



Government of Maharashtra

The Working Plan of Gondia Forest Division (Nagpur Circle)

Volume - I

2013-14 to 2022-23

By

**Shri T.K.Choubey, IFS
Chief Conservator of Forests
Working Plan, Nagpur,
Civil Lines, Nagpur 440 001**



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of
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सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण एवं वन मंत्रालय
MINISTRY OF ENVIRONMENT & FORESTS

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No. : 12-56/98 (FOR)/ 597,

Dated : 09-4-2013,

To,

The Principal Secretary,
Revenue and Forest Department,
Mantralaya,
MUMBAI

Sub : **Working Plan proposal for Gondia Forest Division, written by Shri T. K Choubey, IFS for the period of 2013-14 to 2022-23.**

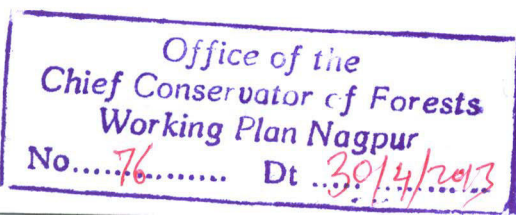
Ref : Revenue and Forests Deptt., Government of Maharashtra letter No. FDM 2013/C.R. 68/F-2, dated 12.02.2013.

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 2013-14 to 2022-23.
- (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 Inter Locutory 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 state government of Maharashtra shall ensure that regeneration of forests is commensurate with fellings 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 fellings. 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

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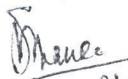


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(2)

- (6) 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 fellings. Instruction/directions of the Central Government in the matter to be issued in future 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) No selection felling shall be carried out in Improvement Working Circle.
- (9) Prescriptions of microplans for JFM (if made) should not deviate 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/following 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 by the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out of turn plantations 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 that approved in previous working plan.
- (15) In the vicinity of Nalas and waterbodies felling shall not be undertaken.
- (16) Felling shall not be undertaken near the known resting places of wild animals.
- (17) Thinning of dead, dying 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, dying and diseased trees and for granting of right and concession as well as all illicit felling should be complied 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 with in two months of the end of control year in a proforma, to be designed by the C.F., Working plan for this purpose. Such removal shall be accounted for against the prescribed felling yield of the relevant year.

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02/01/13

(3)

- (19) To ensure sustainable management of Non Timber Forest produce, 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) A definite plan has to be made to remove encroachment and plant the vacated area by planting suitable local species.
- (22) 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.
- (23) Demarcation and consolidation of Forest Boundaries will be done adequately.
- (24) 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 Forests (Central)

Copy to :

1. The Additional Director General of Forests (FC), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003.
2. The Principal Chief Conservator of Forests, Govt. of Maharashtra, Van Bhawan, Nagpur.
3. The Addl. Principal Chief Conservator of Forests, (Working Plan Circle-East), Nagpur
4. The Chief Conservator of Forests, W.P, Nagpur.

(S.K.Bhandari)

Chief Conservator of Forests (Central)

GOVERNMENT OF MAHARASHTRA

No:- FDM -2013/CR.68/F-2

Revenue and Forests Department

Mantralaya, Mumbai-400 032

Date :- 6th June, 2013

**SUBJECT:- APPROVAL OF WORKING PLAN OF GONDIA FOREST
DIVISION WRITTEN BY SHRI. T.K.CHOUBEY, IFS FOR
THE PERIOD OF 2013-14 TO 2022-2023.**

Memorandum:-

The undersigned presents compliments to the Principal Chief Conservator of Forests (Production & Management) Maharashtra State Nagpur and, with reference to his letter no. Desk-14/WP-E/Gondia/1409/2012-13, dated. 31.01.2013 on the above subject, is directed to convey the sanction of Government of Maharashtra to the working plan of GONDIA FOREST DIVISION, Maharashtra State for the period of 2013-14 to 2022-23 prepared by SHRI. T.K.Choubey 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. 12-55/98(FOR)/597, dt.09.04.2013 under certain conditions. These conditions should be strictly followed.

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



(N.M. SHILWANT)

Deputy Secretary

Revenue and Forests Department

Copy to :-

1. Principal Chief Conservator of Forests (Production & Management), Maharashtra State, Nagpur.
2. Additional Principal Chief Conservator of Forests (Working Plan Circle), Pune/ Nagpur
3. Chief Conservator of Forests (T)/(WP), Nagpur.

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FOREWORD

A.S.K. Sinha, IFS,
Additional Principal Chief Conservator of Forests,
(Working Plan-East), Nagpur

The present Working Plan for the Gondia Forest Division, written by Shri T.K. Choubey, IFS, Chief Conservator of Forest, Working Plan, Nagpur, replaces the earlier Working Plan prepared for the area of Gondia Forest Division by Dr. V.K.Sinha, Shri Jarnail Singh & Shri Araakal Ashraf. This is the first Working Plan prepared for the Division by an officer of the rank of Chief Conservator of Forests. All suggestions given at the time of approval of PWPR-I of Gondia division in the State Level Committee held in the month of March 2011 have been incorporated in this Working Plan. The present working plan has taken into consideration the directives of the State Level Committee given in the past as well as the guidelines issued by Government of India for revision of working plan. The Government of India issued detailed guidelines for preparation of Working Plans during 2004 putting emphasis on NTFP, Wildlife Management, JFM and Protection of forests, which have been incorporated in this working plan.

2.00 It excludes the area transferred to Wildlife wing and FDCM Ltd. This working plan also includes Zudpi jungle area, which has been transferred to forest department as land bank for compensatory afforestation. However, no silvicultural treatment has been prescribed for these areas and they have been included in Miscellaneous Working Circle, because they contain crop, which is too young to respond to any such system and further authentic field data in regard to Zudpi jungles is yet to be collected.

3.00 The present working plan highlights the deteriorating condition of forest in the area and expresses concern over lack of natural regeneration due to increasing biotic pressure in the areas adjoining to the villages and other administrative as well as management factors. For well stocked areas, Selection-Cum-Improvement silvicultural system has been adopted. To deal with the problem of increasing number of hollow teak trees, which neither promise any growth in future nor allow younger regeneration to establish, the removal of all hollow trees above 75 cm girth has been prescribed and preferential treatment to the healthy saplings of seed origin has been proposed. As the District of Gondia is rich in water bodies, Protection Working Circle has

been constituted for areas falling in the catchments of these water bodies to reduce the silt load on these water bodies.

4.00 Other highlights of this working plan are very detailed prescriptions for the management of wildlife. The fragmentation of wild life habitat and corridor has been discussed in detail and remedial measures have also been recommended. Besides the chapter on wildlife, the chapters on NTFP, JFM as well as Forest Protection have also been written in detail on the basis of information provided by the DCF Gondia. Adequate measures have been suggested and included in the prescriptions of the working plan for their implementations in these fields.

5.00 GIS digital maps have been generated in Geo-media cell. Village maps were registered for generating maps of protected forests and, in case of reserve forests, survey of India sheets have been used. These digitized maps are stored permanently with the CCF, Working Plan, Nagpur and requisite number of sets will be made available to the division.

6.00 The author of this working plan, Shri T.K.Choubey, IFS and his staff has taken pains in completing the plan of the present Gondia Forest Division in time. I wish to complement Shri T.K.Choubey, Chief Conservator of Forests, Working Plan, Nagpur & the whole team under him for their hard work and sincere efforts, in spite of many major constraints faced by them in respect of shortage of staff and non-availability of data from various agencies.

7.00 Midterm review of the working plan will be taken after five years to assess the appropriateness of the prescriptions and necessary changes in the prescription will be made, if so felt.

8.00 I wish that the working plan is implemented in the same spirit as it has been formulated by the author and it results in sustainable management of forests, which would bring the glorious past of these valuable forests back for the future generations.

Place : Nagpur

Date : 5th November 2012.


(A.S.K. Sinha)

Additional Principal Chief Conservator of Forests,
(Working Plan-East) Nagpur



INTRODUCTION

T.K. Choubey, IFS,
Chief Conservator of Forests,
Working Plan, Nagpur.

This working plan covers the entire Reserved Forests, Protected Forests, Unclassified Forest and Zudpi Jungle, total area covered under this working plan is 1731.785 sq. km. in charge of the Gondia Forest Division, located in the civil territories of Gondia District. This replaces the Working Plan of Dr. V.K.Sinha, Shri Jarnail Singh & Shri Araakal Ashraf for the period 2003-04 to 2012-13. The area, as compared to the previous working plan, is now slightly changed due to the reorganization of the Gondia and Bhandara Forest Divisions & creation of New Navegaon & New Nagzira wildlife sanctuaries.

1. The Preliminary Working Plan Report -I was prepared by Shri Krishna Mohan, IFS, the then Chief Conservator of Forests, Nagpur Circle and was approved by the State level Committee on 22nd March 2011. On the basis of the approved Preliminary Working Plan-I, the Preliminary Working Plan Report -II has been prepared by the undersigned. The final Plan has been prepared after incorporating all the above mentioned suggested by various members and accepted by the committee during the SLC meeting.
2. For revision of this plan and to write up the plan for new areas, the field work was started during the year 2010-11 and it was completed during the year 2011-12 under the supervision of Shri T.K.Choubey, IFS, Chief Conservator of Forests, Working Plan Nagpur. The preparation of this plan was entrusted to me on March 2011 after approval of PWPR-I.
3. The Working Plan for Gondia Forest Division encompasses the ideas of National Forest Policy guidelines of 1988 and therefore lays more emphasis on conservation, preservation and protection of forest, wildlife and environment. In this plan, suggestions given during the discussion on first preliminary working plan report have been incorporated. Besides, new entries have also been made under the guidance of the honorable Principal Chief Conservator of Forests (Production & Management) M.S., Nagpur and the Additional Principal Chief Conservator of Forests, Working Plan-East, Nagpur.

4. Enumeration of forest crop in Gondia Forest Division has been done by the SOFR unit, Amravati. The analysis of the tree enumeration data was done with the help of computer software developed for the data analysis. Stock mapping was done by the staff of Gondia Forest Division. Analyzed enumeration data, stock maps and satellite imagery density data helped in forming the different Working Circles.
5. The major working circles proposed are Selection - Cum - Improvement Working Circle, Improvement Working Circle, Afforestation Working Circle, Protection Working Circle, Non Timber Forest Produce (Overlapping) Working Circle, JFM (Overlapping) Working Circle and Wildlife (Overlapping) Working Circle, which have been prescribed for the better scientific management of the forest areas in order to meet the ever growing demand for large size timber and the small size timber for construction of houses, Agricultural implements, Firewood and Grasses & Fodder requirements as well as conservation of forest & wildlife in the tract. In addition to this, the present working plan also offers greater employment opportunities to the local people in forestry operations.
6. This working plan has for the first time has suggested prescriptions for identification, multiplication and marketing of medicinal plants in the forest areas in order to increase the potential of growth and harvesting of medicinal herbs in the forest areas as well as to provide employment to the local people in the field of marketing of natural herbs and medicines.
7. This working plan has also suggested for establishment of Eco-tourism in the forest areas on the lines of National Policy on Eco-tourism of Govt. of India in order to educate the people and to create awareness among the citizens visiting forest areas about the conservation, preservation and protection of natural resources including wildlife.
8. The management maps and stock maps have been prepared using GIS technology through Geo-media Professional Software and the same will be supplied with this working plan by this office.
9. This plan has been completed in time in spite of major constraints like acute shortage of staff, timely availability of relevant essential information from Gondia Forest Division. In spite of all efforts, including constant persuasion, many important information, like Coupe Control Forms, Compartment History Forms, various types of maps of Gondia Forest Division in respect of RF, PF, Zudpi Jungle, un-classed forests etc., JFM schemes, list of plantations, list of old and new Survey Numbers of the Protected Forests and Zudpi Jungle etc. have not been provided to this office. Had the required information been given in time a better plan could have been prepared and that too much earlier.

10. I am highly grateful to Shri A.K.Joshi, IFS, Principal Chief Conservator of Forests (HoFF), Maharashtra State, Nagpur for giving me a chance to prepare & revise this working plan. I am also thankful to Dr.S.K.Khetrapal, IFS, the Principal Chief Conservator of Forests (Production & Management), Maharashtra State, Nagpur for his kind inspiration and valuable guidance in the preparation & revision of this working plan. I am thankful to him whose encouragement inspired me to think and incorporate innovative ideas in the preparation and revision of this working plan. I express my deep sense of gratitude for valuable guidance and advice given by Shri A.S.K. Sinha, IFS, Additional Principal Chief Conservator of Forests (Working Plan-East) Nagpur.
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14. All the employees & officers of this office were deeply associated with preparation of this working plan and they deserve appreciation for cooperation they extended. They deserve commends and thanks, who worked hard and with great enthusiasm, against all odds to complete this plan.
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Place :- Nagpur.

Dated :- 25th July 2012.



(T.K.Choubey)

Chief Conservator of Forests,
Working Plan, Nagpur

EXECUTIVE SUMMARY OF THE WORKING PLAN

FOR GONDIA FOREST DIVISION.

THE TRACT DEALT WITH

Name and Situation: This Working Plan deals with the Reserved Forests, Protected Forests, the unclassified forests & Zudpi jungle of Gondia Forest Division in Maharashtra. The Division is situated between 20°39' and 21°38' North latitude and 79°50' and 80°41' East longitude. It covers the entire Gondia District. The forest area under the plan is 1731.786 km² including 782.025 km² of the Reserved Forests, 712.70 km² of the Protected Forests and 71.10 km² of the unclassified forests, 0.25 sq.km of private land acquired under F.C. Act 1980 & 219.70 sq km of Zudpi Jungle. These figures exclude the areas allotted to the Forest Development Corporation of Maharashtra Ltd.

Configuration of the ground: The area is generally undulating and hilly with moderate to steep slopes dissected by meandering streams. This area has varied lithology and intricate geological structure. Tropical sub-humid weathering of crystalline metamorphic and igneous rocks has created highly varied soils. Sihar, Morand, Kardi, and Bhardi are important local soil types.

Climate: The climate of the Gondia district is generally hot and dry. Summer (middle of February to middle of June), monsoon (mid-June to October) and winter (November to Mid-February) are three main seasons. The high daytime temperature during April and May becomes rather unbearable due to hot winds and dryness of the atmosphere. The average annual rainfall is about 1200 mm. Major part of the rainfall is obtained from the Southwest monsoons during June to September. Maximum rainfall is received during July and August. Wind is generally light to moderate, but the velocity increases during later part of the summer and the monsoon months. The incidence of frost is uncommon.

Soil :- The Soils of the district are highly varied. The main types of soils are Black, Cankar, Sihar Marad, Kharoli, and Bardi. The other Soils of the district are Kachhar, Marhami & Petari which are found along the river banks.

Water supply: The main rivers passing through the division are Kanhan, Chulband, Garvi and Bagh, which are fed by many small ephemeral tributaries. Scarcity of drinking water during summer is a major problem in many villages.

Distribution and area: The forest area of the Division covering 1731.786 km² can be classified as the Reserved Forests (RF), the Protected Forests (PF) and the unclassified forests, which are groups of all areas other than the first two legal classes. The unclassified forests can be broadly clustered in three sets: (1) traditionally managed by the division, (2) non-forest areas transferred to the division for the compensatory afforestation through the stipulations under the Forest

(Conservation) Act, 1980, and (3) the unoccupied land identified as the Zudpi Jungle and transferred to the division for management and the compensatory afforestation in future.

Distribution of the forest area in ranges of the Gondia Division.

Abstract of Area in Gondia Forest Division										
S.N.	Name of Range	(RF, NRF , PF, Gose PF, Jh.J. & Unclass Forest)							Private land taken over as a Compensatory land under F.C.A. 1980	Total Area in ha.
		RF	NRF	PF	Gose PF	Grand Total (RF+NRF+P F) 3+4+5+6	Jh.J.	Unclassed Forest		
		Area in ha.	Area in ha.	Area in ha.	Area in ha.	Area in ha.	Area in ha.			
1	2	3	4	5	6	7	8	9	10	11
1	Tiroda	1194.632	1168.938	3345.387	97.000	5805.957	2147.500	0.000	0.000	7953.457
2	Gondia	0.000	1267.571	4175.196	803.100	6245.867	3338.820	0.000	0.000	9584.687
3	Goregaon	0.000	1947.033	6705.087	297.500	8949.620	1584.680	2319.499	2.610	12856.409
4	Amgaon	0.000	579.100	2718.594	320.000	3617.694	2520.860	127.592	0.000	6266.146
5	Salekasa	0.000	4206.770	5360.421	71.000	9638.191	4691.250	1069.603	8.140	15407.184
6	North Deori	0.000	3225.920	8040.656	408.360	11674.936	2103.040	1011.047	4.980	14794.003
7	South Deori	0.000	5085.400	6482.541	173.150	11741.091	378.740	0.000	9.420	12129.251
8	Chichgarh	0.000	12412.290	10196.367	56.850	22665.507	800.890	53.454	0.000	23519.851
9	Sadak Arjuni	2627.538	4487.324	8460.843	304.000	15879.705	1771.780	964.453	0.000	18615.938
10	Nawegaonbandh	6176.484	4435.423	4569.820	282.350	15464.077	1014.500	182.551	0.000	16661.128
11	Gothangaon	8694.920	2423.180	3694.401	58.000	14870.501	1228.740	1381.879	0.000	17481.120
12	Arjuni Mor	9468.170	3401.890	4525.662	124.300	17520.022	389.400	0.000	0.000	17909.422
Grand Total		28161.744	44640.839	68274.975	2995.610	144073.168	21970.200	7110.078	25.150	173178.596

State of boundaries: The Reserved Forest boundaries in the Forest Blocks are generally in better conditions. The rest of forest boundaries need thorough review. The boundary TCM (Trench-cum-mound fencing) dug up in the late 1980's under the Employment Guarantee Scheme often leave out bands of the forest area. A systematic survey and demarcation with assistance of the Land Records Department is urgently required to ensure that the forests are not encroached upon and lost.

Rights and concessions in the Reserved Forests: All rights have been extinguished in the Reserved Forests. However the state governments have admitted some concessions like cattle grazing and firewood collection to the villagers from time to time.

Rights and concessions in the Protected Forests: The access to the Protected Forests is governed by the Vidarbha Protected Forest Rules and provisions of the Nistar Patrak prepared during 1954-56 after conducting the Nistar enquiry in villages. The Nistar generally includes poles for agricultural implements, cattle sheds, firewood, bamboo, thatching grass, fodder grass, fencing material, bark, fibre and *paidawar* in edible fruits, flowers, roots, honey, wax, etc. Items and quantity of the produce permitted in the Nistar Patraks vary within a narrow range.

THE FORESTS

The forests of the Gondia division belong to the Subgroup 5A – Tropical Dry Deciduous Forests of Champion and Seth's classification. Edaphic factors, topography and past management cause local variations. Garari (*Cleistanthus collinus*) is the most common species in the middle storey in the forest.

Forest types in the Gondia Division (*Champion and Seth's classification*)

Type Notation	Classification	Type description
Group 5		Tropical Dry Deciduous Forests
Sub-group 5 A		Southern Tropical Dry Deciduous Forests.
Climate types	5A/ci	Dry teak bearing forests
	5A/cia	Very dry teak forest
	5A/cib	Dry teak forest.
	5A/c3	Southern dry mixed deciduous forests
Local subtypes		1. Superior Quality Mixed Forests 2. Medium Quality Mixed Forests 3. Poor Quality Mixed Forests
Primary serial type	5/1s1	Dry tropical riverain forest

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. The Forest of Gondia Division is susceptible to injuries from the following:

- **Grazing:** Grazing Pressure is acute due to large number of cattle present in this tract. The forests adjoining the villages face severe grazing pressure due to concentrated grazing by cattle including large number of goat and sheep. Over grazing is leading to destruction of ground flora, specially the regeneration of valuable spp. Like Bija, Shisham, Shivan etc. At the same time the soil has also been deteriorated due to compaction and erosion. The loss of various herbs and shrubs are not accounted for.
- **Forest Fire:** Regular Annual Fires are also highly destructive factor for the flora and fauna of the tract.
- **Illicit Felling:** Illicit cutting of trees for local and commercial consumptions and for encroachments upon the forest land is another important factor adversely affecting the forests of the division.
- **Encroachment:** Encroachment upon Forest land is considerably high and as per records, a total of 396.87 ha of Forest Land is under encroachment.

- **Drought** is seldom felt. **Frost** never reported in the area. **Diseases** reported are not so epidemic. Drought, Frost, insects, pests and parasites have little impact on the health of these Forests.

The injuries to the forest can be minimized by strictly implementing all the prescriptions of the plans.

UTILISATION :-

Agriculture customs and wants of people: The Gondia Division falls in the Gondia District. The estimated population of the District is about one million. About 62% of the population live in the rural areas. The scheduled castes and the scheduled tribes make 17% and 14%, respectively, of the population. The 2011 cattle census estimated 13.26 Lakhs of the domestic animals in the district. Cows and bullocks make half, and buffaloes contribute about 14% of the domestic animals. Sheep and goats account for nearly one-fourth of such animals. Forests play very important role in the daily life of local population. They depend on forests for timber, poles, firewood, bamboo, fodder, grass, fruits as well as a number of non-wood forest produce for household consumption and sale.

Forest- related occupation: Local artisans called Burads make their living by making baskets, mats, dholis, etc. from bamboos. They sell most of their products locally. Local people get gainful employment during Tendu leaf collection season from the last week of April to mid-June. Gondia is also a major centre of the *bidi* manufacturing. The division has 48 sawmills. Large number of furniture shops exists in urban as well as rural areas of the division. Arjun plantations in some areas of the division were under the *tussar cultivation*, but such activities are not permitted at present for want of proper authorisation. The forest is suitable for *lac* cultivation mainly on the Palas trees. Villagers living near forests collect a variety of non-wood forest produce such as *Moha flowers, Moha fruits, charoli seeds, gum, honey, etc.* for their household consumption and sale.

Markets and marketable produce: These forests are rich in valuable timber like Teak, Bija, Saja, Surya and Dhaora. Dongargaon and Nawegaon are main timber depots of the division. Firewood is also sold in public auction at the permanent or the temporary depots at Deori, Chichgarh, Kohmara, etc. Nawegaon is also a major bamboo depot. However, bamboo is also auctioned in temporary depots at Chichgad, Salekasa, etc. Gondia, Nawegaon, Lakhandur, Sakoli, Bhandara, Nagpur and Raipur are main timber markets in the region. The division is known for its bamboo production, but the productive bamboo areas are shrinking. The division has about 29 Tendu units yielding about 50400 standard bags fetching more than three crores rupees as revenue.

Lines of export: The division has excellent road and rail connections, and therefore, timber and other forest produce can be conveniently transported to any part of the country. The division falls on the major Mumbai–Howrah broad gauge rail route. Gondia–Chandrapur line passes through Rajoli and Pratapgarh ranges. A network of forest roads criss-crosses the division. Many of these roads have been upgraded to tar roads and are being maintained by the Public Works Department and the Zilla Parishad. The division maintains the remaining forest roads according to the requirement and availability of funds.

Method of exploitation and cost: The coupe harvesting is carried out either through the registered Forest Labourer Co-operative Societies (FLCS) or directly engaging local villagers by the local staff.

STAFF AND MANPOWER AVAILABILITY

Staff: The Division consists of 62 rounds and 297 beats. The division has sanctioned posts of twenty three gazetted officers including five temporary posts. Among the 1014 non-gazetted officials, 130 posts are temporary. Number of sanctioned Foresters' and the Forest Guards' posts are 74 and 333 respectively.

Manpower: There is usually no difficulty in procuring manpower for the forestry works. Exceptions are the months July, August and November, when paddy is transplanted or harvested. In drought years, there is usually demand for additional forestry works to provide employment opportunities.

PAST SYSTEMS OF MANAGEMENT

While the Reserved forests are managed under the working plans since 1897, the ex-proprietary Forests were brought under scientific management at a much later stage. Early reservation period from 1879 to 1897 was of limited activities. The working plan for the Reserved Forests of the old Pratapgarh Range (1897–1910) was the first working plan for the Gondia Division. The authors of the successive four working plans for the combined Bhandara and Gondia Divisions are J. W. West (for 1910–1930), Chadha (for 1930–1940), Jagdamba Prasad (for 1940–1957) and Trivedi (for 1957–1977). The last working plan prepared by M.G.Sardar, P.J.Gurjar and S.G.Joshi for the period of 1981-82 to 1995-96 covered the entire Reserved Forests including all the Forest Blocks of the Gondia Division and area reserved in 1977-1978.

Extensive forest areas of the present Gondia Division was under the ownership and control of the Zamindars (Proprietors), who used to sell the forest produce in irregular manner. Only the Darekasa Zamindari forests had some sort of working plan. Local villagers were allowed to extract the forest produce for their requirement or graze their cattle on payment in kind or cash. Soon after the independence, the Zamindars indulged in unsystematic and extensive felling in their forests accelerating the process of forest degradation and the forest loss.

The proprietary rights were abolished in 1951. Most of the areas under forests were transferred to the Forest Department during the period from 1951 to 1954 to management the forest resources. The Mahala's Working Scheme was the first plan for 1310.73 km² of the Protected Forests (767.64 km² of the old *Fazil* Forests and 534.09 km² of the old *Dochand* Forests). Almost all the ex-proprietary forests under the management of the Forest Department were declared as the Protected Forests during 1950's. Benakatti had prepared two separate working schemes for the ex-*Fazil* and the ex-*Dochand* forests. The working scheme for the old *Dochand* Forests did not receive the approval of the state government, and these Forests remained un-worked. His working scheme for the old *Fazil Forests* excluding the areas under the Bagh and the Itiadoh Projects and covering 890.94 km² forest area was for ten years till 1972, but later extended till 1979-80.

GROWTH OF TEAK

Exercise of Stem analysis was carried out recently in the Tiroda Range of Gondia Division by the Nagpur Working Plan Division while preparing the working plan of Bhandara Division to calculate the growth and yield of teak and some other important species.

STOCK MAPPING

The stock mapping in Gondia Forest Division have been done by territorial staff of the division by traditional procedure. The satellite imageries were also used to classify the forest patches according to density as revealed in the NDVI mapping. The line-plot sampling data were used as supplementary information for preparation of stock maps.

ENUMERATION

The Forest Resources Survey Unit, Amravati carried out the tree enumeration in 0.36-hectare (60 metre x 60 metre) plots and the regeneration survey in 0.04-hectare (20 metre x 20 metre) sub-plots. The systematic line plot sampling was done at the intersections of 600-meter grid. The Forest Inventory Management System was used for analysis.

DIGITAL DATABASE

The GIS Cell of this office has prepared a comprehensive digital database in the GIS (Geographical Information System) environment for the Gondia division. However, 3029.22 hectares of Protected Forests and 740.15 hectares of Unclassified forests as well as 21970.20 ha of Zudpi Jungle could not be incorporated for want of proper maps. Hence, the database updating and correction must continue to ensure accurate boundary representation. Glaring errors in the old maps and records were corrected.

WILDLIFE CONSERVATION

- The division has a fairly good distribution of wildlife spread all over the division except near the habitations. The best sighting is along boundaries of the Navegaon National

Park and the Nagzira Wildlife Sanctuary. Panther, Tiger, Jackal, Jungle cat and Hyaena are also common carnivores. Nilgai, Sambhar, Cheetal and Gaur are large herbivore mammals. The tract has large avifauna. Migratory birds are found near tanks during the season.

- Hunting in the forests was regulated through the hunting licenses issued for specific shooting blocks. Presently, the law does not permit sport hunting of wild animals. The wildlife is threatened by habitat damage` caused by factors like increasing human and cattle population, encroachment for cultivation, fire, communicable diseases and poaching facilitated by the improved road network and efficient weapons. Cattle kill by the wild animals is also common.

SUMMARY OF PRESCRIPTIONS

TREATMENT PRESCRIBED.

Existing protection forests will be preserved and augmented, and the habitat management for wildlife conservation will receive the highest priority. Prescribed soil and moisture conservation works should improve moisture regime and prevent soil erosion. A time-bound programme of the boundary demarcation should ensure territorial integrity of forests. Utilisation of forest areas diverted for non-forestry use shall be reviewed periodically to ensure that the areas are used for the intended purpose, and their use contribute to the sustainable conservation. Natural regeneration and rootstock management will be preferred to plantations, which will be used as the supplementary activity. Sustainable production of the Non-Wood Forest Produce (NWFP) will be encouraged. Timber, if otherwise available, will be harvested from dense tree forests capable of producing large timber on sustained basis. Open forest areas and traditional pasture forests will be managed with active participation of tribal and village communities for meeting local domestic needs.

WORKING CIRCLE & THEIR DISTRIBUTION

The crop analysis is based on the species and tree girth distribution in the enumeration data and the density distribution in the satellite imageries. Prescriptions are primarily based on the site conditions expressed in the treatment types, while the working circle allocation is a suggestive factor showing dominance of the treatment type.

Areas susceptible to high erosion and falling in the catchments of large water bodies are included in the Protection Working Circles. Compartments or part thereof under the non-forest use, forest nurseries or other special purposes are covered under the Miscellaneous Working Circles (MWC). Compartments having sufficiently dense forests and mature trees suitable for harvesting are allotted to the Selection-cum-improvement Working Circles (SCI) for wood production, and areas having pole crop & deficient in mature trees are assigned to the

Improvement Working Circles (IWC) for tending the crop. The Afforestation Working Circle (AWC) has small isolated forest patches, areas of sparse tree crops or dense shrubby growth, and open areas without tree growth, and is expected to respond to tending, protection and tree plantation. The emphasise, however, will continue on tending of existing natural regeneration & rootstock. Compartments having more than 5 bamboo clumps per ha are included in the Bamboo (Overlapping) Working Circle (BMB)

S.N.	Working Circle	RF (in ha)	PF + Gose PF (in ha)	Un. Cl. Forest (in ha)	Zudpi Jungle (in ha)	Acquired Private Land (in ha)	Total Area (in ha)	%
1	SCI WC.	39071.399	23016.182	1308.857	0	0	63396.438	36.60
2	IWC	14446.81	7829.72	450.658	0	0	22727.188	13.12
3	Afforestation WC.	6092.154	29262.693	1777.577	0	0	37132.424	21.44
4	Misc. WC	5036.953	7553.479	3572.986	21970.2	25.15	38158.768	22.05
5	Protection WC	8155.267	3608.511	0	0	0	11763.778	6.79
Total Area		86185.98	72802.583	71270.585	7110.078	21970.2	25.15	173178.596
6	Wildlife (OL) WC						Entire Area	
7	Bamboo (OL) WC						34253.987	
8	NTFP (OL) WC							
9	JFM (OL) WC							
10	OTP (OL) WC						Entire Area	

* The Zudupi Jungle and compensatory afforestation areas have been assigned one notional compartment number for each village, and the detailed numbering will be done later.

PERIOD OF THE PLAN

This plan will be implemented for ten years from the year of approval.

DEMARCATIION, MARKING AND TREATMENT TYPES.

The annual coupes will be demarcated one year in advance, and the treatment map will be prepared using the GIS maps as the compartments base maps. Following types of the treatment areas will be identified:

Treatment types for annual coupe operations

Treatment areas	Symbol	Characteristics	Minimum patch size
Protection area	A1 A2 A3	Area having more than 25 degree slope 20 meter wide strip on both sides of streams Area susceptible to excessive erosion	Any size
Open forests	B1 B2	Open forests (density < 0.4) with adequate NR & rootstock Open forests (density < 0.4) without adequate	5 ha

Treatment areas	Symbol	Characteristics	Minimum patch size
		NR & rootstock	
Pole Crop and old plantations	C	Pole crop of the identified valuable species and old plantations; suitable for retention as future crop, having density 0.4 or more. Old and dense teak plantations.	1 ha
Well-stocked area	D	Areas having density 0.4 and over & having matured trees.	5 ha

The treatment maps should also show adequate regeneration areas in the D-type; and areas suitable for planting bamboo, teak and mixed species in the B2- type. Natural regeneration would be considered adequate if at least 400 saplings per hectare are present. The same criteria will be applied for the rootstock, and used for defining the B1-type. Old and dense teak plantations will be included in the C-type. Scheduled cleaning and thinning operations are expected in such areas. The sixth-year cleaning and eleventh year thinning operations have been prescribed in such areas.

Selection-Cum Improvement Working Circle: Selection-cum Improvement Working Circle consists of Forest Areas to the tune of 63396.428 ha which is 36.60 % of the total plan area. Forest areas with matured crop and capable of producing large sized timber has been included in this Working Circle. The special objects of management are.

1. To gradually convert stunted coppice crop, of valuable species, with reduced coppicing vigor in to high forest.
2. To obtain sustained supply of medium to large sized Timber and poles.
3. To maintain mixed forest composition & high forest of the forest crop and improve the density of the stocking.
4. To increase the proportion of Teak and other valuable miscellaneous trees species in the crop.
5. To improve the productivity of Bamboo.
6. To improve the biological diversity and habitat for the wildlife.

Felling cycle, Felling Series, Harvestable Girth etc. are as follow:

Felling cycle = 20 years.

Number of felling series are 31 and average area of the coupes is 102.25 ha.

Selection Girth:

For Group -1 Species Teak

Site quality III - 135 cm.

Site quality IV - 120 cm.

For group II Species (Ain, Bija, Haldu, Kalam)

Site quality III - 135 cm.

Site quality IV - 120 cm.

For group III Species (Dhaoda, Tiwas, Surya etc.)

Site quality IV - 90 cm.

For group IV species (Garadi, Lendia)

Site quality IV - 45 cm.

Yield calculation was done, based on the stem analysis work, carried out by the Chief Conservator of Forest, Working Plan, Nagpur. **F.D.Liocourt's** method of calculation of yield in all aged forest for selection felling of silviculturally available trees, has been adopted. 50% of the available trees are proposed to be removed and thus marked for felling. The annual yield will be approximately 5128.77 cum. The annual yield per ha is estimated to be 0.0809 cum, which is less than estimated yield of previous plan. The main reason for the reduction in the yield is due to the transfer of best forest areas to FDCM Ltd & to New Navegaon wildlife sanctuary.

Coupes will be demarcated & marking of trees will be followed. Coupes will be demarcated and treatment map will be prepared classifying the areas in categories A, B, C & D. **A-Type** is protection area and no marking for felling will be done. SMC works, seed sowing and stake planting is recommended. Planting of suitable spp. may be taken if necessary.

B-Type area is under stocked, having crown density below 0.4. No selective marking will be done, only dead and malformed trees will be marked for felling. All seedlings and saplings of valuable species of seed origin more than 60 cm in height will be treated at par with planted seedlings inside the plantation area. SMC works will be carried out. Natural Regeneration will be augmented and seedlings of seed origin will be given preference over coppice. Area without NR will be regenerated artificially with choice species. Teak should not be more than 50%.

C-Type area consists of young crop. These areas will be thinned as per rules to provide sufficient growing space to the young crop for proper growth.

D-Type area consists of forests with crown density more than 0.4. Selection felling will be followed for harvesting. No fruit and NTFP bearing trees will be marked for felling. 1st. & 2nd. due coupes for operation will be marked in the first year of operation. Coupe will be marked one year in advance and followed by felling in the next year. SMC works will also be carried out with marking work and will be completed by the onset of monsoon. Regeneration will be achieved by tending of NR. Natural seedling will be treated & tended. Cut back operation in the following year and cleaning in 6th year of the main working year to be carried out. Regeneration

with artificial means will be carried out if it is necessary. Thinning will be carried out in the 11th year.

Improvement Working Circle: Improvement Working Circle consists of forest areas to the tune of 22737.188 ha which is 13.12 % of the total plan area. The special objects of management are:

1. To improve the existing crops & nursing back these forests to normalcy by carrying out improvement felling in favour of desired species and tending of natural regeneration and supplementary plantations of valuable species.
2. To check soil erosion and conserve soil moisture.
3. To provide small timber, poles & firewood to meet the bona fide needs of the local people, besides improving the young crop.
4. To improve the quality of Wildlife habitat.

Felling cycle will be 20 years; number of felling series will be 12. Average area of the coupes is 94.75 ha. No selection girth prescribed as only improvement felling will be carried out to remove dead and malformed trees. Regeneration will be carried out by Natural Regeneration and if required, supplemented with Artificial Regeneration.

Afforestation Working Circle: The Afforestation Working Circle consists of forest area to the tune of 37132.424 ha which is 21.44 % of the total plan area. The special objects of management are:

1. To restore the vegetative cover of the degraded & open areas and to increase its' productivity.
2. To check the loss of top soil and to increase the water absorption capacity of the soil.
3. To meet the local demand of fuel wood, small timber & poles.
4. To improve the quality of the forest by favouring the valuable species.
5. To restore the habitat of the local wild animals and birds

Felling cycle will be 20 years. Number of felling series will be 19 with an average coupe area of 97.71 ha. No felling is prescribed in these areas except the dead, damaged, malformed and live high stumps. Soil & moisture conservation works; plantations of valuable miscellaneous species. Plantation of Teak will also be carried out, only if suitable areas are available for Teak plantation. While tending the Natural Regeneration, seedlings of seed origin will be given preference over coppice. Involvement of local communities would be an integral component of all the activities.

Protection Working Circle: This working circle consists of forest area to the tune of 11763.778 ha which is 6.79 % of the total plan area. Considering the number of water bodies in the district and importance of water supply to the local people, this working circle has been formed in the

Gondia division. The majority of the areas of all the major, medium & minor irrigation projects of Gondia division, having catchment area in the forest, have been included in this working circle. The special objects of management are:

1. To preserve and increase the vegetal cover & to help check the soil erosion and to arrest the runoff
2. To protect the fragile forest sites and to prevent the siltation of the dams and water bodies.
3. To conserve the bio-diversity and develop a suitable habitat for the wild animals and birds including the migratory birds.

Total 5 felling series (Felling Series) with an average area of 117.63 ha /coupe has been formed. The working circle consists of areas directly draining into the water body. No harvesting except dead trees removal is prescribed. Thinning is proposed in the congested pole crops if necessary. Silvicultural system is proposed on the pattern of watershed management in the areas. Soil and moisture conservation works along with the afforestation is proposed in the erosion prone areas, to prevent further soil erosion and siltation of reservoirs.

Valuable species for retention: Order of priority among desirable species will be Tiwas, Shisham, Haldu, Teak, Bija, Saja, Karam, Khair, Sewan, Kasai, Dhaora, Bhirra, Rohan, Mowai, Salai, Surya, Mokha, Dhaman, Bhilawa, Chichwa, Bhorsal, Lendia and Garari. Choice of species for plantations is described separately.

Choice of species for plantations: Valuable local species suitable for the site and favoured by the local village communities will be preferred in plantations. Teak, Shisham, Khair, Siwan, Siras, Chichwa, Aonla, Chinch, Neem and Sitaphal should be considered among the recommended species. Neem, Khair, Aonla, Chinch, Chichwa, Karanj, Siras and Sitaphal may be preferred in areas close to habitation. *Dabergia sissoo* (Sissoo) and *Euclayptus* are not local species, but may be used on suitable alluvial soil. Seedlings of edible fruit-yielding forest species may constitute up to one-fifth and seedlings of medicinal plants up to five percent of the stock. Two stakes per hectare of suitable species such as *Ficus* spp. should also be used in plantations. An officer not below the rank of Assistant Conservator of Forests should approve the final choice of species and source nurseries.

Spacing in plantations: Teak stumps from root-shoot cuttings should be planted on well-drained and suitably open sites. Teak seedlings in poly-pots or root trainer containers can be used in exceptional cases to be justified in the registers for the plantations. Teak stump and the mixed species plantations should be carried out at three-meter interval (3x3-meter spacing), and bamboo seedlings should be planted at six-meter interval (6x6-meter spacing).

Growing space for planted seedlings: Care should be taken to avoid planting of seedlings directly under the canopy of existing trees or established saplings.

Fencing: TCM, live-hedge and other mechanical fencing have been prescribed.

Pit digging: Cubic pits dug up will be of 30-cm sides for planting seedlings of non-teak species and 45 cm sides for bamboo planting.

First year operations: Two scrape weeding in July and August as well as soil working and mulching in October and January is prescribed in the first year. Stone mulching is prescribed in Bamboo plantation in place of the soil working.

Second year operations: The scrape weeding in August and the soil working and mulching in October are prescribed. Maintenance of the stone mulching will replace soil working in the bamboo plantations.

Third year operations: One weeding in the third year should be done along with the soil mulching in September. The weeding in bamboo plantations should include removal of stone mulch.

Cleaning in the sixth year of plantation as well as during the 6th year of main felling has been prescribed.

Thinning: Thinning will be carried out in the eleventh-year of coupe working & in the 11th year of plantation, if required.

Cleaning and Thinning of old plantations: Cleaning and thinning in the young plantation will be carried out during the sixth and eleventh year, respectively, of plantations. Thinning in the dense teak plantations has been prescribed to be carried out in the interval of five years after 10th year of formation.

PRESCRIPTION FOR BAMBOO HARVESTING.

Clump as units: Each clump is an independent entity for the treatment.

Harvestable clump size: No clump should be considered fit for harvesting unless it contains more than 12 (twelve) culms of one year or of older in age.

Immature culms: All current year and the 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 eight, must be retained to provide support to the younger culms.

Restriction on irregular harvesting: The conditions for the irregular harvesting have been prescribed.

Wildlife (Overlapping) Working Circle: This is an overlapping working circle consisting of whole area of the Gondia Forest Division. The forests of Gondia Forest Division is extremely important from wildlife management point of view, as it can act as corridor between important protected areas like Pench, Kanha, Nagzira, Navegaon and Tadoba. Exclusive areas from the point of wildlife management like corridor and additional space for the wild life from Nagzira WLS, Navegaon National Park, New Nagzira WLS, New Navegaon WLS and Tadoba-Andhari Tiger Reserve are identified. The prescriptions given in the chapter of wildlife (overlapping) working circle relating to wildlife conservation; scientific management of wild life in the managed forest by undertaking measures like habitat management (waterhole development and planting of suitable fodder spp. etc.), protection of ecologically sensitive and special habitat sites, compilation of wild life and rare spp. related database. Besides these, proper actions to be taken to protect the wild animals from various deceases and poaching. Action also will be taken to control the illegal trade in wild animal and animal articles in and around the Bhandara city. Large scale 'Awareness Programmes' will be carried out among the local people to develop a better understanding about wild life and its management and to minimize the man animal conflicts.

Bamboo (Overlapping) Working Circle:-Total bamboo bearing area admeasuring 34253.987 ha in 149 compartments has been proposed to be worked under this working circle. 14 felling series with 3 years of cutting cycle have been proposed. The average coupe area is 815.57 ha. The area is to be worked departmentally to improve the clumps and at the same time meet the requirement of the local people.

Non Timber Forest Produce (Overlapping) Working Circle: Sustainable management of the marketable NTFPs and reasonable returns to the villagers especially the tribal communities are objectives of management for this working circle. There are many NTFPs like Mahua flower, Mahua seed, Kullu, Dhaoda & Salai gums, Charoli, Myrabolon (Hirda, Beheda, Aonla), honey, lac, Kosa (Tassar) Palas leaves, grasses etc. are the main NTFP of the area. Besides these there are many medicinal plants also found in Gondia Forest Division. A list of the plants has been prepared by the staff of the office of Chief Conservator of Forests, Working Plan, Nagpur, with the help of the local people of Gondia Forest Division. Developing a data base and techniques of non-destructive harvesting of these NTFP and medicinal plants is the main objective of management. JFM committees are to be encouraged in this regards. The technical knowhow for the harvesting and value addition is to be provided to the people, through proper trainings and workshops of the concerned villages and disposal of these produce will be done as per the recently enacted act i.e. 'The Scheduled Tribes and Other Traditional Forest Dwellers

(Recognition of Forest Rights), Act 2006 and its Rules,' or as decided by the competent authority.

Since legal provisions are not very explicit, it is recommended that treatments prescribed be modified according to the legal directives issued by the state government from time to time.

Joint Forest Management (Overlapping) Working circle: It is a mandatory chapter added to encourage the people's participation in forest management. Poverty and illiteracy are the main obstacles in formation of the JFM committees, eviction of encroachments are also working as obstacle for success of JFM. But few successful JFM results will eliminate these obstacles from the tract. The department will continue to work for promoting JFM. All the micro plans prepared under the JFM scheme, will be in conformation to the silvicultural prescriptions for the area recommended in this plan.

This working circle would endeavour to generate and sustain the participatory forest management through the JFM program. Instead of considering JFM program as a scheme, it should be considered as the approach of forest administration. Its participatory approach should be widely applied even at places, where formal JFM committees have not been constituted.

The forest areas under Afforestation Working Circle are the potential JFM areas. Similarly, areas of the Miscellaneous Working Circle found suitable for the afforestation prescriptions should also be covered under the JFM Program. Forest under the Improvement and the Selection Working Circles can be included in the JFM areas in exceptional circumstances.

MISCELLANEOUS WORKING CIRCLE

The Miscellaneous Working Circle (MIS) covers all the forest areas not included in any other working circles. Stress will remain on the database preparation. Areas diverted for the compensatory afforestation, or otherwise, will be treated according to the prescriptions of the Afforestation Working Circle.

MISCELLANEOUS REGULATION

Demarcation and Protection: 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.

The gaps in the land records such as incomplete disforestation maps or unavailability of the authentic forest maps should be closed as soon as possible.

Demarcation of the external forest boundaries: The entire area shall be tackled during the ten-year plan period. The external boundaries will be demarcated with cement-concrete pillars or

stone slabs at bends and corners of the artificial boundaries immediately after the boundary survey.

Demarcation of the internal forest boundaries: Internal boundaries between compartments or those between the Reserved 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 to the protection staff.

DEVIATION, CONTROL & RECORDS. :

Procedure for preparation and processing of deviation proposal has been prescribed, which should be strictly followed. To monitor and control the various operations Control Forms, Maps and other permanent Records have been prescribed.

ABBREVIATION USED IN THE PLAN.

Aff.W.C	Afforestation working Circle.
A.C.F.	Assistant Conservator of Forests.
b.h.	Breast height.
C.A.I.	Current Annual Increment.
C.A.	Compensatory Afforestation
cm.	Centimeter.
cm³	Cubic centimeter.
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
E.G.S.	Employment Guarantee Scheme
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
GIB	Great Indian Bustard
g.b.h.	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.
IGF	Inspector General of Forests.
IWC	Improvement Working Circle
JFM	Joint Forest Management
km.	Kilometer.
m.	Metre.
mm.	Millimeter.
M.A.I.	Mean Annual Increment.
M.F.P.	Minor Forest Produce.
MISC.	Miscellaneous
NGO	Non Government Organization
NTFP	Non-Timber Forest Produce
PA.	Protected Area (Wildlife)

P.B.	Periodic Block.
P&CAM	Protection & Catchment Area Management
P.F.	Protected Forests.
P.P.O.	Pre Planting Operations.
R.F.	Reserved Forests.
R.F.O.	Range Forest Officer.
Rs.	Rupees.
SCI	Selection-Cum-Improvement
Sq.	Square.
S.Y.O.	Second Year Operations.
T.Y.O.	Third Year Operations.
W.C.	Working Circle.
WL	Wildlife

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>Khasara No.</i>	Serial number given to any portion of land entered in land records
<i>Khories</i>	Valleys in between two hills or hillocks.
<i>Malguzari</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
<i>Nistar Patrak</i>	Record of rights on Government Land.
<i>Occupational...</i>	The Nistar granted to village Craftman i.e. Mahars, blacksmiths,

<i>Nistar</i>	Chamars etc. at concessional rates for purposes of their craft.
<i>Paidawar</i>	Wild edible flowers, fruits or roots.
<i>Patwari.</i>	Village officer (Subordinate of Revenue Department).
<i>P.C. No.</i>	Patwari Circle Number.
<i>Pucca</i>	Permanent construction.
<i>Pulla</i>	Bundles of cut grass.
<i>Rabi</i>	Winter crop.
<i>Rahadari</i>	Transit.
<i>Raiyatwari</i>	A form of land tenure, applied to land in Raiyatwari tenure and to villagers.
<i>Regur</i>	Black cotton soil.
<i>Rith</i>	A deserted village site
<i>Tatta</i>	A bamboo mat.
<i>UF</i>	Unclassified Forest
<i>Wazib-ul-arz</i>	Village record of customs and rights
<i>Jh.J.</i>	Jhudpi Jungle

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

Local Name	Botanical Name	Family
A. Trees		
Amaltas/Bahawa	<u>Cassia fistula</u> , (L.)	Caesalpiniaceae
Apta / Kachnar	<u>Bauhinia racemosa</u> , (Lamk.)	Caesalpiniaceae
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.)	Mimosaseae
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	Mimosaseae
Chinch/Imli	<u>Tamarindus indica</u> ,(L.)	Caesalpiniaceae
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>Soymida febrifuga</u> (A.Juss.)	Meliaceae
Sag/Sagwan/Teak	<u>Tectona grandis</u> , (L.F.)	Verbenaceae
Saja/Ain	<u>Terminalia tomentosa</u> , W & A	Combretaceae

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

B. Shrubs

Aal	<i>Morinda citrifolia</i> , (Linn.)	Rubiaceae
Adulsa	<i>Adhatoda zeylanica</i>	Acanthaceae
Ardanda	<i>Caparis zeylanica</i>	Capparaceae
Bharati	<i>Maytenus emarginata</i> , (Wild)	Celastraceae
Bhawarmal/ Bain Champa	<i>Hamiltonia suaveolens</i> , (Roxb.)	Rubiaceae
Dekamali	<i>Gardenia gummiifera</i> (L.F.)	Rubiaceae
Dudhi/Kalakuda	<i>Wrightia tinctoria</i> , (Roxb)	Apocynaceae
Gautri/Gaturli	<i>Grewia hirsuta</i> (Vahl, symb.)	Tiliaceae
Ghaneri/Ulta	<i>Lantana camara</i> , (Linn.)	Verbenaceae
Gudvel	<i>Tinospora cordifolia</i>	Menispermaceae
Isharmul/saapsan	<i>Aristolochia indica</i>	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	<i>Atylosia scarabaeoides</i> , (L.)	Fabaceae
Isapghol/Aspghol	<i>Plantago ovata</i>	Plantaginaceae

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

D. Bamboos and Grasses

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

Sheda	<i>Sehima nervosum</i> (Rottl.)	Poaceae/(Gramineae)
Tikhadi	<i>Cymbopogon martinii</i> (Roxb.)	Poaceae/(Gramineae)

E. Climber

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

F. Parasites & Saprophytes

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

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

Common Name	Zoological Name
A. <u>Animals</u>	
Tiger	<i><u>Panthera tigris</u></i>
Panther	<i><u>Panthera pardus</u></i>
Striped Hyaena	<i><u>Hyaena hyaena</u></i>
Wild dog	<i><u>Cuon alpinus</u></i>
Jackal	<i><u>Canis aureus</u></i>
Fox	<i><u>Vulpes bengalensis</u></i>
Leopard cat	<i><u>Felis bengalensis</u></i>
Jungle cat	<i><u>Felis chaus</u></i>
Nilgai	<i><u>Boselaphus tragocamelus</u></i>
Sambhar	<i><u>Cervus unicolor</u></i>
Cheetal	<i><u>Axis axis</u></i>
Barking deer	<i><u>Muntiacus muntjak</u></i>
Wild boar	<i><u>Sus scrofa</u></i>
Sloth bear	<i><u>Melursus ursinus</u></i>
Four horned antelope	<i><u>Tetracerus quadricornis</u></i>
Langur	<i><u>Presbytis entellus</u></i>
Three striped Palm squirrel	<i><u>Funambulus palmarum</u></i>
Porcupine	<i><u>Hystrix indica</u></i>
Rufous Tailed Hare	<i><u>Lepus nigricollis ruficaudatus</u></i>
B. <u>Birds</u>	
Painted sand grouse	<i><u>Pterocles indicus</u></i>
Common sand grouse	<i><u>Pterocles exustus</u></i>
Peacock	<i><u>Pavo cristatus</u></i>
Grey jungle fowl	<i><u>Gallus sonneratii</u></i>
Grey partridge(Francolin)	<i><u>Francolinus pondicerianus</u></i>
Black breasted quail	<i><u>Coturnix coromandelica</u></i>
Indian bustard quail	<i><u>Turnix suscitator</u></i>
Blue rock pigeon	<i><u>Columba livia</u></i>

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>Sarcogyps 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 GONDIA FOREST DIVISION



WORKING PLAN OF GONDIA FOREST DIVISION

PART-I

SUMMARY OF THE FACTS ON WHICH THE PROPOSALS ARE BASED

CHAPTER – I

THE TRACT DEALT WITH

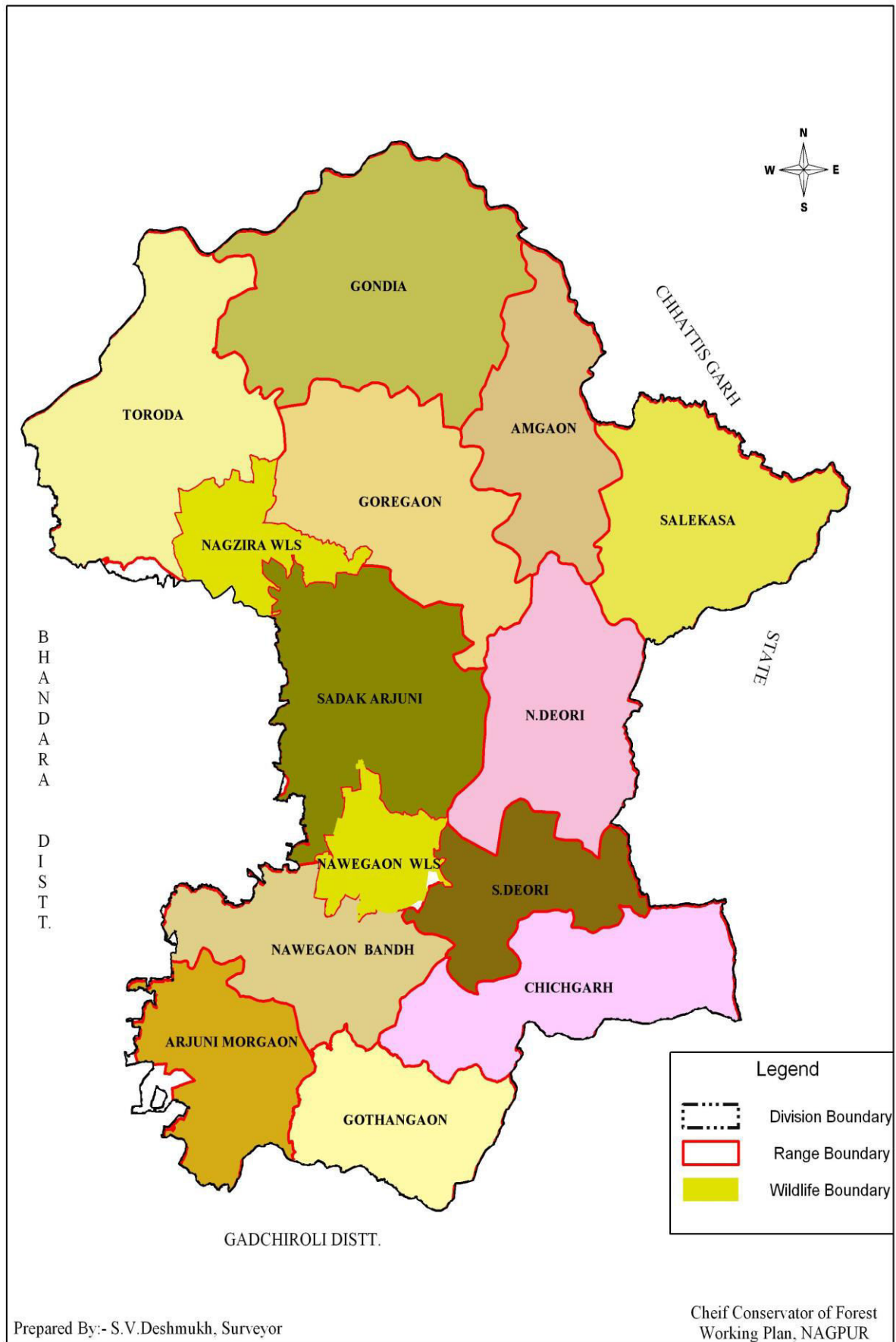
1.1 INTRODUCTION: Gondia district is established on 1st May 1999 after the separation from Bhandara district. Gondia district was under the privilege of 'Gond Raja'. The whole area was surrounded by the dense forest. 'Gond' is the main tribe of this area. According to the book written by Shri R.V. Russel, the main business of the local people was collection and selling of Gum and Lac on which the district takes its name as Gondia. Gondia district lies entirely within the Wainganga basin. Major tributaries of the Wainganga are the Bagh, the Pangoli, Chulband, the Gadhvi, the Sur, the Chandan and the Bawanthadi. The district is traversed West to East in the middle by the Mumbai - Hawrah (South Eastern railway) broad gauge railway line and the Mumbai- Kolkata National Highway No.6. There are two medium irrigation projects, one is built on Bagh river in Sirpur village of Deori Tahsil and another one is on Wainganga river in Kawlewada village of Tiroda tehsil.

