since been declared as revenue villages vide Govt. Notification No FLD 4207/ 1- Y dated 23.05.1967 and 3675/87519- F-6 dated 24.6.1977. Administration of these villages, at present, lies with the Revenue Department. However, laborer's from these villages are continued to be engaged for various forestry works in the Division.

The labor supply in general is inadequate, especially, in the compact blocks of Deolapar, Parseoni, Ramtek, South Umrer, Hingna and Kondhali ranges, because of the less population density due to remoteness of the area. The forestry works are not usually affected by the dearth of workforce except during the months of July and August when the kharif crop is planted; and in the month of November when it is harvested. At times, laborer's brought from the adjoining districts, to complete the plantation works. However, with suitable planning and adequate scattering of work center's laborers can be made available for all forestry works. JFM Committees should be actively involved in all forestry works to address the issue of labor shortage during critical periods.

CHAPTER - V

PAST SYSTEMS OF MANAGEMENT

5.1 GENERAL HISTORY OF MANAGEMENT

Nagpur was under the control of Maratha till 1854, when the district was lapsed to British under the Doctrine of Lapse. Short-term settlements of land revenue were carried out during the Maratha rule by the appointment of Mamlatdars who collected the land revenue. British government conferred Zamindari rights on the persons who had held possession of land for a long time and were capable of paying the land revenue.

Forests were open to uncontrolled felling and unregulated grazing by anyone paying the prescribed fee to those having the proprietary rights over the land. Though the fee for removal of forest produce fetched considerable revenue however forest management was not introduced by such zamindars. Furthermore, the areas near villages were excessively harvested and grazed upon. Practice of shifting cultivation was also common.

Protection of these forests was considered essential and regular forest management began with survey, demarcation and map preparation of forest areas in 1862. The same year was the beginning of the Forest Department in Nagpur.

Forest produce constituted a major source of revenue for the government. After enactment of the Indian Forest Act in 1878 large tracts of good forests in possession of the malgujars and zamindars were declared as Reserved Forests in 1879 while the remaining forest areas continued with them for management and use. Trees of superior species like teak, bija, shisham, kusum, haldu and kullu were reserved, and their removal without license was prohibited. The felling of fruit trees was also banned. However, absence of any felling regulation resulted into over-harvesting in accessible areas, while inaccessible areas remained unworked. The working plan for management of Reserved Forests of the Nagpur Division was introduced in 1895 and, since then, six working plans have been implemented in division (Table 5.1).

Table 5.1.

List of working plans for the Reserved Forests of Nagpur Division

S.N.	Working plans in chronological order	Plan period
1.	Dobbs' Working Plan	1895 - 1912
2.	Shri Dunbar Brander's Working Plan	1912 - 1934
3.	Shri P. Sagreiya's Working Plan	1935 - 1946
4.	Shri R. Mishra's Working Plan	1947 - 1964
5.	Shri G. Thosre's Working Plan	1965 - 1980
6.	Shri Jwala Prasad's Working Plan	1990 - 2000
7.	Shri Jarnail Singh & S.S. Mishra	2004 - 2014

Management of the Reserved Forests of the Nagpur Division can be categorized into three distinct periods:

1. Pre-reservation period from 1853 to 1878,
2. Early reservation period from 1879 to 1895, and
3. Forest management under regular working plans since 1895.

With enactment of the Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahals and Alienated Lands) Act, 1950, rights over private forests under zamindars were vested in the state government with effect from 1st April 1951. Good forest patches in ex-proprietary lands were subsequently transferred to the Forest Department for the management. Such forests were notified as Protected Forests under Section 29 of the Indian Forest Act, 1927. Subsequently, some of these Protected Forests were notified as the Reserved Forests under Section 20 of Indian Forest Act, 1927. While the Reserved Forests were scientifically managed for more than a hundred years, the Protected Forests were brought under working plan management at a much later stage.

5.2 FIRST WORKING PLAN BY DOBBS: 1895 TO 1912

The first Working Plan for management of 718 square miles of forests of the Nagpur division was prepared by Dobbs in 1895. The Nagpur Division was divided

into five ranges, and separate plans were prepared for each range. Working circle allocation was based on stocking and accessibility of the forest crops. Degraded areas having scanty tree growth near villages were set aside as permanent pasture. The remote forests were opened for removal of poles and the areas having demand for timber, firewood and grazing were divided into different felling series, each containing 30 compartments serving as annual extraction coupe. Removal of bamboo, dry firewood and grass was permitted on license. The management aimed at providing a regular supply of straight and sound poles of valuable species. To this end, improvement felling were prescribed. The system of improvement felling was changed to coppice-with-standard system In 1906-07.

Only half of the coupes could be worked during the currency of the plan. Cultural operations prescribed in the plan were not carried out in the worked coupes. Due to excessive removal of poles from the coupes, growing stock became considerably irregular and deficient in stocking. Attempts to restock blank areas, especially, in the Pench range by sowing grass seeds and teak seeds were found unsuccessful.

5.3 SECOND WORKING PLAN BY DUNBAR BRANDER: 1912 TO 1935

Dunbar Brander revised the Dobbs plan for the Reserved Forests of the Nagpur Division. He divided the entire forest into three working circles, namely, the Teak Working Circle, the Mixed Working Circle and the Grazing Working Circle.

TEAK WORKING CIRCLE: The forest comprising of good quality teak forests in the trap zone were assigned to this working circle and were divided into 8 felling series having 45 coupes in each. The treatment prescribed was to reserve at least 20 promising trees per acre and to coppice the rest of the crops.

MIXED WORKING CIRCLE: All the areas containing tree growth of miscellaneous species, poor teak areas and scattered patches of better teak were allotted to this working circle. Coppice with standard was the silviculture system adopted. Out of the 21 felling series formed; 5 felling series were not worked due to lack of demand; while each of the remaining felling series was divided into 30 coupes. The treatment prescribed was to reserve at least 30 of promising trees per acre as standard and to clear fell the rest of the crop. However, the following conditions were prescribed for strict compliance. In felling series I to VII of East Pench ranges, all well grown salai trees of 4 l;h ft girth and under were not be felled. These salai trees were not to be included within the prescribed number of standard.

In felling series I to V and VIII to X of East Pench ranges and in felling series II to V of West Pench ranges, teak trees in these areas were not be felled under the ordinary coppice felling. The felling of teak in these areas was to be confined to a purely cultural operation with the object to increase the stocking of teak in the crop.

Sowing of teak seed in the medium and well-stocked areas of the mixed forests in the Pench range was also prescribed to increase the proportion of teak in the stocking.

GRAZING WORKING CIRCLE: The degraded areas incapable of producing good timber as well as isolated patches of forests near the villages were allotted to this working circle to meet the increasing demand for grazing. No felling were prescribed in this working circle, but it was laid down that if demand arose, the tree growth could be harvested with the sanction of the Conservator of Forests.

MODIFICATION IN THE PRESCRIPTIONS OF MAIN FELLING: The felling rules were modified in 1922-23 when it was found that it was not desirable to leave a minimum no of trees per acre as standard in the teak and mixed working circles. Retention of trees was considered necessary only as seed bearers and for obtaining increment in the standards and it was prescribed that only vigorous saplings of the more valuable species under a prescribed girth limit should be reserved. In 1927-28, it was found that the annual yield in certain felling series was exceeding the demand, especially, for fuel wood in the areas. It was also feared that the short cycle of 30 years, on which some of the forests were being exploited, might weaken the stools to produce vigorous coppice reproduction in the next rotation. The prescriptions were therefore, modified as follows;

- 1.Kondhali mixed felling series I, worked on a cycle of 30 years, was split into two felling series with 45 annual coupes.
- 2.In West Pench felling series II, only half a coupe was to be worked each year.
- 3.In Hingna teak felling series II, mixed felling series I, West Pench felling series the Arvi-Kondhali, and I felling series only two third of a coupe was to be worked each year.
- 4.Umrer mixed felling series II was divided into two felling series with 30 annual coupes in each.
5. At the same time the system was changed from coppice with-standard to simple coppice in Teak.

No clear rules were laid down for the transition felling but the inspection of worked areas, showed that they aimed at the removal of malformed, dead and dying trees to improve the hygiene of the crops.

In 1928-29, prescriptions for the forest of the East Pench Ranges were again modified. Dense and moderately dense patches of teak, bija and ain, attaining a height of more than 50 at maturity, were to be subjected to crown thinning. All groups of advance growth of areas of teak and mixed forest were to be clear-felled as far as the demand justified it but no felling were to be made in poor open forests.

INTRODUCTION OF THINNING

During a review held in 1924-25, it was found that some of the forests were becoming too dense. Thus it was decided to introduce thinning as a silvicultural measure. 10-year thinning cycle was prescribed before and after main felling at the ages 10, 20 and 30 year in the teak forest worked on 45 years rotation. Of these thinning those prescribed 10 years before the main felling in the mixed forests and those at the age of 20 years in teak forests were optional and were to be carried out only if silviculturally necessary while the other were compulsory. The prescriptions given in the plan helped to improve the forest but there were some shortcomings.

(a) In coppice-with-standard system the reservation of a prescribed minimum number of uniformly distributed standards was not always possible and this resulted in the retention of many unsuitable stems in the poorer forests and the sacrifice of many immature trees of valuable species in better forests. Also the standard retained occupied more growing space and developed knotty boles and epicormic branches.

(b) Simple coppice system tried in teak and mixed forests led to sacrifice of a large number of young and middle aged trees unduly exposed the soil leading to growth of grasses and weeds. Moreover, incidences of serious fires resulted in severe damage to the regeneration and the growing stock.

(c) Transition felling though gave satisfactory results but as the prescriptions were vague, the felling were not done in a uniform manner. Thinning introduces since 1924-25, had been heavy and in some areas amounted to regeneration felling and exposed the soil.

5.4 THIRD WORKING PLAN 1935-36 TO 1946-47

The first systematic Working Plan based on the result of stock mapping was written by K.P. Sagreiya. The entire forest was stock mapped on 4"=1 mile scale and classified into tree, scrub and miscellaneous forests. The entire area was divided into five (5) working circles. A few compartments in each working circle were kept unallotted over which no coupes were laid out either to provide facilities for grazing or because of lack of demand. The distribution of area by working circle is given in the Table 5.2.

TABLE 5.2.
Distribution of areas in various working circles in Sagreiya's Plan

(i)	Improvement working circle	13396.451 ha.
(ii)	Conversion working circle	14888.948. ha.
(iii)	Coppice – with – Reserve working circle	85128.226 ha.
(iv)	Open Pasture working circle	11648.956 ha.
(v)	Miscellaneous working circle	
	(a) Grass birs	3701.896 ha
	(b) Forest villages	3939.088 ha.
(vi)	Bamboo (overlapping) working circle	
(vii)	Semal (overlapping) working circle	
	Total Area	132703.559 ha.

TREATMENTS PRESCRIBED

IMPROVEMENT WORKING CIRCLE: Area under this working circle was confined to the remote and hilly tracts of forests in both the Pench ranges. The treatment prescribed was to improve the crop by removing the unsound and malformed trees along with the inferior species interfering with the growth of valuable species. The working was to be mainly confined to the teak patches and to such areas of miscellaneous forests as can be profitably exploited. The felling cycle was fixed as 24 years. No cultural operations were prescribed after felling.

CONVERSION WORKING CIRCLE: All areas containing teak of site quality III and IV (a) were included in this working circle. A rotation of 72 years was fixed and each felling series was divided into 72 coupes. The first 24 coupes from (1 to 24) containing mainly mature trees were to be taken up for main-felling.

If the coppice was sufficient to restock the area, the clear felling was prescribed while retaining the young recruits and advanced growth. In areas lacking established regeneration, thinning was to be carried out. The balance 48 coupes which were not allotted to the regeneration block were called the un allotted areas. Coupes 25 to 48 contained middle age crop while coupes 49 to 72 contained young crop. In one coupe from both these groups improvement felling and light crown thinning were to be carried out annually in favour of the age class to which the group belonged.

The improvement cum thinning operations prescribed in the un allotted areas resulted in over felling and adversely affected the future crop. While the rotation of 72 years was found to be shorter for forests in the Pench ranges it was found to be higher for the forest tracts in Kondhali, Hingni and Urnrer ranges.

COPPICE-WITH-RESERVE WORKING CIRCLE: All quality IV areas suitable for the production of firewood and poles were allotted to this working circle. A rotation of 48 years was prescribed and the felling series were classified as mixed or teak.

All the trees except the following reserved trees, existing individually or in groups, were prescribed for felling in these areas.

1. In poor and open area all healthy trees of any species were to be retained.
2. All healthy fruit species were to be retained.
3. All seedlings and saplings of the species except garari up to 23 cm in girth were to be reserved.
4. Groups of well grown, healthy immature trees of timber species were to be reserved and thinned, wherever, necessary.
5. A belt of trees along nalas and rivers were to be retained.
6. Well grown poles of miscellaneous species were to be retained in areas where teak tended to be pure.

In teak felling series two thinning were to be carried out in the 16th and 32nd year after main felling. The first thinning operation consisted of light crown thinning, climber cutting and removal of inferior species interfering with teak except where teak tended to be pure. In the second thinning, the aim was to induce rapid girth increment on the stems retained for the future and for this purpose, heavy crown thinning was to be carried out. The crown of all well grown teak trees had to be freed but no growth below the level of this crown was to be thinned as congestion in the lower canopy was desirable to prevent the growth of epicorpic branches in the dominant trees. In the mixed felling series one thinning at half the rotation age viz.

24 years was prescribed, as miscellaneous species were slow growing. A light crown thinning was to be carried out to favour the vigorously growing poles of the more valuable timber species and coppice shoots were to be reduced to one or two per tool. However it was prescribed that these thinning were to be carried out only in these areas where it was absolutely necessary. Cutting back operation in the year following the main felling was also prescribed.

PASTURE WORKING CIRCLE: The forest areas close to habitations and incapable of producing valuable timber were included in this working circle. The main object was to improve the pasture by periodic closure to grazing assisted by felling. In total 27 grazing units were formed; out of which only 23 were divided into 4 coupes each, namely, A B, C and D. After carrying out felling with the object of improving the pasture and of removing over mature trees if present, each worked coupe was to be successively closed to grazing for a period of 4 year. All dead, dying and over mature trees prone to decay were to be removed by working Y4 of the coupe every year. 0 grade thinning was to be carried out in the dense patches of forests found in these coupes.

The temporary gain obtained by periodical closure was lost soon after the area was opened to grazing because of excessive grazing. This led to the growth of weeds like tarota, rantulsi and poor quality grasses.

MISCELLANEOUS WORKING CIRCLE: All grass birs and forest villages were included in this working circle. The forest villages were to be managed as per the prescription in the paragraph 68 and 69 of Central Provinces Forest Manual.

BAMBOO (OVERLAPPING) WORKING CIRCLE: Bamboo occurs in appreciable quantity only in the Pench Ranges and hence Bamboo overlapping working circle comprising of these areas was formed. An area of 30185.12 ha in the East Pench Ranges and 28722.99 ha have in the West Pench Ranges, were divided into 4 coupes each. Cutting cycle of 4 year was prescribed. The felling rules prescribed were, as follows;

1. No culms, less than one year old, were to be felled.
2. The height at which culms were to be cut should not exceed 45 cm from the ground.
3. A minimum of 8 culms over one year of age was to be retained in each clump.
4. As far as possible no dead bamboo was to be left in any clump.
5. The digging of rhizomes was prohibited.

SEMAL (OVERLAPPING) WORKING CIRCLE: Due to the increase in demand for semal wood for match industries, an overlapping working circle was created in the East Pench Range except in compartment number 405. The whole area was divided into 20 coupes, which were to be worked on a 20 years felling cycle. Semal trees above 40 cm diameter were to be marked for felling. However no coupes could be worked as the contractors were not ready to fell a few trees occurring on vast areas. Due to the sudden increase in demand for semal trees in 1943-44, the semal trees were harvested departmentally and supplied to contractors at railheads.

The on-going world war II caused a heavy demand for timber and, hence, heavy thinning were carried out over larger areas and as a consequence best stems were harvested to meet the demand during the period from 1940-41 to 1945-46.

5.5 FOURTH WORKING PLAN 1947-48 TO 1964-65

The Sagreiya's Plan was replaced by the B. R. Mishra's Plan. As the stock maps were found to be accurate after carrying out field inspection, they were adopted after changing only the age classes. The entire forest areas was classified on functional basis as per Chief Conservator of Forests, Madhya Pradesh Memo no. 5079 dated 28/9/1946 into Protection forests, Trees forests, Minor forests, Pasture forests and Miscellaneous forests. The following working circles were prescribed for treatment of forest crops;

Table 5.3.
Distribution of working circles in Misbra's Plan

S. N.	Name of Working circles	Area (in ha)	Number of felling series formed
1	Protection Working Circle	9428.411	5 F.S. to be worked under a felling cycle of 24 years.
2	Pench High Forest Conservation Working Circle	24042.691	5 F.S. to be worked under a conversion period of 80 years
3	General High forest Working circle	6339.573	2 F.S. to be worked under conversion period of 60 years.
4	Coppice-with-Reserve Working circle	76050.179	32 F.S. (30 full and 2 part) to be worked on rotation of 48 years. (The other part of the 2 F.S. lies in the Wardha Division).

5	Pasture Working Circle	8511.324	10 grazing units
6	Miscellaneous Working Circle	3722.736	To be permanently closed to grazing.
	(a) Grass birs.	4024.521	No regular working was prescribed.
	(b) Forest villages		
	Total	132169.435	
8	Bamboo (Overlapping) Working Circle	---	12 F.S. to be worked on a felling cycle of 4 years.
9	Semal (Overlapping) Working Circle.	---	1 F.S. to be worked on 20 years felling cycle.
10	Khair (Overlapping) Working Circle	---	6 F.S. to be worked on 20 years felling cycle.

THE PROTECTION WORKING CIRCLE: This working circle included all hilly compartments of the West Pench and Deolapar ranges containing precipitous and steep slopes and a few other compartments for the convenience of management.

THE SELECTION-CUM IMPROVEMENT WORKING CIRCLE: The objective behind the creation of this working circle was to preserve and improve the growing stock; and in consonance to this objective obtain maximum sustained yield from these areas. To this end, the Selection cum improvement system with felling cycle of 24 years was prescribed. The following guidelines were prescribed to be followed under this working circle.

1. Inaccessible areas, areas having precipitous and very steep slopes and under-stocked areas were excluded from working. In such areas only improvement felling was prescribed.
2. Along the river banks, no trees were to be felled up to a width of 30 m.
3. After making reservation as in (1) and (2) from the remaining areas all dead and half of the teak trees 120 cm and above at gbh were to be removed, if silviculturally available.
5. Improvement felling consisting of removal of miscellaneous species interfering with teak and suitable thinning in even aged patches of teak were proposed.
6. Advanced growth of teak (up to 30 cm in girth) which was malformed is to be cut back.

PENCH HIGH FOREST CONVERSION WORKING CIRCLE: All the areas having good quality teak and mixed forests (III and IV) except those included in the protection working circle were allotted to this working circle. The system prescribed was conversion to uniform with adequate safeguards to retain a suitable mixture of teak and miscellaneous species. However, no felling was to be carried out in the steep and precipitous slopes as well as in the under-stocked areas. Conversion period of 80 years was adopted and the entire area was divided into 4 PBs depending on the age of the crops. All the 4 PBs were allotted. One twentieth of the workable area of PB-I was to be taken up for conversion each year. Cultural operations and thinning were to be carried out on 1/20 of the workable areas of the PBS II, III and IV. Regeneration of PB -I was to depend mainly on the existing NR to be supplemented by the coppice seedlings. However as a safeguard in PB-I coupes groups of well-grown advance growth and poles were to be retained as part of future crop. SCI felling was to be carried out in the hilly and inadequately stocked areas. Climber cutting was to be carried out 3 years in advance of main felling and the coupes were to be closed to grazing a year after felling. Climber cuttings, cleaning and suitable thinning were to be carried out when the forest crops attained the age of 5 and 10 years.

THE GENERAL HIGH FOREST WORKING CIRCLE: The better quality forests in the trap zone of Hingna, Kondhali and Umrer ranges were included in this working circle. Conversion to uniform was the treatment prescribed with a conversion period of 60 years. Safeguard measures like retention of a mixture of teak with miscellaneous species in ratio of 50:50, no felling on steep slopes and precipitous areas as well as in under-stocked area were provided. To improve the natural regeneration in the coupes, climber-cutting 3 years in advance of main felling as well as closure of coupes to grazing was also provided. In addition to all these, well-grown poles up to 45 cm in girth of all miscellaneous species except garari subject to a minimum of 40 per acre was to be retained in the mixed forests. In areas having pole crop, poles up to 60 cm in girth and 45 cm in girth were to be retained in good quality and poor quality areas, respectively, as part of future crop. Improvement felling were to be carried out on steep slopes, poorly stocked areas and area having inadequate regeneration. The subsidiary silvicultural operations such as CBO one year after main felling, climber cutting and cleaning at the age of 5 year and thinning at 10, 20 and 40 years were also prescribed.

COPPICE-WITH-RESERVE WORKING CIRCLE: The forests capable of producing small to medium sized timber, poles and firewood were put in this working circle. The rotation of 48 years was continued as was in Sagreiya's plan.

Mature trees were prescribed for felling, all advance growth' up to 23 cm GBH except of garari were to be retained. Healthy well grown poles up to 60 cm were to be reserved to the extent of 30 poles per acre. The CBO, after one year of main felling was prescribed. Climber-cutting and cleaning after 8 years and thinning after 24 years were also prescribed.

PASTURE WORKING CIRCE: Areas incapable of producing timber or fuel wood and where grazing pressure was high were put in this working circle. No felling unless required for the improvement of pasture was to be carried out. Fodder yielding species like anjan, mowai and bija along with grasses like shed a, paonia and marvel were prescribed to be planted. Closure for grazing was proposed in alternate years to provide time for establishing the fodder yielding species.

MISCELLANEOUS WORKING CIRCLE: The grass birs and the forest villages were included in this working circle. The grass birs were created with the intention of providing good fodder to the nearby villages and hence were permanently closed for grazing. For the purpose of improvement of the grass birs, periodical burning once in 5 years, sowing of seeds of high yielding grasses like paonia, sheda, marvel etc, alongwith the removal of weeds and climbers were proposed. The areas of the forest villages were meant for cultivation and also for meeting the nistar requirements of the villagers.

OVERLAPPING BAMBOO WORKING CIRCLE: The workable bamboo areas of Pench range were included in this working circle. The 12 felling series formed were worked on 4 year felling cycle.

OVERLAPPING SEMAL WORKING CIRCLE: One felling series in East Pench range was formed. The felling cycle was fixed at 20 years. All Semal trees above 135 cm gbh were to be exploited departmentally. However as the Semal trees occurred scattered over the entire felling series, extraction became uneconomical and hence after the 1 ha. coupe work was stopped.

OVERLAPPING KHAIR WORKING CIRCLE: Six felling series were formed over the entire division as the Khair occurred scattered or in pure patches in teak and mixed forests in all the ranges. The felling series was fixed as 20 years. The Khair trees above 45 cm girth at BH were to be exploited for manufacturing katha. However as the Khair trees mainly occurred in degraded areas, not much working was carried out to prevent further degradation of the areas.

RESULTS OF THE WORKING

The prescription of this plan helped to improve the forests in general. Natural regeneration except in the dry localities also improved. The semal and khair working circles could not be properly worked as the trees were scattered over the entire area. Some of the short comings of the plan were as listed below:

1. Procedure for demarcating the various areas as well as the method for marking and recording the trees to be felled or reserved were not specified.
2. No soil conservation measures were proposed for erosion prone areas.
3. The method of carrying out the cultural operation was not prescribed.
4. Retention of miscellaneous species in the areas having profuse reproduction of teak was not proposed.
5. No prescription was given for raising plantations of valuable species in the good areas of Pench ranges.

5.6 FIFTH WORKING PLAN: FROM 1965-66 TO 1975-76

The Fifth Working Plan was prepared by J.G. Thosre. The period of the plan was from 1965-66 to 1975-76 for twenty years but was subsequently extended up to 1987-88. The entire forest was restock mapped on 4"=1 mile scale maps. As per the resolution of the M.P. Govt. no. 3952-2624-XI, dated 10/12/1952 the forests were classified on functional basis as below.

Table - 5.4
Functional classification of the forests in Thosre's Plan

S.N.	Classes of forests	Area in in ha
1.	Tree Forests.	30382.264
2.	Minor Forests	76050.179
3.	Protection Forests	9429.411
4.	Pasture Lands.	8511.324
5.	Remaining Forest	
	(a) Grass birs	3615.673
	(b) Forest Villages	4024.521
	(c) Seminary hills	67.410
	Total	1,32,080.782

The following working circles were created taking into account the silvicultural requirement of the crops as well as the demand for timber, fuel wood and grazing in the division.

Table No.5.5

Distribution of working circles in Thosre's Plan

S.N .	Working Circle	Area (in ha)	No.of FS Formed
1.	Protection working circle	9429.411	5 F.S. to be worked under a felling cycle of 24 years.
2.	Pench High Forest conversion working circle	24042.691	5 F.S. to be worked under 80 years conversion period.
3.	General High Forest working circle.	6339.573	2 F.S. to be worked on a rotation of 60 years.
4.	Coppice – with – Reserve working circle	76054.229	33 F.S.(30 full and 3 part) to be worked on a rotation of 48 years.
5.	Pasture working circle.	8799.542	Pasture series.
6.	Miscellaneous working circle. Grass birs. Seminary hills . Forest villeges	3615.673 67.410 4024.521	Permanently closed to grazing.
	Total	132080.782	
S.N .	Working circle	Area (in ha)	No. of FS formed
7.	Bamboo (overlapping) working circle	--	16 F.S. to be worked under 4 years felling cycle.
8.	Khair (overlapping) working circle	--	6 F.S. to be worked on a felling cycle of 20 years.

PROTECTION WORKING CIRCLE: The forests in the hilly and undulating areas on both sides of the Pench River as well as the areas having sandy to sandy loam soils prone to erosion were included in this working circle. The crops consisted of mainly middle-aged trees with a large number of unsound old teak trees in the remote areas. The special objects of management were (1) conservation of soil and moisture by retaining tree cover (2) preservation and improvement of existing

growing stock (3) to increase the value of forests by increasing the proportion of valuable species and (4) to achieve maximum sustained yield. SCI silviculture system was adopted to meet these objectives. The exploitable girth for the different species was fixed, as follows:

1. Teak & Haldu- - 120 em,
2. Bija & Ain - 135 cm,
3. Dhaora, Shisham, Tendu & Bhirra - 90 cm,
4. Tinsa- 75 em.

Area was divided into 5 Felling Series and 24 years felling cycle was prescribed. As a safety measure it was proposed-that the trees required for protection as well as for seed purposes along with healthy trees of species like moha, tendu, achar, harra, kullu and khair were to be retained all over the area. In the steep slopes, under-stocked areas as well as areas prone to erosion no living trees were to be felled. In the frost prone areas, frost hardly species like ain, dhaora,moha, kusum and mowai wereto be retained. In the workable areas one out of two mature teak trees and all mature trees of other valuable species were to be marked for felling. Other operations prescribed were light crown thinning in the immature crop, removal of dead, dying and diseased trees as well as inferior trees interfering with the growth of teak and other superior species. The subsidiary silvicultural operations prescribed included anti-erosion measures in the erosion prone areas, CBO, climber cutting and addressing of stools. In the 6th year cleaning, climber cutting, cutting back of malformed saplings, singling of coppice shoots and removal of inferior species interfering with the growth of superior species were also prescribed. Thinning, in the 13th year, as per the formula; $D = 3/2 (d+3)$ was also prescribed.

PENCH HIGH FOREST WORKING CIRCLE: The good quality forests of Khapa and Deolapar ranges except those allotted to the Protection working circle were allotted to this working circle. The crop was mainly of teak and mixed forests of III and IV a quality. The special objects of management were to convert the forests to a normal series of age classes, to produce big sized timber of teak and other superior species, to extent the area under teak by planting and also to maintain a suitable mixture of teak and miscellaneous species in the areas tending to be pure teak forests. The silvicultural system adopted was conversion to uniform. The conversion period was fixed as 80 years and 4 PBs were created each having 20 coupes. The clear felled areas were to be regenerated artificially.

In the protection and unworkable areas in the PB I coupe improvement felling were prescribed. Minimum 10 acres of area were to be clear felled and planted with teak. Areas having young pole crop of teak were to be thinned so as to

bring the inter spacing distance to 1/3rd of the height. The dead, dying, diseased and malformed poles were also to be removed. Improvement felling consisting of removal of dead, dying, unsound and over-mature trees were proposed in areas having density between 0.4 and 0.6. C/D grade thinning was proposed in congested patches. In the other areas, well grown poles of teak and other valuable species up to 60 cm gbh, healthy fruit trees and all semal, khair and kulu trees were to be reserved and the balance trees were to be felled. Climber cutting was proposed at the time of making.

In the PB II areas light crown thinning, climber cutting and removal of dead trees were proposed. In PB III areas thinning to maintain a mixture of teak and miscellaneous species as well as improvement felling were prescribed. In PB IV areas climber cutting and cleaning operation were prescribed in the 6th year. Light crown thinning to attain a spacement of 3m x 3m was proposed in the 20th year.

GENERAL HIGH FOREST WORKING CIRCLE: The better quality forest areas of Umrer, Kondhali and Hingni ranges were included in this working circle. The crop was mainly teak of quality IVa and IVb. The special objects of management were (1) conversion of the forest to a normal series of age classes. (2) production of Jarge size timber (3) improvement of the crop by planting as well as by taking up suitable cultural operations. 60 years rotation was fixed and 60 annual coupes were formed.

The well-stocked areas (>0.6) were to be clear felled after retaining (a) well grown poles up to 30m, 45cm and 60cm gbh in IVb, IV and quality III areas respectively (b) trees of any size necessary for silvicultural purposes (c) all healthy fruit bearing trees (d) Khair, Kulu and well grown Salai trees. Teak plantation was to be taken up in open patches where teak was absent.

Subsidiary silvicultural operations like gully plugging and CBO in the 15th year of main felling, cleaning in the 6th year and thinning in the 11th year were prescribed.

COPPICE- WITH- RESERVE WORKING CIRCLE: The areas capable of producing mainly small timber, poles and fuel wood were included in this working circle. Rotation was fixed as 48 years and yield was regulated by area. Coupes were to be demarcated 3 years in advance to be followed by climber cutting. It was prescribed that in Khapa, Deolapar and Ramtek ranges minimum 10 acres of suitable areas were to be clear felled followed by planting while in other ranges a

minimum of 5 acres was proposed for clear felling. Subsidiary silvicultural operations like gully plugging and CBO in the 15th year, cleaning in the 6th year and thinning in the 12th and 24th years were also prescribed.

PASTURE WORKING CIRCLE: Areas where demand for grazing was high and which were not capable of producing timber were put in this working circle. No commercial felling was prescribed here. Leaf fodder species like anjan, mowai and bija and edible grasses like sheda, paonia and marvel were recommended for planting in these areas.

MISCELLANEOUS WORKING CIRCLE: The various grass birs, forest villages and the compartments number 715 of Seminary Hills were included in this working circle. In the plantations raised in the compartment number 715, the DFO was authorized to do improvement felling and thinning on 10 years cycle. The forest villages were to be managed as provided in the MP Forest Manual, while the grass birs were closed for grazing. Only works required for the improvement of the grasses was prescribed in the grass birs.

OVERLAPPING BAMBOO WORKING CIRCLE: The forest areas of Ramtek, Deolapar and Khapa, where bamboos were present in workable quantity were included in this working circle. 12 felling series were formed and a cutting cycle of 4 years was fixed. 4 coupes viz. A, B, C, & D were formed in each felling series. Clumps having less than 10 culms were not prescribed for exploitation. Bamboo planting was also prescribed in suitable areas.

OVERLAPPING KHAIR WORKING CIRCLE: As Khair was found scattered in all ranges, six felling series were formed to be worked on 20 years felling cycle and exploitable girth at b.h. was fixed as 38 cm. However most of the coupes could not be worked as it became uneconomical for commercial exploitation due to the scattered presence of Khair in the coupes.

5.7 SIXTH WORKING PLAN 1990-91 TO 1999-2000

The working plan under revision was written by Jwala Prasad. On the basis of the general principles for functional classification of forests and also on the basis of the silvicultural requirement of the forest crops, the following, working circles were formed. In this working plan, areas of both Reserved Forests (RF) and Protected Forests (PF) were included for management purposes together, for the first

time. Area statement, showing various working circles in Prasad's Plan, is given in Table 5.6 below.

Table - 5.6.
Distribution of working circles in Prasad's Plan

S.N .	Name of working circle	Area in ha.
1.	Protection working circle	7960.04
2.	Selection cum Improvement working circle	1628.40
3.	Shelter wood plantation working circle	13797.16
4.	Coppice – with – Reserve working circle	72900.58
5.	Reforestation and soil conservation working circle	62699.46
6.	Pasture working circle	3443.93
7.	Wild life and nature conservation working circle	18124.08
8.	Grass – bir working circle	11567.38
9.	Miscellaneous working circle	29770.22
10	Bamboo (overlapping) working circle	-----
11.	Bamboo under planting (overlapping) working circle	----
	Total area	221891.25

PROTECTION WORKING CIRCLE: In addition to the area included in the Protection Working Circle under Thosre's plan compartments 517, 526 and 528 of Bodelzira Coppice-with-Reserve felling series, 515, 516 and 529 of Kutumba Coppice-with-Reserve felling series, 523 to 525 of Salama and 666, 668 to 670 of Kolutmara Pench High Forest Conversion felling series having steep slopes and forming a compact block were included in this working circle along with PF compartments 240 to 242 and NRF compartments 735. As the areas allotted to this working circle formed part of the core areas of the proposed Pench National Park the main object behind forming this working circle was to preserve and improve the existing growing stock for conserving soil and moisture, the total area allotted to this working circle was 7960.04 ha.

Conforming to the objective, no tree felling was prescribed in this working circle. The emphasis was laid on soil conservation and erosion prevention measures. In the degraded areas dibbling of seeds of suitable species as well as bush sowing of the seeds of neem, bakain, maharukh and sanda was proposed to be carried out by the concerned Beat Guard.

The whole area was divided into 4 working series each containing 10 coupes to be worked on 10 years working cycle. The coupes to be worked were to be demarcated one year in advance and a treatment map showing (a) the areas eroded or liable to erosion (b) road passing through the area and (c) under-stocked areas was to be prepared, climber cutting was also to be done at the time of demarcation. In the year of working, the following operations were prescribed to be carried out in the different types of areas. In the A type areas nala bunding and gully plugging were to be carried out. In B type areas only maintenance works were to be carried out. In the C type areas seeds of neem, maharukh, salai, dhaora, sitaphal and other local species was were to dibbled at 2m x 2m spacing

SELECTION CUM IMPROVEMENT WORKING CIRCLE: The compartments of Deolapar range having density > 0.4 and lying between 15° and 25° slopes were included in this working circle. The object of management envisaged under this working circle were (1) to reduce soil erosion and run off water along the hilly slopes by improving the soil cover (2) to enrich the growing stock by tending the NR or by planting (3) to obtain the maximum sustained yield of timber. The total area allotted to this working circle was 1628.40 ha.

Only one felling series was formed and the felling cycle was fixed as 20 years. The exploitable girth for various species was retained as prescribed in Thosre's plan, as given under.

Bija and Ain – 135 cm.	Shisham, Dhaora, Bhirra – 90 cm
Teak and Haldu – 120cm.	Tinsa – 75 cm.

The silvicultural system adopted was group selection system. The coupes due for working were to be demarcated one year in advance and a treatment map showing the (a) protection areas (b) under-stocked area and (c) area containing pre-selection and exploitable trees was to be prepared. C type areas were further proposed for division as follows;

- (i) Areas containing pole crop and middle aged crop to the extent of 300 stems / ha and natural regeneration up to 750 / ha.
- (ii) Areas containing pre selection and selection girth trees but not young crop.

In the 'C' type areas marking was to be done in-groups of the size 5 chain x 1 chain. The distance between the 2 groups was kept as 100m. In the groups selected for felling all exploitable trees were to be marked for felling, while the pre-selection trees were to be marked rarely if found necessary to aid regeneration. All malformed stems were to be cut back. To prevent over marking it was prescribed that number of trees to be marked should not exceed the prescribed limit of number of trees per coupe. The total area of the group selected will not exceed the area worked out under the Safe - guard Formula. Trees of Tendu, Hara, Kullu, Semal and Khair were to be reserved. To supplement the natural regeneration, planting was also proposed by pit-trench method at the rate of 1100 plants / ha. Subsidiary silvicultural operation like CBO one year after main felling, cleaning in the 6th and 11 th years; and thinning in the 20th year was also proposed.

SHELTERWOOD PLANTATION WORKING CIRCLE: The better quality forest of Deolapar, Ramtek, South Umrer, Kondhali and Narkhed ranges were included in this working circle. While Akola, Bandhara and Manegaon felling series are made up of mainly miscellaneous forests. Dhamangaon and Kodimet - Parsodi felling series containing mainly teak forests. The total area included in this working circle was 13797.16 ha.

THE SPECIAL OBJECTS OF MANAGEMENT OF THIS WORKING CIRCLE: Production of large sized timber of teak and other miscellaneous species. Enrichment of crop by planting teak and other valuable species.

The silvicultural system adopted to achieve these objectives was modified shelter wood system using floating P.B. method. The working circle was divided into 3 PBs. The areas having mature crop were put in PB I (Regeneration PB) while the compartment containing young crop and which had been regenerated during the last 20 years were put in PB III (PB Young). The remaining areas of this working circle were put in PB II (PB Intermediate). On the basis of the stump analysis carried out, the rotation was fixed as 60 years

THE OPERATIONS PRESCRIBED FOR THE 3 PBs: PB I: In the coupes allotted to P.B I the operations were to be carried out in 3 phases, viz. primary felling, artificial regeneration works and final felling. During primary

felling the crop was to be exploited so as to bring the over wood density up to 0.4 for this purpose the forest was to be divided into parallel strips of width 20 mt. in East-west direction. Along the center of each strip all the trees were to be felled on both sides up to the width depending on the crown density as specified. In the second phase, teak was to be planted on the felled strip while shade bearing species were to be under planted in the rest of the areas. The final felling, during which the entire over wood was to be removed, was to be carried out after 4 years, over those areas only where regeneration had established successfully.

P.B II: Only cultural operations like climber cutting and removal of undergrowth to improve the regeneration of teak and other valuable species were prescribed in the areas allotted to this PB.

P.B.III: Thinning to benefit the young crop and removal of malformed and decaying stems interfering with the growth of teak and other valuable species were proposed to improve the young crop present in this P.B. Climber cutting was proposed on a 5 year cycle.

The areas in which main felling had been carried out were to be artificially regenerated by digging 1660 staggered trenches / ha. subsidiary silvicultural operations prescribed were CBO in the year after main felling, soil and moisture conservation works in the year following primary felling, cleaning operation in the 17th , 30th , 35th , 40th and 45th years.

COPPICE-WITH-RESERVE WORKING CIRCLE: The forest of Narkhed, South and North Umrer, Khapa, Kuhi, Ramtek, Hingna, Deolapar and Kondhali ranges having density greater than 0.4 and of quality IVa and IVb which were capable of producing small to medium sized timber, poles and firewood were put in the working circle. The total area included was 72,900.58 ha.

THE SPECIAL OBJECTS OF MANAGEMENT: Production of maximum sustained yield of small sized timber, poles and fuel wood also improvement of the forests by carrying out under planting and tending operations.

The entire area was divided into 42 felling series. The rotation was fixed as 48 years for Reserved Forests areas and 40 years for the Protected Forests areas. Taking into account the poor status of regeneration in the areas allotted to this working circle, it was proposed that the areas should be regenerated in advance i.e. before felling, by resorting to under planting in the under-stocked areas while gap

planting to be carried out in trench pits. The planted coupes were to be closed for grazing for 3 years after planting.

Main felling was to be carried out in the 4th years only in those patches, which had been successfully regenerated. Trees like Semal, Kulu healthy Salai trees up to 90cm, Moha, Achar, Tendu, Aonla along with well grown advance growth of Teak, Shisham, Bija, Bhirra and Ain were to be reserved.

Subsidiary silvicultural operations like anti-erosion works, CBO, cleaning of coupes in the 6th year and thinning in the 12th and 24th years were prescribed. Old plantations were also to be thinned along with main felling so as bring the spacing between adjacent trees to 1/3rd of the average height of these trees.

REFORESTATION AND SOIL CONSERVATION WORKING CIRCLE

All poorly stocked areas having density below 0.4 were put in this working circle. The total area included in this working circle was 62,699.46 ha. The special objects of management envisaged are as follows: Conservation of soil and moisture by taking up plantation and other suitable measures Enhancement of the productivity of the forest lands and availability of fuel, poles, bamboo and small timber for the local populations and fodder for their livestock. As well as restoration of ecological balance by increasing the vegetal cover.

To improve the condition of the crop, cutting back of malformed stems as well as improvement felling on well-stocked areas was proposed. Hardy species were to be planted in the under-stocked and degraded areas. Soil conservation measures were also proposed to improve the moisture regime and to check soil erosion.

As plantation was the main operation prescribed in this working circle, the demarcation of coupes was to be carried out least 2 years before planting. A treatment map showing the various types of areas as well as zonation's based on soil depth was also to be prepared. In the patches of forests having density greater than 0.4, improvement felling as well as singling of coppice shoots was proposed. Thinning was also proposed in the patches of congested advance growth. The felling and extraction operations were to be completed in the same year in which demarcation was to be done. Different plantation techniques were proposed depending on the zonation.

Apart from the customary casualty replacement, weeding and soil working in the plantation was prescribed. Cleaning operations were proposed in the 5th year. Ordinary D-grade thinning was proposed in the zone III area if the number of plants / ha was more than 1250. 5.7.27 PASTURE WORKING CIRCLE: The degraded forest areas incapable of producing either timber or fuel wood; and which were subject to heavy grazing demand were included in this working circle. The total area allotted to this working circle was about 3443.93 ha in extent.

These forests were to be managed primarily with the aim of meeting the grazing demand of the livestock of the local people. Thus it was proposed to improve the quality of fodder by introducing better variety of grasses, legumes and fodder trees.

Only dead trees were to be removed from the under-stocked areas while over mature and malformed trees were to be removed from the better patches. Water absorption trenches (WATs) and grass beds were to be prepared in these areas followed by the sowing of seeds of superior variety of grasses and legumes. In the under-stocked areas having more than 30 cm deep soil, plantations of suitable fodder species were to be taken. After carrying out special improvement works for the development.

GRASS-BIRS WORKING CIRCLE

Areas under permanent grass-birs and kurans as well as some areas from other working circles which are good for conversion into grass birs were included in this working circle. The total area allotted to this working circle was 11567.38 ha.

These areas as they were near to villages and towns were set apart so as to cater to the fodder needs of the local livestock. Thus the objects of management were (1) to improvement of the fodder quality by introducing better and high yielding grasses, (2) to protect vulnerable areas by maintaining suitable soil cover and to increase fodder yield.

The works proposed in the grass birs are.as follows:

- a. Fencing of the grass birs in a phased manner of 10 years.
- b. Taking up adequate soil and moisture conservation measures.
- c. Ploughing the areas followed by sowing of improved variety of grasses.
- d. Planting of fodder tree species.
- e. Climber cutting as well as removal of weeds.

MISCELLANEOUS WORKING CIRCLE

The Reserved Forests and Protected Forests areas not included in any other working circle but which were set apart for certain specific purposes were included in this working circle. The total area allotted to this working circle was 29,770.22 ha (Table 5.7).

Table - 5.7. Area allocation in Prasad's miscellaneous working circle

Areas earmarked for FSCM Ltd	27,169.19 ha
Compartment No. 715 of Seminary Hills	67.41 ha
Compartment No. 421	98.34 ha
Area under submergence of various irrigation projects.	2435.28 ha
Total	29770.22 ha

BAMBOO (OVERLAPPING) WORKING CIRCLE

Eighty compartments of Ramtek, Parseoni and Deolapar ranges where bamboo was available in adequate workable quantities were included in this working circle. The total area allotted to this working circle was 22,999.58 ha. The entire area divided into 6 felling series was to be worked on a 3 -year cutting cycle. The object of management was to harvest bamboo in a scientific manner to get maximum sustained annual yield. Special precautions to be taken while harvesting bamboo as well as during gregarious flowering if it occurred were prescribed.

BAMBOO UNDER PLANTING (OVERLAPPING) WORKING CIRCLE

All the areas suitable for under planting bamboo were included in this working circle. The total area allotted to this working circle was 15,867.75 ha. The special object of management was to increase the percentage of bamboo in the selected areas by resorting to plantation by digging pits of size 45 cm³ at 6m x 6m spacing.