1.2 NAME AND SITUATION: The newly formed Gondia district is situated between 20° 39' and 21° 38' north latitude and 79° 27' and 80° 42' east longitude. The forest area of Gondia division occurs in compact blocks and at some places, in scattered patches and almost touch the district boundary except, on the Road and Railway side. The area is bounded by Rajnandgaon district (Chattisgarh) from East, Bhandara district (Maharashtra) from West, Balaghat district (Chattisgarh) from North and Wadsa Division (Maharashtra) from South.

Table No. 1.1 Boundary of the Gondia Division :

S.N.	Direction	Name of Forest Division/ District
1	North	Chattisgarh State.
2	North & North-East	Chattisgarh State.
3	East	Rajnandgaon district of Chattisgarh State.
4	South	Wadsa Division.
5	West	Bhandara Division.

MAP OF GONDIA FOREST DIVISION



1.3 CONFIGURATION OF THE GROUND:

1.3.01 For administrative reasons Gondia district consists of 8 Talukas namely; Tiroda, Gondia, Goregaon, Amgaon, Salekasa, Deori, Sadak Arjuni and Arjuni Morgaon. The altitude of the district varies from 310 m to 340 m above the mean sea level. Distance of Gondia town from Nagpur is 169 kms.

1.3.02 The area is generally undulating and hilly with moderate to steep slopes dissected by meandering streams. This area has varied lithology and intricate geological structure. Tropical sub-humid weathering of crystalline metamorphic and igneous rocks has created highly varied soils. Sihar, Morand, Kardi, and Bhardi are important local soil types.

1.3.03 Forest Wealth: The forests in charge of this division, excluding areas transferred to FDCM, Navegaon National Park and Nagzira Sanctuary, New Navegaon WLS & New Nagzira WLS is 1731.785 sq. kms. This comprises of 728.025 sq. kms of Reserved Forest, 712.705 sq. kms of Protected Forest which includes 29.95 sq. kms of compensatory lands given against Gosekhurd project and subsequently declared as Protected Forest, 219.70 sq. km of Jhudpi Jungle received from the Revenue Department and 71.10 sq. kms of un-classed forest and private land taken over as compensatory land against the project land under FCA 1980 is 0.25 sq kms. The forest land of Gondia constitutes 30.70 % of the geographical area 5641.00 sq. km.

1.4 GEOLOGY, ROCK AND SOIL:

1.4.01 Geology and Rock: This area is rich in minerals with varied lithology and intricate geological structure. Repeated folding and faulting has complicated the rock structure in the area. The topography is characterised by presence of the lenticular narrow ridges trending in the north-northwest to south-southeast direction with occasional spurs rising to various heights. The oldest rocks are the crystalline complex consisting of granite and granite-gneiss, followed by mica schist, hornblende-schist, quartzite, crystalline limestone, calc-granulite and calciphyre of Sausar series exposed in the northern part of the district. They are usually arranged in continuous parallel bands for many kilometers. The manganese deposits in the form of elongated lenticular bands occur among these gneiss, schist and quartzite. The Sakoli series are exposed as a large triangular outcrop. Two or three sets of faults are common in the main exposures, and are usually indicated by fault breccias. The Dongargarh system consisting of rhyolite, andesite, Dongargarh granites and sandstones occupies 88 kilometer wide belt in a north-northeast direction. Overlying cuddapahs consist of sandstones, shale, grits in the upper part with alternate bands of quartzite and conglomerates in the lower part. The Gondwana sediments referred as Kamthi series have conglomerates, arkose and sandstone, and are exposed in the Wainganga and the Chulband river sections.

1.4.02 Economic Geology: Of the varied mineral deposits found in the district include manganese ore, Chromite, Kyanite-Sillimanite, Iron ores, Corundum, Talc and Soapstone. Dongri-Buzurg, Sitasaongi and Chikhla are the three important actively mined manganese belts. Chromite occurs in small bands near Paoni. Kyanite-Sillimanite is found in the Sakoli series. Massive sillimanite deposits at Pohra and the Kyanite-Sillimanite deposits at Dahegaon are important. Corundum is reported at the foothill of a hillock at Pohra, and gold is reported as placer deposits near the Kohka village. Uranium is found in granophyres near Parsodi. Iron ores such as banded hematite-quartzite and inter-bedded purple ferruginous Phyllite are available in small pockets towards the east. Other reported deposits are of Green Mica near Mahalgaon, of Talc and Soapstone in Sakoli Tahsil and west of Kansli and of Antimony and Lead near Paoni.

1.4.03 Soils: The soils of the district are highly varied, arising out of the tropical sub-humid weathering of crystalline metamorphic and igneous rocks. Tropical sub-humid weathering of crystalline metamorphic and igneous rocks has created highly varied soils. The main types of soils are kali, canker, sihar, morand, khardi and bardi. Sihar, Morand, Kardi, and Bhardi are important local soil types. Sihar is a reddish yellow soil derived from oxidation of crystalline rocks under tropical humid conditions. It cracks very little in the hot climate, and gradually degrades into Kardi, which is dark in colour with considerable lime content. It is generally gravelly and shallow. Morand soil is of two types. Morand I differ from Kanhar, which is very rich alluvial soil by the presence of limestone nodules. Morand II is coarser in texture and consists of a good deal of sand washed down from the sandstone hills. The Bardi is a very poor soil having stones on the surface. Soil erosion is more prominent on slope. In the plains, mostly Sihar and Morand types of soil are found. Both types are light and slightly acidic. The Sihar soil is considered suitable for rice cultivation, and Morand soil is suited for Jowar, Wheat and Linseed.

The other soils of the district are kachhar, marhani and retari which are found along the river banks. They are all alluvial and differ in value according to the deposits brought down. Kachhar is blackish in colour and contains very little sand. Marhani is red and is much more sandy than kachhar. These two soils are good for garden crops. Retari is poor soil and contains almost all sand. Most of the cultivable soils of the district belong to the morand and sihar types, both of which are light and slightly acidic. The sihar soil is best suited for Rice while morand soil is suited to Jowar, Wheat and Linseed. Morand soil is of two types. Morand I differ from Kanhar, which is very rich alluvial soil by the presence of limestone nodules. Morand II is coarser in texture and consists of a good deal of sand washed down from the sandstone hills. The bardi and khardi soils are very inferior types of sihar-morand and are used for the cultivation of inferior rice and minor millets.

1.5 CLIMATE: The climate of Gondia district is hot and dry. There are three seasons namely; cold (winter), hot (summer) and monsoon (rainy). The cold season starts by about the end of November and continues upto middle of February. The cold is mild and the weather is pleasant. The hot season starts by the middle of February till the onset of monsoon in the middle of June. During the months of April and May, the heat of the day is rather unbearable due to hot winds and the dryness of the atmosphere. The monsoon season starts from the middle of June and continues up to first week of October. The monsoon months are sultry. The heat increases as soon as monsoon ends and the months of October and November are mostly uneasy till the winter sets in.

1.5.01 Temperature: The diurnal range of temperature is the largest during March. In August these changes are minimum. In April the maximum temperature goes 45°C, while in May it goes upto 47°C. The shorter divergence is only during the rainy season. The high temperature during the summer months adversely affects the vegetation in flat and bare country. The winter is mild and during December to mid February the minimum temperature varies between 6 -17 degree C. In the forest clad hills, more conditions are favorable to plant growth.

1.5.02 Rainfall: The major portion of the total annual rainfall is received during June to September each year, which generally amounts to 90 percent of the annual rainfall. Normally August is the heaviest rainfall month. The average annual rainfall of Gondia is around 1200 mm. Of late the annual rainfall is showing large variations. The rainfall distribution in a year is also irregular. In the recent past there have been erratic rains during the monsoon almost every alternate year. This affects the natural regeneration as well as afforestation works which are being taken on a large scale.

Average number of rainy days in a year varies with place. Except the rainy season, the entire year is dry. The variation of the rainfall from year to year is significantly large. The following table shows the annual rainfall and average number of rainy days (during the year 1997 to 2007) in a year for 6 rain gauge stations of Gondia district. Rainfall data is given in the **Appendix No. II.**

Table No.1.2 : Average Rain fall and Average Number of Rainy Days during the period from 2001 to 2010.

S N.	Rain –Gauge Station	Annual Rainfall (in mm)	Average number of Rainy days in a year
1	Tiroda	1277.6	101.00
2	Gondia	1398.1	102.50
3	Goregaon	1599.6	102.00
4	Amgaon	1599.6	101.00
5	Salekasa	1599.6	102.50

6	Deori	1495.5	103.00
7	Sadak Arjuni	1538.6	101.00
8	Arjuni Morgaon	1583.1	102.00
	District Average	12091.7	101.90

**Table No.1.3 :Highest and Lowest Rainfall recorded at
Different Stations during 2001 to 2009.**

S. N.	Rain Gauge Station	Year	Highest Rainfall in mm	Year	Lowest Rainfall in mm
1	Tiroda	2003	2195.5	2004	774
2	Gondia	1999	1470.9	2004	754.9
3	Goregaon	1999	1602.4	2004	584.1
4	Amgaon	1999	1711.2	2004	1108.7
5	Salekasa	2007	1569.3	2004	671.8
6	Deori	2000	2796.8	2004	1023.8
7	Sadak Arjuni	2000	1807.6	2004	961.1
8	Arjuni Morgaon	2008	2015.70	2004	897.00

1.5.03 Frost: Frost is almost unknown in the forest areas of the district. Slight damage due to frost in the low lying areas of present Tiroda range and Nagzira wildlife sanctuary was recorded in 1928-29 and 1936-37.

1.5.04 Storms, Winds and Floods: Winds are generally light to moderate with some increase in wind force during the later part of the summer and monsoon months. During the monsoon the winds blow mostly from directions between south-west and north-west. In the period from October to February, the winds are mainly northerly to north-easterly in the mornings of north-easterly to easterly in the afternoons. By March, winds from directions between south-west and north-west begin to blow and with the advance of the season they become predominant. Occasional storms in pre-monsoon or monsoon periods are also experienced which result into uprooting of isolated trees. The occurrence of floods is not common.

1.5.05 Health: The weather is usually oppressive in summer and very sultry and humid during monsoon. However, during winter it is pleasant. Due to improvement in health services the epidemics are rare. However cases of Gastro-enteritis and Malaria occur in remote villages during the monsoon.

1.6 WATER SUPPLY: The main rivers passing through the division are Kanhan, Chulband, Garvi and Bagh, which are fed by many small ephemeral tributaries. The area has three major irrigation projects, Itiadoh, Sirpur and Kalisarar and seven medium irrigation projects. A large number of big and small tanks are used for irrigation, fisheries and drinking water sources. Sources of drinking water are wells, hand pumps, water supply schemes and a network of canals. Most tanks are shallow and seasonal in nature. Low rainfall years witness acute shortage

of water in the area. Scarcity of drinking water during summer is a major problem in many villages. The minor tanks and small tanks are shallow and are mostly seasonal in nature. Seepage at the tank bed and evaporation on surface from these tanks are relatively high and they fail in their water supply during the hot weather or years of low rainfall.

1.6.01 Wells: There are 6978 irrigation wells and 5637 other wells. There are large number of tube wells and hand pumps. The main source of water supply for drinking is through wells, hand pumps and water supply schemes. In summer, shortage of drinking water is felt in many villages, especially in years of low rainfall. During this period drinking water is supplied by tankers and bullock carts to the scarcity villages. Forest department has also constructed wells in the staff colonies, rest houses and nurseries. List of Forest Department wells is in the **Appendix No. III.**

1.7 DISTRIBUTION OF AREA: The total Forest area of the division excluding FDCM, Nawegaon & Nagzira WLS, New Navegaon & New Nagzira WLS extends over to 1731.785 sq. kms.

1.7.01 Reserved Forests: The old forest blocks were reserved in 1879 and 1942. Extensive areas of the Protected Forests were declared as the Reserved Forests during 1977 and 1978. A large number of the Reserved Forest compartments were transferred to the Forest Development Corporation of Maharashtra Ltd. (**Appendix No. XII**) Later the area falling in the Navegaon National Park & Nagzira Wildlife Sanctuary was transferred to the Wildlife Wing of the Department (**Appendix No. XII**). After a series of inter-division transfers, the Gondia Forest Division has the 728.025 sq. km of RF distributed in 340 compartments. The particulars of Reserved Forests are given in **Table No. 1.4.**

1.7.02 Protected Forests: The Protected Forests measuring an area of 71270.585 ha which includes 454 compartments with area of 68274.975 ha of old PF and 85 newly formed compartments with an area of 2995.610 ha in 85 villages, given as compensatory land against Gosekhurd project, declared as Protected Forests. Thus the total protected forest of 71270.585 ha remain with the Gondia Division for Management.

1.7.03 Un-classed Forests and Zudpi Jungle: Zudpi Jungle extends over an area of 21970.200 ha and 7110.078 ha of un-classed forest land are also with the Gondia Forest Division. Private Land taken over as a Compensatory Land against the project land under F.C.A.1980 consists of 25.150 ha. Statement showing distribution of various types of area has been given in **Table No. 1.4.**

Table No.1.4 : Range wise Area Statement of Gondia Division. (in ha.)

Abstract of Gondia Forest Division										
S.N.	Name of Range	(RF, NRF , PF, Gose PF, Zudpi Jungle & Unclassed Forest)							Private land taken over as a Compensatory land under F.C.A. 1980	Total Area in ha.
		RF	NRF	PF	Gose PF	Grand Total (RF+NRF+PF) 3+4+5+6	Jh.J.	Unclassed Forest		
		Area in ha.	Area in ha.	Area in ha.	Area in ha.	Area in ha.	Area in ha.			
1	2	3	4	5	6	7	8	9	10	11
1	Tiroda	1194.632	1168.938	3345.387	97.000	5805.957	2147.500	0.000	0.000	7953.457
2	Gondia	0.000	1267.571	4175.196	803.100	6245.867	3338.820	0.000	0.000	9584.687
3	Goregaon	0.000	1947.033	6705.087	297.500	8949.620	1584.680	2319.499	2.610	12856.409
4	Amgaon	0.000	579.100	2718.594	320.000	3617.694	2520.860	127.592	0.000	6266.146
5	Salekasa	0.000	4206.770	5360.421	71.000	9638.191	4691.250	1069.603	8.140	15407.184
6	North Deori	0.000	3225.920	8040.656	408.360	11674.936	2103.040	1011.047	4.980	14794.003
7	South Deori	0.000	5085.400	6482.541	173.150	11741.091	378.740	0.000	9.420	12129.251
8	Chichgarh	0.000	12412.290	10196.367	56.850	22665.507	800.890	53.454	0.000	23519.851
9	Sadak Arjuni	2627.538	4487.324	8460.843	304.000	15879.705	1771.780	964.453	0.000	18615.938
10	Nawegaonbandh	6176.484	4435.423	4569.820	282.350	15464.077	1014.500	182.551	0.000	16661.128
11	Gothangaon	8694.920	2423.180	3694.401	58.000	14870.501	1228.740	1381.879	0.000	17481.120
12	Arjuni Mor	9468.170	3401.890	4525.662	124.300	17520.022	389.400	0.000	0.000	17909.422
Grand Total		28161.744	44640.839	68274.975	2995.610	144073.168	21970.200	7110.078	25.150	173178.596

1.7.04 The present plan has endeavoured to prepare digital map of entire forests area in the GIS (Geographical Information System) environment, which integrates maps in different scale to bring uniformity. This digitisation includes Reserved Forest boundaries, Cadastral village maps (village maps) of Protected Forests area and digitisation of Zudpi Jungles.

1.8 ADMINISTRATIVE UNITS: For administrative convenience the ranges, rounds and beats were reorganised in Gondia Forest Division and the entire division has been divided into 12 ranges, 62 rounds and 297 beats. Range wise distribution of forests is given in **Appendix No. XIII.**

1.9 FOREST AREAS DIVERTED FOR NON-FORESTRY WORKS :

1.9.01 Disforestation Prior to 1980: Total area of 10108.13 ha has been disforestation in Gondia Division and transferred to Revenue department prior to 1980. Out of is 3842.008 ha area belongs to Reserved Forests & 6266.121 ha belongs to Protected Forest is. (**Appendix No. XVIII.**)

1.9.02. Area Diverted for Non-forestry, Purposes under Forest Conservation act 1980: Forest areas diverted for non-forestry purposes under Forest (Conservation) Act 1980 is 1750.13 ha for 79 projects. In lieu of this 4887.064 ha Zudpi Jungle, 25.15 ha non forest land has been made available to the division from project authorities and revenue department in Gondia Division .The details are given in **Table No. 1.5.(Appendix No. XVI)**

Table No. 1.5 : Projects under F.C.Act 1980 of Gondia District.

No. of Projects	Forest land Under Various projects (ha)	Compensatory lands for various projects (ha)			Remark
		Zudpi Jungle	NFL	Total	
79	1750.1313	4887.064	25.15	4912.214	1. Out of 79 Projects 60 projects are finally approved and 18 proposals are principally approved. In addition to this, one proposal of rehabilitation of Navegaon National Park has been principally approved. 2. Out of 4887.064 ha of Zudpi jungle land, 3423.834 ha of Zudpi jungle land & out of 25.150 ha non forest land , 4.98 ha non forest have been proposed for Compensatory Afforestation in Gondia Division

1.10. STATE OF BOUNDARY:

1.10.01 Approximately the total length of external boundary of the Reserved Forest is 1121 km, of which about 144 km is formed by permanent natural features and 860 km is demarcated artificially and a total number of 5687 pillars are used for the purpose. Artificial boundaries are 12 m wide cleaned lines with numbered pillars at suitable intervals. Each pillar is surrounded by cairn of stones or earth and is placed in the middle of the 12 m wide boundary line. The pillars are serially numbered in anti-clock-wise direction. Separate series of numbers are given for boundary lines passing through different villages. Half width of the boundary line lies in the Reserved Forest adjoining the Protected Forest. While the whole width line lies within the Reserved Forest, where the reserved forest adjoin the other areas. Although boundary of the Forest Blocks can be ascertained relatively easily on the ground, the artificial boundaries of the Reserved Forests formed in 1977 and 1978 and the Protected Forests are not properly demarcated.

1.10.02 The approximate length of the boundary line of Protected Forest is 705 km of which about 105 km is formed by natural features and 600 km is demarcated artificially. The Protected Forest at some places is in small patches and it traverses along with reserved forest. At the time of transfer of ex-proprietary forest to the Forest department, no demarcation was done on the

ground. The survey and demarcation of these forests was started in 1960-61, under the scheme “survey and demarcation of ex-proprietary forests”. The demarcation was done by pillars. But these pillars were not maintained further due to which these pillars are not traceable on site. In the year 1987-88, TCM were taken in the protected forests, under EGS, to provide work to the labourers due to scarcity. But they were taken as per the demand of labourers and many work remained incomplete due to encroachment problems and non-availability of labour. The instructions issued by Principal Chief Conservator of Forests, MS, Nagpur in the year 1987-88, for demarcation in the Protected Forest and Jhudpi jungle land handed over to the Forest department; from the revenue department and accordingly works were carried out to some extent the proposal for reservation of this land under Section 4 of Indian Forest Act, 1927 has already been submitted to the Commissioner, Nagpur. Therefore, a time bound scheme for demarcation needs to be prepared and implemented on top priority to protect it from further encroachment.

1.11 LEGAL POSITION:

1.11.01 Reserved Forest : The forest that were, originally, declared Reserved forests under the provisions of Indian Forest Act, VII of 1878, as per the notification No.917(a) dated 26.02.1879 subsequent changes, as effected under the authority of State Government and gazette notifications issued from time to time are incorporated. The rest of the Reserved Forests were declared as RF under section 20 of the Indian Forest Act 1927 by the Govt. of Maharashtra vide it's notifications FLD-3574-53802-F2 dated 7.9.1977, FLD-3575/93648/F2 Dated 7.9.1977 and FLD-3570-68426-F2 dated 14.4.1978

1.11.02 Protected Forest: As per Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahals and Alienated lands) Act of 1950 (I of 1951), the areas formerly belonging to *Malguzars* were vested in the State Govt. On April 1, 1951, they were taken over by the Revenue Department as per the instructions contained in M. P. Revenue Department's Letter No 2249-286-XII dated April 6, 1951 and No 7177-CR-617-XII, dated December 4, 1951. The transfer of these forests to the Department was completed by the year 1954.

These forests were then declared as Protected Forests under section 29 of the Indian Forest Act, of 1927 vide Govt. of Madhya Pradesh Notification No. 3058-2979-XI dated June 4, 1955.

1.11.03 In exercise of powers conferred by section 30 and 32 of Indian Forest Act, 1927, notifications reserving trees, etc., were issued and rules were framed by the Govt. of Bombay under FLD-4657/103064-E dated December 19, 1958.

1.11.04 Notification under section 4 of the Indian Forest Act, 1927 were issued in respect of all these forests vide Govt. of Maharashtra No FLD-1258/II, 3314-E dated May 30, 1959.

1.11.05 In 1977 and 1978, Govt. of Maharashtra declared 16685.0 ha. area of this Protected Forest as Reserved Forest under Section 20 of the Indian Forest Act, 1927, vide notification No

FLD-3574-53802-F2 dated 07.09.1977, FLD-3575/93648-F2 dated 07.09.1977 and FLD-3570-68426-F2, dated 14.04.1978.

1.11.06 A number of alteration and adjustments affecting the area of the Reserved and Protected Forest have subsequently taken place. The details of these are recorded in Form No 1.

1.11.07 Total area of 21970.200 ha of Zudpi jungle owned by Revenue department was handed over to the Forest department, the proposal for notification sent to Commissioner, Nagpur, to convert these lands into Protected Forest. The notification is awaited. Talukawise and Rangewise Jhudpi jungle is shown in the **Table No. 1.6.**

Table No 1.6. :- Statement Showing Zudpi Jungle in Gondia Division.

Jhudpi Jungle (Taluka Wise)			Jhudpi Jungle (Range Wise)		
Taluka	No. of village	Total area (ha)	Range	No. of village	Total area (ha)
Tiroda	69	2147.500	Tiroda	69	2147.500
Gondia	112	3338.820	Gondia	112	3338.820
Goregaon	48	1584.680	Goregaon	48	1584.680
Amgaon	66	2520.860	Amgaon	66	2520.860
Salekasa	60	4691.250	Salekasa	60	4691.250
Deori	94	3282.670	North Deori	40	2103.040
Sadak Arjuni	42	1771.780	South Deori	22	378.740
Arjuni Mor	46	2632.640	Chichgarh	32	800.890
Total	537	21970.200	Sadak Arjuni	42	1771.780
			Nawegaon bandh	23	1014.500
			Gothangaon	9	1228.740
			Arjuni Mor	14	389.400
			Total	537	21970.200

1.12 RIGHTS & CONCESSIONS :

1.12.01 A. Reserved Forests: There were no rights in the Reserved Forests except right to way and access to water. There is no commutation of Nistar or Paidawar in the Gondia Forest Division. Various concessions were granted from time to time to the agriculturist and others by the erstwhile Govt. of Madhya Pradesh and Govt. of Maharashtra. The following concessions were permitted in the past.

- 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 Forest are given certain quantity of bamboo and firewood for their bona fide domestic use at concessional rates. None of these concessions was a legal right.

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,

has to be respected and granted to the eligible persons and communities after following all the legal formalities.

1.12.02 B. Protected Forest: Before the abolition of the proprietary rights all lands belonged to the proprietors. A village administration paper called ‘Wajib-ul-Arz’ was prepared for every settlement; and plots of land were separately recorded, showing the Khasra numbers and area which was set apart for a particular purpose. In order to distinguish between the rights existing on the government waste lands and on the other land, a provision was made in Madhya Pradesh Land Revenue Code, 1957 prescribing the preparation of the Nistar Patrak and Wajib-ul-Arz for every village. The Nistar Patrak deals exclusively with community and customs over private land.

1.12.03 The Nistar enquiry had been conducted in Gondia district during the period 1954-56 and all the villages have been covered under it. The Nistar officers have formed grazing and Nistar zones by clubbing together surplus villages with deficit villages, while self-sufficient villages have been treated as individual zones. Villages assigned to a particular zone can exercise their Nistar rights within that zone.

1.12.04 The classification of the villages into surplus, deficit or self-sufficient for exercise of Nistar rights was made on the following basis:

- i. A village having tree clad area equal to half the occupied area was considered to be self-sufficient.
- ii. A village having tree clad area more than half the occupied area was considered to be surplus village.
- iii. A village having tree clad area less than half the occupied area was considered to be a deficit village.

1.12.05 Grazing: As per the 2003 cattle census, the total cattle population of Gondia district 6.47 lakhs. Out of this, 50 percent are Cows and Bulls; 15 percent are Buffaloes, 24.65 percent are Sheeps, Goats and Horses. Other cattle recorded are 10.01 %. The cattle density is 778 per Sq.km. in 2005. There has been decrease in the cattle population from 1997. Taluka-wise livestock population in Gondia district is given in **Table No. 1.7** below:

Table No.1.7 : Taluka Wise Live-Stock Population in Gondia District
(as per 2003 census)

Taluka	Cows & Bulls	Buffaloes	Sheeps	Goats	Horses	Others	Total
Tiroda	36051	9596	0	27607	4	7644	80902
Gondia	53824	12585	16	40673	22	14473	121593
Goregaon	29951	3351	0	15228	3946	7013	59489
Amgaon	26748	2468	0	14167	2	5944	49329
Salekasa	25181	3485	0	19787	2	642	49097
Deori	35707	1719	10	11302	0	9862	58600
Sadak Arjuni	30376	4005	0	20877	257	7592	63107
Arjuni Morgaon	24358	2176	0	7696	0	5935	40165
Total	262196	39385	26	157337	4233	51461	522282

1.12.06 The basis for forming grazing zones was that each head of cattle in the cotton-jowar tract should have 0.4 hectare as grazing land. Villages in which the grazing lands were less than the above requirement were clubbed with the neighbouring village in which such area exceeded the above standard. In villages where grazing land 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 recognized unless already recorded in the "*Wajib-ul-Arz.*"

1.12.07 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 their cattle to a longer distance than what their 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 appropriate authority.

1.12.08 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 imposed after considering the severe damage caused by the sheep grazing in the forests. However, subsequent directive from the Government of Maharashtra, vide G.R No.MFP-2103/C.No. 135/F-1 Dated 29/10/2007, has allowed grazing by sheep in the forest areas, as per the recommendations of the Grazing Settlement Reports, but continued complete prohibition on grazing by goats in the forests. Following norms of concessional grazing have been prescribed under the Protected Forests (Vidarbha Area) Rules, 1959:

- a) Cultivators - 2 plough cattle per plough plus 4 others including one she-buffalo.
- b) Agricultural artisans and labourers – 4 cattle including one she-buffalo; provided further that all animals in excess of those specified in 1.13.5 of the directive ; Provided that a calf under one year shall not be counted;

Provided further that all the 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.

1.12.09 Occupational Nistar: In the Nistar Patrak, occupational rights of the Kumbhars, Chambhars, Gonds, Mahars, Pradhan and Lohar communities have been recorded and recognised in several villages, having entries in the *Wajib-ul-Arz* of each village.

As regard other occupational Nistar, **Ghost** fruits and **Dhaoda** leaves are allowed to be removed by the charmakers free of charges. They are also allowed to remove **Bakul** (*Mimusops elengi*), and **Kahu/Kullu** (*Sterculia urens*) bark on nominal payment from trees marked for felling.

1.12.10 General Nistar: The Nistar is required by the villagers for *bona fide* domestic and agricultural purposes. Nistar from the forests 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 accordingly to which, agriculturists and agricultural labourers are entitled to following kinds of forest produce for their Nistar either free of charge or at concessional rates fixed, from their Nistar zones.

1.12.11 Distribution of Forest Produce Under the Nistar System:

(i) **Bamboo:** Prior to the reorganization of the Gondia division there were 824 families of Burad community, but now there are only 669 families remain in this division as rest of them have been allotted to Gondia Division. These Burads are dependent upon the forest department for supply of bamboos. The Forest department has issued cards to each family of Burad community and accordingly 1500 Bamboos are supplied to them on concessional rates from the department's Depots.

Dry and Green bamboos are removed as per silvicultural rules and distributed to the local farmers under Nistar and the surplus Bamboos are sold in open public auction.

(ii) **Small Timber and Poles:** According to the zone arrangement framed 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 zonal villagers, the excess could be given to persons outside the zone on payment at the rates.

(iii) **Firewood:** Free removal of firewood from Khasra number set aside for Nistar is permitted as per rights recorded in Nistar Patraks for *bona fide* use to the villagers. In khasra numbers which are in excess, no such right is allowed. Fire wood is also supplied on Nistar/ concessional

rates from the forest depots.

(iv) Other Forest Produce: Where thorns are not available, removal of brushwood such as lops and tops of the felled trees are permitted. Removal of thorns and brushwood is allowed free of cost or at nominal rates.

Bark, Fibres and Roots are allowed to be removed where it is customary to allow their removal for cordage. Moha, Char, Tendu or other edible fruits, flowers and roots are allowed to be removed free of cost from all over the forests for domestic consumption.

(v) Nistar Rules: In the Nistar Patrak of each village the khasra 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 given in the Nistar Patrak in general. However, due to heavy encroachments, over harvesting, illicit felling over grazing and fire, these areas have become highly degraded and are no longer able to meet the Nistar requirements of the people. They need immediate rehabilitation through afforestation, soil and moisture conservation and proper management on sustainable basis.

CHAPTER – II

THE FLORA & FAUNA

IIA FLORA

2.1 COMPOSITION AND CONDITION OF THE CROP

2.1.01 The forests of the Gondia division consists of the *Subgroup 5A-Tropical Dry Deciduous Forests of Champion and Seth's classification*. Edaphic factors, such as topography and past management cause local variations. Composition and quality of the crop vary according to the soil type and soil depth. Excessive grazing and exploitation of forest; and frequent fires have further degraded the forest in many areas and also seriously damaged the natural regeneration of tree species. Garari (*Cleistanthus collinus*) is the most common species in the middle storey in the forest. Association of Garari and Dhaora is quite rare. The forest of Gondia Division has been classified, as follows: (as per Champion and Seth's classification)

Table 2.1 : Forest types in the Gondia Division (*Champion and Seth's classification*)

<i>Type Notation</i>	<i>Notation</i>	<i>Type description</i>
Group 5		Tropical Dry Deciduous Forests
Sub-group 5 A		Southern Tropical Dry Deciduous Forests.
Climate types	5A/ci 5A/cia 5A/cib	Dry teak bearing forests Very dry teak forest Dry teak forest.
	5A/c3	Southern dry mixed deciduous forests
Local subtypes		1. Superior Quality Mixed Forests 2. Medium Quality Mixed Forests 3. Poor Quality Mixed Forests
Primary serial type	5/1s1	Dry tropical riverain forest

2.1.02 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 Deori, Chichgad, Goregaon Ranges, it forms a pure crop. Saja is the predominant species in the mixed forest. It's important associates are Bija, Dhaoda, Surya and Garadi. Density of the mixed forest varies from blank patches to 0.8. 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.

Table No. 2.1 : Girthwise Distribution of Species and Basal area/ha in Gondia Division.

(Based on Enumeration 2009-2011.)

Species	g15 30	g31 45	g46 60	g61 75	g76 90	g91 105	g106 120	g121 135	g136 150	g151 up	Total	Basal Area
Ain	12.29	7.63	4.56	3.59	2.97	1.96	1.32	0.78	0.45	0.54	36.09	1.10
Aonla	0.85	1.01	0.73	0.56	0.35	0.17	0.08	0.02	0.01	0.01	3.79	0.10
Behada	0.45	0.39	0.34	0.25	0.23	0.13	0.10	0.06	0.04	0.15	2.13	0.10
Bel	0.37	0.31	0.15	0.15	0.08	0.08	0.03	0.02	0.00	0.01	1.20	0.03
Bhirra	3.96	3.13	1.90	1.09	0.75	0.40	0.17	0.08	0.06	0.07	11.60	0.26
Biba	0.70	0.78	0.53	0.32	0.24	0.14	0.09	0.05	0.02	0.05	2.92	0.09
Bija	2.05	1.69	1.68	1.74	1.89	1.61	1.28	0.83	0.50	0.67	13.93	0.81
Bor/Ber	0.04	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.00
Char	5.39	4.06	1.99	0.90	0.50	0.15	0.08	0.02	0.01	0.01	13.11	0.20
Chichwa	0.32	0.46	0.48	0.42	0.33	0.17	0.12	0.06	0.04	0.06	2.46	0.10
Dhaman	0.62	0.67	0.53	0.34	0.22	0.07	0.03	0.01	0.01	0.01	2.51	0.06
Dhawada	9.23	5.74	3.28	2.14	1.70	0.94	0.61	0.33	0.17	0.27	24.40	0.61
Garadi	16.64	11.81	7.41	4.05	2.21	0.77	0.32	0.10	0.05	0.04	43.41	0.76
Haldu	0.24	0.25	0.20	0.12	0.15	0.12	0.11	0.06	0.06	0.16	1.47	0.09
Hirda	0.84	0.51	0.29	0.25	0.21	0.13	0.09	0.06	0.05	0.06	2.48	0.08
Kalam	0.30	0.24	0.18	0.12	0.13	0.13	0.10	0.06	0.04	0.06	1.35	0.07
Kasai	0.74	0.93	0.87	0.66	0.48	0.21	0.12	0.06	0.04	0.07	4.16	0.14
Khair	0.83	0.84	0.64	0.35	0.18	0.04	0.01	0.01	0.00	0.00	2.89	0.06
Kulu	0.06	0.07	0.07	0.03	0.02	0.02	0.01	0.00	0.01	0.01	0.29	0.01
Lendia	12.67	6.07	2.74	1.49	1.08	0.51	0.20	0.08	0.06	0.07	24.96	0.39
Moha	3.31	2.16	1.32	0.91	0.90	0.73	0.61	0.42	0.43	1.13	11.92	0.62
Mokha	0.14	0.16	0.14	0.15	0.14	0.08	0.04	0.03	0.02	0.03	0.93	0.04
Mowai	1.90	2.03	1.79	1.46	1.29	0.79	0.45	0.28	0.15	0.14	10.27	0.39
Palas	3.29	2.00	1.45	0.89	0.71	0.33	0.16	0.10	0.07	0.05	9.07	0.22
Rohan	2.34	1.85	1.31	0.81	0.57	0.27	0.13	0.09	0.03	0.02	7.41	0.18
Salai	0.31	0.47	0.50	0.50	0.65	0.59	0.45	0.34	0.25	0.37	4.44	0.32
Semal	0.18	0.15	0.17	0.16	0.15	0.11	0.10	0.07	0.03	0.05	1.17	0.06
Shisham	0.21	0.32	0.29	0.24	0.17	0.04	0.03	0.01	0.00	0.01	1.32	0.04
Shiwan	0.27	0.17	0.12	0.06	0.07	0.02	0.01	0.01	0.00	0.02	0.77	0.02
Surya	2.29	2.86	2.11	1.44	0.95	0.45	0.20	0.09	0.05	0.04	10.47	0.28
Teak	20.62	11.04	3.86	1.62	1.00	0.63	0.45	0.30	0.17	0.23	39.92	0.62
Tendu	4.74	1.23	0.52	0.32	0.25	0.19	0.11	0.08	0.04	0.07	7.55	0.13
Tiwas	0.39	0.50	0.36	0.41	0.44	0.24	0.15	0.07	0.05	0.04	2.65	0.11
Other	15.17	11.53	7.09	4.37	3.15	1.61	0.99	0.68	0.50	1.14	46.25	1.31
TOTAL	123.73	83.09	49.60	31.95	24.15	13.84	8.74	5.26	3.42	5.61	349.40	9.38

2.1.03 Dry Teak Bearing Forests :- These forests are characterized by the presence of Teak (*Tectona grandis*) in the crop in varying proportions. The composition of the other species in these forests is the same as that of the forests of 5A/c3 category described in the following paragraph. This type of forests can be seen in the Rajoli and the Deori ranges as well as in a few pockets of the Protected Forests. Most of the old teak plantations also fall in such areas. Proportion of teak is high in areas of alluvial soils along the streams and soils derived from

phyllites and quartzite. Its percentage on other rock formations is much lower.

2.1.04 Southern Dry Mixed Deciduous Forest :- The major portion of the forests of Gondia Division comes under this category. The forests are more or less leafless in hot season and are rich in grasses. Stream banks and lower hill slopes have good quality forests due to rich and deep alluvial soil. Climbers are abundant in good quality areas. However, forests are of poor quality on the steep slopes and poorly drained soils. Bamboo (*Dendrocalamus strictus*) is distributed unevenly in the division with exception of the Gondia and the Amgaon Ranges. Bamboo plantations have come up satisfactorily at many places but lack of proper management of these plantations have made these clumps very congested leading to deterioration of the crop. Grass is conspicuous in open and degraded areas. Saja or Ain (*Terminalia alata*) is the predominant species, and its major associates are Bija (*Pterocarpus marsupium*), Dhaora (*Anogeissus latifolia*), Garari (*Cleistanthus collinus*) and Lendia (*Lagerstromia parviflora*). Major area fall in the teak site quality III and IVa. Patches of quality II crops are found mainly in the moist deep soils in valleys and along the streams intermixed with quality III crops. Quality IVa is common on eroded and calcareous soils. The crop varies open to 0.8 in crown density, and middle-aged to mature in the age. Natural regeneration of Ain, Dhaora, Tendu, Bija, Lendia and Garari is better than of Teak. Promising regeneration of teak in open areas is seen in a few pockets. Young regeneration of major species suffers from biotic interference like heavy grazing and frequent fires.

Following species are found in the top storey of the forests: *Terminalia alata* (f), *Pterocarpus marsupium* (f), *Anogeissus latifolia* (f), *Lagerstroemia parviflora* (f), Mokha (*Schrebera Swietenoides*) (f), Dhoban (*Dalbergia paniculata*) (f), Behada (*Terminalia belerica*) (f), Surya (*Xylia xylocarpa*) (lf), Bhirra (*Chloroxylon swietenia*) (c), Mowai (*Laennia coromandalica*) (c), Karam (*Mitragyna parviflora*) (lc), Sewan (*Gmelina arborea*) (o), Bhilawa (*Semicarpus anacardium*) (o), Salai (*Boswellia serrata*) (o), Semal (*Bombax ceiba*) (o), Tiwas (*Ougenia oogenensis*) (o), Moha (*Madhuca longifolia*) (o), Kusum (*Schleichera oleosa*) (o), Bhorsal (*Hymenodictyon excelsum*) (o), Chichwa (*Albizzia odorotissima*) (o), Rohan (*Soymida febrifuga*) (o), Kasai (*Bridelia retusa*) (q), Arjun or Kahu (*Terminalia arjuna*) (r), Kulu (*Sterculia urens*) (r), Haldu (*haldina cordifolia*) (r), Shisham (*Dalbergia latifolia*) (r), etc. Species seen in the middle storey includes *Cleistanthus collinus* (a), Tendu (*Diospyros melanoxylon*) (f), Palas (*Butea monosperma*) (lc), Char (*Buchnanian lanzan*) (o), Dhaman (*Grewia tilifolia*) (o), Gongal (*Cochlospermum religiosum*) (o), Amaltas (*Cassia fistula*) (o), Apta (*Bauhinia racemosa*) (o), Ghoghar (*Gardenia latifolia*) (o), Aonla (*Phyllanthus emblica*) (f), Bor (*Zizyphus* spp.) (c), Lokhandi (*Ixora arborea*) (o) and Tondri (*Caeseria tomentosa*) (o). Khair (*Acacia catechu*) is locally frequent mainly on shallow and rocky sites.

Bans (*Dendrocalamus strictus*) is found in the entire division except in the Gondia and the Amgaon ranges. Katang (*Bambusa arundinacea*) is restricted to a few patches along streams. Bamboo plantations of *Dendrocalamus strictus* have been raised successfully in the past. Natural regeneration of bamboo was noticed in compartment 352 near Nagandoh. However, the bamboo area generally appears shrinking in extent. Improper exploitation of bamboo in the past has resulted in deterioration of clumps.

Shrubs found in these forests are *Bharati* (*Maytenus emarginatus*) (a), *Nirgudi* (*Vitex negundo*) (f), *Kharata* (*Dodonea viscosa*) (lc), *Dikamali* (*Gardenia resinifera*) (o), *Kuda* (*Holorrhena pubescens*) (o), *Jilbili* (*Woodfordia fruticosa*) (o), *Dudhi* (*Wrightia tinctoria*) (o), *Muradsheng* (*Helicteres isora*) (o), *Neel* (*Indigofera tinctoria*) (o), *Kharasani* (*Nyctanthes arbortristis*) (o), *Phetra* (*Gardenia turgiola*) (o) and *Katumber* (*Ficus hispida*) (r).

Chilati (*Mimosa hamata*) (c), *Eruni* (*Zizyphus oenoplia*) (c), *Kukudranji* (*Calycopteris floribunda*) (la), *Mahulbel* (*Bauhinia vahli*) (lc), *Aradphari* (*Oxal scandes*) (o), *Palasbel* (*Butea superba*) (o), *Bokadvel* or *Nagvel* (*Cryptolepis buechanani*)(o) and *Gunj* (*Arbus precatorius*) (o) are climbers generally noticed in the forests. *Loranthus longiflorus* (o) is a common tree parasite. *Tarota* (*Cassia tora*) is among the most abundant herbs in the area. Common grasses include, *Kusal* (*Heteropogon contortus*) (a), *Bhurbhusi* (*Eragrostic tenella*) (c), *Dab* or *Dabat* (*Imperata cylindrical*) (la), *Khas* (*Veteveria zizaniodes*) (lc), *Mushan* (*Iseilema laxum*) (o), *Phulkia* (*Apluda mutica*) (o), *Ghonad* (*Themeda quadrivalvis*) (o) and *Sheda* (*Sehima nervosum*) (r).

2.1.05 Superior Quality Mixed Forests :- This subtype is generally found in the valleys, lower gentle slopes of hills as well as in the deep alluvial soil along the streams. The site quality is predominantly III with some areas under II. The crop is mainly middle-aged to mature. Saja and Bija constitute more than one-third of the crop in the “Saja-Bija subtype.” Saja is the predominant species, and other associate species are Bija, Dhaora, Surya, Tendu, Karam and Garari. This subtype is found along the Nishani nala and in parts of Pratapgarh, Rajoli, Deori, Salekasa and Chichgarh ranges. In the “Without Saja-Bija subtype,” proportion of Saja and Bija is less than one-third of the crop composition. Occasionally Surya and Dhaora become prominent in the crop.

2.1.06 Medium quality mixed forests. :- The forests of this type belong to quality III to IVa, and can be classified into the Saja-Bija, the Garari and the Salai subtypes based on the composition.

1. Saja and Bija constitute more than one-third of the crop in the “Saja-Bija subtype.” The forest soil in the subtype is generally medium to fairly good in depth, and hence, supports good density varying from 0.4 to 0.6. Associate species are Dhaora, Lendia, Tendu, Moha,

Aonla, Palas and Mundhar. It is not uncommon to find high proportion of Garari in the lower storey with Saja and Bija in the top storey. Regeneration of Saja is profuse at many places.

2. Garari is the predominant species in the Garari subtype found in plains to undulating parts in Deori, Khadki and Dighori areas. The site quality is mainly IVa tending to IVb. The other major species found in this subtype in the lower storey are Saja, Dhaora, Moha, Mundi, Tendu, Salai, Tinsa, Amta and Koila. Coppicing power of Garari is so high that it dominates areas where Saja and Bija were felled previously. Lack of tending in the teak plantations resulted in high percentage of Garari suppressing teak. Marshall, Chepti, Chillati and Yeroni are common shrubs and climbers.
3. The Salai subtype is mainly the degradation subtype on the upper slopes and on arid soils. The density varies from 0.3 to 0.5, and usual associates are Bhirra, Mowai, Kulu, Tendu and Khair. This sub type is found in compartment 176 and in Dhivrintola, Fukimeta and adjoining areas.

2.1.07 Poor Quality Mixed Forest.:- The forests falling in this type are mostly of site quality IVa and IVb with the dominance of Rohan or Khair depending upon the soil conditions. Forests with Rohan are often found on scattered patches of calcareous soils, and have Rohan as the main species. The undergrowth comprises of Dikamali, Kurmudi and Jhilbili. Forests with Khair are found on arid and rocky patches on the hill slopes of Deori, Dighori and Gawarra areas, and are seen merging with Salai. Lendia and Dhaora are common associates.

2.2 STATUS OF NATURAL REGENERATION.

2.2.01 Data on regeneration status collected along with enumeration of the crop in 0.04 ha sub-plots in the enumeration plots. The data are analyzed and used to devise prescriptions for regeneration in the forest areas by both the natural and artificial. The focus is on tending of existing natural regeneration of seed based saplings. 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, other than natural blanks.

2.3 INJURIES TO WHICH THE CROP IS LIABLE.

2.3.01 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.

2.3.02 Injuries Caused by Man: The damage by man can be classified into, the following categories.

2.3.03 Illicit Cutting :- Illicit cutting of forests for timber, poles, firewood and agricultural implements is a major factor causing problems for the forests throughout the division, though it

is varying in degree. It is heavy in areas adjoining to thickly populated towns and villages. City and towns having extensive construction activities serve as the main consumption centres of illicitly cut timber. Gondia, Deori, Amgaon, Goregaon and Sakoli as well as Nagpur and adjoining areas in the Madhya Pradesh and Chhatisgarh are recognised as such consumption centres, where timber is in great demand for large scale construction activities. Due to sharp increase in the cost of timber, illicit cutters use various modes for transport from head load to truck and take away the timber, to faraway places even up to Nagpur. Besides this, the construction activity has increased in villages which also put extra pressure on these forests. The increase in population has resulted in the increased demand for fuel wood which also provides an easy employment to local villagers. Illicit cutting and lopping of Tendu trees for leaf collection has also increased. Due to increase in the network of roads in the forest as well as outside the forest areas, the protection of forest has become more difficult. The long term damage done by headloaders are more severe than the illicit cutting of big trees by the timber smuggler, as the headloaders carry away several future trees in one head load thus inflicting a very serious blow to the future crop.

Gondia District has a large population of Burads, who earn their livelihood by making bamboo mats and other articles. Bamboo is used by local people for their various household works. The increase in population has resulted in the increase of illicit cutting of Bamboo also, which cause damages to the naturally regenerated clumps in the area. All these factors have put tremendous pressure on forests and have resulted in depletion of the growing stock. The list of hypersensitive, sensitive and normal beats in Gondia Division has been given in the **Appendix No. LXVIII**

Table No.2.4 :- Hypersensitive, Sensitive and Normal Beats in Gondia Division.

S. N.	Range	Hypersensitive Beats	Sensitive Beats	Normal Beats	Total
1	Tiroda	2	9	4	15
2	Gondia	0	3	13	16
3	Goregaon	0	10	13	23
4	Amgaon	0	7	3	10
5	Salekasa	4	13	10	27
6	North Deori	1	9	16	26
7	South Deori	0	9	20	29
8	Chichgarh	0	0	36	36
9	Sadak Arjuni	0	22	12	34
10	Nawegaonbandh	0	12	15	27
11	Gothangaon	0	0	27	27
12	Arjuni Mor	0	1	26	27
Total		7	95	195	297

Table No.2.5 : Illicit Felling during the Last 10 years:

Year	No. of Cases	Teak	Non-Teak	Loss in Rs.
2001-02	2214	1356	7958	4432826
2002-03	231	1646	4937	2542099
2003-04	2155	1981	8095	3266231
2004-05	2657	1328	7441	1633605
2005-06	2538	1373	7762	1711251
2006-07	2612	1597	8619	1777790
2007-08	3677	4162	14128	6016626
2008-09	2571	2089	6853	2710722
2009-10	3896	2819	9618	2471154
2010-11	2380	1934	6233	1641902
Total	24931	20285	81644	28204206

2.3.04 Encroachments:- 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. LEN/1078/3483/G-1, dated 27.12.1978 and FLD/1079/1366/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 encroachment on forest land after 1978 is given below in the **Table No. 2.6 & Table No. 2.7**.

Table No. 2.6 :-Number of Encroachments and Area Encroached:

Year	Opening Balance		Encroachments during the year		Total Encroachment		Evicted		Balance	
	No.	Area in ha.	No.	Area in ha.	No.	ha.	No.	ha.	No.	ha.
96-97	600	274.62	6	2.606	606	277.23	0	0	606	277.23
97-98	606	277.23	2	1.53	608	278.76	0	0	608	278.76
98-99	608	278.76	12	0.7241	620	279.48.02	0	0	620	279.48.02
99-00	620	297.48	15	4.2728	635	283.75	0	0	635	283.75
2000-01	635	283.75	3	0.595	638	284.35	0	0	638	284.35
2001-02	638	284.35	4	0.2414	642	284.59	0	0	642	284.59
2002-03	642	284.59	64	30.0258	706	314.62	0	0	706	314.62
2003-04	706	314.62	11	5.5	717	320.12	0	0	717	320.12
2004-05	717	320.12	3	1.8	720	321.92	0	0	720	321.92
2005-06	720	321.92	88	56.745	808	378.66	0	0	808	378.66
2006-07	808	378.66	27	14.733	838	393.39	0	0	838	393.39
2007-08	835	393.39	11	3.478	846	396.87	0	0	846	396.87
2008-09	846	396.87	0	0	846	396.87	0	0	846	396.87
2009-10	846	396.87	0	0	846	396.87	0	0	846	396.87
2010-11	846	396.87	0	0	846	396.87	0	0	846	396.87

Table No. 2.7 : Statement Showing Encroachment on Forest Land between 1978 & 2011:

S. N.	Range	No.of Encroachers	Encroachment Area(in ha)	Encroachments Evicted (in ha)
1	Tiroda	43	1.389	0
2	Gondia	46	3.7115	0
3	Goregaon	87	30.7565	0
4	Amgaon	11	2.232	0
5	Salekasa	36	23.231	0
6	North Deori	62	47.53	0
7	South Deori	56	34.412	0
8	Chichgarh	12	18.1	0
9	Sadak Arjuni	54	29.6357	0
10	Nawegaonbandh	1	0.009	0
11	Gothangaon	92	67.072	0
12	Arjuni Mor	62	26.8055	0
From Bhandara Division (Sadak Arjuni,		284	111.987	0
Total		846	396.8712	0

2.3.05 Damage by Forest Fire :- Incidences of ground fire are very common in dry deciduous forests because of abundant combustible matter such as dry leaf litter, dry grasses and twigs. Scorching heat from the forest fire inflicts considerable damage by killing or damaging saplings, seedlings, ground flora and micro flora. Almost all fire incidences are man-made. Tendu contractors often influence setting up fire to obtain profuse flush of Tendu leaves during the collection season. Local villagers set fire to clear undergrowth under Moha and gum-yielding trees to facilitate convenient collection. Sometimes, villages also set forest fire to obtain good flush of grasses. Such fires if left unattended spread to the adjoining forest areas. Summers are

hot and dry from February to mid June during which forests are vulnerable to fires. Fires taking place at the end of winter and beginning of summer are not severe. Whereas, a fire in the hot summer is very harmful as it kills the young seedlings and coppice shoots of all major species and plantations. Severe fire causes considerable damage to the trees also by scorching their bases which ultimately leads to unsoundness and hollowness and renders them liable to attack by fungi and insects. Fire also indirectly cause soil erosion by destroying the soil cover as well as the organic matter.

Many valuable species of NWFP in the form of herbs, shrubs and climbers are also vanishing due to regular fire in the forest. Besides the damages to the flora of the forest, fire causes immense damage to the Fauna found in these forests. The worst sufferers are the lower animals like insects etc., amphibians, reptiles, mammals and birds nesting on the ground. Besides these the micro-organisms found in the surface soil are also destroyed. Fire incidences during 2001-02 to 2009-10 are given in the table below:

Table No.2.8 : Information Regarding Forest Fires:

Year	No of Cases	Extent of area burnt (in ha)
1996-97	45	536.00
1997-98	16	111.00
1998-99	25	500.50
1999-2000	11	253.35
2000-2001	71	739.00
2001-2002	51	1214.00
2002-2003	7	255.00
2003-2004	13	290.50
2004-2005	48	491.59
2005-2006	46	429.00
2006-2007	48	699.14
2007-2008	35	528.44
2008-2009	161	2213.15
2009-2010	82	928.80
2010-2011	149	1861.39
Total	808	11050.86

2.3.06 Improper Implementation of Working Plan Prescriptions. :- It has been observed that besides the above mentioned factors one very important factor, damaging the forest, is the non implementation or partial implementation of the prescriptions of the working plans. It has been observed that the very important Subsequent Operation Prescriptions are not given the required attention and most of the time they are not carried out. For example post felling operations are totally neglected. CBO, singling, tending, thinning, closure for grazing, and fire

protection are neglected.

2.3.07 Unscientific Harvesting of NTFP:- The valuable resource trees like Kulu, Dhaoda, Saja etc. are getting damaged due to unscientific methods of harvesting of gums and Kosa silk. Trees are burnt to harvest honey. Same is the case with various herbs and shrubs, their number is reducing very fast due to unsustainable harvesting. Tendu trees are felled to or heavily lopped to collect Tendu leaves.

2.3.08 Damage by domestic and wild animals. :- 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. Recently the Govt. of Maharashtra vide its G.R No.MFP-2103/Case No.135/F-1, dated 29.10.2007 has granted permission for grazing of sheep in the forest area including Gondia Division. 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 Gondia Division is, generally, very little. Chital and Nilgai, which are found allover and Bison, found near Nagzira sanctuary, 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.

2.3.09 Damage by insects, parasites and climbers. :- Teak suffers from attacks of defoliators (*Hyblia purea*) and skeletonizers (*Hapalia macharalis*), but the damage caused by the attack has not been quantified. 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.

2.3.10 Damage by drought, frost, wind and hailstorms.:- Frost is very rare in Gondia Division. Slight damage to young regeneration due to frost in the low lying areas of present Tirora range and Nagzira sanctuary was recorded during 1928-29 and 1936-37.

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. Hailstorm in the month of April and May sometimes damages Tendu leaves making them unfit for Bidi manufacture.

2.3.11 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 IIB

FAUNA

2.4 DESCRIPTION OF THE FAUNA: The human and cattle population density is varied in Gondia district in and around the forest area. The habitat for wildlife also shows wide variation, the wild animals are unevenly distributed in the Gondia Forest Division, though the forest of Gondia Division is by and large good. The forests of Gondia division belong to miscellaneous forest and are devoid of natural grass lands, essential for the growth of herbivores. Most of the wildlife is confined to the compact forest blocks of Navegaon, Arjuni Morgaon, Goregaon, Gothangaon, Chichgad, North Deori & South Deori ranges and adjoining areas of Nagzira WLS and Navegaon National Park , & New Nawegaon WLS. Besides these areas wild animals like Blue Bull, Barking Deer, Chital, and Panther are found in almost all ranges of the division. The data related to the population of Tiger and Panther seems to be not very realistic as it shows huge variation every year, it might be due to the overlapping areas of Gondia division and the Nagzira Wildlife Sanctuary and the Navegaon National Park. The territorial field staffs needs to be oriented in the field of wildlife management.

2.4.01 Wildlife and its management in Gondia Forest division have been discussed in detail in the Chapter XV, under Wildlife (Overlapping) Working Circle.

CHAPTER III

UTILIZATION OF FOREST PRODUCE

3.1 AGRICULTURE CUSTOMS AND WANTS OF PEOPLE

3.1.01 The Gondia Division falls in the Gondia District. The estimated population of the District as per census 2011 is about one million, which has been shown in the **Table No. 3.1**. About 62% of the population lives in the rural areas. The division is spread over Amagaon, Arjuni (Mor), Sadak Arjuni, Deori, Gondia, Goregaon, Lakhandur and Salekasa Talukas. About one-fifth of population is agriculturist and another one-eighth are agricultural labours. Bidi making engages about 15% of labour. The scheduled castes and the scheduled tribes make 17% and 14%, respectively, of the population.

Table No. 3.1. : Distribution of population among Talukas of Gondia District.

S.N.	Taluka	Area (in sq km)	Population per sq km.	Population in thousands
1	Amgaon	268.00	347	93
2	Arjuni Mor	1164.50	122	142
3	Arjuni Sadak	560.90	168	93
4	Deori	1060.10	64	72
5	Gondia	628.00	492	309
6	Goregaon	581.50	227	132
7	Lakhandur	519.00	218	113
8	Salekasa	616.00	149	92
	Total	5398.00	198	1046

3.1.02 There are three major, eleven medium and several minor irrigation tanks in the division. Several other medium and minor irrigation tanks are under construction. Paddy is the main agricultural crop. Nearly half of the agricultural areas are under double cultivation. Agriculturists have facilities of the Agricultural Produce Marketing Committees. Tribal sub-plan areas also have the monopoly procurement facilities under the Maharashtra Tribal Economic Condition Upliftment Act, 1956.

3.1.03 The year 2011 cattle census estimated 6.47 lakhs of the domestic animals in the district. Cows and bullocks make half, and buffaloes contribute about 14% of the domestic animals. Sheep and goats account for nearly one-fourth of such animals. Almost all cattle, sheep and goats graze in the forests.

3.1.04 Forests play very important role in the daily life of local population. They depend on forests for timber, poles, firewood, bamboo, fodder, grass, fruits as well as a number of non-wood forest produce for household consumption and sale.

3.2 WANTS OF THE PEOPLE

3.2.01 Timbers & Poles: There is a great demand of Teak timber and poles above 15 cm girth. People need timber wood for construction purposes, agricultural implements and furniture. Teak is the most preferred timber species. Besides teak, other species such as Ain, Bija, Dhaoda, Bhirra, Lendia, Kalam, Dhaman and Bamboo 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. Salai, Mowai and Semal logs above 45 cm are preferred for packing cases. Semal logs above 75 cm are also used in match industry.

3.2.02 Firewood: There is a great demand of firewood throughout the division. Dikamali, Garadi, Dhaoda are considered to be the best fuel species. Due to heavy demand inferior firewood of soft wood species like Salai and Mowai are also exploited. 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.

3.2.03 Bamboo: Bamboo is in great demand, required by Burads for making Bamboo articles and by local people for construction and repairs of their houses. It is also used as scaffolding material. The Bamboos rejected by the burads are either distributed among the villagers or sold in open auction. 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. The division has a large number of Burads (bamboo artisans), who make baskets, mats, dholis, etc., from green bamboo and sell them locally. Each Burad family may obtain supply of 1,500 green Bamboo per year from the designated depots at special low price (concession) fixed by the Deputy Conservator of Forests. Heavy demand for bamboos and the bamboo products provokes large-scale illicit cutting of bamboo.

3.2.04 Tendu Leaves : The collection of Tendu leaves provides an employment to the local people and it adds to their income. There are 29 tendu units in the division having productive capacity of 50400 standard bags.

3.2.05 Fodder and pasture: Grasses like Paunia, Sheda, Marvel and Mushan are used as fodder. The broom grass is collected and sold by the local villagers for broom making. Mainly green grasses are removed from the forest. Coarse grasses are used for thatching. Almost entire cattle population in villages in and around forest area graze in the forests. Present level of

grazing is much beyond the carrying capacity of forests. Goat and sheep grazing in the forests is generally not permitted, but quite common in the area.

3.2.06 Non-wood Forest Produce: The other forest produce which the villagers take from the forests are, edible flowers and fruits, fibres, gum, herbs, thorns, and leaves. They also use many plants of medicinal values. List of medicinal plants is in **Appendix No.XXVII**. The main species of edible flowers and fruits are Mahua, Char and Tendu. Fibres are extracted from Palas, Palasvel. Thorns of Bharati, Hiwar, Eruni, Chilhati, Ghoti, Bor and Babul are used. Cordage and lashings are made out from the bark of Kuda, Palas and sometimes Piwarbel. Besides these, Murum and stones are also removed for building and roads. Moha flowers and seeds, gum, fruits, bark, flowers, roots etc. are the main NTFPs required by the people. The thorny branches of Ber, Bharati, Babul, Chilati, etc., are used for fencing purposes. The vegetable growers use the thorny branches of Dikamali as supports.

3.3 OCCUPATION AND INDUSTRIES.

3.3.01 Bidi making: Local people get gainful employment during Tendu leaf collection season from the last week of April to mid-June. Gondia is also a major centre of the bidi manufacturing.

3.3.02 Bamboo articles: Burads make their living by making baskets, mats, dholis, etc. from bamboos. They sell most of their products locally.

3.3.03 Sawmills: The division has 48 sawmills and most of these sawmills may require shifting or closure in light of the *Supreme Court's judgement*.

3.3.04 Furniture making: Large number of furniture shops exists in urban as well as rural areas of the division, but quantum of wood consumption in furniture making is not well recorded in the division. It is commonly perceived that illegally felled wood is often used for furniture making.

3.3.05 Tussar cultivation: Arjun plantations in some areas of the division were under the tussar cultivation, but such activities are not permitted at present for want of proper authorisation.

3.3.06 Lac: The forests are suitable for lac cultivation mainly on the Palas trees, but the practice is almost discontinued in the forest tracts. Lac cultivation requires special focus to provide employment and economic returns to local inhabitants.

3.3.07 Non-wood Timber Forest Produce: Villagers living near forests collect a variety of non-wood forest produce such as Moha flowers, Moha fruits, charoli seeds, gum, honey, etc. for their household consumption and sale in the local market.

3.4 MARKETS AND MARKETABLE PRODUCE :-

3.4.01 Depots and markets:

Timber & Poles :- The forests of Gondia Division produce Timber, Poles, Fuel-wood and few Bamboos. Teak and Sisham are the foremost species followed by Bija, Tiwas, Haldu, Saja,

Chichwa, Dhaora, Bhirra, Rohan, Kahu and Kasai. Softwood like Salai, Mowai and Semal are in demand for packing cases. Teak, Garari, Lendia and Dhaora poles are used for agricultural implements, sheds, house construction, etc. Garari, Dhaora and Dikamali are considered to be good firewood.

Timber, Poles and Firewood after extraction of coupes are brought to sale depots for auction sale and minor supply. Therefore this forest produce is locally consumed through minor consumers or is purchased by traders from outside, mostly from Nagpur. These forests are rich in valuable wood like teak, sisham, bija, saja, surya and dhaora. Timber, poles, firewood and bamboo are graded according to the length, girth and quality classes and sold in public auction at the timber depots. Dongargaon and Nawegaon are main timber depots of the division. Firewood is also sold in public auction at the permanent or the temporary depots at Deori, Chichgarh Kohmara, etc. Nawegaon is a major bamboo depot. However, bamboo is also auctioned in temporary depots at Chichgad, Salekasa, etc. The offence material, that is, wood seized in offence cases, is usually sold at the range or round headquarters. Gondia, Nawegaon, Lakhandur, Sakoli, Bhandara, Nagpur and Raipur are main timber markets in the region.

3.4.03 Bamboo: The division is known for its bamboo production, but the productive bamboo areas are shrinking. Bamboo is in great demand, required by Burads for making Bamboo articles and by local people for construction and repairs of their houses. It is also used as scaffolding material. The forest department is supposed to give them 1500 Green long Bamboos annually. The Bamboos rejected by the burads are either distributed among the villagers or sold in open auction.

3.4.04 Tendu leaves: The collection of Tendu leaves provides an employment to the local people and it adds to their income. The division has about 29 Tendu units yielding Gondia is a major Tendu leaves producing division yielding about 50,400 standard bags fetching more than 3 crores rupees as revenue.

3.4.05 Khus grass: Grasses like Paunia, Sheda, Marvel and Mushan are used as fodder. The broom grass is collected and sold by the local villagers for broom making. Mainly green grasses are removed from the forest. Coarse grasses are used for thatching. Khus grass is extracted in some areas for making cooler mats.

3.4.06 Non-wood forest produce: The other minor forest produce like Moha flowers, Charoli, Gum etc. are collected by the locals and sold in the weekly markets at different villages. Tendu leaves are sold in auction along with other division of the state. Part of these leaves is purchased by the local manufacturers and rest are sold to the manufacturing units outside the district. Moha flowers, Moha seeds, gum, lac, wax, honey, Hirda, Beheda, Aonla and a variety of fruits and plant materials are collected for sale.

3.5 LINES OF EXPORT

3.5.01 Railroad connection: The division has excellent road and rail connections, and therefore, timber and other forest produce can conveniently be transported to any part of the country. The division falls on the major Mumbai–Howrah broad gauge rail route. Gondia–Chandrapur railway line passes through Goregaon, Sadak Arjuni, and Arjuni Morgaon ranges.

3.5.02 Highways and major district roads: The Mumbai–Kolkata National Highway No.6 passes through the division. Other important State Highways and major district roads worth mentioning are Gondia–Tiroda–Tumsar–Bhandara Road, Gondia–Arjuni Road, Gondia–Sakoli–Lakhandur Road, Kohmara–Gondia Road, Gondia–Amgaon–Deori–Chichgarh Road and Gondia–Sakoli–Sangarhi–Navegaon Road.

3.5.03 Forest roads: A network of forest roads criss-cross the division. Many of these roads have been upgraded to tar roads and are being maintained by the Public Works Department and the Zilla Parishad. The division maintains the remaining forest roads according to the requirement and availability of funds.

3.6 METHOD OF EXPLOITATION AND COST

(A) MAJOR FOREST PRODUCE (TIMBER AND FIREWOOD)

3.6.01 Agency for Harvesting : Till 1980 forest coupes for timber and firewood were worked through 3 Agencies, viz. The Forest Department, the Forest Labourer's Co-operative Society and the Contractors. However, as per the policy decision taken by Government of Maharashtra vide its R & FD No. FCT/1581/93544/F-1, dated 04/04/1981, harvesting by contractors was totally stopped, with few exceptions, with effect from July 1981. Now main felling and thinning coupes are either worked departmentally or through Forest Labourers Co-operative Societies (FLCS). The coupes of subsidiary silvicultural operations are worked departmentally.

Marking of coupes is, normally, done a year before the coupe is due for main felling. Estimates are prepared and approved by the competent authority as per due process before starting the coupe operations and the felling starts after the end of rainy season. Trees marked for felling are categorised as timber or fuel wood trees for the purpose of volume estimation of timber and fuel wood. Chalk timber is sold separately.

3.6.02 The timber and pole 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.

3.6.03 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.

3.6.04 All the logging operations are done by engaging local labourers in the departmental working and by the members of the FLCS in case of coupes worked by FLCS. Most of the items of work are done on fixed job rates.

3.6.05 Cost of Harvesting: All the coupe operations ranging from coupe demarcation and marking to the transport of forest produce and making lots in the sale depots, 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 (*Rahnuman Bhatta*) are also taken into consideration. The piece-work rates are fixed at circle level in Wage Board meeting.

(B) Minor Forest Produce (MFP) or Non Timber Forest Produce (NTFP):

- 1. Grass:** Grass from closed coupes and plantations are available as on cutting basis and are free or on rated passes.
- 2. Tendu Leaves:** Tendu leaves trade has been nationalized by the Govt. of Maharashtra and its collection and sale is regulated by the provisions of the Act No. LVII of 1969. The area of Gondia division is divided into 29 units which are sold on modified lump-sum basis by way of open tender. The rates of collection of tendu leaves and target are fixed by the Govt. The collection of tendu leaves commences from the last week of April each year and continues up to the first week of June. Tendu leaves are collected by engaging labourers who deliver the leaves at various collection centres called 'Phadis'. At each centre the leaves are then packed in gunny bags. The quantity of tendu leaves is measured in standard bags. A bag containing 1000 pudas is known as a standard bag. A small portion of these leaves is also used locally for manufacture of bidis.
- 3. Other Minor Forest Produce:** Gum units are sold in open auction and annual lease is given to the petty contractors for their collection. Gum unit coincides with the round boundaries.
- 4. Gum Collection:** 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) Act, 1997 as ACT No. XIX of 1997 on 10th December 1997. According to section 4 of the Act the ownership of the M.F.P found in

the Government lands in the Scheduled Areas, excluding the Nagar Panchayat and Samitee, 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 those Panchayats area. The list of M.F.P covered under the Act is specified in the schedule. The species of state significance such as Tendu, Apta and Bamboo have been excluded from the purview of the Act.

3.7 MECHANISED LOGGING UNIT

3.7.01 A mechanised logging unit headed by the Logging Officer was established at Navegaon Bandh in 1965 for efficient harvesting, efficient conversion and speedy transportation by using improved basic logging tools and mechanised equipment. This programme was taken up to tackle difficult coupe working in the hilly, inaccessible and difficult terrain of Gothangaon, North Deori, South Deori and Chichgarh ranges. A workshop under the charge of the Workshop Superintendent looks after maintenance of trucks and other vehicles of the division. The workshop has a team of technical workers. In addition, the unit has a sawmill for conversion of timber of low economic value into utilisable sawn sizes.

3.8 PAST AND CURRENT PRICES :

3.8.01 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. The average rates for the timber, poles and fuel stages during 2000-01 to 2010-11 are given below in **Table No. 3.2.**

Table No.3.2:

Average Rate for Timber per cum.

Year	Teak Pole	Non Teak Pole
2000-01	14145	3508
2001-02	14787	3350
2002-03	1782	4069
2003-04	4440	1664
2004-05	20069	4938
2005-06	18196	5486
2006-07	21000	6000
2007-08	23000	6800
2008-09	24500	7300
2009-10	26500	7700
2010-11	28000	7900

Table No.3.3:
Average Rate for Each Pole (Rs):

Year	Teak Pole	Non Teak Pole
2000-01	136	52
2001-02	99	63
2002-03	155	48
2003-04	122	52
2004-05	102	33
2005-06	160	72
2006-07	200	95
2007-08	250	105
2008-09	280	125
2009-10	320	140
2010-11	350	150

Table No. 3.4 :
Average Rate for each Fuel wood (Rs) :

Year	Teak Stack	Non Teak Stack
2000-01	1171	421
2001-02	1539	445
2002-03	1810	502
2003-04	405	447
2004-05	1507	636
2005-06	2788	895
2006-07	3000	935
2007-08	3200	1000
2008-09	3600	1200
2009-10	4100	1300
2010-11	4300	1350

CHAPTER IV

STAFF AND LABOUR SUPPLY

4.1 STAFF.

4.1.01 The Gondia Division was carved out of the erstwhile Bhandara Division in January 1961. The division had five ranges, namely Amgaon, Chichgarh, Gondia, Pratapgarh and Rajoli. The administrative charges; ranges, rounds and beats, were reorganised again in June 1981 creating Deori, Goregaon and Salekasa ranges. Some of the compartments were handed over to Gondia division for their subsequent inclusion into Navegaon National Park. Additional staff was created under the Employment Guarantee Scheme to take care of increased workload under the scheme. The present staff position in the Gondia Division is given in **Table No. 4.1** below.

Table No. 4.1 : The Staff Position in Gondia Forest Division.

S.N.	Designation	Pay Scale In Rs.	Permanent posts	Temporary posts	Total
	Gazetted Officer				
1	Deputy Conservator of Forests	15600-39100-6600	1	-	1
2	Assistant Conservator of Forests	9300-34800-5000	4	1	5
3	Range Forest Officer	9300-34800-4400	11	4	15
4	Workshop Superintendent	9300-34800-4400	1	-	1
5	Office Superintendent	9300-34800-4400	1	-	1
	Non-gazetted field officials				
5	Forester	5200-20200-2400	61	13	74
6	Surveyor	5200-20200-2400	2	-	2
7	Driver	5200-20200-1900	9	1	10
8	Police Constable	5200-20200-1900	1	-	1
9	Forest Guard	5200-20200-1800	235	98	333
10	Cleaner	4440-7440-1300	4	-	4
11	Forest labourer	4440-7440-1300	507	-	
	Other non-gazetted officials				
12	Chief Accountant	5200-20200-4200	1	-	1
13	Accountant	5200-20200-2800	12	3	15
14	Junior Statistician	5200-20200-2400	1	-	1
15	Store Keeper	5200-20200-2400	1	-	1
16	Lathe man	5200-20200-2400	1	-	1
17	Mechanic	5200-20200-2400	3	-	3

S.N.	Designation	Pay Scale In Rs.	Permanent posts	Temporary posts	Total
18	Clerk	5200-20200-1900	18	8	26
19	Welder	5200-20200-1900	1	-	1
20	Electrician	5200-20200-1900	1	-	1
24	Daftari	4440-7440-1300	1	-	1
25	Chaukidar	4440-7440-1300	11	1	12
26	Caretaker	4440-7440-1300	5	-	5
27	Peon	4440-7440-1300	7	1	8
28	Mali	4440-7440-1300	2	-	2
29	Khalashi	4440-7440-1300	1	-	1
30	Sweeper	4440-7440-1300	1	-	1
31	Water man	4440-7440-1300	1	-	1
32	Sawyar	4440-7440-1300	1	-	1
33	Naik	4440-7440-1300	1	-	1
		Total	907	130	1037

4.1.02 In the year 1982 reorganisation of the forest department took place with a view to remove the unwieldiness of administrative changes to make them manageable for efficient administration. Government vide its G.R.No.FDN-1081/76/03-F-2, dated 11/06/1981 sanctioned reorganisation of ranges and beats with effect from 1.9.1981. Each range was provided with 1 Clerk and Accountant. The post of accountant was created vide GR No FDM-1879/CR-17-F-2 dated 11/06/1981. One post of Junior Statistical Assistant was created at each Division vide GR No.FDM-1081/76710/F-2/dated 12/05/1981 to collect accurate statistical data for forestry development programme. Gondia Division is headed by an officer of the rank of Deputy Conservator of Forests and its head quarter is located at Gondia.

4.1.03 On the basis of recommendations of the Tata Consultancy Services (TCS) the field charges up to Range level had been further reorganised into two distinct categories, namely, the Protection and the Development charges since 2000. The objective was to optimise the work load at Beat, Round and Range level with a view to improve efficiency of performance and ensure accountability.

4.1.04 Considering experiences of working in Protection Ranges and Development Ranges and based on difficulties faced during working; the Protection Ranges and Development Ranges have been merged into one single range.

4.1.05 The details of the manpower, including the office and field staff in the Gondia Forest Division are given in **Table No. 4.2** shown below.

Table No. 4.2 : Statement Showing Sanctioned Filled up & Vacant Post in Gondia Division as on 31st December 2012.

Designation	Sanctioned	Filled up	Vacant post
<u>A. Gazetted Officers</u>			
Dy. Conservator of Forests	01	01	00
Assistant Conservator of Forests.	05	05	00
Range Forest Officers	15	11	04
Office Superintendent.	01	00	01
<u>B. Non Gazetted Staff</u>			
Surveyor	02	02	00
Forester	74	68	06
Forest Guard	333	298	35
Junior Statistical Assistant	01	01	00
Chief Accountant	01	00	01
Accountant	15	14	01
Clerk	27	25	02
Driver	10	10	00
Mechanic	03	03	00
Cleaner	04	01	03
Daftari	01	01	00
Peon	08	07	01
Chaukidar	12	11	01
Store keeper	01	01	00
Police -constable	01	00	01
Naik	01	00	01
Lethman	01	00	01
Sawyer	01	00	01
Welder	01	01	00
Mali	02	02	00
Khalashi	01	01	00
Sweepar	01	01	00
Waterman	01	00	01
Electrician	01	00	01
Boda Rakshak	05	00	05

Total	530	464	66
Van Kamgar	507	507	00
Grand Total	1037	971	66

4.2 LABOUR SUPPLY.

4.2.01 The labour supply is adequate, except in July and August when paddy is transplanted, & after September the labour supply is adequate. But with proper planning of forestry work, during the above period, labour can be made available for forestry works. Paddy works are done when the rains are sufficient to fill the paddy fields. Therefore, if the plantations are started as soon as on set of rain they can be completed by the time the field are ready for paddy transplantation.

4.2.02 The erstwhile forest villages, which were established with the object of supplying adequate and assured labour for the various forestry operations have since been declared as revenue villages vide Government Notification No.3675/87519-F-6, dated 24.06.1977. The administration of these villages is with the revenue department. However, labourers from these villages are continued to be engaged for various forestry works in the division.

CHAPTER V

PAST SYSTEMS OF MANAGEMENT

5.1 GENERAL HISTORY OF THE FOREST

5.1.01 The earlier Bhandara (including the newly created Gondia district) district was formed in 1821 by combining areas of Nagpur Territory and Part Wainganga. Marathas ruled Bhandara up to 1853. Consequent to the death of Raghuji III in 1853, the district became British territory by the Doctrine of Lapse. Short-term settlements of land revenue were carried out during the Maratha rule by the appointment of an official called Mamlatdar who collected the land revenue. During the British rule Zamindari rights were conferred on the persons who had held possession of land for a long time and who were capable of paying revenue to the Govt. Removal of forest produce from the land constituted a major portion of the revenue. Consequent to the enactment of the Indian Forest Act in 1878, large areas of forests in the possession of the Zamindars were declared as Reserved Forests, while the remaining forests remained with the Zamindars till the abolition of the Proprietary Rights by way of the M.P. Abolition of Proprietary Rights (Estates, Mahals and Alienated Lands) Act of 1950. As a result all the private forests were vested with the State Govt. with effect from 1st April 1951. Good forest patches thus taken over by the Revenue department were subsequently transferred to the forest department for management. These forests were declared as Protected Forests under Section 29 of the Indian Forest Act 1927. Subsequently some of these Protected Forests were declared as Reserved Forests under Section 20 of I.F.A. 1927.

5.1.02 While the Reserved forests are managed under the working plans since 1897, the ex-proprietary Forests were brought under scientific management at a much later stage.

5.1.03 Management history of the Reserved Forests can be studied under three periods: (a) pre-reservation period from 1853 to 1878, (b) early reservation period from 1879 to 1893, and (c) regular forest management using the working plans since 1893.

5.2 FOREST BLOCKS BEFORE FOREST RESERVATION: 1853-1878

5.2.01 There was no organized management of the forests. The forests were open to indiscriminate felling and grazing by any one paying the prescribed fee. The Zamindars rights were given to the persons holding possession of the lands. They used to earn considerable revenue from the removal of forest produce. The areas adjoining the villages were excessively harvested and grazed upon. The aborigines also practiced shifting cultivation. Seeing the destruction caused to the forests it was decided to bring about some control in the exploitation of the forests and to introduce scientific forest management. Hence, the Forest Department was

created in 1862 with the specific purpose of surveying and demarcating the forests and also the preparation of map.

5.3 FOREST BLOCKS SOON AFTER RESERVATION: 1879 TO 1893

5.3.01 After the enactment of the Indian Forest Act 1878, the good forests in the possession of Zamindars were declared as Reserved Forests in 1879 as a the first step towards proper management of the forest resources. Trees like *Teak*, *Bija*, *Shisham*, *Kusum*, *Haldu* and *Kullu* were reserved and could not be removed without a license. The felling of fruit trees was also banned. The felling of fruit trees of *Mahua*, *Harra* and *char* was also prohibited. Thus, there was no scheme to regulate the felling because of which purchasers could fulfil their requirements from anywhere they liked, which resulted in over harvesting of accessible areas as the purchasers could obtain their requirements from anywhere they liked. This resulted in over harvesting in accessible areas, while the inaccessible areas were left untouched.

5.4 FOREST BLOCKS UNDER THE WORKING PLAN SINCE 1897

5.4.1 The working plan for the Reserved Forests of the old Pratapgarh Range (1897–1910) was the first working plan for the Gondia Division. Later, working plans were prepared for the entire Bhandara Division, which also included the Gondia Forests. The authors of the successive four working plans are J. W. West (for 1910–1930), Chadha (for 1930–1940), Jagdamba Prasad (for 1940–1957) and Trivedi (for 1957–1977). The last working plan prepared by M.G.Sardar, P.J. Gurjar and S.G.Joshi for the period of 1981-82 to 1995-96 covered the entire Reserved Forests including all the Forest Blocks of the Gondia Division and area reserved in 1977-1978.

5.5 WORKING PLAN FOR THE PRATAPGARH RANGE 1897–1910. :

5.5.01 This working plan covered all the Forest Reserves in the present Gondia Division. The well-stocked areas were worked under the Improvement Working Circle with thirty-year felling cycle. Fixed number of standards was reserved from felling. The best stems were removed till 1903, and thereafter all tress except the reserved tress were extracted resembling the Coppice-with-standard system. Annual coupes were closed to grazing for ten years. Prescribed seed sowing was not implemented. Removal of bamboo and dry wood was permitted in the remote and inaccessible areas of the Unworkable Working Circle, and the inferior forests of the Grazing Working Circle. Bamboo was extracted on three-year cycle, and grazing was permitted.

5.6 THE BEST'S WORKING PLAN 1910–1930.:

5.6.01 The Best's Plan had High Forest and Coppice-With Standard working circles, and the Bamboo (Overlapping) Working Circle.

5.6.02 The High Forest Working Circle with fifteen-year felling cycle had areas capable of growing large-sized trees of valuable timber. The entire old Pratapgarh Range constituted on felling series. The improvement felling combined with removal of the mature and over mature

trees was prescribed. The minimum exploitable girth for *Teak*, *Saja*, *Bija*, *Tendu*, *Semal*, *Arjun*, *Moha* and *Kusum* was 180 cm GBH. The exploitable GBH for *Lendia*, *Dhaora*, *Salai*, *Shivan*, *Jamun*, *Haldu* and *Bhirra* was 150 cm, while other species were extracted at 135 cm GBH. Many mixed poor forests were included in this Working Circle to obtain easy boundaries, and forests containing valuable trees worked heavily during the earlier plan were excluded without proper justification. The light working resulted in congestion of the crop and reduction in the natural regeneration.

5.6.03 Coppice-With-Standards Working Circle had thirty-year felling cycle. Only sound 75 sound first-class trees and well-grown Harra capable of producing large sized timber were to be reserved in a hectare. In hills, all sound first class trees were to be reserved, and the number of standards was to be increased in better quality forests. In the absence of trees of first class, trees of second class were to be reserved. *Bija*, *Shisam*, *Tinsa*, *Saja*, *Surya*, *Moha*, *Bhirra* and *Dhaman* were the first class species, while *Arjun*, *Garari*, *Lendia*, *Dhaora*, *Tendu*, *Rohan*, *Khair*, *Hiwar*, *Amaltas*, *Siwan*, *Haldu*, *Kusum*, *Parad*, *Mundhar* and *Hirda* were the second class species. The remaining tree species were identified as the third class. The working generally benefited the growing stock, and the resultant crop was straight, sound and well formed.

5.6.04 Light thinning was started after the Farington's tour to then Bhandara Division in 1922, and was carried out on a small scale. The thinning benefited the crop.

5.6.05 Bamboo (Overlapping) Working Circle prescribed three-year cycle. Bamboo was not to be felled above 90 cm. The instructions included retention of all current year bamboo culms and half of the green culms in a clump.

5.7 THE CHADHA'S WORKING PLAN: 1930–1940

5.7.01 The entire forest area was stock mapped at four-inch-to-a-mile scale, and forests were divided into compartments. The High Forest, the Simple Coppice and the Miscellaneous Working Circles were formed on the basis of the stock maps. Similarly, the Bamboo (OL) Working Circle was also defined.

5.7.02 High forest working circle: Compact forests containing good percentage of *Teak*, *Bija*, *Saja* or *Surya* and capable of producing large-sized timber as well as the remote hilly areas with little demand for forest produce constituted the High Forest Working Circle. The felling cycle for the two series in the old Pratapgarh Range was fixed as twenty years. The operations included (a) the *rab burning* in the year of main felling, (b) cutback of suppressed, damaged and malformed advanced growth, (c) opening of canopy in areas having established regeneration, (d) removal of unsound, crooked and malformed trees, (e) thinning in the congested crops, (f) removal of mature trees above 120-cm GBH and (g) clear felling of poor quality mixed forests.

Generally, the entire annual coupes could not be worked, and only selected patches of Teak and other valuable species were harvested. Unworked forests in the remaining areas of the coupes resulted in congestion and deterioration of the crop.

5.7.03 Simple Coppice Working Circle: All the remaining mixed forests were worked under the simple coppice system with thirty-year rotation in quality IVa crop and forty-year rotation in the IVb forests. The main object of management was to produce poles of 30 cm to 60 cm girth. The prescriptions included clear felling in well-stocked areas of the main coupes and thinning at half the rotation age. All Moha and Khirni trees as well as ten Arjun trees along the streams were protected from felling and the list was enlarged in 1932 to include Semal trees up to 105-cm GBH. The system was later on modified to the Coppice-with-Reserve System, and all trees up to 30 cm GBH were kept as reserves. Rohan and Parad trees proved to be beneficial in the eroded and calcareous areas. Garari started dominating in the clear felled areas compromising the growth of valuable species like Bija and Saja. Subsequent thinning helped in producing healthy and well-grown poles.

5.7.04 Miscellaneous Working Circle: The Miscellaneous Working Circle included unworkable areas, forest villages, mining leases, irrigation project areas and areas under the lac cultivation. Lac was to be extracted departmentally.

5.7.05 Bamboo (Overlapping) Working Circle: The prescriptions in the bamboo areas included retention of all current-year bamboo culms and at least eight culms of over one year in age in each clump. All dead bamboos were to be removed. The height of cutting was not to exceed 45 cm.

5.8 THE PRASAD'S WORKING PLAN: 1940–1957

5.8.01 The stock maps of areas under the High Forest Working Circle were revised. Newly constituted Reserved Forests in the Palastola, Dewangota and Rajoli blocks were stock mapped and divided into the compartments. The plan set up five area-specific (High Forest, Improvement, Coppice-with-Reserve, Miscellaneous and Plantation) and two overlapping (Bamboo and Semal) working circles.

5.8.02 High Forest Working Circle: Forests of the High Forest Working Circle in earlier plans were retained this Working Circle. The Conversion-to-Uniform System with four periodic blocks was applied in the area, and the conversion period was fixed at eighty years. *Teak* followed by *Shisam*, *Tinsa*, *Bija* and *Semal* were the main species to be favoured. The prescriptions for the PB I areas included clear felling in areas having sufficient established regeneration of seedling or coppice origin after retaining promising teak saplings and poles up to 50 cm GBH. After removing all teak trees above 90 cm, improvement felling was to be carried out in the crop. Felling in the understocked or blanks areas was restricted. Harvesting of poor

quality mixed forests under the Coppice-with-Reserve system was permitted to meet the demand. Teak plantations after clear felling of the mixed forests were recommended. Cleaning and thinning were laid down in fifth and eleventh year, respectively. Removal of all teak trees above 90 cm resulted in significant loss of seed bearers, shrinkage of the teak areas and forests becoming poorer in teak. Natural regeneration of teak was generally unsuccessful. Since bamboo clearance was not prescribed, bamboo growth hampered natural regeneration. Suppressed and useless teak trees were also retained at many places. Natural as well as artificial regeneration was not properly addressed. The CWR working was to be done in poor forests, but was applied in some good quality forests defeating the objectives of the High Forest Working Circle. Even the reliance on coppice regeneration was contradictory to the objects of the High Forest System. Some areas were not suitable for this system.

5.8.03 Crown thinning favouring trees in 112.5–150.00 cm GBH was directed in the PB II area. For the un-allotted PBs III and IV, thinning in favour of trees having 50–112.50 cm GBH was prescribed in congested stands forty years in advance of main felling. Dead, diseased and over-mature trees (above 150 cm GBH) were to be removed. Most areas of the PB II were on precipitous and very steep slopes, and were unfit for any kind of working. Some areas of PB III and IV were suitable for allotment to the PB I, and wantonly felling of over mature trees without silvicultural considerations caused extensive damage. Cleaning and thinning were generally not carried out causing congestion and suppression in the crop.

5.8.04 Improvement Working Circle: Areas of the High Forest Working Circle in the previous plans considered unsuitable for the working circle were included in the Improvement Working Circle. Silvicultural felling was prescribed on forty-year cycle with exploitable girth at 150 cm GBH for *teak*, *Saja*, *Bija* and *Mundhar* and 90 cm GBH for *Lendia*, *Surya*, *Tinsa* and *Dhaora*. The species to be favoured were *Teak*, *Shisham*, *Tinsa*, *Bija* and *Semal*. The main prescriptions were removal of all (a) dead and diseased trees, (b) silviculturally available trees above exploitable girth, (c) wolf trees and (d) overhead cover over the straight and healthy poles (up to 62.50 cm GBH) of valuable species such as *Teak*, *Bija*, *Tinsa* and *Shisham*. Thinning was prescribed in the group of teak poles. Since the crop was mostly mature and all the mature trees were removed. Further, trees below the selection girth were also felled without assigning reasons for the removal. Thus, the CWR working was applied over this area.

5.8.05 Coppice-with-Reserve Working Circle: The CWR system with forty-year cycle was prescribed to meet demands for poles and small timber. Felling was prohibited in the understocked, the climber-infested and the lac-bearing areas as well as on the steep slope and along the large streams. Felling of Moha trees near inhabited villages, Semal and Kullu trees was also prohibited. The CWR working prescribed minimum of seventy-five standards per

hectare. All seedlings and saplings up to 22.50 cm GBH and Bija trees up to 90 cm GBH were reserved. On sites having sufficient regeneration of seed or coppice origin, reserved trees included isolated Teak trees of any shape and sound, straight and well-grown poles of *Teak*, *Shisham*, *Saja*, *Tinsa*, *Haldu* and *Siwan* having 60 cm GBH. In case of insufficient regeneration, most of the species, other than *Lendia*, *Dhoban*, *Gongal*, *Mokha*, *Baranga* and *Mowai* were to be kept as reserve irrespective of their sizes. Number of reserved trees was also to be kept much higher. Thinning was prescribed in the eleventh year. Crown thinning was prescribed after twenty years of main felling. The thinning rules included felling of all Garari poles above 40 cm GBH and dense clumps of bamboo. Soon after introduction of the plan, the prescriptions were modified to include removal of dead, dying and over matured trees in the under-stocked, erosion-prone and climber-infested forests. Similar removal was also prescribed in the High quality Saja-dominated mixed forests, areas having good quality grass and large proportion of financially immature trees. Tendu, chinch, Mango and Hirda were added in the list of reserved species. Garari was excluded from the reservation. Bija, Dhaora and Bhirra were added in the list of reserved species in areas having sufficient regeneration. Larger GBH trees were to be preferred as reserves.

5.8.06 The number of trees to be reserved became satisfactory after the modification. The prescriptions generally worked well, but they did not provide concentrated working in Teak patches. In spite of the restrictions, good quality non-teak forests were felled heavily at many places. The eleventh-year thinning was not carried out leading to suppression in teak in many areas, but the crown thinning after the twentieth year was carried out fairly regularly. Garari poles over 40 cm GBH were to be removed to get another pole crop of similar size during the second half of the rotation. This expectation proved to be erroneous, and the growth was slower.

5.8.07 Miscellaneous Working Circle: The areas of forest villages, mining leases, irrigation projects and lac areas as well as unworkable compartments (224, 225B, 226B, 245B, 251 and 252) were included in the Miscellaneous Working Circle.

5.8.08 Bamboo (Overlapping) Working Circle: The Bamboo (Overlapping) Working Circle covered the bamboo-bearing areas. The harvesting was prescribed with four-year cutting cycle. All current-year culms and a minimum of eight culms were to be retained in each clump. The height of the cutting was to be kept at or below 45 cm from the ground. All dead culms were prescribed for removal. In practice, the procedure of extraction on rated passes made it difficult to enforce cutting prescriptions, and resulted in overexploitation of the clumps near villages and unworked clumps in the remote areas.

5.8.09 Semal (Overlapping) Working Circle: Harvesting of Semal trees above 120 cm GBH was proposed in the Semal (Overlapping) Working Circle with twenty-year felling cycle. The extraction was done in the period 1939-40 to 1954-55.

5.8.10 Plantation Working Circle: Teak plantations on suitable sites were prescribed in the mixed forests. The plantations were raised during 1940-41 to 1955-56, but were unsuccessful due to poor site selection and improper care.

5.8.11 Advance Working: Advance working in coupe XIII of the High forest and the Improvement Working Circles as well as in coupe XXIII of the CWR Working Circle was carried out during 1951-52 in order to obtain more revenue.

5.9 THE TRIVEDI'S WORKING PLAN: 1957-1977 (extended till 1979-80)

5.9.01 After correcting the stock maps, wherever required, the four area-specific (Selection-cum-Improvement, CWR, Pasture and Miscellaneous) and two ((Bamboo and Lac) overlapping working circles were prescribed.

5.9.02 Selection-Cum-Improvement Working Circle: The Selection-cum-Improvement Working Circle had twenty-year felling cycle. The preferred species were teak, Shisham, Bija, Saja, Semal, Tinsa, Dhaora, Bhirra, Surya, Lendia, Salai and Garari. The better quality forests had higher harvestable girth than the inferior quality forests. Harvestable girth for teak, Bija, Saja and Haldu was 135 cm and 120 cm GBH. Harvestable girth (GBH) was 120 cm and 95 cm for Shisham and 90 cm for Bhirra and Salai. Garari had 60 cm and 45 cm GBH for the harvestable girth. All trees of Semal, Kulu and Hirda and sound trees of fruit-yielding species like Moha, Tendu, Khirni, Achar and Bhilawa were reserved against felling. Removal of only dead and dying trees were permitted in the type-I areas, which included precipitous and steep slopes, understocked areas of density up to 0.4, erosion-prone areas and twenty-meter buffer along rivers and streams. Extraction was limited to only half of trees above harvestable girth in the remaining type-II areas. Crown thinning was prescribed in the even-aged crop, and dense patches having profuse teak regeneration were to be clear felled. Suppressed and malformed advance growth was to be cut back. Singling of coppice shoots and coppicing malformed saplings of valuable species were laid down. The cutback operations in the following year, cleaning in the sixth year and thinning in the eleventh year were also prescribed.

5.9.03 The prescriptions of retention were seldom followed, and some areas had insignificant proportion of mature trees. The resultant crop was depleted in density and proportion of mature trees. Cleaning and thinning was generally not applied, and malformed advance growth of teak also was not cutback. Although necessary, cleaning and thinning in the mixed crop was not prescribed at all. Recurrent annual fire badly damaged the natural regeneration.

5.9.04 Coppice-with-Reserve Working Circle: Quality IVa forests mixed with patches of III and IVb were worked under the Coppice-with-Reserve Working Circle with fifty-year rotation. The preferred species were Teak, Bija, Tinsa, Shisham, Saja, Semal, Siwan, Salai and Siras in this order. Removal of only dead and dying trees were permitted in the type-I areas defined similar to the Selection-cum-Improvement Working Circle. The Divisional Forest Officer had discretion to mark and fell silviculturally available over-mature trees in the stream buffer. All Kullu, Hirda, fruit bearing species like Moha, Achar, Tendu, Mango, Imli and Khirni and sound trees of Semal, Kusum, Palas, Ghont and Ber were reserved from felling. Half of the trees above harvestable girth in quality III forests in the type II areas were to be felled. Crown thinning and opening up of advanced growth of teak was prescribed in manner similar to the Selection-cum-Improvement Working Circle. The harvestable girth (GBH) was fixed at 45 cm for Garari, 90 cm for Bhirra and Salai, 105 cm for Shisham and 120 cm for teak, Bija, Saja and Haldu. Thinning was prescribed in the congested crop. Moderately stocked and well-stocked areas on the quality III sites were identified as the type III areas. Miscellaneous species and bamboo interfering the growth of valuable species were to be removed. Some poles of Teak, Bija, Semal, Saja, Bhirra and Dhaora were to be retained for providing shade and protection to young growth.

5.9.05 In patches of inadequate regeneration and medium to low stocking, 100 to 125 reserve trees (standards) per hectare were prescribed. Sound trees of Bija and Haldu up to 90 cm GBH, Shisham and Salai up to 60 cm GBH and other species (except Garari) up to 30 cm GBH were to be retained. In patches of well stocked forests having adequate regeneration, all sound trees of Bija and Haldu up to 90 cm GBH, Shisham and Haldu up to 60 cm GBH were to be reserved. Sound and well-grown trees of Teak, Saja, Tinsa, Siwan and Bhirra up to 90 cm GBH in IVa and IVb areas and Teak and Saja trees up to 150 cm in the quality III areas were to be reserved. Not less than 75 trees per hectare of seedling origin were to be reserved. Reserves included all well grown advance growth (except Garari) up to 22.5 cm GBH.

5.9.06 As the prescriptions were cumbersome, the staff could not follow and properly implement the prescriptions. Consequently, all trees, except 50–75 standards per hectare, were removed. Further, standards also included inferior species and advance growth resulting in depletion of the valuable species like Bija, Saja, etc. Species like Saja, Bija, Rohan, Dhaora, Bhirra and Haldu did not coppice well, and annual fires adversely affected establishment of the regeneration. Thus, the forests became poorer in valuable species and the extent of understocked areas increased. The cutback operations, cleaning and thinning were not prescribed for non-teak species, and operations were not scrupulously followed in the teak areas. The subsequent crop had suppression among valuable species and malformation in the advance growth.

5.9.07 Pasture Working Circle: Most areas covered in the Pasture Working Circle had become understocked due to heavy grazing, fire and regeneration failure. Each grazing had two sections, which were to be closed to grazing alternatively during the monsoon period from 1st July to 21st October. The Conservator of Forests had authority to sanction harvesting of mature trees in the well-stocked areas. Planting of fodder grass as well as fodder and shade trees were prescribed. In the areas, no efforts were taken to introduce superior grasses and to plant fodder trees. The exception was compartment 301, which had the 1970 plantations of fodder grasses such as Paonia, Sheda, Marvel, Mushan, etc. The monsoon closure was not effective, and the areas deteriorated.

5.9.08 Miscellaneous Working Circle: The areas under grassland (grass birs), forest villages, irrigation projects and mining leases were included in this Miscellaneous Working Circle. Prescriptions were limited to the grass birs, where eradication of weeds and climbers, opening up the dense patches and planting fodder species such as Anjan, Mowai and Pipal were prescribed. The directives included burning of grass birs in the last week of May once in five years, and the burning was to be followed by light soil working and seed sowing of Paonia, Sheda, Mushan, Marvel and Sanibabajara.

5.9.09 Bamboo (Overlapping) Working Circle: - All the bamboo areas were included in the Bamboo (overlapping) Working Circle. The bamboo cutting had four-year felling cycle, which was later modified by the Chief Conservator of Forests in September 1966 to three-year cycle. Hygienic operations included removal of all dead and broken bamboo. The cutting system prohibited removal of all current-year and previous-year culms as well as mature culms double in number to the current year culms. Clumps having less than ten culms were considered unfit for the bamboo extraction. Working season was limited to October to June. Gregariously flowered areas were to be strictly protected from fire and grazing till the clump formation.

5.13 Except in the bamboo area allotted to the Ballarpur Industries, bamboo was harvested on the rated passes. The felling directives were not properly followed in such areas, and the cutting was confined to easy access areas, while the remote areas remained unworked. Illicit cutting of bamboo in the areas near the villages were heavy even during the rainy season. Heavy fires generally destroyed green bamboo on the clump periphery. Depletion of bamboo clumps is evident in most of the areas.

5.9.10 Lac (Overlapping) Working Circle: The lac-bearing areas constituted the Lac (Overlapping) Working Circle. *Palas*, *Ghont*, *Ber* and *Kusum* trees were the main lac hosts. The lac cultivation from 1951 to 1954 was found uneconomical. Fire used to damage the crop. Lessees of the lac areas did not cultivate lac in the forests, and lac was mostly collected from *Palas* trees in private lands, ex-proprietary forests and road strips.

5.10 THE SARDAR, GURJAR AND JOSHI'S WORKING PLAN FOR THE RESERVED FORESTS INCLUDING FOREST BLOCKS: 1981–1996

5.10.01 The Sardar, Gurjar and Joshi's plan covered all the old Forest Blocks as well as the Reserved Forest areas constituted in 1977-78 from the acquired ex-proprietary forests. The stock maps of the Forest Blocks were verified and corrected. The areas of the newly Reserved Forests were stock mapped on 1:15,000 or 1:15,840 scale using toposheets of the Survey of India. Some areas were stock mapped using base maps at 1:15,000 or 1:15840 scales reduced from the village maps drafted by the Forest Settlement Officer. The Conversion, Coppice With Reserve, Improvement, Pasture, Protection and Miscellaneous Working Circles were six area-specific working circles, while the Bamboo and the Wildlife Management were two overlapping working circles prescribed in the plan. Felling on steep slopes and in the buffer along streams and roads was limited to removal of dead, dying and malformed trees.

5.10.02 Conversion Working Circle: Good quality Teak and the mixed forests of quality IVa and above were included in the Conversion Working Circle, which prescribed clear felling followed by the *teak planting*. The eroded and the poor areas were to be planted with Khair and Sissoo. The conversion period was sixty years and each felling series has three twenty-year periodic blocks. Soil and moisture conservation was to be carried out immediately after the main felling. In areas having profuse regeneration, cutback of the advance growth of Teak and other valuable species was prescribed. Bamboo clumps was to be cut in the first and the second year in order to support natural regeneration of Teak and other valuable species. The *rab burning* and planting at two-meter interval was prescribed. The sixth-year cleaning included clear felling of bamboo, singling of coppice shoots and removal of the inferior species suppressing Teak seedlings. The first and the second mechanical thinning were to be done in *ninth and fifteenth year of the Teak plantations*. Silvicultural thinning was to be carried out in naturally regenerated areas. The young to middle-aged crops in the PB II areas were to be spaced out to about one-third of the average height by thinning. In addition to tending of coppice shoots, thinning in plantations and improvement felling in natural forests were prescribed in the PB III areas.

5.10.03 Although cutting followed by burning of bamboo clumps was provided in the plan, bamboo planting accompanied the teak plantations. Bamboo suppressed teak, and most plantations did not put on the expected growth. Uncontrolled grazing and recurrent fires damaged teak plantations and naturally regenerated areas. Thinning was not carried out properly, and the crop became congested and stunted. In the clear felled areas, the fast coppicing species like Garari increased in proportion. Survival and growth of teak is good where bamboo was not present. However, a number of teak plantations failed because of poor site selection. The clear felling was stopped since 1987 because of directives under the Forest (Conservation) Act, 1980.

The crop remained unattended and suffered from congestion at many places. The prescribed thinning in the PB-II and the PB-III areas was not done properly. Fire and grazing control was not effective, and consequently, regeneration is inadequate for the most common species.

5.10.04 Coppice with Reserve Working Circle: The moderately well stocked mixed forests of predominantly the site quality IVa and IVb were constituted as the Coppice-with-Reserve Working Circle. The working was to be done on fifty-year rotation. Teak plantations over minimum of ten hectare were to be done on suitable sites after clear felling. Sound trees of edible fruit-bearing and economically important non-timber forest produce species like Mango, Chinch, Bhilawa, Jamun, Awla and Achar, Moha, Tendu, Hirda, Kulu and Khair as well as well-grown straight Semal trees were reserved from felling. Teak trees over 60 cm GBH were to be felled in the type I areas, and felling of all trees except reserves was prescribed in the remaining area. Reserves included 100–125 per ha healthy trees of seed-origin and the well-grown saplings and poles (up to 60 cm GBH) of superior species, which do not coppice well. Cutback operations in the following year, fifth-year cleaning and ninth, fifteenth and twenty-fifth year thinning were prescribed.

5.10.05 The field-staff perceived the prescriptions as complicated, and the treatment were applied in partial manner without giving due consideration to variation in the crop conditions. Selection of reserves did not reflect due care. Greater proportion of large trees was not felled in the name of conservative marking. Recommendation for clear felling followed by teak plantations was not followed. Aggressive coppicing species like Garari and Lendia started dominating valuable species like Bija, Haldu, Saja, Surya and Dhaora, which are not very good in coppicing. There is a general impression that repeated coppicing has reduced the coppicing vigour of the crop at many places. Tending operations like cleaning and thinning were not properly done.

5.10.06 Improvement Working Circle: Poor quality mixed forests of quality IVa and IVb predominantly having mature and over mature trees were in the Improvement Working Circle. Most of the areas were worked earlier under the Coppice-with-Reserve Working Circle of the Benakatti's Working Scheme before the areas was made the Reserved Forests. The area was to be worked on twenty-year felling cycle, and the favoured species were Teak, Bija, Saja, Sissoo, Tiwas, Siwan, Haldu, Kalam, Chichwa, Dhaora, Lendia, Surya, Bhirra, Salai, Mowai and Garari in this order. All silviculturally available mature (trees above exploitable girth) and over mature trees were to be removed. The exploitable girth was fixed at 120 cm GBH for teak, Saja, Bija, Haldu, Kalam and Beheda, 105 cm GBH for Salai, Mowai, Shisham, Siwan Surya and Rohan, 90 cm GBH for Tiwas, Lendia, Dhaora, Kasai, Parad, Bhirra, Chichwa and Kusum and 45 cm GBH for Garari and other species. The retention included sound trees of fruit-bearing species

(Mango, Chinch, Bhilawa, Jamun, Kawath and Achar), economically important non-timber forest produce species (Tendu, Moha, Hirda, Kulu and Khair) and Semal. Dense crop were to be thinned to achieve average spacing at one-third of the average height. Soil conservation measures like gully plugging, loose rubble check dams and brushwood check dams were to be constructed in the eroded and erosion-prone areas. The cutback operations in the following year and cleaning in the sixth-year were prescribed. Cleaning included seedling coppice, singling and spacing out the established regeneration of superior timber species to three-meter interval. Excessive removal was noticed in many areas of this working circle. Tending operations and cleaning were not properly done, and malformed growth remains in the forests.

5.10.07 Pasture Working Circle: The areas unsuitable for wood production but suitable for grass were included in the Pasture Working Circle. Large forest blanks with interspersed poor non-teak forests of the site quality IVa to IVb were included in the Pasture Working Circle. Each unit was to be closed for grazing successively for three years in rotation, and thereafter, two sections in each unit were to remain closed to grazing alternatively during the monsoon period from July to October. Seed broadcasting of Sheda, Paonia, Marvel, Stylo and other species of better fodder grass and legume was to be done on ploughed beds. Fodder species like Anjan, Mowai, Bija, Pipal, Guler and Pakar were to be planted at suitable sites. Harvesting of mature and unsound trees was permitted if found necessary. Grazing closures could not be enforced, and fodder and grass plantations were usually unsuccessful.

5.10.08 Protection Working Circle: The forests on steep and precipitous slopes forming distinguishable compact blocks were included in the Protection Working Circle. Regular working was not prescribed, but irregular felling for habitat improvement was permitted.

5.10.9 Miscellaneous Working Circle: The areas under mining leases, silvicultural experiments and forest nurseries were included in the Miscellaneous Working Circle, which was constituted mainly for the area accounting.

5.10.10 Bamboo (Overlapping) Working Circle: The bamboo areas of the division constituted the Bamboo (overlapping) Working Circle. The cutting cycle was three year with standard harvesting prescriptions. The clump cleaning operations included removal of dead, diseased, twisted, bent, malformed and partially cut culms. Clumps were to be considered unfit for harvesting unless eight mature culms were present. All current year culms were to be retained. Only mature culms (more than one year old) were to be removed, but culms equal to the current year recruitment, but not less than eight, were to be retained. The extraction was prohibited during mid-June to mid-October. Illicit cutting of Bamboo causing deterioration of Bamboo clumps is a major problem in the area, and bamboo yield has reduced. Prescriptions for the event

of gregarious flowering were included, but the gregarious flowering did not occur during the period.

5.10.11 Wildlife Preservation Working Circle: Habitat improvement was prescribed in the Wildlife Preservation (Overlapping) Working Circle for the entire division. Prescriptions included creating water holes by nala bunding, maintaining den and snag trees, providing salt licks near water holes and awareness generation through wildlife-related hoarding. This working circle is seldom given due importance.

5.11 WORKING PLAN OF SHRI VINAY KUMAR SINHA, SHRI ARAKKAL ASHRAF & SHRI JARNAIL SINGH FOR THE PERIOD (2003-04 to 2012-13)

5.11.01 This working plan included the Reserved Forests, Protected Forests, Un-classed Forests & Zudpi Jungle of Gondia Division.