5.8 EX-PROPRIETARY FORESTS

These forests were initially under the ownership of the malgujars and Zamindars. These forests were not scientifically managed and the owners used to sell the forest produce as they think fit. However, villagers were allowed to take the forest produce or graze their cattle on payment. The proprietary rights over these forests were abolished in 1951 and, thereafter, these forests were brought under

systematic management. The history and management of these forests can be divided into three distinct periods.

1. Management during the pre-abolition period i.e. from 1854 to 1950.
2. Management during early post-abolition period i.e. from 1951 to 1970.
3. Period of regular working under Working Scheme from 1970-71 onwards.

MANAGEMENT BEFORE THE PRE-ABOLITION PERIOD 1854 TO 1950

The private forests were not managed scientifically prior to the abolition of the proprietary rights. The proprietors who were given the Zamindari rights used to manage the forests according to their whims and fancies. In some Zamindari areas Ranwa system was followed while in others Batai system was in practice. Though the local people had different kinds of nistar rights yet they could exercise them only as per the wishes of the malguzars. In the Central Provinces districts a village administration paper called 'Wazib-ul-arz was prepared which showed the rights the local people could exercise over the land. The increased demand for timber, fuel wood etc. during the Second World War led to unregulated heavy felling in these forests. The malguzars resorted to indiscriminate felling of major timber species during the perambulation period viz. from 1948 to 1950; as there were rumours about the abolishment of proprietary rights over the lands

POST ABOLITION PERIOD 1951 TO 1970

After the abolition of the proprietary rights in 1951; about 6,98,572.80 acres or 2,79,476.81 ha of private forests in Nagpur district were vested in the State Government. Out of these, around 96,857.04 ha of forests were transferred to the Forest Department for management from 1951 to 1954 as per the instructions contained in MP Revenue Department order no. 2249- 286-XII dt 6th April 1951 and No. 7177-CR-617-XII dt 24th Dec, 1951.

The process of takeover was completed by the year 1954. These forests were subsequently declared as PF under section 29 of L.F.A. 1927 vide Govt. of MP Notification No. 3057-853-XII dt 4/6/1955. The Notification reserving trees u/s 30 and 32 of IFA 1927 was issued and subsequently rules were framed by the Government of Bombay vide notification No. FLD-4657/103065-E, dated nil December 1958 and 19th Dec, 1958, respectively.

Due to the indiscriminate felling carried out by the malguzars just before the abolishment of proprietary rights, the forests vested in the government were devoid

of any mature and valuable tree growth and hence the crop was made up of mainly young coppice crop. As government became the owner of all the vested lands, in order to determine the existing nistar rights and to allot the vested areas for different purposes. Nistar officers were appointed in the year 1954, who after carrying out necessary inquiries prepared Nistar Patrahs for each village. In the Nistar patrahs the khasra number of the areas set apart for grazing as well as for the collection of timber and fuel wood were mentioned. Villages having forests in excess were linked with villages which were deficit in forests thereby creating grazing and nistar zones to cater to nistar needs of the local people.

During this period efforts were made to protect the area from theft and fire while plantations were also raised in suitable pockets. Due to the combined effect of protection and rest to the forests the crop conditions in these forests were improved.

PERIOD OF REGULAR WORKING 1970-71 TO 1979-80

The protected forests of Nagpur Division were brought under scientific management for the first time during 1970-80 when the working scheme prepared by S.S. Parasnis was approved. For management purposes, these forests were classified as:

1. Minor forests for meeting the demand of small timber, poles and firewood.
2. Pasture lands for meeting grazing demands.
3. Remaining forests were set apart for meeting the demand for cut grass.

Taking into account the condition of the crop, needs of the people and demand for grazing the following working circles were formed.

Table- 5.8. Working Circles in protected forests

Coppice – with –Reserve working circle	20496.97 ha
Improvement working circle	32978.80 ha
Pasture working circle	21615.38 ha
Miscellaneous working circle	21482.74 ha

COPPICE-WITH-RESERVE WORKING CIRCLE

The forests which were capable of producing small timber, poles and fuel wood were included in this working circle. The main objective behind the formation of this working circle was to get sustained annual yield of small sized timber, poles and firewood and also to provide fodder and grazing facilities to the local cattle.

The rotation was fixed as 40 years and the entire area was divided into 10 full and 27 half felling series. The coupes were to be demarcated one year in advance of felling. A treatment map, showing the unworkable areas, patches of poles crop, inadequately stocked areas; and the remaining areas were to be prepared. From the unworkable areas only dead and dying trees were to be removed, cutting back of high stools was also proposed. The patches containing the pole crop were to be thinned so as to bring the spacement equal to 113 of the average height of the trees.

Improvement felling consisting of the removal of dead, dying, diseased and malformed trees was to be carried out in, inadequately, stocked forest areas.

From the remaining areas all the trees except the trees to be reserved were to be felled. The trees to be reserved were (a) Trees required for silvicultural purposes (b) All healthy fruits trees along with Kullu and Khair (c) All advance growth except that of garari up to 23 cm gbh (d) All well grown poles of teak and other valuable species up to 45 cm in quality III areas and 30 cm in quality IV areas.

The subsidiary silvicultural operations like CBO and climber cutting in the year following the year of main felling, cleaning of coupes in the 6th year and thinning in the 20" year were prescribed.

IMPROVEMENT WORKING CIRCLE

The degraded forests as well as the hilly areas with steep slopes were included in this working circle. The forests were characterized by large number of malformed, diseased, crooked and unsound trees.

The main object behind the formation of this working circle were (1) the improvement of the growing stock (2) meeting the demand of nistar and grazing and (3) to check soil erosion and conserve moisture.

A felling cycle of 20 years was fixed and the entire area was divided into 21 felling series. In order to meet the object of management, the following, operations were prescribed.

1. All dead, dying, diseased and malformed trees were to be removed.
2. The inferior species interfering with the growth of teak and other valuable species were to be removed.

3. Thinning was to be done in congested patches.
4. Singling of coppice shoots.
5. Cutting back of stumps of illicitly felled trees
6. Trees along the nala banks were to be retained up to a length of 20 m.
7. All fruit trees were to be retained.
8. Subsidiary silvicultural operations like CBO and climber cutting were to be carried out one year after the working of coupes.

PASTURE WORKING CIRCLE

The forest areas which were incapable of producing timber or fuel wood and where grazing demand was high were put in this working circle. This working circle was formed mainly with the objective of providing maximum grazing facilities to the local cattle as well as to improve the pasture. Each grazing series was divided into 4 coupes, each of which was to be closed in rotation for 3 years. The operations prescribed were climber cutting, improvement felling in the protection and unworkable areas, heavy thinning in the dense crop to encourage the growth of grasses as well as retention of fruit, fodder and shade bearing trees. Climber cutting and uprooting of weeds all over the coupes were to be followed by ploughing on the patches containing good soil before monsoon. Seeds of high yielding grasses like sheda, Paonia, marvel etc. were to be sown on the ploughed areas after the onset of monsoon.

MISCELLANEOUS WORKING CIRCLE

Scattered patches of forests less than 200 acres, grass birs and the areas to be handed over to Revenue Department were included in this working circle. In the scattered patches thinning and improvement felling were prescribed to meet the local demand for fuel and poles. Grass birs were to be managed for the supply of fodder grasses on cut and carry basis. Thus they were permanently closed to grazing. Sowing of the seeds of good variety of grasses was prescribed after light soil working in these areas.

5.9 REGULATION OF GRAZING

RESERVED FORESTS

PRIOR TO 1875: Prior to the reservation of the forests, as there was no grazing control, a large number of animals used to graze in the accessible areas. However, during the early reservation period grazing by goat and sheep was stopped. No restriction however was imposed on cattle till 1875.

FROM 1875 TO 1895: As unregulated grazing began to take their toll on the forests, the need to protect forests from heavy grazing was felt. As a consequence in 1875 about 66.5 sq. miles of forest in the East Pench and in 1881, 63 sq. miles of forest in the West Pench were closed to grazing.

FROM 1895 TO 1912: With the increase in the extent of cultivation followed by the reduction of grazing grounds, the pressure on the forests increased. Moreover, it was noticed that continuous grazing was not favourable for the reproduction of valuable species. Hence in the 1st Working Plan, it was prescribed that coupe after working will be closed to grazing for 10 to 15 years and could remain open to grazing for the rest of the rotation.

FROM 1912 TO 1934: In the Working Plan prepared by Mr. Dunbar Brander, grazing was regulated as per the scheme prepared by Mr. Leftwitch, I. C. S. in 1912-13. This was the first grazing scheme prepared and served as a basis for the subsequent settlements. As per this scheme, the forests of the division were divided into 34 grazing units and in each grazing unit, the grazing was regulated so as to preserve the tree growth and improve pasture. While preparing the grazing units, the grazing requirement of the villages was examined and the villages were attached to the different units depending upon their proximity to the forests. In order to restrict the number of cattle they were categorized into privileged, ordinary and commercial cattle depending on their use and different rates were fixed for grazing for each category. Preference was to be given to privileged and ordinary cattle while issuing grazing passes

The grazing restrictions imposed by this scheme were slightly reduced in 1928 owing to the pressure from the local villagers due to the increase in the number of cattle.

From 1935-36 to 1946-47: In the Working Plan prepared by Sagreyia, the grazing settlement was done as per the new grazing policy issued in the year 1933.

TREE FOREST: This was further divided into (i) Moist type (annual rainfall above 114.3 cm): grazing incidence was fixed as 1.6 ha per animal unit, and (ii) Dry type (annual rainfall below 114.3 cm): grazing incidence for this type was fixed as 0.8 ha per animal unit. 5.9.08 **SCRUB FOREST:** This included forests primarily meant for grass and grazing. This was further divided into: (i) Pasture forests: This was included wooded forest which were capable of producing some poles and fuel wood also, besides grasses. The incidence of grazing for this type was fixed as 0.4 ha per animal unit. (ii) Open forests: These forests were primarily meant for grazing. No limit was fixed for grazing in these areas. As the primary aim of above classification was to meet grazing demand, the forests subjected to heavy grazing were classified as scrub forests.

The grazing settlement was prepared by Y.C. Sukhtankar I.C.S. in the year 1934. The size of the grazing units was reduced while the number was increased from 34 to 70, excluding, 26 units of the forest villages and 14 units of the grass birs.

FROM 1947-48 TO 1964: In 1946, the Chief Conservator of Forests C.P and Berar issued a memorandum No.5079 Dt 28/9/1946 classifying the forests on functional basis. On the basis of this memo, the forests were classified as Protection forests, Tree Forests, Minor Forests, Pasture Forests and Miscellaneous Forests. The grazing incidences, for various types of forests were, as follows.

- Protection Forests - no grazing was permitted,
- Tree Forests - 3 acres per cow unit
- Minor Forests - 2 acres per cow unit,
- Pasture forests - 1 acre pre cow unit.

FROM 1965-66 TO 1974-75: In the Working Plan prepared by Shri J.G. Thosre, functional classification of forests followed in the previous plan was adopted in to. The grazing incidences and closure of the working coupes to grazing were, as below.

TREE FORESTS: Grazing incidence was restricted to 3 acres per cattle units. The coupes were to remain closed for grazing 2 year in advance of main felling followed by a closure for 6 years.

MINOR FORESTS: The maximum grazing incidence permitted was 2 acres per cattle units. All worked coupes were to remain closed for grazing for a period of 6 year after felling. 5.9.14 **PASTURE FORESTS:** The maximum grazing incidence permitted in the areas was one acre per cattle unit.

The grass birs were permanently closed to grazing

FROM 1990-91 TO 1999-2000: In the Working Plan written by Shri Jwala Prasad, the grazing incidence for various types of forests were foxed according to the grazing policy of 1968. In the protection as well as Wild life and Nature Conservation Working Circle grazing was prohibited as the forests allotted to this working circle were classified as Protection Forests.

SECLECTION CUM IMPROVEMENT WORKING CIRCLE

In this working circle maximum grazing incidence permitted was 1.2 cattle unit per ha. The worked coupes were to be closed for a period of 7 years after working with a provision to extend the closure if the status of NR was found unsatisfactory.

SHELTERWOOD PLANTATION WORKING CIRCLE

As the forests allotted to this working circle belonged to the type tree forests, maximum grazing incidence permitted was 1.2 ha per cattle unit. After primary felling, the coupes were to remain closed for a period of 10 years from the year of primary felling. **COPPICE-WITH-RESERVE WORKING CIRCLE**

The maximum grazing incidence permitted in this working circle was 0.4 ha per cattle unit. The worked coupes were to remain closed to grazing for a period of 10 years.

The grass birs were to remain permanently closed to grazing

As the Protected Forests areas were included in the plan for the first time, the grazing units were revised and in all 125 grazing units were formed of which 40 are in the Reserved Forests and 80 in the Protected Forests /

B - PROTECTED FORESTS (PF)

PRIOR TO 1951: Before the abolition of the proprietary rights, the malgujars permitted unlimited grazing by charging fees.

BETWEEN 1951 TO 1970: After the abolition of the proprietary rights, Nistar Officers were appointed in 1954 to determine the existing rights over the land. From 1954 to 1956, they carried out inquiries and prepared "Nistar Patraks" for each village. In the Nistar Patraks, Khasra numbers allotted for grazing of cattle were mentioned. In the villages where grazing land was just sufficient for the need of the cattle of that village no right of persons residing in other villages to graze their cattle was recognized unless already recorded in 'Wazib-ul-arz'. Villages in which the areas of grazing land were less than half acres per head of cattle in cotton-jowar tract and one acre in the remaining tracts were clubbed with the neighbouring village in which such area exceeded the above standard. Villages so clubbed constituted a grazing zone. The clubbing of the villages was done in such a way that the villagers were not required to take the cattle to a distance longer than the distance the cattle can easily cover in a day. Within a specific zone all persons were at liberty to graze their cattle free until otherwise ordered by the Deputy Commissioner.

FROM 1970-71 TO 1979-80: In the Working Scheme written by shri Parasnis, the grazing control was affected as follows

COPPICE-WITH-RESERVE WORKING CIRCLE

All coupes after final felling were to remain closed to grazing for a period of 5 years beginning with the year of working. After mid rotational thinning the coupes were to remain closed to grazing for a period of 3 years from the year in which thinning was carried out.

FROM 1990-91 TO 1999-2000

As the Working Plan prepared by Jwala Prasad was a comprehensive plan comprising of both Reserved Forests and Protected Forests; a unified grazing control was affected for all the entire forest areas.

5.10 RESULTS OF PAST WORKING.

RESULTS OF TREATMENTS PRESCRIBED IN JWALA PRASAD PLAN

As the present Working Plan was sanctioned in the year 1991 and the implementation was started in the year 1992, only eight years have passed since the coupe working was started. Hence it is too early to objectively comment about the effects of treatments prescribed in this plan. However, the observations made, during the field visits, on the treatments prescribed in Jwala Prasad's plan is given, as follows.

PROTECTION WORKING CIRCLE

Treatment maps dividing the areas into 3 categories were not prepared at all. The soil and moisture conservation measures prescribed in the working plan have not been fully carried

COPPICE-WITH-RESERVE WORKING CIRCLE

The areas (both the Reserved Forests and the Protected Forests) which had been previously worked mainly under Coppice-with-Reserve Working Circle as well as Improvement working circle were included in this working circle. The prescriptions that planting should be carried out 4 years prior to felling were not at all carried out. For e.g. coupe No. 4 of Ahemednagar felling series in Kondhali range was worked in 1997 while coupe No. 5 was worked in 1998. But planting was done in both these coupes in the year 1998 only; though as per the working plan prescriptions, plantations should have been taken in the years 1994-95, 1995-96, respectively. On account of conservative marking, in some of these coupes, large number of mature trees is still left in the coupes. Moreover, due to continuous working under one form or the other of coppice system, the trees have lost their coppicing vigour due to which the coppice shoots have become crooked and malformed. The C.B.O and cleaning operations were not properly carried out. Thinning of old plantations though prescribed was not carried out as a result of which some of the old plantations have become congested. The trees, which do not coppice, have been enumerated.

REFORESTATION AND SOIL CONSERVATION WORKING CIRCLE

This working circle was created with the intention of improving the soil and moisture regime by taking up suitable measures to be supplemented by plantations.

Not much yield was expected from the coupes as most of the areas allotted to this working circle were supposed to be under-stocked and devoid of good tree growth. In most of the areas plantations have become a failure due to wrong species selection coupled with heavy grazing. The status of natural regeneration is poor in most of the areas.

PASTURE WORKING CIRCLE

Due to excessive grazing the pasture development works have not become successful. The forest areas that were incapable of producing timber or fuel and where grazing demand was high were put in this working circle. The main object behind the creation of this working circle was the improvement of the quality and quantity of fodder grasses by taking out plantations and by imposing strict control over grazing. However the works as proposed in the working circle were not carried out in most of the coupe citing lack of funds as the main reason. Wherever, some Plantation works were carried out, that has become a failure due to heavy grazing and recurrent fires.

GRASS BIR WORKING CIRCLE

Some of the areas allotted to this working circle are unfit for being retained in the working circle due to the fact that the areas are not open due to the presence of large number of trees e.g. **Basbodi grass-bir** in Kondhali range. In grass bir areas no works, as prescribed in the plan, have been carried out due to the paucity of funds.

BAMBOO (OVERLAPPING) WORKING CIRCLE

Not much works was done in this working circle as the occurrence of bamboo is sporadic in the allotted coupes. However, as no cleaning work was provided for the naturally occurring bamboos, congestion has taken place in the clumps in the areas that were not allotted to this working circle.

BAMBOO (UNDERPLANTING) WORKING CIRCLE

Bamboo plantations have come up very well in some of the areas where timely operations were carried out. However damage due to the attack of wild boar was observed in many areas.

SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN

The special works of improvement undertaken in the past are: (1) Cultural operations (thinning, cut-back operation, climber cutting and cleaning), (2) fire protection, (3) protection from illicit felling, illegal timber transport and encroachment, (4) construction of roads, buildings, tanks, wells, etc., and (5) plantations and afforestation works.

CULTURAL OPERATIONS

(A) Thinning: In the Reserved Forests a scheme of thinning was introduced in the year 1925. Before the introduction of Sagreiya's plan thinning had been very heavy and almost all the valuable and accessible forests had been gone over at least once. The thinning in the Pench ranges was so heavy that they amounted to almost regeneration felling. During the currency of Sagreiya's plan, thinning prescribed in the un allotted areas of conversion working circle and in the Coppice-with-Reserve working circle, was to be carried out only, if necessary. During the period of Second World War (1940-41 to 1945-46), heavy thinning was carried out to meet the requirement of the Defence Department. This resulted in the removal of the best stems of the future crop to a great extent. In the working plan by B.R. Mishra and J.S.Thosre thinning operations were prescribed for forests allotted to Protection Working Circle. Pench High Forest working circle, General High Forest working circle and Coppice-with-Reserve working circle. In the Working Scheme for the ex-protected forests by Shri S.S. Parasnis, thinning operations were prescribed in the Coppice-with-Reserve working circle. After inspection of some of the thinned coupes it is found that heavy thinning have been carried out at a number of places. At some places, these thinning are even heavier than the main felling. This had depleted the growing stock and it is feared that at the time of next main felling lesser out turn will be available. To guard against this, marking shall be strictly done departmentally and under close supervision as prescribed under para 20.3 of the miscellaneous regulations.

(B) CUTTING BACK OPERATIONS, CLIMBER CUTTING AND CLEANING: These operations have not been carried out over major part of the area during the currency of present working plan. These are very important operations leading to inducement of natural regeneration and any negligence in these operations may result in not getting the areas regenerated properly. These operations requires due importance and focus in the subsequent plans.

FIRE PROTECTION

An elaborate scheme of fire protection was introduced in East Pench Range (Deolapar and Ramtek ranges) in 1875. According to this the forests were divided into blocks of convenient size by cutting and cleaning external and internal fire lines of 12m width. These lines were kept clear of inflammable material throughout the fire season and special staffs of fire watches were employed. The scheme worked well and was gradually extended to the rest of the division: (a) East Pench covering present Deolapar and Ramtek Ranges in 1875, (b) Kondhali in 1894, (c) West Pench covering present Parseoni and Khapa in 1878 and (d) Umrer in 1895. In 1911, the scheme was modified. Complete protection was restricted to areas closed to grazing and early burning was allowed elsewhere. From 1935 Central Provisions and Berar Forest Manual under which the forests are divided into the following three classes:

1. Class-I (Complete or Special protection): It involves isolation of the protected areas by fire lines and cut guidelines which are patrolled watchers.
2. Class-II (General Protection): It involves isolation of the areas from the surrounding areas by fire lines and its divisions into convenient blocks by inter fire lines. No guide lines are cut.
3. Boundary of the Reserved Forests and closed coupes in them, plantations and roads passing through the Reserved forests are included in class-I area and the Protected forests, roads passing through them and also the coupes in the Protected forests are included in class-II areas.

PROTECTION FROM ILLICIT FELLING AND ENCROACHMENT

There is one Mobile squad unit consisting of a Range Forest Officer and 2 Foresters, working in the division whose main task is to prevent and detect the cases of illicit felling and transport. Besides this, there are 40 Forest Check - Nakas which are erected with the purpose of preventing the illicit transport of forest produce. In addition to this, a battalion of SRP has been placed at the disposal of the Deputy Conservator of Forests whose main job is to provide assistance of the field staff for forest protection.

5.11 WORKING PLAN OF SHRI S. S. MISHRA & SHRI JARNAIL SINGH FOR THE PERIOD (2004-05 to 2013-14)

Area Included in the Previous Plan: This working plan included the Reserved Forests, Protected Forests, Un-classed Forests & Zudpi Jungle of Nagpur

Division. The total area included in this plan is 172705.68 ha. For the purpose of formation of working circles, compartments were used as units for distribution. The allocation of compartments is based on preponderance of suitability to specific working circle. Based upon the suitability of areas, several area-specific and three overlapping working circles were constituted which are being given in the **Table No.5. 9.**

Table No. 5.9: Distribution of forest areas in working circles.

S.N.	Working Circles	RF	PF	New RF	Other Forests	Total area	Percentage
Area – specific Working Circles							
1	SCI WC	47406.01	5598.20	--	---	53004.21	30.79
2	IWC	10960.87	17110.25	--	---	28071.12	16.31
3	Afforestation & Rootstock Management (A&RSM) WC	2998.04	10467.20	--	---	13465.24	24.12
4	Protection & Catchments Area Management WC (P&C AM)	11802.06	3097.67	2640.45	--	17540.18	10.19
5	Old Teak Plantation WC (OPWC WC)	3666.10	1268.14	--	--	4934.24	2.87
6 (a)	Grass & Fodder Resource Management (G&FRM) (GB)	3659.94	26856.57	--	--	30516.51	17.67
6 (b)	Grass & Fodder Resource Management (G&FRM) (GB)	4719.39	5644.57	--	--	10363.96	6.00
7	Miscellaneous WC	0	---	--	14810.22	14810.22	8.27
	Total	85212.41	70042.60	2640.45	142331.33	172705.68	100.00

Overlapping Working Circles							
8.	Bamboo (OL) WC	10527.25	---	---	---	10527.25	6.12
9.	Wildlife (OL) WC	----	----	----	----	Entire forest	
10.	NWFP (OL) WC	----	----	----	----	Entire forest	

SCI Working Circle: Total area included in this working circle was 53004.21 ha. The entire area 53004.21 ha of this working circle was divided into 24 felling series of average size 2208 ha each. Each felling series has been further partitioned in 20 annual coupes of average size 110 ha. The special objects of management of this working circle were as under.

- 1. To obtain sustained supply of large-sized timber.**
- 2. To maintain mixed forest nature and high forest character of the forest crop.**
- 3. To improve the proportion of teak and other valuable trees species in the crop by suitable tending operations and providing growing space for naturally regenerated seedlings of such species.**

Results of Past working: While implementing the prescription of this working circle, following results have been observed.

1. Since 2004-05 to 2011-12; 192 coupes were due for felling. Out of this, 103 coupes were worked. 78 coupes falling within 10 KM from the boundary of Protected Areas were not worked keeping in view the requirement of Wildlife. In remaining 11 coupes, works not executed as the areas were either transferred to FDCM or areas not suitable for SCI working due to non-availability of Selection Girth trees.
2. The major technical problem faced while carrying out the prescriptions like, demarcation, marking, logging and subsequent silvicultural operations, of SCI working circle was that the working of coupe was left to the lowest level field staff like forest guards or foresters. Marking rules were little complicated for the field level staff, specially, the forest Guards and foresters, to understand and practice in the field. The important operation of marking has been neglected as most of the times this has been left to the junior most forest staffs.
3. The main problem was that during the preparation of this plan, DCF Nagpur failed to give timely information relating to working and implementation of last

working plan such as Coupe control forms and Compartment History forms .Under these circumstances it is not possible to assess any considerable result due to the implementation of this working plan and coming to any conclusion, positive or negative, would not be justified.

4. It is observed that it has become a standard practice to carry out only the revenue yielding operations prescribed in the plans and the subsequent operations, vital for the health of the future crop, like CBO, Cleaning, Thinning, Singling, protection from fire and grazing etc. have been neglected & even it has been implemented, no proper record has been maintained in the division. Besides no any appreciable improvement in the crop could be observed, leading to the general deterioration of the forests.

5. Most of the time over felling have been done in patches and was not spread all over the coupe, thus creating opening in the forest.

6. The valuable species were given priority in marking and felling leading to felling of some rare trees like Haldu and Shisham, which should have been avoided.

7. The forest allotted to this Working Circle, at times did not have sufficient matured trees for marking and many times the area was rich in young congested crop. These crops needed proper thinning, which was not carried out in time thus adversely affected the crop.

8. The areas from CWR of the previous Working Plan, most of the time did not have sufficient stock of matured trees for marking as per the prescriptions of the plan. This led to removal of whatever matured trees were available in the area leading to reduction in matured trees in the area.

9. Thinning and cleaning in the pole crops and old plantations were not carried out, leading to congestion in the crop, retarding the growth of valuable species and encouraging the growth of inferior species.

10. The malformed regenerations and advance growths were also not cut back leading to increase in the number of malformed and damaged tree growth in the coupe.

11. To regenerate the worked areas, important subsequent operations after main felling, like stool dressing, CBO, singling, cleaning and thinning operations were

prescribed in the plan but were not implemented properly, leading to deterioration of the crop.

12. A considerable part of forest allotted to this working circle was also heavily damaged due to regular fire and uncontrolled grazing. The prescriptions regarding protection of worked and regenerated areas from fire and grazing were not implemented. Grazing by goats has very badly damaged the natural as well as artificial regenerations.

13. Many of these' plantations, in the areas adjoining to the villages, are in very bad shape due to fire and grazing.

14. At places it was noticed that plantation sites are not properly selected, Teak plantations have been done in dense forest areas leading to suppression of the plantations.

15. Besides this the areas prescribed for working in the working plan in a particular year was also never completed.

Improvement Working Circle: The entire area of 28071.12 ha allotted to this working circle has been divided into 14 felling series, which were divided into 20 annual coupes for treatment. The average area of a felling series is about 2005 ha, while the average area of a coupe is about 100 ha. The special object of management for this working circle was as under.

1. To improve the existing crops by tending operations and supplementary plantations.
2. To check soil erosion and conserve soil moisture.
3. The hygienic tending operations will provide small timber, poles and firewood to meet bona fide needs of the local people.

Results of Past working: While implementing the prescription of this working circle, following results have been observed.

1. The observations of SCI WC made above are also applicable to this working circle.
2. The forest staff failed to execute effective improvement felling in favour of desirable species. Thus the required positive effects of improvement felling were not observed in most of the areas, specially in areas near villages.

3. The working under this working circle was also not properly monitored, which is apparent from the condition of the crops. There are plenty of damaged and malformed trees present in the areas, large areas are still under inferior spp. and valuable spp. was suppressed.
4. Like the SCI Working Circle areas, under IWC were never worked completely and all the prescribed treatments were never given to the crops, as a result the crop does not show signs of improvements.
5. Regarding regeneration in this Working Circle, is almost nil in this working circle. Due to the proximity of these lands to villages, whatever plantations have been taken, most of them have been damaged by fire and grazing.
6. As most of the areas are around villages, it had lot of pressure of grazing, head loads and fire. Like SCI working Circle, the prescriptions of the working plan related to protection and regeneration could not be implemented effectively. As a result the regeneration status in the areas adjoining the villages, is not satisfactory, whereas the areas away from the villages, it is comparatively better.
7. Like SCI working circle, vital for the health of the future crop, like CBO, Cleaning, Thinning, Singling, protection from fire and grazing etc. have been neglected & even it has been implemented, no proper record has been maintained in the division. Besides no any appreciable improvement in the crop could be observed, leading to the general deterioration of the forests.

AFFORESTATION & ROOTSTOCK MANAGEMENT WORKING CIRCLE

The Afforestation Working Circle included 13465.24 ha. The entire area of this working circle has been divided into 9 treatment series of average size 1496 ha. Each felling series has been further divided into 20 annual coupes of average size 75.00 ha. The special objects of management of constitution of this working circle were as under.

1. To restore the vegetative cover of these degraded and open areas, primarily, by tending of existing natural regeneration and rootstock and supplementing it with plantations,
2. To improve socio-economic condition of local people. The successful results would provide services of the life-support system,
3. To supply small timber, poles and firewood to meet bona fide future needs of the local people, including the nistar.

Result of Past working: The area under this working circle was not properly taken care of in the past. As per the prescriptions, the area was supposed to be closed for grazing, high quality grasses were supposed to be planted and protected from fire and grazing, but none of these operations were carried out properly. Areas taken for afforestation were not as per the sequence of working plan. Tending of natural regeneration & root stock could not be done properly, due to which the area under this working circle further deteriorated. Like other working circles, no subsequent treatments were given leading to further deterioration of the crop. As per the prescriptions, the area was supposed to be closed for grazing and protected from fire and grazing, but none of these operations were carried out properly. Because of that the plantations are mostly failure.

PROTECTION & CATCHMENT AREA MANAGEMENT WORKING CIRCLE

The Protection Working Circle included 17540.18 ha. The special object of management of this working circle was to protect the fragile forest sites and soil conservation in the catchments of dams and water bodies. No considerable works as proposed in this working circle were carried out.

Grass & Fodder Resource Management G&FRM)(GB): The total area covered in this working circle was 10363.96 ha. The special objects of management of this working circle were as under.

1. The forests put under this working circle were primarily intended to augment fodder requirements of the villages.
2. Availability of fodder resources was drastically reduced. Introduction of suitable improved varieties of grasses as well as legumes and fodder tree species in selected areas were therefore proposed.
3. These areas being close to villages and local people being still dependant to a large extent for their fuel wood and small timber requirements on the forests, may also manage such areas to supply these forest produce, though these tracts are primarily meant to act as grazing grounds and grasslands.

But most of the prescriptions of this working circle could not be implement during the plan period

Miscellaneous Working Circle: The rest of the areas of the division were allotted to this Working Circle. A total of 14810.22 ha area was allotted to this Working Circle. Some of areas were under submergence. The prescriptions for the lands with other agencies were only demarcation and fire protection etc. Prescriptions for the land in charge of the Forest department were also the same in addition plantation was also proposed, but no considerable works were carried out in these areas.

Bamboo (Overlapping) Working Circle: The total area allotted to this working circle was 10527.25 ha. The area was divided into 16 cutting series. Each cutting series was divided into 3 coupes viz. A, B, C and one of the coupe from each cutting series was to be worked annually. Total number of coupes due for working was 16 each years. The special objects of management of this working circle were as under.

1. To improve the bamboo productivity for meeting local needs and demand in the surrounding areas
2. To improve the socio-economic demand of people by giving them bamboo at concessional rate as well as employment.
3. To development of local inhabitants of this region.

Result of Past working:- While implementing the prescription of this working circle, following results have been observed.

1. Bamboo working was mainly confined to Deolapar & Paoni ranges which were with 10 km. from the boundary of Pench NP & Mansinghdeo WLS & therefore most of the areas are not worked. Therefore, the clumps have become so congested that now it has become very difficult to work. Some of these clumps are dying due to congestion and recurrent fire.

2. The traditional Bamboo areas where the coupe working had been carried out for several cycles, but the areas under plantation could not be worked and left to its fate. The result is that in spite of good survival the clumps have become so congested that now it has become very difficult to work. Some of these clumps are dying due to congestion and recurrent fire.

3. Natural Bamboos are also available in in the division in some patches, which too have deteriorated due to illicit cutting. Large scale plantations have been taken throughout the division, which are successful in varying degrees. At some places clump formation has started but no systematic working has been done in these areas, due to which clumps have become congested and even dead, in many places.

Wildlife (Overlapping) Working Circle: The entire of the division were allotted to this working circle. The position of wildlife in Nagpur division is fairly good but the distribution of wildlife is uneven. The forests of Nagpur division are extremely important as it lies adjacent to Pench NP, Mansinghdeo WLS & New Bor WLS. This forest should have been given much more importance for wildlife habitat management and corridor management point of view. But unfortunately the case was reverse.

Result of Past working:- There were several important prescriptions III the said working plan but as per the information provided by the DCF Nagpur, most of these prescriptions could not be implemented, hence it is not possible to analyse the impact of this working plan on the health of wildlife.

5.12 PAST YIELD, REVENUE AND EXPENDITURE

The annual out turn of various forest produces, gross revenue and expenditure during the past years has been given in the volume II of this working plan.

CHAPTER - VI

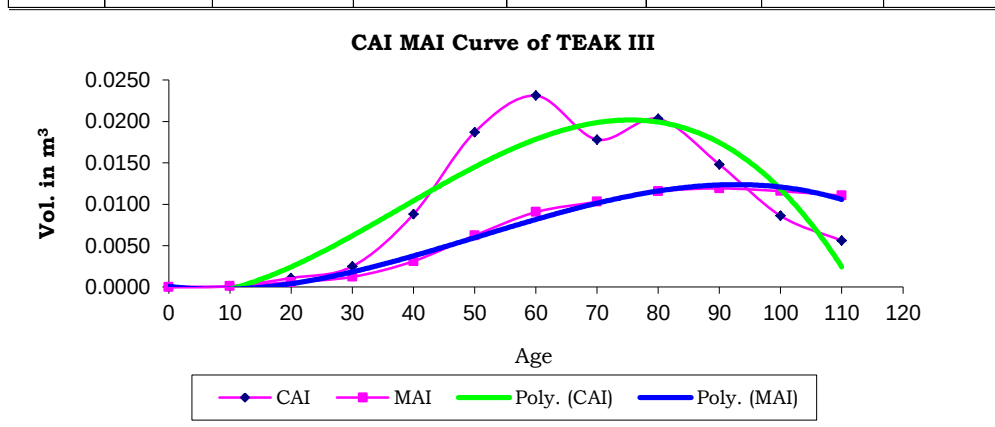
STATISTICS OF GROWTH AND YIELD

6.1 Statistics of Rate of Growth of Teak: Exercise of Stem analysis was carried out recently in the Gondia Division by the Conservator of Forest Working Plan Nagpur to calculate the growth and yield of teak and some other important species.

Stem Analysis of Teak III: Site Quality III is found in very few patches of the Bhandara division. The work was carried out in the compartment No. 63 PF of Tiroda range and its result applied for Nagpur division and reproduced in the Table 6.1.

Table No. 6.1 Results of Stem Analysis for Teak Site Quality III

Sr. No.	Age in Years	Height in Meters	DBH(ob) in cm.	GBH(ob) in cm.	Volume in M ³ .	CAI in M ³ .	MAI in M ³ .
1	0	0	0.00	0.00	0.000	0.0000	0.0000
2	10	4.25	3.50	11.00	0.001	0.0001	0.0001
3	20	8	8.00	25.14	0.012	0.0011	0.0006
4	30	11.2	16.70	52.47	0.037	0.0025	0.0012
5	40	13.6	26.20	82.32	0.125	0.0088	0.0031
6	50	15.5	31.80	99.92	0.312	0.0187	0.0062
7	60	16.7	35.30	110.91	0.543	0.0231	0.0091
8	70	18.2	37.00	116.25	0.721	0.0178	0.0103
9	80	19.4	38.50	120.97	0.924	0.0203	0.0116
10	90	20.6	40.90	128.51	1.072	0.0148	0.0119
11	100	21.7	42.60	133.85	1.158	0.0086	0.0116
12	110	22.5	44.10	138.56	1.214	0.0056	0.0110



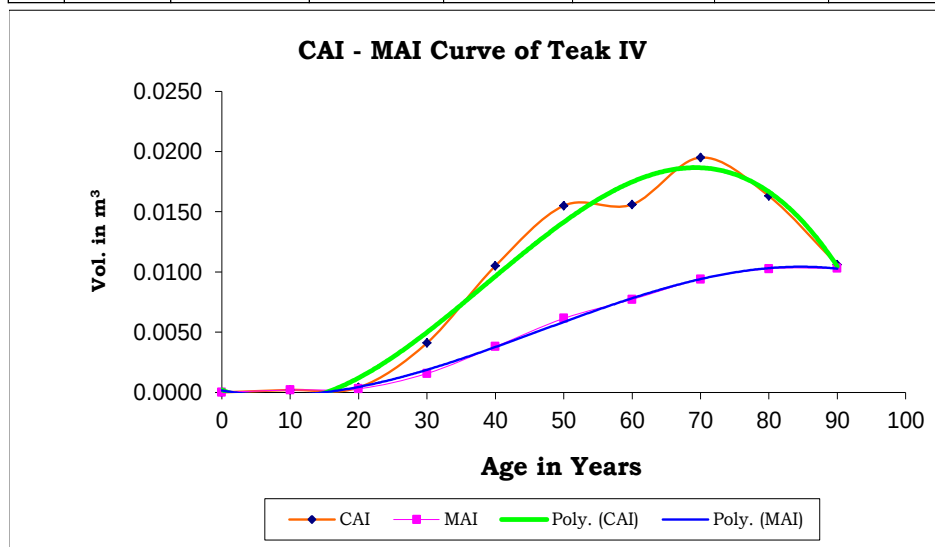
The CAI/MAI curves for Teak III intersect at 99 years of age and girth (OB) corresponding to this exploitable age is 134 cm. The exploitable girth is hence fixed at 135 cm.

Teak patches of site quality III is found in Khapa, Ramtek, Parsheoni, Hingana ranges, Nagpur Forest Division.

Stem Analysis of Teak IV A: For Stem analysis exercise trees were selected in compartment No. 30RF and 63PF of Gondia Division. The Stem analysis carried out by CF, Working Plan, Nagpur and its result applied for Nagpur division and reproduced in the Table 6.2.

Table No. 6.2 Results of Stem Analysis for Teak Site Quality IV.

Sr. No.	Age in Years	Height in Meters	DBH (ob) in cm.	GBH (ob) in cm.	Volume in M ³ .	CAI in M ³ .	MAI in M ³ .
1	0	0	0.00	0.00	0.000	0	0
2	10	4.8	4.95	15.55	0.002	0.0002	0.0002
3	20	7.6	12.51	39.31	0.006	0.0004	0.0003
4	30	10.3	20.24	63.59	0.047	0.0041	0.0016
5	40	11.7	25.72	80.81	0.152	0.0105	0.0038
6	50	13.1	28.37	89.14	0.307	0.0155	0.0061
7	60	14.8	34.93	109.75	0.463	0.0156	0.0077
8	70	15.9	37.28	117.13	0.658	0.0195	0.0094
9	80	17.2	38.64	121.41	0.821	0.0163	0.0103
10	90	18.5	39.20	123.17	0.927	0.0106	0.0103



The CAI/MAI curve for Teak IV intersect at the age of 90 years girth (OB), corresponding to this exploitable Girth is 123 cm. (OB). The exploitable girth is hence fixed at 120 cm.

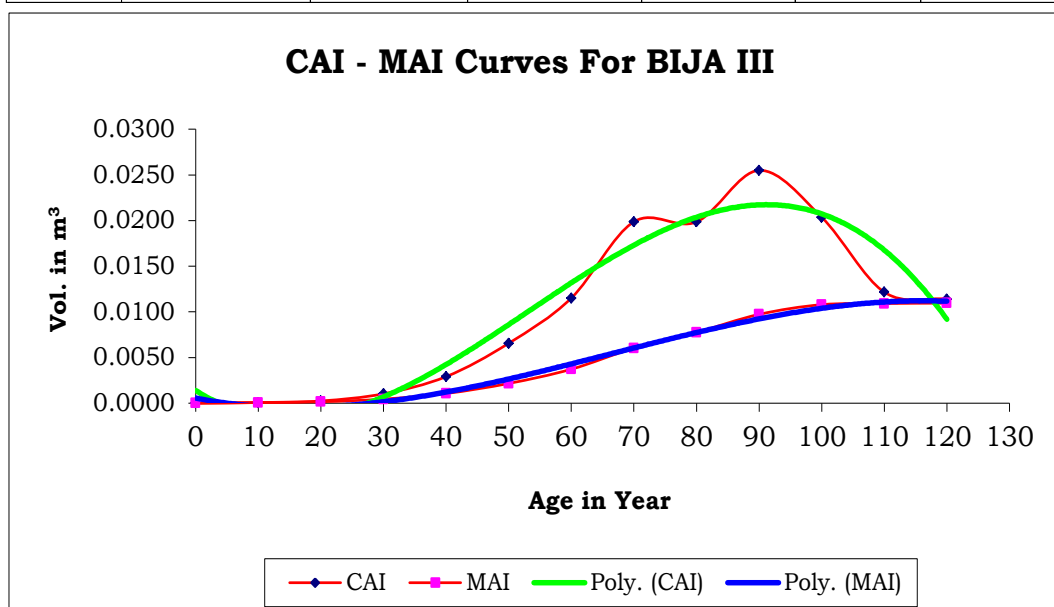
6.2 Growth of Miscellaneous Species : Stem analysis of miscellaneous species like Bija, Ain, Dhaoda in site quality III and IV areas was carried out by the CF, Working Plan, Nagpur by selecting sample trees form different sites of the division. The results of this exercise are given in the following table.

Results of Stem Analysis for Bija Site Quality III.

Table No.6. 3 Stem Analysis Results of Bija III

Compartment No. 108 RF and 204 RF of Gondia Division

Age in Years	Height in Meters	DBH(ob) in cm.	GBH(ob) in cm.	Volume in M ³ .	CAI in M ³ .	MAI in M ³ .
0	0.00	0.00	0.00	0.0000	0.0000	0.0000
10	1.37	3.51	11.03	0.0007	0.0001	0.0001
20	3.70	6.55	20.58	0.0031	0.0002	0.0002
30	7.20	12.50	39.28	0.0134	0.0010	0.0004
40	10.15	18.05	56.71	0.0425	0.0029	0.0011
50	12.70	24.45	76.82	0.1081	0.0066	0.0022
60	15.20	30.40	95.52	0.2232	0.0115	0.0037
70	16.15	36.75	115.47	0.4219	0.0199	0.0060
80	19.60	38.70	121.60	0.6204	0.0199	0.0078
90	21.65	39.80	125.05	0.8754	0.0255	0.0097
100	22.85	40.70	127.88	1.0790	0.0204	0.0108
110	24.50	42.00	131.96	1.2006	0.0122	0.0109
120	25.00	43.00	135.11	1.3145	0.0114	0.0110



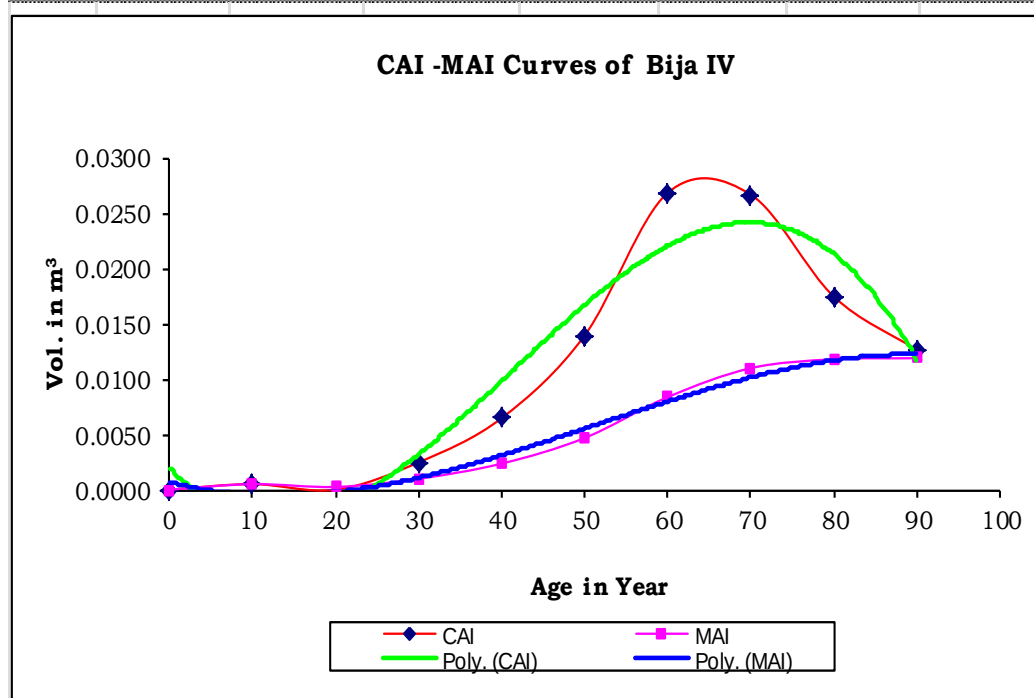
The CAI/MAI curve intersects at 118 years of age and the girth (OB) corresponding to this exploitable Girth is 134 cm. The exploitable girth is hence fixed at 135 cm.