5.11.02 Area Included in the Previous Plan: The total area included in this plan is 215929.10 ha which should have been 225603.039 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, four area-specific and four overlapping working circles were constituted which are being given in the **Table No. 5. 1.**

Table 5.1. : Distribution of forest areas in working circles

Working circle	Reserved Forest (ha)	Protected Forest (ha)	Other Forest (ha)	Total area (ha)	% of forest	Compartments
Area-specific working circles						
SCI WC	54,179.9	14,601.3	7,468.5	76,249.7	35.3%	411
Improvement WC	22,082.3	15,750.7	3,027.6	40,860.6	19.0%	385
Afforestation WC	3,048.4	27,038.3	3,017.6	33,104.3	15.3%	1211
Protection WC	2,004.1	6,837.3	3.6	8,845.00	4.1%	113
Miscellaneous WC	32,468.9	4897.3	19,503.3	56869.5	26.3%	711
Total	113,783.6	69124.9	33,020.6	2,15929.1		2,831
Overlapping Working Circles						
Bamboo(OL) WC	32818.48	1042.08	983.5	34844.04	16%	157
JFM (OL) WC				Entire forest		
NWFP (OL) WC				Entire forest		
Wildlife (OL) WC				Entire forest		

5.11.03 SCI Working Circle. Total area included in this working circle was 76,249.82 ha. The entire area 76,249.70 ha of this working circle was divided into 25 felling series of average size

3049.99 ha each. Each felling series has been further partitioned in 20 annual coupes of average size 152.50 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.

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

1. 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.
2. The main problem was that during the preparation of this plan, the DCF Gondia failed to give most of the important information related to the working and implementation of the last working plan, like various Control Forms, 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.
3. 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.
4. 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.
5. 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.
6. 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.

7. 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.
8. 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.
9. 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.
10. To regenerate the worked areas, important subsequent operations after main fellings, 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.
11. 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.
12. Many of these plantations, in the areas adjoining to the villages, are in very bad shape due to fire and grazing.
13. 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.
14. Besides this the areas prescribed for working in the working plan in a particular year was also never completed.

5.11.05 Improvement Working Circle: The entire area of 40,860.60 ha allotted to this working circle has been divided into 18 felling series, which were divided into 20 annual coupes for treatment. The average area of a felling series is about 2270.03 ha, while the average area of a coupe is about 113.50 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.

5.11.06 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 area, large areas are still under inferior spp. and valuable spp. are 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, where as 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.

5.11.07 AFFORESTATION WORKING CIRCLE:- The Afforestation Working Circle included 33,104.36 hectares forming 15.3% of the entire forest areas of the division. The entire area of this working circle has been divided into 16 felling series of average size 2071.4 ha. Each felling series has been further divided into 20 annual coupes of average size 103.52 ha. Plantations in this working circle were proposed to be carried out in *two-stages- the restorative phase, followed by, planting phase*. 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*.

5.11.08 Result of Past working :- The area under this working circle was not properly taken care of. 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. Two stage afforestation programme were proposed, which have not been followed at most of the places, while taking plantation under various scheme. Such record of two phases plantation have not been maintained in the division, if it has been taken at any place. 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 failure.

5.11.09 PROTECTION WORKING CIRCLE:- The Protection Working Circle included 8845.00 ha 113 compartments forming 4 percent of the division area. The entire area of this working circle was divided into 2 felling series of average size 4422.5 ha. Each treatment series has been further divided into 20 (twenty) annual coupes of average size 221.12 ha each. The special objects of management of constitution of working circle were as under. 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.

5.11.10 Miscellaneous Working Circle: The rest of the areas of the division were allotted to this Working Circle. A total of 56,869.49 ha area was allotted to this Working Circle. Out of which 32,468.91 have been transferred to FDCM Ltd. & 18,762.75 ha area are Zudpi jungle. 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.

5.11.11 Bamboo (Overlapping) Working Circle : The total area allotted to this working circle was 34844.04 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 were 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 local tribal & non-tribal and burads by giving them bamboo at concessional rate as well as employment.
3. To development of local inhabitants of this region.

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

1. Bamboo working was mainly confined to 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 inspite 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.
2. Large number of Burads is in the division who prepare Bamboo articles for their livelihood.
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. While carrying out Bamboo plantation no proper care was taken and seeds of different species have been sown in the same poly pots. This can be seen in the field as there are many clumps with more than one species of Bamboo.
4. Bamboo plantations in general are satisfactory so far the survival and growth is concerned. The Bamboos of these plantations could not be utilised as these clumps were never worked in time and now it is not possible to work due to over congestion of these clumps.

5.11.13 Wildlife (Overlapping) Working Circle: The entire of the division were allotted to this working circle. The position of wildlife in Gondia division is fairly good but the distribution of wildlife is uneven. The forests of Gondia division is extremely important as it lies adjacent to, Nawegaon, Nagzira, Sanctuaries. Tadoba, Pench & Kanha National Parks are also nearby. 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.

5.11.14 Result of Past working:- There were several important prescriptions in the said working plan but as per the information provided by the DCF Gondia, 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 THE ZAMINDARI FORESTS DURING 1854-1950

5.12.01 Extensive forest areas of the present Gondia Division was under the ownership and control of the Zamindars (Proprietors) The Estates were known as Zamindari and the estate holders were known as Zamindars in the popular parlance. Technically, an estate was collection of mahals held by the same proprietor and declared by notification to be an estate. A mahal was the unit of revenue assessment. The Bhandara Group of zamindari spread over the present Bhandara and Gondia Districts had 35 Zamindaris. The Maratha conquest had substantially reduced powers of the Bhandara Zamindars. The policy formulated by Richard Temple during 1863 treated Zamindars as ordinary subjects, and the Bhandara settlement was carried out accordingly. Later in March 1892, the Government of India advised that a record of the Zamindar's rights, duties and supposed status be made in the *Wajib-ul-arz*, which defined rights and responsibilities as against the Government in the first part; and between Zamindars and tenants in the second part*.

5.12.02 The Zamindars used to sell the forest produce in irregular manner in accordance with provisions of the Central Provinces Land Revenue Code. Only the Darekasa Zamindari forests had some sort of working plan, and its area was divided into annual coupes yielding average annual revenue of Rs. 8289. However, it is difficult to estimate the annual yield for want of the control forms or other records of similar nature.

5.12.03 Local villagers were allowed to extract the forest produce for their requirement or graze their cattle on payment in kind or cash. There were a variety of systems prevalent in different zamindari areas. In the *Ranwa System* grazing fee was based on ploughs per cultivator. In some zamindaris flowers and fruits of Moha were allowed to be removed on the *Batai System* (sharing with the Zamindars) or free of cost in exchange of farmyard manure to the Zamindars.

5.12.04 At the settlement of the 1860's, the general policy laid down was to allot forest area limited to twice the cultivated land in the village. All *waste* and forestland in excess of this area were to be made into separate state reserves. However, state reserves were not separated out, and the forests were left under the control of the Zamindars. Such forest mahals, however, were assessed separately from the land included in the villages. The Bhandara group was among a few Zamindaris, where excess *wastes* were properly demarcated and came to be called *Fazil*[☼] mahals, while the area left to form part of the villages was designated as *Dochand*. During the

* Kamath (1941:147-160) has given a concise historical perspective on Zamindari (Kamath, H.S. 1941. *Grazing & Nistar in the Central Provinces Estates: A Report of an Enquiry*. Nagpur: Government Printing Press).

second round of settlement in 1880's and 1890's, additional *Fazil* mahals were demarcated, the old *Fazil* mahals were demarcated more accurately.

5.12.05 The Zamindari forests did not attract any attention till the construction of the Bengal-Nagpur Railway began, and the estates along the track could not resist temptation of the emerging timber and firewood market. The most famous one was the Darekasa case of 1882, when the Zamindar had sold to a contractor from Nagpur “for a term of years the right to cut timber without restrictions of any sort.” Restrictions in the government forests provided right backdrop for the onslaught on the Zamindari forests. The government responded with formulation of the five rules in 1886 for management of the Zamindari forests. These rules banned shifting cultivation, authorised the Deputy Commissioner to issue the directives for the management and permission for timber harvesting, enforced mandatory timber account and transit passes, and provided for direct management by the government in case of default by the Zamindars. The refusal to accept these rules was to attract considerably high assessment. The Bhandara Zamindars resisted these rules. Later, the 1889 amendment of the Land Revenue Code gave the power to make rules for the management of forest mahals and to assume direct management if the Zamindars failed to observe the prescribed rules. The Zamindars gradually accepted the new set of regulations. Subsequently, the Sambalpur Resolution of 1891 declared that the direct management would be resorted to in case of the destructive management or if the public interests make it necessary. The new Land Revenue Act of 1917 applied rules applicable to other private forest areas to the Zamindari forests also. Thereafter, it was legally feasible to force working plans on Zamindars, but hardly anything worth mentioning was done.

5.12.06 Grazing and nistar[■] rights were generally unrestricted in the beginning, and were often available to the entire neighbourhood. The restrictions were limited to absolute reservation of certain superior species for the Zamindar. In the second settlement of Bhandara, free grazing was restricted to agricultural cattle, which was generally understood as cattle used for agricultural purposes or for the agriculturist-owners' own domestic necessities. The third round of settlement was carried out during 1914–1921. The nistar rights were defined by entries in the village record known as “Wajib-ul-arz[◇].” Actual practices were usually more liberal than suggested by the entries in the wajib-ul-arz. Firewood, thatching grass, creepers, roots, leaves, Bakkal, thorns, Khakri, Bamboos, timber and wood were usual nistar items[◇]. However, the

■ *The nistar is loosely defined as the right of users in respect of certain forest produce required for bona fide domestic use. The term is used in three senses, namely, right of users, items of the forest produce and the bona fide domestic use (Kamath 1941: 34).*

◇ *The term was borrowed from the 1863 settlement circular issued by the Government of North-western Province.*

◇ *Kamath (1941:105)*

Bhandara Zamindaris like Kamtha and Chichgarh adopted de-liberalisation by creation of the Grass birs in the village waste and large-scale alienation of grassland. The villagers often resisted the creation. The prevalent commutation system allowed a person to obtain the nistar requirement from anywhere in the Zamindari for a fixed payment every year. Plough used to be basis for the commutation, with notable exception of Chichgarh where the size and circumstances of each household were taken into the account. The rate of commutation varied from two to six rupees for tenants and one-quarter to one rupee for others. Many Zamindaris had traditionally tyrannical administration. The records show that some of the Zamindars were reprimanded for not giving adequate nistars to the tenants.

5.12.07 Soon after the independence, there was a move to take over the proprietary forests. The Zamindars indulged in unsystematic and extensive felling in their forests accelerating the process of forest degradation and the forest loss.

5.13 THE EX-PROPRIETARY FORESTS DURING 1951–1970

5.13.01 The proprietary rights were abolished in 1951, and rights over Zamindari areas including forests were vested with the Revenue Department with effect from the 1st April 1951. Most of the areas under forests were transferred to the Forest Department during the period from 1951 to 1954 to management the forest resources. One Forest Ranger, two forester and six forest guards were appointed immediately for the purpose, and the strength was increased in 1953 to two Rangers, six foresters and thirty-six forest guards. A scheme for bamboo harvesting on four-year cycle received sanctioned of the Chief Conservator of Forests in February 1954.

5.13.02 Since 1952, removal of the forest produce except timber was permitted from the Fazil forests on the rated passes to meet *bona fide* demands of the people. The order dated 4th December 1954 from the Madhya Pradesh Land Reforms Department regulated grazing in the forest areas. In 1954, another significant development was appointment of the Nistar Officers to enquire into the nature of rights existing over Dochand Forests and to prepare Nistar Patraks. In the Patraks, survey numbers were allotted for cattle grazing and supply of small timber, the Patraks, survey numbers were allotted for cattle grazing and supply of small timber, the Patraks, survey numbers were allotted for cattle grazing and supply of small timber, the Patraks, survey numbers were allotted for cattle grazing and supply of small timber, firewood, etc., for nistar. Villages with excess forests and those deficient in forests were grouped together to form grazing units and nistar zones. Most of the areas in-charge of the Forest Department was subsequently declared as the Protected Forest under the Indian Forest Act, 1927.

5.14 THE MAHALA'S WORKING SCHEME: 1955–1961

5.14.01 The Mahala's Working Scheme was the first plan for 1310.73 km² of the Protected Forests (767.64 km² of the old *Fazil* Forests and 534.09 km² of the old *Dochand* Forests).

Although stock mapping was not done, the forests were inspected thoroughly. The area coverage under the Miscellaneous, Coppice-With-Reserve and Improvement Working Circles were about 48, 40 and 12 percents, respectively. The Bamboo working circle was overlapping in nature.

5.14.02 Miscellaneous Working Circle: No working was prescribed in the Miscellaneous Working Circle, which contained old *Dochand* Forests under extensive nistar rights and privileges, and some old *Fazil* Forests under some sort of lease agreements.

5.14.03 Coppice-with-Reserve Working Circle: Forests of site quality III and IV were assigned to the Coppice-with-Reserve Working Circle, which was to be worked on forty-year rotation. Six types of treatments were defined depending upon the crop characteristics. (a) Fairly dense and young to middle-aged non-teak forests of site quality II and III were to be worked under the improvement felling after reserving about 175–250 trees per hectare in size of 30 cm to 90 cm GBH. (b) In dense teak forests on site quality IV, 100–115 sound teak and non-teak poles per hectare was to be reserved in 45–60 cm GBH range. Malformed and unsound teak trees and advance growth were to be cut. Reservation of 200 to 250 trees per hectare was prescribed, if sound Teak poles were in plenty. (c) The working was to be done on like the Coppice-With-Standards System in areas having middle-aged and pole forests with or without teak. The prescription was to reserve 100–200 poles per hectare of teak, Bija, Tinsa, Ain and Tendu was in 30–60 cm GBH class. (d) In such forests having dense bamboo undergrowth, all saplings below 22.5 cm GBH with exception of Garari was to be reserved. Bamboo suppressing teak regeneration was to be cut, if saleable. (e) Forests having mature malformed trees with young and middle-aged growth were to be managed under the improvement thinning in young crop and felling of mature trees was prescribed. (f) Cleaning, thinning and coppice management were prescribed in the young crop, where non-teak species mainly Garari were felled in the recent past.

5.14.04 Only a third of felling series could be worked, because of disputes with the ex-proprietors. The annual coupes were too big and unwieldy to be worked during one year, and marking was considered complicated. Further, no plantation was provided to supplement the natural regeneration.

5.14.05 Improvement Working Circle: Good quality teak and mixed forests in Palasgaon and Chichgarh area were placed in the Improvement Working Circle to be worked under twenty-year felling cycle. Tendu and Semal trees were reserved from felling, and the preferred species for retention were teak, Bija, Mundhari, Salai and Dhaora. Crown thinning were to be carried out in the crop, trees above 120 cm GBH were to be felled, and all dead, dying, malformed, unhealthy and badly grown trees were to be removed. The annual coupes were too big and unwieldy to be

completely worked in a single year. Thinning was not prescribed, and no safeguarding provisions were made.

5.14.06 Bamboo (Overlapping) Working Circle: The provisional scheme sanctioned in 1954 for the bamboo working was continued as a part of the plan. Four-year cutting cycle and retention of at least eight mature culms per clump were main directives. Twelve bamboo coupes were put to auction for the first time in 1954, but only six coupes were sold. The remaining coupes were opened for sale on the rated passes, and poor control on their felling caused clump deterioration.

5.15 THE BENAKATTI'S WORKING SCHEME: 1961–1977

5.15.01 Almost all the ex-proprietary forests under the management of the Forest Department were declared as the Protected Forests during 1950's. Benakatti had prepared two separate working schemes for the ex-*Fazil* and the ex-*Dochand* forests.

5.15.02 The working scheme for the old *Dochand* Forests did not receive the approval of the state government, and these Forests remained unworked since then. Although mature and over mature trees are present in some remote areas, the forests generally suffered from the uncontrolled grazing and unregulated extraction. Poor demarcation of boundaries encouraged forest encroachment in these forests. Which also had heavy illicit felling leading to deterioration of the forest areas. Some parts have a few trees of valuable non-teak species like Bija, Saja and Surya because of inadequate regeneration. Heavy grazing pressure and recurrent annual fires also ensured failure of the extensive reforestation works carried out in the past.

5.15.03 The working scheme for the old *Fazil* forests, excluding the areas to be submerged under the Bagh and the Itiadoh Projects, was prepared for ten years till 1972, but the scheme was later extended till 1979-80. The forest area covered in the scheme was 890.94 km².

5.15.04 A lot of transformation was involved in the map preparation for the scheme at 1:15,840. The village maps at 1:3,960 (16 inch = 1 mile) were reduced to 1: 15,840 (4 inch = 1 mile) on which topographical features were transferred by enlarging the 1:63,360 (1"=1 mile) SOI toposheets. Contiguous areas from adjoining villages were joined together. These transformations are sources of errors in the Benakatti's maps, and the errors are carried forward to a great extent in this plan.

5.15.05 The forests were divided into 390 compartments. Some compartments were stock mapped, and the descriptions in the Mahala's scheme were used for the rest of the forest areas. The Coppice-with-Reserve Working Circle was the largest working circle. Other working circles were the Selection-cum-Improvement Working Circle and the Bamboo (Overlapping) Working Circle.

5.15.06 Coppice-with-Reserve Working Circle: This working circle had the inferior forests capable of producing small timber, poles and firewood. The forests were worked on forty-year rotation. The protection areas included precipitous slopes, eroded areas, open forests (density below 0.4), 20-meter buffer along streams and 100-meter buffer around tanks. Plots not less than four hectare in extent and suitable for raising teak plantations, were to be clear felled and planted with teak stumps. Patches of young crop, at least 0.4 hectare in extent, were to be thinned. All advance growth except Garari up to 22.50 cm GBH, Kullu, Khair and edible fruit-bearing trees were to be reserved in the plantation and the thinning areas. Improvement felling after reserving trees for silvicultural purposes was prescribed in dense forests having density 0.4 to 0.6. The remaining areas were to be clear felled after reserving following types of trees: (a) all well grown poles of Teak and other valuable species up to 30 cm, 45 cm and 60 cm GBH on site quality IVb, IVa and III, respectively; (b) all Khair, Semal, Kulu and healthy edible flower- and fruit-yielding trees; (c) isolated seed-bearer trees of valuable species; and (d) trees of any shape, size and species in small blanks. At least 75 reserves per hectare were to be maintained. Subsidiary silvicultural operations included cutback operations, sixth-year cleaning and *11th and 26th year thinning*. Average spacement of one-third of the average height was prescribed for thinning.

5.15.07 The prescriptions were not followed carefully, and almost all trees were removed except 50–75 standards per hectare of advance growth and inferior species. Only damaged trees were removed in the cutback operations, the sixth-year cleaning was confined to plantations only, and thinning was not carried out. Coppice regeneration of valuable species except Garari and Lendia generally failed, and the prescribed teak plantations were not taken up. Further, annual fires adversely affected the seedling regeneration. The crop density also declined, and the resultant forests are poorer in valuable species. Most of CWR areas were either suitable for the SCI working or were on steep and precipitous slope.

5.15.08 Selection-Cum-Improvement Working Circle: The site quality varied from III to IVa, and the areas were relatively remote and less disturbed. The Zamindars had earlier exploited only the larger and valuable trees. The prescriptions fixed the felling cycle at twenty years, and the exploitation girth was fixed at 120 cm GBH for Teak, Bija, Saja, Haldu and Semal, 105 cm GBH for Shisham, 90 cm GBH for Bhirra, Salai and Kalam, and 45 cm GBH for Tiwas and Garari. Reservation of trees included healthy fruit- and NWFP-yielding trees like Moha, Tendu, Achar, Harra, Semal, Kulu and Khair as well as seed-bearers and those required for the erosion control. Only dead trees were to be removed in the protection areas as defined for the CWR. Fifty percent of unsound, over mature or dying trees were also to be removed in the buffer along streams and tanks. Plots not less than four hectare in extent and suitable for teak

plantations, were to be clear felled and planted with teak stumps. Over wood in the areas, not less than two hectares and suitable for promoting existing established regeneration of valuable species, was to be removed, and malformed advance growth and Bamboos were to be cut. Teak, Shisham, Bija, Semal, Tinsa, Saja, Haldu, Kalam, Bhirra, Dhaora, Garari and Salai were the favoured species. In the remaining area, light crown thinning in favour of Teak and superior non-teak species was prescribed in the immature crop. All the non-teak and half of the teak trees above harvestable girth were to be removed. Cutback in the following year, sixth-year mechanical thinning and eleventh-year thinning were also prescribed. Some of the protection areas were included in this working circle. The felling rules were not properly followed, and the prescribed teak plantations were not taken up.

5.15.09 Bamboo (Overlapping) Working Circle: Bamboo areas covering 58,225 hectare were harvested on the four-year cycle, which was later reduced to the three-year cycle. The Ballarpur paper mill harvested one out of the fourteen cutting series, and the rest were harvested on rated passes. Generally pass holders carried out selective felling and did not follow the cutting rules. The cutting was generally limited to the clump periphery, and removal included current year culms. These practices and the uncontrolled extraction resulted in deterioration of clumps.

5.16 GRAZING IN THE RESERVED FORESTS

5.16.01 There was no restriction on grazing till 1897, but grazing was mostly confined to the accessible areas. Grazing of sheep and goats in forests was common. The ten-year closure to grazing was prescribed in the worked coupes after main felling, when the first working plan was prepared for the old Pratapgarh Range. Cattle grazing and goat grazing continued unabated till 1910 in the rest of area. Goat grazing in the forest was stopped during the Best's Plan, and the forest areas were divided into nine grazing units. Although grazing units were not specified carefully, the grazing incidence remained light because of low cattle population. The grazing settlement was carried out for the first time during the Chadha's plan, and the grazing incidence in each grazing unit was fixed. Ten-year grazing closure was applied for CWR coupes. The High Forest Working Circle coupes generally had five-year grazing closure.

5.16.02 Meanwhile the Grazing Policy was revised in 1933 to reflect the carrying capability of forest areas. Grazing incidence of 1.6 hectare and 0.8 hectare per animal unit was fixed for the moist-type and the dry-type tree forests, respectively. The wooded scrub forests capable of producing some poles and firewood in addition to grasses were identified as the pasture forests, and had grazing incidence of 0.4 hectare per cattle unit. The remaining open forests were primarily meant for grazing, and no limit was fixed for such areas. Most forests subjected to heavy grazing pressure were classified as scrub forests.

5.16.03 The working plan prescribed seven years closure after the main felling. Fresh grazing settlement was not done during Prasad's plan. Grazing units were attached to villages, and their carrying capacities were fixed in terms of the maximum number of cattle to be admitted. However, such numbers were not fixed for villages. The revised classification of tree and scrub forests in 1940 to accommodate high grazing pressure in some units, and grazing was allowed in drive paths through closed coupes. These practices continued till 1974-75, and heavy grazing pressure caused forest deterioration in many areas.

5.16.04 The Chief Conservator of Forests proposed norm revision in September 1946. The revised norm suggested prohibiting grazing in on steep and precipitous slopes identified as the Protection Forests. Maximum grazing incidence of 1.2 animal units was suggested for the Tree Forests managed for large-sized timber. Minor Forests for producing small timber, poles and firewood were to have maximum grazing incidence of 0.8 hectare per animal unit. Although the Grass reserves were to be managed for the fodder grass production, grazing was to be prohibited in the area. This classification dropped the Pasture Forests. Trivedi used this proposed classification in his plan, but identified eroded and open forests as the pasture forests. Five-year closure was provided after main felling. Grazing incidence was fixed in terms of units, and maximum number of cattle to be admitted to each unit was fixed for villages also. The grazing settlement of the Trivedi's Plan was implemented quite in 1974-75.

5.16.05 The Government of Maharashtra announced a new grazing policy in December 1968 prohibiting cattle grazing in the Protection Forests and the Grass Reserves. The resolution permitted up to one cattle unit for every 4.0 hectare of the Protection Forests in exceptional cases. Maximum grazing incidence of 1.2, 0.8 and 0.4 hectare per cattle unit was allowed for the Tree Forests, the Minor Forests and the Pasture Forests, respectively. The state government fixed following priorities for the purpose of grazing in 1971: (1) up to four cattle units of plough and milch cattle belonging of cultivators and (2) the same limit for cattle belonging to non-cultivators. The remaining order of priority was (3) up to four cattle units of milch cattle belonging to non-cultivators, (4) the rest of essential cattle belonging to cultivators, (5) milch cattle of non-cultivators and non-essential cattle of cultivators and (6) non-milch cattle of non-cultivators. (7) Cattle from the non-listed villages appeared at the last. The actually lactating cattle have been defined as milch cattle. Up to eight hectare of cultivable land is considered as one plough unit. New Grazing Rules formulated in 1973 defines that one cattle unit means a cow, bullock and buffalo-calf under three years of age, while cow-calf constitute half unit and adult buffalo make two units. Each cultivator family may be allowed free grazing to a maximum of two plough units (4 cattle units) on the basis of certificate issued by the concerned Talathi or Gram Sevak. Grazing of other essential cattle is to be charged at the rate of one rupee per cattle

unit. The Forest department should issue grazing licenses during 15th June to 31st July for a period of one year, and may refused the license for one year on the ground of persistent illegal grazing. Shri Patil and Shri Sardar's Plan followed the classification of the 1968 Grazing Policy. The grazing closure could not be enforced effectively, and the excessive grazing adversely affected the regeneration and soil structure in many forest areas. Cattle and goat grazing in the forests is definitely among the most serious issues of the forest management.

5.17 GRAZING IN THE PROTECTED FORESTS

5.17.01 The Zamindars used to allow grazing in their forests on payment of fees in kind or cash, and the practice continued in the *Dochand Forests* after the 1897 settlement. No nistar or grazing rights were permitted in the *Fazil Forests*. The grazing system remained unchanged even after the abolition of the proprietary rights vested in the Zamindars. Gradually grazing pressure increased on the *Dochand Forests*, and the government permitted grazing in the *Fazil Forests* also since December 1954. The nistar patraks regulated grazing in the Protected Forests depending on availability of the grazing lands, and identified the clusters of villages as the grazing zones. Grazing units were not formed during the Shri Mahala's scheme, but the main felling coupes were to be closed to grazing for a period of five years.

5.17.02 With increase in the cattle population, these forests had heavier grazing pressure, and the government notification in 1958 attempted to regulate grazing by introducing distinction between cultivators, agricultural artisans and labourers. Free grazing in the ex-proprietary forests was allowed to two plough cattle per plough and four other cattle heads including one she-buffalo belonging to cultivators. Agricultural artisans and labourers were permitted to graze four cattle including one she-buffalo free of charge. Calves under one year of age were ignored in the counting. A valid license was essential for grazing cattle in the forests. Sheep and goat grazing was permitted in the forests under the Revenue Department and other community land. Seven-year closure to grazing was prescribed in the SCI and the CWR coupes of the Benakatti's scheme for the *Fazil Forests*. However, the Conservator of Forests could approve early opening of the coupes if the grass growth hindered the regeneration. The grazing incidence in the remaining area was kept limited to two acres per animal unit.

5.18 SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN

5.18.01 The special works of improvement undertaken in the past includes extensive forest plantations of Teak, Bamboo, Eucalyptus and other superior non-teak species. A number of roads, wells, tanks, residential buildings, offices and store buildings were constructed in the past. Measures to control illicit felling, poaching, encroachment and fire were also taken up.

5.19 PAST YIELD, REVENUE AND EXPENDITURE

5.19.01 The annual out turn of various forest produces, gross revenue and expenditure during the past years has been given in the (**Appendix No. LXXXIV**)

☼ *Fazil* means the excess and *Dochand* means the double.

CHAPTER VI

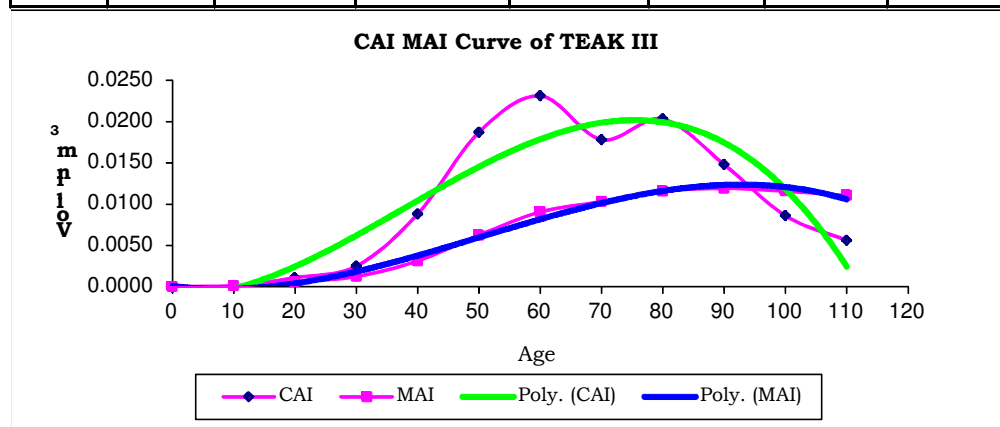
STATISTICS OF GROWTH AND YIELD

6.1 STATISTICS OF RATE OF GROWTH OF TEAK: Exercise of Stem analysis was carried out recently in the Tiroda Range of Gondia Division by office of Chief Conservator of Forests, Working Plan, Nagpur, while preparing the working plan of Bhandara Division to calculate the growth and yield of teak and some other important species.

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

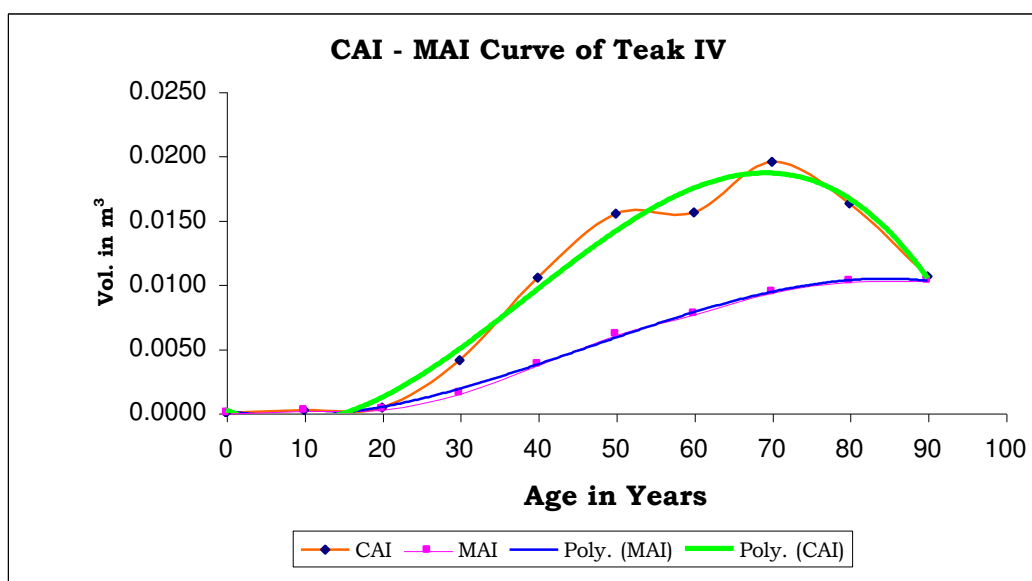
Teak patches of site quality III is found in Tiroda range, which was earlier part of Bhandara Range but after reorganisation it has been transferred to the adjoining Gondia Forest Division.

6.1.02 Stem Analysis of Teak IVA : For Stem analysis exercise trees were selected in compartment 63 PF & 30 RF of Tiroda & Jamkandri and Tiroda ranges, respectively. The Stem

analysis carried out by Working Plan Division, Nagpur and its result applied for Gondia division and reproduced in the **Table No. 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



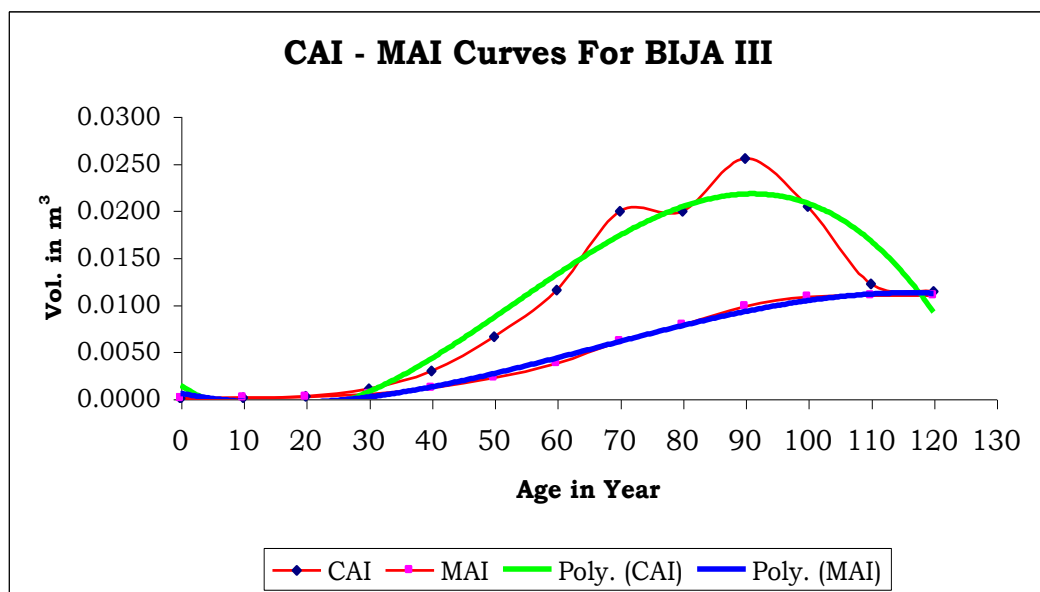
The CAI/MAI curve for Teak IV intersect at the age of 90 years girth (OB), corresponding to this exploitable Girth is 123 cm. (OB). The exploitable girth is hence fixed at 120 cm.

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.

6.2.01 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 Tiroda and Sakoli Range Respectively*

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.

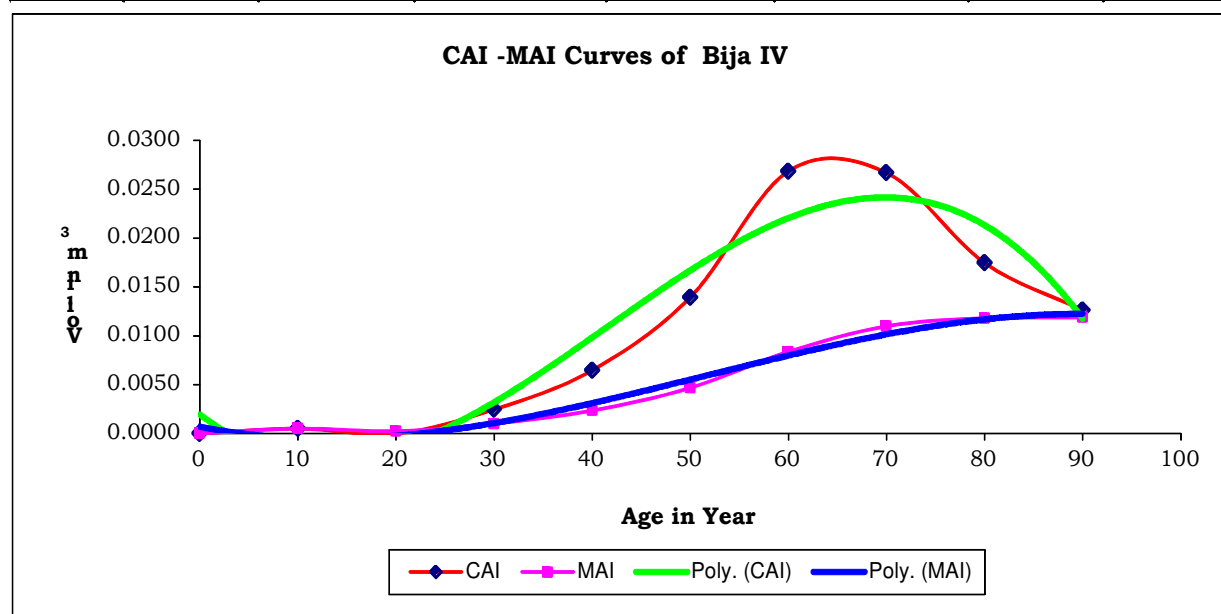
6.2.02 Stem analysis of Bija for Site quality IV

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

Compartment No. 108 RF of Tiroda Range

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

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

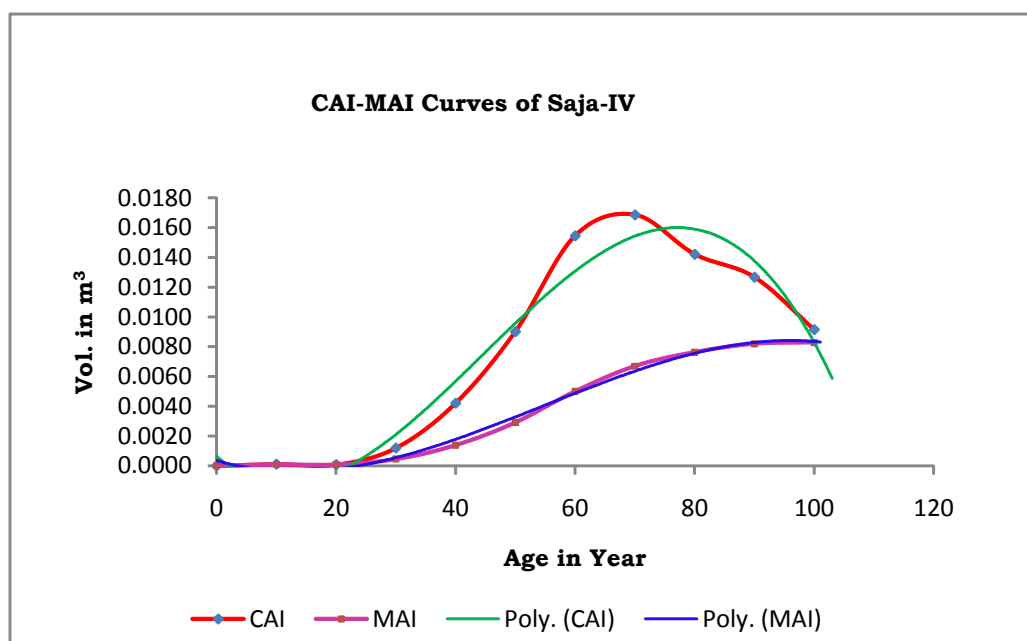


6.2.03 Stem analysis of Saja (Ain) for Site Quality IV

Table No. 8.5 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



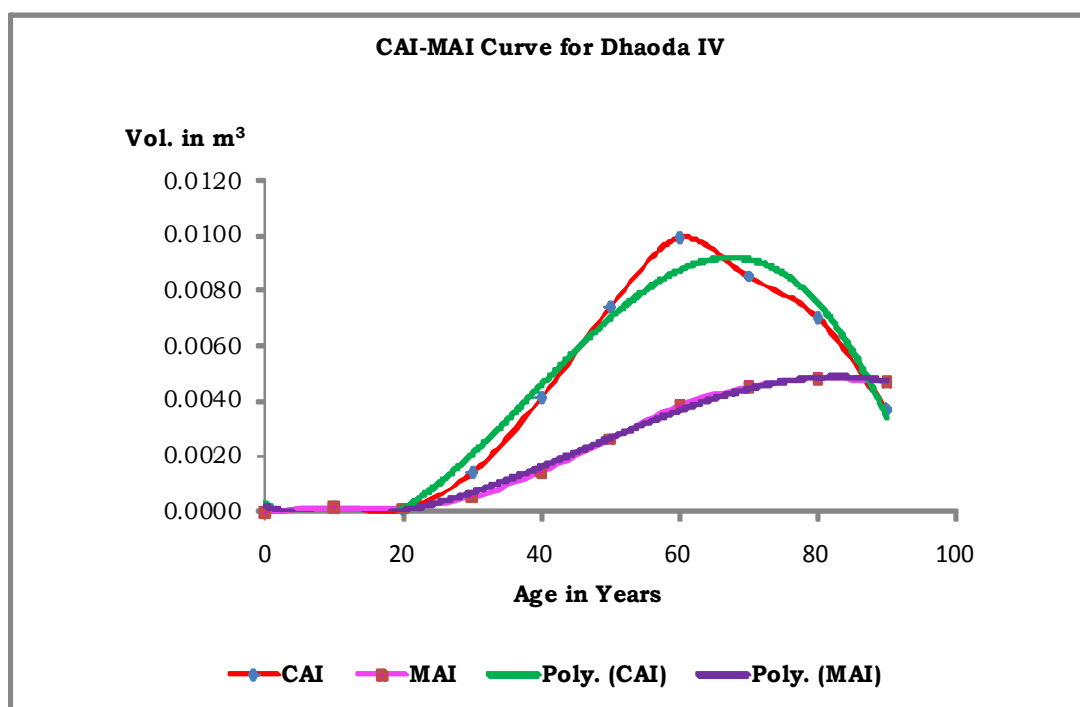
The CAI/MAI curve intersect at 100 years age, girth corresponding (OB) to this exploitable girth is 129 cm. The exploitable girth is hence fixed at 120 cm.

6.2.04 Stem Analysis of Dhaoda for Site quality IV

Table No. 8.6 Results of Stem Analysis for Dhaoda Site Quality IV

Compartment No. 312 RF of and Paoni Range

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 curve 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.

6.2.05 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. 8.7 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:

6.3.01 The following Local volume table for Teak, Ain, Bija, Dhaoda and Garadi has been applied for Gondia Forest Division. The Local volume table is given in **Table No. 6.8**

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

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

6.3.02 Local volume table for few miscellaneous species has been prepared by the staff of the office of Chief Conservator of Forests, Working Plan Nagpur. The field data for this has been collected from Gondia division is given in the **Table No. 8.9**.

Table No.8.9 : Local Volume Table for Other Miscellaneous Species.

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:

1. The enumeration of trees and the regeneration survey of the forest crop in the Gondia division have been carried out by Forest Resources Survey Unit, Amravati during the year 2010-11 & 2011-12. The sampling design was systematic line-plot survey and the intensity of sampling was 1(one) percent.

2. Systematic line-plot sampling was carried out at the intersections of 600-meter grid. Species and girth distribution (15 cm girth classes) of trees counting were done in 0.36-hectare plots (60 meter x 60 meter).
3. Regeneration count of seedlings and coppice shoots of teak and other miscellaneous species was done in three height classes (0.3 to 1.0; 1.0 to 3.0 and above 3.0 meters) in 0.04-hectare (20 meter x 20 meter) sub-plots.
4. Recording of forest types, site quality, density have been included as an integral part of the enumeration exercise.
5. 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 **Appendix No. XXXII**.

6.5 STATISTICS OF RATE OF GROWTH OF TEAK & 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 in **Table No. 6.10 & Table No. 6.11**.

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

Age in years	Height (in m)	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 m)	Diameter O.B. at Breast height cm.	Girth O.B.	MAI in Cum	CAI in Cum
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.*

6.5.01 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 upto 18.20 m 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 Shri Patil and Sardar is given in the **Table No. 6.12.**

Table No 6.12. : Age Girth Relation of Teak Plantation:

Age in Years	Height (in m)	G.B.H. (O.B) (in 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 Shri Patil and Sardar are given in the **Table No. 6.13** shown below.

Table No. 6.13 : Result of Stem Analysis of Bija (Site Quality 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 in Cum	CAI in Cum
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 -

1. The areas capable of growing sound trees upto 21.80 m in height and 41.40 cm in diameter and 130 cm. girth (OB) at breast height in 90 years.
2. The CAI and MAI curves intersect at 91 years.

- (ii) **Growth of Ain:** Growth data of Ain as given in the working plans of Bhandara & East Chanda and Noth Khandwa (M.P.) written by Shri Patil and Sardar, Kartar Singh and Nigam respectively, are given in the **Table No.6.14**.

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 : 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 given in the **Table No. 6.16** below.

Table No. 6.16 : 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 Miscellaneous Species:** Growth data of Garadi, Tinsa, Bel, Lendia, Khair, Rohan and Salai obtained from various working plans is reproduced below:-

Table No. 6.17 : Age-Girth Relation of Some Miscellaneous Species:

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: During the course of revision of the plan, fresh stock mapping have been carried out by the territorial staff of Gondia Division and data is given in **Appendix No. LIV**.

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 digital data related to forest have been analysed to get the extent of area and other features to arrive at the fixation of different working circles. These digital maps are meant only for Forest Management purposes and not for any legal disputes or court cases etc.

The Classified scene of 2010 LISS-III data have been procured from FSI, Nagpur and analysed at GIS Cell of this office. Stocking of the forest, as per Satellite data analysis and as on the ground, have been ascertained by conducting Ground Truthing during preparation of working plan report. On that basis management maps have been prepared. User officer will also be provided digital data to have better information, which can not be seen on the hard copies, about the division.

6.7 ANNUAL YIELD: The annual outturn of Forest Produce is given in the **Appendix No. LXXXII & LXXXIII**. 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

7.1.01 Gondia 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 Navegaon National Park and the Nagzira Wildlife Sanctuary. Two new wildlife sanctuaries in the Gondis Division, namely New Navegaon WLS & New Nagzira WLS, which is adjoining Gondia Division. 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 Chichgarh, Gothangaon, Arjuni Morgaon and North & South Deori Ranges. Jackal, Jungle cat and Hyaena are also common. Gaur and wild dogs are mainly seen near the Navegaon National Park. Large avifauna can be seen in the tract. Migratory birds near tanks are common during the season. The Siberian crane is a regular visitor to the tank near the Navegaon National Park. 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.

7.1.02 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. The division is rich in wild life. The common wildlives found in the tract are as under.

7.1.03 CARNIVORA.

Tiger (*Panthera tigris*) :- Commonly known as Patta Wagh or Wagh, this animal is found in dense plain forests and sheltered valleys in hilly areas. In the summer this animal is mostly confined to wooded banks of big rivers and areas in vicinity of stagnant pools in bigger streams.

Panther (*Panthera pardus*) :- It is commonly known as Bibat. It is more common than tiger because it is able to live and thrive almost anywhere. Like tiger it is not restricted to forest or heavy cover and thrives as well in open country as among rocks and scrub. In spite of its ability to thrive in varying conditions of living, its number has declined in the recent past.

HERBIVORA :- The herbivorous animals that are found in these forests are; Sambar (*Corvus unicolor*), Cheetal (*Axix axis*), Nilgai (*Boselaphus tragocamelus*), Wild boar (*Sus cristatus*), Sloth bear (*Melursus ursinus*), Barking deer (*Muntiacus muntjak*), Langur (*Prebytis entellus*).

RODENTS :- The smaller animals that are common in tract; Jungle striped squirrel (*Funambulus sublineatus*); Tree striped palm squirrel (*Funambulus pennanti*), Porcupine (*Hystrix indica*), Hare (*Lepus ruficaudatus*)

AVIFAUNA :- The commonly seen birds are Pea fowls (*Pavo cristatus*), Jungle fowls (*Gallus sonnerataii*), Quails (*Coturnix coromandelicae*), Partridges (*Francolinus pondicerianus*), Crane (*Grus antigone*), Ducks (*Casarca rutila*), Snipes (*Capella galaliangs*), Green pigeon, Crows, Tites, Babblers, Bulbuls, Robins, Fly catchers, Shrikes, Drongos, Warbles, Myna, Weaver birds, Munias, Buntings, Wagtails, Wood peckers, Cuckoos, Parakeets, Bee-eaters, King fishers, owls, Vultures, Doves, Egrets etc.

7.2 GENERAL HISTORY OF THE WILDLIFE

7.2.01 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 Gondia are coordinating their efforts including the eco-development programmes to ensure success of their protection measures.

7.2.02 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.

7.3 INJURIES TO WILDLIFE

7.3.01 Poaching: 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.

7.3.02 Disease: 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.

7.3.03 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 stress having adverse impact on the wildlife.

Part-II

CHAPTER VIII**FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED****BASIS OF PROPOSAL**

8.1 INTRODUCTION: This Working Plan has been prepared for the scientific management of the Forests of Gondia Division. The primary management objectives for the Forests of Gondia Division, has been to restore the Forest Resources to its best condition. This plan is intended to focus on future management and sustainable use of the Forest Resources of this Division. The Plan includes the Reserved, Protected, Unclassed forests, and Jhudpi Jungle of the Division. Long term Strategic Goals has to be established to guide our steps towards sustainable, ecosystem based forest management. Under the Eco-system based management, equal emphasis is given to ecological, social and economic aspects of the Forest resources.

8.1.01 Ecological Goals :

Goal-1: *Practice Sustainable, Ecosystem-based Management:* Resource Planning and operations will be conducted to maintain the long term integrity, representation, diversity and productivity of terrestrial and aquatic ecosystems; with recognition of valued human activities and uses derived from these systems. Fundamental processes and values of ecosystems shall be protected or rehabilitated. In doing so the following sets of Objectives shall be followed:

- **Objective-1:** *Conserve the Geophysical Processes:* Emphasise conservation and rehabilitation of geo-physical processes such as soil formation & conservation, geomorphic sedimentation, carbon dynamics, hydrologic dynamics and nutrient dynamics. Such processes are the foundation of the habitat conditions required to sustain desired biological assemblages.
- **Objective-2:** *Conserve Biodiversity:* Encourage the management of intact, functional landscapes, ecosystems, and communities that will achieve the conservation of representative biological assemblages, including rare species; maintaining local biological diversity at ecosystem, species and genetic level.

8.1.02 Socio-economic Goals: The management of the forests of the Gondia Division will be carried out with the following Goals and objectives:

Goal-2: *Maintain Essential Ecosystem Services :* The resource planning and operations shall ensure the variety of ecosystem services which includes – natural environment produce resources

that are useful to people, including maintenance of air and water quality, ground water recharge, soil conservation, nutrient cycling, carbon sequestration, provision of habitat and biodiversity and attenuation of drought and flood conditions.

Goal-3: *Sustain Social-economic Values:* The resource planning and operations shall encourage the efficient and sustainable production of desired forest products to provide a range of social and economic benefits.

Goal-4: *Provide Public Access:* Resource Planning and operations shall be done through participatory management under the JFM scheme to protect and preserve the natural, historic and cultural features of the forest resources while providing access to these resources. While doing so the following sets of objectives shall be followed :

- **Objective-1:** To meet the bona fide requirements of the local peoples, which includes small timber, firewood, fodder and other NTFPs.
- **Objective-2:** To provide ecological education and recreation through Eco-tourism.
- **Objective-3:** To allow the Cultural uses by the indigenous peoples.

8.2 FACTORS INFLUENCING THE GENERAL OBJECTIVES OF MANAGEMENT:

Working Plans are supposed to be 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. Various standard scientific treatments, suitable for a particular land, 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 Governments of India and Maharashtra, so that all the prescriptions should be in accordance with them.

8.2.01. 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:

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

2. 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.
3. Checking the soil erosion and denudation in the catchments area of the rivers, lakes and reservoirs in the interest of soil and water conservation for mitigating flood and droughts and for retardation of siltation of reservoirs.
4. Checking the extension of sand dunes in the desert areas and along the coastal tracts.
5. Increasing the forest/tree cover in the country through massive afforestation and social forestry programmes, especially, on all denuded, degraded and unproductive lands.
6. Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
7. Increasing productivity of forests to meet essential national needs.
8. Encouraging efficient utilization of forest produce and maximizing substitution of wood.
9. Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on the existing forests.

The principal aim of the Forest Policy must be 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 must be secondary to this principal aim.

8.2.02 Essentials of Forest Management embodied in the National Forest Policy 1988 are given as follows:

1. 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.
2. For conservation of biodiversity, network of national parks, sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately.
3. Provision of sufficient fodder, fuel and pasture, especially, in areas adjoining to forest is necessary in order to prevent depletion of forests beyond sustainable limit.
4. 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.

5. 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.
6. No forest should be permitted to be worked without the approved working plan, which should be in keeping with the National Forest Policy.
7. The rights and concessions enjoyed by the tribal and other rural poor living within and near the forests should be fully protected. Their domestic requirements of fuel wood, fodder, minor forest produce and construction timber should be the first charge on forest produce.
8. Inculcate in the people, a direct interest in forests and make them conscious of the value of trees, wildlife and nature in general through forest extension, education and training.

8.3 NATIONAL FORESTRY ACTION PLAN:

8.3.01 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. At present major portion of the forests have no natural regeneration and are prone to fire.

8.3.02 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

Conclusion:

- i. For sustainability and productivity of forests, the production to be increased at least 3 to 5 m³ per ha per year by promoting regeneration and enrichment plantations.
- 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.

8.4 NATIONAL WILDLIFE ACTION PLAN:

8.4.01 Ministry of Environment and Forests, Government 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.

8.4.02 Gondia Division has to identify and prioritize degraded habitats outside PAs for the natural regeneration of forests/wetlands, identify and restore linkages and corridors between wildlife habitats using a combination of satellite imageries and ground truthing. The budgets allocated by different sectors can be streamlined and used to enhance the process of natural regeneration outside PAs through carefully monitored soil and water conservation works and effective protection activities. Plantations of appropriate indigenous species coupled with the removal of unwanted exotic plants should be done wherever necessary, apart from working with scientific institutions specializing in ecological restoration of degraded Eco system.

8.5 COURT JUDGMENTS AND RELATED COMMITTEES:

8.5.01 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.

8.5.02 Hon'ble Supreme Court passed an order on 22.09.2000 in Inter- Locutory application No. 424 saying that regeneration of forest should 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.

8.5.03 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. Central government shall be strictly complied with and felling 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.

8.5.04 Peoples' Participation through JFM:-

The Government of Maharashtra Resolution No.SIF-1091/199/F-11, dated 16th March 1992 JFM approach was adopted for degraded forest areas of this state. These guidelines were modified vide G.R.No.MSC/2000/C.No.143/F-2, dated 25/04/2003. Recently Revenue & Forest Department has issued consolidated G.R. No. FDM-2011/CR-100/F-2, dated 5th October 2011, FDM-2011/CR-104/F-2, dated 25th October 2011, FDM-2011/CR-100/F-2, dated 22nd December 2011 & FDM-2012/CR-4/F-2, dated 10th July 2012, which should be strictly followed by DCF Gondia while implementing JFM scheme in Gondia Division. It has authorised the forest department to take up JFM activities in well stocked areas also & to share the usufruct with the villagers. All JFM activities should be in consonance to the prescription of the working plan.

8.6 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 has been greatly affected, 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.

It is presumed that the standard practice of Silviculture will be applied to manage the Forest, irrespective of the ownership of the forest and its produce, as the forest can be managed on the sustainable basis only if it is managed under proper silvicultural system.

The following rights are recognised under the section 3(1) of this Act :

1. Right to hold and live in the forest land under individual or common occupation for habitation or self cultivation for livelihood.
2. Community rights such as Nistar etc. including those used in erstwhile princely states, Zamindaris or such intermediaries.
3. Right of ownership, access to collect, use and dispose of Minor Forest Produce, traditionally collected within or outside the village boundaries.
4. Community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastoralist communities.
5. Rights of community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities.
6. Rights in or over disputed lands under any nomenclature.
7. Right for conversion of Pattas or leases or grants issued by any local authority or any State Government on forest lands to titles.
8. Right of access to biodiversity and community right to intellectual propriety and traditional knowledge related to bio-diversity and cultural diversity.
9. Any other traditional rights customarily enjoyed by the forest dwelling Scheduled Tribes and other traditional Forest Dwellers, as the case may be, which are not mentioned in the clauses (a) to (k), excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal.
10. Right to *in situ* rehabilitation including alternative land in case where the Scheduled Tribes and other Traditional Dwellers have been illegally evicted or displaced from forest land without receiving their legal entitlement to rehabilitation prior to the 13th December 2005.

8.7 GENERAL OBJECTIVES OF MANAGEMENT:

8.7.01 Following general objectives of forest management have been identified in pursuance of the National Forest Policy, 1988; and other directives issued by the state and the union governments, from time to time:

1. To preserve forest cover on hill slopes, along streams, watercourses and water bodies in order to prevent soil erosion and to check siltation in reservoirs; and to maintain their essential protective and life support functions, including, regulation of the water regime.
2. To meet expectations of wild life protection and biodiversity conservation from managed forests.

3. To restore and augment tree cover in under-stocked and degraded forests, and to improve productivity and growing stock of natural forests using appropriate modes of management and techniques.
4. To alleviate poverty in the forest dependent villages.
5. To enhance productivity of firewood, fodder, non-wood forest produce, small timber and other construction wood required for meeting local household demands, particularly, of the tribal communities.
6. To involve women community in forestry management.
7. To ensure optimum sustained yield of desirable forest produce and services consistent with other objectives as well as National and State forest policies.
8. Ecotourism
9. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Rights) Act, 2006 and Joint Forest Management.

8.7.02 The Main Objectives of Management are Listed Below :

1. The forests are primarily mixed in nature and poor in quality, having low proportion of valuable species like Teak and need enrichment by miscellaneous species in the stocking. A large chunk of forest tract is under stocked, open and degraded that needs improvement in stocking through tending of existing rootstock and plantations.
2. The coppice vigour of Teak and miscellaneous species have declined due to repeated coppicing under coppice systems for over 3 to 4 rotations leading to deterioration in growth and quality of Teak and other valuable species. It also has led to increase in proportion of prolific but unwanted coppicers like Garadi and Lendia in the stocking.
3. The natural regeneration of Teak and miscellaneous is not satisfactory. Natural regenerations were observed at places but far short of required numbers as to established natural regeneration to serve as normal future crop.
4. A large extent of forest areas fall in the catchments of irrigation projects and water bodies, thereby need specific treatment in the interest of longevity of these water bodies, having focus on soil and moisture conservation to check siltation.
5. A large portion of forests of the division adjoins the Protected Areas, namely, Navegaon National Park and Nagzira Wildlife Sanctuary, hence, require treatments in conformity with the wildlife and bio-diversity conservation and eco-tourism.
6. The Bamboo is the most sought after forests produce in the division by the local communities especially the Burads. The uncontrolled Bamboo exploitation has resulted

in shrinking of Bamboo areas in the division. The Bamboo areas require special focus and treatment to reverse this trend.

7. The forests suffer heavy biotic pressure, like, uncontrolled grazing and fire, resulting in destruction of natural regeneration and humus. Besides this the soil becomes compact and unproductive. Excessive grazing and uncontrolled fires are the main adverse factors causing degradation of forests in the division. The situation requires some bold measures to minimise these adverse influences.
8. The NTFP (MFP) species form a substantial proportion of the forest crops that contribute substantially to the livelihood of local communities especially the tribal. The forest areas rich in NTFPs require special thrust for their sustainable management and use in the interest of the local communities, by involving them through JFM and local NGOs having the skill of processing and value addition.

8.8 SPECIAL OBJECTIVES OF MANAGEMENT:

1. To gradually convert stunted Teak coppice crop with reduced coppicing vigour into 'High Forests' by suitable silvicultural techniques and tending operations in existing natural regenerations and rootstocks
2. To improve the existing crops by applying improvement measures aimed at nursing back these forests to normalcy.
3. To restore the vegetative cover of degraded and open areas and to increase their productivity, through suitable measures like site protection, tending of natural regenerations & rootstocks, supplementing it with plantations, wherever, necessary, possibly through JFM.
4. To prevent the siltation of the dams and other water bodies by checking the soil erosion in the forest catchments through soil and water conservation measures
5. To augment fodder requirements of the villages. Mostly it is grass resources, which are to be supplemented, wherever required, with palatable legumes and tree fodder.
6. To improve the productivity of water bodies for the benefit of wild life and villagers.
7. To provide a safe and proper habitat for wild animals and birds.

8.9 ANALYSIS AND VALUATION OF THE CROP:

8.9.01 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 is used for the purpose.

8.9.02 Areas susceptible to high erosion and falling in the catchments of large water bodies are included in the Protection Working Circle.

8.9.03 Compartments under non-forest use, forest nurseries or other special purposes such as Forest Research have not been included under any Working Circle. Therefore such areas have been included in miscellaneous working circle.

8.9.04 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 and firewood.

8.9.05 Compartments having preponderance of pole crop, dense tree cover without enough mature trees and damaged crop, is designated as the Improvement Working Circles (IWC). These compartments are expected to produce poles, small timber and firewood. Only improvement felling, in favour of desirable species, is to be carried out to improve the crop so that it may become the future Selection Forests.

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

8.10 FUNCTIONAL CLASSIFICATION OF FORESTS:

8.10.01 The broad principles of classification of forests on functional basis have been guided by the Govt. Resolution No. MRF-1365/132211-Y, dated 06/12/1968 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 (25^0 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.

8.10.02 The functional classification of the forest has been made by taking into consideration the above aspects besides the growing stock and condition of site. 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. Only dead trees will be harvested in such areas. Over congested young crops will be thinned and open areas will be regenerated, both by natural as well as artificial means. Strict control over grazing and protection from fire will be proposed. The areas directly draining into any water body are kept under Protection Working Circle.
- B. Tree Forest:** This type of forest includes the better quality forests, especially the site quality III and IVA areas, capable of producing medium to large-sized timber, which are comparatively away from local habitations. They have been worked under Conversion and CWR system in the past except areas under Protected Forests. 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. The percentage of Teak in the existing crop is not very high, tending to small pure patches at places. Therefore,

plantation of Teak and other valuable miscellaneous species shall be designed in such a way that the proportion of Teak should not be more than 50 % in the resulting crop. These areas have been proposed 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 with few patches of quality III. The density varies from 0.4 to 0.6 and natural regeneration is deficient in open areas. These forests have been worked under CWR system under the previous plans. These forests will be managed under Improvement system by carrying out improvement felling only. 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 Improvement Working Circle, where only improvement fellings are recommended so that this crop may become selection forests in future.
- D. 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 small patches of the Jhudpi Jungle will be treated as a reserved forest as the proposal has already been sent by DCF Gondia to the Government. These Jhudpi jungles are also kept reserved as a land bank for any future compensatory land against any project. Mostly these areas are included in the Miscellaneous Working Circle.

8.11 TREATMENTS PRESCRIBED:

- i. Management treatments will depend upon requirements of environmental stability, protection of topography, biodiversity conservation, 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. Forest areas susceptible to erosion and falling in catchments areas of medium and large irrigation projects and reservoirs shall be protected and given separate treatment having focus on soil and water conservation, afforestation eco-restoration and eco-tourism.
- iii. Recommended soil and moisture conservation works should restore ecological balance and ensure biodiversity conservation.
- iv. 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.
- v. The forests of Gondia Division is extremely important from wildlife corridor management point of view as it lies between six important wildlife protected areas viz. Tadoba, Navegon, Nagzira, Kanha, Pench (MS) and Pench (MP), of which four are Tiger project areas. It is therefore important that these forests should be managed in such a way that the corridors are not disturbed instead in future it should improve and the animals can migrate safely from one PA to another.
- vi. Compilation of a comprehensive database of floral and faunal resources as well as ecologically sensitive sites in the division is proposed.
- vii. 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.

- viii. 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.
- ix. 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.
- x. 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.
- xi. Involving local people in managing forests and generating awareness in rural and tribal areas is considered indispensable for the forest conservation.
- xii. Reducing biotic pressure on forests, particularly, illicit felling, unsustainable grazing, fire and encroachment near villages will be considered on priority basis.
- xiii. Forests capable of producing medium to large sized timber will be harvested under the Selection-Cum-Improvement management system. For production of small timber, poles and fuel wood to meet the local and the Nistar requirements, Improvement System is proposed to continue in areas of poor quality and stunted growth.
- xiv. Boundary demarcation will be carried out in time-bound manner for ensuring territorial integrity of forests. The Revenue and Forest Departments shall ensure maintaining forest boundaries, updating land records and reconciling revenue records in accordance to forest notifications.
- xv. Old notifications with estimated area of forest or with some errors will be taken up for correction. Proper survey and area measurement should be done on a time bound basis where the 'Blocks of Forests' have been notified Reserved Forests or Protected Forests.

- xvi. Action will be taken to convert all the Zudpi jungles adjoining the Reserved Forests and large patches, away from villages into Reserved Forests.
- xvii. Important areas from wildlife point of view should be identified in the division & provision for improvement and conservation of wildlife in such areas of the division, as well as for reduction of man-animal conflict, problems of poaching in the division, management of wildlife corridors, if any, should be given on top priority by DCF Gondia.
- xviii. The location of water holes, suitable habitat for wild animals, measures needed to conserve and improve the same and anything specific and beneficial to wildlife in the Division should be taken by DCF Gondia. The areas of the division adjacent to National Parks & WLS shall be managed in consonance with objective & management prescriptions of the Management plan respective PAs in vogue from time to time.
- xix. Assessment of existing biodiversity in the division should be done by DCF Gondia & suitable steps to be taken for their protection & conservation.
- xx. Details of study & survey of wildlife corridors, eco-tourism and status of wildlife population should be done by DCF Gondia for future management for their protection & conservation. Climbers and other species included in Red Data Book of BSI and IUCN Red Data Book should not be sacrificed due to ignorance during forestry operations.

8.12 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 5 (five) area-specific and 4 (four) overlapping, working circles are prescribed. (Abstract of allotment of compartment to various Working Circles and Felling series is given in **Appendix No. XXXIII**.)

Table No.8.1 : Distribution of Forest Areas in Various Working Circles:

S.N.	Working Circle	RF (in ha)	PF + Gose PF (in ha)	Un. Cl. Forest (in ha)	Zudpi Jungle (in ha)	Acquired Private Land (in ha)	Total Area (in ha)	%
1	SCI WC.	39071.399	23016.182	1308.857	0.00	0.00	63396.438	36.60
2	IWC	14446.81	7829.72	450.658	0.00	0.00	22727.188	13.12
3	Afforestation WC.	6092.154	29262.693	1777.577	0.00	0.00	37132.424	21.44
4	Misc. WC	5036.953	7553.479	3572.986	21970.20	25.15	38158.768	22.05
5	Protection WC	8155.267	3608.511	0.00	0.00	0.00	11763.778	6.79

	Total Area	86185.98	72802.583	71270.585	7110.078	21970.2	25.15	173178.596
6	Wildlife (OL) WC						Entire Area	
7	Bamboo (OL) WC						34253.987	
8	NTFP (OL) WC						Entire Area	
9	JFM (OL) WC						161414.82	
10	OTP (OL) WC						Entire Area	

8.12.01 Distribution of Area to Various Working Circles: The reallocation of forest areas under various working circles of the current working plan has been given in Table No. 9.1. The areas have been allotted after analysing the enumeration data.

- i. **SCI WORKING CIRCLE :** 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 found suitable for SCI have also been allotted to this Working Circle. The compartments, which have not been worked under last plan, are included under SCI working circles in the current plan, having dense forest of mature and over mature crop capable of producing timber and poles, is available for harvesting
- ii. **IMPROVEMENT WORKING CIRCLE:** Most of the IWC areas of the previous plan and some compartments SCI, Misc. and FF & P Working Circles, found suitable for IWC, have been allotted to this Working Circle. Most of these areas belonged to the old CWR WC, which have been worked in previous working plans and, have been put under Improvement working circle, because the young to middle aged crop in the area needs to reach at maturity for future productive selection forests.
- iii. **AFFORESTATION WORKING CIRCLE :** Areas having sparse crops and open areas are included in Afforestation Working Circle. Tending operations of root stock and afforestation work have been proposed in such areas.
- iv. **PROTECTION WORKING CIRCLE :** Areas susceptible to high erosion occurring in the catchment of large water bodies have been included in the Protection and Catchment Area Management Working Circle. Mostly soil conservation works have been prescribed in this working circle. No felling is to be carried out in the areas directly draining into the water bodies.
- v. **MISCELLANEOUS WORKING CIRCLE :-** This working circle comprises forest areas not included in any other working circles.

Table No.8.2 : Showing areas Allotted to Different Working Circles viz a viz the Previous Plan.

S.N.	Dr.V.K.Sinha, Shri Jarnail Singh & Shri Arrakal Ashraf's Working Plan.		Present Plan Working Circle (ha)
	Working Circle	Area (ha)	Area (ha)
1	SCI WC	76249.70	63396.438
2	IWC	40860.60	22727.188
3	AFF WC	33104.30	37132.424
4	MISC WC	56869.50	38158.768
5	PRO WC	8845.00	11763.778
6	Bamboo (OL) WC	34844.04	34253.987
7	OTP (OL) WC		
8	Wildlife (OL) WC	Entire Area	Entire Area
9	NTFP (OL) WC	Entire Area	Entire Area
10	JFM (OL) WC	Entire Area	161414.82
Total		215929.10	173178.596

8.12.02 The SCI working circle areas are largely concentrated in Chichgarh, Gothangaon, South Deori, Sadak Arjuni and Navegaonbandh ranges while the Improvement Working Circle areas are distributed in North Deori, Arjuni Morgaon and Gothangaon ranges. Protection Working Circle areas are distributed among South Deori & Chichgarh ranges. Whereas Afforestation Working Circle areas are distributed in all the ranges as most of the ranges. Statement showing the proposed Range-Wise Distribution of areas of different working circles for the Current Plan has been given in **Table No. 8.3**.

Table No. 8.3 : Statement Showing Distribution of Area under SCI Working

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Commt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Commt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	6	1374.054	3	316.091	0	0	0	0	0	9	1690.145
2	Gondia	2	977.551	4	1495.06	0	0	0	0	0	6	2472.606
3	Goregaon	6	1054.733	11	2820.43	0	0	1	180.532	0	18	4055.698
4	Amgaon	0	0.00	0	0	0	0	0	0	0	0	0
5	Salekasa	14	2741.27	8	2041.63	0	0	0	0	0	22	4782.901
6	North Deori	7	1313.2	12	2827.96	0	0	0	0	0	19	4141.163
7	South Deori	8	1875.7	13	4120.06	0	0	0	0	0	21	5995.758
8	Chichgarh	30	7725.2	11	4523.62	0	0	0	0	0	41	12248.822
9	Sadak Arjuni	16	3515.637	11	2272.07	0	0	2	70.6	0	29	5858.303
10	Navegaonbandh	25	6150.224	4	517.713	0	0	0	0	0	29	6667.937
11	Ghothangaon	33	7564.68	10	1523.15	0	0	9	1057.73	0	52	10145.558
12	Arjuni Morgaon	21	4779.15	5	558.397	0	0	0	0	0	26	5337.547
Total		168	39071.399	92	23016.2	0	0	12	1308.86	0	272	63396.438

Table No. 8.4 : Table Showing Distribution of Area under Improvement Working Circle.

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comtt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comtt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	3	952.706	18	2045.32	0	0	0	0	0	21	2998.023
2	Gondia	0	0	1	79.936	0	0	0	0	0	1	79.936
3	Goregaon	2	290	4	595.629	0	0	0	0	0	6	885.629
4	Amgaon	2	369.2	3	439.456	0	0	0	0	0	5	808.656
5	Salekasa	3	490.5	6	852.973	0	0	0	0	0	9	1343.473
6	North Deori	10	1526.22	12	1898.97	0	0	0	0	0	22	3425.185
7	South Deori	8	1252.5	2	587.106	0	0	0	0	0	10	1839.606
8	Chichgarh	3	564.2	5	723.874	0	0	0	0	0	8	1288.074
9	Sadak Arjuni	1	344.944	1	238.546	0	0	1	307.399	0	3	890.889
10	Nawegaonbandh	6	1303.44	1	107.44	0	0	0	0	0	7	1410.88
11	Ghothangaon	14	2735.51	2	215.111	0	0	1	143.259	0	17	3093.88
12	Arjuni Morgaon	22	4617.59	2	45.367	0	0	0	0	0	24	4662.957
Total		74	14446.81	57	7829.72	0	0	2	450.658	0	133	22727.188

Table 8.5 : Showing Distribution of Area under Afforestation Working Circle.

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comtt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comtt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	0	0	7	664.344	0	0	0	0	0	7	664.344
2	Gondia	3	290.02	19	2740.205	0	0	0	0	0	22	3030.225
3	Goregaon	4	602.3	24	3399.025	0	0	3	827.677	0	31	4829.002
4	Amgaon	2	209.9	24	2599.14	0	0	0	0	0	26	2809.038
5	Salekasa	5	975	20	1843.07	0	0	0	0	0	25	2818.072
6	North Deori	0	0	27	3722.09	0	0	0	0	0	27	3722.088
7	South Deori	0	0	7	513.106	0	0	0	0	0	7	513.106
8	Chichgarh	0	0	9	1650.47	0	0	0	0	0	9	1650.466
9	Sadak Arjuni	8	1728.234	39	5174.71	0	0	4	586.454	0	51	7489.395
10	Nawegaonbandh	2	629.14	13	1002.56	0	0	2	182.551	0	17	1814.249
11	Ghothangaon	5	242.4	10	2014.14	0	0	1	180.895	0	16	2437.432
12	Arjuni Morgaon	7	1415.16	28	3939.85	0	0	0	0	0	35	5355.007
Total		36	6092.154	227	29262.7	0	0	10	1777.58	0	273	37132.424

Table No 8.6 : Table Showing Distribution of Area under Miscellaneous Working Circle.

S.N.	Name of the Range	RF + NRF (Total Comtt.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comtt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comtt.)	Zudpi Jangal Area (in Ha)	UN (Total Comtt.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	1	36.81	10	416.64	69	2147.50	0	0.00	0.00	80	2600.95
2	Gondia	0	0.00	28	663.10	112	3338.82	0	0.00	0.00	140	4001.92
3	Goregaon	0	0.00	5	187.50	51	1584.68	5	1311.29	2.61	61	3086.08
4	Amgaon	0	0.00	0	0.00	66	2520.86	3	127.59	0.00	69	2648.45
5	Salekasa	0	0.00	0		60	4691.25	15	1069.60	8.14	75	5768.99
6	North Deori	0	0.00	0	0.00	40	2103.04	5	1011.05	4.98	45	3119.07
7	South Deori	2	261.30	3	991.29	22	378.74			9.42	27	1640.75
8	Chichgarh	7	1634.23	5	2415.19	32	800.89	1	53.45	0.00	45	4903.77
9	Sadak Arjuni	0	0.00	0	0.00	42	1771.78	0	0.00		42	1771.78
10	Nawegaonbandh	10	2529.10	9	2879.76	23	1014.50	0	0.00	0.00	42	6423.36
11	Ghothangaon	2	575.51	0	0.00	10	1228.74	0	0.00	0.00	12	1804.25
12	Arjuni Morgaon	0	0.00	0	0.00	14	389.40	0	0.00	0.00	14	389.40
Total		22	5036.95	60	7553.48	541	21970.20	29	3572.99	25.15	652	38158.77

Table No 8.7 : Table Showing Distribution of Area under Protection Working Circle.

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comtt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comtt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	0	0	0	0	0	0	0	0	0	0	0
2	Gondia	0	0	0	0	0	0	0	0	0	0	0
3	Goregaon	0	0	0	0	0	0	0	0	0	0	0
4	Amgaon	0	0	0	0	0	0	0	0	0	0	0
5	Salekasa	0	0	4	693.745	0	0	0	0	0	4	693.745
6	North Deori	2	386.50	0	0	0	0	0	0	0	2	386.5
7	South Deori	10	1695.90	3	444.127	0	0	0	0	0	13	2140.027
8	Chichgarh	14	2488.66	6	940.061	0	0	0	0	0	20	3428.721
9	Sadak Arjuni	7	1526.047	3	1079.52	0	0	0	0	0	10	2605.571
10	Nawegaonbandh	0	0	1	344.703	0	0	0	0	0	1	344.703
11	Ghothangaon	0	0	0	0	0	0	0	0	0	0	0
12	Arjuni Morgaon	7	2058.16	1	106.351	0	0	0	0	0	8	2164.511
Total		40	8155.267	18	3608.51	0	0	0	0	0	58	11763.778

8.13 BLOCKS AND COMPARTMENTS:

8.13.01 Reserved Forests of this division have been distributed in 340 compartments and 16 forest blocks. All the compartments of Reserved Forests have been retained their original numbers.

8.13.02 Protected Forests (PF) covering 454 villages have been organised in 454 compartments, in such a way that each forest patch has a distinct compartment number irrespective of its size. The distinct patches within these compartment numbers are assigned with distinct sub compartment numbers. The notified area of such villages is considered for the purpose of area accounting.

8.13.03 The Gondia Division has 7110.078 ha of unclassified forests. The Revenue Authorities have handed over 21970.20 ha of Zudpi Jungle in 541 villages to the Gondia Division in the year 1990. (Appendix No. XI)

Table 8.8 :Table Showing Distribution of Forest Compartments under various W.C.

S.N.	Working Circle	Reserved Forests (Comp.)	Protected Forests + Gose PF (Comp.)	Zudpi Jungle (Comp.)	Un-classed Forest (Comp.)	Total Number Comp.
1	SCI	168	92	0	12	272
2	IWC	74	57	0	2	133
3	Afforestation	36	227	0	10	273
4	Miscellaneous	22	60	541	29	652
5	Protection	40	18	0	0	58
Grand Total		340	454	541	53	1388

8.14 PERIOD OF THE PLAN: The schedules of various operations have been provided for 20 years. This plan, however, is proposed to be implemented for a period of 10 (Ten) years from the year of approval. However, the mid-term review after five year may be carried out if the

circumstances demand and if concerned Chief Conservator of Forests (Territorial) comes forward with a proposal for review.

8.14.01 Principal Chief Conservator of Forests (HoFF), Maharashtra State, Nagpur may issue necessary supplementary instructions on the aspects not covered in the plan.

CHAPTER IX

SELECTION-CUM IMPROVEMENT WORKING CIRCLE

9.1 GENERAL CONSITUTION OF THE WORKING CIRCLE: The areas included in this working circle are capable of producing large timber, poles and firewood with less biotic pressure. The aim is to gradually convert the areas into High Forests by encouraging natural regeneration supplemented by artificial regeneration. It includes areas which support straight bole and sound trees of both seedling and coppice origin. It includes 63396.438 ha of total areas comprising of 39071.399 ha of Reserved Forests and 23016.18 ha of Protected Forests & 1308.86 ha of un-classed forest. It constitutes an area of 36.60 % of the total forest area of the division.

9.1.01 Based on the results of the enumeration data and satellite imageries and existing stock map details, the following criteria is proposed for allocation of compartments to the SCI areas:

1. Compartments suitable for producing timber of medium and large size and not critically important for the protection of the topography.
2. Compartments having dense Teak forest of IVA quality having patches of quality III and IVB inextricably mixed in the crop, capable of producing timber and poles.
3. Compartments having more than 20 hectare of dense tree cover, more than 10 trees per ha of harvestable girth and more than 8 square m in basal area are included in SCI, subject to the above condition.

9.2 GENERAL CHARACTER OF THE VEGETATION:

9.2.01 The forests are mixed in nature and contain trees of all age classes. The crop consists mainly of miscellaneous species with varying proportions of teak. In some compartments pure Teak trees are also present, but they are confined to the well drained areas, mainly along the major nalas and area consisting of good loamy soil. The major miscellaneous species are Saja, Bija, Kalam, Haldu, Tiwas, Dhaoda, Garadi, Mowai, Rohan, Bhirra, Surya, Lendia, Chichwa, Parad etc. In the fruit bearing species, Tendu, Moha, Char, Aonla, Bel, Harra and Beheda are the main species. Haldu and Shisham are confined to a few compartments. Garari and Lendia are abundant in pole crop, and adversely affect regeneration and growth of other light-demander species. Natural Bamboos are very less, but in many compartments Natural as well as artificially planted bamboo crop occurs extensively in the entire division. Kuda, Garadi, Decamali are the main species in the understorey.

9.2.02 As per the enumeration results, composition and structure of forest crop in SCI area is given in the **Table No. 9.1**.

Table No. 9.1: Species & Girth wise Distribution (per ha) in SCI WC.

Species	g15 30	g31 45	g46 60	g61 75	g76 90	g91 105	g106 120	g121 135	g136 150	g151 up	Total	Basal Area
Ain	4.756	3.062	1.976	1.744	1.534	1.063	0.696	0.447	0.263	0.327	15.869	0.566
Aonla	0.377	0.449	0.322	0.207	0.166	0.082	0.045	0.007	0.005	0.002	1.662	0.044
Behada	0.204	0.158	0.171	0.130	0.109	0.053	0.055	0.031	0.031	0.083	1.025	0.052
Bel	0.170	0.139	0.066	0.065	0.038	0.039	0.017	0.005	0.003	0.006	0.550	0.016
Bhira	1.392	1.184	0.805	0.477	0.378	0.214	0.096	0.037	0.041	0.044	4.668	0.122
Biba	0.314	0.420	0.298	0.166	0.139	0.097	0.048	0.029	0.014	0.034	1.558	0.052
Bija	0.564	0.647	0.684	0.832	0.877	0.825	0.649	0.430	0.297	0.400	6.204	0.416
Bor/Ber	0.000	0.008	0.004	0.006	0.001	0.003	0.000	0.000	0.000	0.000	0.023	0.001
Char	1.924	1.855	0.948	0.454	0.284	0.087	0.042	0.011	0.005	0.006	5.614	0.097
Chichwa	0.121	0.177	0.177	0.164	0.164	0.070	0.065	0.031	0.035	0.035	1.039	0.050
Dhaman	0.247	0.299	0.254	0.181	0.125	0.056	0.018	0.014	0.007	0.004	1.205	0.034
Dhawada	2.974	2.114	1.403	1.037	0.809	0.442	0.274	0.153	0.084	0.158	9.447	0.277
Garadi	6.940	4.953	3.375	2.003	1.185	0.461	0.203	0.060	0.034	0.018	19.233	0.373
Haldu	0.134	0.136	0.102	0.048	0.079	0.073	0.056	0.035	0.031	0.076	0.771	0.046
Hirda	0.259	0.232	0.151	0.127	0.104	0.079	0.046	0.039	0.029	0.029	1.096	0.044
Kalam	0.108	0.096	0.081	0.054	0.076	0.054	0.051	0.041	0.017	0.039	0.617	0.035
Kasai	0.341	0.455	0.463	0.322	0.254	0.121	0.068	0.034	0.026	0.050	2.133	0.078
Khair	0.282	0.451	0.323	0.182	0.114	0.030	0.007	0.009	0.001	0.000	1.399	0.031
Kulu	0.038	0.048	0.041	0.019	0.004	0.008	0.000	0.000	0.006	0.012	0.179	0.007
Lendia	4.651	2.374	1.085	0.566	0.460	0.204	0.100	0.052	0.046	0.049	9.588	0.167
Moha	1.009	0.842	0.599	0.414	0.464	0.379	0.354	0.230	0.220	0.623	5.133	0.322
Mokha	0.074	0.078	0.056	0.067	0.074	0.048	0.017	0.017	0.009	0.026	0.467	0.023
Mowai	0.696	0.811	0.708	0.638	0.547	0.355	0.220	0.135	0.089	0.082	4.281	0.179
Other	6.13	5.59	3.64	2.26	1.64	0.89	0.57	0.41	0.29	0.71	22.13	0.71
Palas	1.063	0.828	0.680	0.468	0.394	0.187	0.099	0.062	0.042	0.032	3.855	0.114
Rohan	0.990	0.842	0.582	0.400	0.302	0.167	0.080	0.052	0.026	0.020	3.463	0.094
Salai	0.168	0.203	0.239	0.197	0.280	0.274	0.210	0.172	0.167	0.204	2.115	0.163
Semal	0.081	0.075	0.099	0.081	0.069	0.068	0.053	0.038	0.023	0.024	0.611	0.034
Shisham	0.113	0.182	0.157	0.165	0.125	0.032	0.026	0.008	0.003	0.004	0.815	0.026
Shiwan	0.087	0.058	0.065	0.034	0.057	0.013	0.010	0.010	0.003	0.011	0.347	0.013
Surya	1.105	1.277	0.991	0.665	0.476	0.249	0.101	0.042	0.025	0.022	4.954	0.135
Teak	8.135	3.980	1.441	0.635	0.455	0.335	0.233	0.150	0.111	0.137	15.612	0.274
Tendu	1.721	0.496	0.223	0.170	0.133	0.108	0.059	0.050	0.026	0.042	3.028	0.065
Tiwas	0.194	0.244	0.185	0.184	0.251	0.163	0.082	0.044	0.033	0.028	1.409	0.066
Total	47.360	34.760	22.393	15.162	12.171	7.328	4.651	2.886	2.048	3.339	152.099	4.728

9.2.03 The crop is young to middle aged with occasional mature trees, in the major portion. The density of the crop is 0.4 to 0.8. The quality of the crop is III to IVA with some open patches of IVB mixed with above qualities. Dominant site qualities are III and IVa, but areas of site quality IVb is also not uncommon. Some patches of site quality II are also seen in the division.

9.2.04 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. Although proportion of teak is small, the forests are suitable for teak. Hence, proportion of teak could be increased by suitable tending operations.

9.3 BLOCKS AND COMPARTMENTS: Details of block and compartment wise area distribution is given in the **Appendix No.XXXIV & XXXV**. Range-wise area distribution under SCI Working Circle is given in the following table:

Table No. 9.2: Table Showing Range Wise Area Distribution Under SCI Working Circle.

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comitt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comitt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	6	1374.054	3	316.091	0	0	0	0	0	9	1690.145
2	Gondia	2	977.551	4	1495.055	0	0	0	0	0	6	2472.606
3	Goregaon	6	1054.733	11	2820.433	0	0	1	180.532	0	18	4055.698
4	Amgaon	0	0.00	0	0	0	0	0	0	0	0	0
5	Salekasa	14	2741.27	8	2041.63	0	0	0	0	0	22	4782.901
6	North Deori	7	1313.2	12	2827.96	0	0	0	0	0	19	4141.163
7	South Deori	8	1875.7	13	4120.06	0	0	0	0	0	21	5995.758
8	Chichgarh	30	7725.2	11	4523.62	0	0	0	0	0	41	12248.822
9	Sadak Arjuni	16	3515.637	11	2272.07	0	0	2	70.6	0	29	5858.303
10	Nawegaonbandh	25	6150.224	4	517.713	0	0	0	0	0	29	6667.937
11	Ghothangaon	33	7564.68	10	1523.15	0	0	9	1057.73	0	52	10145.558
12	Arjuni Morgaon	21	4779.15	5	558.397	0	0	0	0	0	26	5337.547
	Total	168	39071.399	92	23016.2	0	0	12	1308.86	0	272	63396.438

9.4 SPECIAL OBJECTIVES OF MANAGEMENT:

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

1. To gradually convert stunted Teak and other valuable coppice crop with reduced coppicing vigor into 'High Forest' by suitable silvicultural techniques and tending existing natural regeneration of seed origin.
2. To obtain sustained supply of medium to large-sized timber and poles.
3. To maintain mixed forest composition and High Forest character of the forest crop and improve density of stocking by tending existing natural regeneration and supplementing it with artificial regeneration of suitable valuable species.
4. To improve the proportion of valuable miscellaneous tree species in the crop by suitable tending operations and providing growing space for naturally regenerated seedlings of such species.

9.5 ANALYSIS AND VALUATION OF THE CROP:

9.5.01 Stock Mapping: The conventional stock mapping has also been carried out, besides the extensive enumeration exercise and crown density mapping through image processing and analysis of the satellite imageries.

9.5.02 Age and Density: The crop is mostly middle aged to mature having density varying from 0.4 to 0.8. The dense forest areas form about 3/4th of the crop in SCI areas.

9.5.03 Site Quality: Site quality governs the harvestable girth. It can be determined by average height of about 100 matured dominant Teak trees or its associates in the forest patches of consistent characteristics. However, site quality does not change much in time span of 20 years and hence the information from the previous plan has been used to delineate and digitise the various site quality classes.

9.5.04 Enumeration: Enumeration was carried out in 1412 plots over an area of 63396.438 ha. 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 No. XXXII.**

9.5.05 Regeneration: Data on regeneration status was collected along with enumeration of the crop. The data has been 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 the regeneration through root stock. 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).

9.6 SILVICULTURAL SYSTEM:

9.6.01 SCI 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.

9.6.02 Besides, the forests of Gondia division are primarily mixed in nature, having a few valuable species of good coppicing nature. In addition they have a significant proportion of Garari and Lendia - the prolific coppicing species- adversely affecting the extent and quality of teak and other valuable species in the crop composition. Except Teak, forests of Gondia Division support very few valuable species of good coppicing nature. Moreover, a significant part of these forests have been worked under Coppice Systems for 4 successive rotations leading to reduction in their coppicing vigour. In view of these reasons, coppice systems are not considered suitable for the future management of the forests of Gondia Division.

9.6.03 In view to above, and to maintain the mixed composition and High Forest character of the forest crop and to achieve the objective of management, these forests are proposed to work under SCI working circle. Local demands of small wood can also be met from SCI coupes.

9.6.04 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.

9.6.05 The natural regeneration will be given proper scientific treatments to regenerate the area.

9.6.06 The areas poor in natural regeneration will be artificially regenerated by Teak, miscellaneous species and Bamboo. Plantations will not be taken up in SCI areas unless a minimum 5 ha of degraded area, having crown density less than 0.4, is available in an annual coupe.

9.7 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 then CCF Working Plan Nagpur. The details are given in the **Table 9.6**.

Table No. 10.6 :Table showing the Harvestable Girth for Various Species in the Division:

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

9.8 CHOICE OF SPECIES:

9.8.01 Since Teak is the most valuable species and comes above all the miscellaneous 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.

9.9 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 31 Felling Series with an average area of 2045.00 ha and each felling series is further divided into 20 coupes with an average area of 102.25 ha. (**Appendix No. XXXVI**)

9.10 YIELD CALCULATION: The yield is regulated by area.

9.10.01 The annual yield will be regulated by area by making coupes equi-productive in each felling series, as far as possible. Coupes of around 102 ha each, will be laid down.

9.10.02 From the enumeration data of SCI WC of this working plan, the average number of stems per ha have been calculated. For the purpose of yield, data of each species mentioned above is used. The data is as under.

Table No.9.7 :Table Showing Abstract of Enumeration Data.

S.N.	Girth Class (cm)	Group-I Teak	Group-II Ain, Bija, Haldu, Kalam	Group-III Dhaoda, Khair, Bhirra, Chichwa, Salai, Mowai, Rohan, Shivan, Shisham, Tiwas, Surya, Kasai, Mokha, Palas, Dhaman, Bhilwa.	Group-IV Lendia, Garadi	Total
1	15-30	8.413	5.94	11.649	13.673	39.677
2	31-45	4.571	4.38	11.384	9.342	29.677
3	46-60	1.836	3.26	8.781	5.768	19.643
4	61-75	0.833	3.03	6.287	3.301	13.449
5	76 - 90	0.605	2.93	5.342	2.013	10.888
6	91 - 105	0.418	2.26	2.884	0.769	6.332
7	106 - 120	0.295	1.61	1.659	0.336	3.904
8	121 - 135	0.212	1.04	0.966	0.126	2.341
9	136 & above	0.150	0.79	0.750	0.084	1.774
	Total	17.333	25.239	49.702	35.411	127.685

9.10.03. Survival Percentage: The percentage of trees, that will be reaching the harvestable girth has, been calculated on the basis of number of trees that should have been in each girth class, if the present stock was evenly balanced. The expected number of trees in different girth classes in an evenly balanced growing stock is what is obtained from the law of **F.De Liocourt**.

F. De Liocourt's Law: This formula was used for the yield calculation in the previous working plan hence it has been adopted in this working plan too. The theory states that in a fully stocked selection forest i.e. the normal growing stock of the uneven aged forests, the number of stems falls off from one diameter class to the next higher diameter class in a geometrical progression with a constant ratio. This means that the percentage reduction in the stem number from one diameter class to the next is constant. Although the numerical value of the ratio varies from one forest to another, the general form of the distribution follows an exponential curve of decrease in number of trees as diameter increase is a fundamental characteristic of the uneven aged condition which provides the basis for the concept of uneven aged normally.

Thus, according to the law of **F.De Liocourt**, the number of trees in successive diameter or Girth classes represents a geometrical series of the form.

$$a, ar^{-1}, ar^{-2}, ar^{-3}$$

Where 'a' represents the number of trees in the lower diameter/girth class, ar^{-1} the number in the next higher diameter/girth class, ar^{-2} the number in the next higher diameter/girth class and so on and 'r' represents the common ratio of the geometrical progression. If the value of 'r' and the number of stems in any class are known, the whole series can be worked out and this would give the proportionate distribution of stems of an evenly balanced composition in an ideal selection forest.

The numerical values of 'r', which is the ratio of the geometric series, can easily be calculated if the stand table of such an ideal forest is available. By dividing the number of tree in a given diameter class by the number of trees in the next higher diameter class will give the value of 'r', which will be constant throughout all diameter/girth classes if the distribution is balanced. But in actual, such balanced distribution does not exist due to a number of reasons. In order to visualise an ideal distribution for a given actual distribution, the above law is applied. For a given stand table the value of 'r' and 'a' are obtained as follows:

(A) Calculation of 'r' :

'r' can be calculated by 3 methods. They are as follows:

- a)** The average (arithmetic mean) of the successive ratios. If $a_1, a_2, \dots, a_9$ are number of stems in 9 girth classes, then

$$r = \frac{1}{8} = \frac{a_1}{a_2} = \frac{a_2}{a_3} = \dots = \frac{a_8}{a_9}$$

b) Since $\frac{a_1}{a_2} = \frac{a_2}{a_3} = \dots = \frac{a_8}{a_9} = r$

and so $\frac{a_1 + a_2 + \dots + a_8}{a_2 + a_3 + \dots + a_9} = r$

c) Since $\frac{a_1}{a_2} = \frac{a_2}{a_3} = \dots = r$

and therefore $\frac{a_1}{a_2} = \frac{a_2}{a_3} = \dots = r$, or $r = \frac{a_1}{a_2} = \frac{a_2}{a_3} = \dots = \frac{a_8}{a_9}$

The value of 'r' can be calculated from any of the three methods, mentioned above, but (a) and (b) involves all terms of the series to find out the average value, whereas the in last one only two terms are required, and so these two (a & b) are more appropriate.

Between (a) and (b), (a) includes ratio of higher girth classes, which contains fewer trees and so the chance of error is more and the estimate of 'r' may have more standard error, and therefore method (b) appears to be most appropriate one and the same is being applied in the subsequent calculation.

(B) Calculation of the First Term of Geometrical Progression:

The sum of n terms of a G.P. is given as

$$S = a + ar^{-1} + ar^{-2} + ar^{-3} \dots\dots\dots + ar^{-(n-1)}$$

Where 'a' is the number of stems in the lower girth class.

Multiplying both sides by 'r' and subtracting it from the former, we get the following :

$$a = s (r^{n-1}) (r - 1) / (r^n - 1)$$

Here 'S' is the some of stems of all girth/dia classes which is known and 'r' has been calculated as above. Therefore, the value of 'a' can be calculated. From these 'a' and 'r' the whole series of an ideal distribution for a given stem distribution can be found out. The same principle is applied hereafter to construct the table for different harvestable girth.

9.10.04 Yield Calculation for Group-I Species (Teak)

Table No. 9.8 : Table Showing Average Annual Recruitment for Teak.

Harvestable girth 120 cms.

Girth Class	Stem per ha	Stem/ha as per De Liocourt's Law.	% of survival.	Stem/ha reaching harvestable girth [(2 x 4)/100]	Years required to pass over next girth class.	Average annual recruitment. (5/6)
1	2	3	4	5	6	7
15-30	8.413	8.360	2.871	0.242	10	0.024 R1
31-45	4.571	4.310	5.568	0.255	10	0.025 R2
46-60	1.836	2.110	11.374	0.209	12	0.017 R3
61-75	0.833	1.230	19.512	0.163	13	0.013 R4
76 - 90	0.605	0.840	28.571	0.173	14	0.012 R5
91 - 105	0.418	0.560	42.857	0.179	15	0.012 R6
106 - 120	0.295	0.370	64.865	0.192	18	0.011 R7
121 - 135	0.212	0.240	100.000	0.212		
136 & above	0.150	0.150	100.000	0.150		
Total	17.333					

In the above table by **De Liocourt's formula**

$$\begin{aligned}
 \text{i) } r &= \frac{a_1 + a_2 + \dots\dots\dots + a_8}{a_2 + a_3 + \dots\dots\dots + a_9} \\
 &= \frac{8.413 + 4.571 + \dots\dots\dots + 0.212}{\dots\dots\dots}
 \end{aligned}$$

$$\begin{aligned} & 4.571 + 1.836 + \text{-----} + 0.150 \\ & 17.18 \\ & = \frac{\text{-----}}{8.92} = 1.93 \end{aligned}$$

$$\begin{aligned} \text{and } S &= a_1 + a_2 + \text{-----} + a_9 \\ &= 8.413 + 4.571 + \text{-----} + 0.150 \\ &= 17.333 \end{aligned}$$

$$\begin{aligned} \text{ii) } a &= s (r^{n-1}) (r - 1) / (r^n - 1) \\ &= 17.333 \times (189.67)(0.93) / (365.37 - 1) \\ &= 3056.89 / 364.37 \\ &= 8.36 = \text{Recruitment in successive three felling series.} \end{aligned}$$

Felling Cycle	Total Recruitment
1) 18R7 + 2R6	= 0.192 + 0.024 = 0.215
2) 13R6 + 7R5	= 0.155 + 0.086 = 0.242
3) 7R5 + 13R4	= 0.086 + 0.163 = 0.249

Realisable recruitment in successive three felling cycles

a) First Felling Cycle

$$\begin{aligned} \text{i) } R_{r1} &= \frac{1}{2} \{0.215 - 18 (0.215 / 20 - 0.011) \} \\ &= \frac{1}{2} \{0.215 - 18 (0.01075 - 0.0110) \} \\ &= 0.1065 \end{aligned}$$

ii) Available recruitment R_{a1}

$$\begin{aligned} R_{a1} &= 0.215 - 0.1065 \\ &= 0.109 \end{aligned}$$

b) Second Felling Cycle

$$\begin{aligned} \text{i) } R_{r2} &= \frac{1}{2} \{0.242 - 13 \times (0.242 / 20 - 0.012) \} \\ &= \frac{1}{2} \{0.242 - 13 \times (0.0121 - 0.0120) \} \\ &= \frac{1}{2} (0.242 - 0.0013) = 0.1198 \end{aligned}$$

ii) Available recruitment R_{a2}

$$R_{a2} = 0.242 - 0.1198 = 0.1220$$

c) Third Felling Cycle

$$\begin{aligned} \text{i) } R_{r3} &= \frac{1}{2} \times \{0.249 - 7 \times (0.249 / 20 - 0.012) \} \\ &= \frac{1}{2} \times \{0.249 - 7 \times (0.01245 - 0.0120) \} \\ &= \frac{1}{2} \times (0.249 - 0.00045) = \frac{1}{2} \times (0.248) = 0.124 \end{aligned}$$

ii) Available recruitment R_{a3}

$$R_{a3} = 0.249 - 0.124 = 0.125$$

Table No. 9.9 : Table Showing the Net Realisable Recruitment

Felling Cycle	Total Recruitment	i. Realisable ii. Accumulation	Net Realisable Recruitment	Annual average realisable (4/20)	Annual average volume (in cum)
1	0.215	0.1065	0.1065	0.0053	0.0036
		0.1089			
2	0.242	0.1199	0.2287	0.0114	0.0078
		0.1217			
3	0.249	0.1242	0.2459	0.0123	0.0084
		0.1249			

Yield in First Three Felling Cycles:

The existing number of stems per ha above 120 cm girth is 0.362 which will be liquidated in first three cycles. The annual liquidation will be 0.00603 stems/ha or 0.0041 m³/ha. Thus the annual average yield in the first, second and third cycle will be 0.0077 m³, 0.0119 m³ and 0.0125 m³ per ha respectively. The total area of the Working Circle is 63396.438 ha. Hence for yield calculation the 63396.438 ha area should be used. Reserving 50% as the future safeguard, the utilizable yield in three cycles will be 0.0039 m³, 0.0059 m³ and 0.0062 m³ respectively, and the estimated annual yield for the whole working cycle for three cycles will be 247.25 m³, 374.04 m³ & 393.06 m³ respectively.

9.10.05 Yield Calculation for Group-II Species (Ain, Bija, Haldu, Kalam)**Table No. 9.10 : Table Showing Annual Average Recruitment***Harvestable girth 120 cms.*

Girth Class	Stem per ha	Stem/ha as per De Licourt's Law.	% of survival.	Stem/ha reaching harvestable girth [(2 x 4)/100]	Years required to pass over next girth class.	Average annual recruitment. (5/6)
1	2	3	4	5	6	7
15-30	5.94	6.04	16.89	1.00	9	0.111 R1
31-45	4.38	4.79	21.29	0.93	10	0.093 R2
46-60	3.26	3.89	26.22	0.85	10	0.085 R3
61-75	3.03	3.24	31.48	0.95	11	0.086 R4
76 - 90	2.93	2.62	38.93	1.14	12	0.095 R5
91 - 105	2.26	1.96	52.04	1.18	13	0.091 R6
106 - 120	1.61	1.43	71.33	1.15	14	0.082 R7
121 - 135	1.04	1.02	100.00	1.04		
136 & above	0.79	0.79	100.00	0.79		
Total	25.24					
			Stock in hand 1.83			

In the above table by **De Liocourt's** formula

$$\begin{aligned}
 & a_1 + a_2 + \dots + a_8 \\
 \text{i) } r &= \frac{a_1 + a_2 + \dots + a_8}{a_2 + a_3 + \dots + a_9} \\
 &= \frac{5.94 + 4.38 + \dots + 1.04}{4.38 + 3.26 + \dots + 0.79} \\
 &= \frac{24.45}{19.30} = 1.27 \\
 \text{and } S &= a_1 + a_2 + \dots + a_9 \\
 &= 5.94 + 4.38 + \dots + 0.79 = 25.24
 \end{aligned}$$

$$\begin{aligned}
 \text{ii) } a &= s (r^{n-1}) (r - 1) / (r^n - 1) \\
 &= 25.24 \times (6.64) (0.27) / (8.41 - 1) \\
 &= 45.25 / 7.41 \\
 &= 6.04
 \end{aligned}$$

Recruitment in successive three felling series

Felling cycle	Total recruitment
1) 14R7 + 6R6	= 1.152 + 0.543 = 1.695
2) 7R6 + 12R5 + R4	= 0.634 + 1.140 + 0.087 = 1.860
3) 10R4 + 10R3	= 0.867 + 0.854 = 1.721

Realisable recruitment in successive three felling cycles.

a) First Felling Cycle

$$\begin{aligned}
 \text{i) } R_{r1} &= \frac{1}{2} \{1.695 - 14 \times (1.695 / 20 - 0.082)\} \\
 &= \frac{1}{2} \{1.695 - 14 \times (0.0847 - 0.082)\} \\
 &= \frac{1}{2} (1.695 - 0.0378) \\
 &= 0.8299
 \end{aligned}$$

ii) Available recruitment R_{a1}

$$\begin{aligned}
 R_{a1} &= 1.695 - 0.8299 \\
 &= 0.865
 \end{aligned}$$

b) Second Felling Cycle

$$\begin{aligned}
 \text{i) } R_{r2} &= \frac{1}{2} \{1.860 - 7 \times (1.860 / 20 - 0.091)\} \\
 &= \frac{1}{2} \{1.860 - 7 \times (0.093 - 0.091)\} \\
 &= \frac{1}{2} (1.860 - 0.0175) \\
 &= 0.9213
 \end{aligned}$$

ii) Available recruitment R_{a2}

$$Ra_2 = 1.860 - 0.9213$$

$$= 0.939$$

c) Third Felling Cycle

$$i) R r_3 = \frac{1}{2} \{1.721 - 10 \times (1.721 / 20 - 0.095)\}$$

$$= \frac{1}{2} \{1.721 - 10 \times (0.0861 - 0.095)\}$$

$$= \frac{1}{2} (1.721 + 0.0894) = 0.9052$$

ii) Available recruitment Ra_3

$$Ra_3 = 1.721 - 0.9052 = 0.816$$

Table No. 9.11: Net Realisable Recruitment:

Felling Cycle	Total Recruitment	(i) Realisable (ii) Accumulation	Net Realisable Recruitment	Annual average realisable (4/20)	Annual average volume in cum)
1	1.695	0.830	0.830	0.0415	0.0311
		0.865			
2	1.860	0.921	1.786	0.0893	0.0670
		0.939			
3	1.721	0.905	1.844	0.0922	0.0692
		0.816			

Yield in First Three Felling Cycles:

The existing number of stems per ha above 120 cm girth is 1.83 which will be liquidated in first three cycles. The annual liquidation will be 0.0305 stems/ha or 0.0229 m³/ha. Thus the annual average yield in the first, second and third cycle will be 0.054 m³, 0.0899 m³ and 0.0921 m³ per ha respectively. The total area of the Working Circle is 63396.438 ha. Hence for yield calculation the 63396.438 ha area should be used.

Reserving 50% as the future safeguard, the utilizable yield in three cycles will be 0.027 m³, 0.0449 m³ and 0.0460 m³ respectively, and the estimated annual yield for the whole working cycle three cycles will be 1711.70 m³, 2846.500 m³ & 2916.236 m³ respectively.

9.10.06 Yield Calculation for Group-III Species

(Dhaoda, Khair, Rohan, Shiwan, Shisham, Salai, Mowai, Surya) Harvestable girth 90 cms.

Table No. 9.12 Table Showing Annual Average Recruitment;

Table 10.12 Yield Calculation for Group-III species

Girth Class	Stem per ha	Stem/ha as per De Licourt's Law	% of survival.	Stem/ha reaching harvestable girth [(2 x 4)]/100)	Years required to pass over next girth class.	Average annual recruitment. (5/6)
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15-30	11.65	12.35	17.81	2.08	9	0.231 R1
31-45	11.38	9.78	22.49	2.56	10	0.256 R2
46-60	8.78	7.17	30.68	2.69	11	0.245 R3
61-75	6.29	5.11	43.05	2.71	12	0.226 R4
76 - 90	5.34	3.61	60.94	3.26	18	0.181 R5
91 - 105	2.88	2.20	100.00	2.88		
106 - 120	1.66	1.41	100.00	1.66		
121 - 135	0.97	0.97	100.00	0.97		
136 & above	0.75	0.75	100.00	0.75		
Total	49.70					
			Stock in hand 6.26			

In the above table by De Liocourt's formula

$$\begin{aligned}
 \text{i) } r &= \frac{a_1 + a_2 + \dots + a_8}{a_2 + a_3 + \dots + a_9} \\
 &= \frac{11.65 + 11.38 + \dots + 0.97}{11.38 + 8.78 + \dots + 0.75} \\
 &= \frac{48.95}{38.05} = 1.29
 \end{aligned}$$

$$\begin{aligned}
 \text{and } S &= a_1 + a_2 + \dots + a_9 \\
 &= 11.65 + 11.38 + \dots + 0.75 \\
 &= 49.70
 \end{aligned}$$

$$\begin{aligned}
 \text{ii) } a &= s (r^{n-1}) (r - 1) / (r^n - 1) \\
 &= 49.70 \times (7.5) (0.29) / (9.65 - 1) \\
 &= 108.098 / 8.65 = 12.35
 \end{aligned}$$

Recruitment in successive three felling series

Felling Cycle	Total Recruitment
1) 18R5 + 2R4	= 3.256 + 0.451 = 3.707
2) 10R4 + 10R3	= 2.256 + 2.249 = 4.705
3) R3 + 10R2 + 9R1	= 0.245 + 2.561 + 2.075 = 4.881

Realisable recruitment in successive three felling cycles.

a) First Felling Cycle

$$\begin{aligned}
 \text{i) } R r_1 &= \frac{1}{2} \times \{3.707 - 18 \times (3.707 / 20 - 0.181)\} \\
 &= \frac{1}{2} \times \{3.707 - 18 \times (0.1853 - 0.181)\} \\
 &= \frac{1}{2} \times (3.707 - 0.0954) \\
 &= 1.8132
 \end{aligned}$$

ii) Available recruitment Ra_1

$$Ra_1 = 3.707 - 1.8132 = 1.894$$

Second Felling Cycle

$$\begin{aligned}
 \text{i) } R r_2 &= \frac{1}{2} \{4.705 - 10 \times (4.705 / 20 - 0.226)\} \\
 &= \frac{1}{2} (4.705 - 10 \times (0.235 - 0.440)) \\
 &= \frac{1}{2} (4.705 - 0.09) = 2.3039
 \end{aligned}$$

ii) Available recruitment Ra_2

$$\begin{aligned}
 Ra_2 &= 4.705 - 2.3039 \\
 &= 2.401
 \end{aligned}$$

b) Third Felling Cycle

$$\begin{aligned}
 \text{i) } R r_3 &= \frac{1}{2} \times \{4.881 - 10 \times (4.881 / 20 - 0.245)\} \\
 &= \frac{1}{2} \times \{4.881 - 10 \times (0.244 - 0.245)\} \\
 &= \frac{1}{2} \times (4.881 + 0.01) \\
 &= 2.4408
 \end{aligned}$$

ii) Available recruitment Ra_3

$$Ra_3 = 4.881 - 2.4408 = 2.440$$

Table No.9.13 : Table Showing Net Realisable Recruitment:

Felling Cycle	Total Recruitment	(i) Realisable (ii) Accumulation	Net Realisable Recruitment	Annual average realisable (4/20)	Annual average volume in cum)
1	3.707	1.8132	1.8132	0.0907	0.0363
		1.8936			
2	4.705	2.3040	4.1976	0.2099	0.0840
		2.4009			
3	4.881	2.4409	4.8418	0.2421	0.0968
		2.4400			

Yield in First three Felling Cycles:

The existing number of stems per ha above 90 cm girth is 6.26 which will be liquidated in first three cycles. The annual liquidation will be 0.104 stems/ha or 0.0417 m³/ha. Thus the annual average yield in the first, second and third cycle will be 0.078 m³, 0.1257 m³ and 0.1385 m³ per ha respectively. The total area of the Working Circle is 63396.438 ha. Hence for yield calculation 63396.438 ha area should be used.