Stem analysis of Bija for Site quality IV

Table No. 6.4 Results of Stem Analysis for Bija Site Quality IV

Compartment No. 108 RF of Tiroda Range

Sr. No.	Age in Years	Height in Meters	DBH(ob) in cm.	GBH(ob) in cm.	Volume in cum.	CAI in M ³ .	MAI in M ³ .
1	0	0.00	0.00	0.00	0	0	0
2	10	1.37	3.50	11.00	0.0050	0.0005	0.0005
3	20	4.34	5.15	16.18	0.0049	0.0000	0.0002
4	30	8.72	12.47	39.18	0.0295	0.0025	0.0010
5	40	12.64	18.74	58.88	0.0941	0.0065	0.0024
6	50	14.95	24.92	78.30	0.2334	0.0139	0.0047
7	60	15.40	31.34	98.47	0.5016	0.0268	0.0084
8	70	17.74	35.30	110.91	0.7682	0.0267	0.0110
9	80	19.15	37.55	117.98	0.9427	0.0175	0.0118
10	90	20.34	38.70	121.60	1.0689	0.0126	0.0119



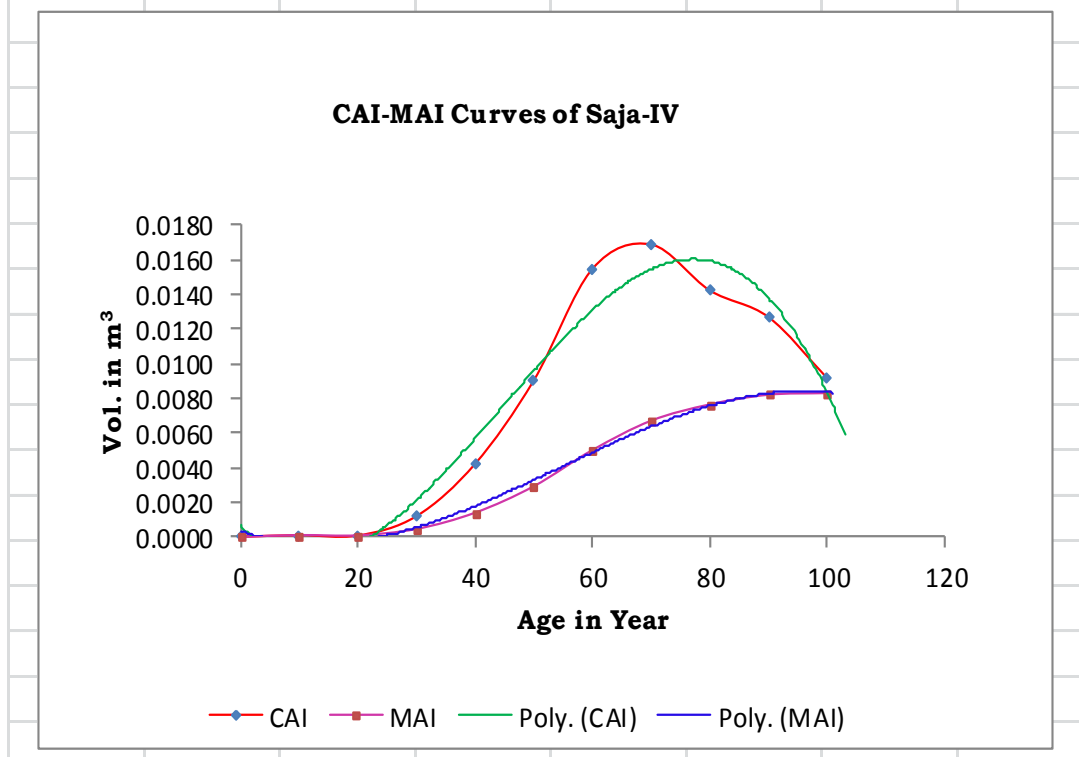
The CAI/MAI curves intersect at 89 years age girth (OB) corresponding to this exploitable Girth is 120 cm. The exploitable girth hence is fixed at 120 cm.

Stem analysis of Saja (Ain) for Site Quality IV

Table No. 6.5 Results of Stem Analysis for Ain Site Quality IV

Compartment No. 204 RF and 63 PF of Sakoli and Tiroda range

Sr. No.	Age in Years	Height in Meters	DBH(ob) in cm.	GBH(ob) in cm.	Volume in m ³ .	CAI in m ³ .	MAI in m ³ .
1	0	0.00	0.00	0.00	0.00	0.00	0.00
2	10	1.37	2.75	8.64	0.001	0.0001	0.0001
3	20	7.32	6.71	21.08	0.0017	0.0001	0.0001
4	30	12.59	12.48	39.21	0.0136	0.0012	0.0005
5	40	15.54	19.19	60.29	0.0556	0.0042	0.0014
6	50	17.35	25.16	79.05	0.1458	0.0090	0.0029
7	60	18.25	31.20	98.03	0.3003	0.0155	0.0050
8	70	19.25	35.77	112.39	0.4689	0.0169	0.0067
9	80	20.38	38.64	121.41	0.6110	0.0142	0.0076
10	90	21.17	40.18	126.25	0.7376	0.0127	0.0082
11	100	22.36	41.3	129.76	0.8291	0.0091	0.0083



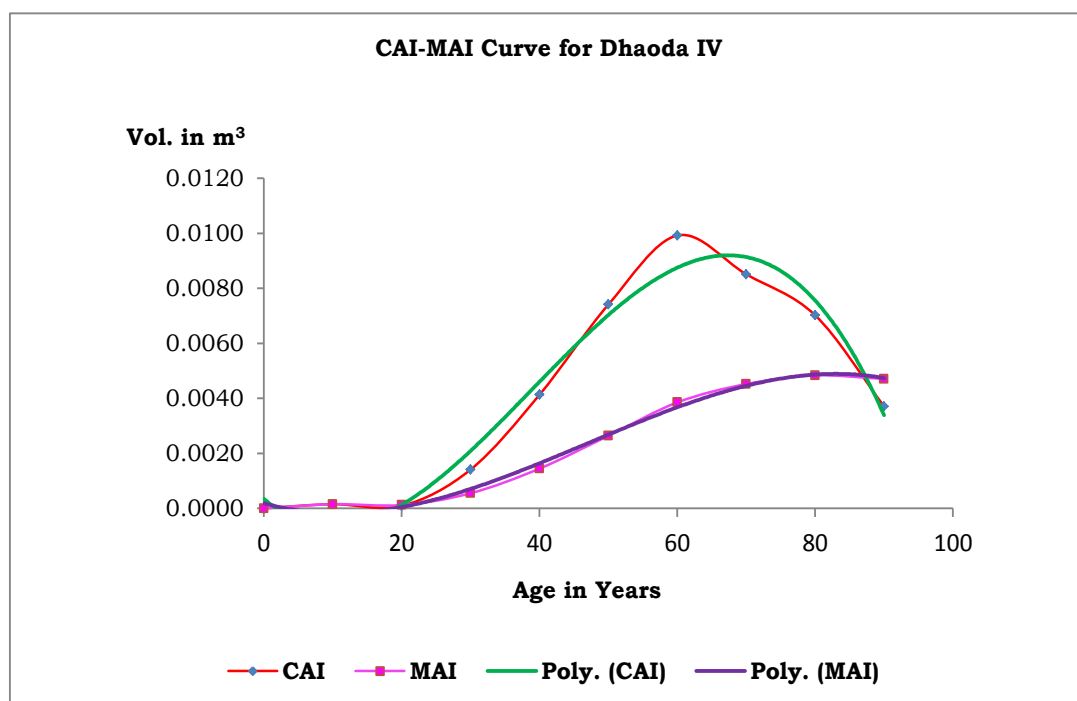
The CAI/MAI curve intersect at 100 years age, girth corresponding (OB) to this exploitable girth is 129 cm. The exploitable girth is hence fixed at 120 cm.

Stem Analysis of Dhaoda for Site quality IV

Table No. 6.6 Results of Stem Analysis for Dhaoda Site Quality IV

Compartment No. 312 RF of and Gondia Division

Sr. No.	Age in Years	Height in Meters	DBH(ob) in cm	GBH(ob) in cm	Volume in cum.	CAI in cum.	MAI in cum.
1	0	0.00	0.00	0.00	0.00	0.00	0.00
2	10	2.65	1.72	5.40	0.0015	0.0002	0.0002
3	20	7.54	7.34	23.06	0.0024	0.0001	0.0001
4	30	10.37	12.25	38.49	0.0165	0.0014	0.0006
5	40	13.28	17.15	53.89	0.0578	0.0041	0.0014
6	50	15.24	21.32	66.99	0.1319	0.0074	0.0026
7	60	16.32	26.50	83.26	0.2311	0.0099	0.0039
8	70	16.94	28.45	89.39	0.3162	0.0085	0.0045
9	80	17.31	29.52	92.75	0.3864	0.0070	0.0048
10	90	17.52	30	94.26	0.4235	0.0037	0.0047



The CAI/MAI curves of Dhaoda site quality IV intersect at 88 years of age girth (OB) corresponding to this, exploitable age is 93 cm. The exploitable girth is hence fixed at 90 cm.

6.2.1 The growth data of Garadi, Tinsa, Bel, Lendia, Khair, Rohan and Salai obtained from various working plans of neighboring Division is reproduced below.

Table No.6.7 Table Showing year and Girth of Misc. Species.

Age in years	Mean Girth (OB) at breast height in cm for species						
	Garadi	Tinsa	Bel	Lendia	Khair	Rohan	Salai
10	16.7	12.7	19.1	15.7	10.0	13.7	9.8
20	26.4	25.4	28.2	28.7	24.0	25.4	12.4
30	35.4	35.8	33.5	33.0	38.0	34.3	(23.0)
40	40.9	(43.0)	(37.2)	38.1	51.0	(38.0)	(30.3)
50	44.00	(48.0)	(39.2)	40.6	65.0	(40.0)	*(38.3)

*The figures in the brackets are obtained by extrapolation

6.3 Local Volume Tables:

6.3.1 The following Local volume table for Teak,Ain,Bija,Dhaoda and Garadi has been applied for Nagpur Forest division. Bhandara Forest division is adjoining to the division; hence it will be applied to this division. The Local volume table is given in Table 6.8

Table No.6.8 Local Volume Table for Teak, Ain, Bija, Dhaoda and Garadi (IVAQuality)

Girth Class (cms)	Mid-girth (cms)	Volume per Tree in Cubic Metres		
		Teak	Ain,Bija,Dhaoda and Tendu	Garadi
16-30	23	0.0166	0.0185	0.0134
31-45	38	0.034	0.0374	0.0272
46-60	53	0.0784	0.0862	0.0627
61-75	68	0.1483	0.1631	0.1186
76-90	83	0.2437	0.2681	0.195
91-105	98	0.3646	0.4011	0.2917
106-120	113	0.5111	0.5622	0.4089
121-135	128	0.6831	0.7514	0.5465
136-150	143	0.8806	0.9687	0.7045

6.3.2 Local volume table for few miscellaneous species has been prepared by the staff of Working Plan Division Nagpur. The field data for this has been collected from Gondia and Bhandara Division and are given in the **Table No 6.9**

Table No.6.9 Local Volume Table for Other Miscellaneous Spp.

Girth Class (cms)	Shisham	Surya	Haldu	Kumbhi	Khair	Babul	Mowai	Shiwan	Beheda
	Volume (M ³ .)								
10-20	0.060	0.18	0.05	0.16	0.04	0.075	0.025	0.005	0.15
20-30	0.180	0.36	0.15	0.36	0.1	0.163	0.075	0.05	0.4
30-40	0.58	0.82	0.3	0.56	0.26	0.5	0.3	0.31	0.7
40-50	1.34	1.62	0.5	0.98	0.62	1.31	1.375	0.94	1.15
50-60	2.54	2.76	1.1	1.76	1.2	3.125		2.2	1.8
60-70	4.9	4.66	2.25	2.98	2.08				2.55
70-80			4.4	4.58	4.6				3.5

6.4 Enumeration:

- The enumeration of trees and the regeneration survey of the forest crop in the division is carried out by Forest Resources Survey Unit, Amravati. The sampling design was systematic line-plot survey and the intensity of sampling was 1(one) percent.
- Systematic line-plot sampling was carried out at the intersections of 600-meter grid. Species and girth distribution (15 cm girth classes) of trees counting were done in 0.36-hectare plots (60 meter x 60 meter).
- 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.
- Recording of forest types, site quality, density have been included as an integral part of the enumeration exercise.
- Enumeration data was analysed and enumeration results have been computed separately for each working circle. Stem density, basal area and frequency of each species have been calculated. The results of enumeration and regeneration for various working circle compartment wise are given in Volume II of this plan.

6.5 Statistics of Rate of Growth of Teak, and Miscellaneous Species:

(A) Growth of Teak :

- (i) **Stem Analysis:** In the Patil and Sardar's plan the growth data for teak was compiled from stem analysis of 65 trees. Twenty eight of these trees fall in all India quality III and 37 in quality IV. The results of stem analysis are reproduced below.

Table No. 6.10: All India Teak Site Quality III.

Age in years	Height In Mts.	Diameter O.B. at Breast height cm.	Girth O.B at Breast height cm.	MAI M ³	CAI M ³
10	5.5	5.5	17.3	0.0005	0.0005
20	11.25	14.5	45.6	0.00325	0.0060
30	15.25	22.0	69.1	0.00683	0.0140
40	18	28.4	89.3	0.010625	0.0220
50	20	33.6	105.6	0.0133	0.0240
60	21.5	37.5	117.9	0.01483	0.0225
70	(22.25)	(40.3)	126.7	0.01557	0.0200
80	(22.8)	(41.8)	131.4	0.01568	0.0165
90	(23)	(42.5)	133.6	0.01555	0.0145

Table No. 6.11: All India Teak Site Quality IV.

Age in years	Height in Mts.	Diameter O.B. at Breast height cm.	Girth O.B.	MAI M ³	CAI M ³
10	5.5	3.2	101	0.0003	0.0003
20	7.5	8.6	27	0.0011	0.0019
30	10.5	13.3	41.8	0.002083	0.00405
40	12.7	18	56.6	0.0030	0.00575
50	14.2	22	69.1	0.00416	0.0088
60	15.5	25.5	80.1	0.0051	0.0098
70	16.3	29	91.1	0.00594	0.0110
80	17	31.6	99.3	0.00666	0.0117
90	17.4	34	106.9	0.00745	0.01375
100	17.7	36	113.1	0.008125	0.01420
110	(18)	38	119.4	0.008636	0.01375
120	(18.1)	39.5	124.1	0.008958	0.0125
130	(18.2)	(41)	(128.9)	0.00915	0.01145
140	(18.2)	(42)	(132)*	0.00921	0.0100

*The figures in the brackets are based on extrapolation of the curves.

From the above tables following conclusions can be drawn.

(a) All India Quality III :

- (i) The areas capable of growing sound trees up to 23 m in height and 42.5 cm diameter over bark at breast height in 90 years.
- (ii) The CAI and MAI curves intersect at the age of 82 years.

(b) All India Quality IV :

- (i) The areas are capable of growing sound trees up to 18.20m in height and 42.0 cm in diameter over bark at breast height in 140 years.
- (ii) The CAI and MAI curves intersect at the age of 145 years.

The teak trees falling in quality IV were mostly, from hilly and poor areas. Also they had grown under adverse conditions and had suffered suppression at various periods for want of proper treatment. It will attain a diameter of 38.2 cm (girth 120 cm) over bark at breast height in 90 years, with proper treatment.

Teak Plantations: The growth data of teak plantations compiled by Patil and Sardar is reproduced below:-

Table No 6.12.

Age Girth Relation of Teak Plantation:

Age in Years	Height (Mt.)	G.B.H. (O.B) (cm.)
10	9.06	34.8
20	14.7	57.5
30	18.57	79.3
40	26.67	100.4

The above table shows that -

- (i) Teak plantations on an average are of quality III.
- (ii) The height and girth increment during young age is much faster in teak plantations compared to the growth of teak trees in natural teak forest of quality III.

B. Growth of Miscellaneous Species:

- (i) **Growth of Bija** : Results of stem analysis of Bija by Patil and Sardar are reproduced below:-

Table No. 6.13 Result Of Stem Analysis of Bija IV B:

Age in Years	Height at Breast height in mts.	D.B.H(O.B.) in cm.	G.B.H. (O.B) in cm.	MAI M ³	CAI M ³
10	3	4	12.6	0.0002	0.0002
20	5.9	10	31.4	0.00075	0.0013
30	8.5	15.7	49.3	0.001833	0.004
40	11.1	20.9	65.7	0.00325	0.0075
50	13.3	25.9	81.4	0.00474	0.0107
60	15.6	30.8	96.8	0.006416	0.0148
70	17.7	35.2	110.6	0.008543	0.0213
80	19.8	38.8	121.9	0.00985	0.019
90	(21.8)*	41.2	129.5	0.01	0.0112

*The figures in the brackets are based on extrapolation of the curves.

On the basis of above table it can be concluded that -

- The areas capable of growing sound trees up to 21.8 m in height and 41.40 cm in diameter and 130 cm. girth (OB) at breast height in 90 years.
- The CAI and MAI curves intersect at 91 years.

Growth of Ain: Growth data of Ain as given in the working plans of Bhandara, East Chanda and Noth Khandwa (M.P.) written by Patil and Sardar, Kartar Singh and Nigam respectively, are reproduced in Table No.8.14

Table No. 6.14 Age Girth Relation of Ain in Different Divisions:

Age in Years	Mean Girth O.B. at Breast Height in cms.		
	Bhandara	East Chanda	North Khandwa
10	11.9	11	16.5
20	26.7	21	29.5
30	38.5	30.0	40.6
40	50.3	39	45.7
50	59.7	49.	48.3
60	(70)	58.0	0
70	(80.0)	67.5	0
80	(91)	78	0
90	(102)	88	0
100	(112)*	99	0

*The figures, in the brackets are obtained from extrapolation.

(iii) Growth of Bhirra: Growth data of Bhirra obtained from various working plans is reproduced below:-

Table No. 6.15 Table Showing Age - Girth Relation of Bhirra in different Divisions:

Age in Years	Mean girth O.B at breast height in cm. As per W.P. of		
	Nagpur	East Chanda	North Khandwa
10	7.5	7.5	16.0
20	17.6	16.0	27.9
30	30.2	24.0	39.6
40	45.3	30.0	55.0
50	61.6	37.0	70.0
60	74.2	43.0	83.0
70	86.7	51.0	95.0
80	96.8	59.0	105.0
90	104.3	67.0	113.0
100	118.9	75.0	121.0

(iv) Growth of Dhaoda: The growth data of Dhaoda obtained from different working plans is reproduced below:-

Table No .6.16 Table Showing Age-Girth Relation of Dhaoda in Different Divisions:

Age in Years	Mean girth O.B at breast height in cm. as per W.P. of Dr. Nandkishore		
	Bhandara	East Chanda	Indore
10	11.0	0	11.0
20	24.5	26.4	21.0
30	33.5	0	31.5
40	39.6	45.0	42.0
50	43.7	52.5	50.0

(v) Growth of Other Misc. Species: Growth data of Garadi, Tinsa, Bel, Lendia, Khair, Rohan and Salai obtained from various working plans is reproduced below:-

Table No. 6.17 Table Showing Age-Girth Relation of Some Misc. Spp.

Age in years	Mean Girth O.B. at Breast Height in cm. for specific years						
	Garadi	Tinsa	Bel	Lendia	Khair	Rohan	Salai
10	16.7	12.7	19.1	15.7	10.0	13.7	9.8
20	26.4	25.4	28.2	28.7	24.0	25.4	12.4
30	35.4	35.8	33.5	33.0	38.0	34.3	(23.0)
40	40.9	(43.0)	(37.2)	38.1	51.0	(38.0)	(30.3)
50	44	(48.0)*	(39.2)	40.6	65.0	(40.0)	(38.3)

*The figures in the brackets are obtained by extrapolation.

6.6 Stock Mapping: Stock mapping was done during this plan preparation well in time carried out by Dy. Conservator of Forest, Nagpur Forest Division, and records compared with the enumeration data as well as satellite imageries.

With help of GIS compatible Software entire data pertaining to watershed, soil, Classified scene of vegetation, road, range, beat, division boundaries, stock maps, important features like village, tank, rest houses, headquarters of range, round beats, Tahsils etc. have been digitised and maintained in the form of different layers.

The Classified remote sensing data of 2010 have been procured from FSI, Nagpur and analysed at GIS Cell in the Office of the Conservator of Forests, Working Plan, Nagpur. Stocking of the forest, as per Satellite data analysis and as on the ground, have been ascertained by conducting Sample Ground Truthing during preparation of Draft Plan Report.

6.7 Annual Yield: The annual outturn of Forest Produce is given in the Volume II of this working plan. Based on the past workings, the Form Factors will be prescribed for calculating the yield.

CHAPTER -VII

WILDLIFE CONSERVATION

7.1 DISTRIBUTION OF THE WILDLIFE

Nagpur division has a fairly good distribution of wildlife spread all over the division except near the inhabited areas. The wildlife sighting is the best near boundaries along the Pench National Park and the Mansinghdeo wildlife sanctuary, Bor wildlife sanctuary. Two new wildlife sanctuaries in the Nagpur division, namely new Urnred-Karandla WLS & Mansinghdeo WLS, have been created. Absence of natural grassland limits the herbivore population. Panther is found in all ranges and is commonly found near the villages. Nilgai, sambhar and cheetal as well as wild boars are found all over the tract. Tiger is often seen in Urnred, Kondhali, Khapa, Deolapar & Paoni ranges. Jackal, jungle cat and hyaena are also common. Gaur and wild dogs are mainly seen near the Pench National Park & Mansinghdeo WLS. Large avifauna can be seen in the tract. Migratory birds near tanks are common during the season. Barking deer, sloth bear, langur and monkeys are also common mammals. Common wild birds include painted sand grouse, common sand grouse, pea fowl, grey jungle fowl, red jungle fowl, red spur fowl, painted partridge, grey partridge, jungle bush quail, black breasted quail, indian bustard quail, common or grey quail, pigeon, crane, dove, cotton teal, whistling teal and comb duck are found in the tract.

The wildlife in the tract dealt with is seriously depleted due to the indiscriminately shooting during the zamindari regime. Hunting by local tribals also contributed in the decline of wildlife even in the interior hilly areas having good forests. Apart from indiscriminate shooting, poaching and hunting, the population explosion and economic developments have led to the severe degradation of natural habitat of wildlife. The food, water and shelter, the basic needs of the wild animals have become scarce in plain, accessible areas.

Biodiversity conservation is an important mandate of the forest department and with the enactment of Wildlife (Protection) Act 1972; wildlife management has become synonymous with biodiversity conservation. The history of wildlife management, summary of Wildlife (Protection) Act, 1972 and other important issues of man-animal interface have been summarized under this chapter.

7.2 DESCRIPTION OF THE WILDLIFE

The division is rich in wild life. Almost all the forest areas of the division have a fairly good distribution of wild animals, but population density varies with the availability of habitat conditions like food, water and shelter. Deolapar, Parseoni, Ramtek, Khapa, Paoni, South Umred and Hingna ranges that is, the areas adjoining to the Pench National Park, Mansinghdeo wildlife sanctuary, Umred-Karandla wildlife sanctuary and Bor Sanctuary and also the South Umred range are particularly rich in wildlife. In Narkhed, Kondhali, North Umred and Kuhi ranges, wild animals are less in number, where they are seen in better patches of the forests. Representative Central Indian fauna is found in the division and the category wise list of the animals usually found is as shown below:

CARNIVORA: (i) Tiger (*Panthera tigris*) (ii) Panther (*Panthera pardus*) (iii) Hyaena (*Hyaena hyaena*) (iv) Wild Dog (*Cuon alpinus*) (v) Indian Wolf (*Canis lupus pallipes*) (vi) Jackal (*Canis aureus*) (vii) Common Fox (*Vulpes bengalensis*) (viii) Leopard Cat (*Felis bengalensis*) (ix) Jungle Cat (*Felis chaus*).

HERBIVORA: (i) Bison-Gaur (*Bos gaurus*) (ii) Sambhar (*Cervus unicolor*) (iii) Cheetal (*Axis axis*) (iv) Nilgai (*Boselaphus tragocamelus*) (v) Barking Deer (*Muntiacus muntjak*) (vi) Wild pig (*Sus scrofa*) (vii) Sloth bear (*Ursus ursinus*) (viii) Black Buck (*Antelope cervicapra*) (ix) Four horned antelope (*Tetracerus quadricornis*) (x) Chinkara or Indian gazelle (*Gazella gazella bennettii*), (xi) Mouse deer (*Tragulus memina*).

RODENTS: (i) Flying squirrel (*Pteromya fimbriatus*) (ii) Three striped palm squirrel (*Funambulus palmarum*) (iii) Porcupine.

BIRDS: (i) Painted sand grouse (*Pterocles indicus*) (ii) Common sand grouse (*Pterocles exustus*) (iii) Pea fowl (*Pavo cristatus*) (iv) Grey jungle fowl (*Gallus sonneratii*) (v) Painted partridges (*Francolinus pictus*) (vi) Grey partridges (*Francolinus pondicerianus*) (vii) Jungle bush quail (*Pardicula asiatica*) (viii) Black breasted Rain quail (*Turnix coromandelicus*) (ix) Indian Bustard quail (*Turnix sorsator*) (x) Indian or yellow legged button quail (*Turnix tanki*) (xi) Red spur fowl (*Gallus spadices*) (xii) Crane (*Grus antigone*) (xiii) Spotted

bill duck (*Anas poecilorhyncha*) (xiv) Pigeon (*Treron phoenicoptera*) (xv) Dove (*Streptopelia* spp.) (xvi) Cotton teal (*Nettion coromandelianus*) (xvii) Whistling teal (*Dendrocygna javanica*).

Tiger is usually found in Ramtek, Khapa, Parseoni and Deolapar ranges and Panther in almost all the ranges. Hyena, Jackal and Foxes are seen frequenting near the inhabited areas. Packs of wild dogs are seen in the Ramtek, Parseoni, Deolapar and Khapa ranges.

Nilgai, Chital and Sambhar are found all over the division. Gaurs are mainly found in Parseoni, Ramtek and Deolapar ranges. Bears are found usually in the valleys of Deolapar and Ramtek ranges and also in the Ranbodi block of North Umred range. Typical Central Indian avifauna is also found in the forest tracts of this division and waterfowl are seen in the water bodies within as well as those located outside the forests. In fact, there are many large water bodies, some even close to Nagpur city like Koradi Lake, which provide good habitat to many migratory winter visiting water birds.

7.3 HISTORY OF THE WILD LIFE MANAGEMENT.

Hunting in the Reserved Forests was regulated according to the hunting licenses issued for specific shooting blocks. The Zamindars used to regulate hunting in the ex-proprietary forests prior to the abolition of their rights, which was followed by the shooting block system and the licenses similar to the Reserved Forests. Presently, the law does not permit sport hunting of wild animals. The wildlife is threatened by habitat damaged caused by factors like increasing human and cattle population, encroachment for cultivation, poaching facilitated by the improved road network and efficient weapons. Poaching problem has attained a menacing proportion as evident from large seizures all over the country. Greater attention to the wildlife management, however, is a heartening trend. The wildlife and the territorial divisions at Nagpur are coordinating their efforts including the eco-development programmes to ensure success of their protection measures.

A number of cattle kill by wild carnivores is reported in the division. Such cattle kills and occasional injuries to the villagers are promptly attended, and the loss is compensated in accordance with the prevailing policies.

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 tribal's 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.

Prior to the abolition of the proprietary rights, hunting in the malgajari forests was done with the permission of the malgajars. Consequent to the vesting of these forests in the government as Protected Forests, hunting in these forests was also regulated by fixing shooting blocks and by issuing licenses.

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 roads and availability of sophisticated weapons. Due to increase in demand for wildlife products all over the world, poaching problems have increased over the years and Nagpur, the head quarters of this division being a very big city and an important centre of central India, special efforts are required to be made by the division to protect the wildlife in the region.

7.4 INJURIES TO WILDLIFE

Poaching: 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.

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.

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 method which is proving to be a potential threat to animals, besides sometimes being hazardous to local people.

Wild animals are poached for the skin, bone and meat, and sometimes trapped to serve as pets; Water holes are generally the most vulnerable sites for the poaching. Nets and traps are used for trapping birds, deer and small mammals.

Disease: The livestock from the villages in the forests regularly frequent the forests and share space and resources. Water borne (contagious diseases)

disease 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 certain death.

Sharing the forest areas with disease-affected domestic animals often compromises health of the herbivore population. Outbreaks of contagious diseases like Foot and Mouth Disease drastically reduce the herbivore population.

Fire and habitat damage: Frequent fires damage the wildlife habitat, and animals become vulnerable to poaching. Similarly, habitat disturbances of different types create diverse kinds of stress having adverse impact on the wildlife.

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.

7.5 INJURIES DUE TO WILDLIFE

The carnivores, tigers and panthers particularly sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. The villagers sometimes indulge in poisoning the carcass to take revenge 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. (Revenge Killings) The govt. of Maharashtra therefore has evolved a policy of compensating for the loss of livestock as well as for the injury to and loss of human life. This is summarised below:

COMPENSATION FOR THE LOSS OF LIVESTOCK

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(1 SA)) due to attack of a Tiger, Panther or any other wild animal. The present rates of compensation as per the GR No.WLP-100S/C.No.2701F-1 of 02/07/2010 are as follows and compensation is to be paid within 3 months.

Sr.No.	Particulars	Amount to be paid
1	Cow, Buffalo, Bullock	75% of the market price or Rs.10000/- whichever is less;
2	Sheep, Goat, other livestock	75% of the market price or Rs.3000/- whichever is less;
3	Cow, Buffalo, Bullock became permanently handicapped	50% of the market price or Rs.3000/- and whichever is less;
4	Injury to Cow, Buffalo, Bullock, Goat	Treatment cost. (Govt. or ZP Hospital) 25% of the market price or Rs.1000/- whichever is less.

The compensation to livestock damage has to be given as per the terms and condition mentioned in the Govt. Resolution No. No.WLP-1008/C.No.270/F-I of 02/07/2010. Some the conditions to be fulfilled are as under:

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.
6. No compensation in case the livestock was grazing illegally.

COMPENSATION FOR THE INJURY TO AND LOSS OF HUMAN LIFE:

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, South Bear, Bison, Wild Pigs, Wolf,

Hyena, Jackal and wild dogs is covered under the scheme. Present rates of compensation have been fixed through Govt. Resolution No.WLP-2012/C.No.337/F-I, dt.30/03/2013. These are as follows:

S.N.	Particulars	Amount to be Paid
1	Death	Rs.5.00 lakhs.
2	Permanent disability.	Rs.4.00 lakhs.
3	Major injury	Rs.1.00 Lakh.
Note: cost of medication, preferably in govt. hospital, but in case of unavailability, private medication.		

The compensation to injury & loss human life has to be given as per the terms and condition mentioned in the Govt. Resolution No.WLP-1008/C.No.270/F-I, dated 02/07/2010 and Govt. Resolution No.WLP-2012/C.No.337 /F-I, dated 30/03/2013. Some of the conditions for claiming and deciding above compensation are as under.

1. Such attack 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 legal heir and compensation due to injury is to be given to individual concerned.
1. Compensation is to be sanctioned by the officer not below the rank of DCF/DFO.

7.6 LEGAL POSITION

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

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

"Wild animals, skins, tusks, horns, bones, silk cocoons, honey and wax and all other parts or produce of animal." Section 7 (2)(b) of this act after this amendment provided that anyone who hunts, shoots, fishes, poisons water or sets traps or snares, shall be punishable with the fine which may extend up to fifty rupees or, when the damage resulting from the offence amounts to more than twenty five rupees, to double the amount of such damage. 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.

Vide Notification G.L.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.

After the promulgation of the Indian Forest Act 1927, rules relating to wildlife regulations were framed under section 26(I) 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.

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 Reserve 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

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 sponsoring 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 1 st 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.

1. The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra with effect from 1.6.1973)

2. The Wildlife (Transactions and Taxidermy) Rules, 1973 (became effective III Maharashtra w.e.f. 16.1973).
3. Wildlife (Protection) (Maharashtra) Rules, 1975 (became effective from 6.3.1975).
4. The Wildlife (Protection) Rules and Licensing (Additional matters for consideration) Rules, 1983(became effective w.f. 13.4.1983).
5. Wildlife (Protection) Rules, 1995
6. Wildlife (Specified Plants-Condition for Possession by License) Rules, 1995
7. Recognition of Zoos Rules, 1992.
8. Declaration of Wildlife Stock Rules, 2003.

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. Pench National Park & Mansinghdeo WLS is geographically located within the Deolapar and Parseoni ranges and part of the Bor wildlife sanctuary within Hingna range. 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.

7.7 MANAGEMENT OF WILDLIFE: Wildlife and its management in Nagpur Forest division have been discussed in detailed in the part 2 of Volume I of this working plan, under Wildlife (Overlapping) Working Circle. The detail prescription for Special objectives of management for development & conservation of wildlife & its habitat, recommendations for future management, habitat development works, water hole development, protection measures for wildlife, other protection measures and eco-development, awareness generation and eco-tourism etc. has been given in Wildlife (Overlapping) Working Circle in part 2 of this working plan.

PART – II

CHAPTER - VIII

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED BASIS OF PROPOSAL

8.1 Introduction: This Working Plan is prepared for the scientific management of the Forests and Wildlife of Nagpur. The primary management objective for the Forests of Nagpur Division is to treat forests as per the requirement of site so as to optimise Growing Stock. Nagpur division which is co-terminus with the geographical area of Nagpur district has the distinction of harbouring four protected areas viz., Pench National Park, Mansingdeo Sanctuary, Umred Karandla Sanctuary and Bor/New Bor Sanctuary. Therefore, the territorial forest areas adjoining to these protected areas are rich in Wildlife including the flagship species “Tiger”. Hence, important focus has been given for Wildlife management and Conservation.

8.2 Factors Influencing the General Objectives of Management: Working Plans are technical documents prepared to manage a particular area of forest land on a sustainable basis, with an objective to conserve the bio-diversity, soil and water regime, optimise production of forest products to meet the market needs and also bonafide needs of local people. Various standard scientific treatments, suitable for a particular area, are prescribed to conserve and improve the quality and productivity of the forest to meet the national and global needs in general and the bona fide needs of the local people in particular. While preparing and implementing the plan it is necessary to examine the National Forest Policy and all relevant Laws, Rules, Court orders and various administrative orders issued by the Government of India and Maharashtra, so that all the prescriptions are brought under the umbrella of existing policy framework.

8.3 The National Forest Policy: The National Forest Policy was first enunciated in 1894 and was revised in 1952, after independence. It was again revised in shape of the National Forest Policy 1988, which is, presently, in force.

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

- Maintenance of environmental stability through preservation and where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of forests.

- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represents the remarkable biodiversity and genetic resources of the country.
- 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.
- Checking the extension of sand dunes in the desert areas and along the coastal tracts.
- Increasing the forest/tree cover in the country through massive afforestation and social forestry programmes, especially, on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- Increasing productivity of forests to meet essential national needs.
- Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on the existing forests.

The principal aim of the Forest Policy is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animals and plants. The derivation of direct economic benefit is secondary to this principal aim.

Essentials of Forest Management embodied in the National Forest Policy 1988 are mentioned below:

- Existing forests and forest lands should be fully protected and their productivity improved. Forests and vegetative cover should be increased rapidly on hill slopes, in catchments of the rivers, lakes, reservoirs, ocean shores, on semi arid, arid and desert tracts.
- For conservation of biodiversity, network of national parks, sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately.
- Provision of sufficient fodder, fuel and pasture, especially, in areas adjoining to forest is necessary in order to prevent depletion of forests beyond sustainable limit.
- Minor forest produce provides sustenance to the tribal population and other indigenous population residing in and around the forests. Such produce should be protected, improved and their production should be enhanced with due regard to generation of employment and income.

- Schemes and projects which interfere with forests on the steep slopes, catchments of rivers, lakes and reservoirs, geologically unstable terrain and other ecologically sensitive areas should be severely restricted.
- No forest should be permitted to be worked without the approved working plan, which should be in keeping with the National Forest Policy and directions of the Hon'ble Apex court.
- 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.
- Inculcate in the people, a direct interest in forests and make them conscious of the value of forests, wildlife and nature in general through forest extension, education and training.

8.4 National Forestry Action Plan:

Introduction: Having about 2.5% of world's geographic area, India at present is supporting 16% of world's human population and 18% of cattle population. About 41% of forest cover of the country has already been degraded and dense forests are losing its crown density and productivity continuously. A large number of India's livestock population graze in the forests causing serious damage to soil, ground flora, including regeneration, and productivity of the forests. The use of forests beyond its carrying capacity and encroachments are the main cause of continuous degradation of forests.

To reverse the process of degradation and for sustainable development of forests, the Government of India has prepared National Forestry Action Plan (NFAP), a comprehensive strategic programme. These programmes are as follows:

- i. Protect Existing Forest Resources
- ii. Improve Forest Productivity
- iii. Reduce Total Demand of Forest Produce
- iv. Strengthen Policy and Institutional Framework
- v. Expand Forest Area

Strategies:-

- i. For sustainability and productivity of forests, the production to be increased at least 3 to 5 m³ per ha per year by promoting appropriate silvicultural treatments.
- ii. Hygiene of forests to be improved through suitable silvicultural practices.

- iii. Efforts to be made to bring one-third geographic area of the country under forest and tree cover by plantations on all categories of wastelands and agro forestry.
- iv. Plantations on non-forest wastelands to be done mostly with fuel wood species as 70% of the wood produced from forests are used as fuel wood. Species of pulpwood and other industrial wood may be encouraged in farm forestry.

8.5 National Wildlife Action Plan:

Ministry of Environment and Forests, Govt. of India has formulated National Wildlife Action Plan (2002-2016) , based upon the decision taken in the 21st meeting of the Indian Board of Wildlife held in January 2002. The plan had outlined the strategies and action points for wildlife conservation. The strategy for action is to be adopted under wildlife action plan on the following parameters:

- i. Strengthening and Enhancing the Protected Area Network
- ii. Effective Management of Protected Areas
- iii. Conservation of Wild and Endangered Species and Their Habitats
- iv. Restoration of Degraded Habitats outside Protected Areas
- v. Control of Poaching, Taxidermy and Illegal Trade in Wild Animal and Plant Species
- vi. Monitoring and Research
- vii. Human Resource Development and Personnel Planning
- viii. Ensuring People's Participation in Wildlife Conservation
- ix. Conservation Awareness and Education
- x. Wildlife Tourism
- xi. Domestic Legislation and International Conventions
- xii. Enhancing Financial Allocation for Ensuring Sustained Fund Flow to the Wildlife Sector.

8.6 Court Judgments and Related Committees:

Hon'ble Supreme Court passed an Order in Writ petition (202 of 1995) in the matter of "Godavarman Thirumalkpad" V/s Union of India. The order speaks about the felling of trees in all forests is to remain suspended except in accordance with the working plans of the State government, as approved by Central government.

Hon'ble Supreme Court passed an order on 22.09.2000 in Inter- Locutory application No 424 saying that regeneration of forest should be commensurate with felling carried out under a working plan. To achieve this, it must be ensured that no felling be carried out without allocating necessary fund to regenerate the felled

areas. In the event of failure in regeneration or any shortfall in carrying out regeneration operation no further felling shall be undertaken until the failure/shortfall is made up.

Following the directions of Hon'ble apex court in their order dated 22.09.2000 in IA No 424; a core group was constituted to decide the extent of felling. As per these Orders, felling are to be carried out by the State Governments only after obtaining the permission from core group constituted by the Ministry of Environment and Forests, New Delhi.

Peoples' Participation through JFM: Joint Forest Management approach was adopted for degraded forest area of the State vide GR dated 16 March 1992. The programme was extended to Good Forest areas vide Govt. Resolution dated 25/4/2003. The latest revision in G.R. has been made on 5th October 2011 and 10th July 2012. **All JFM activities should be in consonance with the broad prescriptions of the Working Plan. The Micro plans are to be dovetailed with the prescriptions of the Working Plan.**

8.7 The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006:

After the enactment of this Act, the administration of the forest will be greatly influenced, as this act recognises several individual as well as the community rights over the forest land and its produce. All the provisions of this Act will have to be taken into consideration while managing the forest.

8.8 The Biological Diversity Act, 2002: This Act aims to provide for Conservation of biological diversity and sustainable use of biological resources. These issues are reflected in various Working Circles and the prescriptions made there under.

8.9 Analysis and Valuation of the Crop:

The analysis of forest crop is carried out after enumeration of the crop. The species and tree girth distribution from the enumeration data and density distribution from satellite imageries and Stock Maps prepared by the Staff of Nagpur division has been used for preparing this Working Plan.

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

Areas having sparse tree crops, open areas without tree growth and isolated small forest patches are included in the Afforestation Working Circle

(AWC). In such areas the focus would be upon tending of existing NR and rootstock; in natural regeneration management, the seedlings of seed origin of desirable species will be given preference over the coppice. If NR is insufficient then it will be supplemented by seedling plantations, wherever necessary. Involvement of the local community is considered focal for management of such areas as well as afforestation of open areas and isolated patches.

The compartments and areas close to the habitations which are unsuitable for raising timber crops due to their refractory nature, heavy biotic pressure and grass birs have been proposed to be managed under Grass and Fodder Management Working Circle to cater to the needs of Wildlife and also local people.

8.10 Functional Classification Of Forests:

The broad principles of classification of forests on functional basis have been guided by the Govt. Resolution No. MRF-1365/132211-Y, dated December, 6, 1968 issued by the Government of Maharashtra. The following functional classes have been recognised by the state:-

- a. Protection Forests:** It include forests on steep slopes (25° and above), along river banks and the forests 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 at conserving these forests, through soil and moisture conservation measures, so that they may exert beneficial influence on the soil, water regime and the physical and climatic factors of the locality.
- b. Tree Forests:** These forests are situated in remote tracts that are mainly capable of growing large sized timber and other products of commercial value.
- c. Minor Forests:** It includes forests that are interspersed with cultivated lands and are capable of producing small timber and fuel wood and providing grazing which are indispensable needs of adjoining agricultural population.
- d. Pasture Lands:** These are openly stocked forests or scrub lands that have ceased to yield even the small timber but are conveniently situated for providing grazing to the cattle used for agricultural works.

e. Miscellaneous Forests:

- **Grass Reserves:** These are small blocks of forests situated amidst cultivated tracts carrying scrubby growth and capable of producing good fodder grasses.
- **Remaining Areas** needed for other purposes.

Based on the functional classification of Forests, the various types of forests will be treated as follows:

- A. Protection Forests:** This type of Forests includes the forest found on Steep slopes (More than 25⁰), areas along the water courses and in the Catchments of big water bodies. It generally includes good quality forests. They will be managed to protect the area from soil erosion and to minimise the siltation of water bodies. Soil and Moisture Conservation measures will be taken to protect the erosion prone lands and to improve the under ground water table. The commercial felling will not be the priority in these areas. These prescriptions have been included for treatment of A-1 type areas of different Working Circles.
- B. Tree Forest:** This type of forest includes the better quality forests, especially of good site quality, capable of producing medium to large-sized timber, which are comparatively away from local habitations. They will be managed to produce medium to 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 planted with suitable valuable species. These areas have been included to be worked under **SCI Working Circle**.
- C. Minor Forest:** These areas will be managed to meet the local need of small timber, poles and fuel wood. The growing stock is mainly of site quality IVA and IVB. The density varies from 0 to 0.4 and natural regeneration is deficient in open areas. These forests have been worked under Afforestation Working Circle in the previous plans. Large scale soil and moisture conservation works are proposed to be taken in open and eroded areas. Natural Regeneration and rootstock will be tended and supplemented with Artificial Regeneration of suitable species. The forests will be managed under **Afforestation Working Circle**, where only hygienic felling is prescribed.