Reserving 50% as the future safeguard, the utilizable yield in three cycle will be 0.039 m³, 0.0628 m³ and 0.0693 m³ respectively and the estimated annual yield for the whole working cycle three cycles will be 2472.46 m³, 3981.29 m³ & 4393.373 m³ respectively.

9.10.07 Yield Calculation for Group-IV Species (Lendia, Garadi) : Harvestable girth 45 cm.

Table No. 9.14 : Table Showing Annual Average

31-45	9.34	8.54	57.73	5.39	19	0.284 R2
46-60	5.77	4.93	100.00	5.77		
61-75	3.30	2.70	100.00	3.30		
76 - 90	2.01	1.40	100.00	2.01		
91 - 105	0.77	0.59	100.00	0.77		
106 - 120	0.34	0.28	100.00	0.34		
121 - 135	0.13	0.13	100.00	0.13		
136 & above	0.08	0.08	100.00	0.08		
Total	35.41					

Stock in hand 12.40

In the above table by **De Liocourt's** formula

$$\begin{aligned}
 \text{i) } r &= \frac{a_1 + a_2 + \dots + a_8}{a_2 + a_3 + \dots + a_9} \\
 &= \frac{13.67 + 9.34 + \dots + 0.13}{9.34 + 5.77 + \dots + 0.08} \\
 &= \frac{35.33}{21.74} = 1.63
 \end{aligned}$$

And $S = a_1 + a_2 + \dots + a_9$

$$\begin{aligned}
 &= 13.67 + 9.34 + \dots + 0.08 \\
 &= 35.41 \\
 \text{ii) } a &= s (r^{n-1}) (r - 1) / (r^n - 1) \\
 &= 35.41 \times (48.65) (1.63 - 1) / (79.07 - 1) \\
 &= 1085.30 / 78.07 \\
 &= 13.80
 \end{aligned}$$

Recruitment in successive three felling series

Felling cycle Total recruitment

$$1) 19R_2 + R_1 = 5.393 + 0.349 = 5.742$$

$$2) 13R_1 + 7R_2 = 4.536 + 1.987 = 6.523$$

$$3) 12R_2 + 8R_1 = 3.406 + 2.791 = 6.197$$

Realisable recruitment in the successive three felling cycles.

a) First Felling Cycle

$$\begin{aligned}
 \text{i) } R_{r1} &= \frac{1}{2} \times \{5.742 - 19 \times (5.742 / 20 - 0.284)\} \\
 &= \frac{1}{2} \times \{5.742 - 19 \times (0.2871 - 0.284)\}
 \end{aligned}$$

$$= \frac{1}{2} \times \{5.742 - 0.0589\}$$

$$= 2.8399$$

ii) Available recruitment Ra_1

$$Ra_1 = 5.742 - 2.8399$$

$$= 2.902$$

b) Second Felling Cycle

$$i) R_{r_2} = \frac{1}{2} \times \{6.523 - 13 \times (6.523 / 20 - 0.349)\}$$

$$= \frac{1}{2} \times \{6.523 - 13 \times (0.3261 - 0.349)\}$$

$$= \frac{1}{2} \times (6.523 + 0.2977)$$

$$= 3.4093$$

ii) Available recruitment Ra_2

$$Ra_2 = 6.523 - 3.4093 = 3.113$$

c) Third Felling Cycle

$$i) R_{r_3} = \frac{1}{2} \times \{6.197 - 12 (6.197 / 20 - 0.284) \}$$

$$= \frac{1}{2} \times \{6.197 - 12 (0.3099 - 0.284)\}$$

$$= \frac{1}{2} \times (6.197 - 0.3108) = 2.9424$$

ii) Available recruitment $Ra_3 = 6.197 - 2.9424 = 3.255$

Table No. 9.15 :Table Showing Net Realisable Recruitment:

Felling Cycle	Total Recruitment	i) Realisable ii) Accumulation	Net Realisable Recruitment	Annual average realisable (4/20)	Annual average volume in m ³
1	5.742	2.8399	2.8399	0.1420	0.0089
		2.9018			
2	6.523	3.4093	6.3111	0.3156	0.0198
		3.1132			
3	6.197	2.9424	6.0557	0.3028	0.0190
		3.2548			

Yield in First Three Felling Cycles:

The existing number of stems per ha above 45 cm girth is 12.40 which will be liquidated in first three cycles. The annual liquidation will be 0.207 stems/ha or 0.013 m³/ha. Thus the annual average yield in the first, second and third cycle will be 0.0219 m³, 0.0328 m³ and 0.0320 m³ per ha respectively. The total area of the Working Circle is 63396.438 ha which will be used for yield calculation.

Reserving 50% as the future safeguard, the utilizable yield in three cycles will be 0.0110 m³, 0.0164 m³ and 0.0160 m³ respectively, and the estimated annual yield for the whole working cycle three cycles will be 697.36 m³, 1039.70 m³ & 1014.34 m³ respectively.

The total yield for all four harvesting girth classes will be as under:

Table No. 9.16 : Table Showing Total Annual Yield for Three Felling Cycles

Felling Cycle	Per ha annual yield in cum					Annual average estimated yield for SCI WC in m ³
	Harvestable Girth					
	120 cm (Teak)	120 cm (misc)	90 cm	45 cm	Total	
1	0.0039	0.027	0.039	0.011	0.0809	5128.77
2	0.0059	0.0449	0.0628	0.0164	0.1300	8241.54
3	0.0062	0.046	0.0693	0.016	0.1375	8717.01

The above table shows that the yield will be increasing progressively in successive felling cycles provided the crop is protected effectively from various damages.

9.11 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, in most of the coupes will be carried out by FLCS and in some coupes it will be done by the Forest department, as per the directives issued by the Government. 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.

The Forest department will examine the legal provisions in the “The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act.2006”, before allotting the coupes to the existing Forest Labour Co-operative Societies. The opinion of the villages should be considered as per the provisions of the Act. JFM committees should also be taken into confidence to encourage the participatory system of forest management.

9.12 COUPE DEMARCATION, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:

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

The main annual coupes shall be demarcated one year in advance along with coupes due for Cleaning and Thinning. 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.

9.12.02 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 along with GPS reading, 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, if not detrimental to the riparian ecosystem.
- ii) **Bush Sowing:** Bush sowing of *Khair*, *Neem*, *Maharukh*, *Sandal*, *Babul* and other local seeds is prescribed. Any one species should not constitute more than one-fourth of the disseminated seeds.
- iii) **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, as per Miscellaneous Regulations.
- iv) **Plantation:** Plantation of suitable species may be taken, if necessary and an area not less than 5 ha is available.
- iv) **Harvesting Prohibited:** Harvesting of standing trees (dead or alive) is strictly prohibited in the A-type areas. The marketable down logs of valuable species such as *Teak*, *Shisham*, *Bija*, *Haldu* and *Tiwas* may be extracted.

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 (600 or more saplings per hectare)
- **B2-type:** Open forests (density < 0.4) without Natural Regeneration (saplings less than 600)

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. Such identified areas should be shown in the treatment map & grid-wise recording of such natural regeneration along with GPS reading should be maintained. Spacing operations, if required, will be carried out to leave nearly 400 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.

ii. Singling of Coppice Shoots: One 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 (Plantations) in B2-Type Areas: Plantations will not be taken up in SCI WC areas unless a minimum of 5 ha 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 the plantations. The choice of species will be decided as per the site. Teak and valuable miscellaneous 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. All planting operations and subsequent operations should follow the guidelines for planting operations described in the chapter of Miscellaneous Regulations.

C. Soil and Moisture Conservation Works: Required soil and moisture conservation works will be carried out as mentioned in the miscellaneous regulations. CCT should only be taken if it is necessary and the estimates are approved by the CCF, Nagpur.

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 400 or above established seedlings.
- b. Plantation is not proposed 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:** 50% of available matured trees above harvestable girth are prescribed for harvesting. However hollow Teak trees above 75 cm girth are prescribed to be harvested. The harvesting will start from higher girth class to lower girth class. Hollow trees will be harvested first on priority and then other sound Teak trees, subject to their silvicultural availability. The opening created by harvesting are to be regenerated naturally .Well-formed and vigorous seed origin trees will be preferred for retention. To avoid the over felling of valuable species, like Teak, Bija etc., removal of trees will be proportionate to the number of trees of that species found in the coupe.
- iii. **B-Grade Thinning:** If the congestion is expected to persist in some patches after the harvesting, the B-grade thinning in the same girth class will be carried out in such patches. *B-grade or moderate thinning is defined as removal of dead, dying, diseased, suppressed, defective dominated stems and whips in this order.* Removal of inferior individuals will start from suppressed class and then to some of the dominated class of the crop. Advanced growth having too many branches not desirable to be pruned or lopped, may also be removed.
- iv. **Tending of Natural Regeneration:** Singling and spacing out will be carried out among saplings of Teak and other valuable species listed in the section for the rootstock management. Such identified areas should be shown in the treatment map & grid-wise recording of such natural regeneration along with GPS reading should be maintained. Spacing operations should leave nearly 400 saplings per ha. The natural regeneration present should be encouraged by soil working and mulching around them in accordance with the guidelines for the rootstock management described in this chapter.

9.12.02 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, with required modifications described in the following paragraphs.

- i. 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.

- ii. 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 trees, after retaining 2 dead trees/ha, as snags and dens for nesting and resting of wildlife, shall be marked for felling.
2. All live high stumps shall be marked.
3. All multiple coppice poles; retaining only one, the most promising / stool, 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 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. All hollow Teak trees above 75 cm girth are to be marked for felling. Felling marking is prescribed to proceed from highest girth-class to lower girth-classes; and no trees, except hollow trees, shall be marked for felling unless 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 trees, after retaining 2 dead trees per hectare, shall be marked for felling. To avoid excessive felling it is prescribed that malformed trees having straight clear bole exceeding 2.5 metre height from ground level shall not be marked for felling.
5. All live high stumps and all but one vigorously growing coppice pole per stool shall be marked for felling.

6. The marking of Bija, Shisham, Haldu and Tiwas will be done only in the areas where adequate established natural regeneration of these species is found.

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

Tending of Natural Regeneration: *Taking care of the Natural Regeneration, both of seed origin as well as coppice, and nursing them to future healthy matured crop. This operation includes: CBO, Singling of coppice on the stump, spacing out of young saplings, de-budding & branch cutting of saplings, cleaning & soil working for natural seedlings of desired species. It does not include the silvicultural thinning of old plantations as well as clearing of bushes in the coupe. Such identified areas having sufficient regeneration of valuable species should be shown in the treatment map & grid-wise recording of such natural regeneration along with GPS reading should be maintained.*

9.13 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 will include gully plugging and nala bunding etc. 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.

9.14 METHODS OF REGENERATION:

- Tending of Natural Regeneration, including rootstock management, is prescribed to be given preference over plantations. The areas with promising seedling of seed origin and rootstock patches shall be identified and marked on the treatment map along with GPS reading. 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.
- Plantations shall be taken only in the B-type and A-type areas, (except natural blanks) having inadequate NR in a patch of a minimum of 5 ha area. For plantations, Plantation Guidelines shall be followed.
- 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 the mixed species plantations using suitable species like Shiwan, Shisham, Bija, Khair, Mahrukh, Kinhi, Semal, Sisso, Babul and fruit trees (Ficus species, Ber etc for wildlife).

9.15 SUBSIDIARY SILVICULTURAL OPERATIONS:

- **Cutback Operations:** Cutback operations shall be carried out, in the next year of coupe working in the annual coupes. (**Appendix No. XXXVI**) 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 one per stool so as to serve as future crop. All newly risen coppice shoots of valuable species shall be removed to encourage establishment of seedling regeneration for future crop. Recording of such areas should be made in the treatment map along with GPS reading.
- **Cleaning** - Cleaning in the 6th year from the main felling will be done. Treatment map of the coupe of proposed work of cleaning should be prepared by RFO & GPS reading of the same should be recorded. The same should be verified after field inspection by ACF. All areas of the natural regeneration, tending, rootstock management and plantations shall be recorded in the divisional notebook and shall be cleaned. Unwanted undergrowth interfering or likely to interfere with the growth of NR of Teak and other valuable species shall be cut to facilitate the existing crop. Coppicing of damaged and malformed saplings and singling of coppice shoots shall be carried out to keep most promising coppice shoot. All newly risen Teak coppice shoots shall be removed. 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.
- **Thinning** - Thinning is prescribed in the 11th year of main felling in teak plantation. It will be carried out in patches of dense pole crop by maintaining average spacing of 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. Poles of vigorously growing

non-Teak species should be preferred for retention so long as not less than 50 percent of the crop is dominated by Teak.

9.16 JFM ACTIVITIES.

9.16.01 Forest conservation necessitated active participation of local communities. The National Forest Policy, 1988 accordingly provided for creating a massive people who suffer the most as a result of forest degradation. 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 1988, the Ministry of Environment and Forests decided to ask the State Governments to adopt the JFM system for the protection and rehabilitation of degraded forest. The Government of Maharashtra Resolution No.SIF-1091/199/F-11, dated 16th March 1992 JFM approach was adopted for degraded forest areas of this state. These guidelines were modified vide G. R. No. MSC/2000/C. No. 143/F-2, dated 25/4/2003. Recently Revenue & Forest Department has issued consolidated G.R. No. FDM-2011/CR-100/F-2, dated 5th October 2011, No. FDM-2011/CR-104/F-2, dated 25th October 2011, FDM-2011/CR-100/F-2, dated 22nd December 2011 & FDM-2012/CR-4/F-2, dated 10th July 2012, which should be strictly followed by DCF Gondia while implementing JFM scheme in Gondia Division.

9.17 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, till completion of the 6th year coupe cleaning operations.

CHAPTER X

IMPROVEMENT WORKING CIRCLE

10.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE

10.1.01 Forest areas capable of producing medium to large-sized timber, poles and fuel wood but not considered fit for harvesting due to preponderance of young crop has been included in this working circle. The Improvement Working Circle (IWC) covers an area of 22727.188 ha, comprising 14446.81 ha of Reserved Forests and 7829.72 ha of Protected Forests & 450.66 ha of un-classed forest. It constitutes 13.12 % of the total forest area of the division.

10.1.02 It includes a bulk of forests under old Coppice With Reserve and Improvement Working Circles of older working plans. It also includes areas of successfully converted crop under the Conversion Working Circle during earlier plans. This working circle is expected to serve as transition to SCI working circle. Forests capable of producing large-sized timber but not considered fit for harvesting, are included in this working circle. It includes forests that need rest for sometime, the pole crop and old the teak plantations.

10.1.03 Based on the results of Enumeration data, satellite imageries and existing stock map details, following criteria has been considered for allocation of compartments to the Improvement Working Circle.

1. Areas with young crop and damaged crop, requiring spacing out (thinning) and improvement felling to develop it as future SCI crop.
2. Majority of old IWC Working Circle (CWR Working Circle areas of old working plans) in the previous plans with young and pole crops are included.
3. Some Compartments of SCI working circle and Miscellaneous working circle of the previous plans, have been found suitable for IWC, have been included in this Working Circle.
4. Compartments should have dense forests more than forest blanks and have at least 5 sqm per ha of basal area.

10.1.04 This Working Circle includes a total area of 22727.188 ha. The Range-wise distribution of area under this Working Circle has been given in **Appendix No. XXXVIII**.

10.2 GENERAL CHARACTER OF THE VEGETATION.

10.2.01 The forest area allotted to this working circle vary considerably in composition, density and growth. On the basis of enumeration results, the species composition and their girth distribution in forest areas under this working circle, is given below in **Table No. 10.1**.

Table No. 10.1: Species and Girth- wise Distribution in IWC Area.**(Source: Enumeration Data)**

Species	g15 30	g31 45	g46 60	g61 75	g76 90	g91 105	g106 120	g121 135	g136 150	g151 up	Total	Basal Area
Ain	2.069	1.304	0.750	0.464	0.328	0.156	0.088	0.037	0.020	0.016	5.232	0.108
Aonla	0.118	0.112	0.067	0.077	0.036	0.014	0.005	0.001	0.000	0.000	0.430	0.010
Behada	0.097	0.053	0.036	0.033	0.029	0.019	0.012	0.005	0.008	0.013	0.307	0.012
Bel	0.060	0.073	0.025	0.024	0.010	0.019	0.000	0.000	0.000	0.000	0.209	0.004
Bhirra	0.706	0.463	0.214	0.103	0.055	0.027	0.013	0.009	0.001	0.001	1.592	0.025
Biba	0.105	0.072	0.055	0.024	0.010	0.001	0.000	0.004	0.002	0.000	0.273	0.005
Bija	0.504	0.335	0.303	0.265	0.262	0.155	0.107	0.065	0.031	0.052	2.081	0.084
Bor/Ber	0.006	0.018	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.027	0.000
Char	0.968	0.474	0.215	0.122	0.044	0.024	0.004	0.000	0.001	0.000	1.852	0.024
Chichwa	0.060	0.104	0.141	0.140	0.092	0.031	0.027	0.005	0.002	0.008	0.611	0.023
Dhaman	0.095	0.098	0.066	0.043	0.016	0.004	0.006	0.000	0.000	0.000	0.329	0.006
Dhawada	1.411	0.879	0.533	0.279	0.194	0.108	0.046	0.022	0.012	0.007	3.491	0.068
Garadi	2.662	1.866	0.973	0.425	0.148	0.045	0.010	0.003	0.002	0.001	6.133	0.083
Haldu	0.044	0.023	0.018	0.020	0.025	0.005	0.008	0.002	0.000	0.009	0.154	0.006
Hirda	0.102	0.043	0.033	0.008	0.011	0.015	0.014	0.007	0.005	0.013	0.252	0.009
Kalam	0.027	0.038	0.031	0.027	0.017	0.023	0.016	0.004	0.003	0.004	0.190	0.008
Kasai	0.155	0.138	0.083	0.079	0.033	0.018	0.007	0.006	0.001	0.003	0.523	0.012
Khair	0.147	0.118	0.114	0.064	0.028	0.004	0.001	0.000	0.000	0.000	0.476	0.009
Kulu	0.003	0.010	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.016	0.000
Lendia	2.226	0.893	0.326	0.226	0.113	0.029	0.013	0.004	0.003	0.002	3.835	0.046
Moha	0.660	0.274	0.189	0.129	0.097	0.090	0.060	0.037	0.051	0.114	1.701	0.069
Mokha	0.012	0.014	0.031	0.019	0.017	0.008	0.003	0.001	0.001	0.001	0.106	0.004
Mowai	0.313	0.329	0.327	0.207	0.166	0.071	0.039	0.025	0.015	0.006	1.498	0.045
Other	2.97	1.80	1.14	0.71	0.43	0.18	0.11	0.06	0.02	0.08	7.49	0.16
Palas	0.501	0.314	0.188	0.093	0.098	0.033	0.005	0.004	0.005	0.000	1.243	0.023
Rohan	0.426	0.288	0.192	0.111	0.061	0.019	0.010	0.008	0.000	0.000	1.116	0.020
Salai	0.035	0.054	0.059	0.070	0.067	0.045	0.025	0.015	0.008	0.008	0.386	0.019
Semal	0.028	0.017	0.028	0.014	0.019	0.015	0.013	0.005	0.002	0.001	0.142	0.006
Shisham	0.021	0.040	0.065	0.042	0.010	0.000	0.000	0.000	0.000	0.000	0.178	0.004
Shiwan	0.031	0.050	0.005	0.002	0.000	0.000	0.002	0.000	0.000	0.000	0.089	0.001
Surya	0.313	0.437	0.342	0.221	0.099	0.030	0.004	0.002	0.000	0.001	1.449	0.031
Teak	2.526	1.748	0.533	0.213	0.109	0.080	0.053	0.026	0.006	0.010	5.306	0.074
Tendu	0.874	0.223	0.083	0.036	0.024	0.022	0.010	0.004	0.005	0.005	1.285	0.016
Tiwas	0.064	0.038	0.010	0.008	0.015	0.006	0.010	0.000	0.003	0.000	0.153	0.004
Total	20.339	12.743	7.177	4.293	2.664	1.295	0.721	0.367	0.207	0.351	50.157	1.019

10.2.02 The crop consists mainly of mixed miscellaneous species with scattered teak. The prominent species are *Saja*, *Moha*, *Bija*, *Garadi*, *Dhaora*, *Teak*, *Lendia*, *Mowai*, *Salai*, *Tendu*, *Rohan*, *Char*, *Kasai*, *Bhirra*, *Khair*, *Hirda*, *Beheda*, *Semal*, *Surya* and *Aonla*. Natural as well as planted bamboo occurs in a few compartments. Though the proportion of teak is small, the areas are potentially suitable for teak forests. Natural regeneration of common species is present, but its establishment varies, depending upon fire and grazing damage.

10.2.03 The site quality ranges from III to IVb. The density of forests varies from 0.4 to 0.6. The crop is young to middle aged with occasional mature trees. Stems in lower girth classes are proportionately higher in number. Forests adjoining to villages are subjected to constant hacking for fuel-wood, specially in PFs. All the growths in such areas have become bushy, including the superior miscellaneous species, except in some protected forest where hardy species like Teak is abundantly present. The miscellaneous species are *Saja*, *Dhaoda*, *Garadi*, *Bhirra*, *Rohan*, *Bija*, *Lendia*, *Kalam*, *Khair* and *Haldu*. The understorey consists of *Garadi*, *Kuda* and *Dicamali*. The fruit species are *Aonla*, *Char*, *Moha*, *Sitaphal*, *Bel*, *Tendu* etc. In the well stocked areas very less grass comes up. In under-stocked areas *Kusal*, *Ghonad*, *Marvel*, *Paunia* and *Mushan* grasses come up. The natural regeneration of almost all species is seen. But due to heavy grazing

pressure, annual fires and desiccation it does not get established. *Garadi and Lendia* are very good coppicers, but their coppice shoots are cut annually for fencing material and fuel wood. In some compartments Bamboo have been planted, which are successful in many areas, but need cleaning operations. In the areas, near villages, where grazing pressure is high, the ground flora and regenerations, including plantations, are destroyed and the soil has become compact. The crop is also damaged due to pressure of firewood. Soil erosion has started at many places. The miscellaneous species found are *Bija, Saja, Bhirra, Dhaoda, Surya, Kalam, Garadi and Lendia*. Among the fruit trees *char, Aonla, Moha and Bel* have come up. The undergrowth consists of *Kuda and Decamali*.

10.3 BLOCKS AND COMPARTMENTS:- The entire working circle comprises of 147 compartments, including 88 compartments of RF, 57 compartments of PF and 2 compartment of unclassified forests. Details of the compartments are given in the **Table No. 10.2** given in the **Table No. 10.2** below. (Appendix No. XXXVIII)

Table No.10.2 : Area allotted to Improvement Working Circle:

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comtt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comtt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	3	952.706	18	2045.317	0	0	0	0	0	21	2998.023
2	Gondia	0	0	1	79.936	0	0	0	0	0	1	79.936
3	Goregaon	2	290	4	595.629	0	0	0	0	0	6	885.629
4	Amgaon	2	369.2	3	439.456	0	0	0	0	0	5	808.656
5	Salekasa	3	490.5	6	852.973	0	0	0	0	0	9	1343.473
6	North Deori	10	1526.22	12	1898.97	0	0	0	0	0	22	3425.185
7	South Deori	8	1252.5	2	587.106	0	0	0	0	0	10	1839.606
8	Chichgarh	3	564.2	5	723.874	0	0	0	0	0	8	1288.074
9	Sadak Arjuni	1	344.944	1	238.546	0	0	1	307.399	0	3	890.889
10	Nawegaonbandh	6	1303.44	1	107.44	0	0	0	0	0	7	1410.88
11	Ghothangaon	14	2735.51	2	215.111	0	0	1	143.259	0	17	3093.88
12	Arjuni Morgaon	22	4617.59	2	45.367	0	0	0	0	0	24	4662.957
Total		74	14446.81	57	7829.72	0	0	2	450.658	0	133	22727.188

Details of the allotment of compartments to Improvement Working Circle have been given in the **Appendix No. XXXVIII**.

10.4 SPECIAL OBJECTIVES OF MANAGEMENT:

The special objectives of management of the constitution of for this working circle are:

1. To improve the quality and productivity of the existing crops by improvement felling, tending operations in favour of valuable species and supplementary plantations, all these measures are aimed at nursing back these forests to normalcy.
2. To check soil erosion and conserve soil moisture, essential for creating conditions conducive for rejuvenation and growth of natural regeneration and rootstock.
3. To meet the bona fide needs of the local people by carrying out the hygienic tending and thinning operations, expected to provide small timber, poles and firewood.
4. To conserve the biological diversity of the area.

10.5 ANALYSIS AND VALUATION OF THE CROP:

10.5.01 Stock Mapping: The conventional stock mapping has been carried out by the field staff of Gondia Division & the results are given in the **Appendix No. LVI**.

10.5.02 Age and Density: The crop is mostly young to middle aged with scattered matured trees having crop density of around 0.4, but in some patches with dense pole crop the density is up to 0.6 or even more,

10.5.03 Site Quality: Site quality governs the harvestable girth. Harvesting is not the main objective, but the harvestable girth will be used for patches where the density of matured trees is good. However, site quality does not change much in time span of 20 years and hence the information from the previous plan has been used to delineate and digitise the various site quality classes.

10.5.04 Enumeration: Enumeration was carried out in 480 plots in over an area of 22727.188 ha. Inventory work included complete enumeration of species and girth distribution of all trees, regeneration, and recording of the site quality and density. Analysis of the data collected from these sample plots is given in **Appendix No. XXXII**. This data was used for the relative distribution of species, girth-wise, basal area wise, which ultimately is used for allocation of working circles.

10.5.05 Regeneration: Average numbers of seedlings and saplings per ha in the IWC areas are found out from regeneration survey, which are not satisfactory, because of uncontrolled grazing & fire.

10.6 SILVICULTURAL SYSTEM: The good quality dense forests having young to middle aged crop are aimed at to mature as future productive selection forests, if hygienic operations of improvement felling are carried out and adequate growing space is provided to the trees of valuable species, like *Teak*, *Bija*, *Chichwa*, *Haldu*, *Kasai*, *Kullu*, *Mokha*, *Semal*, *Shisham*, *Shiwan*, *Tiwas*, *Beheda* etc. The species whose population in the 'stand' dynamics is less than 1% shall be retained till they reach the rotation age. Supplementary plantations of suitable species in open forests and forest blanks would result in improvement of stocking. The best suited system of treatment is improvement felling supplemented by tending of naturally regenerated crop and rootstock. The future crop has been visualized to have mixed composition of valuable species like *Teak*, and other superior miscellaneous species.

10.7 HARVESTABLE GIRTH: This working circle aims at improvement of the crop, and therefore, harvesting is not visualised in the area. However, for the purpose of managing a few dense patches of over-matured trees the harvestable girth adopted for the SCI working circle areas will be applied for this working circle. However, in this working circle no commercial

felling except for improvement felling, shall be carried out. This will also lead to opening of canopy to some extent resulting in regeneration of light demander species.

10.8 CHOICE OF SPECIES: The species in the existing growth to be favoured, in order of their priorities i.e. *Teak, Bija, Shisham, Haldu, Saja, Tiwas, Garadi, Lendia, Dhaoda, Kalam, Rohan and Bhirra*. In the understorey Kuda and Dikamali will be preferred as they are very good fuelwood. Edible fruit and flower yielding trees in general, are to be reserved every where. Same sequence of priority will be maintained in the tending of natural regeneration. In the artificial regeneration, besides planting of above species *Khair, Kinhi, Babul, Neem and Shiwan* will be planted. Though *Kinhi, Neem and Babul* are not forestry species, they are suitable for planting in the forest as these species are now increasingly being used by the villagers. Some shade and fruit bearing trees like *figus spp. etc.* will also be planted for the benefit of wildlife.

10.9 FELLING CYCLE: The entire area in this working circle is proposed to be covered for prescribed treatment in 20 (twenty) years. Thus the felling cycle is fixed at 20 (twenty) years.

10.10 ROTATION : No rotation is fixed as the basic object of management is to improve the growing stock by tending of recruitment, thinning in the whole plantations, removal of dead and deceased trees and taking of plantations to improve the composition.

10.11 FORMATION OF FELLING SERIES AND ANNUAL COUPES : The entire area of this working circle is divided into 12 Felling Series with average area of treatment series of 1894.76 ha The area of each Felling series is further divided into 20 (twenty) coupes with an average area of about 94.73 ha. (**Appendix No. XL**)

10.12 REGULATION OF YIELD: The felling is not adapted for yield. The silvicultural tending operations will be done.

10.13 AGENCY FOR 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 may be allotted to the FLCs or JMFCs of the villages or as decided by the competent authority under the provisions of “the scheduled tribes and other traditional forest dwellers (recognition of rights on forest land) act 2006”, provided the coupe has sufficient material to be extracted. Strict supervision of the forest department should be kept on the working of the harvesting agencies, so that all the prescriptions are implemented properly. Some coupes will be worked departmentally, as per the directives issued by the government. Silvicultural operations like cut-back operation, cleaning, thinning etc. and other regeneration activities after main felling of the coupes will be done departmentally.

10.14 COUPE DEMARCATION, PREPARATION OF TREATMENT MAPS AND MARKING RULES:

Demarcation: The demarcation of annual coupes shall be carried out one year in advance of main working along with the coupes due for cleaning and thinning, as per the prescriptions given in the Chapter of Miscellaneous Regulations.

Preparation of Treatment Map: Treatment Maps shall be prepared by the RFO and verified by the ACF. All the treatment type areas i.e. A-Type, B-Type, C-Type and D-Type areas and their sub-classes shall be shown distinctively on the map along with GPS reading. This shall include the areas suitable for planting and areas having adequate promising NR and rootstock.

Treatment Prescribed :- Treatment proposed in various treatment type areas marked on the treatment map shall be taken as under.

A-Type Areas (Protection Areas):

They will include:

A1- Type areas, which have slope more than 25°.

A2-Type areas i.e. 20 m wide strip on both sides of streams.

A3-Type areas, areas susceptible to excessive erosion.

Following Treatments are recommended:

1. Soil and moisture conservation works/measures, as prescribed in the Chapter of Miscellaneous Regulations.
2. Suitable species should be planted if the area is more than 5 ha and poor and in natural regeneration.
3. No harvesting is prescribed in these areas, except down logs of valuable spp.

B-Type Areas (Under-Stocked Areas): Open and degraded areas with density less than 0.4 are included.

B1-Type areas are with sufficient Natural Regeneration (400 or more seedlings/ha.)

B2-Type Areas are with insufficient Natural Regeneration (<400 Seedlings/ha.)

Following Treatments are Recommended:

1. Soil and moisture conservation works/measures will be carried out in B-Type areas, as prescribed in the Chapter of Miscellaneous Regulations.
2. In the B1-Type areas, tending of Natural Regeneration will be carried out in favour of valuable and desirable species. The seedlings of seed origin shall be given preference over coppice.
3. B2-Type areas shall be regenerated with the help of Artificial Regeneration and in the process, Teak, suitable miscellaneous (including NTFP and Ficus) species and

Bamboo shall be planted in conformity with the Ecological Index and the Plantation Guidelines given in the Miscellaneous Regulation.

C-Type Areas (Congested Pole Crop): Areas with sufficient pole crop of valuable species which can be retained as future crop are included in this type of areas.

Following Treatments are recommended:

1. No planting shall be done in these areas.
2. Thinning shall be carried out in young pole crop with thumb rule of $1/3^{\text{rd}}$ spacing out of the crop height.
3. The field staff should be trained and encouraged to use the local yield table for the purpose of thinning and to bring the numbers and spacing, matching with the yield table, as prescribed under the Thinning Guidelines.

D-Type Areas: Well-stocked Areas: Areas having density of 0.4 or over, showing adequate regeneration, 400 or above established seedlings are considered as well stocked areas and have been included in D-Type area.

Following Treatments are Recommended:

1. **Enumeration in Annual Coupes:** Trees suitable for removal will be enumerated and listed.
2. **Marking for Harvesting:** Trees for improvement felling in favour of valuable species and over matured trees in few dense patches (above harvestable girth as prescribed in SCI WC) are marked for felling. Well-formed and vigorous trees of valuable timber and NTFP species will be preferred for retention.
3. **Cutback Operations:** The cutback operations shall be carried out in the year following harvesting of mature trees, if any, trees damaged during harvesting and all live stumps shall be removed by cutting it to the ground.
4. **No Commercial Felling:** However, in this working circle no commercial felling except for improvement felling shall be carried out.
5. No Plantation is recommended.

Marking Rules :- Marking technique and prescription described in the chapter of Miscellaneous Regulations shall be followed. Marking shall be carried out under the close supervision of RFO and under the guidance of ACF concerned. DCF shall himself inspect majority of coupes to ensure proper marking and to guard against wrong marking, if any.

The following rules are proposed to 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 trees, after retaining 2 dead trees / ha, as snags and dens, for nesting and resting of wildlife.
2. All live high stumps shall be marked.
3. All multiple coppice poles; retaining only one, the most promising/ stool, shall be marked.

C-Type Areas: Groups of Young Pole Crop:

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. Unwanted undergrowth interfering or likely to interfere the seed based NR of Teak and other valuable species shall be removed.

D- Type Areas: Well-stocked Areas:

1. All over-matured *Teak, Ain, Bija and Dhaoda* trees if any, are to be enumerated in 15 cm girth-classes, before marking.
2. All healthy edible fruit bearing species, such as, *Moha, Char, Tendu, Aonla, Sitaphal, Chinch, Bel, Hirda, Beheda* and NTFP yielding species like, *Kullu, Semal etc.* shall be reserved.
3. All dead trees, after retaining 2 dead trees per hectare and all live high stumps shall be marked for felling.
4. Mature trees that have developed hollowness and show visual sign of decay will be marked for felling if, silviculturally, available.
5. All, but one, vigorously, growing coppice pole per stool shall be marked for felling.
6. However, in this working circle no commercial felling except for improvement felling, shall be carried out.

10.15 SOIL AND MOISTURE CONSERVATION WORKS: Soon after the receipt of approved treatment map, soil and moisture conservation works will also be taken along with marking and will be completed before the onset of monsoon in the next year. Standard Models of Soil and Moisture Conservation works, other than CCT/SCT, will be carried out after it is sanctioned by the competent authority only. CCT/SCT should only be taken, if necessary, and the estimate should be examined and sanctioned by competent authority. The details of these works are given in the chapter of miscellaneous regulation.

10.16 METHODS OF REGENERATION: All open and blank areas (except natural blanks) will be regenerated either by tending and nursing the existing Natural regeneration and if it is not possible, shall be regenerated artificially. In both the methods the treatment maps and execution on the ground will be based on 50 m X 50 m grids with proper reference points.

10.16.01 NATURAL REGENERATION:

1. Natural Regeneration of seed origin of valuable shall be given preference over the plantations. The existing NR, including rootstock, shall be tended as per the prescriptions for NR management in SCI working circle. Plantations shall be taken as a supplementary activity to NR in the under stocked areas. Such identified areas should be shown in the treatment map & grid-wise recording of such natural regeneration along with GPS reading should be maintained.

2. Tending operations for natural regeneration in the B1-type shall be taken up along with the coupe operations. Clearing of bushes should not be understood as tending of natural regeneration.

- i) **Singling of Coppice Shoots:** One healthy and promising coppice shoot will be retained on the stumps and the rest be removed to serve as a future crop. This will facilitate the growth of most promising crop. Coppice shoots interfering with promising saplings of seed origin should be removed. Such coppice shoots should also be close enough to the ground so that it would not topple after gaining volume and weight and would be able to develop root system of its own subsequently. Such areas should be demarcated in the field with grid-wise recording of GPS reading should be recorded. Grid-wise recording of all species where tending operation has been done should be done.
- ii) **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 and cause erosion and lead to soil loss. Poles having at least 2.50 meter of clean bole will not be treated as malformed.
- iii) **Tending of Natural Regeneration of Seed Origin:** All seedlings and saplings of seed origin shall be given preference over the coppice. Saplings of valuable species, *more than 60 centimetres in height will be nursed as future crop.* Spacing operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5 metre spacing. The natural regeneration shall be assisted and encouraged by soil working and mulching around them, in the following manner.
 - **First year operations:** Weeds in one-meter diameter around saplings of valuable species shall be cleared during the first week of July. Uprooted weed, grasses and leaf-litter shall 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 shall be carried out in October.

- **Second year operations:** The soil working in October will be repeated in the following year. However, one scrape weeding of one-meter diameter shall be carried out in the first week of August around the shoots of coppice seedlings.
- **Third year operations:** Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance shall be done.

10.16.02 ARTIFICIAL REGENERATION: Plantations in the B2-type and A-type areas are prescribed as per the plantation guidelines given in the Miscellaneous Rules. Preference will be given to the local valuable species and as desired by the local people. Areas suitable for Bamboo will be brought under the Bamboo plantations but reasonable care should be taken while taking Bamboo plantation, so that it should not suppress the young crop of valuable species like Teak and Bija. Stump planting of Teak shall only be considered in well drained areas with crown density less than 0.2. The remaining plantation area will be brought under the mixed species plantations, using suitable species like *Shiwan*, *Maharukh*, *Kinhi*, *Siras Semal*, *Sissoo*, *Babul* and other NTFP species at suitable sites. Some suitable species like *Ficus*, *Ber*, *Babul* etc. species should also be planted to improve the habitat of wild animals and birds.

10.17 SUBSIDIARY SILVICULTURAL OPERATIONS:

Cutback Operation: The cutback operations will be carried out in the next year of coupe working (**Appendix No. XXXVII**). All trees damaged during the harvesting of mature trees shall be removed. All left over multiple coppice shoots and poles shall be reduced to one per stool. The objective is to facilitate the most vigorous coppice shoot to become future crop. All newly risen coppice shoots shall be removed to encourage establishment of seedling regeneration. 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 one per stool so as to serve as future crop. All newly risen coppice shoots of valuable species shall be removed to encourage establishment of seedling regeneration for future crop. Recording of such areas should be made in the treatment map along with GPS reading.

Cleaning in the sixth year: Cleaning in the 6th year from the main felling will be done. Treatment map of the coupe of proposed work of cleaning should be prepared by RFO & GPS reading of the same should be recorded. The same should be verified after field inspection by ACF. All areas of the natural regeneration, tending, rootstock management

and plantations shall be recorded in the divisional notebook and shall be cleaned. All inferior species including the unwanted undergrowth interfering or likely to interfere with the growth of teak and other valuable species shall be cut. Unwanted undergrowth interfering or likely to interfere with the growth of NR of Teak and other valuable species shall be cut to facilitate the existing crop. Coppicing of damaged and malformed saplings and singling of coppice shoots shall be carried out to keep most promising coppice shoot. All newly risen Teak coppice shoots shall be removed. 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.

C. Thinning in 11th Year: Thinning is prescribed to be carried in the worked coupe in the 11th year of coupe working as per thinning guidelines. This will reduce the congestion in the young crop. Poles of vigorously growing non-Teak species should be preferred for retention so long as not less than 50 percent of the crop is dominated by Teak. It will be carried out in patches of dense pole crop by maintaining average spacing of 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. Poles of vigorously growing non-Teak species should be preferred for retention so long as not less than 50 percent of the crop is dominated by Teak.

10.18 OTHER REGULATIONS: 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 completion of the 6th year cleaning operations.

CHAPTER XX

FOREST PROTECTION

20.1 GENERAL CONSTITUTION: Preparation of a working plan and all its' prescriptions will be proved to be a futile exercise, if the forest resources, like any other precious treasures, are not provided with an appropriate and effective protection from the factors injurious to them. Therefore, forests are to be protected from factors like fire, grazing, illicit cutting and encroachments etc. Considering the importance and gravity of this problem, the National Working Plan Code 2004, prescribes this 'the mandatory Working Circles' for the Forest Protection Working Circle' in all the Working Plans. The State Level Working Plan Committee, in its meeting held during the month March 2008, recommended, while giving sanction to the PWPR II, that Forest Protection should be a chapter and not a Working Circle.

The forests are burdened with heavy biotic interferences; hence addressing these problems in a systematic manner necessitated the constitution of this Chapter. Illicit felling, Grazing, Fire, Encroachments and Poaching are the major causes for the damage of the forests.

20.2 SPECIAL OBJECTIVES OF MANAGEMENT:

20.2.01 The special objectives of management are:

1. To enforce the Indian Forest Act 1927, Wildlife (Protection) Act 1972 and Forest (Conservation) Act, 1980, for effective control of Illicit felling, grazing, encroachments, poaching, fires and diversion of any forest land for non-forestry purpose.
2. To develop a database to monitor various forest and wildlife offence cases in a systematic manner.
3. To motivate and sensitize the staff and to strengthen their hands and capabilities so that they face the challenges and threats from organized groups of offenders.
4. To equip and train the staff to meet the field challenges, including their own protection, while discharging their duties.

20.3 ILLICIT FELLING: Illicit cutting are done either by

1. Commercial wood smugglers to feed the demand of urban market and
2. Local people to meet their house hold requirements of timber and firewood.
3. Supply of timber and fire wood to the nearby towns by the local people as Headloads.

Illicit felling in the forest area is growing at an alarming rate. Illicit felling is observed near villages particularly in Sadark Arjuni, Goregaon, Salekasa, Chichgad, North Deori & South Deori Ranges. To deal with the offenders of illicit felling with the help of better communication

system, the forest department has installed wireless communication system in Gondia Division. Various base-stations have been established in the Division for this purpose.

To check the illicit felling in the forest it is necessary that the forest produce are not transported without transit permit, as the transit permit is the most powerful tool for controlling the illegal harvest and transport of any forest produce. To have a control on transport of the forest produce, 15 check posts have also been established in the Division. A list of these check nakas have been given in the **Appendix No. LXVII**.

Regular patrolling in the sensitive areas, faster communication including Motor vehicles facilities, adequate self protection capabilities, frequent training and establishment of forest stations at strategic places are recommended to control illicit felling and transport of wood. Establishing intelligence network, with the help of Forest Protection Committees, for this purpose is strongly recommended.

20.3.01 In addition, to address supply-side management by augmenting wood production on forest and other community land, the demand-side management should be taken up like efficient wood utilization and energy efficient alternatives like, Community Kitchens of Hindustan Petroleum, Biogas, solar cookers, etc. The following general principles are prescribed for the effective protection of the forest:

1. Rapport establishment with the local villagers through JFM and other development schemes
2. The Forest Department shall try to meet the bonafide needs of wood of the local population from the regular coupe working, including thinning and cleaning.
3. Employment through forestry works shall be generated in the remote villages where there is no other job opportunity so that the economically weak population is not get involve in illicit felling for big smugglers.
4. An intelligence network will be very useful in preventing any offence
5. The forest field staff shall stay at their respective headquarters.
6. Regular patrolling shall be done in the sensitive areas and a squad of 6 to 10 persons, as per requirement, can be made for this purpose.

Besides this, the following measures are also recommended:

- i. Review of beat wise offence cases, every month.
- ii. Review the *varas*, *bevaras* offence cases monthly; efforts are made to find out the offenders in each *bevaras* case.
- iii. Every *varas* case having more than Rs.10,000/- worth forest produce/loss to the forest

- invariably is submitted to the court within the prescribed time.
- iv. Charge sheets should be filed in the courts without any delay.
 - v. IPC sections may be used for offences where the IFA is not applicable.
 - vi. To properly monitor the forest offences, a modern data compilation and analysis system, with suitable software, should be developed at Range, Division and Circle levels.
 - vii. Wireless, phone or internet systems shall be used for fast communication.
 - viii. Use the provisions of rewards for gathering of information through intelligence.
 - ix. The staff should be given regular exposure regarding all the legal aspects of handling the offence cases.
 - x. Suitable staff should be posted at suitable places
 - xi. History sheets of all the offenders along with their photo and bio-data are maintained at Round Level, Range and Division Level.
 - xii. Prepare the list of offenders, showing the offence cases involved by him, against the each offender.
 - xiii. The provisions of the G.R. dated 8/5/2003 shall be implemented. If any difficulties are there be communicated to the Govt. with supporting data.
 - xiv. Sufficient funds for protection related works should be made available in time.
 - xv. Beat checking should be carried out as per the standing orders.
 - xvi. Every beat guard shall maintain a register of stumps in the standard proforma. Every stump is registered by a serial number followed by/ and year, for example, if the number is 198/05, means 198 is tree no. and 05 is the year.
 - xvii. Every year from January 1, onwards start the new series.
 - xviii. The supervisory officers, during the beat inspection, verify the registered stumps and unregistered stumps. The beat guard shall be held responsible for non-registering the illicit stumps.
 - xix. Every Range and Division office shall maintain the Xerox copies of the judgments of all forest cases for the guidance and improvement purposes.
 - xx. Inter state co-ordination meetings with the authorities of Madhaya Pradesh & Chhatisgarh government shall be made, to arrest and prosecute the offenders of Madhaya Pradesh & Chhatisgarh who are involved in the offences of Maharashtra state.
 - xxi. The RFO shall collect the monthly beat *khairiyat* report from each forest guard and Round officer and shall submit Range *khairiyat* report to the DCF in the first week of

every month.

xxii. All cases of violation of the Forest Conservation Act, 1980 shall be referred to the Nodal Officer for necessary legal and administrative actions.

20.4 FIRE PROTECTION: Forest Fires are one of the most important factors adversely affecting the forest resources, especially, natural regeneration, growth rate of trees, ground flora, soil organisms, wild life and site productivity. Effective fire control as prescribed in the plan is essential for the conservation of forest resources. The division officials and local people shall be sensitized about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

20.4.01 Fires occur annually over most of the areas due to increased biotic interference in Gondia Division. Fires are mostly set by Tendu collectors to obtain profuse flush of leaves on Tendu shoots. Fires are also set by local villagers to facilitate movements in the forest for the collection of Mahua flowers, gum and other forest produce and to get new flush of grasses. Sometimes fires spread from the adjoining cultivation area or through half burnt cigarette or bidi stubs thrown by the people passing through the forest. Natural fire is extremely rare. Fire is the major factor responsible for the degradation of forest. It also leads to degradation of forest soil. Many valuable species of NTFP in the form of herbs, shrubs and climbers are also vanishing due to regular fire in the forest.

Besides the damages to the flora of the forest, fire causes immense damage to the Fauna found in these forests. The sufferers are all types of animals like insects, amphibians, reptiles, mammals and birds nesting on the ground. Besides these the micro organisms found in the surface soil is also destroyed.

20.4.02 Classification of Fire Control Areas:

A. Class-I (Complete Fire Protection): The Class-I fire control areas include all felling coupes (for six years) of SCI working circle, Improvement Working Circle, Afforestation WC, Protection Working Circle, thinning coupes (for six years), plantations (for five year), the A-type areas (permanent), forest depots (permanent), forest nurseries (permanent), Special habitat areas (permanent) and any other areas of special importance decided by the CCF(T) Nagpur.

B. Class-II (General Fire Protection): The Class-II fire control areas include the remaining areas of the Selection-Cum-Improvement, Improvement Working Circle, Afforestation Working Circle, Protection Working Circle as well as any other areas, which deserve the protection in the opinion of the CCF (T) Nagpur.

C. Class-III (General vigilance): The remaining forest areas (that is, areas not included in the

above two classes) are identified as the Class-III fire control areas. Special measures for the fire protection are not undertaken, but deliberate setting of fire and burning the forest is prohibited.

20.4.02 Fire control measures:

A. A fire protection scheme for the entire division which would be consistent with the instructions given in this working Plan, shall be prepared before November each year, identifying the watch points (including watch towers), strategic locations, and strength of firewatchers at each location, deployment of vehicles, use of wireless sets, supervisory forest staff and the co-ordination protocol.

B. Each location is proposed to have 5 to 10 persons including regular staff and firewatchers. The staff shall be trained in the application of modern fire-fighting tools. The fire prevention shall be treated as a high priority item. The scheme shall be implemented sincerely during the fire season.

C. Areas deliberately burnt for silvicultural reasons under the sanction of the Chief Conservator of Forests (T) Nagpur shall be excluded from the fire protection scheme. Fire in such areas need not be reported unless spreads beyond such area.

D. All the Class-I and Class-II areas will have external fire lines and internal fire lines dividing the forest area into convenient blocks.

E. Fire Watchers and local forest staff shall constantly patrol the Class-I and Class-II fire control areas. The directives require that fire in the Class-I areas be reported to the Deputy Conservator of Forests immediately along with details of the area burnt and the damage inflicted to the forest crop.

F. The group of firewatchers shall immediately rush to the site and extinguish fire as soon the fire spot is located by upcoming smoke in their area of operation. Modern fire fighting tools shall be used for extinguishing the fire. The supervising officials should mobilize reinforcement in case of large fire. Utmost care will be taken to quench the smouldering material. Providing a thick layer of soil over such material is generally effective.

G. The fire lines shall be kept clear of all growth and combustible material during the season. Leaf litter and other dry material on the fire lines shall be collected periodically along the edge and burnt before the fire season starts. Firewatchers engaged for this purpose will have a duty to sweep the fire lines continuously and keep them clean of any debris or leaf litter. Depending upon the watchmen and other manpower available in the area, suitable blocks may be identified around which regular clearing of the fire lines should be ensured.

H. The cutting of fire lines shall be completed by December. Fire tracing (burning) shall be

completed by 15th February every year and thereafter burning should require permission of the Deputy Conservator of Forests and physical presence of a gazetted officer.

I. The division office shall maintain a “Register of Fire Lines” showing the length and width of fire lines, and enter the period of cutting and burning of fire lines. The register will be kept up to date and checked every year, in March. In addition, a map showing the length and width of fire lines division wise and range wise as far as possible shall be prepared in the beginning of the fire season and the same shall be used to depict the areas burnt every fortnight.

J. Negligence in the fire protection shall be taken as dereliction of duty. The supervisory officers shall extensively verify fire control measures.

K. Efforts will be made to motivate the JFM Committees to protect the forest from fire by assigning them certain areas of forest, in case they agree and sincerely protect the assigned forest from fire, the grants earmarked for protecting that area should be given to JFM committees after verifying the area protected.

L. It was observed that the existing fire lines are not maintained in their prescribed width for its full length. Hence their efficacy could not be assessed in the absence of clearly laid fire lines. The committee formed by PCCF, based on its report, shall examine the scheme submitted by CCF (T); the PCCF shall take decision for further implementation of the scheme, if any.

M. Standard widths of fire lines are prescribed in the **Table No.20.2**

Table No. 20.2 : Standard Widths of Various Types of Fire Lines:

S.N.	Characteristics of the area	Width of fire line (in m)
1	External boundaries of the forest.	12
2	Naturally or artificially regenerated areas (For 5 years) (coupes)	6
3	Remaining coupe boundary.	3
4	Both sides of road and cart tracks through the forests.	6
5	Timber, bamboo and firewood depots.	40

Daily monitoring of fire incidences and the areas burnt and the efforts taken by the staff to control the fire shall be monitored through wireless on day-to-day basis by D.C.F. and D.F.O. vigilance under the supervision of CCF (T) Nagpur.

20.5 GRAZING REGULATIONS:

20.5.01 The entire forests are liable to damage from grazing including grazing by goats, except

the interior areas, which are away from the villages. The grazing is confined to the lower hills and the calculated incidence does not give the true picture of the grazing pressure here, while a large inaccessible area of the units remains un-grazed. A realistic calculation of grazing incidence is required.

20.5.02 The grazing incidence figures are much heavier than estimated. Damage caused by uncontrolled grazing is heavy due to large cattle population. The grazing incidence, as prescribed in the grazing policy of 1968 of Govt. of Maharashtra, is not followed. The Cattle of the erstwhile forest villages are also grazing in the immediate vicinity of the villages. The true grazing incidence in the areas adjoining the villages is therefore, very detrimental to the forest conservation. 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 number of goats is 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 fact the closure of forest areas are only on paper, in reality grazing is carried out in all areas including the current coupes and plantations.

Areas with clayey soil, the trampling by cattle results in compaction, change in structure of the soil and reduction in 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 for 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. Due to the structure of the hoof of sheep and goats, the pressure exerted on the soil due to their body weight is very high which leads to the compaction of the surface soil. Once the soil becomes compact, it becomes very difficult for the wild seeds to germinate during the rainy season.

20.5.03 Grazing shall be regulated as per guidelines of Grazing Policy 1968 of Maharashtra State issued vide Resolution No. MFP-1365/132211-Y dated December 6, 1968 and Grazing Rules issued vide No.MFP-1371/237035-Z dated November 3, 1973. However no grazing beyond carrying capacity shall be permitted.

20.5.04 Heavy cattle pressure adversely affects the forest regeneration and soil condition. The present political economy of domestic animals in the area throws up strong challenge, and

implementation of the Grazing Regulations in its current form. Therefore special efforts need to be taken up to ensure that no grazing is allowed beyond carrying capacity.

20.5.05 The situation may be substantially improved by establishing effective communication with the local people, by awareness generation and efficient animal husbandry programme. The forest officers should take up these preventive measures in co-ordination with the Animal Husbandry Officers.

20.5.06 Maximum admissible grazing incidence according to the current policy has been shown for various working circles in **Table No.20.3**. A systematic survey of fodder availability is recommended during the plan period in each round.

Table No. 20.3 : Admissible Grazing Incidence in Various Working Circles:

Working Circle	Functional Classification	Maximum Grazing incidence (ha/Cattle unit)	Period
Special Areas (overlapping)			
Protection areas (A1 & A2) & Special habitat areas.	Protection forest	Nil	Permanent
Flowered Bamboo area	Protection forest	Nil	Till seventh year
Annual coupes	Protection forest	Nil	Till six years
Plantations	Protection forest	Nil	Till fifth year
Other Area (under various Working Circles)			
Selection-cum-Improvement.	Tree forest	1.2	
Improvement.	Minor forest	0.8	
Afforestation	Open forest	0.8	Except plantations

***Note:** Area required for wildlife population should be calculated accordingly, and deducted from the available area for the domestic cattle. If relevant data is not available 20% area should be marked for the wildlife.*

20.5.07 The carrying capacity and period of closure should be calculated for the forest area adjoining each village. The grazing passes, free or otherwise to individual families are proposed to be distributed on the calculated carrying capacity basis. Village bodies should also be actively be engaged in the implementation of grazing regulations.

20.5.08 The surplus cattle should be kept under regular watch, and villagers should be

encouraged to adopt stall-feeding or other means to address mismatch between cattle-heads and fodder availability.

20.5.09 Fodder development on the community lands and translocation of surplus cattle may be encouraged.

20.5.10 Animal Husbandry and Dairy Development Agencies should be motivated and influenced to take up breed improvement program. Fodder in the plantation areas should be made available free of cost on cut-and-carry basis.

20.5.11 The DCF shall carry out cattle census of each village during the winter season at the beginning of the plan period to find out the local cattle once for all and maintain record and passes shall be issued limited to those cattle subject to the availability of carrying capacity.

20.5.12 All forest officers while visiting the forest areas should check the grazing pass if any cattle found grazing in the forest. Stringent action should be taken if any person found his cattle illegally grazing in the forest. The passes shall show the compartment numbers meant for the grazing by writing clearly.

20.5.13 Hacking and felling of young plants and big trees be dealt seriously and offenders shall be prosecuted.

20.5.14 The misuse of transit passes of cattle for grazing be strictly checked and if found their passes be cancelled and be dealt according to law.

20.5.15 Recently the Govt. of Maharashtra G.R.No.MFP-2103/Case No.135/F-1/dated 29/10/2007 has granted permission for grazing of sheep in the forest area including Gondia division. The illegal grazing by goats and sheep is already in practice and if it goes uncontrolled, it will lead to heavy degradation of forest leading to severe scarcity of fodder in the forests. The degradation of forest will not only limited 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.

20.6 ENCROACHMENTS ON FOREST LAND:

1. 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 Nos. LEN/1078/3483/G-1, dated 27/12/1978 & FLD/1079/1366/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. 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.

2. The encroachment problem is more prevalent in almost all Ranges of Gondia Division and mostly made for agricultural purposes. The eviction operations led to animosity between the villagers and foresters.
3. The causes of forest encroachment shall be examined thoroughly and addressed in a comprehensive manner. A proper boundary management and standard administrative guidelines will help to control encroachment.
4. Renewed and concentrated efforts on the part of division staff is required to prevent new encroachment on forest land.
5. Small isolated patches of the forestland are often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.
6. The civil powers of eviction are entrusted with ACF and DCF vide G.R. No. R & F.D./PWR/1196/296/CR.No.17/LII, dated 30/01/1997. The procedures laid out in the Land Revenue Code shall be followed before the execution of eviction.
7. Habitual encroachers shall be prosecuted as per Indian Forest Act.1927.
8. All external boundaries shall be demarcated with concrete pillars.
9. All sensitive and important boundaries and wherever disputes are there, be surveyed with DILR and concrete pillars be laid immediately.
10. All encroachments be listed with their names, age, residence, profession whether belongs to SC, ST, OBC/NT, extent of encroachment, Survey Number and location of encroachment, village/block.
11. A Detailed report of the encroachment cases after 13/12/2005 be prepared for each encroacher and be submitted to ACF to obtain summary eviction orders, in a time bound program.
12. After the completion of due procedure of Land Revenue code and after giving a reasonable opportunity of being heard to the encroacher, the ACF shall pass a summary eviction order if he satisfies so, quoting the findings.
13. The concerned RFO will issue the eviction order.
14. The concerned RFO shall execute the eviction order.
15. If the encroachments in a village are more in number, police protection be obtained for the operation.

16. Use of Cr. P. C. provisions like section 106 and 110 be used to obtain good character of offenders before *Tahsildar* and SDO respectively to smoothen the eviction operations as well as to prevent the tendency of future encroachments.
17. For the encroachments on the un-classed forests (though 7/12 shows clear possession of the departments) FIR shall be lodged in the concerned police station for the prosecution.
18. To prevent the tendency of encroachments, improved crop techniques be propagated in the problem villages to enhance the crop productivity with the help of Agricultural Department.
19. Regarding encroachments before 13.12.05, action as given in the Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and rules made there under be taken.
20. In the month of May, a drive for encroachment prevention be taken up in all the sensitive areas by taking meetings in the villages by *Dawandi* and distribution of leaflets and posters.
21. Keep a watch on all the sites meant for debris cleaning, ploughing etc., in the month of May, so that encroachments are removed even before the sowings.
22. A total of 396.87 ha of encroachment were registered in Gondia Division. The detailed list of encroachers is given in the **Appendix No. LXIX, LXXI & LXXVI**.
23. The actual encroachment may be much more than recorded by the Department. Now, action is required to be taken as per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and Rules made there under.

20.7 PROTECTION OF VALUABLE MINERALS IN FOREST LAND

The forest lands of Gondia division are rich in valuable mineral deposits and they are highly vulnerable to theft. Most of the forest staff is not aware about this fact. DCF Gondia should sensitize the field staff about the importance and vulnerability of the forest areas, where the deposits of valuable minerals are found. The name of minerals and locations where they are found should be mentioned in the beat, round and Range maps. The list of minerals and its location (Latitude and Longitude) are given in the **Appendix No. XXVII**.

1. These minerals should also be considered as a forest produce and should be given the same priority as timber or other forest produce.
2. In case of any theft, prompt legal action should be taken.
3. A proper watch should be kept on all trucks moving in the areas, rich in minerals.
4. The beat, round and range Khairiyat Reports should include the report about these

minerals.

5. Any large scale illegal mining or quarrying should be immediately reported to the Nodal Officer.

20.8 POACHING OF WILD ANIMALS: The issues related with poaching have been dealt in detail under Chapter on Wildlife (Overlapping) Working Circle of this plan.

CHAPTER XIX

CONTROL AND RECORDS

19.1 CONTROL AND RECORDS:

19.1.01 The prescriptions regarding control and records are given in details in Chapter - IX of the working plan code, Bombay State as well as in the National Working Plan Code 2004, which will be followed. Accordingly, the following records will be maintained in the Gondia Forest Division.:

- i. Control Forms.
- ii. Compartment History.
- iii. Plantation and Natural Regeneration Registers.
- iv. Seed and Nursery Register
- v. Divisional Note Book
- vi. Boundary Registers

19.1.02 Control Forms: The records of all harvesting, subsidiary silvicultural operation and regeneration works carried out according to the prescription of the working plan will be maintained in the control forms. All these forms and records shall be maintained as per the guidelines given in chapter No. IX of working plan code of Maharashtra State and the Standing Order No. 24, Chapter I prescribed by the office of the Principal Chief Conservator of Forests, Maharashtra State, Nagpur (then CCF, MS Pune, dated 30.11.1967)

19.1.03 These are to exercise an effective control over the working of these forests under this working plan. The control forms for harvesting in each working circle have been prescribed separately whereas those for plantation and silvicultural operation are the same for all working circles. The set of control forms for each working circle will be kept in a separate control book which will have separate pages for each felling series.

19.1.04 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 in the **Appendix No. LXLV**.

19.1.05 Two sets of all control forms will be prepared. One set will be kept in the divisional office and the other set will be flying for the use of the Chief Conservator of Forests, Working Plan Nagpur. The flying set will be sent annually by the Deputy Conservator of Forests, Gondia Division to the Chief Conservator of Forests Working Plan Nagpur not later than 1st October,

every year taking the necessary entries. All entries showing the deviations from the prescriptions will be underlined in red. The Chief Conservator of Forests, Working Plan, Nagpur will scrutinize it and will send it to the Chief Conservator of Forests (T) Nagpur Circle at Nagpur. The Chief Conservator of Forests, Nagpur, will in turn send it to Additional Principal Chief Conservator of Forests, Working Plan-East, Nagpur with his remarks not later than 1st February of the following year. The Additional Principal Chief Conservator of Forests, Working Plan-East, Nagpur in turn will forward them to the Principal Chief Conservator of Forests (Production and Management) Maharashtra State, Nagpur for perusal and orders where required.

19.2 COMPARTMENT HISTORY FORMS:

19.2.01 Compartment History Forms i.e. the records of various forestry activities and observations made in the past year in all the compartments will be maintained in Compartment History Form No. I to V as given in the **Appendix No. LXLVI** of this plan.

1. Form No. I: Description of the Compartment.
2. Form **No. II**: Records of plantations and changes in growing stocks.
3. Form **No. III**: Records of operations and out-turns.
4. Form **No. IV**: Records of observations.
5. Form **No. V**: Records of injuries.

19.2.02 Each Compartment will have a separate file for its records. Compartment History Form No.1 has been written for each compartment during the preparation of this plan and typed copies in duplicate will be supplied to the Dy. Conservator of Forests, Gondia. Other records & forms will be prepared & maintained immediately by Dy. Conservator of Forests, Gondia. One copy of the compartment history will be kept in the Divisional Forest Office and the other in the Range Office. Every year, in July, the Range Forest Officer will fill in the columns in the compartment history forms and submit the same to the Dy. Conservator of Forests, who will get them scrutinized by the Assistant Conservator of Forests, who will get them and signed them. One copy of the forms will be filled in the divisional compartment history file and another copy will be returned to the Range Forest Officer. The copies of annual compartment history files kept in division Office, after completion will be supplied yearly in the month of August to the office of the Chief Conservator of Forests, Working Plan, Nagpur for filling in the compartment history files, maintained in his Office. After making entries in the compartment history files, maintained in the Office of the Chief Conservator of Forests, Working Plan, Nagpur, the same will be returned to the Dy. Conservator of Forests, Gondia in the month of September every year.

19.2.03 Each Compartment must have a separate file for its records. Compartment history forms must be maintained & updated every year in time in the office of Gondia Forest Division, since they keep the record of past management practices and their effects on the growing stocks.

19.3 PLANTATION & NURSERY REGISTERS: Plantation registers will be maintained for all the areas regenerated artificially in the Form No.1 to Form No.9 as given in the **Appendix No. LXLVII**. Nursery registers will be maintained in Form No.1 to 10 as given in the **Appendix No. LXLVIII**.

19.4 DIVISIONAL NOTE BOOK:

19.4.01 The matters of divisional importance will be recorded by DCF Gondia under standard headings. The Dy. Conservator of Forests, Gondia must record every year his explicit opinion about the success or otherwise of the application of prescriptions of the working plan without reserve. A brief note of the plantations will also be recorded by the Dy. Conservator of Forests, Gondia under the appropriate heads. The Divisional Note Book will contain the information on the following topics :

1. Record of seed years of various tree species and bamboo.
2. Note on insects.
3. Notes on fungi.
4. Notes on fire damage.
5. Notes on other causes of injury.
6. Notes on building, roads and paths.
7. General Note on export, sale etc.
8. Notes on Grazing.
9. Statistical information on out turn and rate of important trees species.
10. Auction results.
11. Black List of contractors, sportsmen and Government servants.
12. Annual record of market prices of various forest produce.

19.4.02 The divisional note book proforma have been given in the **Appendix No. LXLIX**.

19.5 FIRE RECORDS: This will be maintained as per the latest orders from State Government from time to time. A record of the same will also be maintained for each compartment.

19.6 OTHER RECORDS: List of amendments to the working plan and list of area changes will be maintained in prescribed forms.

CHAPTER XVIII

MISCELLANEOUS REGULATIONS

18.1 BOUNDARY DEMARCATION

18.1.01 Demarcation Priorities: 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 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;

1. Notified Reserved Forests.
2. Notified Protected Forests.
3. Outer boundary of compartment in which erstwhile forest villages are located.
4. All unclassified forests with the Division.
5. Jhudpi Jungles transferred to the Division.
6. Disforested areas against various projects.
7. Forest areas where exact boundaries are not shown on the forest maps.

18.1.02 SPECIAL OBJECTIVE OF MANAGEMENT: The objective of the demarcation and protection is to maintain territorial integrity of forestlands in the division by clearly delineating their boundaries by permanent pillar marks to act as psychological barriers. Following are the objective of management.

1. To collect all relevant Notifications, Maps and other relevant records.
2. To identify and carry out the survey and demarcation work of all un- demarcated forest lands.
3. To maintain boundaries of forestlands in the Division by permanent pillar marks, which will serve as psychological barriers.
4. To ensure effective protection of the forest resources against adverse influences.

18.1.03 APPROACH TO THE FOREST DEMARCATION: Well-defined forest boundary is a prerequisite for effective forest protection and its sustainable management. However, in case of most of the protected forests, the land is neither properly surveyed nor demarcated on the ground. In case of demarcated protected forests, the forest boundary marks are either missing or in a very poor state. 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. Artificial boundaries adjoining non-forest land are proposed to receive the highest priority to ensure protection of these areas.

The procedure for Demarcation of un-demarcated Forest Lands should have the following steps.

1. All the notifications should be collected
2. All the relevant maps (Topo-sheets of RF, Bandobast Maps, Consolidation maps and resurvey maps for PF, Un-classed Forests and Zudpi jungle) to be collected.
3. Demarcation should be carried out with the help of these maps, which was the basis for the notifications under Indian Forest Act.
4. In case of Protected Forests and recently declared RF, ground Survey to be carried out with the help of TILR.
5. Appropriate pillars to be fixed immediately after the survey.
6. Boundary lines between forest and non-forest land to be taken on priority.
7. Proper records of boundary demarcation to be maintained in the boundary register, both at Range as well as the Division level.
8. It is necessary to improve the quality of the digital database using the appropriate maps.
9. Reconciliation of Forest and Revenue records should be done every year.

Demarcation on the ground for such forest areas is also not well defined. Hence, it is desirable to consolidate the boundary position at the earliest. Lack of legal protection to the unclassified forests may be rectified by immediate notification declaring such areas as the Protected Forests and initiating the reservation process.

The forest maps have been developed by using GIS software and the total length of external boundaries have been calculated by digitising external boundaries in Geo-media software.

18.1.04 APPLICATION OF GPS: The Dy. Conservator of Forests, Gondia shall take initiative in training the field staff of the Division in handling a GPS instrument. All field staffs should develop the skill in handling and using a GPS instrument in the field for demarcation and fixing the location of boundary pillars. While using the GPS, proper care should be taken and its limitations should be considered. The GPS should be considered as an additional tool to locate any point or boundary or to measure area of any piece of land in the field, within short period of time and the department should not fully rely only upon it, especially in legal matters. **Appendix No. XXVI** shows the methods of using a Garmin-72/76 GPS instrument.

18.1.05 DEMARCATION OF ZUDPI JUNGLE: The Zudpi 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. Hence, examination of records, collection of relevant

authentic maps and demarcation of the area is essential for the entire Zudpi Jungle in the division. Majority of these areas have been proposed for notification under section 4 of IFA, 1927. This process shall be completed expeditiously and enquiry will have to be conducted in a time bound manner.

18.1.06 Fixing Boundary of the Erstwhile Forest Villages: There were six forest villages, which were located within the Reserve Forest compartments. They have been formed into the revenue villages in the year 1977 by disforesting the requisite area of the reserved forest of the respective compartments. These details are given in the **Appendix No.XIV**. The boundaries between the forest land and the village within these compartments however are not clear on the ground. Therefore, it is necessary that outer boundary of village is surveyed and new pillars are to be erected and accordingly maps may be generated.

18.1.07 BOUNDARY DEMARCATION AND 1/5TH BOUNDARY DEMARCATION SCHEME: It is prescribed that the boundary of all the lands, Reserved Forest, Protected Forest, Un-classed Forest, Jhudpi Jungle and non-forest land, in possession of the Gondia Forest Division, should be properly surveyed and demarcated on top priority and should be completed within 5 years period. These boundaries then should be annually maintained under the 1/5th Boundary Demarcation Scheme. Details of the compartment boundaries, for survey and demarcation purposes are included as shown in **Appendix No. XXIII**.

1. **Demarcation of the External Forest Boundaries:** The length of the external boundary of the Reserved Forests is 1121.00 km, of which about 144.00 km is formed by permanent natural features. Whereas, the boundary line of Protected Forests is 705.00 km, out of this 105.00 km. formed by permanent natural features and 600.00 km is the artificial boundary. Large portion of this artificial boundary along the PF & Zupdi Jungle is not demarcated and it is under progress by fixing new RCC pillars. The survey works are carried out with the help of TILR. **Appendix No. XXIII & Appendix No. XXV** shows the 1/5th boundary demarcation and verification scheme of already demarcated forest lands.
2. In May 2001 the Principal Chief Conservator of Forests approved a demarcation model, using a series of concrete pillars. This model as modified, till date, shall be followed for the external boundary demarcation.
3. Cement-concrete pillars at bends and corners of the artificial boundaries should be raised immediately after the survey. This work will require substantial fund allocation, as it will need sizeable manpower and resources.
4. **Demarcation of the Internal Forest Boundaries:** Internal boundaries between compartments or those between the Reserve Forests and the Protected Forests may be demarcated using traditional stone cairn, earthen cairn or standard wooden pillar.

5. **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 condition of forest boundaries including pillar numbers and inter-pillar visibility conditions. Separate certificate should be submitted for each compartment. The Round Officer should submit similar certificates for his inspections.
6. The Range Forest Officer should check accuracy of the '*Compartment Inspection Certificates*' according to the prescribed norms covering each round. He should personally check vulnerable compartments other than those covered by the Beat Guards and the Foresters.
7. **Specification of Boundary Pillars as per BFM Vol. III:** 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.
8. **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. 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 with white colour for the open forests and red for the closed forests. Such Cairns can be made of earthen mass, where stone boulders are not available.

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 numbers shown on the topo-sheets will be maintained.

9. **Clearance for the Boundary Line:** Boundary line should be cleared and only matured 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*.
10. **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.
11. **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.

18.2 DEMARCATION, PREPARATION OF TREATMENT MAP AND MARKING OF COUPES:

18.2.01 Demarcation of Coupes:

1. The annual coupes to be worked as per the prescriptions of the plan, will be demarcated one year in advance, and each coupe, if so required, is proposed to 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. 18.1**

Form No. 18.1

"I ----- R.F.O. -----
hereby certify that I have personally inspected the demarcation of the coupe No. -----
in the 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:

Name, Signature

& Official Seal of the RFO.

3. Annual coupes have been prescribed to be demarcated by cutting and clearing bushy undergrowth on 3 (three) metre 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. 18.2**.

Form No 18.2 : List of trees on the coupe boundary

S. N.	Name of species	GBH (OB)	Remarks
1			

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 and Improvement Working Circles 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 Protection Areas:** Selected trees, on the periphery of the *Protection areas* will be given two geru bands 15 cm apart, lower band being at B.H. In addition, a cross in geru colour between the bands will also be given on the side away from the protection areas. All those trees will be serially numbered. The serial number will be given on the side away from the protection area just below the lower geru band, on the side bearing the cross. All the protection areas will be numbered in Roman numerals and the trees standing on the periphery of each protection area will be numbered in Arabic, adopting separate series for each area, so that the trees on periphery of Protection Area No. I will bear the Sr. no. I/1, I/2, I/3, etc. and the similar trees on the periphery of Protection Area No. II will bear the Sr. no. II/1, II/2, II/3, etc. The

protection area will also include sample plot and presentation plot, shown in Red. These are to be excluded from the marking.

9. 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.

18.2.02 Treatment Map: Instruction for demarcation of areas & preparation of treatment maps issued by the office of Principal Chief Conservator of Forests vide letter dated 2nd July 2010 should be followed strictly. Grid wise GPS reading should be taken & the same should be shown in the treatment map.

1. Immediately, after completion of demarcation of the coupe, RFO will prepare the *Treatment map* of the coupe by clearly showing the various *Treatment-type* areas by laying a base line and 100 m X 100 m grid on the ground as well as on the map. The concerned ACF will verify the treatment map and make corrections, if necessary, before submission to the DCF for approval.

The treatment map will bear the date of preparation by the Range Forest Officer and the date of verification by the Assistant Conservator of Forests and their official seals and signature with name.

2. Preparation of treatment map will preferably be done one year in advance of the coupe working. Timely preparation would facilitate necessary checking and corrections, if any in time.

3. Immediately after seeking approval of the treatment map, site-specific workplan for the entire coupe shall be prepared by the RFO, verified by the ACF concerned and approved by the DCF.

18.2.03 Marking of Trees for Harvesting:

1. After approval of treatment map, marking of trees for harvesting shall be carried out as per the prescriptions given in respective working circles. Marking of trees for harvesting shall be done one year in advance of the coupe working and it shall be done departmentally. 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 the coupes to ascertain proper marking as per prescriptions of the working plan as well as to guard against the excessive marking. To ensure this close supervision, a marking certificate in following format **Form No. 18.3** is prescribed.

Form 18.3

I, ... RFO, ... personally inspected the marking of the coupe No. in the compartment No of felling series in Working circle on .../.../..... and found that marking of trees for felling has been done as prescribed in the working plan.

Date:

Name, Signature

& Official Seal of the RFO.

These certificates shall be regularly and frequently checked and verified by the ACFs as well as the 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.

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, Dhaoda and Shiwan* 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. 216	XX (Hammer mark)
	2
	1
	6

7. All trees bearing serial numbers will be individually recorded in marking (recording) book in, the following, **Form No 18.4**. Serial number given in coal tar must be recorded in the marking book.

Form No.18.4 : Format for Marking of Trees for Harvesting:

S.N.	Tree No./ Grid No.	Serial No. in 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.

18.3 SOIL AND MOISTURE CONSERVATION WORKS: This operation should be carried out in accordance with the 'Watershed Development Principles' and Guidelines of the Government. The local people should also be encouraged and motivated for Participatory Management of Water Resource.

18.3.01 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, and shrub clearance shall be used for brushwood check dams to arrest the soil loss.

18.3.02 It is prescribed to follow watershed management approach viz. the *Ridge-to-Valley approach* for carrying out soil and moisture conservation works. The contour trenching and gully plugging/ check dams, as given under, have been prescribed to constitute the major component of these works.

18.3.03 Contour Trenching: Contour Trenching as soil conservation measure could be taken in suitable places only with due precautions. The estimates should be examined and sanctioned by the Chief Conservator of Forest (T) Nagpur. Unnecessary digging of such trenches, only to meet the financial target or to provide employment to labours under MGNREGS or any other central or state government scheme should be avoided.

The contour trenching is prescribed in areas having density less than 0.4 and slope below 25°. The size of the trench is prescribed as 30 cm deep and 45 cm wide. Dug up soil from the trenches will form a ridge on the downhill side, and pebbly material from the trench will be neatly pitched on the lower side. *Agave* Bulbils, *Khus* tussocks and seeds of other suitable soil binding species will be planted on the mound at one-meter interval in two staggered rows set 20 centimetres apart on the downhill side. The mound will also have sowing of seeds of *Khair*, *Babul* and *Neem*, etc. *Chilati* seeds may be preferred on refractory sites.

Trenches near the *nalas* are prescribed to be discontinued and curved upward at both sides of the *nalas* at 45° to prevent the run off of water stored. Contour trenches will normally be not more than 10 meter in length, and two contour trenches will be spaced at least 5 meter apart (horizontal distance)

The quantum limit of contour trenches is prescribed to be not exceeding 300 running meter per hectare in the B-type areas, and 100 running meters per hectare in the C-type and the D-type areas.

18.3.04 Nala-Bunding and Check-Dams: The primary objective of nala- bunding and check dams are to reduce the run off of water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the nala beds or from the dug up soil. No blasting or quarrying 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 & soil loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.

- a. The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions and 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 m³/hectare of loose rubble filling or earthwork unless otherwise prescribed in the specific scheme or on special reasons, Chief Conservator of Forests (T) Nagpur gives permission to increase the per ha volume of the bunds.
- b. The streambeds more than 8 meters in width shall not be covered under the nala bunding. Nalas more than 8 meter wide at the top should normally require elaborate engineering structures for bunding, and therefore, such bunds should not be considered as part of the quantity prescribed here. Each of such nala bunds, if required, should be treated as an independent project.
- c. The Forest Tanks (not more than 1 ha submergence area) are proposed to be taken up in exceptional circumstances without causing damage to the tree crop will prove basically helpful for water conservation and availability of water for wild animals only and not for the use by the cattle and villagers.

18.3.05 Monitoring of Soil and Moisture Conservation Works: Considering the amounts of fund being spent on Soil and Moisture Conservation Works, a proper monitoring is required to study and record the effects of these works in the field. Dy. Conservator of Forest (T) Gondia with the help of the competent authority of Soil Conservation, in the Agriculture Department, will monitor the effects of these works and will develop a proper record of the activity and its effects on the Soil, Soil moisture, vegetation and wildlife habitat. The future planning will depend upon the assessment results of the Soil and Moisture Conservation Works carried out by the division during the implementation period of this Plan. The DCF shall provide all these information to the Working Plan Officer before preparation of next PWPR-II of Gondia Division.

18.4 GUIDELINES FOR REGENERATION: Regeneration process is extremely important to restore the health and over all productivity of the forest. The regeneration may be either natural or artificial. The RFOs should prepare the Grid-based (100 m x 100 m) treatment maps on the scale 1:5000 showing GPS reading, under the supervision of the ACFs. All the operations of Artificial Regeneration and Natural Regeneration should also be Grid oriented (50 m X 50 m) with clear base lines and reference points, on the ground showing GPS reading. The Natural Regeneration should be given preference over the artificial one. Among Natural Regeneration,

the Regeneration of Seed Origin of valuable species will be given preference over the Coppice Origin according to the importance of the species. A proper record, in the form of Register, will be maintained at Range level as well as Division level regarding all activities of Regeneration. All entries will also be made in the relevant Coupe Control Forms and Compartment History Forms & the same should be sent to the office of Chief Conservator of Forest, Working Plan, Nagpur in time.

In case of Artificial Regeneration, proper Plantation Registers shall be maintained at Range as well as Division levels.

18.4.01 Natural Regeneration Management:

i. Tending of Natural Regeneration of Seed Origin: All seedlings and saplings (of seed origin) of valuable species, more *than 60 centimetres in height*, will be nursed as future crop. Such identified areas should be shown in the treatment map & grid-wise recording of such natural regeneration along with GPS reading should be maintained. Spacing out operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5 metre spacing. While doing so (species like, Bija, Shisham, Haldu and Tiwas etc.) which are less in number in stocking and NTFP species shall however be given preference for retention.

Tending of Natural Regeneration: *Taking care of the Natural Regeneration, both of seed origin as well as coppice, and nursing them to future healthy matured crop. This operation includes: CBO, Singling of coppice on the stump, spacing out of young saplings, de-budding & branch cutting of saplings, cleaning & soil working for natural seedlings of desired species. It does not include the silvicultural thinning of old plantations as well as clearing of bushes in the coupe. Such identified areas having sufficient regeneration of valuable species should be shown in the treatment map & grid-wise recording of such natural regeneration along with GPS reading should be maintained.*

The natural regeneration shall be assisted and encouraged by soil working and mulching around them, in the following manner.

- **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.
- **Second year Operations:** The soil working in October will be repeated in the following year. However, one scrape weeding of one-meter diameter should be

carried out in the first week of August around the shoots of seedling coppice within the rootstock management area.

- **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.

ii. Root Stock and Coppice Management : In the areas where there are no sufficient seedlings of seed origin, (at least 400-500 healthy and established saplings) are found the existing root stock shall be managed to increase the density and productivity of the crop. Preference will be given to encourage the valuable species of choice of the areas and will be managed accordingly. Tending of rootstock (Valuable spp.) in the B-1 type will be carried out as following :

ii. Singling of Coppice Shoots: One healthy and promising coppice shoot will be retained on the stumps and the rest be removed. However, coppice shoots interfering with promising saplings of seed origin shall 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 develop root system of its own subsequently. 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.

18.4.02 Artificial Regeneration: It has been observed that the soil depth in some areas, covered under plantation programme in the Division, is shallow and therefore the efforts made in the past in raising plantations (particularly the miscellaneous plantations) have resulted in failures. Hence, the 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, such sites should be avoided. 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 shall specifically be put to above tests before taking up plantation there. Only the areas neither having sufficient seedlings/ saplings of seed origin nor sufficient root stock but are found to be suitable for plantation of miscellaneous species shall be covered under the plantation programme. One-stage plantation approach is prescribed in refractory sites of B-Type areas. The idea is to give the

nature a fair chance to regenerate itself and to intervene by way of artificial plantation only as a last resort, whereas in remaining places; one stage plantation is prescribed to fill the deficit of natural regeneration.

18.4.03 One stage Plantation in Afforestation Areas: Areas having adequate regeneration from rootstock and of seed origin will be tended as described for the Natural Regeneration Management. PPO/PYO (pre-planting operations) shall be taken up in the next year of coupe working, while the seedling planting and other FYO (first year operations) activities shall be carried out in the following year, that is, the third year of coupe working. Other plantation works will follow in the sequence. The cleaning and thinning operations in plantations will be done in the 6th and eleventh year of plantations.

18.4.04 The required field staff shall be provided with plantation targets, as per the norm and the target should not exceed the fixed norm for staff and officers at different levels. Plantation sequence is given in the **Appendices No. XXXVI, XXXIX, XLII & XLV.**

- **Planting Operation in SCI & IWC Working Circles:** In the coupes of SCI and IWC working circles the pre-monsoon works shall be carried out after completion of coupe working. The SMC works will be carried out with the work of demarcation and marking of the coupe and will be completed by the onset of monsoon. The PPO/PYO (pre-planting operations) shall be taken up in the following year of coupe working, while the seedling planting and other FYO (first year operations) activities shall be carried out in the second year of coupe working. Other subsequent plantation works will follow in the sequence. The cleaning and thinning operations in plantations will be done in the sixth and eleventh year of plantations respectively.
- **Planting Operations in Afforestation & Protection Working Circle:** Since these coupes do not have the work of timber harvesting, the plantation operations shall be one year in advance as compared to SCI and IWC Working Circles. Demarcation and SMC works will be carried out with the SCI & IWC coupes. Next year after carrying out felling, whatever little is required, the PPO/PYO will be carried out. The planting operation will be carried out in the next rains and the subsequent operations will be carried out accordingly. Cleaning and thinning will be carried out in 6th and 11th year of planting respectively.

18.4.05 Seed Sowing and Stakes Planting: In areas where seed sowing and stake planting are prescribed, the work has to be carried out by the beat guards and Van Mazdoors working under him. The following steps will be followed for seed sowing operation:

1. The RFO concerned, in consultation with the ACF, will decide the species of seeds to be sown.
2. The RFO will identify the healthy source of the seed and get the seed collected by the

Forest Guards and Van Mazdoors.

3. Seed of unknown sources should not be used.
4. The seeds should be sown at the appropriate places before onset of monsoon i.e. in the second half of May.
5. The seeds will be sown under some bush by making the soil loose with the help of planting bar, 1-1.25 m long obliquely cut pointed iron pipe of ½ or ¾th inch in diameter.
6. Waste small cut cloth pieces of bright colour, collected from tailors' shop, should be tied on the bush under which the seed has been sown to verify the germination of the seed after the rains.
7. Proper records like Compartment no., species, quantity of seed sown, date of sowing etc. will be maintained in a Seed Sowing Register and the respective Compartment History Form at range level.
8. Subsequently the number of germinated seedlings will be recorded in the register.
9. The stakes of Ficus and other suitable species will be planted at a distance of 6 m long nala sides and other moist areas after onset of monsoon. This work will also be carried out by the Forest Guards and Van Mazdoors and entries will be made in the seed sowing register.

18.4.06 Seeds and Planting Stocks: Planning for plantation shall be done in advance so that good quality seeds can be collected and healthy seedlings can be raised in the nurseries. Plantations mainly depend upon the quality of seeds and planting stocks, it is therefore very important that all necessary precautions should be taken to get the best quality seeds and best planting stocks i.e. Teak stumps, seedlings of misc. spp. and Bamboo for artificial regeneration.

1. **Seeds:** Seeds used for artificial regenerations must be of high quality and from known sources. The D.C.F should take all precautions that the best quality seeds are collected for raising the planting stocks.
2. **Teak Stumps and Seedlings of Miscellaneous spp.:** The planting stocks either Teak stumps or seedlings of miscellaneous species should be raised timely and only the best stocks should be transported to the planting sites to avoid planting of inferior stocks. The ACFs should supervise the sorting and transportation of planting stocks and all plantation operations under the direct supervision of the D.C.F.
3. **Planting Stock of Bamboo:** The seed collected for plantation must be from known clumps so that the quality and species are known. Seeds should be sown in the bed and these rhizomes should be shifted in the beds, at least twice. After one year one single healthy rhizome should be transplanted in to the poly bags of suitable size. Two years old

rhizomes should be planted in the site. Special care should be taken that the seeds are of known species of Bamboo. Regular cutting of shoots should be carried out to get well developed rhizomes.

4. **Planting Stocks for Species with Short Lived Seeds and Slow Growing spp.:** Planting stocks of species like Mahua, Tendu, Hirda, Karanj, Bija and Anjan should be raised one year in advance i.e. the seedlings of two monsoons old should be planted.

18.4.07 Choice of Species: Valuable local species suitable for the site and favoured by the local village communities will be preferred in plantations. Teak, Shisham, Khair, Shiwan, Siras, Chichwa, Aonla, Chinch, Neem, Kullu, Mahua and Sitaphal should be considered among the recommended species. *Neem, Khair, Aonla, Chinch, Chichwa, Karanj, Siras and Sitaphal* may be preferred in areas close to habitation. *Dalbergia sissoo* (Sissoo) is not local specie, but may be used on suitable alluvial soil. Seedlings of edible fruit-yielding forest species and other important NTFPs like Kullu, may constitute up to 20 percent and seedlings of medicinal plants up to 5 percent of the planting stock. Stakes or tall planting of suitable species, such as, *Ficus, Umber, Ber, Anjan, Babul* etc. useful to wildlife are also proposed in plantations, up to 10 percent of planting stock. An officer not below the rank of Assistant Conservator of Forests should approve the final choice of species and source nurseries in consultation with the D.C.F.

18.4.08 Spacing in Plantations:

1. Teak stumps from root-shoot cuttings should be planted on well-drained and suitably open sites only at two meter spacing (2x2-meter spacing). Teak seedlings raised in poly-pots or root trainer containers can be used in special cases only after duly recording the reasons in the prescribed register. Mixed species plantations should be carried out at two-meter interval (2x2-meter spacing) in 30cm X 30 cm X 30 cm pits.
2. Bamboo and some NTFP seedlings like Hirda, Mahua etc, should be planted at six-meter spacing (6 X 6-meter) in 45 cm X 45 cm X 45 cm pits. Care should be taken to avoid planting of seedlings directly under the canopy of existing trees or established saplings.
3. Grass plantation will be taken in 38 beds/ha of 1 m X 8m X 0.15 m. dimensions whereas, the fodder trees will be planted at 10m X 10 m spacing in pits of 30 cm X 30 cm X 30 cm.

18.4.09 Fencing of Plantations: The plantation areas or the rootstock management areas are prescribed to be fenced effectively to protect it from grazing. The fence can be (a) Traditional Fencings like TCM (Trench-cum-mound), Live-hedge fencing or suitable mechanical fencing or more effective (b) Social Fencing, with the help of the villagers. The villagers through the JFM committees should be encouraged for the protection by sharing the expenditure of fencing with the JFM Committees. In case the social fencing does not materialise then the following traditional methods may be tried:

1. TCM (Trench-cum-mound) of the standard cross section, one-meter deep and 1.90 (On top) and 0.60 meter (Bottom) wide at top and bottom respectively is prescribed. Across the slope, however, rubble wall is proposed in place of TCM.
2. Boundaries of the plantation areas or the rootstock management areas running across the contour or artificial boundaries inside the compartment are prescribed to have live hedge fencing on 1.20-meter wide ridge of worked up soil. Two rows of *Agave* will be planted at the outer edges along with seed sowing of *Chilati*, *Babul*, *Jatropha*, Bamboo and other local thorny species immediately after onset of the monsoon.
3. The mechanical fencing, if found financially viable, may be used in areas prone to heavy biotic pressure, if the situation so demands. Justification for use of mechanical fencing should be recorded in the prescribed plantation register.

18.4.10 Pit Digging: Pits of size, preferably, 30 cm x 30 cm x 30 cm for planting seedlings of non-Teak miscellaneous species and 45 cm x 45 cm x 45 cm sides for Bamboo and NTFP Species like Mahua, Hirda etc., are prescribed. The dug up soil will be kept on the upper side of the slope, and allowed to weather from March to the first week of May. Pit refilling must be completed before the onset of monsoon. Pits for Bamboo planting shall be half filled during the refilling using topsoil from the heap.

18.4.11 Planting:

1. **Planting of Teak Stumps:** Crowbar planting of Teak stumps must be carried out within one week after the first monsoon shower.
2. **Poly-pot or Root-trainer Planting:** Seedling planting must be completed within a fortnight after the first monsoon shower.
3. **Bamboo Planting:** Bamboo planting must be completed within a fortnight after the first monsoon shower. Preferably, two-year-old Bamboo seedlings with well-developed rhizomes should be planted. If stone mulching is feasible in the area, the pit should be refilled up to the ground. Otherwise, the ball of the earth and rhizome of the seedling should just be covered with soil and almost half of the pits should be left unfilled for reducing wild boar damage. In case the Bamboo plantation is to be taken in a planted area, it should only be taken in the sixth year on ward so that the mixed or Teak plantations are not suppressed and the watch and ward of the planted area will be extended to 10 years (5 years for each plantation scheme)

18.4.12 Subsequent Planting Operations: It is common in the field that all attention is paid only to the current year plantations and in the process of PPO/PYO the old plantations are neglected. The work of casualty replacement, weeding and soil working are neglected and not carried out properly and timely. The protection of old plantations from fire and grazing are also

neglected. This leads to big losses in the form of failed plantations. To avoid this, D.C.F should fix the responsibility on Beat guards, Round Officers, RFOs and ACFs to inspect the old plantations regularly and see to it that all prescriptions are implemented and all steps are taken to protect it from any damage. The ACFs should supervise these works very closely and give a certificate in the first week of November that all due operations have been carried out properly and timely in all the plantations up to 5 year of age.

A. First Year Operations: All weeding and soil working should be carried out in a circle of one-meter diameter around the seedlings or saplings. The first scrape weeding should be started immediately after completion of the entire plantation and appearance of weed growth. Casualty replacement should be done along with the first weeding in July. The second scrape weeding should be done in the last week of August. The soil working and mulching should be done in the first week of October. In case of, prolonged hot and dry season, it is desirable to carry out one soil working in the month of January.

B. First Year Operations in Bamboo Plantations: The first weeding, casualty replacement and the second weeding should be carried out as described in the preceding paragraph. Stone mulching should also be carried out with the second weeding in Bamboo plantations as a safeguard against the wild boar damage. The third weeding and soil working operations are not required in the Bamboo plantation.

C. Second Year Operations: In the second year of plantation, casualty replacement should be done in the planting season. The first scrape weeding should be carried out in the first week of August, and the soil working and mulching should be done in early October. The first and second weeding should also be carried out around the seedling coppice in the plantation area.

D. Second Year Operations in Bamboo Plantations: The first weeding should be done in the first week of August, and it should include maintenance of the stone mulching in the Bamboo plantations.

E. Third Year Operations: One weeding in the third year should be done along with the soil mulching in September. Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance should be repeated as third year operations.

F. Periodic Appraisal of Regeneration by Staff: The regeneration of the species in the forest area should be monitored in 2 years periodically, by territorial Division and their findings be sent to Working Plan Division.

18.5 THINNINGS: Details of thinning guidelines are in **Appendix No. LIV.**

18.5.01 Definition: Thinning is defined as a felling made in an immature stand for the purpose of improving the growth and form of the trees that remain on the ground, without permanently

breaking the canopy. Thinning is chiefly concerned with promoting good growth in the stems that are retained.

18.5.02 Special Objectives in Thinning: Plantations are made with various objects in view; and thinning methods have to be varied accordingly. The maximum volume production (in a given form) is generally an objective. Plantation work is expensive and it may be desired to get some return as soon as possible; however, in this case, thinning will aim at giving some of the promising trees the adequate room and nutrition they can utilize, thus ensuring rapid volume growth. Plantations are often made in an attempt to minimize a foreseeable shortage of timber consequent to the rapid depletion of the matured stock of natural forests.

18.5.03 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, whilst 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 following:

- (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 $5/6^{\text{th}}$ of the height of predominant.
 - (a) Trees with normal crown development and good stem form.
 - (b) Trees with defective stems or crowns, e.g. :
 - i. Trees with crown space cramped by neighbouring trees,
 - ii. Badly shaped old advance growth,
 - iii. 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 $3/4^{\text{th}}$ of 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 $\frac{5}{8}$ th 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 (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.

- (a) Dominant.
- (b) Dominated and suppressed.

Thinning guidelines for teak are given in the **Appendix No. LIV.**

18.5.04 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.

1. It is prescribed to be carried out in the plantations having at least 50 % survival at the time of thinning.
2. The first and second mechanical thinnings shall be carried out in the 6th and 11th year (of the coupe working) respectively and subsequent silvicultural thinnings at 10 years interval till the age of 65 years year. By this time such areas are expected to merge with the adjacent natural growth.
3. All thinnings will be done either at the beginning or at the end of the growing season.

18.5.05 Mechanical Thinning: It will be desirable to provide extra growing space to the planted saplings by carrying out 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) This method is followed in Teak plantations for the first and less commonly for the second thinning. Each operation of removing 50% of the original planting lines, reducing the number of plants to $\frac{1}{2}$ in each operation. For instance, in case of 2 x 2 spacing, number of plants will reduce from 2500 to 1250 and then 625 per hectare and increasing the spacing from 2 m x 2 m to 4 m x 4 m. In case of 3 m x 3 m spacing, as proposed in this plan, number of plants will reduce from 1111 to 556 and then 278 per hectare and increasing the spacing from 3 m x 3 m to 6 m x 6m.

(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.

18.5.06 Silvicultural Thinning: Alternatively, thinning may be selective, the case for removal or retention being considered for each tree in turn according to a set of rules drawn up for the purpose. This is the most usual procedure even where additional checks are applied, being often described as a “*silvicultural*” thinning.

A. Technique for Silvicultural Thinning in Teak Plantation:

- a. First off all the Teak site quality of the area in respect of the each section shall be determined and recorded in the register maintained for the plantations. The site quality shall be determined from the table showing “Top Height by Site Quality and Age” after calculating average “Top Height” based on the measurements of height of several dominant Teak trees per ha in the crop. If difference in site quality is noticed, then the delineation of patches on the ground according to site quality should be done and the same be shown on the map in the manner as it is done while doing stock mapping of any forests.
- b. By the method of point sampling, the existing average of basal area per ha for each section shall, then, be measured by using a wedge prism of suitable Basal Area Factor (BAF). A wedge prism of BAF where least counts 0.5 sq m per ha can be used. If the difference in basal area per ha measured at different points in the section is high (say more than 2 sq mts), then the delineation of patches has to be done for giving required treatment to the crop accordingly. Arranging in such cases should be avoided.
- c. Section wise average basal area per ha so measured should then be comprised with the figures contained in the yield table in respect of that site quality and age.
- d. If the actual basal area measured exceeds the basal area as prescribed in yield table for that site quality and age, then it would indicate the need for thinnings in the crop necessitating the removal of basal area to the extent the actual basal area exceeds the basal area prescribed in the yield table. If it equals or falls short, then it would indicate that no thinning is needed in the crop.
- e. After averaging the test as mentioned in sub para II above, if the crop needs thinning, then the thinnings should be carried out keeping in view the distribution of stems per

ha in various girth classes as contained in the stand table (main crop) for that particular site quality and age, provided that all past thinning have been done according to the parameters contained in the yield table.

B. 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. (**Appendix No. L**)

18.5.07 Types of Thinning:

(a) Ordinary Thinning:

- i. 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*.
- ii. 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.
- iii. Most foresters tend, at first, to thin very lightly corresponding to something between B and C grades, after experience however they mark heavily up to a full C-grade and D-grade. The term 'heavy thinning' implies the C-grade thinning.

(b) The Standard Grade of Ordinary Thinning:

1. **Light Thinning (A-grade):** This is limited to the removal of dead, dying, diseased and suppressed trees, i.e. classes V, IV and III. 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 of 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.
7. **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.

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.

18.6 ROADS, CART TRACKS AND CULVERTS:

18.6.01 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 should compile comprehensive records for all roads passing through the forest area and the roads transferred to the Division for maintenance, on priority basis.

18.6.02 The extent of forestry operations and gravity of forest protection concerns should determine the priority for maintenance of the forest roads.

18.6.03 Unwarranted up-gradation of the forest roads should be discouraged, but required culverts may be constructed in stretches useful for the forest protection.

18.7 HARVESTING AND DISPOSAL:

18.7.01 Agency for Harvesting: The Deputy Conservator of Forests, Gondia shall decide the agency for harvesting in accordance with the applicable policies and regulations. Present policy prohibits the sale of standing trees. Regarding NTFP, the disposal should be according to the Acts and Rules, defining the NTFPs and right of ownership over them.

18.7.02 Disposal at Timber Depots: Harvested timber and firewood are prescribed to be transported to the established forest depots for sale by auction or allocation according to the prevailing policies and guidelines. 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 the Range Headquarters, in addition to beat and round headquarters.

18.7.03 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 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, so that villagers may not be required to traverse large distance to procure the Nistar materials. The Deputy Conservator of Forests in consultation with the District Collector fixes the Nistar rate. Supplies of small timber, firewood etc. as well as the forest produce required for occupational Nistar will be governed by Nistar Patrak of each village (also refer to Para 1.9 of chapter I in this regard). Availability of the Nistar material will to be informed to the Taluka Panchayats and the material left unused for three months will be sold through open auction.

18.8 IRREGULAR HARVESTING:

18.8.01 Restriction on Irregular Harvesting: Irregular harvesting of timber, firewood, Bamboo and other NTFPs is prohibited, except in the following cases:

18.8.02 Harvesting for the Fire Lines and the Transmission Lines: Deputy Conservator of Forests may permit felling of herbs, shrubs, thorny bushes, 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.

18.8.03 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 finally approved by the Government of India under the provisions of the Forest (Conservation) Act, 1980. The Deputy Conservator of Forests, Gondia after preparation and sanction of estimate by competent authority, may permit felling of trees on forestland diverted for the non-forestry purposes as approved 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 regular coupe material.

18.8.04 Harvesting of Dead, Damaged, Fallen and Uprooted Trees in a Storm: Removal of dead fallen firewood and trees uprooted by wind or storm 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 dead fallen firewood and 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 and mark accordingly. At least two dead and fallen trees are required for retention from wildlife conservation. 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. Harvesting of dead and fallen firewood is governed by the Nistar rights and privileges as admitted in the *Nistar-Patrak* or directed by the government from time to time.

18.8.05 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.

18.9 MAINTENANCE OF FOREST LAND RECORDS:

18.9.01 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.

18.9.02 Forest Notification: Unclassified Forests and Non-Forest areas transferred for the compensatory afforestation shall be immediately proposed for notification as the Reserved Forests and the reservation process shall be initiated with the section 4 notification under the provisions of Indian Forest Act 1927.

18.9.03 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 Bhandara Division to mark completion of the process.

18.10 DIGITAL DATABASE: The office of the Chief Conservator of Forests, Working Plan, Nagpur is preparing digital management maps of forest areas of different scale and is stored in CDs. These CDs will be available in the office of Chief Conservator of Forests, Working Plan, Nagpur to supply to the territorial Divisions subject to procurement of relevant software to open these CDs, at their cost. This will be helpful for Division to generate; compartment map, beat map, round and Range map. This map also provide several information about the area like information regarding soil, geology, drainage, mini watersheds, stock maps etc., which cannot be seen in one single hard copy of map.

18.11 PERMANENT NURSERY AND CENTRAL DEPOT :

1. The central nurseries will be used for producing Bamboo rhizomes and Teak stumps; and non-Teak seedlings in poly-pots or root-trainers as required for the plantations. A proper Nursery Registers should be maintained in all nurseries where entries regarding all infrastructure and machines & tools, stock, fertilizers, insecticide etc. should be made with their quantity, the date of procurement and amount.

A separate seed register should be maintained, mentioning the species of seed, quantity, source, date of procurement, percentage of germination and finally name of the site where the seedlings of these seed are planted. If a seed needs treatment then the period of treatment should be mentioned.

2. The central depots will be used for sale of timber, fire wood and Bamboo by public auctions. All prescribed registers and documents shall be maintained and the ACFs and

D.C.F will do the physical verifications as per the guidelines and standing orders. These areas will be strictly protected from fire and theft.

CHAPTER XVII

NON TIMBER FOREST PRODUCE (OVERLAPPING)

WORKING CIRCLE

17.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE:

17.1.01 This is an overlapping working circle covering the entire forest area of the tract dealt with. The Non Timber Forest Produce includes both Minor Forest Produce (MFP) and the Medicinal Plants found in this tract.

17.1.02 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.

17.2 AVAILABILITY OF NON-TIMBER FOREST PRODUCE IN THE TRACT:

17.2.01 There are numerous minor forest produce available in this tract and are found in almost all Ranges with varying extent. This contributes a sizeable revenue to the State exchequer as well as generate employment tribals. These play an important role in rural economy.

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, hirda, behda, achar, salai etc.* These trees are found scattered in the entire division and well mixed with other species. NTFP collection generates substantial employment opportunities and supplementary income, and thereby, plays an important role in the rural economy, particularly, in the tribal villages.

The important NTFPs found and collected in this tract are Mahua flowers, Mahua seeds, Tendu leaves, Hirda fruits, Kullu gum, Dhaoda gum, Salai gum, Dikamali gum, lac etc.

17.2.02 The tract is rich in variety of medicinal plants which are used for curing various ailments by the local people and therefore medicinal plants occupy an important position in the socio-cultural, spiritual and medicinal arena of local villagers/tribes. Their sustainable management and harvesting can conserve bio-diversity, sustain human and environmental health, generate employment and earn foreign exchange by promoting exports. There are several species, with medicinal value, found in Gondia Division and are used by the local people have been given in the **Appendix No. XXVII.**

17.2.03 The special task force set up by the Planning Commission for Conservation and sustainable use of medicinal plants stressed the need for conservation and preservation of

medicinal plants. The per capita annual consumption of drugs of Rs.125/- in India is the lowest in the world mainly because medicinal plants constitute the principal health care resources for the majority of the population in India. The World Health Organisation (WHO) estimated that 80% of the population of developing countries rely on traditional medicines mostly plant drugs for their primary health care needs. The modern pharmacopoeia still contains at least 25% drugs derived from plants and many others which are synthetic analogues built on prototype compounds isolated from plants. Transition from synthetic analogues built on microbially produced antibiotics to plant based drugs is rapidly gaining acceptance. Global resurgence in the use of plant based drugs is an opportunity for India to attain self reliance and boost the export of herbal drugs. The demand on plant based therapeutics is increasing in both developing and developed countries due to the growing recognition that they are natural products, being non-narcotic, having no side-effects, easily available at affordable prices and some times the only source of health care available to the poor. The conservation and sustainable use of medicinal plants are issues on which immediate focus is required in the context of conserving bio-diversity and promoting and maintaining the health of local communities, besides generating productive employment for the poor with the objective of poverty alleviation in tribal and rural areas.

17.2.04 At present 90% collection of medicinal plants is from the wild, generating about 40 million mandays employment and since 70% of plants collections involve destructive harvesting, many plants are endangered or vulnerable or threatened. Currently medicinal plants are collected without having a complete knowledge about their maturity and use. They are also not stored properly which results in deterioration of their medical value.

17.2.05 For sustainable and equitable development of medicinal plants it has been realised that medicinal plants conservation areas need to be identified and field surveys and studies are required to be conducted in order to take necessary steps for their *in situ* conservation. The task force had also recommended the establishment of “Vanaspati Van” covering an area of about 3500 to 5000 hectares each for the intensive production of medicinal plants and their propagation which will produce quality herbal products and generate productive employment to the local people specially women who are skilled in herbal production, collection and utilisation. These “Vanaspati Vans” can be managed under Joint Forest Management Programme for benefit sharing to alleviate poverty of local people/tribals.

17.3 SPECIAL OBJECTIVES OF MANAGEMENT:

17.3.01 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. Besides this, Sustainable management of the marketable NTFPs in the division

and to help to ensure reasonable returns to the local villagers especially the tribal communities are also the special objectives of management for this working circle. As per the National Forest Policy, 1988 the proper utilization of Minor Forest produce has been one of the objectives in the Forest Management. Therefore, consistent with the above policy, the special objectives of management are as follow.

- 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 manage MFP and medicinal plants scientifically and to utilize the existing potential optimally and thereby to enhance the productivity and production of the same.
- iv. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division.
- v. To take measures for conservation and sustainable use of all NTFPs found in the tract.
- vi. To generate employment and improve the economy of the local people and thereby improving their socio-economic conditions.
- vii. To increase the growing stock of various non-timber forest produce species in the area.
- viii. To provide better and improved quality and culture supporting items to the local tribals.
- ix. To identify and conserve the forest areas rich in M.F.P. and medicinal plants.

17.4 OWNERSHIP AND MONOPOLY PROCUREMENT OF THE NTFPS:

17.4.01 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. Now the working plan has to be in accordance with this Act.

17.4.02 The Seventy-third Amendment of the Constitution of India has brought the NTFPs under the management of the Village Panchayat. NTFPs in the state and its sale procedure can be categorised into two parts:

- A.** 33 NTFPs in scheduled areas.
 - B.** Other NTFPs 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 No. XXX**) are 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. Wages for NTFP collection are paid to labourers by Tribal Development Corporation.

B. OTHER NON-TIMBER FOREST PRODUCE, (EXCLUDING 33 NTFPS IN SCHEDULED AREA) AND NTFPS IN NON SCHEDULED AREAS:

1. Other NTFPs excluding 33 NTFPs in Scheduled Areas and NTFPs in Non Scheduled Areas are auctioned unit wise by DCF in open auction. The amount received in the auction is Govt. revenue.
2. Units are formed for this NTFP.
3. Yield is not notified for these units.
4. Concerned contractor pays the wages for collection of NTFPs.
5. Due taxes are levied on the amount received in the auction.
6. Collection of NTFPs, processing and its auction is done by concerned unit purchase.

Seventy-third Amendment of the Constitution of India has brought the NTFPS under the management of the Village Panchayat. ‘The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006’, has defined the NTFP, which includes all forest Produce other than Timber and firewood. This Act also recognises the rights of the indigenous peoples over the forest produce and forest land.

17.5 AGENCY FOR THE COLLECTION OF NTFPS.:

17.5.01 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, accordingly in the Schedule 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.

The Government shall decide the ownership on these NTFPs and develop the mechanism of collection; value addition and disposal of these NTFPs. Year wise Revenue Obtained from various Types of NTFPs in Gondia Division have been given in the **Appendix No. LXXXIII**.

17.5.02 The revenue realised from the gum collection is meagre and further it shows declining trend in gum availability. It will therefore be preferable to stop this auction and earmark gum collection to the FPCs under JFM. In this connection specific rules are to be framed for which necessary, proposal be moved to the Government by the division.

17.5.03 There may be many other forest species which yield various products or leaves, flowers, fruits etc. of such trees are of some use or the other including medicinal uses. 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 include under the JFM programme of the Division. The possibility of involvement of NGOs in such an endeavour should be explored.

17.6 METHODS OF TREATMENT:

17.6.01 Modifications According to the Legal Provisions: Since legal provisions are not very explicit, it is recommended that Govt. of Maharashtra may notify the guidelines regarding:

1. Ownership of NTFPs,
2. Creation of a scientific data base for NTFPs and other valuable species.
3. Conservation and propagation of NTFP species
4. Improving the methods of harvesting to avoid destructive harvesting
5. Value addition and marketing of all valuable NTFPs
6. Agency for harvesting and marketing

17.6.02 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.

1. The Village Panchayats and FPCs shall be involved in awareness generation programme to help control forest fires.
2. In case of forest fire, legal action should be taken against the defaulters. Strict vigilance is necessary during the months of March-April to check the spread of fires specially during the Tendu and Mahua flower season.

17.6.03 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. The Education Circle should prepare and oversee the training modules.

17.6.04 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 Beat Guards will also maintain these records in his Beat Khairyat Report. 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.