- D. Pasture Land:** This area includes forests which are adjoining to villages with heavy biotic interference. They are not capable of producing even small timber and fire wood to any appreciable quantity. These areas will primarily be managed to provide fodder by introducing fodder trees species and superior grasses. Rotational grazing is prescribed. Soil and moisture conservation works will be taken along with planting and sowing of grass seeds. These areas are included in the Grass & Fodder Resources Management Working Circle.
- E. Jhudpi Jungle (Miscellaneous Forests) :** These includes the small scattered patches which are handed over by Revenue Department which are unsuitable for any type of working described earlier and areas earmarked for other purposes. These patches are not demarcated on ground. Hence, it is prescribed to demarcate these areas and ensure territorial integrity.

TREATMENTS PRESCRIBED:

- i. Management treatments will depend upon requirements of environmental stability, protection of topography, biodiversity conservation and characteristics of growing stock in the forest and the objectives of management.
- ii. Existing protection forests will be preserved. Soil and moisture conservation works should improve the moisture content and prevent soil erosion and siltation of the water bodies.
- iii. Suitable tending and soil working operations will be carried out to stimulate the growth of the naturally regenerated seedlings and rootstock.
- iv. Timber, if silviculturally available, will be extracted from the dense tree forests capable of producing medium to large-sized timber and poles on sustained basis.
- v. Open forest areas and traditional pastures will be managed with active participation of tribal and village communities for improving the productivity of the land to meet the local domestic needs of fodder and fire wood.
- vi. Uncontrolled grazing, fire, poaching, illicit cutting and uncontrolled encroachment, the major threats for sustainable growth for forest, shall be curbed.

The General Approach of the Treatments:

- i. The entire forests on steep and precipitous slopes will be protected from harvesting. 20 meter wide strips on either sides of streams and watercourses will also be protected from harvesting in the similar manner.
- ii. 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 body management in forest areas.
- iii. The forests of Nagpur Dn. are extremely important from wildlife management point of view as they intersperse with four important protected areas of Nagpur district.
- iv. Preference will be accorded to natural regeneration and rootstock management. Natural regeneration and promising coppice growth will receive suitable tending and soil working to stimulate growth and development. Areas having good natural regeneration of valuable species shall be protected from fire and grazing. Artificial regeneration will be used as supplementary activity, at places, where natural regeneration is inadequate or is not likely to succeed.
- v. Management of forests close to villages will be given priority for meeting demands of local people for small timber, poles, firewood, fodder, 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. Management of forests close to villages shall primarily be done through JFM committees.
- vi. Non-Timber Forest Produce (NTFP) has great potential for sustainable economic development of local communities with conservation of forest resources. Sustainable NTFP production will be given high priority in the forest management.
- vii. Sustainable use of forest resources will remain the guiding principle for managing the demands of forest 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, population control of cattle and livestock improvement.

- viii. Involving local people in managing forests and generating awareness in rural and tribal areas is considered indispensable for the forest conservation.
- ix. Reducing biotic pressure on forests, particularly, illicit felling, unsustainable grazing, fire and encroachment near villages will be considered on priority basis.
- x. Forests capable of producing medium to large sized timber will be harvested under the Selection-Cum-Improvement management system.
- xi. Boundary demarcation will be carried out in time-bound manner for ensuring territorial integrity of forests.
- xii. Action will be taken to convert all the Jhudpi jungles adjoining the Reserved Forests and large patches, away from villages into Reserved Forests.

8.11 Working Circles and Their Distribution: For the scientific management of forests, a compartment has been used as a unit for distribution. The allocation of compartments is based on preponderance of suitability to specific working circle. In all 4 (Four) area-specific and 5 (Five) overlapping, working circles are prescribed. (Abstract of allotment of compartment to various Working Circles and Felling series is given in **Appendix XXVII**)

Distribution of Area to Various Working Circles: The allocation of forest areas under various working circles of the current working plan has been given in **Table No. 8.1**.

Table 8.1: Area allocation to different Working Circles:

Sr. No.	Name of Working Circle	Area allocated (Ha)
1	Selection-Cum-Improvement	102566.12
2	Afforestation	21070.55
3	Grass and Fodder Management	7376.93
4	Urban Forest Working Circle	1036.85
5	Miscellaneous area management (Jhudpi and Unclassed area) under Miscellaneous Regulations	14029.06
6	JFM (Overlapping)	Entire area
7	NTFP (Overlapping)	Entire area

8	Old Teak Plantation (Overlapping)	4616.71
9	Bamboo (Overlapping)	22021.21
10	Wildlife (Overlapping)	Entire area

The areas have been allotted after analysing the enumeration data.

- i. **SCI WC:** The SCI Working Circle of this plan has mainly been constituted out of the SCI working circle area of the previous plan. Some areas of IWC, FFP and Misc. WCs, found suitable for SCI have also been allotted to this Working Circle. Compartments with crop density > 0.4, Basal Area > 10 Sq.mt. per Ha and availability of Selection Girth trees have been included in this Working Circle.
- ii. **G & FRM WC:** Old pasture, grass birs, and areas of Protected Forests adjoining to villages have been included in the Grass & Fodder Resource Management Working Circle.
- iii. **AFF. WC:** Areas having sparse crop and open areas are included in Afforestation Working Circle. Tending operations of root stock and afforestation work have been proposed in such areas. The Crop density is < 0.4 and Basal Area < 3 Sq.mt. per Ha.

8.12 Period of the Plan: The schedule of various operations in SCI Working Circle have been provided for 20 years. For, AWC and G& FRM WC, Schedule of operations are prescribed for 10 years. This plan will be implemented for a period of 10 (Ten) years from the year 2015-16. However, the mid-term review may be carried out if the circumstances demand and if concerned Chief Conservator of Forests (Territorial) comes forward with a proposal for review.

CHAPTER - IX

SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

9.1 General Constitution of the Working Circle: The areas capable of producing large timber, poles and firewood are allotted to this working circle. It predominantly includes areas which support straight bole and sound trees of both seedling and coppice origin. It includes 102566.12 ha of total areas comprising of 63182.3 ha of Reserved Forests and 39383.9 ha of Protected Forests. It constitutes an area of 70 % of the total forest area of the division.

9.2 Area allocation: Based on the results of the enumeration data and satellite imageries and existing stock map details, the following criteria were used for allocation of compartments to the SCI areas:

- Compartments suitable for producing marketable timber and firewood.
- Compartments having dense Teak forest of IVA quality having patches of quality III and IVB inextricably mixed in the crop.
- Areas which are dense and supporting good Growing Stock which were earlier part of Improvement Working Circle, Pasture Working Circle and Miscellaneous WC have been included in this Working Circle.
- Compartments having crop of average basal area more than 10 Sq.mt. per ha.

9.3 Area Statement

Range wise compartment and area Allocation to Selection-cum-Improvement Working Circle (in ha.)

Table No. 9.1

SCI W.C.							
Sr.No.	Range	RF		PF		Total Comptt	Total Area
		No.of. Comptt	Area in ha.	No.of. Comptt	Area in ha.		
1	Narkhed	16	3103.63	10	1461.53	26	4565.16
2	Katol	12	2594.32	16	2933.23	28	5527.55
3	Kondhali	30	5945.03	26	4160.51	56	10105.54
4	Hingna	40	7163.06	30	5067.22	70	12230.28
5	Buttibori	16	3591.31	20	4434.49	36	8025.8
6	Seminary Hill	0	0	0	0	0	0
7	Kalmeshwar	14	2441.89	13	1544.69	27	3986.58
8	Khapa	12	2328.68	17	2675.46	29	5004.14
9	Paoni	33	7785.29	11	1666.25	44	9451.54
10	Deolapar	47	10988.66	15	1879.84	62	12868.5
11	Parshioni	26	4627.38	21	3076.22	47	7703.6
12	Ramtek	13	2363.78	12	2537.71	25	4901.49
13	N.Umred	17	4471.4	23	5448.79	40	9920.19
14	S.umred	15	4233.13	20	4042.62	35	8275.75
Grand Total		304	63182.3	221	39383.9	525	102566.12

9.4 General Character of the Vegetation:

The forests are mixed in nature and contain trees of all age classes. The crop predominantly consists of Teak crop and its associates. Proportion of Teak is about 28 percent. The major mixed species are Saja, Bija, Kalam, Haldu, Tiwas, Dhaoda, Garadi, Mowai, Rohan, Bhirra, Garadi, Lendia, Palas, Salai etc. In the fruit bearing species, Tendu, Moha, Char, Aonla, Bel, Harra and Beheda are the main species. Natural Bamboo is limited to few compartments. Bamboo plantations have come up very well. Kuda, Garadi, Decamali are the main species in the understorey. The crop is predominantly young to middle aged with occasional mature trees. The density of the crop is 0.4 to 0.8. The dominant site quality is IVA with some patches of site quality III and IVB occurring in patches. Natural regeneration of almost all species is present. But the establishment of natural regeneration varies from place to place. In the area subjected to annual fires and heavy grazing, the establishment is less. But the overall position of the natural regeneration is satisfactory. The advantage of this regeneration will be taken to regenerate the area.

As per the enumeration results, composition and structure of forest crop in SCI area is as given below:

Species and Girth- Class wise Distribution (Per Ha.) in SCI Working Circle

Table No. 9.2

SCI Working Circle												
Species	Girth class (cm.) Distribution of Trees/ha.											
	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151 up	Total	Basal Area
Ain	5.507	5.120	4.095	2.850	2.093	1.143	0.514	0.275	0.115	0.108	21.820	0.61
Aonla	0.63	0.97	0.87	0.49	0.26	0.08	0.03	0.01	0.00	0.01	3.35	0.08
Behada	0.36	0.50	0.52	0.38	0.26	0.21	0.09	0.04	0.02	0.06	2.44	0.09
Bel	0.85	1.32	1.20	0.81	0.57	0.22	0.07	0.04	0.00	0.00	5.08	0.14
Bhirra	10.77	7.61	5.33	3.64	2.53	1.36	0.76	0.43	0.22	0.10	32.76	0.82
Biba	0.69	0.65	0.40	0.19	0.09	0.06	0.02	0.02	0.01	0.04	2.18	0.05
Bija	0.47	0.41	0.41	0.32	0.39	0.18	0.08	0.05	0.03	0.02	2.34	0.09
Bor/Ber	0.38	0.18	0.09	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.69	0.01
Char	2.34	2.47	1.62	1.01	0.63	0.27	0.11	0.05	0.01	0.00	8.52	0.19
Chichawa	0.17	0.28	0.24	0.28	0.29	0.20	0.14	0.06	0.06	0.05	1.77	0.09
Dhaman	0.51	0.56	0.46	0.20	0.15	0.04	0.02	0.01	0.01	0.00	1.94	0.04
Dhawada	5.23	5.67	4.26	2.89	2.34	1.23	0.59	0.31	0.12	0.06	22.70	0.64
Garadi	8.36	6.37	3.45	1.15	0.45	0.10	0.02	0.01	0.00	0.02	19.93	0.27
Haldu	0.41	0.45	0.33	0.23	0.33	0.09	0.08	0.06	0.01	0.07	2.06	0.08
Hirda	0.09	0.07	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.23	0.00
Kalam	0.51	0.71	0.83	0.69	0.63	0.38	0.25	0.14	0.08	0.09	4.32	0.19
Kasai	0.32	0.53	0.45	0.33	0.27	0.10	0.05	0.03	0.01	0.01	2.08	0.06
Khair	5.00	5.25	4.06	1.82	0.77	0.24	0.06	0.02	0.00	0.00	17.22	0.31
Lendia	10.22	6.85	3.25	1.47	0.77	0.26	0.07	0.02	0.02	0.01	22.94	0.33

Moha	1.33	1.25	1.12	0.83	0.83	0.50	0.42	0.31	0.23	0.47	7.28	0.37
Mokha	0.05	0.11	0.10	0.05	0.10	0.02	0.03	0.01	0.01	0.01	0.49	0.02
Mowai	1.47	2.11	2.45	2.49	2.43	1.70	1.00	0.47	0.24	0.16	14.52	0.67
Palas	6.67	6.34	4.28	2.33	1.29	0.46	0.17	0.10	0.03	0.03	21.69	0.43
Rohan	1.40	1.44	1.42	1.13	0.95	0.55	0.32	0.17	0.09	0.11	7.57	0.28
Salai	0.34	0.33	0.46	0.55	0.72	0.79	0.59	0.37	0.23	0.17	4.55	0.32
Semal	0.06	0.10	0.18	0.12	0.11	0.09	0.13	0.05	0.06	0.08	0.99	0.07
Shisham	0.03	0.06	0.13	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.31	0.01
Shiwan	0.11	0.13	0.08	0.06	0.04	0.01	0.01	0.00	0.01	0.00	0.45	0.01
Surya	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Teak	22.13	24.36	19.95	13.65	8.89	4.56	2.71	1.24	0.51	0.26	98.27	2.73
Tendu	12.60	4.89	1.90	1.02	0.70	0.33	0.17	0.08	0.06	0.11	21.86	0.31
Tiwas	0.23	0.28	0.30	0.13	0.10	0.01	0.02	0.00	0.01	0.01	1.08	0.03
Other	0.57	0.50	0.33	0.16	0.14	0.09	0.04	0.01	0.02	0.03	1.88	0.05
Total	99.81	87.88	64.60	41.38	29.16	15.30	8.55	4.37	2.21	2.08	355.34	9.37

9.5 Blocks and Compartments: Details of block and compartment wise area distribution is given in the **Appendix- XXIX**. Range-wise area distribution under SCI Working Circle is given in the following table: **Table No. 9.3**

Range-wise area distribution.							
Sr. No.	Range	RF		PF		Total Comptt.	Total Area (ha.)
		No.of. Comptt	Area in ha.	No.of. Comptt.	Area in ha.		
1	Narkhed	16	3103.63	10	1461.53	26	4565.16
2	Katol	12	2594.32	16	2933.23	28	5527.55
3	Kondhali	30	5945.03	26	4160.51	56	10105.54
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5	Buttibori	16	3591.31	20	4434.49	36	8025.8
6	Seminary Hill	0	0	0	0	0	0
7	Kalmeshwar	14	2441.89	13	1544.69	27	3986.58
8	Khapa	12	2328.68	17	2675.46	29	5004.14
9	Paoni	33	7785.29	11	1666.25	44	9451.54
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12	Ramtek	13	2363.78	12	2537.71	25	4901.49
13	N.Umred	17	4471.4	23	5448.79	40	9920.19
14	S.umred	15	4233.13	20	4042.62	35	8275.75
Grand Total		304	63182.3	221	39383.9	525	102566.12

9.6 Special Objectives of Management:

The special objects of management of the forest areas under the **SCI Working Circle** are as follows:

- i. To obtain sustained supply of medium to large-sized timber and poles.
- ii. To maintain mixed forest composition and High Forest character of the forest crop and improve density of stocking by tending existing natural regeneration.
- iii. To improve the proportion of valuable mixed tree species in the crop by suitable tending operations and providing growing space for naturally regenerated seedlings of such species.
- iv. To conserve the local bio-diversity.

9.7 Analysis and Valuation of the Crop:

Stock Mapping: The conventional stock mapping has been carried out by the field staff of Nagpur forest division, besides the extensive enumeration exercise conducted by SOFR unit and crown density mapping through satellite classified data obtained from Forest Survey of India, Nagpur.

Age and Density: The crop is mostly young to middle aged to small proportion of mature and over-mature trees. Crop density varies from 0.4 to 0.7.

Site Quality: Site quality governs the harvestable girth. The dominant Site quality is IVa with occasional patches of Site quality III and IVb.

Enumeration: Enumeration was carried out by SOFR unit in 3657 sample plots spread over the entire division. Inventory works included complete enumeration of species and girth distribution of all trees, regeneration and recording of site quality and density. This data was used for girth class wise and basal area distribution of different species, which was further used for area allocation to various working circles. Analysis of the data collected from these sample plots is given in **Appendix - XXVI**.

Regeneration: Data on regeneration status was collected along with enumeration of the crop. The seedlings were enumerated in the following three categories, as given in the Table 9.4. The data is analysed and used to devise prescriptions for regeneration of forest areas by both natural as well as artificial means. The focus is on tending of existing natural regeneration. The seedlings of seed origin are preferred over coppice regeneration. Plantation is proposed only as a supplementary activity limited to the extent to fill the deficiency in natural regeneration, on the degraded and blank areas (excluding natural blanks). The Status of Natural Regeneration in SCI areas is satisfactory.

Status of Regeneration				
Table No. 9.4 Table Showing Status of Natural Regeneration Per hectare				
Range	Seedling (R1)	Sapling (R2)	Sapling (R3)	Total
	Up to 1 meter	1.0-3.0 meter	> 3 meter	
Narkhed	340.36	21.98	11.87	374.22
Katol	128.91	34.42	22.59	185.93
Kondhali	445.43	38.57	42.19	526.19
Hingna	503.77	96.74	45.42	645.93
Butibori	225.04	51.72	12.93	289.68
Kalmeshwar	305.84	10.87	11.63	328.34
Khapa	623.90	54.55	38.39	716.84
Paoni	1463.77	129.64	20.59	1614.00
Deolapar	1318.33	490.06	111.85	1920.24
Parshioni	750.06	101.32	38.37	889.75
Ramtek	615.37	359.94	39.77	1015.08
N.Umred	970.53	96.83	17.88	1085.24
S.Umred	380.06	96.66	15.35	492.07
Average per Ha.	620.87	121.79	32.98	775.64

9.8 Silvicultural System:

- Selection-Cum-Improvement System prescribes removal of mature trees above the harvestable girth to create openings in the tree canopy, thereby, facilitates tree growth in the lower girth classes. It supports establishment of natural regeneration of Teak and other valuable light demander species. This system has advantages over, the clear felling and coppice systems, in its ability to address the issues related to the biodiversity conservation and maintenance of site conditions and Mixed and High Forest nature of the forest crops.
- Forest areas containing dense pole crops will be thinned along with coupe working. Growth of naturally regenerated pole crop will be encouraged by the tending, cleaning operations and improvement felling as well as protection from fire and grazing.
- The natural regeneration will be given suitable treatments to regenerate the area.
- The areas poor in natural regeneration will be artificially regenerated by suitable species as per requirement of site. Plantations will not be taken up in SCI areas unless a minimum 5 hectares of degraded area, having crown density less than 0.4, is available in an annual coupe.

9.9 Harvestable Girth: Harvestable girth for various important species, in SCI working circle, has been determined at maximum volume production as per the CAI & MAI curves in stem analysis exercises, carried out by the C.F Working Plan Nagpur during 2007. The details are given in the Table 9.5.

Table No. 9.5 Table showing the Harvestable Girth for Various Species in the Division:

Group	Species	Harvestable Girth
Group 1	Teak	135 cm. for quality III
		120 cm. for quality IV
Group 2	Ain, Bija, Haldu and Kalam.	135 cm for quality III
		120 cm. for site quality IV
Group 3	Dhaoda, Tiwas, Surya, Shisham, Rohan, Bhirra, Kasai, Mokha, Palas, Dhaman, Bhilawa, Chichwa, etc.	90 cm. for site quality IV
Group 4	Garadi, Lendia, Khair	45 cm for site quality IV
Group 5	Species protected from felling (Semal, Kullu, Beheda, Karai, etc. and all fruit trees)	No felling

In the past, substantial areas of S.C.I. working circle have been worked under Coppice with Reserve Silvicultural system. Hence, the proportion of coppice teak is significant. Timber obtained from coppice origin attains hollowness at an early age and therefore, the market value of Teak timber gets reduced. In view of this potential problem, Nagpur division shall collect data on the hollowness in Teak timber during the first 5 years of Working Plan implementation and transmit the data to Working Plan division, Nagpur for analysis. Based on this analysis, WPO would undertake Stem Analysis and submit the report before State Level Committee for undertaking mid-course corrections in deciding Harvestable Girth of Coppice Teak.

9.10 Choice of Species:

Since Teak is the most valuable species and comes above all the mixed timber species; it will be given top priority, wherever present. The miscellaneous species to be favoured in the existing crop, in order of their priorities, are Bija, Saja, Shisham, Tinsa, Kalam, Haldu, Kasai, Dhaoda, Bhirra, Rohan, Lendia, Garadi and Mowai. However, in inferior areas with degraded soil, Rohan, Bhirra, Khair, Garadi and Lendia will be preferred. In the artificial regeneration, **Teak will be planted only in open areas with well drained soil**, and Khair and Rohan will be planted in inferior areas. Bamboo will be planted in all suitable soils but due precaution should be taken so that it should not suppress other valuable species. Besides this, edible fruit and flower yielding plants will be reserved from felling and will also be planted along with the timber species. In the plantation some shade bearing fruit trees like Ficus spp, Ber etc will also be planted for the benefit of wildlife. Some important MFP yielding species, like Kullu, Char, Mahua etc or as desired by the villagers, may also be planted to benefit the local population.

9.11 Felling Cycle: Felling cycle has been fixed at 20 years.

Felling Series and Annual Coupes: The entire area of this working circle has been divided into 49 Felling Series with an average area of 2093 ha. and each felling series is further divided into 20 coupes with an average area of 105 ha. (Details in **App. XXXI**)

9.12 Yield Calculation: The yield is regulated by area.

The annual yield will be regulated by area by making coupes equi-productive in each felling series, as far as possible. Coupes about 105 ha. each, will be laid down.

From the enumeration data, the average number of stems per ha for species representing Group I to IV are calculated. For the purpose of yield, data of each species representing a particular Group is used for Yield calculation. Group-wise enumeration data is summarized as under.

Table No. 9.6

SCI					
Table Showing Abstract of Enumeration Data					
Girth Class (cm)	Group - I Teak	Group - II Ain, Bija Haldu, Kalam	Group - III Bhirra, Chichwa, Salai, Mowai, Rohan, Shiwan, Shisham, Tiwas, Surya etc.	Group - IV Lendia, Garadi & Khair	Total
15 30	22.13	6.89	14.53	23.57	67.12
31 45	24.36	6.68	12.25	18.47	61.76
46 60	19.95	5.66	10.43	10.75	47.01
61 75	13.65	4.09	8.33	4.43	30.97
76 90	8.89	3.44	7.10	1.99	21.95
91 105	4.56	1.79	4.64	0.60	12.54
106 120	2.71	0.92	2.83	0.16	7.30
121 135	1.24	0.52	1.50	0.05	3.66
136 150	0.51	0.24	0.85	0.03	1.63
151 up	0.26	0.30	0.60	0.89	0.89
Total	98.27	30.53	63.05	60.94	252.52

Yield Regulation by Smythies' Safe-guarding Formula:-

Smythies' evolved this formula for regulating yield in Selection forests of U.P in thirteens. This formula has been used in the past for Selection Forests of Maharashtra. This formula considers the essentiality of maintaining sustained yield, mostly from Selection Class of trees which is termed as Selection Yield. The method stipulates the following procedure:

- a) Fixing the felling cycle and Exploitable Girth.

- b) Fixing the Girth Classes starting from Selection Girth (Class-I) to successively below it to the youngest.
- c) Carrying out enumerations in various Girth classes.
- d) Every Selection tree is prescribed for felling subject to the limitation fixed to safe-guard the Selection Yield; this limitation is the number of approach class (Class II) trees which pass into Class I during the felling cycle 'f' represented by 'X'.
- e) The value of 'X' determined by the formula:

$$X = f/t (II-Z\%II), \text{ where}$$

'f' = felling cycle

't' = time taken by a Approach class tree to pass into Selection Girth.

'Z' = Percentage of approach class trees that do not pass into Selection Girth in 't' years; due to mortality or removal in thinning, etc. Values of 'Z' has been calculated based on long term data obtained from preservation plots maintained by Research division.

- f) Yield is calculated by the formula:

$$Y = [X/I + X/2 * 100 \pm A] \% N$$

Applying the above formula, Yield for different groups of species is as under:

Group I : Teak belongs to this group. The exploitable girth for Teak in Site quality IV is 120 cm. Time required to pass from approach class to Selection class is 20 years. By applying, Smythies' formula, the Yield per Ha is 1.38 cu.m. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 3 out of 4.

Group II: Species representing this group are Ain, Bija, Haldu and Kalam. The exploitable girth for these species in Site quality IV is 120 cm. Time required to pass from approach class to Selection class is 24 years. By applying, Smythies' formula, the Yield per Ha is 0.28 cu.m. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 1 out of 2 i.e. 50% of Selection trees are to be marked if Silviculturally available.

Group III: Species representing this group are Chichwa, Bhirra, Rohan, Dhaoda, Salai, Mowai etc. The exploitable girth for these species in Site quality IV is 90 cm. Time required to pass from approach class to Selection class is 22 years. By applying, Smythies' formula, the Yield per Ha is 1.30 cu.m. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 1 out of 2.

Group IV: Species representing this group are Lendia and Garadi. The exploitable girth for these species in Site quality IV is 45 cm. Time required to pass from approach class to Selection class is 19 years. By applying, Smythies' formula, the Yield per Ha is 0.61 cu.m. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 3 out of 4.

From the above calculations for different groups of species, the expected average yield per hectare is 3.57 cu.m. This may vary from coupe to coupe due to differences in growth conditions, distribution of selection girth trees and their silvicultural availability.

9.13 Agency of Harvesting: Demarcation of coupes and marking of trees for felling will be carried out departmentally to meet the silvicultural and technical requirements. Felling of trees, logging and haulage of the felled material will be carried out either by Department or by FLCS as per the existing Govt. directives. Silvicultural operations like cut-back operation, cleaning, thinning etc. and other regeneration activities after main felling of the coupes will be carried out under strict supervision of the Forest Department.

9.14 Coupe Demarcation, Preparation of Treatment Maps and Marking Techniques:

Demarcation: The coupe demarcation, preparation of treatment maps and marking will be carried out as per the prescriptions mentioned in the chapter on Miscellaneous Regulations.

The main annual coupes shall be demarcated one year in advance. The coupe shall be divided into four sections i.e. A, B, C and D, to effectively control the various coupe operations. A particular section will be demarcated only if the area is more than 5 ha.

Preparation of Treatment Maps: Treatment maps shall be prepared by the RFO and verified by the ACF. All the treatment type areas shall be shown distinctively on the map, including the areas suitable for planting, areas having adequate promising natural regeneration and areas prone to soil erosion.

The Treatments Proposed for Various Areas:

A-Type Areas: Protection Areas

- An area having more than 25° slopes and more than a quarter hectare in extent must be shown on the map as the **A1-type i.e. steep slope**. Smaller areas of steep slope, even if not marked on the map, will also receive the prescribed treatment.
- 20 meter wide buffer along streams will be measured from the bank or the high flood mark. Similar buffer of the **A2-type** areas will be marked along all water bodies and Nallas.
- The **A3-type** areas are excessively erosion prone and include seasonally flooded areas.

Treatments Recommended for A-Type Areas:

- i) Soil and Moisture Conservation:** Gully plugging and other soil and moisture conservation works, as described in the chapter of Miscellaneous Regulations shall be taken in the A3-type areas. Such works may be taken up in the A2-type areas, as per requirement of site.

- ii) **Stake Planting:** In the areas around water bodies and along watercourses(A2-type) , stakes of *Ficus* spp., Pangara, Salai or other suitable species will be planted at six-meter interval, and tussocks of *Khas grass* will be planted on suitable sites.

Harvesting Prohibited: Harvesting of standing trees (dead or alive) is strictly prohibited in the A-type areas.

B-Type Areas: Under-stocked & Blank Areas: Under stocked areas can be categorised into 2 types:

- **B1-type:** Open forests (density < 0.4) with Natural Regeneration (200 to 250 saplings per hectare)
- **B2-type:** Open forests (density < 0.4) without Natural Regeneration.

Treatments Recommended for B-Type Areas: Preference will be given to natural regeneration and proper treatment will be given to the crop considering the existence of seedlings or rootstock in the areas.

Tending of Natural Regeneration of valuable species in the B- type will be carried out as follows:

A. Natural Regeneration Management in B1-type Areas: Following treatments are prescribed for B1-type areas:

i. **Tending of Natural Regeneration (of seed origin):** All seedlings and saplings (of seed origin) of valuable species, more than 60 cm. in height, will be nursed as future crop. Spacing operations, if required, will be carried out to leave nearly 200 to 250 saplings per hectare at an average of 5 metre spacing. Spacing out operation will be in favour of valuable species and species rarely found in the area. The natural regeneration shall be assisted and encouraged by soil working and mulching around them, in the following manner.

- a) First Year Operations:** Weeds in one-meter diameter around saplings of valuable species should be cleared during the first week of July. Uprooted weed, grasses and leaf-litter should be mixed in the upper layer of soil as the organic mulch and facilitate loosening and aeration of the soil by worms and insects. One soil working should be carried out in October.
- b) Second year operations:** The soil working in October will be repeated in the following year. However, one scrap weeding of one-meter diameter should be carried out in the first week of August around the shoots of seedling coppice within the rootstock management area.
- c) Third year operations:** Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance should be repeated as third year operations.

Progress of Natural Regeneration should be monitored by the division from time to time and data should be collected for further analysis.

- ii. **Singling of Coppice Shoots:** 1 to 2 healthy and promising coppice shoot will be retained on the stumps and the rest will be removed. Such coppice shoots

should also be close enough to the ground so that it will not topple after gaining volume and weight and would be able to subsequently develop root system of its own. However, coppice shoots interfering with promising saplings of seed origin or coppice of valuable species shall be removed.

- iii. Coppice Management of Damaged and Malformed Saplings:** The saplings and poles of up to 45 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, causing erosion and leading to soil loss. Poles having at least 2.50 meter of clean bole will not be treated as malformed.

B. Artificial Regeneration in B2-Type Areas: Plantations will not be taken up in SCI areas unless a minimum of 5 hectares of open area, having crown density less than 0.4, is available in an annual coupe. Such suitable sites of the B-type areas may be brought under Artificial Regeneration. The choice of species will be decided as per the site. Teak and valuable miscellaneous local spp. should be given preference in the plantation. Bamboo may be planted depending upon the site. Stump planting of Teak should be taken only in well drained areas with crown density less than 0.2.

It shall be ensured that no seedling is planted within 3 meters distance from an established seedling or existing trees. The standing trees have influence zone of spreading shadow and pits should not be dug either in the shadow or in the influence zone of the standing trees. Influence zone for various sizes of trees are as given below.

Zone of influence of trees

Sr. No.	Girth class (cm)	Influence zone (metre)
1.	< 30	2
2.	30-60	3
3.	60-90	4
4.	90-120	5
5.	> 120	6

C. Soil and Moisture Conservation Works: Required soil and moisture conservation works will be carried out as mentioned in the miscellaneous regulations.

C-Type Areas: Congested Pole Crop: It includes groups of naturally grown poles, having 15 to 45 cm GBH.

Treatments Recommended:

Thinning: Thinning of congested pole crops will be carried out to maintain an average spacing of one-third of the crop height in such patches. The post-thinning crop should have basal area and number as close as possible to the relevant stand or yield table for that site quality. Detailed guidelines for thinning have been included in Chapter of Miscellaneous Regulations. Poles of vigorously growing non-Teak species should be preferred for retention if Teak is more than 50 percent of the crop in stocking.

D-Type Areas: Well-Stocked Areas:

Treatments Recommended in D Type Areas

- a. Main felling is concentrated in the areas having density 0.4 or over and showing adequate regeneration of 200 or above established seedlings.
- b. Artificial Regeneration is not prescribed in this area.

The following operations are recommended:

- i. **Enumeration in Annual Coupes:** Species and girth-class of all trees above harvestable girth class and approach class are prescribed to be recorded in 15 cm. girth class for enumeration. The enumeration will be carried out in a 100 m. X 100 m. grid with a base line.
- ii. **Harvesting:** The extent of Harvesting in different Groups is as under:

Group I species: For Teak, 3 out of 4 trees above Selection Girth (120 cm) are to be harvested if they are Silviculturally available.

Group II species: For, Ain, Bija, Haldu and Kalam, the exploitable girth for these species in Site quality IV is 120 cm. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 1 out of 2 i.e. 50% of Selection trees are to be marked if Silviculturally available.

Group III: For Chichwa, Bhirra, Rohan, Dhaoda, Salai, Mowai and other timber yielding species, the exploitable girth in Site quality IV is 90 cm. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 1 out of 2.

Group IV: For Lendia and Garadi the exploitable girth for these species in Site quality IV is 45 cm. To safe-guard future yield, the number of Selection Girth trees to be marked (if Silviculturally available) are 3 out of 4.

Marking Techniques: Marking will be done along with the work of coupe demarcation, one year in advance of the main felling.

Marking technique and prescriptions described in the chapter of the Miscellaneous Regulations shall be followed.

Marking shall be carried out under the close supervision of the RFO and under guidance of ACF concerned. DCF shall himself inspect the coupes to ensure proper marking and to guard against excessive marking, if any.

- i. The following rules shall be observed strictly for marking in various treatments type areas.

A- Type Areas (Protection Areas): No tree shall be marked for felling.

B-Type Areas (Under Stocked Areas):

1. All dead and diseased trees, retaining 2 dead trees/ha., as snags and dens for nesting and resting of wildlife, shall be marked.
2. All live high stumps shall be marked.
3. All multiple coppices shoots; retaining 1 or 2 promising shoots, shall be marked.

4. All NTFP trees, fruit bearing trees and trees useful for wild life are to be reserved.

C-Type Areas (Groups of Young Poles):

1. The congested pole crop shall be marked for thinning to maintain a spacing equal to $1/3^{\text{rd}}$ of the crop height and/or to bring down stem number as per the yield table.
2. All high stumps, dead and diseased poles shall be marked for harvesting.
3. Unwanted undergrowth interfering or likely to interfere, the seed based NR of Teak and other valuable species, shall be removed.
4. All NTFP trees, fruit bearing trees and trees useful for wild life are to be reserved.

D-Type Areas (Well-stocked Areas):

1. All Teak (group I), Ain, Bija, Haldu & Kalam (group II) and the group III & IV (listed species), trees above the harvestable girth and approach class are prescribed to be enumerated in 15 cm girth-classes, before marking.
2. Marking of trees above Selection Girth for different Groups of Species (Group I to IV) has been discussed above. Felling marking is prescribed to proceed from highest girth-class to lower girth-classes. No tree shall be marked for felling unless it is Silviculturally available. Trees of seed origin shall be preferred for retention.
3. All edible fruit bearing species, such as, *Mahua*, *Char*, *Tendu*, *Aonla*, *Sitaphal*, *Chinch*, *Bel*, *Hirda*, *Beheda* etc, NTFP species such as *Kullu*, *Semal*, etc. and all trees useful for wild life, shall be reserved against felling.
4. All dead and diseased trees, retaining 2 dead trees per hectare, shall be marked for felling.
5. All live high stumps and all but 1 or 2 vigorously growing coppice pole per stool shall be marked for felling.
6. The marking of trees whose population is less than one percent is prohibited.

9.15 Soil and Moisture Conservation: The soil and moisture conservation works will be taken up along with marking operation and completed before on set of monsoon in the next financial year. The soil and moisture conservation works are to be based on the requirement of site. These works will be taken up after preparation of a detailed treatment map of the area and model of soil and moisture conservation measures duly sanctioned by the competent authority. As breaking of soil is not advisable in the forest, Continuous Contour Trenches/Staggered Contour Trenches should be taken only if it is necessary. The estimates of these trenches should be examined and approved by the Chief Conservator of forests, Territorial, Nagpur.

9.16 Methods of Regeneration:

- Natural Regeneration, including rootstock management, is prescribed to be given preference over Artificial Regeneration. The areas with promising seedling of seed origin and rootstock patches shall be identified and marked on

the treatment map. The treatment, as prescribed above, shall be given to such areas. Tending operations as prescribed for natural regeneration in the B-type areas will be taken up with the coupe operations.

- Artificial Regeneration shall be taken only in the B-type areas, (except natural blanks) having inadequate NR in a patch of a minimum of 5 ha area.
- Bamboo plantations shall be taken in suitable areas in such a way that it does not suppress the valuable light demanding species like Teak.
- Stump planting of Teak should only be taken in the areas with well-drained soil and crown density less than 0.2. The remaining plantation area will be brought under suitable local species as per requirement of site.

9.17 Subsidiary Silvicultural Operations:

- **Cutback Operations:** Cutback operations shall be carried out, in the next year of coupe working in the annual coupes (**Appendix– XXX**). All the left over marked trees during the main coupe operations shall be removed. 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 Chief Conservator of Forests (Territorial), Nagpur. All trees damaged during the main coupe felling shall be marked for removal as well as multiple coppice shoots and poles shall be reduced to 1 or 2 per stool. All newly risen coppice shoots shall be removed to encourage establishment of seedling regeneration.
- **Cleaning** - Cleaning in the 6th year from the main felling will be done. All areas of the natural regeneration, tending, rootstock management and plantations shall be recorded in the divisional notebook. Unwanted undergrowth interfering or likely to interfere with the growth of NR of Teak and other valuable species shall be cut. Climber cutting, shrub clearance, dressing of high stumps, should be carried out in the entire coupe. Coppicing of damaged and malformed saplings and singling of coppice shoots shall be carried out. Established 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.

Other regulations: Protection from Fire and Grazing is essential for the success of Natural and Artificial regeneration. All annual coupes shall remain closed to Grazing; and shall be provided strict fire protection, at least till completion of the 6th year coupe cleaning works.

CHAPTER - X

AFFORESTATION WORKING CIRCLE

10.1 General Constitution of this Working Circle

The open forest areas having density less than 0.4 with sparse vegetation and inadequate natural regeneration and shrubby growth have been included in this Working Circle.

Afforestation Working Circle (AFF) forms about 13% of the entire forest area of the division. It includes 21070.55 ha of the forest area comprising both the Reserved Forests to the extent of 4174.39 ha and Protected Forests to the extent of 16896.16 ha (**Table 10.1**).

The following criterion has been applied for allocation of compartments to the AFF Working Circle:

- Compartments having large proportion of area under forest blanks.
- Compartments having poor quality open forests, which need to be afforested.
- Average Basal area of the crop in the compartments allotted to this working circle is less than 3 Sq.mt. per ha.

Table 10.1 Compartments allocation to Afforestation Working Circle

AFF.W.C.							
Sr.No.	Range	RF		PF		Total Comptt.	Total Area
		No.of. Comptt	Area in ha.	No.of. Comptt.	Area in ha.		
1	Narkhed	6	991.47	29	3204.7	35	4196.17
2	Katol	2	490.89	19	2905.29	21	3396.18
3	Kondhali	2	162.78	23	2621.17	25	2783.95
4	Hingna	2	128.33	3	391.64	5	519.97
5	Buttibori	4	469.3	6	950.47	10	1419.77
6	Seminary H.	0	0	0	0	0	0
7	Kalmeshwar	0	0	0	0	0	0
8	Khapa	0	0	7	443.52	7	443.52
9	Paoni	2	119.14	7	783.5	9	902.64
10	Deolapar	4	114.27	10	665.16	14	779.43
11	Parshioni	1	33.03	3	282.26	4	315.29
12	Ramtek	2	180.48	16	2385.69	18	2566.17
13	N.Umred	3	619.18	18	1614.06	21	2233.24
14	S.umred	4	865.52	7	648.7	11	1514.22
Grand Total		32	4174.39	148	16896.16	180	21070.55

10.2 General Character Of The Vegetation

This working circle generally comprises of degraded open forest areas interspersed with forest blanks or brushwood. The blank areas have dominance of shrubby growth and inferior grasses. The common grasses include Ghonad, Kusal, Bhurbhusi, Marvel and Sheda. While Ghot, Khair, Eruni, Bharati, Ber, etc. are the common thorny or brushwood species. Tarota, gokhru and bantulsi are the common weeds. In such area Lantana has spread over many places.

The allotted areas in general are under stocked and open with crop density usually less than 0.4, though patches of better stocked areas are also met with in some compartments. The most of the PF areas allotted to this WC, especially, those near the villages are highly degraded and lays bare without any significant tree crop.

The crop consists mainly of scattered trees or patches of open forests. The principal species is Teak and its common associates are Saja, Dhaora, Bhirra, Rohan, Tendu, Lendia, Salai, Mowai, Char, garari, kalam, khair and Palas, etc. Anjan, Jamun and Ficus are found along streams (**Table 10.2**).

Table 10.2 Species and girth distribution in the AFF Working Circle areas per ha.

AFF Working Circle												
Species	Girth Class wise Trees/ha.											
	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151 up	Total	Basal Area
Ain	3.04	1.54	1.17	0.85	0.54	0.56	0.15	0.10	0.01	0.05	8.00	0.20
Aonla	0.47	0.08	0.07	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.69	0.01
Behada	0.33	0.26	0.22	0.09	0.04	0.11	0.03	0.04	0.06	0.03	1.24	0.05
Bel	0.21	0.19	0.18	0.15	0.06	0.01	0.00	0.01	0.00	0.02	0.82	0.02
Bhirra	7.93	3.39	1.61	0.80	0.41	0.23	0.09	0.01	0.02	0.00	14.49	0.19
Biba	1.15	0.20	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.01
Bija	0.20	0.02	0.08	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.33	0.00
Bor/Ber	0.10	0.08	0.07	0.04	0.07	0.00	0.02	0.00	0.00	0.00	0.38	0.01
Char	1.44	0.81	0.48	0.22	0.13	0.04	0.05	0.02	0.00	0.00	3.19	0.05
Chichawa	0.18	0.02	0.24	0.26	0.26	0.12	0.03	0.03	0.00	0.04	1.18	0.05
Dhaman	0.02	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
Garadi	2.22	1.16	0.44	0.08	0.03	0.04	0.00	0.00	0.00	0.00	3.97	0.04
Haldu	0.03	0.02	0.04	0.03	0.05	0.03	0.00	0.00	0.02	0.02	0.22	0.01
Hirda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kalam	0.13	0.07	0.06	0.08	0.05	0.02	0.03	0.03	0.05	0.04	0.55	0.03
Kasai	0.00	0.08	0.05	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.15	0.00
Khair	4.10	2.88	0.97	0.32	0.21	0.04	0.00	0.00	0.00	0.00	8.52	0.10
Lendia	6.81	3.20	0.98	0.26	0.23	0.05	0.02	0.00	0.00	0.00	11.55	0.12
Moha	1.15	0.33	0.32	0.23	0.18	0.10	0.13	0.07	0.07	0.22	2.80	0.12
Mokha	0.06	0.02	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.12	0.00

Mowai	1.30	0.76	0.80	0.84	0.57	0.34	0.35	0.15	0.05	0.03	5.18	0.19
Palas	6.53	4.95	2.70	1.09	0.52	0.13	0.04	0.00	0.00	0.00	15.97	0.23
Rohan	0.83	0.52	0.31	0.14	0.12	0.10	0.09	0.03	0.03	0.01	2.18	0.06
Salai	0.36	0.21	0.19	0.27	0.30	0.23	0.25	0.22	0.09	0.01	2.12	0.12
Semal	0.00	0.00	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.02	0.06	0.01
Shisham	0.02	0.03	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00
Shiwan	0.02	0.02	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.06	0.00
Teak	10.45	8.60	5.96	3.52	2.57	1.17	0.83	0.37	0.23	0.09	33.78	0.82
Tendu	8.31	3.00	1.09	0.52	0.22	0.09	0.03	0.01	0.00	0.00	13.27	0.14
Tiwas	0.03	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00
Other	0.20	0.06	0.06	0.06	0.06	0.02	0.00	0.00	0.00	0.02	0.48	0.01
Total	57.61	32.66	18.33	9.97	6.69	3.49	2.16	1.08	0.62	0.58	133.18	2.60

The site quality varies between IVb and IVa. The canopy density of the vegetation varies from 0.0 to 0.4. Natural regeneration of common species is present but its extent is far from being adequate (**Table 10.3**). Heavy grazing pressure has resulted in compaction of the soil with little sub-soil moisture. Young recruits of species like Ain, Dhaoda, Bhirra and Teak, etc. are found in many compartments. Due to excessive grazing, fires and refractory nature of areas, establishment of Natural Regeneration is inadequate.

Table 10.3: Natural Regeneration per Ha. recorded in the Afforestation Working Circle

AFF W.C.				
Range	(R1)	(R2)	(R3)	Total
	Up to 1 meter	1.0-3.0 meter	> 3 meter	
Narkhed	175.63	30.47	10.06	216.16
Katol	53.49	32.07	29.38	114.94
Kondhali	23.02	3.46	4.49	30.97
Hingna	3.16	2.25	2.14	7.55
Buttibori	28.90	9.48	2.17	40.55
Khapa	5.90	0.00	0.38	6.29
Paoni	95.95	7.06	0.00	103.01
Deolapar	174.95	84.33	12.92	272.20
Parshioni	162.38	36.69	3.16	202.24
Ramtek	156.44	76.20	7.59	240.23
N.Umred	98.11	28.58	2.50	129.19
S.Umred	17.71	9.30	2.31	29.32
Grand Total	995.64	319.88	77.11	1392.63
Average	71.12	22.85	5.51	99.47

10.3 Block and Compartments

10.3.1 Details of the compartments in the working circle have been given in **Appendix XXXII.**

10.4 Special objects of Management

The special objectives of management of this working circle are as follows:

- To restore the vegetative cover and of degraded and open areas and increase their productivity by site protection and tending of natural regeneration and rootstock, supplementing it with plantations, wherever, necessary.
- To check the loss of top soil by adopting suitable soil and moisture conservation measures and to increase the water absorption capacity of the soil.
- To actively involve Gram Panchayats and other village institutions like JFM committees in re-vegetating degraded areas.
- To improve the quantity and quality of fodder by planting fodder tree species and introducing superior and high yielding fodder grasses and legumes.

10.5 Analysis and Valuation of the Crop

Stock mapping: The stock maps were prepared by territorial staff and were correlated with the enumeration results of SOFR Unit and Satellite imagery classified data obtained from Forest Survey of India, Nagpur.

Age and density: The crop of forest areas under this working circle is mostly young to middle aged with occasional mature trees having density below 0.4 which were reflected by stock mapping and satellite imageries.

Enumeration: Most of the areas under this Working Circle fall in PF, which are mainly barren with little growth. Teak constitutes over more than 15% of the total stock in the forest. The enumeration of the growing stock has been carried out by the SOFR Unit, Amaravati and intensity of sampling was nearly 1%. The plots of size 60m x 60m were laid at a distance of 600m x 600m. Analysis of the data collected from these sample plots is given in table 10.2.

10.6 Silvicultural System

10.6.1 The area will be regenerated with suitable tree species depending on the site conditions. Tending of existing rootstock viz. the saplings, coppice shoots and poles, supplemented by plantations have been proposed as the main activities in this working circle. Yield removal are not prescribed except for removal of wind fallen, dead and extremely malformed trees.

10.6.2 In view of vicinity of these areas to habitations, fuel wood and fodder availability will be expanded through plantation of fuel wood and fodder species and by involving JFM committees.

10.6.3 The areas of this working circle are, primarily, in bad shape. Inadequate sub-soil moisture, highly compact soil structure and heavy biotic pressure are the main limiting factors for the establishment of seedling in this area. Top soil has been washed away and as a result vast areas do not have even adequate soil-depth to support tree crop. As a consequence, a large chunk of these areas lay bare without any significant vegetation. Hence, intensive soil and moisture conservation measures and tending of existing rootstock should go hand in hand with the efforts of artificial regeneration.

10.7 Choice Of Species

10.7.1 Order of priority among desirable species for retention is prescribed as: Teak, Tiwas, Saja, Bija, Karam, Haldu, Shisham Dhaora, , Khair, Siwan, Rohan, Salai, Mowai, Dhaman, Lendia, Semal, Kulu Bhirra,, etc.

10.7.2 Valuable local species suitable for the site and favoured by the local village communities will be preferred in plantations. Teak, Shisham, Khair, Siwan, Sisoo, Siris, Chichwa, Karanj, Ain, Bija, Dhaora, Aonla, Chinch, Neem, Maharukh, semal, Sitaphal, bamboo etc. should be considered among the recommended species. In poorly drained areas and swampy area Arjun, Babul, Jamun and Ain shall be preferred. Seedlings of edible fruit-yielding forest species may constitute up to 20 percent and seedlings of medicinal plants up to 5 percent each. The extent of plantation should not be exceed 50 ha.. An officer not below the rank of Assistant Conservator of Forests should approve the site selection. The broad information of the different species growing in different types of soil conditions is given in **Appendix XL** as different species show their preference for edaphic factors. 10.7.3 Mixed species plantations will include fairly good proportion of fodder and firewood yielding species, like, Anjan, Neem, Sissoo, Ficus, babul, Gular, Pakar, Maharukh, Kinhi, Siwan, Karanj, Siras, Sitaphal, etc.

10.8 Felling Cycle, Felling Series and Annual Coupes

Felling cycle: It is fixed as Ten years. The entire area of this working circle will be covered in a period of Ten years.

Felling series and annual coupes: The entire area of this working circle has been divided into 23 felling series. Each felling series has been further divided into 10 annual coupes. Details are provided in the **Appendix XXXIV**.

Regulation of yield: No yield is prescribed for this working circle. Only hygienic felling are prescribed.

10.9 Demarcation and Treatment Prescriptions

The coupe demarcation, preparation of treatment map and marking will be done one year in advance.

Treatment Map: Treatment map shall be prepared in detail well in advance to facilitate effective planning for raising nursery stock and also to mobilise financial resources to execute the work.

Treatment Prescribed: Treatment map shall be prepared for each working coupe on the basis of treatment prescribed for various areas. Treatment map should invariably be verified by ACF before estimates are technically approved by the DCF.

Area specific treatment is as below:

A -Type Areas (Protection Areas)

They will include-

- ☑ A1 type areas, which have slope more than 25°,
- ☑ A2 type areas, i.e. 30 m wide strip on both sides of streams,

B -Type Areas (Under-stocked Areas)

- ☑ The open forests with root stock as well as without root stock shall be shown in the treatment map.
- ☑ The areas which were earlier planted but the plantations have failed.

C -Type Areas (pole crop)

Areas with sufficient pole crop of valuable species which can be retained as future crop shall be marked separately.

D - Type Areas: Well-stocked Areas

Well stocked areas shall be separately shown in the treatment map.

Extent of plantation: Requirement of site would be the prime consideration for deciding the extent of plantation. However, in each coupe, not more than 50 ha be taken up for plantation. While taking plantations under special schemes such as NREGA, FDA, DPDC etc the areas under due coupes should be invariably considered.

10.10 Marking Rules and Prescriptions

Marking technique and prescriptions described in the Chapter of the Miscellaneous Regulations shall be followed.

Marking shall be carried out under the close supervision of the RFO and under guidance of ACF concerned. DCF shall himself inspect majority of coupes to ensure proper marking and to guard against excessive marking, if any.

The following rules shall be observed strictly for marking the trees for felling in various prescribed treatment type areas;

A-Type Areas: Protection Areas:

1. No tree shall be marked for felling.

B- Type Areas: Under stocked Areas:

1. No standing tree shall be marked for felling except dead trees retaining at least 2 trees/ha as snags.
2. All live high stumps shall be marked.
3. In case of Coppice regeneration, 1 or 2 most promising shoot will be retained and rest marked for removal.
4. Areas which do not contain sufficient natural regeneration or rootstock will be artificially regenerated by suitable local species. In case, the areas selected contain old unsuccessful plantations, such areas shall be treated only after examining the factors responsible for failure and upon taking prior approval from the CCF (T).

C -Type Areas: Groups of young poles:

1. The congested pole crop shall be marked for thinning to maintain spacing equal to $1/3^{\text{rd}}$ of the crop height. Poles of seedling origin shall be preferred for retention over the poles of coppice origin.
2. Dead poles shall be marked for thinning.
3. Multiple poles shall be thinned to retain one promising pole per stump/stool.

D - Type Areas: Well-stocked Areas:

1. All dead trees shall be marked for felling except two trees per hectare which shall be retained as snags.
2. All live high stumps shall be cut back to the ground level.
3. All but one or two promising coppice pole per stool shall be marked for felling.

Sequence of Working: Demarcation of coupe, preparation of treatment map, marking, felling, PPO works will be done in the same year. Sequence of operations is depicted in **Appendix No. XXXIII.**

10.11 Methods of Regeneration

Tending of Natural Regeneration and existing rootstock is prescribed to be given preference over plantations. The areas having promising NR and rootstock patches shall be identified and marked on the treatment map. Cultural operations for natural regeneration in the D-type areas and rootstock management in the B-type areas are prescribed.

Soil and moisture conservation works in the areas put under this working circle will be done as prescribed in the relevant paras under Miscellaneous Regulations and in accordance with specific guidelines issued from time to time in this regard. Hence, no specific quantum of such works has been prescribed.

Plantations shall be taken in the B-type areas (but not in natural blanks wherein geology, soil and water regime does not support tree growth) which have good soil depth and are well drained. Choice of species is carefully selected as per site suitability. Improved nursery practices including Root trainers shall be adopted to raise quality seedlings.

It shall be ensured that no seedling is planted within 3 meters distance from an established seedling or existing trees. The standing trees have influence zone of spreading shadow and pits should not be dug either in the shadow or in the influence zone of the standing trees. Influence zone for various sizes of trees are as given below.

Zone of influence of trees

Sr. No.	Girth class (cm)	Influence zone (metre)
1.	< 30	2
2.	30-60	3
3.	60-90	4
4.	90-120	5
5.	> 120	6

10.12 Closure to Grazing and Fire Protection

Protection from fire and grazing is essential for success of natural and artificial regeneration.

All annual coupes will be provided strict fire protection and will remain closed to grazing till the seedlings reach a minimum height of 10 feet.

10.13 Institutional Frame Work for Executing Afforestation Work

1. Agency of Implementation: For the success of afforestation works, role of local communities is extremely important. Therefore, afforestation works under this

working circle are to be entrusted to JFMCs as per area allotted to JFMCs and forest department should provide technical guidance. Already, Govt. of Maharashtra has identified JFMCs as implementing agency for NREGA works.

2. NREGA Scheme can be effectively used for raising tall seedlings. This would bring in suitable convergence between the Non-plan budget resources and funds from special scheme like NREGA.

3. For protection of such plantations, JFMCs should be asked to select protection labour from among their members as per guidelines of G.R. of July 2012. This model would enable intensive protection and management of small patches.

4. Treatment map shall be prepared for each working coupe on the basis of treatment prescribed for various areas. Treatment map should invariably be verified by ACF before estimates are technically approved by the DCF. DCF shall ensure that the ACF has verified about the suitability of site.

10.14 Positive Deviations:

Afforestation activities are budgetary intensive and the pace of afforestation is directly proportional to the funds allocated for such activities. Therefore, the extent of Afforestation works may vary from year to year due to fluctuation in budgetary allocations. Hence, to achieve convergence between the objective of Afforestation and the utilization of funds allocated for such works, deviations in the sequence of working will be treated as positive deviations.

CHAPTER - XI

GRASS AND FODDER RESOURCES MANAGEMENT WORKING CIRCLE

11.1 General Constitution:

The forests included under this working circle are-

- i. Areas under Grass and Fodder Resources Management Working Circle of Previous plan found fit for inclusion.
- ii. Mainly Protected forests of Narkhed, Kondhali, Hingna, North Umred, Ramtek, South Umred and Butibori ranges (with a few adjoining RF patches), which are in the vicinity of the villages and subjected to heavy biotic pressure.
- iii. Forest compartments having more open areas are selected for this working circle.

Mainly compartments of the protected forests mentioned above have been included to this working circle because they are highly degraded and are burdened with heavy grazing pressure. Plantations in the past have failed in these selected areas due to heavy biotic pressure and poor site. Control of grazing along with the protection to the site and soil and moisture conservation works is expected to improve the site.

11.2 Grass Production:

Division has not auctioned Grass units after 1996-97. Hence, figures on extent of production from Grass Bir areas are not available. However, the adjoining JFM villages have utilized the resource. Division should build database on grass production and utilization by JFMCs.

11.3 Area allocation:

Areas allotted to this working circle have very sparse vegetation, large open areas with basal area less than 2 Sq.mt. per Ha. Compartments allocated are given below:

Table 11.1 Compartments and Area allocation to G & FRM Working Circle

G &FRM .W.C.							
Sr.No.	Range	RF		PF		Total Comptt.	Total Area in ha.
		No.of. Comptt.	Area in ha.	No.of. Comptt.	Area in ha.		
1	Narkhed	1	232.29	7	225.56	8	457.85
2	Kondhali	0	0	12	297.76	12	297.76
3	Hingna	0	0	2	342.94	2	342.94
4	Buttibori	0	0	4	597.45	4	597.45
5	Ramtek	1	236.34	0	0	1	236.34
6	N.Umred	5	914.01	13	2272.91	18	3186.92
7	S.umred	2	546.05	17	1711.62	19	2257.67
Grand Total		9	1928.69	55	5448.24	64	7376.93

11.4 General Character of the Vegetation

The forests put under this working circle contain degraded soils and are with heavy biotic pressure. They are therefore open (density ranges from 0.1-0.4) containing brushwood and bushes along with the grasses. Trees are stunted, malformed and hacked and are found scattered throughout. Stocking of tree species is thus poor but a few small patches of good tree growth may be found occasionally. Main grass species found are Kusal, Bhurbhushi, Ghonad, Sheda, Marvel. Tree species found are Teak, Palas, Lendia, Bhirra, Ain, Bor, Dhawda, Movai, Salai, Char, Moha, Sitaphal, Rohan, Khair. Thorny and bushy species like Bor, Bharrati, Eruni, Ghoti, Chilati, Phetra are also common.

Rantulasi and Tarota as weeds have invaded in some patches. There are other herbs and shrubs also which are spreading fast as weeds in the areas which were used as pasture lands and grass birs in the past. Lantana has also invaded in large areas and in some places it has virtually replaced all other bushes, grass and fodder plants. Besides, there are regular and repeated fires every year. The palatability of the vegetation and availability of the grasses from such areas has therefore drastically reduced.

11.5 Analysis and Valuation of the Tree Crop

The enumeration results, which relate to the valuation of the tree crop, are given in the table below:

Table 11.2: Species and girth-class wise distribution per Ha

G & FRM Working Circle												
Girth class wise Trees/ha.												
Species	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151 up	Total	Basal Area
Ain	2.89	1.50	0.72	0.43	0.40	0.18	0.06	0.00	0.06	0.04	6.28	0.12
Aonla	0.04	0.00	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.17	0.01
Behada	0.188	0.202	0.130	0.043	0.036	0.087	0.036	0.043	0.014	0.014	0.794	0.03
Bel	0.13	0.00	0.00	0.04	0.07	0.01	0.01	0.01	0.00	0.00	0.29	0.01
Bhirra	1.52	0.27	0.25	0.14	0.03	0.01	0.02	0.01	0.01	0.01	2.25	0.03
Biba	1.41	0.48	0.04	0.04	0.02	0.02	0.00	0.00	0.00	0.00	2.02	0.02
Bija	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Bor/Ber	1.49	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.71	0.01
Char	1.27	0.34	0.09	0.26	0.13	0.00	0.00	0.00	0.00	0.00	2.09	0.03
Chichawa	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Dhaman	0.13	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00
Ghoti	1.59	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.82	0.01
Haldu	0.09	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00
Kalam	0.22	0.17	0.13	0.05	0.10	0.02	0.03	0.01	0.04	0.01	0.78	0.03
Khair	4.87	2.51	1.51	0.23	0.12	0.03	0.00	0.00	0.00	0.00	9.26	0.10
Lendia	3.86	2.35	0.73	0.26	0.25	0.00	0.02	0.00	0.00	0.00	7.47	0.08
Moha	0.30	0.17	0.07	0.04	0.09	0.02	0.02	0.00	0.04	0.04	0.80	0.03
Mokha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mowai	0.69	0.43	0.28	0.32	0.19	0.17	0.12	0.04	0.00	0.00	2.25	0.07
Rohan	1.57	0.27	0.22	0.04	0.00	0.02	0.00	0.00	0.00	0.02	2.15	0.02
Salai	0.24	0.28	0.17	0.09	0.13	0.13	0.04	0.09	0.04	0.00	1.21	0.05
Semal	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
Shiwan	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
Teak	3.46	3.34	1.07	1.02	0.89	0.44	0.27	0.17	0.08	0.08	10.82	0.27
Tendu	5.45	1.61	0.42	0.19	0.11	0.07	0.02	0.02	0.02	0.07	7.98	0.09
Other	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Total	31.70	14.51	5.91	3.28	2.61	1.20	0.65	0.40	0.31	0.29	60.87	1.01

Regeneration status of the tree crop in the forests allocated to this working circle is given in table below:

Table 11.3: Average number of seedlings and saplings per ha in G & FRM areas

G & FRM Working Circle				
Range	(R1)	(R2)	(R3)	Total
	Up to 1 meter	1.0-3.0 meter	> 3 meter	
Narkhed	16.88	0.54	0.03	17.44
Kondhali	0.00	0.00	0.00	0.00
Hingna	0.00	0.00	0.00	0.00
Buttibori	34.93	6.85	0.07	41.85
Ramtek	3.92	3.17	0.05	7.13
N.Umred	178.61	17.75	3.22	199.58
S.Umred	38.16	10.45	1.82	50.43
Avearge	19.46	2.77	0.37	22.60

From the above table, it is evident that, these areas are highly deficient in natural regeneration of tree species.

11.6 Analysis and Valuation of Grass and Fodder Resources

Present enumeration primarily valuates tree crop and this has been discussed above. However, for the proper management of grass and fodder resources and for their further development, specific enumeration exercise for grass and fodder species is necessary. Such exercise must include qualitative and quantitative estimation of species and biomass.

11.7 Special Object of Management

- 1) The forests put under this working circle are primarily intended to augment fodder requirements of the villages and wildlife.
- 2) Availability of fodder resources has drastically reduced. Introduction of suitable improved varieties of grasses as well as legumes and fodder tree species in selected areas is therefore proposed.
- 3) These areas being close to villages and local people being still dependant to a large extent for their fuel wood and small timber requirements on the forests, may also manage such areas to supply these forest produce, though these tracts are primarily meant to act as grazing grounds and grasslands.
- 4) As the above objects link forest management to people, active involvement of Gram Panchayat and other village institutions is a must. Hence eliciting peoples participation in such management and evolution of site specific and need based JFM mechanisms shall be attempted.

- 5) All area will be available for wild life and villagers as fodder bank.

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11.8 Silvicultural System

Despite these areas under grass birds (cut and carry-away grasslands permanently closed to grazing), grass production is still low. Also these forestlands are burdened with huge grazing pressure. Therefore, a long term strategy and sustained efforts are required to bring back grasslands of the Nagpur forest division to the level of their optimum production.

Based on the grass and forest resources of the site as well as the objectives of the management, the silvicultural treatment to be followed may be classified in the following categories:

1. Regulated and rotational cutting of grasses in grass and fodder areas.
2. Grassland management and development by regulating seeding and grass cutting. The area reserved for seed production should be closed with chain link fencing for minimum period of two to three years.
3. Small dense patches which are scattered will be managed by following hygienic felling by removal of dead and extremely malformed trees after retaining two trees per Ha, as a snag.

11.9 Blocks and Compartments

The blocks and compartments allotted to this working circle are shown in Volume II, Appendix XXXV.

11.10 Method of Treatment

- i) Coupe demarcation, Marking and preparation of treatment map will be done one year in advance. Period of the closure will be prominently displayed at the convenient places. Due intimation be given to local Gram Panchayat and JFM committee also.
- ii) In the closed coupe, works for facilitating improvement in grass and fodder productivity such as removal of weeds and woody growth will be taken up. Soil and moisture conservation works shall be taken up as per requirement of site.
- iii) Areas containing palatable natural grasses shall be closed to grazing and work of removal of weeds to facilitate these grasses to come up naturally will be taken up. It has been seen that as a result of protection to grasslands, a lot of shrubs invade the area as weeds resulting in reduction in grass production. Hence, removal of such weeds is suggested.

- iv) It is well established that grasses when young, that is, prior to their flowering are most nutritious (highest protein content) but management requirements are that they should be removed (grazed or cut) only after grass seeding. Grasslands developed as grass birs (permanent grasslands) are therefore to be allowed for grass cutting either after October or on rotational basis and 4 years after their establishment.
- v) Areas suitable for grass production shall be identified in due coupe. Soil working through deep ploughing is done to prepare the site. Grass seeds are broadcasted during early monsoon for germination and establishment. Such artificially regenerated grass areas shall be strictly closed for grazing for at least 3 years. JFMCs shall be actively involved in development of grass resources. Enclosures can be erected as per site conditions.

HYGIENIC OPERATIONS IN SCATTERED DENSE FOREST PATCHES WITHIN GRASSLANDS

The areas included in this working circle occasionally contain dense tree growth in very small patches. Such areas if existing interspersed with pasture lands and grass birs, may be worked for hygienic operations.

The above working is prescribed in the first year of closure .While the tree growth is worked in the above manner, trees of fodder value will be given preference in retention as well as in facilitating their natural regeneration through nursing of seedlings of seed origin and coppice management.

Formation of Fodder series and coupes: The working circle has been divided into various fodder series (the term ‘felling series’ has been replaced with ‘Fodder series’). As all the Fodder and grass birs are proposed to be managed on a three years rotation, each such series will have 4 coupes. Details are given in **Appendix-XXXVII.**

Area specific treatments:

- A) Protection areas- steep slopes and those forming catchment of some reservoir. They shall be shown as unworkable but soil and moisture conservation measures will be taken up as per site condition.
- B) Understocked and blank areas (with reference to tree crop) – Grass production will be taken up in these areas. Removal of invasive weeds and woody growth is prescribed.
- C) Pole crop- suitable for meeting local needs of small timber and firewood.

- D) Well stock patches suitable for meeting local needs of small timber and firewood through hygienic operations.

11.11 Other regulations: The areas will be strictly protected from fire with the involvement of the local people. Some areas may be developed with better varieties of grasses through ploughing and broadcast sowing where the local people agree not to graze their cattle for at least three years. The extent of such areas per JFMC may be around 20 ha and such grass development activity should be taken if demanded by the village community and may be executed through schemes like JFM/FDA/CAMPA etc.

11.12 Agency for executing the works

The forest areas allotted to this working circle are, in general, those which are in the vicinity of villages. Hence, they are major thrust areas for formation of JFMCs and evolving JFM mechanisms. Regulation of improvement of grass and fodder availability is to be achieved by involving the JFMCs. The JFMCs will also be persuaded in finding out ways and means to reduce traditional dependencies on forests. For this, they will be encouraged to create awareness for reducing unproductive cattle and meet the fodder needs from village common lands /agricultural lands. Villages following “Cut and Carry” method should be suitably rewarded. Coordination with Agricultural Department to develop “Grass Demonstration Plots” in JFM villages is prescribed.

CHAPTER - XII

THE SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNITION OF FOREST RIGHTS) ACT, 2006

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was passed by the Parliament of India and the assent to this Act was received from the President of India on 29th December, 2006. The said Act was notified in the Gazette of India on 2nd January, 2007. For implementation of the said Act, the Central Government notified the Rules for Recognition of Forest Rights on 1st January, 2008. These Rules were further amended by the Central Government vide notification dated 6th September, 2012.

1.1 Salient Provisions of the Forest Rights Act, 2006:

- (I) Section 3 (1): The following rights which secure individual or community tenure or both, shall be the forest rights under the Act. They are:
- (a) Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers;
 - (b) Community rights such as *nistar*, by whatever name called, including those used in erstwhile Princely States, Zamindari or such intermediary regimes;
 - (c) Right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries;
 - (d) Other community rights of uses or entitlements such as fish and other products of water bodies, grazing and traditional seasonal resource access of nomadic or pastoralist communities;
 - (e) Rights including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities;
 - (f) Rights in or over disputed lands under any nomenclature in any State where claims are disputed;
 - (g) Rights for conversion of *Pattas* or leases or grants issued by any local authority or any State Government on forest lands to titles;
 - (h) Rights of settlement and conversion of all forest villages, old habitation, un-surveyed villages and other villages in forests, whether recorded, notified or not into revenue villages;

- (i) Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use;
 - (j) Rights which are recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribal under any traditional or customary law of the concerned tribes of any State;
 - (k) Right of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity;
 - (l) Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be, which are not mentioned in clauses (a) to (k) but excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal;
 - (m) Right to in situ rehabilitation including alternative land in cases where the Scheduled Tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land of any description without receiving their legal entitlement to rehabilitation prior to the 13th day of December, 2005.
- (II) Section 3(2): Notwithstanding anything contained in the Forest (Conservation) Act, 1980, the Central Government shall provide for diversion of forest land for the following facilities managed by the Government which involve felling of trees not exceeding 75 trees per hectare, namely:-
- (a) Schools;
 - (b) Dispensary or hospital;
 - (c) Anganwadis;
 - (d) Fair price shops;
 - (e) Electric and telecommunication lines;
 - (f) Tanks and other minor water bodies;
 - (g) Drinking water supply and water pipelines;
 - (h) Water or rain water harvesting structures;
 - (i) Minor irrigation canals;
 - (j) Non-conventional source of energy;
 - (k) Skill up gradation or vocational training centres;
 - (l) Roads; and
 - (m) Community centres;

Provided that such diversion of forest land shall be allowed only if, the forest land to be diverted is less than one hectare in each case; and the clearance of such developmental projects shall be subject to the condition that the same is recommended by the Gram Sabha.

- (III) Section 5: The holders of any forest right, Gram Sabha and village level institutions in areas where there are holders of any forest right under this Act are empowered to (a) protect the wildlife, forest and biodiversity; (b) ensure that adjoining catchment area, water sources and other ecological sensitive areas are adequately protected; (c) ensure that the habitat of forest dwelling Scheduled Tribes and other traditional forest dwellers is preserved from any form of destructive practices affecting their cultural and natural heritage; (d) ensure that the decisions taken in the Gram Sabha to regulate access to community forest resources and stop any activity which adversely affects the wild animals, forest and the biodiversity are complied with.
- (IV) Section 6(1): The Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both that may be given to the forest dwelling Scheduled Tribes and other traditional forest dwellers within the local limits of its jurisdiction under this Act by receiving claims, consolidating and verifying them and preparing a map delineating the area of each recommended claim in such manner as may be prescribed for exercise of such rights and the Gram Sabha shall, the, pass a resolution to that effect and thereafter forward a copy of the same to the Sub-Divisional Level Committee.
- (V) Section 6(3): The State Government shall constitute a Sub-Divisional Level Committee to examine the resolution passed by the Gram Sabha and prepare the record of forest rights and forward it through the Sub-Divisional Officer to the District Level Committee for a final decision.
- (VI) Section 6(5): The State Government shall constitute a District Level Committee to consider and finally approve the record of forest rights prepared by the Sub-Divisional Level Committee.
- (VII) Section 6(6): The decision of the District Level Committee on the record of forest rights shall be final and binding.
- (VIII) Section 11: The Ministry of the Central Government dealing with Tribal Affairs or any officer or authority authorised by the Central Government in this behalf shall be the nodal agency for the implementation of the provisions of this Act.

1.2 Status of Implementation of FRA 2006 in Nagpur Forest Division: The status of implementation of this Act is summarized in the table below:

**Information regarding forest right recognised under Forest Rights Act 2006 in Nagpur
Division Abstract**

Sr. No	Range	Number of Villages where Rights have been recognised Name	Total Comptt. No/ Survey No. where rights recognised	Total No of Individual Forest rights settled	Total Area (Ha)	Total No of Community Forest rights settled	Total Area in ha	Remarks
1	Narkhed	1	1	4	1	4	2	
2	Katol	2	2	10	4.11	0	0	
3	Kondhali	9	20	43	19.871	0	0	
4	Hingna	14	46	83	114.044	0	0	
5	Butibori	31	61	87	117.104	1	0.04	
6	Seminary Hill	0	0	0	0	0	0	
7	Kalmeshwar	7	9	9	0.051	10	1.21	
8	Khapa	24	38	9	1.815	35	7.966	
9	Paoni	7	37	38	39.444	0	0	
10	Deolapar	7	24	32	26.642	0	0	
11	Parshioni	11	35	72	74.378	0	0	
12	Ramtek	2	9	11	7.686	0	0	
13	N. Umrer	19	45	106	98.632	16	4.03	
14	S.Umrer	8	16	20	29.703	6	2.26	
Total		142	343	524	533.99	72	17.55	

Facility wise breakup under section 3(2) of FRA

Sr.No.	Facility	No. of cases finally approved	Area diverted in ha.
1	2	3	4
1	Schools;	3	0.69
2	Dispensary or hospital;	1	0.83
3	anganwadis;	0	0
4	fair price shops;	0	0

5	electric and telecommunication lines	13	7.991
6	tanks and other minor water bodies;	3	2.944
7	drinking water supply and water pipelines;	11	0.557
8	water or rain water harvesting structures;	2	0.0198
9	minor irrigation canals;	1	0.85
10	non-conventional source of energy;	0	0
11	skill upgradation or vocational training centres;	0	0
12	roads; and	11	3.387
13	community centres;	4	1.48
	Total	49	18.75

Prescriptions for management of forest areas on which the forest rights are recognised:

1. **Boundary Demarcation:** The forest areas on which the individual forest rights are recognised by District Level Committee are to be properly demarcated on ground with suitable boundary pillars in order to prevent any further encroachment. In case of Community Forest Rights (CFRs), the area should be properly demarcated so that the Village level institutions and the Forest Department officials can maintain absolute clarity about the boundaries of CFR. As of now, boundary demarcation work of FRA beneficiaries has not been initiated in the division. Therefore, this exercise needs immediate attention of CCF & DCF, Nagpur and shall be completed within 2 years from the date of commencement of this Working Plan. The progress of boundary demarcation works shall be monitored on a monthly basis by the DCF and on a Quarterly basis by the CCF. The GPS coordinates of such boundary pillars shall be maintained in the Boundary Pillar Register. Forester shall inspect cent percent boundary pillars in his jurisdiction; RFO and ACF shall inspect 50 percent & 20 percent works respectively.
2. **Updating of Area Registers:** The Divisional Area Register (Form No. 1) shall contain the area vested with rights under FRA in the 'Remarks' column against each Compartment/Survey No./Gat no.
3. **Awareness creation among FRA beneficiaries** about the responsibilities of forest and wildlife conservation will aid in the long run to prevent further encroachments.
4. In the FRA Rules 2012, there is a provision to handhold the holders of forest rights through convergence of various Govt. schemes relating to land

improvement, land productivity, basic amenities and other livelihood measures. In this regard, special efforts need to be made to identify areas of livelihood support such as NTFP collection, processing and marketing, need based skill development programmes for self-employment.

5. If the claims under the Act are finally rejected by the competent authority, such encroachments shall be removed immediately by following the due process of law.
6. As per Rule 4(e), the Gram Sabha is duty bound to constitute Committees for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the Act. Similarly, as per Rule 4 (f), such Committee shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest resources and integrate such plan with the micro plans or working plans or management plans of the forest department. Therefore, the territorial officers shall examine such Conservation and Management Plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of the approved working plan.

CHAPTER-XIII

THE BIOLOGICAL DIVERSITY ACT, 2002

Introduction:

India is a party to the United Nations Convention on Biological Diversity signed at Rio de Janeiro on the 5th day of June, 1992. This Convention reaffirms the sovereign rights of the States over their biological resources. Therefore, legislation was enacted by the Indian Parliament in 2002 to give effect to the United Nations Convention.

This Act aims to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto.

Important provisions of the Act:

- (a) Section 2(a) defines the term “Benefit Claimers” as; the conservers of biological resources, their by-products, creators and holders of knowledge and information relating to the use of such biological resources, innovations and practices associated with such use and application.
- (b) Section 2(b) defines the term “Biological diversity” as; 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 of eco-systems.
- (c) Section 2(c) defines the term “Biological resources” as; Plants, animals and micro-organisms 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 material.
- (d) Section 2(o) defines the term “Sustainable use “as the use of components of biological diversity in such manner and at such rate that does not lead to the long-term decline of the biological diversity thereby maintaining its potential to meet the needs and aspirations of present and future generations.
- (e) Section 3(1) regulates the access to Biological diversity for persons mentioned in section 3(2) who shall, without previous approval of the National Biodiversity Authority(NBA), obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.
- (f) Section 3(2): The persons who shall be required to take the approval of the NBA under section 3(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 corporate body, association or organization not registered in India 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.

- (g) Section 4: No person shall, without the previous approval of the NBA, 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.
- (h) Section 6(1): No person shall apply for any intellectual property right (IPR), 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 NBA before making such application.
- (i) Section 7: No person, who is a citizen of India or a body corporate, association or organisation 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 concerned.
- (j) Section 8(1): Central Government for the purposes of this Act, shall appoint a body called the National Biodiversity Authority (NBA).
- (k) Section 21(1): The National Biodiversity Authority shall while granting approvals shall ensure that the terms and conditions subject to which approval is granted secures equitable sharing of benefits arising out of the use of accessed biological resources, their by-products, innovations and practices associated with their use and applications and knowledge relating thereto in accordance with mutually agreed terms and conditions between the person applying for such approval, local bodies concerned and the benefit claimers.
- (l) Section 21(4): NBA shall in consultation with the Central Government frame guidelines for operationalising section 21(1).
- (m) Section 22(1): For the purposes of this Act, State Government may, by notification in the Official Gazette, establish State Biodiversity Board.
- (n) Section 37(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 the Act.
- (o) Section 37(2): The State Government, in consultation with the Central Government, may frame rules for the management and conservation of all the heritage sites.
- (p) Section 38: Without prejudice to the provisions of any other law for the time being in force, the Central Government, in consultation with the concerned State Government, may from time to time notify any species which is on the verge of extinction or likely to become extinct in the near future as a

threatened species and prohibit or regulate collection thereof for any purpose and take appropriate steps to rehabilitate and preserve those species.

- (q) Section 41(1): Every local body shall constitute a Biodiversity Management Committee (BMC) within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.
- (r) Section 41(2): The NBA and SBA shall consult the Biodiversity Management Committees (BMCs) while taking any decision relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the BMCs.
- (s) The BMCs may levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purposes from areas falling within its territorial jurisdiction.
- (t) Section 55(1): Whoever contravenes or abets the contravention of the provisions of sections 3, 4 or 6 shall be punishable with imprisonment for a term which may extend to five years, or with fine which may extend to ten lakh rupees and where the damage caused exceeds ten lakh rupees such fine may commensurate with the damage caused, or with both.
- (u) Section 58: The offences under this Act shall be cognizable and non-bailable.
- (v) Section 59: The provisions of this Act shall be in addition to, and not in derogation of, the provisions in any other law, for the time being in force, relating to forests or wildlife.

Prescriptions for implementation of the Act:

- (1) In Nagpur forest division, Biodiversity Management Committees have not been formed so far as per provisions of Section 41(1) of the Act. Therefore, this provision shall be implemented within 6 months from the date of commencement of this Working Plan.
- (2) The field functionaries of Nagpur forest division shall identify areas of immense biodiversity value and take lead in declaring them as biodiversity heritage sites.
- (3) The Joint Forest Management Committees (JFMCs) and Eco-Development Committees (EDCs) are already involved in protection and conservation of forests and wildlife. Since, forests are repertoires of biodiversity, JFMCs and EDCs are already performing the role of biodiversity conservation. Hence, they may be designated as BMCs as per this Act through a Gram Sabha resolution if the respective Gram Panchayat resolves to do so.

CHAPTER-XIV

THE WILDLIFE (OVERLAPPING) WORKING CIRCLE

14.1 General Constitution of the Working Circle: Nagpur forest division has tremendous significance for wildlife conservation as the territorial areas adjoin protected areas such as Pench National Park, Mansinghdeo Wildlife Sanctuary, Umred-Karandla Sanctuary and Bor/New Bor Wildlife Sanctuary. These forests are important for corridor management between the P.As mentioned above and the adjoining territorial areas. Apart from functioning as crucial corridors, the territorial areas provide space for the spill over population of wildlife from the core zone of protected areas.

Considering the importance of these forests a separate Working Circle has been included in this Working Plan. This is basically an overlapping working circle, but a few exclusive areas from the point of wildlife management are proposed to be given special protection and treatments for better management of wildlife in the areas, specially where there is a Protected Area around it.

General Condition of Flora and Fauna: The general condition of vegetation has been prescribed in various working circles. The general condition and density of wildlife in the Division is good, however, its distribution is quite uneven. Wildlife population density varies with the habitat depending upon availability of food, water and shelter. The forest of Nagpur Division is predominantly a mixed forest with Teak as dominant species. Wildlife commonly found in the division is as below:

A. Carnivores: (i) Tiger (*Panthera tigris*) (ii) Panther (*Panthera pardus*) (iii) Wolf (*Canis lupus*). (iii) Striped Hyena (*Hyaena hyaena*) (iv) Wild dog (*Cuon alpinus*) (v) Jackal (*Canis aureus*) (vi) Indian Fox (*Vulpes bengalensis*) (viii) Leopard Cat (*Felis bengalensis*) (ix) Jungle Cat (*Felis chaus*). (x) Common Mongoose (*Herpestes edwardsi*).

B. Herbivores (i) Bison (*Bibos gaurus*) (ii) Nilgai (*Boselaphus tragocamelus*) (iii) Sambhar (*Cervus unicolor*) (iv) Cheetal (*Axis axis*) (v) Barking Deer (*Muntiacus muntjak*) (vi) Wild boar (*Sus scrofa*) (vii) Sloth bear (*Melursus ursinus*) (viii) Four horned antelope (*Tetraceros quadricornis*) (ix) Common Langurs (*Presbytis entellus*), (x) Rhesus Macaque (*Macaca mulatta*), (xi) Bonnet Macaque (*Macaca radita*).

C. Rodents: (i) Three striped palm squirrel (*Funambulus palmarum*) (ii) Jungle striped squirrel (*Funambulus sublineatus*) (iii) Porcupine (*Hystrix indica*) (iv) Hare (*Lepus ruficaudatus*) and (v) Jungle Rats and Moles.

D. Snakes: Kadu (*Typhlops braminus*), Kawda (*Lycodon aulicus*), Gavtya snake (*Macropisthodn plumbicolor*), Dhondya (*Natrix piscator*), Dhaman or Common Rat-

snake (*Ptyas mucosus*), Indian Rock Python-Ajgar (*Python molurus.*), India Cobra or Nag (*Naja naja*), Dandekas (*Bugarus caerulues*), Russel's Viper or Ghunus (*Vipera russelli*). Checkered keel back (*Xenochrophis piscator*)

F. Birds: (i) Painted sand grouse (*Pterocles indicus*) (ii) Common sand grouse (*Pterocles exustus*) (iii) Pea fowl (*Pavo cristatus*) (iv) Grey jungle fowl (*Gallus sonne ratil*) (v) Red jungle fowl (*Gallus gallus*) (vi) Red spur fowl (*Gallus spadicea*) (vii) Painted partridges (*Francolinus pictus*) (viii) Grey partridges (*Francolinus pondicerianus*) (ix) Jungle bush quail (*Perdicula asiatica*) (x) Black breasted quail (*Cturnix coronandelicus*) (xi) Indian Bustard quill (*Turnix suscitator*) (xii) Common or grey quail (*Coturnix*), (xiii) Pigeon (*Treron phoonicoptera*) (xiv) Crane (*Grus antigone*) (xv) Dove (*Streptopota spp*) (xvi) Cotton teal (*Nettapus coromandelianus*) (xvii) Whistling teal (*Dendrocugna javanica*) (xviii) Comb duck (*Sarkidiornis melanotus*). (xxix) Little Grebe (*Podiceps ruficollis*) (xxx) Cormorant (*Phalacrocorax carbo*) (xxxi) Grey Heron (*Ardea cinera*) (xxxii) Large Egret (*Ardea alba*) (xxxiv) Black ibis (*Pseudibis papillos*) (xxxv) Pariah Kite (*Milvus migrans govinda*) (xxxvi) Shikra (*Accipiter badiues*) (xxxvii) India Whitebacked Vulture (*Typs bengalensis*).

14.2 History of Wildlife Management In General:

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 tribal 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.

The population of some wild animals in Nagpur Forest Division as per 2010 population estimation is given below:

Table No.14.1 : Population Estimation of Wildlife in 2010

Species	Population estimation
Tiger	8
Leopard	9
Spotted deer	515
Sambar	304
Nilgai	471
Wildboar	621

Prior to the abolition of the proprietary rights, hunting in the *malguzari* forests was done with the permission of the *malguzars*. Consequent to the vesting of

these forests in the Government as Protected Forests, hunting in these forests was also regulated by fixing shooting blocks and by issuing licenses.

However, after the enactment of the Wildlife (Protection) Act, 1972, the hunting and trading of wild animals and its trophies were strictly monitored and subsequent amendments in this Act in 1991 and 2002, hunting of any animal included in the Schedules of Wildlife (Protection) Act 1972, (other than vermin), as game or sport, has been completely banned.. Hunting of wild animals however can be allowed for special purposes but only in exceptional circumstances. The maintenance of biological diversity is the new mandate of National Forest Policy, 1988. Restriction of degraded habitats outside the protected areas is one of the strategies for action listed in National Wildlife Action Plan (2002-2016). Therefore, primacies of environmental concerns and biodiversity conservation have been dealt in this chapter.

The wildlife, which used to flourish in the forests of the Division, is threatened due to various factors like population explosion, encroachments, over grazing, regular forest fires, improved network of roads and availability of sophisticated weapons. Due to increase in demand for wildlife products all over the world, poaching problems have increased over the years in and around Nagpur. Hence, special efforts are required to be made by the Division to protect the wildlife in the region.

Many birds are migratory and visit the area in a particular season, mostly during winter. They are under great threat from poachers and fishermen.

There are many endangered insects and plants included in the schedule of Wildlife Protection Act 1972. They silently play a very important role in the ecology but information about such species is scanty. Hence, division should make efforts to build database on such species by instituting special studies involving research organizations.

Existence of Wildlife in Forest: Existence of particular wild animals in a particular forest can be identified from the following observations.

1. **By Actual Sighting:** In the early morning or evening, near water holes, grazing sites or on the roads, we can see the wild animals.
2. **Pug Marks:** By keen observation of these pug/hoof marks we can identify the category of wild animals, their sex and age.
3. **Grazing Marks:** The method of grazing of different herbivores is different. We can identify the category of herbivore by the nature of grazing and browsing.
4. **By Excreta:** By the examination of excreta we can know the category of wild life, their numbers, way of walking and, quantity of food etc.

5. **Antlers Marks (on the stem of tree):** Before falling of antlers, Spotted Deers and Sambers rub their antler to some stem. In Spotted Dear and Samber this habit can be observed.
6. **By Smell (odour):** Many animals having the smell glands. In Hyena these glands are found in his Anus and in case of Black Buck they are found below their eyes.
7. **By Salt Licking Places:** In forest some soil contains more percentage of salt and minerals and wild animals use to lick this soil to get the necessary amount of salt.
8. **By Sound:** In forest we can hear different types of sounds of wild animals. Some wild animals give signal of danger to other animals with the help of different sounds.
9. **By Wallowing Sights:** Samber, Wild Boars etc like mud and they wallow in mud. By this they clean their skin and protect it from insects.
10. **Nail Marks:** Tiger and Bear with the help of their Claws/nails scratch the bark of some trees.

14.3 Injuries to Wild Animals:

Poaching: In spite of stringent provisions in the wildlife and forest laws, poaching for skin, bones, pets and flesh, continues to be the most important reason for destruction of wildlife in the Division. Poachers use various methods to kill wild animals. Vulnerability to poaching increases during summer (pinch period) when number of water holes reduce drastically and also water in a water hole recedes to minimum.

It has been noticed that poisoning of drinking water by mixing urea in large concentration can kill wild animals instantaneously. When an animal drinks such water, it dies within hours due to intense gas formation in stomach and choking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets, snares and traps for catching birds, hares and sometimes small animals like deer has been recorded in the past but of late the poachers have been found using the improvised spring steel traps for killing the large animals, like Tigers and Panthers, very effectively. This method is often used by Baheliya gangs for killing tiger.

Electrocuting the animals including Tigers by laying live electric wires on the tracks followed frequently by wild animals and by drawing electric current by high tension lines passing through the forests is another method which is proving to be a potential threat to animals, besides sometimes being hazardous to local people.

Degradation of Habitat: Due to various human activities the habitat of various wild animals are degrading very fast and is manifested in the form of

reduced population of many animal and bird species. The main factors adversely affecting the wild habitat are:

- Heavy biotic pressures, like over grazing, encroachments on forest lands, large scale human and cattle movement in the forest areas, forest fires etc. are responsible for the general degradation of these habitats.
- Large scale diversion of Forest Land for **projects like, irrigation dams and canals** are also adversely affecting the wildlife habitat by fragmenting the forest areas and creating permanent barriers for the movement of wild animals on one hand and risk to their lives, specially for the young ones, on the other hand. The Forest department should convince the Irrigation department to construct suitable passages for wild animals at suitable regular intervals. This could have been avoided, had the Dy.C.F. put the condition for these passages in the proposal of the project under Forest Conservation Act, 1980.

Diseases: The livestock from the villages in the forests regularly frequent the forests and share the water holes used by wild animals. Therefore various diseases common in domestic cattle, and which spread through contact and are water borne (contagious diseases) are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (4) FMD (5) Canine distemper. FMD has a potential to wipe out large populations, while rinderpest, anthrax and rabies are highly infectious and lead to certain death. Therefore, the need of coordinated efforts with Animal Husbandry Department to vaccinate domestic animals in wildlife rich areas is a must to safeguard wildlife.

Fires: Forest fires are of common occurrence these days. The fires in the interior of the forests, besides destroying the natural habitat of the forest fauna, drive them to take shelter near the human habitation and make them easy targets of poacher's guns or local villager's weapons. Due to fire even the young ones of big and strong animals may perish, besides other animals, reptiles and birds, which live on ground and can not escape the fire and its heat. In case if they survive their food, grasses, herbs and shrubs are destroyed this is already insufficient to meet the requirements of cattle as well as the wild animals. The whole tract experiences water scarcity in summer. These fires aggravate the already existing water scarcity and expose these animals to above mentioned risks. It increases the man animal conflict.

14.4 Damages to Crop, livestock and humans:

Damages to the Crops: Incidences of crop damages by herbivores have been reported predominantly in forest fringe villages. This is leading to economic losses to farmers. Statistics of Crop damage by wildlife is given in Volume II, Appendix

XLVI. Farmers are compensated for the losses as per the Govt. orders issued from time to time.

Injuries to Cattle and Human: The carnivores, Tiger and Panther sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. The villagers sometimes indulge in poisoning the carcass to take revenge 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. Statistics of damage to livestock and humans is given in Appendix XLVI. The Govt. of Maharashtra, has therefore has evolved a policy of compensating for the loss of livestock as well as for the injury or loss of human life.

14.5 Animal Health, Diseases and its Symptoms: Like other animals many times wild animals are also get sick due to contagious diseases. The reasons for their sickness are as follows:

From the observation of its behavior and condition of its body, we can come to know whether the wild animal is sick or healthy. The following measures are helpful for the identification of condition of wild life health:

Table No. 14.2 Table Showing Symptoms of Healthy and Unhealthy Wild Animals:

Sr. No.	Particulars	Healthy	Diseased
1	Behavior	Cautious, Clever, smart, swift	Drowsy
2	Head	Up-wards	Downwards
3	Mouth and Nose	No bleeding	Bleeding may be seen
4	Hairs on body	Bright	Rough and erected
5	Ear	Erected	Fallen (Drooping)
6	Eyes	Bright	Drowsy
7	Diet	As usual	Avoid to take diet
8	Response	Alert	No response
9	Walking	Stylish	Prefer to sit
10	Milk kas	Good in condition	Found swollen
11	Back side observation	Backside high	Backside goes inwards
12	Ribs	Not seen	Seen
13	Waist bones, Back-bones and, skeleton of stomach	Continuous, bones not seen and , seen rounded from back side	Waist bones and back bones are seen, there will be deep portion on back
14	Two bones of waist	Seen triangular from back side	Waist bones are not seen as triangular.

Following Factors are Responsible for Contiguous Diseases:

1. Common grazing areas with village cattle.
2. By contact.
3. Common water holes.
4. By excreta.
5. By meat.
6. By communication media.
7. By human being.
8. Other factors.

Types of Diseases Found in Wild Animals:

1. Bacterial disease
2. Viral disease.
3. Fungal disease.
4. Parasitic disease.
5. Protozoan disease.

14.6 Wild life First Aid: Some times wild animals get injured by accidents or by disease. Many times these injuries are so small that there is no need to get them to Veterinary doctor. Therefore it is necessary for forest staff to know about these small injuries and first aid to be given to the animals accordingly.

14.7 Special Objectives of Management:

- 1) To ensure wildlife (animals & plants found in wild) protection and conservation in the managed forests of this Division.
- 2) To ensure scientific management of wildlife in the managed forests by undertaking measures like habitat management, waterhole development and monitoring population of the wild animals.
- 3) To provide extra space for spill over population from adjoining protected areas.
- 4) To ensure protection of ecologically sensitive and special habitat sites for wildlife conservation, such as riparian zones, mesic sites (natural water seepage sites), perennial water holes, natural grasslands, natural wallows, salt licks, natural resting, breeding and nesting sites (caves snags, overhangs, groves of old Ficus trees, thick Bamboo groves).
- 5) To check wildlife trade and smuggling.
- 6) To promote and encourage ecotourism without disturbing and damaging wildlife.
- 7) To generate awareness among local communities towards the need for biodiversity conservation.
- 8) To protect the wild animals from various diseases.
- 9) To explore the possibility of engineering habitat to reduce man-animal conflict.

14.8 Recommendations for Future Management:

Standing Order (Wildlife) No. 001.

The PCCF (WL) MS, Nagpur has issued a standing order (Wildlife) No.001. This order prescribes duties and lists measures for the protection and conservation of the wildlife outside PAs. Following are the general prescriptions, majority of which are based on the guidelines under this Standing Order, for the protection of wildlife in the areas outside the Protected Areas. The territorial staff of the Nagpur Division shall scrupulously implement these prescriptions.

1. Duties of Forest Guard, Forester, RFO and ACF include-
 - Keeping information of waterholes, particularly in summer and watch on the same, that is, special vigilance at all the water holes in the Division is prescribed.
 - Keeping a watch on the electric lines passing through forests.
 - Ensuring registration of arms licenses as required under Wildlife (Protection) Act 1972.
 - Cognizance of cases of injury due to wild animals as per Govt. Orders from time to time with speedy and transparent disposal of cases.
 - Keeping a track of animals like Tiger, particularly Tigress with cubs and a watch on such vulnerable animals.
 - Proper disposal of carcass of wild animals found dead or killed.
 - Local staff shall maintain record of sensitive wildlife areas such as areas with heavy wild animal concentration.
 - Establishing a network of informers with the aid of Secret Service Fund.
 - There shall be regular short-term training/ workshops in anti-poaching activities and legal requirements in dealing with wildlife offence cases.
 - Cases of Man-animal conflict should be handled swiftly and efficiently. Keeping in view the vast area of the division, at least two Rapid Response teams shall be operationalized 24*7. Such team should be given need based training. Every Range HQ should contain equipments necessary to handle conflict situations.
2. Nature education programme in the villages adjoining forests and in schools and colleges shall be arranged.
3. Ecologically sensitive habitats shall be identified and protected.
4. Antler trade is now banned; hence, no collection of shed antlers is to be allowed.
5. The involvement of Honorary Wildlife Warden and serious NGO's be encouraged for nature education programme.
6. It will be ensured that cattle grazing in forests near the important wildlife habitats are inoculated against contagious diseases.

14.9 Creation of Data Base:

The Division will carry out survey of *riparian zones, mesic sites, perennial water holes, saltlicks, natural wallows, resting places, breeding and nesting sites, etc.* and map them (with GIS) for the purpose of their protection and management. The staff will also identify the areas where these sites are under potential threat. The Division will also maintain a meticulous record of these sites on a register the “Register of the Special Wildlife Habitat” and update it annually by an officer not below the Range Forest Officer.

The Division will undertake population estimation of the wildlife, including the migratory and other rare birds, at the frequency decided by the Chief Conservator of Forests (Territorial); in addition to All India Tiger and Panther population estimation. Special note should be taken if any nesting site of endangered birds like Vultures is noticed.

Delineation and Mapping of Special Habitat Areas: Delineation of the special wildlife habitat sites including natural water seepage sites (mesic sites), water holes, natural wallows and saltlicks used by the wildlife, breeding sites, dens or nesting sites of animals and birds appearing in the Schedules of the Wildlife (Protection) Act, 1972 shall be carried out and marked on the Divisional/range maps. For instance, the Mango and Jamun groves on moist sites are generally the mesic sites. A strip of 50-meter around special habitat sites shall also be delineated and mapped to serve as buffer for the site.

While preparation of treatment map of coupe for working in the area-specific working circles the special wildlife habitat sites given above shall be identified and marked on the map along with its buffer of 50 metre width strip around.

Habitat Development Works: Due to continuous biotic pressure, the wild life habitat has also deteriorated and today it has reached a critical condition. The most important factors in the habitat are water, food, safe places for resting, breeding, and nesting. Wallows and salt licks are other factors. To meet the minimum requirement of the wild animals the following activities are recommended:

A. Water Hole Development: Water availability, or the scarcity of it, is one of the major factors that decide the health of the habitat. Its non-availability at sufficient places in the forests also increases probability of animals being found on the limited water holes or near villages and thereby increases their susceptibility to poaching. Water is a major limiting factor during the summers in these forests. The water hole density shall be commensurate with the density of wild animals found in the area

and as per the wildlife management regulations. To meet the requirement the following steps may be taken:

- i. All the perennial and ephemeral water holes will be identified, recorded and marked on Divisional/range maps.
- ii. De-silting, if required, shall be carried out during summer to provide adequate drinking water.
- iii. Creation of additional water holes (permanent and temporary) is prescribed so that undisturbed water holes are available.
- iv. Small nalla-bunds, underground bunds and other technically sound small water harvesting structures may be constructed across the streams to create water holes and habitat development.
- v. Small water harvesting structures with submergence area less than 1/2 hectare shall be taken up. However, creation of water holes or water harvesting structure should not damage the riparian ecosystem.
- vi. Small cement concrete saucer shaped water holes shall be constructed at suitable and safe places and be linked with Solar Powered pumps fitted to bore well.

The distribution of waterholes in the areas up to 10 Km from the boundary of protected areas is shown in table below. This exercise was done using GIS software. Grids of 9 Sq. Km were laid on GIS map and the existing waterholes were plotted. The number of Grids with presence and absence of waterholes was counted.

Name of Protected Area	No. of Grids (9 Sq.Km) in 10Km radius	No. of Grid with existing waterhole		No. of Grids without waterhole
Pench N.P. & Mansinghdeo WLS	77	0	7	70
Umred-Karandla WLS	65	0	4	61
Bor & New Bor WLS	27	0	0	27
Total	169	0	11	158

From the above table, it is amply evident that, special efforts need to be made to improve the density of waterholes (Grid map is appended herewith). The sites for potential waterholes along with GPS readings is given in Volume II, Appendix-LI. However, works shall be executed upon ascertaining the sensitivity of the area.

D. Food/Prey Base: Whether the prey base is adequate or not shall be ascertained from regular herbivore count. Supplements of cattle kill should be taken into account while computing existing herbivore population. Any downward trend should be

looked into seriously and possible reasons for its downslide must be found out and rectifying steps must be taken.

To improve the prey base, care of herbivores should be taken by improving the assured fodder availability in the forest, especially during the summer season, when the forest grasslands are burnt. The open areas in wildlife rich zones should be developed into meadows for the herbivores.

E. Development of Nesting Sites: Nagpur Division has many water bodies, small and large and lots of water birds are found in these water-bodies. To provide suitable nesting places to these birds, seed sowing of species like Babul and takes planting of species like Banyan and other Ficus spp. should be done near water-bodies and in the riparian areas.

F. Protection Measures for Wildlife:

There are many villages within and nearby the forest. They are dependent on agricultural and forestry works. These villages, with large number of live stock, are threat to the wild animals as they share the same water bodies and grazing grounds. Due to common grazing and drinking water at same places, many contagious diseases may spread in the wild animals. To protect the wild animals from such contagious diseases, forest department with the help of Veterinary doctors, should take the following preventive measures in such villages:

Vaccination of Village Cattle: All cattle of adjoining villages within 5 KM from the boundary of Protected Areas should be vaccinated every year for important diseases. This activity shall be monitored by the PA manager and also DCF (Territorial).

Regular Health Checkup for Cattle: Forest staff, with the help of veterinary doctor of the area, should organize annual cattle health checkup camps in villages. Required vaccination should be done and if required, proper treatment to sick animal should be given.

Proper Sensitization of Staff: The field staffs of the Division should be trained in day to day wildlife management and protection works. They should work in close cooperation with the Wildlife wing.

Protection from Poaching and Trade: The forest staff shall develop an intelligence system with the help of local people, specially with Joint Forest Management Committee, to gather information about any activities related to poachers and traders of wild life.

- Regular patrolling by the staff shall be carried out in the areas where the population of wildlife is more, specially during summer when these animals become more vulnerable due to shortage of water in the forest areas.
- Poaching of birds is also common and it is not given due importance. The aquatic migratory birds are to be protected from the fishermen.
- The fishery department and the local villagers should be convinced to use fishing nets of such size so that small fishes are left in the tank for these water birds.
- The forest staff shall also be vigilant in the towns' market where at times birds like Parakeets, Partridges, Quails, Water-Birds, Monitor lizards, Tortoise, Turtles etc. are brought for sale.

Protection of Forest from Over-grazing and Fire: After poaching, uncontrolled grazing and fire are the most important factors, adversely affecting the wildlife. To restrict illegal grazing, by cattle including goat, sheep etc., and during the fire season, to prevent the forest fires, patrolling parties should carry out regular patrolling in the sensitive areas of the forest.

Supply of Books: Books, related to Wild animals disease, treatment, tranquilization, wildlife management etc. should be supplied to the field staffs to improve their management skills. Short period training of tranquilization of wild animals, to the forest staff and Veterinary Doctors, will be given by the wild life staff. This will facilitate safe capture and transportation of wild animals in trouble.

14.10 Marking Reservations, Other Restrictions: The following, prescriptions have been made for implementation along with coupe operations and other treatment prescriptions, in the wildlife area-specific coupes.

- No felling of trees or harvesting of any sort shall be allowed on these sites and in 50 metre wide buffer strips around them.
- While marking of dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.
- While harvesting at least 2 down hollow logs, of low commercial value, per hectare shall be reserved for shelter of wildlife.
- Tendu collection centres or labour camps shall not be allowed near water holes frequented by the large mammals or other important wildlife species. The labour camps shall be established away from areas of high wildlife density.

14.11 Development of Fodder

- The carrying capacity for grazing is determined after excluding the forest area required to meet fodder requirements of the wild animals and ecologically sensitive sites and special habitat sites for wildlife in the area.
- Habitat improvement is proposed at places having high density of wildlife and the areas frequented by both domestic animals and wildlife. Special efforts are to be initiated to develop meadows.
- Plantations prescribed in various working circles shall include at least 10 percent of fodder and fruit species of wildlife importance. *Ficus spp. (Vad, Gular, Umbar), Ber, Anjan, etc.* are recommended for this purpose.
- In the areas falling within the FTL 2-4 metre level of major and medium irrigation projects, planting of good fodder grass shall be taken to increase the grazing facilities for the wildlife.

14.12 Annual Works and Requirement of Fund: The Dy.C.F. Nagpur will take special care to motivate and orient the field staff in favour of Wild life through regular meetings, guidance and workshops. Some of the RFOs and Foresters shall be sent to short term training in the Wildlife Institute of India. Besides this help of trained officers and staff of wildlife Divisions may also be taken.

To start the work of habitat improvement some demonstration works and visits to wildlife areas should be carried out to expose the field staff to the technical aspects of Wildlife Management.

14.13 Compensation For The Loss of Livestock

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(1 SA)) due to attack of a Tiger, Panther or any other wild animal. The present rates of compensation as per the GR No.WLP-100S/C.No.2701F-1 of 02/07/2010 are as follows and compensation is to be paid within 3 months.

S.N.	Particulars	Amount to be paid
1	Cow, Buffalo, Bullock	75% of the market price or Rs.10000/- and whichever is less;
2	Sheep, Goat, other livestock	75% of the market price or Rs.3000/- and whichever is less;
3	Cow, Buffalo, Bullock became permanently handicapped	50% of the market price or Rs.3000/- and whichever is less;
4	Injury to Cow, Buffalo, Bullock, Goat	Treatment cost. (Govt. or ZP Hospital) 25% of the market price or Rs.1000/- and whichever is less.

The compensation to livestock damage has to be given as per the terms and conditions mentioned in the Govt. Resolution No. No.WLP-1008/C.No.270/F-I of 02/07/2010. Some the conditions to be fulfilled are as under:

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 DCFIDFO.
6. No compensation in case the livestock was grazing illegally.

14.14 Compensation For The Injury To And Loss Of Human Life:

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, South Bear, Bison, Wild Pigs, Wolf, Hyena, Jackal and wild dogs is covered under the scheme. Present rates of compensation have been fixed through Govt. Resolution No.WLP-2012/C.No.337/F-I, dt.30/03/2013. These are as follows:

S.N.	Particulars	Amount to be Paid
1	Death	Rs.5.00 lakhs.
2	Permanent disability.	Rs.4.00 lakhs.
3	Major injury	Rs.1.00 Lakh.

The compensation to injury & loss human life has to be given as per the terms and conditions mentioned in the Govt. Resolution No.WLP-1008/C.No.270/F-I, dated 02/07/2010 and Govt. Resolution No.WLP-2012/C.No.337 /F-I, dated 30/03/2013. Some of the conditions for claiming and deciding above compensation are as under.

1. Such attack 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 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.

14.15 Eco-Development, Awareness Generation And Eco-Tourism:

- Effective protection and management of sensitive ecological and special habitat sites/areas is not possible without active involvement and support of village communities in the vicinity. Their help and support can only be ensured if their genuine needs and concern are given due consideration by the department. If the people living around are poor and anguished, the objective in question can not be achieved. Thus, to seek their willing support and goodwill it is proposed to undertake eco-development works by the Division in villages around these sites. It is also proposed to promote and encourage eco-tourism in the Division by extending and developing camping and nature interpretation facilities at sites/spots, rich and unique in natural and cultural beauty and diversity. It is, in accordance with, the current policy focus of the State and Government of India on eco-tourism. The forest department should be in touch with the MTDC for the development of such sites.
- The prominent **water bodies and specific habitat sites** in the Division are proposed as sites for creation of **Eco-centres** with facilities of nature interpretation and eco-tourism and to serve as centres for awareness generation and dissemination of issues and concerns of forestry and wildlife.

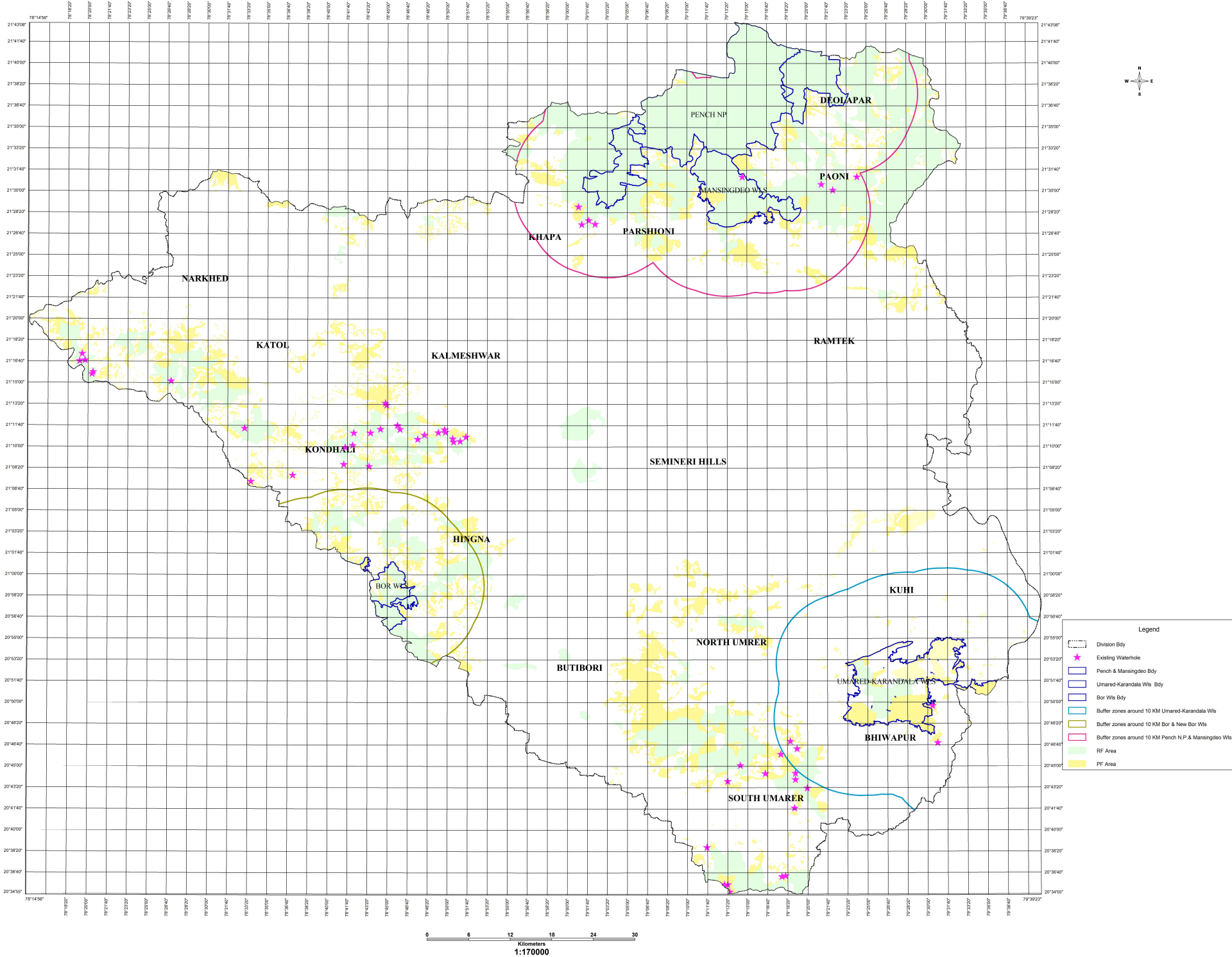
The villages adjoining sensitive sites are proposed to be taken up under eco-development program for their overall development. Eco-development plans shall be prepared with the help of local communities.

It is also prescribed to delineate sacred sites/grooves and worship sites, including, sites for tribal deities with involvement of the local village communities. They are marked on the Division/range maps.

- Archeologically important sites identified as such by the Archaeological Survey of India or the State Department of Culture shall be delineated to serve as focal sites for eco-tourism.
- The Division will maintain record of sacred and cultural sites on a register *the "Register of the Cultural Sites"* and verified and update it annually by an officer not below the Range Forest Officer.
- Awareness generation campaign be taken up to involve local villagers in the wildlife conservation programme. *Village Panchayats* and *JFMCs* shall be involved actively to further the cause of wildlife protection.

Teaching institutions viz. schools, colleges, etc. and NGOs shall be involved through nature camps, wildlife film shows, exhibitions, seminars, competition, etc.

DISTRIBUTION OF WATERHOLE IN 10 KM.RADIUS OF PROTECTED AREAS



CHAPTER – XV

BAMBOO (OVERLAPPING) WORKING CIRCLE

15.1 General Constitution of The Working Circle

Natural bamboo is found in Compartments of Khapa, Parseoni, Paoni, Ramtek, Kalmeshwar, and Deolapar ranges. In other parts of division, Bamboo occurs occasionally along nals or on small hillocks in the form of thinly scattered clumps. However, such bamboo growth is often damaged due to biotic pressure such as grazing and fire. There are also old surviving bamboo plantations. Many such plantations were raised as under-planting in old Teak plantations. Many important bamboo areas however are transferred to wildlife (as part of Pench National Park) and FDCM and, as a result, 12472.63 ha in 41 compartments is now not available under this working circle. Thus, out of the original bamboo area of 80 compartments (22999.88 ha), 12472.63 ha in 41 compartments is either included in Pench National Park or transferred to FDCM.

Area allocation: Compartments with naturally occurring Bamboo and successful plantations have been included in the Bamboo (overlapping) Working Circle. Total area extends over to 22245.819 hectares in 97 compartments forming 15.07% of division area. **The areas under successful old bamboo plantations suitable for harvesting have also been included in this working circle.** Out of total area of 22245.819; RF, NRF and PF are to the extent of 14603.72 ha, 406.47 and 7235.6 ha respectively (Area details are in Volume II, Appendix-XLII)

Range-wise area distribution is given in table below:

The criteria used for the allotment of compartments are as follows:

Range	Number of Compartments	Area in Ha.
Deolapar	17	4280.56
Ramtek	17	3696.4
Parseoni	18	4414.99
S. Umred	4	999.77
Butibori	1	215.29
Hingana	3	538.1
Kalmeswer	9	1650.119
Katol	5	1053.72
Khapa	5	697.12
Kondali	1	265.88
N. Umred	5	1119.99
Pavni	12	3314.6
Total	97	22245.819

15.2 General Character Of The Vegetation

Dendrocalamus Strictus is the main Bamboo species found in the tract. Bamboo crop is of both natural and planted. Katang bamboo (*Bambusa Arundinacea*) was introduced in small quantities and in some stretches along the streams, rivers and water bodies viz. near Chorbaoli tank, Ambakhorinala, Mogarkasa tank etc. It is usually associated with Ain, Lendia, Dhaora and Teak.

The growing stock has been considerably damaged due to over harvesting, frequent fires, illicit cutting and over grazing. The irregular working has resulted in extensive damage to the bamboo clumps at places, and shrinkage of the bamboo area over the years. Approachable areas have been heavily exploited and the interior clumps suffer from congestion. Many of the successful plantations have not been worked leading to deformation and congestion of clumps.

15.3 Block And Compartments

The compartments allotted to this working circle have detailed in Volume II, Appendix-XLII.

15.4 Special Objects Of Management

Bamboo has a significant place in local economy. Local tribal and non-tribal families use bamboo for construction, fencing and for making variety of articles. Bamboo has a great potential as an alternative to the timber and supports handicraft artisans called Burads for their livelihood. It has significant value for interior decoration, furniture making and manufacture of other articles of domestic use. Hence, increasing the bamboo productivity, in the division, is very important for the development of local inhabitants of this region.

This working circle aims at improving the bamboo production and productivity for meeting local needs and demand in the surrounding areas as well as to meet the Nistar for people.

15.5 Method Of Treatment

Each clump is prescribed to be treated as an independent entity for the treatment. Silvicultural system shall be the Culm selection system, each Culm to be treated as a stem. Clump cleaning is prescribed as an integral part of bamboo harvesting operation. Successful old bamboo plantations and patches of gregariously flowered areas are prescribed to be cleaned as **per para 15.10** under bamboo harvesting.

15.6 Cutting Cycle And Sequence Of Cutting

Cutting cycle of 3 year duration is proposed for the bamboo harvesting.

The entire area in the working circle has been divided into 10 cutting series of average size 2202 hectares. Each cutting series is further divided into three cutting sections of average size 734 hectares in the cyclic order viz. C, A and B; that will serve as annual coupes in each cutting series. The sequence of cutting is given in the (Volume II, Appendix XLIII)

15.7 Agency Of Harvesting

The Deputy Conservator of Forests, Nagpur Forest Division will decide the agency of harvesting according to the government policy and regulations.

15.8 Treatment Map And Enumeration

The treatment map for the Bamboo coupes will show bamboo areas, staking sites (temporary coupe depot) and the extraction roads.

Random Sample plots are laid in Bamboo bearing zone and atleast two percent sampling done to enumerate Culms and Clumps. Based on this data, expected yield of Bamboo and Bamboo bundles will be estimated.

High cleaning intensity will mean presence of badly twisted culms, and moderate cleaning intensity would indicate presence of malformed and dead culms exceeding four in number. Fewer malformed and dead bamboos will suggest low intensity cleaning.

15.9 Clump Cleaning And Bamboo Harvesting

Cleaning of bamboo clumps and harvesting of culms shall be carried out in accordance with the prescriptions given in para 15.10.

15.10 Prescriptions For Bamboo Harvesting

Harvesting Season: Bamboo harvesting will not be permitted during 15th June to 30th September, the period new Culm formation.

Cutting Implements: Bamboo cutting will be done with sharp axe or other suitably designed instruments. A bamboo Culm must be cut in a single stroke with a slant cut so that cutting is above the first inter-node and height of the cut is between 15 cm to 45 cm above the ground, to avoid damage to Rhizome.

Clump as units: Each clump is an independent entity for the treatment.

Cleaning operations: All clumps will be cleaned during the coupe working. Cleaning operations in bamboo clumps will include following elements:

- (a) Climbers infesting bamboo clumps will be removed.
- (b) All dead, decayed and dry culms will be removed.
- (c) All culms, cut high above the ground, will be cut above the first inter-node.

- (d) Twisted culms will be removed.
- (e) Top-broken culms, with more than half of the top damaged, and malformed culms will be removed.

Harvestable clump size: No clump shall be considered fit for harvesting unless it contains more than 12 (twelve) culms of one year or older in age.

Even working: While extraction of bamboo it should be ensured that the reserved culms are evenly spaced and some mature culms are present on the periphery of the clumps.

Immature culms: All current year and previous year culms will be retained. Current year culms have the Culm sheath on the lower half and abundant bloom (white powdery dust), which comes off easily when touched. Previous year culms do not have the Culm sheath, and the patchy bloom does not come off easily. Older or mature culms have blackish-grey bloom.

Reserved culms: The mature culms, equal in number to the current year culms subject to minimum of 8 culms, must be retained to provide support to the younger culms.

Culm harvesting: The remaining mature culms after reserving as described in the preceding paragraph may be harvested. No Culm shall be extracted without cleaning the clump, which should be an integral part of the bamboo harvesting.

Debris clearance: Debris of the cutting should be stacked at least 3 meter away from clumps.

Prohibited activities: Digging of rhizomes, removing tender parts of older culms or cutting current year or previous year culms will be strictly prohibited.

Authority: The bamboo management will follow the orders dated 13th April 1994 of the Chief Conservator of Forests (Production) as modified from time to time. It is as follows:

1. The culms at the periphery of the clump will not be removed except where it is absolutely necessary for facilitating working in the interior portion of the clump.
2. The leading exterior culms may not be cut under any circumstances, even if they are malformed. Their relation is in the interest of the outward growth of rhizome and clump and they also support new culms.
3. In order to make whole of the clump accessible, removal of all the culms in the form of a wedge may be permitted but the width of the wedge shall not be more than one meter.
4. The working of the clump will be such that the culms after working are well spaced.

5. The bamboo extraction should end by March, when the culms are almost devoid of starch and attract less insect borers.

Gregarious flowering: Period, extent and location of the flowering will be recorded in the divisional notebook. Extraction of bamboo will be deferred for one year in case of the gregarious flowering. The clumps will be clear felled after seeds are mature and have been collected. Strict protection from fire and grazing will be provided for 7 years to the area where bamboo seeds would be found viable. Gregarious flowering in areas larger than one thousand hectares should be reported to the Chief Conservator of Forests, (T) Nagpur Circle, who should issue necessary instructions for management of the flowered area. The incidence of gregarious flowering should also be brought to the notice of the Working Plan Officer, the Conservator of Forests, Research Circle and the Officers-in-charge of specialised seed units in FDCM and the Department. Seed collection, disposal of bamboo from dried clumps after flowering and tending operations for bamboo seedlings requires extensive planning and timely action. Very often seeds after the gregarious flowering are subjected to fungus attack and if such incidence is noticed, following treatment should be effected:

The area should be sprayed with a very light solution of fungicide like Bevestein.

15.11 Treatment Of Gregariously Flowered Areas

The area of gregarious flowering must be closed to grazing and special fire protection measures must be implemented.

The bamboo seeds falling on the ground will germinate and establish into seedlings. The resultant clump formation generally takes nearly 8 years to reach at the harvestable stage. Hence, the grazing closure should continue for 7 years in areas, where bamboo seedlings would be found adequate.

Once the seeding is over, all the flowered clumps will be clear felled and removed in the year following the gregarious flowering.

15.12 Collection Of Bamboo Seeds

Fresh and viable seeds of bamboo are proposed to be collected from the areas near the clumps. The seed collection should preferably be organised under the management of the specialised seed units.

15.13 Tending Operation Of Natural Crop

The gregariously flowered areas will be tended in every 3rd year matching with the annual bamboo coupes. The tending operation will cease, if the new clump foci fall below 100 per hectare, clumps become harvestable, or eight years after the bamboo seeding.

Bamboo seedlings 1-3 years old

To induce formation of healthy clumps, evenly distributed, 250 clump foci of 80-cm diameters will be formed in the area having good bamboo regeneration. Groups of bamboo seedlings showing good growth will be preferred for the foci formation. Weeds, climbers and other bamboo seedlings up to 1.50 meter around bamboo foci should be cleared in July-August to assist growth of bamboo seedlings in the selected foci. The entire area will strictly be protected from fire.

Beginning of the clump formation: 4–8 years old

Immature crop will receive cleaning operations till the crop becomes harvestable. All badly grown, twisted and damaged culms will be removed from the selected foci. Weeds, climbers and other bamboo seedlings up to 1.50 meter around bamboo foci should be cleared, and soil working should be carried out in August. The entire area will continue to receive protection from fire and grazing.

Harvestable bamboo crop

Clumps may be harvested in the eighth year onward depending upon growth conditions.

15.14 Control of Injuries Due To Insects

The bamboo culms damaged by the insects *EstigminaChinensis*, *Chrysomelidaccolioptera* and *Bryotracheluslongipipes* should be cut and burnt during the winter, when these insects hibernate. The insects hide under the debris, and can be eliminated by causing light ground fire during the winter in the affected areas. Bamboos are highly susceptible to insect attack and moderately susceptible to fungal attack. They are also often attacked by *Lyctus* (powder pest beetle) and by *Dinoderusminutus*. *Dendrocalamusstrictus* responds well when it is treated with a mixture of boric acid, Copper sulphate, Zinc chloride and Sodium dichromate in a ratio of 3:1:5:6.

CHAPTER-XVI

NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

16.1 General Constitution of the Working Circle:

This working circle covers the entire forest area of the division. Non-Timber Forest Produce (NTFP) plays a key role in the life and economy of communities living in and around forest. NTFP is mostly collected by the economically backward people living in and around forest area. The tribal people have been conserving plant and crop genetic resources as well as the knowledge on their utility. The people living in forest mostly supplement their food with Leaves, tubers, flowers and fruits all year around. The medicinal plants play a key role in the health support systems in remote villages.

16.2 Availability of Non-Timber Forest Produce:

A sizeable portion of the forests of this division are of Mixed Forest type, supporting species of great NTFP value, namely, *Tendu, Mahua, Biba, Char, Kullu, Dhaoda, Beheda, Mowai, Khair, Salai, Aonla etc.* These trees are found scattered in the entire division and well mixed with other species. NTFP collection also generates employment opportunities. The important NTFPs found and collected in this tract are Mahua flowers, Mahua seeds, Tendu leaves, Dhaoda gum, Salai gum, Dikamali gum, etc.

The tract is rich in variety of Medicinal plants which are used for curing various ailments by the local people. The species and girth-class wise distribution of NTFPs is given in the table below:

Table No. 16.1
Distribution of NTFP species girth- class wise.

NTFP Working Circle												
Girth-Class wise Trees/ha.												
Specie	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151 up	Total	Basal Area
Behada	1.273	1.596	1.595	1.084	0.706	0.658	0.277	0.152	0.118	0.183	7.642	0.29
Mowai	2.35	2.84	3.24	3.31	3.11	2.16	1.33	0.62	0.30	0.20	19.46	0.88
Salai	1.28	1.13	1.43	1.70	2.18	2.30	1.77	1.19	0.70	0.46	14.14	0.95
Aola	2.67	3.32	2.99	1.67	0.92	0.29	0.09	0.02	0.01	0.02	12.00	0.27
Kullu	1.80	0.76	1.36	0.76	0.92	0.46	0.24	0.14	0.24	0.16	6.85	0.28
Bor	4.45	2.66	0.96	0.24	0.11	0.02	0.02	0.00	0.00	0.00	8.46	0.09
Tendu	16.00	6.08	2.31	1.22	0.78	0.36	0.18	0.09	0.06	0.12	27.19	0.37
Char	4.45	4.16	2.68	1.67	1.03	0.42	0.18	0.08	0.02	0.01	14.71	0.31
Moha	3.01	2.36	2.11	1.56	1.54	0.92	0.79	0.57	0.44	0.94	14.24	0.71
Chinch	0.09	0.45	0.58	0.27	0.94	0.45	0.31	0.40	0.54	1.30	5.32	0.54
Sitaphal	12.42	0.44	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	12.91	0.06

Biba	4.08	2.52	1.35	0.63	0.29	0.20	0.06	0.07	0.03	0.13	9.37	0.18
Semal	0.40	0.56	0.98	0.66	0.61	0.53	0.69	0.28	0.33	0.44	5.49	0.38
Dhaoda	7.67	7.73	5.72	3.87	3.09	1.55	0.73	0.39	0.16	0.07	30.99	0.84
Bel	1.81	2.68	2.43	1.67	1.15	0.44	0.14	0.08	0.01	0.02	10.42	0.28
Hirda	2.09	1.67	0.60	0.66	0.24	0.04	0.00	0.00	0.00	0.00	5.30	0.08
Khirni	0.76	0.76	1.07	0.52	0.52	0.69	0.00	0.17	0.00	0.00	4.50	0.16
Palas	10.40	8.83	5.60	2.79	1.50	0.52	0.18	0.10	0.03	0.03	29.98	0.54
Khair	10.98	10.24	7.16	3.07	1.34	0.39	0.10	0.04	0.00	0.00	33.31	0.56
Total	87.98	60.79	44.18	27.36	20.97	12.41	7.11	4.43	2.99	4.07	272.29	7.75

Table No.16.2 : Occurrence of NTFPs in various compartments

Sr.No.	Name of Species	No of Comptt. In which the NTFP		
		RF	PF	Total
1	Behada	120	84	204
2	Mowai	250	198	448
3	Salai	149	86	235
4	Aola	115	43	158
5	Kullu	3	14	17
6	Bor	54	62	116
7	Tendu	263	267	530
8	Char	195	158	353
9	Moha	176	132	308
10	Chinch	25	6	31
11	Sitaphal	31	41	72
12	Biba	95	68	163
13	Semal	65	33	98
14	Dhaoda	257	192	449
15	Bel	176	96	272
16	Hirda	18	5	23
17	Khirni	10	6	16
18	Palas	249	277	526
19	Khair	192	144	336

Besides the above mentioned tree species there are many herbs and shrubs found in the forests and need to be properly documented.

16.3 Special Objectives of Management:

As per the National Forest Policy, 1988 and ‘**The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006**’, the development of Non Timber Forest Produce (NTFP) has been one of the most important objectives in forest management. Therefore, consistent with the above policy and law, the special object of management is enunciated as below:

- i. To manage the marketable NTFPs on sustained basis in the division and to help ensure reasonable returns to the local villagers especially the tribal communities
- ii. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques.
- iii. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division.
- iv. To generate employment and improve the economy of the local people and there by improving their socio-economic conditions.

16.4 Ownership and Monopoly Procurement of the NTFPs:

The statutory provisions have vested ownership rights over the listed NTFPs species in the village communities in the Scheduled Areas without granting such rights over the trees and the land. Till recently, this list did not include Tendu, Apta and Bamboo, the prominent NTFP species in this tract. But after the enactment of **‘The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006’**, even these forest produces have been included in the category of NTFP.

The Seventy-third Amendment of the Constitution of India has brought the NTFPs under the management of the Village Panchayat. NTFPs (MFPs) in the State and its sale procedure can be categorised into two parts:

- A) 33 NTFPs (MFPs) in scheduled areas
- B) Other NTFPs (MFPs) excluding 33 NTFPs in scheduled area and NTFPs in Non Scheduled Areas.

A) 33 Minor Forest Produce in Scheduled Areas :

- 1) “Govt of India passed the Provisions of the Panchayat Extension to the Scheduled Areas in 1996”. In pursuance to this, Govt of Maharashtra passed Maharashtra Act No XLV of 1997, “Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act 1997.”
- 2) As per 1997 amendment, 33 Minor Forest Produce (list enclosed in **Appendix – XXVIII A**) found on Govt land in Scheduled Areas; ownership lies with Village Panchayat.
- 3) Ownership rights of NTFPs in practice have not been handed over to village Panchayat because today village Panchayat are not technically sound.

- 4) These 33 Minor Forest Produce are sold to Maharashtra State Co-operative, Tribal Development Corporation, authorised, vide RDD & Water Conservation Dept. GR No (Marathi) PRJ-1203/CR 366/PR-2(06) dated 11.05.2004.
- 5) RDD & Water Conservation Dept. GR No PRJ-201/CR 43/06 dated 21.04.2001 vide which royalty for NTFPs is required to be paid to village Panchayat by Tribal Development Corporation.
- 6) Collection wages for NTFPs are paid to labourers by Tribal Development Corporation as per the rates fixed by the District Collector.

B) Other Non Timber Forest Produce, (excluding 33 NTFPs in Scheduled Area), and NTFPs in Non Scheduled Areas:

1. R & RD, GoM, Govt. Resolution dated 5th October 2011, confers the rights of NTFP collection, processing and sale to the JFMCs. Therefore, capacity building of JFMCs is crucial for realising the potential of harnessing employment generation to JFMC members and additional income to the committee to further invest in the development of NTFPs.
2. Forest Rights Act, 2006 confers the rights over NTFPs to the community right holders. Therefore, in areas where the CFRs (involving NTFPs) have been vested with village community, in such areas, the process of NTFP collection, processing and sale has to be initiated by that community.

Excluding the above mentioned areas, DCF can empower JFMCs to take up collection, processing and disposal of NTFPs.

16.5 Agency for the NTFPs Collection:

The Maharashtra Tribal Economic Condition (Improvement) Act, 1976 empowers the State Government to enforce monopoly procurement of certain goods including the NTFPs in the Tribal Sub-Plan Areas. **Tribal Development Corporation (TDC) of Maharashtra** serves as the Chief Procurement Agent. This procurement provision is binding and, therefore, prescribed to be carried out, in the Scheduled Areas. Procurement of NTFP should be according to ‘**The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**’, and its Rules.

Table No. 16. 3 : PRODUCTION & REVENUE OF IMPORTANT NTFPs.

Year	Tendu		Sitafal (Rs)
	Actual Collection std.bags	Tendu Rev. (Rs in Lakh)	
1	2	3	5
2003-04	64600	520.8	12000
2004-05	63300	299.27	14300
2005-06	38823	246.59	0
2006-07	38408	314.06	9100
2007-08	58046	88.836	4001
2008-09	52723	86.877	13000
2009-10	44257	88.813	0
2010-11	50925	121.42	500
2011-12	49994	131.441	13000
2012-13	51967	135.358	350
2013-14	29581	126.279	0

As the figures in the above table indicate, the revenue realised from NTFPs is meagre. Therefore, specific holistic efforts are needed to encourage JFMCs to harvest NTFPs to create livelihoods. Demonstrative effect has to be shown in atleast few villages, so that, the positive results will spread to other villages.

There may be many other forest species which yield various products. However systematic information in this respect is not available at present. But such NTFPs should also ideally find their due place in the JFM micro-plan. Proper grading, value addition and exploring new markets for the traditional NTFPs (such as gum), shall be included in the JFM Microplans. The possibility of involvement of NGOs in such an endeavour should be explored.

16.6 Methods of Treatment:

Fire Protection Measures: Collection of NTFPs is often associated with forest fires, 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 under the belief to get better flush of Tendu leaves. If it is left unattended, such fires spread into forests as forest fires.

- The Village Panchayats and FPCs shall be involved in awareness generation programme to help control forest fires.
- In case of forest fire, legal action should be taken against the defaulters. Strict vigilance is necessary during the months of Feb-April to check the spread of fires specially during the Tendu and Mahua flower season.

Training Programme for NTFP Collection: To reduce the Destructive Harvesting Techniques, training programmes and work shops for proper NTFPs collection, value addition and marketing shall be organised in each range to ensure their sustainable harvest and use.

Documentation of NTFP Collection : The Beat Guard will send a monthly report to the Range Forest Officer on the quantity of NTFPs collected in their Beats, both by contractors and villagers. The Range Forest Officer will compile and send the detail report, mentioning the quantity as well as the market price, to the division office. The Division office will compile the figures for each species for division with the view to monitor the collection and to improve the productivity of these NTFP to sustainable limit. Involving JFMCs in this exercise would be beneficial as they are the major stakeholders in collecting, processing and sale of NTFPs. To capture such information with uniformity, suitable printed registers be supplied to all JFMCs through the division office.

The treatment to be given will be different for different types of NTFPs. therefore, each NTFP will have separate treatment as follows.

16.7 Management of Tendu:

Collection of Tendu Leaves: Tendu is the prominent revenue generating NTFP of this tract. Tendu leaves are used for manufacturing *bidis*. Tendu trade has been nationalised by the Govt. of Maharashtra Act No.LVII of 1969. As per the Forest Rights Act 2006, Tendu has been classified as minor forest produce. Therefore, wherever CFR's have been approved for NTFPs, such areas should be excluded from Tendu units. Tendu leaves were collected by the department through agents till 1990 season. During the 1991 season Tendu units were sold on lump sum basis. The collection of Tendu leaves commences from the last week of April each year and continues up to first week of June. Quality of leaves is a major criterion for bidi manufacturers. The quality depends on the colour, texture and presence of nodules and veins. The best quality leaves are those ranging from ashy to palest hue; Almond colour is also prized shade. Leaves with leathery texture either too thick or thin are good quality for making Bidi. The leaves are collected at various collection centres called phadies. The leaves (pudas) are dried and then packed in gunny bags. The quantity is measured in standard bags.

- Tendu leaf collection has to be in consonance with the existing policy frame work such as FRA 2006, PESA etc.
- Tendu leaf collection is an income generating activity for most local and tribal villages in the region. The local village communities shall be gainfully engaged in Tendu collection in the Division to support their livelihood.

- Pruning of young Tendu plants does help in increasing leaf yield. Saplings having more than 5 centimetres collar diameter shall not be pruned. However, felling of Tendu trees or branch lopping for leaf collection should be dealt with firmly.

Tendu Regeneration: In view of 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 to be given added focus.

- Maintenance and improvement of Tendu in the forest crop composition is prescribed by ensuring regeneration of Tendu and its subsequent protection.
- Singling of shoots and soil working around Tendu seedlings is prescribed in the plantation and rootstock areas to promote growth of Tendu seedlings along with the annual coupes in area-specific working circles.
- Tendu regenerates through root suckers. Hence, young root suckers should be identified and aided for creation of congenial growth conditions such as cleaning of bushes, protection from fire etc.

16.8 Management of Mahua:

A. Mahua Collection: There is substantial number of Mahua trees in the forest crop. The villagers in the tract have local system for allocation of collection rights of Mahua flowers and fruits. For better protection of Mahua trees and to increase its stock, Mahua trees be numbered and these trees be allotted to members of JFM committee. The members of committees who have been assigned with job of protection & nurture of Mahua trees, they should protect them from fire. This exercise would inculcate sense of ownership and responsibility in protecting the resource. This also indirectly aids in controlling forest fires. Range Forest Officer shall take lead in promoting such practices and also monitor its implementation. Documentation of such steps is necessary to promote the achievements of JFMCs.

B. Mahua Regeneration: It is prescribed to provide soil working along with other planted seedlings during coupe operations of area-specific working circles. Mahua will be one of the species in mixed plantation. Seedlings of Mahua, raised during the previous season i.e. 18 months old, should only be planted in the mixed plantation schemes.

16.9 Management of Gums: Gum is an important NTFP and is exuded by plants, partly as normal phenomena and partly as the result of disease or injury to the bark. Wood Gum is a substance of more or less sticky nature. The Kullu (*Sterculia urens*), Dhaoda (*Anogeissus latifolia*), Salai (*Boswellia serrata*) and Acacia gum (*Acacia nilotica*) are main sources of gums in the area. These gums are used in medicines,

chemicals, cosmetics, food industries and incense. Indian Gum, Arabic or babul gum is from *Acacia nilotica* and is of great commercial importance. The gum is used in calicoprinting, dyeing and as a sizing material for silk and cotton and in the manufacturing of paper. Salai gum is mostly used in the Indian medicines for the treatment of rheumatism and nervous diseases. Salai gum has the potential of becoming mounting media by substituting imported Canada balsam in the preparation of microscopic slides. Dhaoda gum is used in food industry for making sweets. It may also be suitable in the manufacture of elastic adhesive, lacquers, oilcloth compositions, ink and perfumery.

Dhaoda and Salai Gum: Dhaoda trees are quite common in the forest crop of this tract. Salai trees are also found in a large number of compitt. Hence collection of Dhaoda and Salai gum by scientific tapping is prescribed.

No scientific method for tapping has been used so far in this area. For the purpose of scientific extraction of gum the FRI Gum Tapping Rules, have been proposed for tapping of gum.

Tapping Rules:

- The tapping season will commence from November to end of May each year.
- No tree below 90 cm in girth will be tapped.
- 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.
- Each tree shall be tapped continuously for 3 years; and, thereafter, will be given rest for 3 years.
- The initial blaze 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 axe having 7.5-cm wide blade. The blaze is made 0.6 cm deep in the bark.
- Blaze may be made horizontally leaving approximately equal space between the blazes. The blazes should not have any loose fibre. 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 axe.
- The Guggul starts oozing out soon after blazes are made and may be collected initially after a month, that is, by about December when the blazes may also be freshened. Subsequent collections and freshening may be done fortnightly up to May. Overall, 12 freshening are required to be made, during the year.
- 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 from either side in width in each freshening.

- 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 that is, 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.

The number of blazes to be made on each tree will depend on its girth at breast height, as given below:

Table No.16.4 Maximum Blazes Allowed on Each Tree:

Category	Girth at BH	Maximum Blazes Allowed on Each Tree
I	0.9 to 1.3 m	2
II	1.3 to 2.0 m	3
III	2.0 to 3.0 m	4
IV	Over 3 m	One blaze for each 45 cm girth in addition to the category III above.

- No fresh blaze will be made on the partially healed up surface or old wounds.
- 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.
- At the end of the season, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10cm x 12.5cm x 0.6 cm in width, height and depth, respectively.
- 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 37.50 cm, the width and depth remaining the same.
- In the second cycle that is, in the 7th year (after three-year rest) new blazes will be made in the same way in the un-blazed 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 operations will be repeated till un-blazed portion is fully covered.
- In addition, tapping of trees below 90 cm GBH shall be prohibited Collection period will be confined from November to May, to minimise the damage to the trees. The areas around the trees should be cleaned to facilitate gum collection and to prevent fire in the forests. A strict watch is necessary to enforce tapping rules and check unauthorised collection of gum. No gum producing trees should be felled. No tapping of gum should be carried out during the period of rest.
- Kullu, Dhawda and Salai saplings are prescribed to be provided soil working along with planted seedlings in various area-specific working

circles. Singling and tending of Salai shoots would further help the Salai regeneration. Gum-yielding species are prescribed for plantations.

16.10 Management of Hirda, Beheda, Aonla, Char and Other NTFPs.

Collection of Hirda, Beheda, Aonla, Char and other NTFPs: Fruits of Hirda, Beheda, Aonla and Char are marketable items. Similarly, fruits, flowers and leaves of certain shrubs and trees are used for variety of purposes. Current level of collection is quite erratic and, therefore, poor indicator of their potential in the tract.

Collection of species, which are not covered under the monopoly procurement by government agencies, should be allowed by the Joint Forest Management Committees or Village Panchayats for better protection of Hirda, Beheda, Aonla, Char trees and to increase its stock, few of the above trees be numbered and these trees be allotted to members of JFM committee. The members of committees who have been assigned with job of protection & nurture of above trees, they should protect them from fire. Range Forest Officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

Removal of NTFPs shall be within the sustainable limits of production. Felling of trees and lopping of branches shall not be permitted for NTFPs collection. Destructive removal shall not be permitted, in any case. Digging up of plant roots, branch cutting, debarking on a plant will be considered as destructive removal.

Regeneration of Hirda, Beheda, Aonla and Char: Required tending is prescribed where saplings of *Beheda*, *Aonla* and *Char* are found in worked coupes, to remove congestion. Soil working and mulching are prescribed along with planted seedlings and to be done during coupe operations of various areas in working circles. *Hirda*, *Beheda*, *Aonla* and *Char* are prescribed for plantations.

16.11 Management of Grass:

The common grasses are Kusal, Bhurbhusi, Ghonad, Sheda and Marvel. Coarse grasses are used for thatching and palatable grasses for stall feeding. The demand for grass is local. For fodder, Marvel, Sheda, Paunia are preferred. Some villagers also collect Broom grass (Jhadu gavat).

Development of suitable grazing sites to the local cattle is a basic demand of local villagers. Therefore, the degraded areas adjoining to villages should be taken up for fodder plantations with the active involvement of JFMCs. Development of fodder resources to meet the requirements of local cattle should be a major criteria for performance evaluation of JFMCs.

16.12 Future Interventions:

For building the database on NTFPS, it is prescribed that weekly markets will be surveyed extensively to find out the types of NTFPs coming from forest areas, their

extent, purpose of utilisation, rate, chain and the agency of marketing and final destination. JFMCs being primary stakeholders should be involved in this important exercise. A suitable printed register be supplied to all the JFMCs by the division so as to collect this information.

It is prescribed that the above information should be used to formulate correct prescriptions at the time of next revision.

CHAPTER - XVII

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

17.1 General Constitution:

This Overlapping Working Circle extends to the entire area of the Nagpur forest division which is co-terminus with the area of Nagpur district. All villages that are adjoining to the forest areas will be the focus areas for practicing Joint Forest Management.

17.2 Objectives :-

- To develop the degraded forest resources by promoting natural and artificial regeneration with active participation of the villagers. It also aims to provide effective protection.
- To strengthen local institutions for protection and conservation of forest and wildlife resources through people's participation.
- To empower village communities to play a crucial role in forest resource conservation as major stakeholders.
- To explore and evolve strategies to generate sustainable employment to local people

17.3 Background of the Joint Forest Management:

Degradation of forests is a reality due to various factors such as over exploitation of forest resources due to heavy biotic pressure such as illegal removals from forest, overgrazing, forest fires, loss of top soil due to excessive erosion etc. Rate and magnitude of degradation is directly proportional to the involvement of rural communities in the protection and management of forest resources. In the past, local communities enjoyed free access to the forests. With the bringing of forests under Govt. control through the process of reservation the access to forest resources were substantially regulated. Thus, Forest reservation policy came in conflict with the interest of local communities dependent on these forests to meet their basic needs of forest produce for *bonafide* requirements. The forests were managed as govt. property in larger national interest as provided for in the National Forest Policy 1952 which stated that the use of forests by village communities in their neighborhood should in no event be permitted at the cost of national interest. Such policy of managing forest only in larger national interests, overlooking the basic needs of local communities did not succeed and forests were degraded as a result of over use.

Forest resource being common property resource entails participation of communities in protection and management of resource so that the belongingness of

the community acts as a catalyst for long term forest and wildlife conservation. Therefore, the National Forest Policy, 1988 accordingly provided for creating a massive people's movement for the conservation of forest resources.

The National Forest Policy, 1988 emphasized that domestic requirements of the tribal and other poor people living within and near the forest for fuel wood, fodder, NTFP and construction timber should be the first charge on forest produce and the holders of customary rights and concession in forest areas should be motivated to identify themselves with the protection and development of forest from which they derive benefits. In pursuance to the National Forest Policy, the Ministry of Environment and Forests advised the State Governments to adopt the Joint Forest Management (JFM) approach for the protection and rehabilitation of degraded forest. The Govt. of Maharashtra vide Resolution No.SIF-1091/199/F-11, dt.16th March 1992 adopted JFM approach for degraded forest areas. Thereafter, the State Government vide Resolution dt. 25/4/2003, expanded the scope of JFM to Good quality forests also. On 5th October 2011, the JFMCs were provided legal backing by bringing them under the umbrella of Mumbai Gram Panchayat Act 1959. Similarly, to further strengthen the institution of JFM, special schemes have been introduced to reduce the biotic pressure on forest and to improve the success of plantations viz., Distribution of LPG/Biogas, Distribution of improved cattle in lieu of scrub cattle, protection of plantations.

JFM is a concept under which Forest Department and village committee jointly protect and manage the forest. The starting point of JFM has to be the realization of the need of JFM both by Forest Department and the local people. Generally, the scarcity of forest products such as fuel wood, fodder etc. as a result of degradation of forest on which the local communities depended, forces the people to think of steps for the protection and improvement of degraded forests. The people are usually reluctant to participate in JFM where sufficient forest areas are still available to meet their requirements. On the part of Forest Department, the challenge to effectively protect forests with limited resources is enormous. The JFM program succeeds where the initiative comes from the people's side and it usually fails where it is forced from FD side as it would only be a Govt. driven and target oriented program. Villagers themselves are required voluntarily to participate in the program. Forest Protection Committee (FPC) is to be formed in each village through the resolution of Gram Sabha. Each Forest Protection Committee constitutes a Managing Committee consisting of members elected from general body and with local Forest Guard /Forester as the member secretary. The managing committee is responsible to implement the decisions of general body with regard to the execution of JFM works in partnership with Forest Deptt. Memorandum of Understanding

(MOU) is signed between Forest Deptt. and managing committee clearly specifying the duties and responsibilities of both parties. Entitlement of FPC members to the share in forest produce is subject to the fulfillment of conditions of MOU.

The members of the FPC will help in protection and development of forests and in turn they will receive share in the usufructs from the forest areas assigned to such committee. The JFM area will be managed as per the Microplan prepared by the JFMC and approved by the DCF. These micro plans shall contain the details of forest and village development works. This has to be sustainable, should cater to needs of local communities and the same time, the silvicultural requirements of the forest are to be factored properly.

Govt. of Maharashtra vide Resolution dated 5th October 2011 and 10th July 2012 has issued revised guidelines for implementation of JFM programme. Important provisions of these Govt. Orders are summarized below:

- i) JFMC will be constituted by the Gram Sabha through a Resolution under the provisions of Section 49 of Mumbai Gram Panchayat Act, 1958. It would consist of 12 to 24 members, of which, atleast 50% are women. Representation to SC, ST, VJNT will be as per prevailing Govt. norms.
- ii) The ex-officio member secretary of JFMC would be Forest Guard/Forester if the village population is less than 1000 or more than 1000 respectively.
- iii) The forest area to be assigned to JFMC would be decided based on parameters such as production potential, available eco-tourist sites etc through consultative process. In general, forest areas within 3 KM of *Gaothan* would be identified for assignment. Apart from degraded forest areas, even dense forest areas can also be assigned to JFMCs.
- iv) Memorandum of Understanding (MoU) will be signed in prescribed format by DCF (T) and JFMC.
- v) Microplan will be prepared by the JFMC and would be approved by the DCF. All JFM activities should be taken up as per the approved microplan. The microplans are to be dovetailed with the broad prescriptions of the approved Working Plan of the division.
- vi) JFMC is authorized promote Eco-tourist activities in their assigned areas and can levy Entry Fee & Nuisance Tax from eco-tourists to preserve these sites sustainably and also generate livelihoods to local people.
- vii) JFMC is authorized to impose penalties on persons involved in forest and wildlife crimes.
- viii) RFO and JFMC has to submit an annual performance report jointly to the DCF w.r.t. the responsibilities assigned and achievements of the committee.

- ix) The JFMC would be eligible for usufruct sharing from intermediate and final fellings as per working plan if the responsibilities thrust on the committee are executed for a period of five years. However, in case of Bamboo yield from dense areas/degraded areas, the same would be available to JFMC soon after execution of MoU and upon protection of Bamboo for 3 years respectively. All removals would be as per the provisions of approved Working Plan.
- x) In case, the JFMCs do not perform the responsibilities assigned to them, DCF is authorized to dissolve such committees by applying the principles of natural justice.
- xi) Non forest land available in the village, can be included in the JFM programme if the Gram Panchayat agrees to do so.
- xii) To reduce the biotic pressure on forests for fuelwood, Govt. of Maharashtra vide Resolution dated 10th July 2012 has launched schemes for distribution of LPG/Biogas connections on 75% subsidy. Similarly, to reduce grazing pressure, distribution of improved breed of cattle in lieu of disposal of scrub cattle has been introduced on 50% subsidy. To improve the performance of plantations, scheme for plantation protection through financial incentive has been launched.

17.4 Potential Areas For JFM:

The following areas will be suitable for JFM program.

- Areas prescribed under the Afforestation Working Circle.
- Areas under miscellaneous management, especially the Jhudpi jungles suitable for afforestation are proposed to be covered under JFM.
- Areas under Grass & Fodder resource management Working Circle are also proposed to be included in JFM.
- Regeneration and protection of NTFP areas and collection, grading, value addition and marketability of various NTFPs in the division are proposed to be given focus for working under JFM program.
- Villages which are adjoining to potential Eco-tourism sites are proposed to be included in JFM programme.
- All potential wildlife areas are to be included in either JFM or EDC programme as per provisions contained in Govt. Resolution.

17.5 Present Status of JFM in the division:

JFM concept has been introduced in this division in the year 1998 under the World Bank assisted Maharashtra Forestry Project. Initially few villages were selected for JFM activities. At present, JFM approach has spread to 517 villages

over 94310 ha of forest land in 13 forest ranges. Thus, 65 percent forest area of the division is managed through people's participation.

Table No.17.1 Range wise Area Distribution under JFM Committees:

Sr. No	Range	No of villages adjoining to forests	Total forest area in Sq. Km. (ha.)	Committees formed	Area allotted to the committees (ha.)	Plantation & Other Activities		
						Name of scheme	No. of JFMCs	Area Planted
1	Khapa	23	6362.08	23	4913.78	JFM	2	60.00
						Vidarbha VikasProg rame	2	70.00
						Campa	1	30.00
2	Parseoni	24	8523.51	24	5008.42	FDA	4	130.00
						N.B.M.	1	25
						13 th Finance	1	20
						Vidarbha VikasProg rame	4	180
3	Deolapar	27	13675.59	27	4973.76	FDA	7	190.00
						JFM	2	60.00
						Medicinal Plant	1	20.00
						Vidarbha VikasProg rame	5	147.00
4	Ramtek	36	8357.99	36	6583.14	FDA	4	90.00
						Campa	1	30
						Medicinal Plant	1	40
						Vidarbha VikasProg rame	3	135.00
5	Paoni	26	10416.22	26	6817.78	FDA	6	120.00
						13 th Finance	1	35.00
						Campa	2	60.00
						Medicinal Plant	1	50.00
						Vidarbha VikasProg rame	5	180.00
6	Hingna	40	14556.21	40	9435.98	FDA	1	20.00
						Vidarbha VikasProg rame	1	20.00
7	North Umrer	72	17833.87	72	14331.99	FDA,	10	240.00

						JFM	1	30.00
						Vidarbha V Prog	1	40.00
8	South Umrer	54	12797.46	54	13344.46	Vidarbha VikasProg rame	3	50.00
						FDA	7	210.00
						JFM	1	30.00
						Campa	1	30.00
9	Narkhed	42	10666.36	42	5084.86	FDA	8	190.00
						JFM	1	30.00
10	Katol	60	10512.82	60	7981.51	FDA	1	20.00
						Vidarbha VikasProg rame	2	55.00
						Campa	2	60.00
11	Buttibori	35	12842	35	4734.86	Vidarbha VikasProg rame	10	10.00
						JFM	1	30.00
						N.B.M.	1	25.00
						Medicinal Plant	1	20.00
						FDA	2	80
12	Kalmeshwar	16	5515.22	16	575.00	FDA	2	60.00
						JFM	2	60.00
						Medicinal Plant	2	39.00
						Vidarbha VikasProg rame	1	60.00
13	Kondhali	62	13480.83	62	10524.58	FDA	1	30.00
Total		517	145540.14	517	94310.12		117	3111.00

Reducing dependence on forests:

One of the important reasons for forest degradation is the dependence of local people for firewood from forests. Therefore, to reduce such dependence, GoM vide resolution of 10th July 2012 decided to distribute LPG connections to forest fringe villages. JFMC's have played a key role in implementing this scheme. In the division, 1494 families spread over 48 JFM villages have benefitted from LPG connections.

Table No. 17.2 Distribution of L.P.G. and Replacement of Scrub Cattle.

S. No.	Range	Year	No. JFMCs	L.P.G. Distributed	Replacement of scrub cattle	Remarks
1.	Ramtek	2012 – 13 2013 – 14	- 2	- 60	- -	No. bio gas and no beneficiary from plantation protection
2.	Khapa	2012 – 13 2013 – 14	} 6	67 197	- 1	
3.	Kalmeshwar	2012 – 13 2013 – 14	} 3	26 58	- 11	
4.	Narkhed	2012 – 13 2013 – 14	} 12	145 -	- 19	
5.	Kondhali	2012 – 13 2013 – 14	} 4	98 47	- -	
6.	Katol	2012 – 13 2013 – 14	} 3	29 -	- -	
7.	Deolapar	2012 – 13 2013 – 14	} 4	3 81	- -	
8.	parshivani	2012 – 13 2013 – 14	} 8	16 537	- 4	
9.	South Umred	2012 – 13 2013 – 14	} 2	26 62	- -	
10.	Butibori	2012 – 13 2013 – 14	} 4	- 42	- -	
Total			48	1494	35	

From the above table it is inferred that the coverage of LPG distribution in JFM villages is about 9 percent. Hence, this activity should be vigorously pursued in the coming years to increase the coverage to remaining JFM villages.

17.6 Area Covered and Committees Formed Under FDA: The Government of India started direct funding to the circle in charge for the developmental works in the forest with the participation of the Villagers under the JFM programme. The table below shows the area covered in various ranges and villages under this scheme.

Table No. 17.3

Sr No	Range	No.of Committes formed	Area in ha handed over to committee
1	Parshioni	10	5008.42
2	Deolapar	15	4973.76
3	Ramtek	9	7280
4	Paoni	15	6597.8
5	Hingna	2	7537.81
6	N.Umrer	12	6625.71
7	S.Umrer	12	8781.23
8	Narkhed	9	3679.72
9	Katol	5	6729.63
10	Butibori	6	2013.54
11	Kalmeshwar	7	3214.82
12	Kondhali	1	10420.27
	Total	108	64590.38

17.7 Village Forests:

Introduction: “Village forests” or “*Gram Van*” means such part of reserved forests or protected forests in the village as assigned to the Village Panchayat under the Indian Forest Act, 1927 and the Village Forest Rules 2014 and also under the Maharashtra Village Panchayats Act 1959 for management through Joint Forest Management Committee. The JFMC shall manage its village forests on behalf of the Village Panchayat with due reference to the relevant provisions of the Panchayats (Extension to the Scheduled Area) Act, 1996, the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act, 2006, the Indian Forest Act, 1927, the Wildlife (Protection) Act, 1972, the Biological Diversity Act, 2002, the Maharashtra Village Panchayats Act and rules made thereunder and any other law in force as applicable to the State of Maharashtra.

Maharashtra Village Forest Rules, 2014: In exercise of the powers conferred by sections 26, 28, 30, 32, 34 and 76 of the Indian Forests Act, 1927 (Act No. XVI of 1927), and all other powers enabling it in that behalf, the Government of Maharashtra has notified the Village Forest Rules on 13th May, 2014. The salient aspect of these rules are mentioned below:

- (a) JFMCs fulfilling the criteria of Zero encroachment, Positive rate of Natural regeneration, effective control of forest fire (area burnt not more than 5 % in last three years), Over 60% survival in plantations raised in the said area at the end of fifth year, effective implementation of “*charaibandi*” and “*kurhadbandi*” are eligible for assignment of Village Forests if atleast three criteria are fulfilled.

- (b) The village forests assigned to the village community or the Village Panchayat shall be managed by a committee called as the “*Van Vyavasthapan Samiti*” or the Village Forest Management Committee.
- (c) “Van Vyavasthan Samiti” has to prepare “Ten Year Microplan” in consonance with the Working Plan of the landscape and, an “Annual Implementation Plan” every year for managing the village forests and place the microplan before the Gram Sabha for ratification and its approval by the ACF or Sub-DFO in charge of independent sub-division and revise it periodically.

17.8 Prescriptions and Recommendations:

- JFM Micro-plans will be prepared for each village through the process of participatory rural approach. Micro plans are linked with the working plans objective oriented site specific planning adopted for the assigned areas. Villages & watershed development planning shall be given utmost importance.
- Silvicultural management, maintenance of forest boundary, removal of forest encroachment and control over illicit cutting, illicit grazing and fire should receive high priority.
- Forest protection cannot be viewed in isolation. The works depicted in the Microplans should be reflected in the planning process of the Gram Panchayat.
- In carrying out the developmental activities, the expertise of NGOs has to be fully utilized.
- Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
- JFM programme should be implemented with complete transparency. The accounts of JFMCs shall be annually audited as per Govt. instructions and a copy of such audited statement shall be shared with Gram Panchayat. All payments to JFM members shall be made either through A/c payee cheques or RTGS transfer or depositing directly into respective bank accounts. Payments through Cash shall be strictly discouraged.
- As far as possible, all works are to be executed by JFM members only. However, if due to unavoidable circumstances, workers of other villages

are to be employed, in such cases, prior approval of JFMC executive body shall be taken.

- Monitoring of JFM activities by supervisory cadres (ACF to CCF) is the key for effective implementation of JFM programme. Periodic reviews at various levels will aid in good implementation.
- Often, there is a thinking in the grassroot level functionaries that, JFM has to be implemented only if funds are allotted to a village. This notion is detrimental to the core values of JFM. Therefore, the supervisory officers should strive to bring suitable awareness among the grassroot functionaries (FG to RFO) to change attitudes and mindset.
- Dedicated NGOs/Civil society groups can aid the village communities in strengthening JFM institution. Their services can be utilized by the FD in areas of capacity building of JFMCs in microplanning, community motivation, eco-tourism initiatives, evolving models for enhancing livelihoods etc.
- Periodic evaluation of JFMCs should be done to identify Performers and Non-Performers. While Performing JFMCs should be rewarded, the Non-Performers should be given opportunity for improvement. If no improvement is seen in Non-Performers, action should be taken by competent authority as per provisions contained in the Govt. Resolution.

CHAPTER - XVIII

OLD TEAK PLANTATION (OVERLAPPING) WORKING CIRCLE

18.1 General Constitution of the Working Circle: Teak and other plantations have been raised in Nagpur Forest Division in the past. Among these old plantations, Teak is the most valuable species; it requires altogether different treatments and periodical cultural operations for its optimum commercial production on a sustained basis. All areas with old and successful Teak plantations are included under this Working Circle. The areas under Teak plantations are found scattered throughout the Division.

Area Distribution: The list of various old Teak plantations have been obtained from the Nagpur forest division and suitably compiled by the Working Plan Division, Nagpur. The information about these plantations is given in Volume II, Appendix-XLI and the range wise abstract is as follows:

Table No.18.1 Table Showing Range wise area Distribution of Old Teak Plantations:

Sr. No.	Range	Total Nos. of Teak Plantation	Total Area in Ha.	Plantation Year	
				From	To
1	Narkhed	1	10.00	2000	2000
2	Katol	5	114.00	1991	2008
3	Kondhali	4	95.00	1988	1999
4	Hingna	5	78.00	1976	1988
5	Kalmeshwar	2	45.00	1996	2003
6	Khapa	6	205.00	1988	2013
7	Paoni	44	961.27	1960	2011
8	Deolapar	62	1985.44	1960	2013
9	Parshioni	13	286.00	1979	2013
10	Ramtek	19	566.00	1980	2013
11	N/ Umrer	11	230.00	1988	2013
12	S/ Umrer	2	41.00	2004	2013
	Total	174	4616.71		

18.2 General Character of the Vegetation: The plantations are scattered in various compartments. Separate enumeration of the plantations has not been done by the SOFR unit. The various compartments in which these plantations are located contain the representative forest crop of the particular working circle to which that compartment has been allotted to.

18.3 Blocks and Compartments: Details of these plantations have been given in the Volume II, Appendix XLI.

18.4 Special Objectives of Management: To maintain perpetual growth in the plantations throughout their growing phase by carrying out required suitable silvicultural operations .

18.5 Silvicultural Operations: The Silvicultural operations are the regular thinnings and the schedule is mechanical thinning in 11th Year followed by silvicultural thinning from 15th year onwards, every tenth year till the age of 65 year of formation of the plantation.

Mechanical Thinning: Teak is traditionally planted at a spacing of 2m x 2m i.e. 2500 seedlings per hectare.

The sigmoid growth curve between Age (on X axis) and Volume (on Y axis) for Teak indicates that its growth follows a moderate slope till 10th year and then it picks up and forms a steep curve upto 50 years. Hence, first mechanical thinning in the 11th year is prescribed. As a result of thinning, the stems will be free from canopy interference and also the poles produced from the thinning operations shall be saleable. The mechanical thinning will be done by considering a cluster of three poles in diagonals. One of them will be removed.

Prescriptions For Silvicultural Thinnings: The various operations required for Silvicultural thinning in a Teak plantation are summarised below :

1. Stock mapping and delineation of the area of different site quality classes of the plantation to be thinned will be done before actual operations are started.
2. Cleanings to remove undesirable undergrowth which hinders proper growth of planted Teak and which may obstruct the thinning work is to precede actual thinning operations. Extent of cleaning as well as the species to be removed is to be decided based on the site conditions. Cleaning should also include systematic climber cutting.
3. Sample plots will be laid (atleast 5% sampling) for total enumeration in such plots to work out entire growing stock (planted as well as naturally regenerated trees) Basal area per ha. of such plots shall also be measured. Average crop diameter shall also be calculated.
- 4 Yield and stand tables will be used to compare girth class wise actual stocking and basal area of the plantation under consideration. If such comparison indicates that basal area measured, exceeds that of given in the yield table for the same site quality, this would necessitate removal of material to the extent basal area given in the yield table is achieved. Which girth classes and their extent to be removed can be ideally found out by comparing actual stocking with the stand table (main crop) for the particular site quality and age.

5. The average crop diameter may be taken as guiding rule to decide the individual trees to be marked for removal, i.e., trees below average crop diameter only are to be marked for removal and only when they are silviculturally available.

Following order of marking, regarding silvicultural availability of trees in thinning, shall be maintained.

- i. Non-Teak coppice trees (except any rare tree) are first to be marked.
- ii. Teak coppice trees and defective stems
- iii. Non-Teak trees of seed origin
- iv. Sound Teak trees of seed origin to be marked for felling only in the last.

18.6 Thinning Guidelines

Objective: Thinning may be defined as felling made without permanently breaking the canopy in an immature stand and for the purpose of improving the growth and form as well as maximum volume production of the remaining trees in the stand.

General considerations: Thinning is proposed to be carried out in plantations and patches of dense pole crop and, by doing it, average spacing is to be maintained at one-third of the crop height. The post-thinning crop should have basal area and number as close to the relevant stand or yield table for that site quality as possible.

- It is prescribed to be carried out in the plantations having at least 50% survival in the 6th year, that is, after the sixth-year cleaning. Such areas shall be recorded in the divisional notebook.
- The first thinning shall be carried out in the 10th -year and it shall be of mechanical in nature. Subsequent thinnings will be silvicultural in nature and will be done in 15th, 25th, 35th year and so on till the 65th. By this time such areas are expected to merge with the adjacent natural growth.
- All thinning will be done either at the beginning or at the end of the growing season.
- The expected results of the thinnings are available in FRI publication No Volume 9, Yr.1957.

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 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 are still only available for a few species. The individual trees in a crop were classified by

height and size of crown, while the thinning prescriptions laid down which classes were to be removed. The standard adopted is, as follows:

- I. DOMINANT TREES (D): All trees which form the uppermost leaf canopy and have their shoots free. These 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.
 - (a) Trees with normal crown development and good stem form.
 - (b) Trees with defective stems or crowns, e.g. :
 - 1) Trees with crown space cramped by neighbouring trees,
 - 2) Badly shaped old advance growth,
 - 3) Trees with forked leader and similar defects
 - (c) Trees with very defective stems or crowns, i.e. with 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 neighbouring 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 neighbouring 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 neighbours 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 that their growth is seriously affected or that they are a danger to their neighbours.

THINNING METHODS

(1) Mechanical Thinning: There may accordingly be little objection to provide extra growing space by the mechanical removal of complete lines of plants, or 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 trees is removed if the distance between them is less than a prescribed length.

- (i) Only one mechanical thinning has been prescribed and it will be removal of one pole in a diagonal cluster of three poles.
 - (ii) It is usually provided that where there is a gap in the retained line, an adjoining plant in the cleared line should be retained.
 - (iii) 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.
 - (iv) 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 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/or age. 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.

TYPES OF THINNING

- (a) **ORDINARY THINNING**
- (i) The mechanical thinning meet the initial requirements of plantations. It soon ceases to be a practical proposition owing to the unequal development of the trees and their smaller numbers, and hence calls 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 which appears already 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 or, otherwise, inferior crowns. As this method begins with the removal of the lowest canopy class and then works upwards, 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.

(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. 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):** This consists in the 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):** This consists in the 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 prescribes 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.

(6) It is often inadvisable to make a full C-grade or D-grade thinning in a dense crop in which thinning has been unduly delayed. The first thinning in such cases should be lighter than is ultimately intended.

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 (LC - 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 (HC- grade):** This grade pays even more attention to favouring the selected best 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.

18.7 Inspection of Marking: After the marking for thinning in the crop is over, the inspecting officer must measure the basal area per ha. (with the help of a wedge prism of BAF-1) of the crop by point sampling as if the trees marked are already felled. In other words, while measuring the basal area, the trees marked shall not be counted whether they fall in the category of 'full tally' or 'half tally'. If the basal area so measured is within around + or -0.5 Sq. mt./ha.(i.e. equal to the least count of the wedge prism) of that given in the Yield Table for that particular site quality and age, then the marking done can be approved. If the basal area exceeds 0.5 sq.mt/ha. then some more marking of trees (to the extent of exceeded basal area) will be done. If the basal area falls short, then marking of trees to that extent will be cancelled.

The marking for thinning will be done by an officer not below the rank of an RFO. ACF shall inspect the marking thoroughly and DCF shall make sample checks.

18.8. Agency of Harvesting: Thinning operations in Teak plantations is a technical work and require regular monitoring through recording and analysis of growth measurements periodically. Therefore, thinning works are to be executed by the Department.

CHAPTER - XIX

URBAN FOREST WORKING CIRCLE

19.1 General Constitution:

This Working Circle comprises of forest areas falling within the jurisdiction of Nagpur Municipal Corporation.

19.2 Object of Management:

Forest areas falling within the jurisdiction of Nagpur Municipal Corporation will be managed with the following objectives:

- a) To secure the boundaries of urban forest areas through boundary demarcation.
- b) To create awareness in the urban masses about issues concerning Environment, Forest and Wildlife.

19.3 Area Statement:

Forest area allotted to this Working Circle is 1036.85 ha. It comprises of Reserved Forest, Unclassed forest and Zudpi jungle. Range-wise area details are given in table below.

Table No.19.1: Range-wise area allotment to Urban Forest Working Circle

Range	R.F (Ha)	Zudpi Jungle (Ha)	Unclassed Forest (Ha)	Total (Ha)
Seminary Hills	67.41	175.42	21.93	264.76
Hingna	758.74	13.35	0	772.09
TOTAL	826.15	188.77	21.93	1036.85

Village-wise area details are mentioned in Appendix No. LXXVII of Volume-II.

19.4 Status of Vegetation:

The forest areas allotted to this Working Circle consist of scattered small forest patches. Predominantly, the density is less than 0.2. However, in some small patches, good quality forests are also noticed.

19.5 Treatment proposed:

1. **Afforestation:** In areas with density less than 0.2 and adequate soil depth, afforestation with suitable species is proposed. Involvement of local people is desirable.
2. **Boundary Demarcation:** Forest areas falling in the jurisdiction of Nagpur Municipal Corporation shall be demarcated immediately with boundary pillars to prevent encroachment and illegal diversion to non-forestry use. Based on the vulnerability and sensitivity of the site, DCF (T) upon

obtaining approval from CCF (T) can erect permanent wall provided the patches are small and scattered.

3. **Nature Awareness Centre:** A large number of bio-diversity rich areas are situated in and around Nagpur. Therefore, to make public aware of the importance of bio-diversity, creation of Nature Awareness Centre at Seminary Hills, Nagpur is suggested.
4. **Timber Museum:** The forests of Vidarbha contribute enormously towards timber production from various species. Therefore, to spread awareness among the public about various Timber yielding species and their properties, creation of timber museum at Nara Depot is suggested.
5. **Staff Welfare Activities:** Forest staff at cutting edge such as Forest Guards and Foresters work in remote areas and hence their children often face difficulties to pursue education in important centres. Therefore, infrastructure creation through construction of Hostels for wards of forest employees will motivate the cutting edge staff to focus on core protection activities.

19.6: Applicability of Forest Conservation Act, 1980:

While executing various works suggested in this chapter, the CCF(T) Nagpur and DCF (T) Nagpur would follow the procedure (wherever applicable) laid down in the Forest Conservation Act, 1980 and the rules made thereunder.

CHAPTER - XX

MISCELLANEOUS REGULATION

20.1 BOUNDARY DEMARCATION

In order to keep the integrity of forests areas intact, strict vigilance over the forest boundary and periodic verification of the demarcation on the ground for the entire forest area has been prescribed. However, in view of the present position of demarcation and boundary pillars on the ground, priority areas for the demarcation work have been identified. For the purpose of boundary demarcation, the following areas have been identified in the order of priority;

- All the Protected Forests.
- Outer boundary of remaining forest of compartment in which erstwhile forest villages are located
- All unclassified forests with the division.
- Zudupi Jungles transferred to the division.
- Disforestation areas of the various projects
- Forest areas where exact boundaries are not shown on the forest maps.

The priority will be the areas which are at the interface with the private land.

THE SPECIAL OBJECTIVE OF MANAGEMENT

1. To maintain territorial integrity of forestlands in the division by delineating their boundaries by permanent pillar marks to act as psychological barriers.
2. To ensure effective protection of the forest resources of the entire division against adverse influences.

APPROACH TO THE FOREST DEMARCATION

1. Well-defined forest boundary is a prerequisite for effective forest protection and its sustainable management. However, in most of PF the forest boundary marks are either missing or unable to find easily. Forest areas vulnerable to boundary obliteration need to be identified for survey and demarcation so that forest encroachment on the forest fringes could be detected promptly. Presence of boundary marks also serves as psychological barrier against the forest encroachment. Forest boundaries adjoining private land shall receive the highest priority to ensure protection of these areas.
2. The Zudupi jungle areas were taken over by the division, without due verification of records and demarcation on the site. Most of these areas were not demarcated before taking over the area. Hence, examination of record, collection of authentic maps and demarcation of the area is essential for the entire Zudupi Jungle within three years. Majority of these areas have by now been proposed for notification under section 4 of IFA, 1927. In last 10 years

very less work of demarcation has been carried out. Entire 14131.14 ha of Zudpi is still to be demarcated.

3. Fixing Boundary of the Erstwhile Forest villages

Table No. 20.1 The Range-wise status of boundary demarcation is shown in the table below:-

Sr. No.	Range	Total No. of Beat	Total Villages of Protected forest	Total Villages of Zudpi Jungle	Length of Boundary					
					Demarcated			Undemarcated		
					Total Comptt/Survey No.	Total Length (Km)	Total No. of Fixed pillars	Total Comptt/Survey No	Total Area (ha.)	Total Length (Km)
1	Narkhed	17	42	90	24	113.00	1116	132	5515.87	496.43
2	Katol	16	33	53	0	0.00	0	262	7427.61	668.48
3	Kondhali	23	59	23	0	0.00	0	115	7366.94	663.02
4	Hingna	26	31	41	24	136.85	1945	135	3293.70	274.25
5	Butibori	19	32	99	0	0.00	0	438	8761.92	788.57
6	Seminary Hills	17	1	42	38	25.15	566	58	400.11	36.01
7	Kalmeshwar	9	14	48	15	25.93	234	257	2275.17	204.77
8	Khap	13	22	84	11	137.15	289	691	3287.24	295.85
9	Paoni	11	35	6	0	0.00	0	28	2511.79	226.06
10	Deolapar	17	35	8	7	722.58	781	37	1840.52	165.65
11	Parshioni	14	25	31	13	48.37	617	138	1825.68	164.31
12	Ramtek	16	39	47	8	166.97	553	137	4489.58	404.06
13	N.Umrer	29	75	81	19	172.42	1402	357	8682.06	781.39
14	S.Umrer	28	55	20	9	178.98	751	78	5471.63	492.45
	Total	255	498	673	168	1727.41	8254	2863	63149.82	5661.30

FORMATION OF DEMARCATION WORKING SERIES

It is proposed to cover the entire boundary in 3 years period. Hence, three Working Series have been formed. The details of villages and compartments/survey numbers are shown in Appendix No. **XXI**

SURVEY AND DEMARCATION OF BOUNDARIES

1. The Principal Chief Conservator of Forests 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 where ever possible as per requirement of site.
2. Experience in the field suggest that the RCC pillars are vulnerable to damage due to theft of Steel bars and therefore, there is a need to re-design the model of boundary pillars. During the course of field visit, W.P.O. has inspected the boundary pillars of adjoining M.P. State which appear to be more field hardy. The design of such pillar is given in Appendix **LXXVI**. The CCF (T), Nagpur

shall examine this model and get the model estimate prepared from the Engineering wing. Technical and Administrative approvals would be obtained from competent authority before executing works.

Specifications of Madhya Pradesh Pattern of Boundary Pillar: A Cairn should be made of loose stones upon excavated foundation to a depth of 30 (thirty) centimetres and shaped like a Trapezoid. Interspaces between the large stones should be filled in with small stones, and the outer stones will be wedged with stone chips and local mud.

To build such cairn following points are taken into consideration. .

1. Excavation for foundation: Length 1.2 mt, breadth 1.2 mt, height 0.3 mt.
 2. Built up: Height should be taken 1 mt and at base length and breadth is of 1.2 mt. Top of Trapezoid is of size 0.80 mt in length and breadth.
Generally it is built in rainy season. Use of Cement mortar can be done for paving the surfaces.
 3. Upper surface should be plastered.
 4. Stone Rubble masonry work with the help of Mud and small stone filling the proper gap at the time of construction.
 5. Works should be carried out in rainy season.
 6. In the same season by removing outer surface mud and then paving of cement mortar should be done.
 7. Detail design should be prepared from Engineer. .
 8. Technical and Administrative approvals shall be obtained from competent authority.
3. Some of the forest surveyor staff can be trained at the training institutes of the Land Records Departments, and engaged for boundary survey and demarcation work in undisputed sections. There is a need to delegate the power under section 136 of Maharashtra Land Revenue Code, 1966 to the forest surveyors.
 4. The protection staff shall continue with traditional demarcation using stone Cairns or earthen Cairns of standard size till such permanent boundary marks are created or re-established in the field.
 5. **Demarcation of the internal forest boundaries:** Internal boundaries between compartments or those between the Reserved Forests and the Protected Forests may be demarcated using traditional stone cairn, earthen cairn or standard wooden pillar. Fund allocation for this work is generally discouraged because it is a part of the responsibilities entrusted as per Maharashtra Forest Manual to the protection staff. This work should not be unmanageable in light of the additional manpower available through *Van-majurs*.
 6. **Routine boundary maintenance:** The Beat Guard after his personal inspection of the entire compartment must submit the 'Compartment Inspection

Certificates' every month 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.

7. The Round Officer should submit similar 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 forest enquiries entrusted to him.
8. The Range Forest Officer can allow the delay not exceeding 15 days for reasons recorded in writing. Default on this account for consecutive 2 months should be viewed as dereliction of duty and should attract disciplinary action.
9. The Range Forest Officer should check accuracy of the 'Compartment Inspection Certificates' according to the prescribed norms covering each round. He should personally check at least 2 (two) vulnerable compartments other than those covered by the Beat Guards and the Foresters during the previous month.
10. The Range Forest Officer, Mobile Squad will co-ordinate cross-checking of 'Compartment Inspection Certificates'.
11. These guidelines shall be applied along with other directives issued for the forest protection from time to time. Other field officers will carry out their field inspections according to these guidelines as modified from time to time. As per Maharashtra Forest Manual 2012, duties of Forest Guard, Round Forest officers, Range Forest Officer as well as ACFs shall be applied along with directives issued for the forest protection.
12. **Specification of boundary pillars:** The prescribed design must be followed to carry out the task of fixing the boundary pillars as prescribed. According to provisions contained in the BFM Vol. III, Chief Conservator of Forests is empowered to give sanction to the design of the pillars. However, May 2001 instructions referred to as above have given uniform specification for this purpose. Accordingly 1.40-meter long cement concrete pillars at roughly 50 meters interval on the external forest boundaries will be erected. Wherever the external boundary is shared with other government land, the interval should be increased to 100-150 meters and intermediate pillars may be 0.90 meter long. Both types of pillars should be embedded to 0.40-meter depth in the cement-concrete base. The prescribed tapering cross-section of the 1.40-meter pillar is 0.10 x 0.15 meter at the top and 0.15 x 0.23 meter at the base. The 0.90 - meter pillars are parallel pipe with 0.15-meter width and thickness. As per review of

forest staff work is very poor for cement concrete pillars. Most of the cement concrete pillars get broken for removal of steel bar by local people. Hence Protection for pillars becomes essential.

12.1. Specification of a boundary cairn: Artificial boundaries should be marked with a series of boundary Cairns. A Cairn should be made of loose stones upon excavated foundation to a depth of 30 (thirty) centimetres and shaped like a truncated cone. Interspaces 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 stone (0.20 x 0.20 x 0.90 meter) or a timber stake projecting 1/2 (half) meter in the centre will be fixed firmly on the top of the cairn, and marked with cairn serial number. Each boundary marks (cairns) must be visible from its neighbouring ones 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 forests. The cairn tops should have direction of boundary lines shown by the same colour lines radiating from the centre. Such Cairns can be made of earthen mass, where stone boulders are not available.

12.2 Recording locations of the boundary pillars or Cairns: The location of the boundary pillars and Cairns along with their numbers should be shown on the maps. The numbering will follow the convention communicated by the Chief Conservator of Forests in charge of the land matters. The numbers shown on the topo-sheets will be maintained unless warranted by the compelling reasons. Such reasons must be reduced in writing and entered as a note on the master set of the maps. This master set will be made available to the Working Plan Division for updating the working maps and the digital database with GPS reading. Also register for maintenance of boundary pillars be updated at range and division level.

13. **Clearance for the 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.
14. **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-kilometre interval on the side away 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 15 cm and 10 cm, respectively. Strokes should be at least 2 cm wide.

15. **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 carried out in September-October. He must submit details for 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 decided by the Range Forest Officer. Only material cost should be admissible for the purpose.

Review and Monitoring of Boundary Demarcation works:

Continuous review and monitoring of boundary demarcation works is absolutely necessary to ensure time bound implementation. Dy.CF Nagpur shall get the annual work plan for boundary demarcation prepared from RFOs well in advance and make suitable budgetary provisions. He shall review the implementation of works every month and report the progress to CF, Working Plan on a quarterly basis. CCF (T), Nagpur shall review the progress every quarter and instruct for course corrections. A six monthly progress report be submitted to CCF (Land Records), Office of PCCF.

20.2 MISCELLANEOUS AREA MANAGEMENT

Eco - tourism in Nagpur division

Nagpur division has several areas suitable for promoting Eco-tourist activities to bring awareness about forest and wildlife issues among the general public. Some of the Eco-tourist sites are discussed below:-

I) Seminary Hills, Nagpur: Compartment No. 715 with area 67.41 Ha is situated in the heart of Nagpur City and offers enormous opportunities for developing Eco-tourism initiatives such as Bio-diversity Park, Timber Museum etc. Following prescriptions shall be followed to manage this area:-

1. No felling is prescribed in this compartment.
2. Only dead, wind fallen up rooted trees and wind broken branches should be removed after retaining two dead trees per ha as snags.
3. Tree plantation activities should be taken up with the active involvement of civil society for which DCF Nagpur would initiate dialogue with citizen groups. Plantation shall be done only of local species.
4. No opening of crown should be created for any purpose.
5. Soil and Moisture Conservation Works shall be taken up as per the requirement of site.
6. DCF Nagpur shall explore the possibility of initiating Urban JFMC within the existing policy framework .

Specific prescriptions for management of Urban forest areas is discussed in the chapter on “Urban Forest Working Circle”.

II) Kuvara Bivsen :- In Parshivani range, Beat-Khairy, temple of Kuvara Bivsen is situated near compartment no.236 PF . Temple is situated in a picturesque surroundings adjoining to Pench National Park. Adivasis visit this site to offer prayers. Local JFM committee shall be involved to manage this area. There is scope to identify trekking trails and nature trails adjoining to forest areas of this site. If developed, it would attract visitors from Nagpur city and generate livelihoods to the local people as guides and service providers.

III) Khekda Nala: In Khapa Range, Irrigation department has built a dam which is covered in compartment no.201 PF, 713RF 203 PF named as Khekda nala. This site of scenic beauty has potential to be developed as Eco-tourist spot. Activities that can be promoted are Bird Watching, Trekking etc. Local JFM committees are to be involved in these activities.

The above sites are only indicative and not exhaustive. DCF Nagpur shall identify all potential eco-tourist sites and prepare a plan for their development involving local JFM committees.

Zudapi Jungle: 13942.37 ha of Zudapi jungle, 86.69 ha of non-forest land is spread over 630 villages. Hence, boundary demarcation program should be implemented and plantation should be taken as per suitability of site.

The Zudupi jungle areas are characterised by blanks and sparse vegetation having few dense patches scattered over entire area. Some areas have been proposed for compensatory afforestation under various projects by the division. In the event of approval of projects, these areas will be taken up for plantations under compensatory afforestation scheme, as per prescriptions of the Afforestation Working Circle (AFF).

Due to their proximity to the habitations these areas require close watch and proposed to be provided protection against forest fires, over grazing, illicit cutting and encroachment. It is proposed that these areas shall be managed to primarily meet the local needs of fuel wood, fodder and small timber by involving local communities through JFMCs.

20.3 Demarcation, Preparation of Treatment Map And Marking of Coupes.

Demarcation of Coupe:

1. The annual coupes for harvesting will be demarcated one year in advance, and each coupe, if so required, may be subdivided into four sections for effective management and control. The Range Forest Officer will thoroughly inspect the coupe after demarcation and issue ‘Coupe Demarcation Certificate’ in the

prescribed format, given in the following paragraph, which is to be verified by the concerned Assistant Conservator of Forests.

2. Format for the Coupe Demarcation Certificate is prescribed, as follows, in Form No. 20.1 :

Form No. 20.1

“I ----- R.F.O.
-----certify that I
have personally inspected the demarcation of the coupe No. -----
in Compartment No. ----- of F.S. -----
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

3. **Demarcation Of Coupes:** Annual coupes have been prescribed to be demarcated by cutting and clearing bushy undergrowth on 3 (three) meter wide line and by erecting pillars or posts up to 2 meter height in middle of the cut line at suitable intervals, so as 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.
4. Selected trees, above 45 cm gbh, at suitable intervals standing on the periphery of the coupe will be given two coal tar bands and a geru band in between after scrapping the loose dead bark. The lower coal tar band will be at B.H. and the other coal tar band will be 15 cm above it. Just below the lower coal tar band *Tree serial number* in Arabic will be given on the side away from the area of the coupe. The bands and serial numbers of such trees will be maintained in the marking register in the following, Form No. 20.2.

Form No. 20.2 List of trees on the coupe boundary

S.N	Name of species	GBH (OB)	Remarks
1			
2			
3			

5. No tree, bearing the coupe demarcation bands, is proposed to be marked for felling.

6. **Demarcation Of Sections:** For effective monitoring and control of the harvesting operations, each coupe marked for felling in SCI Working Circle will normally be divided into four approximately equal sections. Sections will be demarcated by 1.5 m. wide cut lines by clearing brushwood, unless the section line runs along a permanent feature.
7. Trees above 45 cm girth, selected at suitable intervals on the inner edge of the 1.5 m wide cleared section line will be given two coal tar bands 15 cm apart, the lower coal tar band being at breast height. Just below the lower coal tar band section number will be given on the side away from the area they would denote.
8. **Demarcation Of Other Areas Given In The Treatment Map:** The other categories of areas shown in the treatment map will be marked by giving one geru band at B.H and one coal tar band 5 cm above it.

Treatment Map:

1. Immediately, after completion of demarcation of the coupe, Forester will prepare the Treatment map of the coupe under the close supervision of RFO by clearly showing the various Treatment-type areas. The concerned ACF will verify the treatment map and make corrections, if necessary, before submission to the DCF Nagpur for approval.

The treatment map will bear the date of preparation by the Range Forest Officer and verification by the Assistant Conservator of Forests.

2. Immediately after seeking 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 is proposed to be verified by the ACF concerned and submitted for approval to the competent authority.

MARKING OF TREES FOR HARVESTING.

1. After approval of treatment map, marking of trees for harvesting shall be carried out as per prescriptions given in respective working circles. Timely marking would facilitate necessary checking and corrections, if any, in time.
2. Marking is prescribed to be done by the forester concerned under the close supervision of RFO and constant guidance of 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. To ensure this close supervision, a marking certificate in following format is prescribed.

Form 20.3

I, ... RFO, ... personally inspected the marking of the coupe No. in compartment No of felling series in Working circle on dt..... and found that marking of trees for felling has been done as prescribed in the working plan.

Date :

Signature of the RFO

These certificates shall be regularly and frequently checked and verified by ACF as well as Deputy Conservator of Forests.

3. Trees marked for felling will be given *geru bands* at breast height and will bear marking hammer impression at the B H (breast height) as well as at the base on the blazes of sizes 10 cm x 10 cm. The blaze size should be strictly adhered to so as to aid in identification of marked trees at the time of felling.
4. Following trees in addition will bear digit serial numbers both at BH (Breast Height) and at the base.
 - a) All trees of Teak, Bija, Shisham, Ain, Tiwas, Haldu, Kalam, Dhaora and other timber yielding trees of 45 cm and above girth at b.h (o.b).
 - b) Trees of all other species, of and above, 60 cm girth at b.h.
5. The remaining trees marked will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series.
6. The number of the tree marked shall be written vertically on the blaze, shown as under:

For Tree no. 195

XX (Hammer mark)

1

9

5

7. All trees bearing serial numbers will be individually recorded in marking (recording) book in, the following, *Form No. 20.4*. Serial number given in coal tar must be recorded in the marking book. Remarks column shall invariably mention about the deformities if any, such as Dead, Top broken, Hollow, severe insect damage etc.

Form No. 20.4 Format for marking of trees for harvesting

Tree Digit No.	Serial No. Coal tar	Name of species	GBH (OB)	Remarks

8. Abstract of trees marked for felling will be made in 15 cm girth classes. Timber, poles and firewood trees will be shown, separately.
9. Malformed trees alone will be recorded as fuel trees, except that of teak. A tree will be classified as fuel tree only when it is incapable of yielding any useful sawn timber or pole.

20.4 Forest Protection

Status of forest offence cases: The Range Forest Officer, the Assistant Conservator of Forests and the Deputy Conservator of Forests will take review of forest offence cases at least once, every month. Shifting of boundary marks along the forest boundary shall be viewed seriously, and the adjoining landholders or encroachers would be charged in the court for omission or commission causing obliteration of the forest boundary. Charges regarding all cases of forest encroachments must be submitted before the Judicial Magistrates within 3 months. Similar time-bound action is recommended in all cases of timber theft. All cases of violation of the Forest (Conservation) Act, 1980 shall be dealt with timely and firmly.

Routine monitoring: The Deputy Conservator of Forests shall personally carry out routine checking of the Range Offence Register and the Round Enquiry Reports in at least 4 Ranges every year. Similarly, the Chief Conservator of Forests shall check these records in at least one Range every year, and circulate the inspection report to all the Ranges.

Regular training: The Deputy Conservator of Forests and the Assistant Conservator of Forests will periodically convene staff meeting to review and impart training for the boundary management and for effective disposal of offence cases.

Awards and Rewards: Staff who have performed exemplarily in forest protection should be nominated for State and National awards.

JFM activities: JFM activities open up communication channel, discourage forest offences and provide village bodies an opportunity for direct involvement in forest protection. Therefore, JFM activities should be encouraged, and taken advantage of as a workable strategy for effective forest protection.

20.5 FIRE PROTECTION

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 should be sensitised about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

Classification of fire control

Class-I (Complete Fire Protection): The Class-I fire control areas include all felling coupes, thinning coupes (six years), plantations (five years), the A-type areas (permanent), forest depots (permanent), forest nurseries (permanent), Special Wild life habitat areas (permanent) and any other areas of special importance decided as such by the Chief Conservator of Forests (Territorial) Nagpur.

Class-II (General Fire Protection): The Class-II fire control areas include the remaining areas of the Selection-Cum-Improvement Working Circle as well as any other areas, which deserve this protection in the opinion of the Chief Conservator of Forests (Territorial) Nagpur.

Class-III (General vigilance): The remaining forest areas (that is, areas not included in the above two classes) and G and FRM areas are identified as the Class-III fire control areas.

Fire control measures

1. A fire protection scheme for the entire division shall be prepared before February each year, identifying the watch points (including watch towers), strategic locations, strength of fire watchers at each location, deployment of vehicles, use of wireless sets, supervising of the forest staff and the co-ordination protocol.
2. Each location is proposed to have 5 to 10 persons (24*7) including regular staff and fire watchers. The staff should be trained in the application of modern fire-fighting tools. The fire prevention should be treated as a high priority item. The scheme should be implemented sincerely during the fire season.
3. Areas deliberately burnt for silvicultural reasons under the sanction of the Chief Conservator of Forests (Territorial) Nagpur will be excluded from the fire protection scheme. Fire in such areas need not be reported unless spreads beyond such area.
4. All the Class-I and Class-II areas will have external fire lines and internal fire lines dividing the forest area into convenient blocks. The Class -I areas will also have cut and cleared Guide-lines.
5. Fire Watchers and local forest staff will 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 on the forest crop.
6. The group of fire watchers 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 should be used for extinguishing the fire. The supervising officials should mobilise reinforcement in case of large fire. Utmost care will be taken to quench the smouldering material

7. The fire lines will be kept clear of all growth and combustible material during the fire season. Leaf litter and other dry material on the fire lines will be collected periodically along the edge and burnt before the fire season starts.
8. The cutting of fire lines should be completed in December. Fire tracing (burning) should be completed in February, and thereafter should require permission of the Deputy Conservator of Forests and physical presence of a gazetted officer.
9. The division office shall maintain a “Register 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.
10. Standard widths of fire lines are prescribed in the Table 19.2. The supervising officer will decide the width unit for carrying out the fire line work on the shared boundary.
11. Establishment of 24*7 Control Room at Range and Division Office by pooling of resources is necessary to swiftly deploy the teams for dousing fires.
12. Fireline cutting and burning works are to be done with the close cooperation of JFMCs. This approach will instil a sense of direct responsibility on the JFMCs to protect forests from fire. This would act as a performance assessment tool for the department to assess the JFMCs. The funds for fireline cutting and burning shall be allotted by DCF to the JFMCs and the concerned RFO would get the works executed from them. This approach will bring a sense of ownership to the JFMCs.

Table 20.2 Standard width of various types of fire lines

Sr. N0.	Characteristics of the area	Width of fire line
1	External Reserved & Protected Forests boundary	12 meter
2	Naturally or artificially regenerated areas (For 5 years)	6 meter
3	Remaining coupe boundary	3 meter
4	Both sides of roads and cart tracks passing through the forests	6 meter
5	Timber, bamboo and firewood depots	40 meter

13. Negligence in the fire protection by the staff should be taken as dereliction of duties. The supervisory officers have been proposed to, extensively, verify the fire control measures.

20.6 GRAZING:

Unregulated grazing is detrimental to forest regeneration. Hence, open cattle grazing should be within the limits of carrying capacity. Fodder development on

the community lands must be encouraged to enhance fodder production. The Animal Husbandry and the Dairy Development agencies should be motivated to take up breed improvement programme. Fodder in the plantation areas should be made available free of cost on cut-and-carry basis. JFMCs shall be actively involved in all the above initiatives.

20.7 ILLICIT CUTTING :

Illicit felling in the forest area is a cause of concern. Since the subject is dealt separately according to a series of directives for the purpose, recommendations of this plan are of a little consequence. However, faster communication including vehicle facilities, adequate check post/barriers, capacity building of staff and establishment of forest stations at strategic places are recommended to control illicit felling and wildlife offences. Establishing intelligence network for the purpose is strongly recommended. The Secret Service Fund scheme instituted by the Govt. of Maharashtra should be used to control illicit tree felling.

In addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should take up efficient wood utilisation and energy efficient alternatives like smokeless chulhas, biogas, LPG connections, solar cookers, etc.

20.8 FOREST ENCROACHMENT

The causes of forest encroachment should be examined thoroughly and addressed in a comprehensive manner. All the necessary support should be provided, and encroachment should be evicted as early as feasible. The boundary management and standard administrative guidelines will help contain encroachment.

The forest areas under encroachment from 1978 onwards are 2322.75 Ha. Renewed and concerted efforts on the part of division staff for eviction of encroachment are proposed on priority basis.

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.

20.9 SOIL AND MOISTURE CONSERVATION:

The areas adjoining the human habitations, especially, the Protected Forests are vulnerable to degradation by way of illicit cutting, heavy grazing and repeated fires. The compaction of soil reduces percolation of water and the water holding capacity of the soil. Due to these factors, NR of teak and its associates die back before being established as part of future crop.

The soil and moisture conservation is crucial to maintain and improve the site conditions as well as water regime of a given tract. Moreover, extensive silvicultural works have been prescribed in this working plan to regenerate the

forests primarily assisting and tending the existing NR and the available rootstock. To ensure the success of these operations in improving the forests, soil and moisture conservation works are of utmost importance.

The soil and moisture conservation works would start along with the marking of coupe and be completed before the onset of monsoon. Wherever feasible, the local material obtained from climber cutting, bamboo cleaning and shrub clearance should be used for brushwood check dams to arrest the soil loss.

It is prescribed to follow watershed management approach viz. the *ridge-to-valley approach* for carrying out soil and moisture conservation works. Structures for SMC works should be decided as per the requirement of site. A large proportion of area is adjoining to various protected areas. Hence, deep CCTs should be avoided to avoid damage to wildlife.

Nala Bunding and Check Dams: The primary objective of nala bunding and check dams is to reduce the run off water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the nala bed or from the dug up soil. No blasting shall be done for this purpose. Where sufficient boulders are not available brushwood may be used. In this plan check dams of both the loose rubble for arresting silt and soil loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.

The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions, local availability of suitable materials. However, to narrow the wide variations in implementation, the norm for gully plugging or nala bunding is proposed as 5 meter³/hectare of loose rubble filling or earthwork unless otherwise prescribed in the specific scheme.

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 work.

The forest tanks are proposed to be taken up in suitable sites without causing damage to the tree crop either during construction or due to submergence as per norms fixed in the Government Orders.

20.10 GUIDELINES FOR REGENERATION:

Plantations should be taken up on selective basis and only in the areas having good soil depth and which are well drained. Also the areas selected should have no or negligible grazing pressure. If the area was already planted and resulted in failure, the causes of failure shall be examined and only after eliminating such causal factors, the area be taken up for raising new plantations with the prior approval of CCF (T), Nagpur. B2 type areas in the various working circles i.e. the

under-stocked areas with scanty natural regeneration are prescribed to be considered but such areas should specifically be put to above tests before taking up plantation. In the rest of the under-stocked areas, attempts will be made to encourage natural regeneration. JFMCs should be involved in all types of afforestation activities.

Tending of natural regeneration: Preference will be to encourage natural regeneration and management of existing rootstock. Natural regeneration is proposed to be achieved in two ways:

- i) Identifying 200 to 250 seedlings and saplings per hectare (those having attained a height of 60 cm). of valuable species. Growth of these seedlings/saplings shall be encouraged by way of weeding, singling, soil working and mulching in the same way as in case of plantations.
- ii) The areas devoid of seedlings/saplings of seed origin but containing sufficient rootstock shall be tended (stool dressing, singling, removal of congestion etc.) in favour of valuable species. While doing so, the species, which are less in number in stocking (as indicated by enumeration results) shall however be given preference.

Artificial Plantations: Only the areas neither having sufficient seedlings/saplings of seed origin nor sufficient root stock but are found to be suitable for plantation of suitable species shall be covered under the plantation programme. Quality seedlings are to be used in plantations.

Choice of species in artificial regeneration: Naturally occurring local species will be preferred for the plantations.

20.11 THE RULES FOR GUM TAPPING (FRI, DEHRADUN)

The tapping season will commence from November to end of May each year. No tree below 90 cm in girth will be tapped.

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.

Each tree shall be tapped continuously for 3 years; and, thereafter, will be given rest for 3 years.

The initial blaze 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 axe having 7.5-cm wide blade. The blaze is made 0.6 cm deep in the bark.

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 sloping outwards to avoid lodging of guggul in the blazed pocket.

The guggul starts oozing out soon after blazes are made and may be collected initially after a month, that is, by about December when the blazes may also be freshened. Subsequent collections and freshening may be done fortnightly up to May. Overall, 12 freshening are required to be made, during the year.

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 from either side in width in each freshening.

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 that is, 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.

The number of blazes to be made on each tree will depend on its girth at breast height, as given below:

Category	Girth at BH	Maximum blazes allowed on each tree
I	0.9 m to 1.3 m	2
II	1.3 m to 2.0 m	3
III	2.0 m to 3.0 m	4
IV	Over 3 m	One blaze for each 45 cm girth in addition to the category III, above.

No fresh blaze will be made on the partially healed up surface or old wounds.

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.

At the end of the season, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10cm x 12.5cm x 0.6 cm in width, height and depth, respectively.

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 37.50 cm, the width and depth remaining the same.

In the second cycle that is, in the 7th year (after three-year rest) new blazes will be made in the same way in the un-blazed 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 operations will be repeated till un-blazed portion is fully covered.

All Gum Yielding trees should be tapped before Felling the trees in due coupes marked for felling.

20.12 ROADS, CART TRACKS AND CULVERTS

The forest areas of the division have a good network of roads and cart tracks. The Public Works Department of the state government or the Zilla Parishad maintains large number of roads passing through the forest area. Some stretches have been permanently transferred to the Department. The division is proposed to compile a comprehensive record for all roads passing through the forest area and the roads transferred to the division for maintenance, on priority basis.

The extent of forestry operations and gravity of forest protection concerns should determine the priority for maintenance of the forest roads.

Unwarranted up-gradation of the forest roads should be discouraged, but required culverts may be constructed in stretches useful for the forest protection.

20.13 HARVESTING AND DISPOSAL

Agency for harvesting: The Deputy Conservator of Forests, Nagpur shall decide the agency for harvesting in accordance with the applicable policies and regulations

Disposal at timber depots: Harvested timber and firewood are proposed to be transported to the established forest depots for sale by auction or allocation according to the prevailing policies and guidelines. Bamboos are also sold at these depots. Scope of E-auctioning to be explored and implemented to bring transparency and induce desirable competition among buyers. The National Forest Policy, 1988 acknowledges the first charge on the forest produce in the local tribal and village community living in and around the forest areas. Hence, decision for the disposal of the forest produce should be guided by the philosophy of the first right of the local village communities, which is also recognised in the *nistar* patraks. For facilitating *nistar distribution*, temporary depots can be created at convenient places.

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 sanctioned rates to 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 large distance to procure the *nistar* materials.

20.14 IRREGULAR HARVESTING

Restriction on irregular harvesting: Irregular harvesting of timber, firewood and other NWFPs is prohibited, except in the following cases:

Harvesting for the fire lines and the transmission line: The Deputy Conservator of Forests may 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, will be applicable to the transmission lines. Creation of new fire lines shall require prior permission of the Chief Conservator of Forests.

Felling for the haulage roads: The Deputy Conservator of Forests may permit felling of trees for the purpose of haulage roads, which should be aligned properly to ensure minimum possible felling of trees.

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., will only 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 material obtained from such harvesting will be brought to the depots and will be disposed off as per departmental procedures.

Harvesting of wind-fall material: Removal of wind-fall material from all parts of the forests, except the coupes due for working, will be done in the following manner. Every year in the month of October each beat guard will report the availability of wind-fall trees uprooted by wind or storm to the concerned Range office. The Range Forest Officer will estimate availability for such material in each compartment and ACF concerned will verify the same. Wood removal will be carried out from the compartment after approval of the Deputy Conservator of Forests. The details of material obtained from each compartment and revenue realised from it will be entered in the respective Compartment History Form.

No irregular harvesting for the purpose of undertaking plantations/afforestation works under schemes outside the scope of this working plan will be taken up in any of the areas under the working plan.

20.15 MAINTENANCE OF THE FOREST LAND RECORDS

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. A certificate to this effect will be recorded annually in the Form No 1- Register during the month of June.

Forest notification: Unclassified forests and non-forest areas transferred for the compensatory afforestation shall be, immediately, proposed for notification under Section 4 of Indian Forest Act 1927.

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 Rights to the Nagpur Division to mark completion of the process.

Along with the reconciliation, the details of land grants (*patta*) issued on the forestland will also be made available to the Nagpur 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.

20.16 CHECKLIST OF INFORMATION REQUIRED FOR NWFP MANAGEMENT

A database for the NWFP management is proposed to be created at the division level incorporating the following information:

- 1) Red data plants of Maharashtra vis-à-vis concerned division (district).
- 2) Endemic plants.
- 3) District (division) flora as published by BSI.

Information in regard to the most traded plants and plants used as traditional medicine, their trade name, local name and Marathi names is to be obtained.

- 4) Identification of bare foot botanist for the above purposes.
- 5) Recorded MFP collection.
- 6) Estimation of unrecorded MFP (NWFP) collection: A “Systems Approach” has to evolved. JFMCs be given this role so that reliable data generation at village level gets prepared. DCF, Nagpur should explore this possibility.
- 7) Establishment of 1 ha plot in each range; monthly monitoring of occurrence, flowering and fruiting of NWFP plants.
- 8) Identification of areas capable of supplying seed material (Seed/ Rhizome/ Tuber) of common NWFP species.
- 9) Survey of weekly markets regarding

- Type of NWFP
- Extent
- Purpose of utilisation
- Rate
- Chain of custody and agency of marketing
- Final destination and processing

To maintain information of all vendors, purchasers, manufacturers etc. associated with NWFP trade as obtained in the above survey and through other means. Creation of database of the above in the division office.

- 10) Compilation of traditional knowledge about NWFP plants and their utilisation.
- 11) NWFP species, which are harvested through unscientific and destructive methods shall be identified at the division level and shall be referred to the research wing of the department to explore non-destructive methods.
- 12) Database creation by each JFMC regarding NWFP collection and it will be linked to the database proposed at the division level.

Management of Preservation Plots/Research Plots:

The Preservation Plots / Research Plots which are in existence are to be maintained as per the objectives of the ongoing studies and should not be interfered with during regular coupe working.

CHAPTER- XXI

THE ESTABLISHMENT AND LABOUR

21.1 The Establishment

Sanctioned Staff: A total of 1424 posts are sanctioned for the division to oversee the functioning of various duties assigned to Nagpur division. Out of 1424 posts, 856 posts are of Van-Majoors (Forest Labourers). Van-Majoors should be effectively used in forest protection and management works. Staff strength is adequate for full implementation of the Working Plan prescriptions.

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 different stations. These conditions demand special efforts for the staff welfare programme. Sufficient facilities should be provided for quality education to the children of field staff by constructing Hostels at District Headquarters.

Skill up-gradation training or exposures on various aspects of forest management such as nursery management, plantations management and organising 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. Nursery techniques for raising important forest species such as Bija, Dhaora, Ain, Rohan, Shisham, Haldu etc are to be given focus so as to improve the quality of plantations.

Training in GPS is necessary for field staff up to RFO level and to capable Foresters and Guards, so that GIS maps and data which are generated by the working plan office can be properly used and updated/modified as per requirements by the field staff for preparation of round, beat, coupe maps. This sort of training can be imparted by working plan office, provided, necessary funds are given by territorial division.

Training of field staff and village communities, in collaboration with NGOs, is essential and is proposed for NTFPs collection, grading and value addition mechanisms to upgrade their skill in NTFPs management.

21.2 Labour Requirement:

Most of the schemes have provision on labour welfare. As per provision the expenditure shall be incurred on labour welfare programme in concerned villages by involving local communities.

Different forestry operations require sufficient labour every year. Temporary manpower shortage may be experienced during the paddy transplanting

and harvesting seasons. However requirement of labour can be met if advance planning and dialogue is initiated with JFM committees.

Sometimes labours from adjoining districts come to the area for Tendu collection and other forestry works. Care should be taken to ensure adequate employment availability to the local people. The Forest Labourer Co-operative Societies (FLCS) often engage large manpower of non-members in coupe working allotted to the Societies. In such cases, they should be instructed to take labourers from JFMCs and accord primary membership status so that the benefits of FLCS welfare fund become available to hard working individuals.

21.3 Buildings: The problem of accommodation is acute, as the existing buildings are not sufficient to house all the staff, especially the field staff. Many residential quarters for the Forest Guards and the Foresters working in the field are in poor conditions, and many beat and round headquarters do not have residential facilities. The field staffs are forced to occupy private accommodation. Although a number of buildings were constructed under the Maharashtra Forestry Project, substantial number of residential buildings is 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. DCF should prepare a detailed plan for repair of old buildings; write off of dilapidated buildings which are beyond repairs; construction of new staff buildings etc.

21.4 Water Supply: The availability of water for drinking as well as for agriculture depends mainly on the pattern of monsoon. Whenever the rainfall is scanty, water scarcity is experienced throughout the division. Adequate arrangements shall be made to supply drinking water to staff, especially, at the interior places. The existing nursery sites are near the perennial water sources. The new nursery sites, if required, shall be selected near the perennial water sources.

21.5 Meteorological Observations: Since meteorological observatories are in existence in all the Talukas and the district headquarters, there is no need for a separate observatory for the department. However, record of the rainy days will be maintained in each plantation register.

CHAPTER XXII
FINANCIAL FORECAST

Table 22.1 Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Division.

Selection-Cum Improvement Working Circle																	
Expected expenditure during the plan period (Rs. In Lakh)																	
Sr. No.	Particulars of work	Avg. Quantum of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (Rs. In lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs.in Lakh)
1	Demarcation and marking	4699	Ha	4.5	1198	56.29	56.29	56.29	56.29	56.29	56.29	56.29	56.29	56.29	56.29	56.29	56.29
2	Coupe working				0	0.00											0
2a	Timber harvesting	10065	cum	9.5	2529	254.56	254.56	254.56	254.56	254.56	254.56	254.56	254.56	254.56	254.56	254.56	254.56
2b	Firewood extraction	6710	stack	3.5	932	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
3	Natural Regeneration																
	Nursing of naturally occuring seedlings and coppice management etc. in "D" area	2350	Ha	10	2662.3	62.56	62.56	62.6	62.56	62.56	62.56	62.56	62.56	62.56	62.56	62.56	62.56
4	Soil and moisture conservation works				0.00	0.00											0.00
	490 Ha.	2450	cum	0.92	245	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
5	Cutback operation	2350	Ha	6	1597.38	37.53	0	37.53	37.53	37.53	37.53	37.53	37.53	37.53	37.53	37.53	37.53
6	Plantation (Teak)	250	Ha		0.00	0.00	0.00										0.00
6a	PPO/PYO (Pre - planting works)	250	Ha	51.93	13825	34.56	34.56	34.56	34.56	34.56	34.56	34.56	34.56	34.56	34.56	34.56	34.56
6b	FYO (First year operations)	250	Ha	158.70	42250.701	105.62		105.62	105.62	105.62	105.62	105.62	105.62	105.62	105.62	105.62	95.05
6c	SYO (Second year operations)	250	Ha	103.00	27421.69	68.55	0.00	0.00	68.55	68.55	68.55	68.55	68.55	68.55	68.55	68.55	68.55
6d	TYO (Third year operations)	250	Ha	76.00	20233.48	50.58	0.00	0.00	0.00	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58
6e	4th YO (Fourth year operations)	250	Ha	38.50	10249.855	25.62	0.00	0.00	0.00	0.00	25.62	25.62	25.62	25.62	25.62	25.62	25.62
6f	5th YO (Fifth year operations)	250	Ha	38.50	10249.855	25.62	0.00	0.00	0.00	0.00	0.00	25.62	25.62	25.62	25.62	25.62	25.62

7	Plantation (Mix)	240	Ha														
7a	PPO/PYO (Pre - planting works)	240	Ha	119.22	31740	76.17	76.17	76.17	76.17	76.17	76.17	76.17	76.17	76.17	76.17	76.17	76.17
7b	FYO (First year operations)	240	Ha	160.63	42764.5249	102.63	0.00	102.63	102.63	102.63	102.63	102.63	102.63	102.63	102.63	102.63	92.36
7c	SYO (Second year operations)	240	Ha	71.82	19120.6386	45.88	0.00	0.00	45.88	45.88	45.88	45.88	45.88	45.88	45.88	45.88	45.88
7d	TYO (Third year operations)	240	Ha	55.17	14687.9091	35.25	0.00	0.00	0.00	35.25	35.25	35.25	35.25	35.25	35.25	35.25	35.25
7e	4th YO (Fourth year operations)	240	Ha	38.50	10249.855	24.59	0.00	0.00	0.00	0.00	24.59	24.59	24.59	24.59	24.59	24.59	224.59
7f	5th YO (Fifth year operations)	240	Ha	38.50	10249.855	24.59	0.00	0.00	0.00	0.00	0.00	24.59	24.59	24.59	24.59	24.59	24.59
8	Cleaning	2350	Ha	8.00	2130	50.05	0.00	0.00	0.00	0.00	0.00	50.05	50.05	50.05	50.05	50.05	25.02
	Total			992.89	264337.04	1149.18	552.67	798.45	912.88	998.71	1048.92	1149.18	1149.18	1149.18	1149.18	1149.18	1303.31

Note 1. The mandays approved for Demarcation & Marking is for 'D' type areas. However, mandays for 'B' type and 'C' type areas be decided by teritorial Dy.CF as per crop condition.

2. Manydays for Fire Protection will be sanctioned after preparing "Fire Protection Plan" for the entire division.

3.The fund requirement will vary as per the prevailing wage rate.

Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Divisoin																	
Afforestation Working Circle																	
Sr. No.	Particulars of work	Avg. Quantum of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (lakh Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (RS. In Lakh)
1	Demarcation and marking	2182	Ha	1.5	399	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70
2	Coupe working																
2a	Timber harvesting	0	cum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2b	Firewood extraction	10910	stacks	3.5	932	101.68	101.68	101.68	101.68	101.68	101.68	101.68	101.68	101.68	101.68	101.68	101.68
3	Natural Regeneration	230	Ha	10													
	Nursing of naturally occuring seedlings and coppice management etc. in understocked patches	230	Ha	10	2662	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12
4	Soil and moisture conservation works																
	690 Ha.	3450	cum	0.92	245	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45
5	Plantation (Misc including Bamboo depending upon sutability of site)																

	Teak Plantation																
6a	PPO/FYO	345	Ha	51.93	13825	47.70	47.70	47.70	47.70	47.70	47.70	47.70	47.70	47.70	47.70	47.70	47.70
6b	FYO (First year operations)	345	Ha	158.7	42250	145.76	0.00	145.76	145.76	145.76	145.76	145.76	145.76	145.76	145.76	145.76	145.76
6c	SYO (Second year operations)	345	Ha	103	27422	94.6	0.00	0.00	94.60	94.60	94.60	94.60	94.60	94.60	94.60	94.60	94.6
6d	TYO (Third year operations)	345	Ha	76	20367	70.27	0.00	0.00	0.00	70.27	70.27	70.27	70.27	70.27	70.27	70.27	70.27
6e	4th YO (Fourth year operations)	345	Ha	38.5	10250	35.36	0.00	0.00	0.00	0.00	35.36	35.36	35.36	35.36	35.36	35.36	35.36
6f	5th YO (Fifth year operations)	345	Ha	38.5	10250	35.36	0.00	0.00	0.00	0.00	0.00	35.36	35.36	35.36	35.36	35.36	35.36
	Platation (MIX)																
7a	PPO/FYO	345	Ha	119.22	31740	109.50	109.50	109.50	109.50	109.50	109.50	109.50	109.50	109.50	109.50	109.50	109.50
7b	FYO (First year operations)	345	Ha	160.63	42756	147.50	0.00	147.50	147.50	147.50	147.50	147.50	147.50	147.50	147.50	147.50	147.50
7c	SYO (Second year operations)	345	Ha	71.89	19139	66.02	0.00	0.00	66.02	66.02	66.02	66.02	66.02	66.02	66.02	66.02	66.02
7d	TYO (Third year operations)	345	Ha	55.17	14688	50.67	0.00	0.00	0.00	50.67	50.67	50.67	50.67	50.67	50.67	50.67	50.67
7e	4th YO (Fourth year operations)	345	Ha	38.50	10250	35.36	0.00	0.00	0.00	0.00	35.36	35.36	35.36	35.36	35.36	35.36	35.36
7f	5th YO (Fifth year operations)	345	Ha	38.50	10250	35.36	0.00	0.00	0.00	0.00	0.00	35.36	35.36	35.36	35.36	35.36	35.36
	Total			976.46	257425	998.41	282.15	575.41	736.03	856.97	927.69	998.41	998.41	998.41	998.41	998.41	998.41

Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Division

Grass & Fodder Resource Management Working Circle																	
Sr. No.	Particulars of work	Av. Quantum of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (lakh Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (RS. In Lakh)
1	Demarcation of coupe	740	Ha.	0.5	133	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
2	Deep Ploughing in 10 Ha. Area suitable for grass land	40	Ha.	-	2000	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
3	Seed broadcasting in July	40	Ha.	2.5	666	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
4	Enclosure	40	Ha.	-	30000	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
5	Removal of woody tree & shrub growth & weeds	200	Ha.	5.00	1331	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
	Total			8	34130	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7

Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Divisoin																	
Old Teak Plantation																	
Sr. No.	Particulars of work	Avg. Quantum of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (lakh Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (RS. In Lakh)
1	Thinning	462	Ha.	9.5	2529	11.68	11.68	11.68	11.68	11.68	11.68	11.68	11.68	11.68	11.68	11.68	11.68
2	Cleaning	462	Ha.	6	1597	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38
	Total			15.5	4126	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06

Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Divisoin																	
Bamboo (Overlapping) Working Circle																	
Sr. No.	Particulars of work	Avg Quantu m of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (lakh Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (RS. In Lakh)
1	Demarcation and marking	2202	Ha.	0.15	39.93	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
2	Bamboo harvesting	1000	Ha.	-													
2a	Long Bamboo	400000	Bamboo	0.08	21.30	85.20	85.20	85.20	85.20	85.20	85.20	85.20	85.20	85.20	85.20	85.20	85.20
2b	Bamboo bundles	20000	bundle	0.08	21.30	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26
3	Bamboo Plantation	300	Ha.														
3a	PPO/PYO	100	Ha.	112.16	29860.00	29.86	29.86	29.86	29.86	29.86	29.86	29.86	29.86	29.86	29.86	29.86	29.86
3b	FYO	100	Ha.	91.26	24296.00	24.30	0.00	24.30	24.30	24.30	24.30	24.30	24.30	24.30	24.30	24.30	24.30
3c	SYO	100	Ha.	57.9	15415.00	15.41	0.00	0.00	15.41	15.41	15.41	15.41	15.41	15.41	15.41	15.41	15.41
3d	TYO	100	Ha.	11.91	11914.00	35.74	0.00	0.00	0.00	11.91	11.91	11.91	11.91	11.91	11.91	11.91	11.91
3e	4th YO	100	Ha.	38.5	10250.00	10.25	0.00	0.00	0.00	0.00	10.25	10.25	10.25	10.25	10.25	10.25	10.25
3f	5th YO	100	Ha.	38.5	10250.00	10.25	0.00	0.00	0.00	0.00	0.00	10.25	10.25	10.25	10.25	10.25	10.25
4	Cleaning	1000	Ha.	0.10	26.62	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Total			350.64	102094.15	216.42	120.47	144.77	160.18	172.09	182.34	192.59	192.59	192.59	192.59	192.59	192.59

Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Division

Boundary Demarcation																	
Sr. No.	Particulars of work	Avg Quantum of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (lakh Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (RS. In Lakh)
1a	Fixing boundary pillars (Artificial & Natural RF Boundary)	649	pillar	1	266.23	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
1b	Fixing boundary pillars (Artificial & Natural PF Boundary)	488	Km.	1	266.23	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
1c	Fixing Boundary pillars (Zudpi jungle)	2120	pillar	0	3000	63.60	63.60	63.60	63.60	0	0	0	0	0	0	0	0
	Total			2	3532.46	66.62	66.62	66.62	66.62	3.02	3.02	3.02	3.02	3.02	3.02	3.02	22.1

Note - Dy CF shall explore the possibility of allotting Line Cleaning work and minor Pillars repairs from Forest Labourers who were regularized by the Government of Maharashtra

Estimated Annual Expenditure (details) for the Working Plan Implementation in Nagpur Division

Sr. No.	Particulars of work	Avg Quantum of work	unit	Man days/ unit	Rate /unit (Rupees)	Annual (lakh Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (RS. In Lakh)
NFTF (Overlapping)																	
1	Training for collection method	10	Range	–	20000	5.20	5.20	5.20	5.20	0	0	0	0	0	0	0	5.20
Wildlife (Overlapping)																	
1	Habitat improvement	26	Division	–	50000	13	13	13	13	13	13	13	13	13	13	13	13
2	Strengthening of Rapid Response Unit	–	Division (2 unit)	–	0	10.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10
3	Wildlife Rescue center	–	Division	–	10.00	10.00	10.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10
4	Reward to informants and staff	10	Cases	–	5000	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Total	46			55010	33.50	33.50	33.50	23.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	18.50

Abstract of Yearwise Requirement Of Funds for Implementation of Working Plan (Rs. In Lakh)

Sr. NO	Working Circle /Activity	Year -1	Year-2	Year-3	Year -4	Year -5	Year -6	Year -7	Year -8	Year -9	Year -10
1	Selection cum Improvement	552.67	798.45	912.88	998.71	1048.92	1149.18	1149.18	1149.18	1149.18	1149.18
2	Afforestation	282.15	575.41	736.03	856.97	927.69	998.41	998.41	998.41	998.41	998.41
3	Grass & F.R.M.	16.70	16.70	16.70	16.70	16.70	16.70	16.70	16.70	16.70	16.70
4	Old Teak Plantation	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06
5	Bamboo Overlapping	120.47	144.77	160.18	172.09	182.34	192.59	192.59	192.59	192.59	192.59
6	Boundary Demarcation	66.62	66.62	66.62	3.02	3.02	3.02	3.02	3.02	3.02	3.02
7	Wildlife (Overlapping)	33.50	33.50	23.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50
8	NTPP (Overlapping)	5.20	5.20	5.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grand Total	1096.37	1659.71	1940.17	2080.05	2211.23	2392.46	2392.46	2392.46	2392.46	2392.46

Note - The requirement for funds will vary According to prevailing wage rate.

Revenue Forecast of Nagpur Division																									
Sr. No.	Working Circle	Approximate Expected yield (Annual)								Avg. Unit Price in Rupees (As per Schedule of Rates)								Approximate Annual Revenue (Rs. in Lakh)							
		Timber		Beat		Poles		Bamboo		Timber		Beat		Pole		Bamboo		Timber		Beat		Pole		Bamboo	
		Teak	Non Teak	Teak	Non Teak	Teak	Non Teak	Long Bamboo	Bamboo Bundle	Teak	Non Teak	Teak	Non Teak	Teak	Non Teak	Long Bamboo	Bamboo Bundle	Teak	Non Teak	Teak	Non Teak	Teak	Non Teak	Bamboo	Bamboo Bundle
1	SCI	7049 cum	5667 cum	2820	3778	4900	4900			39000	7000	5000	2400	375	110			2749.11	376.60	141.00	90.67	18.38	5.39		
2	AFFWC	0	0	218	218	0	0			39000	7000	5000	2400	0	0.00			0	0	10.9	5.23	0	0		
3	Bamboo Overlapping							400000	25000							15	50							60.00	12.50
3	Old Teak Plantation					20790	2310							375	110							77.96	2.54		
Grand Total		7049 cum	5667 cum	3038	3996	25690	7210	400000	25000	78000	14000	10000	4800	750	220	15	50	2749.11	376.60	151.90	95.90	96.34	7.93	60.00	12.50

Note - The expected Annual Revenue would vary as per the prevailing market prices.

CHAPTER – XXIII

CONTROL AND RECORDS

23.1: Control and Records:

The following records will be maintained in the Nagpur Forest Division Office:

- i. Control Forms.
- ii. Compartment History.
- iii. Plantation Registers.
- iv. Nursery Registers
- v. Divisional Note Book
- vi. Boundary Registers

Control Forms : All control forms and Compartment histories shall be maintained as per the formats prescribed in **Appendix - LXXIV and LXXV** of Volume-II.

The records of all harvesting, subsidiary cultural operations, regeneration works and soil and moisture conservation works carried out as per this working plan prescriptions, will be maintained in the control forms. The prescribed proforma of the control forms have been given in the Volume II of Appendix- **LXXIV and LXXV**

Two sets of control forms will be prepared. One set will be kept in the division office and the other set will submitted to the Conservator of Forests Working Plan Nagpur. The Forms will be sent annually by the Deputy Conservator of Forests Nagpur Division to the Conservator of Forests Working Plan Nagpur not later than October, 1st. every year taking the necessary entries. All entries showing the deviations from the prescriptions will be underlined in red. The Conservator of Forests, Working Plan, Nagpur will scrutinise it and process further.

23.2 Compartment History:

Compartment histories i.e. the records of various forestry activities and observations made in the past year will be maintained in Forms prescribed in **Appendix- LXXV**.

Each Compartment must have a separate file for its records. Compartment history must be maintained in the office of Nagpur Forest Division since they keep the record of past management practices and their effects on the growing stocks.

Every year, in July, the Range Forest Officer should fill in the necessary information and will send it to Dy.C.F. Nagpur Forest Division for scrutinizing, editing through ACF in charge, who after doing so will get them typed and sign them. One copy of the forms will be sent to CF, Working Plan for scrutiny.

23.3 Plantation and Nursery Registers: Plantation registers will be maintained for all the areas regenerated artificially as per established departmental procedures.

23.4: Divisional Note Book: At divisional level all important matters will be recorded by the DCF every year with his explicit opinions about the working plan operations. A brief note about the plantation will also be recorded by the DCF under appropriate heads.

23.5 Fire Records: They should be maintained as per the latest orders from State Government from time to time.

23.6 Other Records: List of amendments to the working plan and list of area changes will be maintained in prescribed forms.

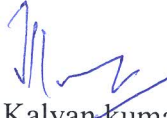
State level committee Meeting held on 24th and 25th September 2014

Ref: Govt.G.R. Revenue and Forest Department MSC 2004/CR-102/F-2,
Dt. 25.06.2004

With reference to the above mentioned Govt. Resolution, the Draft Working plan of Nagpur Forest Division was discussed and approved by the Committee under the Chairmanship of The Principal Chief Conservator of Forests (HOFF), Maharashtra State, Nagpur.



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Deputy Conservator of Forests,
Nagpur Forest Division, Nagpur



(P. Kalyan Kumar)
Conservator of Forests,
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Principal Chief Conservator of Forests
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(Abhishek Krishna)
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Nagpur



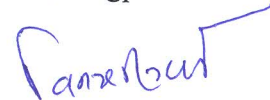
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Adl. Principal Chief Conservator of Forests,
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