17.6.05 Non-destructive Removal of NTFP: The areas in Gondia Division, capable of producing NTFPs, should be identified and marked. Compartments having promising regeneration areas of NTFP species shall be well demarcated on the ground and on map. Unless detrimental to the wildlife conservation and site conditions, sustainable harvesting and non-destructive removal of flowers, fruits, Gums, Barks and other parts can be permitted. For this the local villagers shall be given proper training regarding no-destructive methods of harvesting of various NTFPs. Species, which are endangered, need to be prohibited from removal. Poor class of the villagers when not engaged on agricultural works collect Mahua flowers and fruits, char, gum, honey, wax, bark, roots, leaves etc and sell them locally to supplement their meagre income. Mahua flower, Char, gum etc are sold in the weekly market at many places.

17.6.06 The treatment to be given will be different for different types of NTFPs, therefore, each NTFP will have separate treatment as follows.

17.7 MANAGEMENT OF TENDU:

17.7.01 Collection of Tendu Leaves: Tendu is the prominent revenue generating NTFPs 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. 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 area of Gondia Division divided into 29 groups of units. (5 units & 24 groups of 57 units, 50400 standard bags) 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.

1. Tendu leaf collection is the monopoly of the State Government under the Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969. The Tendu leaf collection shall be carried out in the manner prescribed by the Principal Chief Conservator of Forests Maharashtra State, Nagpur from time to time.
2. 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. Revenue Realized from tendu leaves collections in the last ten years in Gondia Division have been given in the **Appendix No. LXXXV**.
3. A-1 type areas in working circles should be excluded from Tendu units. Tendu leaves shall not be collected from buffer area surrounding the special habitats of wildlife & in the buffer zone of national parks & wildlife sanctuary.
4. 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.

17.7.02 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.

1. Maintenance and improvement of Tendu in the forest crop composition is prescribed by ensuring regeneration of Tendu and its subsequent protection.
2. 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.
3. Pruning should not be done yearly. It should be done at an interval of three years, during which some seedlings could establish and become the future seed bearer. Pruning should strictly and exclusively be of branches and not of seedlings irrespective of their origin.
4. It is proposed to ensure the inclusion of Tendu in mix plantations prescribed under various area-specific working circles.

17.8 MANAGEMENT OF MAHUA:

A. Mahua Collection: There is substantial number of Mahua trees in the crop. Inventory of Mahua trees shall be made to have an idea of its production potential and regeneration status. The villagers in the tract have local system for allocation of collection rights of Mahua flowers and fruits. In view of the viability of traditional of allocation of collection rights by the local communities no intervention is warranted in the process of Mahua collection. For better protection of Mahua trees and to increase its stock, few Mahua trees should 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. Range Forest Officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

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. 13-14 months old, should only be planted in the mixed plantation schemes.

17.9 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*), Dhaora (*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 calico printing, 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. Revenue Obtained from Gum Collections in the last ten years in Gondia Division have been given in the **Appendix No. XXIX & LXXXIII**.

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 compartments. Hence collection of Dhaoda and Salai gum is also permitted.

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.

The Forest Department should collect species wise data for various types of Gums.

Tapping Rules:

1. The tapping season will commence from November to end of May each year.
2. No tree below 90 cm in girth will be tapped.
3. 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.
4. Each tree shall be tapped continuously for 3 years; and, thereafter, will be given rest for 3 years.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. The number of blazes to be made on each tree will depend on its girth at breast height, as given in the **Table No. 17.8**.

Table No.17.8 :- 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.

11. No fresh blaze will be made on the partially healed up surface or old wounds.
12. 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.
13. 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 10 cm x 12.5 cm x 0.6 cm in width, height and depth, respectively.
14. 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.
15. 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.
16. 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.
17. The agency, the organisation or the individual collecting the Dhaoda or Salai gum in violation of the prescribed tapping rules should be treated as a forest offence and dealt with accordingly.

Formation of Gum Units: The gum units for collection of Dhaoda and Salai gums are formed and well demarcated, range as a unit, they are coterminous with protection ranges which ensure effective monitoring and control.

Besides, Kullu and Salai saplings are prescribed to be provided soil working along with planted seedlings in various area-specific working circles, after field inspection & their assessment. Singling and tending of Salai shoots would further help the Salai regeneration. Gum-yield species are prescribed for plantations.

17.10 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 are 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.

If these village bodies are not interested in collection, the collection rights may be auctioned. Collection units shall be co-terminus with the protection ranges.

Removal of NTFPs shall be within the sustainable limits of production. Felling of trees and lopping of branches shall not be permitted for collection of NTFPs. 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: Compartments having Natural regeneration of Beheda, Aonla and Char are shown in **Appendix No. XXXII**. Required tending is prescribed where saplings of *Beheda, Aonla and Char* are found prescribed, 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. These activities should be carried out after prior inspection of the coupes or compartment by Assistant Conservator of Forests.

17.11 MANAGEMENT OF GRASS:

17.11.01 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 and Mushan are preferred. Some villagers also collect Broom grass (Jhadu gavat). Broom grass may be propagated in the suitable areas.

17.11.02 The demand for grazing is very heavy in some area of this division, aiming to provide good grazing site to the local cattle without deterioration of the productive capacity of the site. The quantity of fodder can be improved by introducing superior grasses, legumes and fodder tree species.

17.12 FUTURE MANAGEMENT:

A. For building the data of NTFPS, it is proposed that weekly markets will be surveyed extensively to find out the types of NTFPs coming from forest area, their extent, purpose of utilisation, rate, chain and the agency of marketing and final destination. The local schools, village level functionaries and NGOs are proposed to be associated in building up this database. It is proposed that the above information should be used to formulate correct prescriptions at the time of next revision.

B. To make a beginning towards NTFP cultivation, each forest guard and his van-mazoor will be given target of collecting seed material of most traded NTFPs and to propagate it as part of his beat patrolling duties.

C. The division will endeavour the following:

1. Explore possibility of developing a methodology for collection and disposal of NTFPs under the provisions of various Acts and Rules, specially “The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006’, and its Rule”
2. The Dy. Conservator of Forests, Gondia will improvise a system to develop a NTFP related data base through his field staffs and the JFMCs.
3. Each NTFP purchaser to maintain a register, in which the information like the type of NTFP; person/s who collected it; quantity, rate and place of collection (compartment); rate at which and to whom it has been sold, will be maintained.

17.13 RESEARCH WORKS

17.13.01 There are so many minor forest produce in the forest which are unidentified and untapped. The efforts of the department should be to explore them and manage them scientifically. The identification of medicinal plants is the field to be taken for study immediately. The help from botanists from Nagpur University/ some local expert may be taken to identify unidentified medicinal plants available in the tract.

CHAPTER XVI

THE WILDLIFE (OVERLAPPING) WORKING CIRCLE

16.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE:

16.1.01 This is an overlapping working circle covering the entire area of the division. This tract represents a great variety of wild animals which were depleted owing to indiscriminate shooting in the regime of zamindari.

16.1.02 The location of Gondia Division's forests is very important from the wild life management point of view and the said areas have already been included in the proposed Tiger Habitat and corridor management. These forests are important for corridor management between the PAs like Tadoba, Navegaoan, Nagzira, Kanha, Pench (MP) and Pench of Maharashtra, as it provides the continuity of forests among these Protected Areas. Out of these six PAs, four are Project Tiger Project areas. For the adjoining PAs, like Navegaon and Nagzira, these forests provide an additional space too, for the wild animals. Under the present circumstances when most of the PAs are facing the problem of corridor. The forests of Gondia Division can provide the solution to this problem, if managed properly with a futuristic approach.

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. The prescriptions given in this chapter, applies to the forest area of the Division as well as to the issues relating to control the illegal trade in wild animals and animal articles in and around Bhandara city. It includes the total area of the Bhandara Division.

16.1.03 GENERAL CONDITION OF FLORA & 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 Bhandara Division is miscellaneous forest which is devoid of natural grass land, essential for the growth of herbivores. Therefore, most of the wildlife confined to the compact forest grass of Tumsar, Tiroda and Sakoli ranges adjoining to Nagzira Sanctuary and Navegaon National Park. The minimum concentration of wildlife is in Paoni range. The common wild animals found in tract are given as under: List of animals is given in **Appendix No. LXI**.

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*).

Sighting of tiger & panther are except in some patches of Nawegaon National park. Panther is found in almost all the ranges. Hyena, Jackal and Foxes are found very frequently near the inhabited areas. Wild dogs are found in and around Nagzira sanctuary. Jungle cats are common.

B. Herbivores (i) Gava (*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*).

Gava are confined to Nagzira Sanctuary and Nawegaon National Park and they can be seen in the adjoining forests of Gondia Division. Nilgai and Sambar are found in hilly ranges. Chital is found all over the tract. Wild boars are confined to hills and valleys all over the tract. Langur and monkeys are quite common. Barking deer is found in Nawegaon National Park & Nagzira WLS & its surrounding areas.

Blue Bull (Nilgai) is found all over the tract. Rest of the herbivores are found mostly in the compact area. Hares are common throughout the Division.

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 (*Macropisthodon 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 caeruleus*), Russel's Viper or Ghunus (*Vipera russelli*). Checkered keel back (*Xenochrophis piscator*)

The rich natural setting has been responsible for rich snake pollution in the area, whereas Python (Ajgar) is commonly found deep in the forest.

E. Fishes: Besides large irrigation reservoirs, many small irrigation tanks are resources for future potential of fishery development in the district. The major catch from the riverine resources comprises local fishes e.g. Tambir (*Labeo fimbriatus*), Waghur (*Clarias batrachus*), Bodth (*Bagrius bagarius*) and Tambu (*Anguilla bengalensis*). Prawn rearing mainly of *Macrobrachium malcolmsonii*, constitutes an important fishery in the district. The prawn found in the Wainganga river & other rivers of the district is famous for its quality and taste. It is being tried

in other river & tanks in the tract. The important species of fishery found in the tank and other reservoirs are Catla (*Catla catla*), Mrigal (*Cirrhina mrigala*), Botri (*Channa purctatus*), Dookkar machhi (*Nsndus nandus*), Bam (*Mastocemblus pencalus*).

F. Wild 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 (*Coturnix coronandelicus*) (xi) Indian Bustard quill (*Turnix suscitator*) (xii) Common or grey quail (*Coturnix*), (xiii) Pigeon (*Treron phoonicoptera*) (xiv) Crane (*Grus antigone*) (xv) Dove (*Streptpotia 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 migruns govinda*) (xxxvi) Shikra (*Accipiter badiues*) (xxxvii) India Whitebacked Vulture (*Typs bengalensis*). (xxxviii) Parakeets (xxxix) Moorhen (*Gallinula chloropus*), (xl) yellow Legged Green pigeon (*Terno phoenicoptera*).

16.2 HISTORY OF THE WILDLIFE MANAGEMENT.:

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

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. Census data of Navegaon National Park & New Navegaon WLS and Nagzira Wildlife Sanctuary & New Nagzira WLS are given in **Appendix No.LVIII and LIX** respectively.

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, after prior permission of CWLW, but only in exceptional circumstances. This act also enjoins on us the responsibility for wildlife conservation outside the protected areas. 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, which is nearby to Gondia district, special efforts are required to be made by the Division to protect the wildlife in the region.

Besides these, mammals there are many other animals belonging to amphibian, reptilian, and avian groups. Out of them many birds are migratory and visit the area in a particular season, mostly during winter. They are under great threat from poachers and (aquatic birds) fishermen.

There are many endangered insects and plants also included in the wildlife Act's schedule. They silently play a very important role in the ecology but do not get proper importance from the forest department. These lower animals and plants also need special treatment so that their viable population can survive.

16.2.02 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 Dears and Sambhars 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. For ex. Deer, Sambhar, Monkey etc.
9. **By Wallowing Sights:** Sambhar, 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.

16.3 INJURIES TO WILD ANIMALS:

16.3.01 Poaching : In spite of stringent provisions in the wildlife and forest laws, poaching for skin, bones, pets and flesh, continues to be the most important reason for destruction of wildlife in the Division. Poachers usually shoot the animals when they (wild animals) come to waterholes. Therefore the animals are particularly vulnerable during summer, when number of such water holes 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 chocking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets, snares and traps for catching birds, hares and sometimes small animals like deer has been recorded in the past but of late the poachers have been found using the improvised traps for killing the large animals, like Tigers and Panthers, very effectively and regularly.

Electrocuting the animals including Tigers by laying live electric wires on the tracks followed frequently by wild animals and by drawing electric current by high tension lines passing through the forests is another new method which is proving to be a potential threat to wild animals, besides sometimes being hazardous to local people.

16.3.02 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:

1. 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.
2. 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 DCF put the condition for these passages in the proposal of the project under Forest (Conservation) Act 1980.

16.3.03 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.

16.3.04 Fires: Forest fires are of common occurrence these days. The fires in the interior of the forests, besides destroying the natural habitat of the forest fauna drive them to take shelter near the human habitation and make them easy targets of poacher's guns or local villager's weapons. Due to fire even the young ones of big and strong animals may perish, besides other animals, reptiles and birds, who live on ground and can not escape the fire and its heat. In case if they survive, their food, grasses, herbs and shrubs are destroyed which are 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.

16.4 DAMAGES TO PROPERTIES AND INJURIES TO HUMAN DUE TO WILDLIFE:

16.4.01 Damages to the Crops: Incidences of crop damages is increasing as the number of wild animals is increasing and the pressure on their grazing land is increasing due to the grazing and fire. The herbivores are coming out of the forest and damaging the agricultural fields leading to the man-animal conflict. Details about crop damage during the period during the last ten years have been given in the **Appendix No. LX.**

16.4.02 Injuries to Cattle and Human: 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. Human being attacked by Wild animals during the last ten year is given in the **Appendix No. LVII and LX**. The Govt. of Maharashtra therefore has evolved a policy of compensating for the loss of livestock as well as for the injury or losses of human life vide Revenue & Forest Department, Government Resolution No. WLP-1094/CR-115/F-1, Mumbai dated 23rd August 2004.

16.5 ANIMAL HEALTH, DISEASES AND ITS SYMPTOMS:

16.5.01 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. 16.6 : Symptoms of Healthy and Unhealthy Wild Animals:

S. N.	Particulars	Healthy	Diseased
1	Behavior	Cautious, Clever, smart, swift	Drowsy
2	Head	Up-wards	Down-wards
3	Mouth and Nose	No bleeding	Bleeding may be seen
4	Hairs on body	Bright	Rough and erected
5	Ear	Erected	Fallen (Drooping)
6	Eyes	Bright	Drowsy
7	Diet	As usual	Avoid to take diet
8	Response	Alert	No response
9	Walking	Stylish	Prefer to sit
10	Milk kas	Good in condition	Found swollen
11	Back side observation	Backside high	Backside goes inwards
12	Ribs	Not seen	Seen
13	Waist bones, Back-bones and, skeleton of stomach	Continuous, bones not seen & seen rounded from back side	Waist bones and back bones are seen, there will be deep portion on back
14	Two bones of waist	Seen triangular from back side	Waist bones do not seen as triangular.

16.5.02 Following Factors are Responsible 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.

16.5.03 Types of Diseases Found in Wild Animals:

1. Bacterial disease
2. Viral disease.
3. Fungal disease.
4. Parasitic disease.
5. Protozoan disease.

16.6 WILD LIFE FIRST AID: Sometimes 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.

16.7 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 Nagzira Wildlife Sanctuary and corridor for other P.As.
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 disseminate percept of biodiversity and wildlife conservation and generate awareness among local communities, to seek support for this cause.

8. To protect the wild animals from various diseases.
9. To provide best possible habitat to the wild animals in the forest areas to minimise the Man-Animal Conflict.
10. It would focus on present population status, minimizing conflict, steps to monitor the animals by developing a methodology to conduct census, spreading awareness and to see how joint forest management committees (JFMCs) and eco-development committees (EDCs) could be roped to avoid any man-animal conflict

16.8 RECOMMENDATIONS FOR FUTURE MANAGEMENT:

1. Nagzira Wildlife Sanctuary, Navegaon National Park, New Navegaon WLS & New Nagzira WLS are adjoining Gondia Division, which is exclusively managed for wildlife protection and conservation. Besides these four PA, the forests of Gondia Division falls in between Project Tiger areas like Tadoba, Pench and Kanha. In order to provide extra space and safe corridor for free movement of wildlife and to reduce the impact of biotic pressure on the Protected Areas and to conserve the special wildlife habitat and sensitive ecological sites in the area the proper management of the forests of Gondia is extremely necessary. The improved habitat will discourage the wild animals from straying into the human habitation, thus reducing the chances man animal conflict.
2. Important areas from wildlife point of view should be identified in the division & provision for improvement and conservation of wildlife in such areas of the division, as well as for reduction of man-animal conflict, problems of poaching in the division, management of wildlife corridors, if any, should be given on top priority by DCF Gondia.
3. The location of water holes, suitable habitat for wild animals, measures needed to conserve and improve the same and anything specific and beneficial to wildlife in the Division should be taken by DCF Gondia. The areas of the division adjacent to National Parks & WLS shall be managed in consonance with objective & management prescriptions of the Management plan respective PAs in vogue from time to time.
4. Assessment of existing biodiversity in the division should be done by DCF Gondia & suitable steps to be taken for their protection & conservation.
5. Details of study & survey of wildlife corridors, eco-tourism and status of wildlife population should be done by DCF Gondia for future management for their protection & conservation. Climbers and other species included in Red Data Book of BSI and IUCN Red Data Book should not be sacrificed due to ignorance during forestry operations.

6. For better management of the Wildlife, the PCCF (Wildlife), M.S., Nagpur has issued a very comprehensive standing order and if it is followed by the field staff, most of the problems related to wild life will be solved. The DCF Gondia shall take initiative and educate all the field staff regarding this Standing Order and all the instruction shall be followed.

16.8.01 Standing Order (Wildlife) No. 001.

The PCCF (WL) MS, Nagpur has issued a standing order (Wildlife) No.001 (**Appendix No. LXLIII**). 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 Gondia Division shall scrupulously implement these prescriptions.

1. Duties of Forest Guard, Forester, RFO and ACF include-

- Keeping information of waterholes, particularly in summer and watch on the same, that is, special vigilance at all the water holes in the Division is prescribed.
- Keeping a watch on the electric lines passing through forests.
- Ensuring registration of arms licenses as required under Wildlife (Protection) Act 1972.
- Cognizance of cases of injury due to wild animals as per Govt. Orders from time to time.
- Keeping a track of animals like Tiger, particularly Tigress with cubs and a watch on such vulnerable animals.
- Proper disposal of carcass of wild animals found dead or killed.

Local staff shall maintain record of sensitive wildlife areas such as areas with heavy wild animal concentration.

A network of information system shall be established. A cell under RFO (MS) of the Division and also under DFO (Vigilance) in the office of CCF (T) Nagpur for handling wildlife offence cases, shall be established. There shall be regular short-term training/workshops in anti-poaching activities and legal requirements in dealing with wildlife offence cases. Forest check posts shall be sensitized for keeping a watch on wildlife offences. Any transit of wildlife articles etc. from these check posts should be scrupulously stopped.

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 be encouraged for nature education programme, as well as in establishing network of informers and in eliciting people's participation.
6. It will be insured that cattle grazing in forests near the important wildlife habitats are inoculated against contagious diseases.

16.8.02 Creation of Data Base: It is prescribed that the Division will undertake compilation of data of floral and faunal resources, as well as ecologically sensitive sites in the Division and creates a comprehensive database for the Division.

The Division will also 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 stress and 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 census survey for estimation of the wildlife population, 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 Census. Special note should be taken if any nesting site of endangered birds like Vultures is noticed.

16.8.03 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.

16.8.04 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: List of Compartments, where various habitat development works are recommended, is mentioned in the **Appendix No. LXII & LXIII.**

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 within about 5 kilometres of the areas, frequented by the large herbivores.
- 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. These waterholes will be filled with water by Bullock carts.

The work of water hole developments should be undertaken under 7% zilla parishad grant. Division should improve the wildlife habitat in the region by taking the works as follows:

1. Repairs to anicuts.
2. Construction of Bore wells, with attached cement saucer shaped tank of 3 metre diameter.

Sometimes wild animals become dangerous to human population, due to increased population of wild life in that area; in such cases, they are to be transported to other suitable places like National Parks, Sanctuaries, dense forests etc. Keeping such aspect in mind, it is proposed to procure animal cages (both trapping as well as transport) and tranquillising gun to

tranquillise the animal to put them in cage. The required fund may be allotted to the Division. Besides these, proper video and still digital cameras should also be procured to document all wildlife related activities.

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, specially during the summer season, when the forest grasslands are burnt. Fodder trees like Ber etc. should be protected and propagated for this purpose. The open areas in interior forest areas should be developed into meadows for the herbivores.

E. Development of Nesting Sites: Gondia 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 species should be done near water-bodies and in the riparian areas.

F. Mitigation of Canal Induced Fragmentation of Habitat: It has been observed that very good forest areas, rich in vegetation and wild life, have been fragmented due to the construction of canals of various irrigation projects. This is highly detrimental to the wildlife conservation. DCF Gondia will take initiative in mitigating the fragmentation of the habitat in the tract, induced by the construction of canals, with co-operation of the project agencies. DCF Gondia with the project authorities, will identify the areas where passages (Bridges with natural look) can be constructed on these canals for the wild animals, so that the corridor for these animals is not obstructed and they can move and migrate freely. These works shall be appropriately designed and technically approved by both NHAI, PWD as well as the Chief Wildlife Warden of Maharashtra. DCF Gondia is also advised that, in future, while recommending any projects for diversion of forest land, proper care must be taken regarding corridor and all precautions should be taken to avoid any fragmentation of the habitat. If it is unavoidable provision of proper and safe passages for the wild animals should be included in the project at the cost of the project authorities.

16.9 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:

1. **Vaccination of Village Cattle:** All cattle of adjoining villages should be vaccinated every year for Foot and Mouth disease.
2. **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.
3. **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, i.e. Staff of New Nagzira WLS, Nagzira Sanctuary New Navegaon WLS and Navegaon National Park.
4. **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.
5. **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.
6. **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.

16.9.01 Transportation of Wild Animals: In case some wild animal is rescued, they should be safely transported to a safe place, without any delay, after giving it the first aid.

1. Precautions to be taken while translocation of the Wild Animals:

- Generally the transportation is done by Truck.
- The schedule of program should be prepared and should be intimated to the staff concerned.
- The cage with the trapped animal should be immediately covered so that the animal can not see outside specially the human crowd and is not scared or disturbed by people while loading, transporting and unloading.
- The crate should be kept smoothly in the truck with the help of crane.
- Before transportation wild animal should be tranquilized and should be lifted with the help of stretcher.
- Health of wild animal should be examined by a veterinary doctor before and after transportation.

2. Material Required for Transportation:

- Empty crate.
- Nylon rope, heavy duty wire rope, iron mesh, crow bar.
- Drinking Water.
- Bucket, Mug.
- Tarpaulin.
- Stretcher.
- Torch, Walky Talky, Mobile Phones.
- Phenyl.
- Other essential materials.

Transportation Crates: Following 4 types of crates used for transportation of wild animals. The size of crates varies according to size of animal and nature of transportation.

1) Transportation Crate: Used for transportation. General size is length 8 feet, Width 5.5 feet, height 4.5 to 5 feet.

2) Treatment Crate: Treatment to wild animals is given in these crates. Sometimes transportation is also done in these crates. Size is according to the requirement.

3) Bait Crate: Without tranquilization or where tranquilization facility is not available, wild animals can be captured and transported in such crates. General size is Length 8 feet, width 4 feet, height 4 feet.

4) Combined Transportation and Treatment Crates: Many times wild animals gets injured while capturing in such cases, it is necessary to give them treatment before transportation.

3. Materials Required for Tranquilization.

Materials Required:

- Blow pipe with standard equipment
- Gas rifle model no. 50 with standard equipment. (range 70 m)
- Gas pistol model no. 35 with standard equipment. (range 50 m)
- Pneumatic blow pipe model 45 delta-special with equipment.

Medicines for Tranquilization:

- Ketamine 100 (50 ml. x 2)
- Xylazil 100 (50 ml. x 2)
- Antagozil SA (20 ml x 10)

16.10 MARKING RESERVATIONS, OTHER RESTRICTIONS: The following prescriptions have been made for implementation along with coupe operations and other treatment prescriptions, in the wildlife specific coupes.

1. No felling of trees or harvesting of any sort shall be allowed on these sites and in 50 metre wide buffer strips around them.
2. 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.
3. While harvesting at least 2 down hollow logs, of low commercial value, per hectare shall be reserved for shelter of wildlife.
4. 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.

16.11 DEVELOPMENT OF FODDER AND BROWSE.

1. 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.
2. Habitat improvement is proposed at places having high density of wildlife and the areas frequented by both domestic animals and wildlife.

3. 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.
4. 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.

16.12 ANNUAL WORKS AND REQUIREMENT OF FUND: DCF Gondia 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. The details of year-wise works to be carried out and its financial requirements are given in the **Appendix No.LXLIV**.

16.13 OTHER PROTECTION MEASURES:

1. Special vigilance is prescribed at water holes during summer season because of vulnerability of wildlife to poaching. Anti-poaching intelligence network of the wildlife wing should be used and supplemented to prevent wildlife offences in the Division.
2. The field staff should be trained in anti-poaching activities and dealing with offence cases related to wildlife. Forest check posts should be made sensitive to the wildlife offences to check its illicit transport.
3. The areas near sensitive water holes frequented by the wildlife may be excluded from grazing, and specially mentioned in the grazing license. Inoculation of cattle grazing near sensitive wildlife habitat sites and waterholes frequented by wildlife.
4. The special wildlife habitat sites shall be effectively protected from fire, grazing and other adverse influences.
5. Removal of flower, fruit and other medicinal parts and harvesting of herbs shall not be allowed in ecologically sensitive areas. The NTFP harvesting should be watched and monitored to prevent loss of genetic material from the forest area.
6. Any person possessing a firearm and residing within 10 km of the forests will register his name with the Deputy Conservator of Forests.

7. Joint patrolling with police on the identified wildlife sensitive routes has been taken up in all the ranges.
8. There is growing trend in killing the wild animals by electrocution. Normally the farmers take electric current illegally by attaching wire to the over head line wire in the night. The animals get killed due to electric current due to tripping. MSEB officials are involved in Tiger Cell meeting. Tripping prone areas identified where vigilance is increased.

16.14 COMPENSATION FOR THE LOSS OF LIVE STOCK : The scheme, which was introduced for the first time in 1971, covers the loss of Cow, Buffalo, Bullock, Sheep, Goat and other livestock (as per definition given under Section 2(18A)) due to attack of a Tiger, Panther or any other wild animal. Compensation are paid as as per the GR No.WLP-1002/C.No.258/F-1 of 17/01/2003 & are to be paid within 3 months.

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

Cattle killed by wild animals, damage to the crop have been given in the **Appendix No. LVII & LX.**

The conditions to be fulfilled for Compensation:

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

16.15 COMPENSATION FOR THE INJURIES TO AND LOSS OF HUMAN LIFE:

Introduced through GR dated 27/01/1986, the scheme covers death as well as injury including minor injury caused to any individual in an attack by a wild animal. Any such attack by Tiger, Panther, Sloth Bear, Bison, Wild Pigs, Wolf, Hyena, Jackal and wild dogs is covered under the scheme. Present rates of compensation have been fixed through GR No.WLP-1002/C.No.258/F-1, dated 17/01/2003 and dt.20/05/2003. These are as follows:

1. Death or permanent disability :- Rs.2.00 lakhs to legal heir. (Adult as well as minor)
2. Major injury. :- Rs.50,000/- to the individual injured.

3. Minor injury :- Cost of medication, preferably in govt. hospital, but in case of unavailability, private medication, limited to Rs.7500/-per individual.

There is considerable number of human casualties & crop loss in the area due to wild animals. Information has been given in the **Appendix No. LVII.**

Conditions for the Claim of Compensation for Injuries or Death of Human Being:

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

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.

16.16 ECO-DEVELOPMENT, AWARENESS GENERATION AND ECO-TOURISM: It would focus on present population status, minimizing conflict, steps to monitor the animals by developing a methodology to conduct census, spreading awareness and to see how joint forest management committees (JFMCs) and eco-development committees (EDCs) could be roped to avoid any man-animal conflict

1. 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.
2. 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 under eco-development programme for their overall development, eco-development plans shall be prepared with the help of local community.

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.

3. 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.
4. 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.
5. Awareness generation campaign should 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.
6. Teaching institutions viz. schools, colleges, etc. and NGOs shall be involved through nature camps, wildlife film shows, exhibitions, seminars, competition, etc.

CHAPTER XV

JOINT FOREST MANAGEMENT IN THE DIVISION

15.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE

15.1.01 The prescriptions of this chapter will be applicable to the entire division. It shall be an overlapping working circle of all working circle areas excluding areas under Protection Working circle. Entire division excluding areas under Protection Working circle has been allotted to this working circle. JFM works will be taken up in any village, if the forests belong to the category as described in the Government Resolution dated 5th October 2011 & 22nd December 2011 and local people are interested in participatory approach in Forest Protection and Management.

15.2 BACKGROUND OF THE JOINT FOREST MANAGEMENT:

15.2.01 The National Forest Policy 1988 envisages massive people's movement for conservation of forest resources. To this end, Government of India has advised state governments in June 1990 to involve local people in protection and development of forests in the participatory management in the shape of strategy, the Joint Forest Management (JFM).

15.2.02 Degradation of forests is a continuing process, besides, very heavy pressure of human and live stock, population, alienation of rural communities from forest resources protection and management is an important factor responsible for degradation of forests. In the past, local communities enjoyed free access to the forests. With the bringing of forests under Govt. control & consequent, reservation of forests permitting only specified usufructory concessions, local communities were denied access to forest resources. Forest reservation policy came in conflict with the interest of local communities dependent on these forests to meet their basic needs of forest products. The forests were managed as government 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 Department could not effectively protect the forests whose degradation continued.

15.2.03 Forest conservation necessitated active participation of local communities. The National Forest Policy, 1988 accordingly provided for creating a massive people who suffer the most as a result of forest degradation.

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 1988, the Ministry of Environment and Forests decided to ask the State Governments to adopt the JFM system for the protection and rehabilitation of degraded forest. The Government of Maharashtra Resolution No.SIF-1091/199/F-11, dated 16th March 1992 JFM approach was adopted for degraded forest areas of this state. These guidelines were modified vide G. R. No. MSC/2000/C. No. 143/F-2, dated 25/4/2003. Recently Revenue & Forest Department has issued consolidated G.R. No. FDM-2011/CR-100/F-2, dated 5th October 2011, No. FDM-2011/CR-104/F-2, dated 25th October 2011, FDM-2011/CR-100/F-2, dated 22nd December 2011 & FDM-2012/CR-4/F-2, dated 10th July 2012, which should be strictly followed by DCF Gondia while implementing JFM scheme in Gondia Division.

15.2.04 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 problems in protecting forest without the help of local people make the Forest Department staff realize the need of JFM. The JFM program succeeds where the initiative comes from the people's side and it usually fails where it is forced from Forest department side as a government driven and target oriented program. Villagers themselves are required to voluntarily participate in the program. Forest Protection Committee (FPC) is to be formed in each village. Each Forest Protection Committee constitutes a Managing Committee consisting of members elected from general body and ex-officio members representing concern Govt. Department at village level and with local forester as the member secretary. The managing committee is responsible to implement the decision of general body with regard to the execution of JFM works in partnership with Forest Department Memorandum of Understanding (MOU) is signed between Forest Department and managing committee clearly specific 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 they will receive in turns of share in the usufructs at out put from the forest areas assigned to such committee. The JFM area will be managed & according to the micro plans prepared jointly by the Deputy Conservator of Forests and the member of the FPC, which will be approved by DCF Gondia. These micro plans shall contain the details of forest and village developments. 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 made properly. Guidelines issued by Government vide G.R. No. FDM-2011/CR-100/F-2, dated 5th October 2011, FDM-2011/CR-104/F-2, dated 25th October 2011, FDM-2011/CR-100/F-2, dated 22nd December 2011 & FDM-2012/CR-4/F-2, dated 10th July 2012, which should be strictly followed while implementing JFM scheme in the division.

15.2.05 The program underlines conservation of forests and wildlife and therefore any activity/ agreement etc. which are not in accordance with the Forest (Conservation) Act, 1980 should not be incorporated in the JFM micro plan. All JFM activities should be in conformation to the silvicultural prescriptions of the approved working plan.

15.3 PRESENT EXPERIENCE WITH THE JFM IN THE DIVISION:

15.3.01 Objective of the JFM working circle on multi pronged strategies for developing forest resources, water resources and human resources in the JFM villages, they are as follows:

1. To develop the degraded forest resources by promoting natural and artificial regeneration (through plantation activity) with active participation of the villagers. It also aims to provide effective protection.
2. To empower village communities to play a crucial role in forest resource conservation and enable them to resolve their issues and problems.
3. This JFM approach should be widely applied even at places where formal JFM committees have not been constituted.
4. JFM should be evolved on the basis of its capacity to generate sustainable employment.

15.4 POTENTIAL AREAS FOR JFM:

15.4.01 The following area priority wise prescribes one selected for JFM program.

1. Areas prescribed under the Afforestation Working Circle are the potential areas for undertaking JFM program.
2. Areas under miscellaneous management, especially the Jhudpi jungles suitable for afforestation are proposed to be covered under JFM.
3. Areas under Improvement Working Circle, Selection Cum Improvement Working Circle, Fuel-wood, Fodder and Pasture Working Circle are also proposed to be included in JFM.
4. 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.

15.5 SPECIAL OBJECTIVES OF MANAGEMENT:

15.5.01 This working circle would endeavour to generate and sustain the participatory forest management through the JFM program. This approach has shown promising results in forest protection in many parts of the country, and it is consistent with philosophy of the democratic governance. Instead of considering JFM program as a scheme, it should be considered as the

approach of forest administration. Its participatory approach should be widely applied even at places, where formal JFM committees have not been constituted. After analyzing the reasons for the present deteriorated condition of these areas, it is found that non-involvement of the local people in our efforts to develop these areas is the main cause for our continuous failure. Naturally, therefore, prime objects will be to involve local people in the development of the areas. The other objects of management shall be as under.

1. To increase vegetal cover
2. To check soil erosion
3. To bring about soil and moisture conservation
4. To utilise the land for the productive purpose according to its capability.
5. And ultimately bring about the integrated development of the adjoining villages with the help of all other development agencies.

15.6 PRESENT STATUS OF JFM COMMITTEES:

15.6.01. JFM concept has been introduced in this division in the year 1998. So far 98 villages over a period of 5 years have been covered and rest of the villages are under process. The present status of the committee formed in this division are given in the **Table No. 15.1:**

Table No.15.1 : Range wise Area Distribution under JFM Committees:

S. N.	Range	No of Villages Adjoining to forests	Total forest area in Sq.Km. (ha.)	Committees formed			
				Name of scheme	No of JFM Committees formed	Area Handed over to committee	No of villages to be deleted
1	Gothangaon	Umarpaili	314.99	F.D.A	5/14/2004	314.99	-
2	---do---	Dongargaon	451.54	F.D.A	5/15/2004	451.54	-
3	---do---	Chichtola	115.13	F.D.A	4/25/2002	115.13	-
4	---do---	Wadegaon	188.80	F.D.A	5/17/2004	188.80	-
5	---do---	Bortola	170.31	F.D.A	4/16/2003	170.31	-
6	---do---	Shivramtola	170.87	F.D.A	4/16/2003	170.87	-
7	---do---	Navintola	239.12	F.D.A	12/4/2002	239.12	-
8	---do---	Ambora	214.82	F.D.A	4/25/2002	214.82	-
9	---do---	Junewani	126.91	F.D.A	10/26/2002	126.91	-
10	---do---	Parstola	165.20	F.D.A	10/28/2002	165.20	-
11	---do---	Arat tondi	127.47	F.D.A	10/30/2002	127.47	-
12	Arujuni/Morgaon	Tidaka	445.15	Vidharbha Vikas	5/31/2007	445.15	-
13	Nawegaon bandh	Injori	100.00	JFM State	2008	100.00	-
14	---do---	Dhabetekadi	394.20	JFM State	9/16/2005	394.20	-
15	---do---	Yerandi (Dev)	260.86	JFM State	1/17/2008	260.86	-
16	Goregaon	Murdoli	448.40	F.D.A	1/3/2000	448.40	-

17	---do---	Kanhartola	228.73	F.D.A	7/16/2004	228.73	-
18	---do---	Mundipar	293.42	F.D.A	2/26/2002	293.42	-
19	---do---	Saitola	300.69	F.D.A	12/12/2002	300.69	-
20	---do---	Garada	115.54	F.D.A	3/12/2001	115.54	-
21	---do---	Tanutola/ Pipartola	140.45	JFM State	1/4/2007	140.45	-
22	---do---	Halbitola	50.02	JFM State	1/4/2007	50.02	-
23	---do---	Kalpathari	139.15	JFM State	7/22/2007	139.15	-
24	---do---	Sodhalagondi	119.68	JFM State	7/11/2007	119.68	-
25	---do---	Sonegaon	245.20	JFM NTSP	7/11/2007	245.20	-
26	---do---	Nawargaon	185.67	JFM NTSP	7/11/2007	185.67	-
27	---do---	Palewada	216.81	R.S.V.Y	8/31/2007	216.81	-
28	---do---	Bolunda	215.00	Vidharbha Vikas	2007	215.00	-
29	---do---	Ramatola	265.67	F.D.A	10/20/2000	265.67	-
30	---do---	Malpuri	296.02	F.D.A	12/21/2001	296.02	-
31	---do---	Asalpani	209.83	Vidharbha Vikas	7/11/2007	209.83	-
32	---do---	Chanditola	63.39	Vidharbha Vikas	8/10/2007	63.39	-
33	Tirora	Alezari	169.92	SMC	7/11/2007	169.92	-
34	---do---	Balapur	185.61	---do---	7/11/2007	185.61	-
35	---do---	Pindkepar	290.49	---do---	7/11/2007	290.49	-
36	---do---	Sarra	79.62	---do---	8/10/2007	79.62	-
37	---do---	Berdipar	156.27	---do---	7/11/2007	156.27	-
38	---do---	Nimgaon	393.60	---do---	8/11/2007	393.60	-
39	---do---	Mangezari	498.86	---do---	7/17/2007	498.86	-
40	---do---	Govindtola	446.33	---do---	7/11/2007	446.33	-
41	---do---	Kodobarra	105.85	---do---	7/11/2007	105.85	-
42	---do---	Lonara	102.29	---do---	8/10/2007	102.29	-
43	Gondia	Kohaka	129.24	Bamboo Mission	11/26/2008	129.24	-
44	---do---	Walad	234.93	JFM	11/6/2004	234.93	-
45	---do---	Balmatola	137.37	JFM	12/17/2004	137.37	-
46	Saleksha	Darrekasa	96.22	F.D.A	12/12/2002	96.22	-
47	---do---	Darwada	71.31	---do---	12/12/2002	71.31	-
48	---do---	Gorre	94.28	---do---	2005	94.28	-
49	---do---	Kosamtarra	354.84	---do---	12/12/2002	354.84	-
50	---do---	Kotra	224.51	---do---	12/12/2002	224.51	-
51	---do---	Halbitola	185.57	---do---	5/27/2004	185.57	-
52	---do---	Nimba	113.55	---do---	8/10/2007	113.55	-
53	---do---	durgutola	55.69	---do---	8/10/2007	55.69	-
54	Amgaon	Walad	50.00	Bamboo Mission	8/11/2007	50.00	-
55	---do---	Tigaon	50.00	Vidharbha Vikas	2/13/2007	50.00	-
56	---do---	Bageda	50.00	---do---	7/22/2007	50.00	-
57	North Deori	Mundipar	213.00	JFM	8/10/2007	213.00	-

58	---do---	Nakti	170.24	---do---	2007	170.24	-
59	---do---	Albedar	100.10	---do---	8/10/2007	100.10	-
60	---do---	Salaitola	56.33	---do---	2007	56.33	-
61	---do---	Masulkasa	50.00	---do---	8/31/2007	50.00	-
62	---do---	Futana	100.00	---do---	8/27/1993	100.00	-
63	---do---	Zunjaritola	165.00	---do---	2003	165.00	-
64	Chichgarh	Chipota	198.91	F.D.A	2004	198.91	-
65	---do---	Mohandi	131.02	---do---	2002	131.02	-
66	---do---	Wasni	191.81	---do---	2004	191.81	-
67	---do---	Mehatkhedda	481.20	---do---	2004	481.20	-
68	---do---	Paulzola	229.05	---do---	2004	229.05	-
69	---do---	Tumdikasa	300.31	---do---	2004	300.31	-
70	---do---	Ghogara	100.58	---do---	7/13/2007	100.58	-
71	---do---	Yemagondi	238.69	---do---	8/7/2007	238.69	-
72	---do---	Dongargaon	112.06	JFM	8/8/2007	112.06	-
73	Sounth Deori	Palasgaon	246.69	R.S.V.Y	2003	246.69	-
74	---do---	Bodaldand	297.25	JFM	8/9/2007	297.25	-
75	---do---	Kosbi	264.69	---do---	2003	264.69	-
76	---do---	Jethbhawada	246.24	---do---	8/10/2007	246.24	-
77	---do---	Gadegaon	158.62	---do---	8/9/2007	158.62	-
78	---do---	Lendijob	136.06	JFM	8/10/2007	136.06	-
79	---do---	Kanhargaon	204.31	R.S.V.Y	8/10/2007	204.31	-
80	Sadak Arujuni	Raka/Palsgaon	79.87	JFM	9/27/2003	79.87	-
81	---do---	Murpar /Ram	126.00	R.S.V.Y	8/23/2007	126.00	-
82	---do---	Dhanori	181.33	R.S.V.Y	11/28/2002	181.33	-
83	---do---	kanheri	255.77	Vidharbha Vikas	2009	255.77	-
84	---do---	Duggipar	108.62	---do---	7/2/2007	108.62	-
		Total	16439.116			16439.116	-

15.6.02 RECOMMENDATIONS:

1. 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.
2. Silvicultural management, maintenance of forest boundary, removal of forest encroachment and control over illicit cutting, illicit grazing and fire should receive high priority.
3. Forest protection can not be viewed in isolation. The forest department may be designated as Nodal agency for all developmental works in the villages, recommended in the micro plans.
4. In carrying out the developmental activities, the expertise of NGOs has to be fully utilized.

CHAPTER XIV

BAMBOO (OVER-LAPPING) WORKING CIRCLE

14.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE:

14.1.01 This working circle includes all the areas where Bamboo is present in workable quantity, natural or planted. Workable means that there are sufficient Bamboo clumps which require independent working. This includes areas of SCI as well as Improvement working circles. The total area of the working circle is 34253.987 ha and is spread over 149 compartments in all the ranges except Tiroda, Gondia & Amgaon Ranges. There are some old Bamboo plantations in the division, some of which are not growing due to congestion. Details of area allotted to this working circle are given in the **Appendix No. LIA**. They are proposed to be worked as per the prescriptions given in this working circle. Statement showing the compartments & area allotted to this working circle are given the **Table No. 14.1**.

14.2 GENERAL CHARACTER OF THE VEGETATION:

14.2.01 The general character of vegetation in the areas included in this working circle is given in the respective working circles; the condition of Bamboos only is described here. Bamboo crop is of both natural and planted in origin. The major species of Bamboo available in the forest areas of Gondia Forest Division is *Dendrocalamus strictus*. Katang bamboo (*Bambusa Arundinacea*) is found in small quantities in some stretches along the streams and rivers. In almost all the ranges, the Bamboo has come up due to plantations taken in different years in the past. The natural Bamboo clumps have deteriorated primarily due to illicit cutting. Even new recruits are cut by the illicit cutters.

The survival and growth of Bamboo varies from area to area. In most of the cases the clumps have become congested. In some areas, cleaning of clumps has been done in the past. But the work has been taken arbitrarily, therefore, all the areas need immediate attention. This 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.

14.2.02 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.

14.2.03 The BMB areas have about 17.7 clumps per ha and per hectare yield is expected at 89.3 culms.

14.3 BLOCKS AND COMPARTMENTS:

14.3.01 The abstract of Range wise Bamboo area distribution is shown in the **Table No. 14.1**.

Table No. 14.1: Range wise Bamboo Area Distribution:

S.N.	Range	No. of Compartments	Area in ha.
1	Tiroda	3	338.83
2	Gondia	1	10.00
3	Goregaon	2	473.354
4	Amgaon	0	0.00
5	Salekasa	28	5432.159
6	North Deori	4	691.789
7	South Deori	11	2351.343
8	Chichgarh	33	7785.738
9	Sadak Arjuni	5	1150.203
10	Navegaonbandh	27	6283.152
11	Ghothangaon	30	8003.09
12	Arjuni Morgaon	5	1734.329
	Total	149	34253.987

14.3.02 Bamboo area have been divided into 14 Cutting Series, each cutting series further divided in to three coupes i.e. A, B & C. Cutting series, coupe wise details & sequence of working in this working circle are given in the **Appendix No. LII**.

14.4 SPECIAL OBJECTIVES OF MANAGEMENT:

14.4.01 Bamboo has a significant place in local economy. Local tribal and non-tribal families use bamboo for construction, fencing and for making variety of implements.

14.4.02 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.

14.4.03 This working circle aims at improving the bamboo productivity for meeting local needs and demand in the surrounding areas.

1. This working circle aims at improving the Bamboo productivity for meeting local needs and demand in the surrounding areas.
2. Harvesting of Bamboo on scientific manner to obtained maximum sustained yield.
3. To meet the local people demand Agricultural, Crafts and, Artisans.
4. To protect the Bamboo clumps, both natural and artificial, from illicit cutting, browsing, fire and congestion.

14.5 METHOD OF TREATMENT: Each clump is prescribed to be treated as an independent identity 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 14.10 under Bamboo harvesting.

14.6 CUTTING CYCLE AND SEQUENCE OF CUTTING:

1. Cutting cycle of 3 year duration is proposed for the Bamboo harvesting.
2. The entire area in the working circle has been divided into 14 Cutting Series of an average area 2446.71 ha.
3. Each cutting series is further divided into three cutting sections of average size 815.57 ha in the cyclic order viz. A, B and C; that will serve as annual coupes in each cutting series. The sequence of cutting is given in the **Appendix No. LII**.

14.7 AGENCY FOR HARVESTING: Since the harvesting of Bamboo will require close supervision, it will be worked departmentally. The harvested Bamboos will be brought to the sale depots for further disposal.

14.8 METHOD OF HARVESTING:

- **Demarcation:** The coupe due for working will be demarcated before the onset of monsoon, in the year in which they become due for harvesting, by erecting poles at suitable intervals. On the poles, compartment number, coupe number and name cutting series will be written. The coupe due for working in the regular working circle will be excluded from this, to avoid duplication of work.
- **Estimation of Clumps:** Most of the areas included in this working circle contain planted Bamboos at 6m -6m as well as natural. The growth of Bamboos differs from compartment to compartment and even in the same compartment. In natural Bamboo growth, the clump size varies.

Soon after the demarcation, the whole coupe due for working will be thoroughly inspected by RFO. The inspection will be carried out compartment wise and the area containing Bamboo will be shown on the treatment map. In this area 5% enumeration of Bamboo will be done and the Bamboo will be classified in to above three categories. Each bamboo clumps will be numbered and two percent of clumps in each compartment of the coupe will be enumerated for the current year, previous year, mature and dead culms as well as intensity of cleaning operations. 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. Since in plantation, Bamboos are planted at 6m-6m, therefore, exact estimate of Bamboo clump can be

made. In case of natural Bamboos also, the approximate estimate can be made as the Bamboos in this case will be confined to nalas or slopes. As per the enumeration the estimates of various works and yield of Bamboo will be made.

14.8.01 METHOD OF WORKING: The method of working will be as per Rules for Bamboo harvesting works of issued by then Chief Conservator of Forests (Production) M.S., Nagpur in the year 1994. Present practice of working Bamboo forest areas on three years felling cycle shall continue. The method of working will be as under.

- i) No harvesting works should be permitted from 15th June to 30th September.
- ii) No clump should be considered fit for harvesting unless it contains more than 12 mature culms (one year as well as two year old included).
- iii) No culms below the age of two years will be felled.
- iv) Following culms shall be removed from all clumps.
 - (a) All dead, decayed and dry Bamboos.
 - (b) Culms whose half or more top part is broken or damaged.
 - (c) Twisted or malformed culms.
- v) In a matured clump the following type of culms (green and living) will be retained:
 - (a) All current seasons i.e. less than one year old culms.
 - (b) From rest of culms equal in number to the current seasons (i.e. less than one year old) culms or eight, whichever is more.
 - (c) The remaining culms will be considered available for harvesting.
- vi) The cutting height of culms will be between 15 cm to 45 cm above ground level i.e. above the first internode above the ground. The cut shall be made with a sharp instrument.
- vii) In case of any flowering, no Culm from flowered clumps shall be felled in the year of flowering.
- viii) Harvesting of Bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two years old are retained on periphery for the purpose of support to the new culms.
- ix) Following acts will be strictly prohibited.
 - (a) Digging of rhizome.
 - (b) Lopping of Bamboo culms for fodder.
 - (c) Use of tender Bamboo culms for bundling.
- x) Climbers affecting the growth of Bamboo clumps shall be cut.
- xi) A clump will be distinguished as an independent clump where its periphery is easily discernible from the adjacent clumps, irrespective of its distance from other. Only when

such a distinction is not possible, two clumps within one meter distance will be considered as one.

- xii) The exposed Bamboo or rhizome on the periphery should be covered with the slash and earth to provide nourishment to spreading rhizomes and thus promoting peripheral growth of culms.
- xiii) Very often soft and flexible, current year culms are demanded by Burads for basket weaving, this practice is much against the silvicultural norms. This practice is injurious to the Bamboo crop; hence no immature Bamboo should be harvested.

14.9 IDENTIFICATION OF BAMBOOS: Since the marking of Bamboo is highly selective, it is essential to distinguish current year or a previous year or mature culms from each other.

1. **Current Year:** Culms sheath is present on lower half of the culms, branches are present throughout the length of the culms and white bloom is present abundantly and comes off easily.
2. **Second Year:** Culms sheath is absent, branches are present practically at all nodes. White bloom is patchy and comes off easily.
3. **Third Year:** Culms sheath is absent, branches are present practically at all nodes, white bloom is absent, and replaced by blackish gray.

14.10 BAMBOO FLOWERING: Flowering is either periodic (Gregarious) or annual (Sporadic). It is either gregarious, sporadic or both. Gregarious flowering is usually followed by the death of clumps, but in some cases of sporadic flowering, the clumps do not die after flowering. Following of treatment will be given to such area as given below.

14.10.01 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. All Gregarious flowerings should be immediately 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 Chief 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*.

14.10.02 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 should 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

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.

Tending Operation of Natural Crop: The gregariously flowered areas will be tended 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 diameter 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.

Mature Bamboo Crop: Fully mature clumps may be harvested in the eighth year onward depending upon location in the annual coupe.

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.

14.11 OTHER REGULATIONS:

- **Fire Protection:** Fire causes extensive damage to the new shoots of Bamboos and, therefore, these areas must be completely protected from fire by removing all debris from the forest in the form of cleaning.
- **Grazing Control:** These areas should be protected from grazing especially after flowering and in the rainy seasons in which the recruitment of new culms takes place.
- **Control of Injuries Due to Insects:** The Bamboo culms damaged by the insects like, *Estigmina chinensis*, *Chrysomelidac colioptera* and *Brytotrachelus longipipes*, should be cut and burnt during 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 *Dinoderus minutus*. *Dendrocalamus strictus* 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 XIII

MISCELLANEOUS WORKING CIRCLE

13.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE

13.1.01 This working circle comprises forest areas not included in any other working circles and extends over an area of 38158.768 ha. It includes 5036.95 ha of the Reserved Forests, 7553.48 ha of Protected Forests, 3572.99 ha of unclassified forests & 21970.20 ha of Zudpi Jungle. It constitutes 22.05 % of the entire area of the division. Area allotted to this working circle has been given the **Table No. 13.1**.

Table 13.1: Areas Allotted to Miscellaneous Working Circle

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Commt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Commt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	1	36.81	10	416.635	69	2147.5	0	0	0	80	2600.945
2	Gondia	0	0	28	663.1	112	3338.82	0	0	0	140	4001.92
3	Goregaon	0	0	5	187.5	51	1584.68	5	1311.29	2.61	61	3086.08
4	Amgaon	0	0	0	0	66	2520.86	3	127.592	0	69	2648.452
5	Salekasa	0	0	0		60	4691.25	15	1069.6	8.140	75	5768.993
6	North Deori	0	0	0	0	40	2103.04	5	1011.05	4.980	45	3119.067
7	South Deori	2	261.3	3	991.294	22	378.74	0	0	9.420	27	1640.754
8	Chichgarh	7	1634.23	5	2415.19	32	800.89	1	53.454	0	45	4903.768
9	Sadak Arjuni	0	0	0	0	42	1771.78	0	0	0	42	1771.78
10	Nawegaonbandh	10	2529.103	9	2879.76	23	1014.5	0	0	0	42	6423.359
11	Ghothangaon	2	575.51	0	0	10	1228.74	0	0	0	12	1804.25
12	Arjuni Morgaon	0	0	0	0	14	389.4	0	0	0.000	14	389.4
	Total	22	5036.953	60	7553.48	541	21970.2	29	3572.99	25.15	652	38158.768

13.1.02 The compartments allotted to this working circle is given in the **Appendix No. XXXIII**.

13.1.03 Following criteria have been used to assign areas to this working circle:

1. Compartments under the submergence.
2. Protected Forests & unclassified forests in some *villages* for which maps have not been made available.
3. Protected Forests in 87 *villages* notified in 1999.
4. Zudpi Jungle transferred to the Gondia Division for management or compensatory afforestation
5. Permanent forest nurseries and central depots in forest areas.
6. Forest areas used for infra-structural facilities such as residential buildings, seed storage, rest houses and field offices.
7. Forest areas diverted for the non-forest use without disforestation.
8. Sacred grooves, worship sites and archaeological sites.

13.1.04 Maps of Protected Forests in 2 *villages* (*Bhagi and Pipartola*) and maps of unclassified forest in 7 *villages* (*Sirpur, Jarugatta, Bondgaon, Bhagi, Changtola, Baki and Pangdi*) were not made available. Similarly, maps were not made available for Protected Forests in 87 *villages*

notified in 1999, during the preparation of the digital database. In absence of these maps, one compartment number has been assigned to the entire forest area of the village in each of these 96 *villages*. These areas have been included in Miscellaneous Working Circle for purpose of area accounting.

13.2 SPECIAL OBJECTS OF THE MANAGEMENT : The special objects of management of this working circle are as under.

1. Main objectives of this working circle are to maintain territorial integrity and comprehensive area accounting of the Reserved, Protected and unclassified Forests in the division. The special objects of management of this working circle are as under.
2. Provide provisions and guidelines for management of areas not included in other working circle of this plan.
3. Provide guidelines for protection and management of Zudupi jungles transferred to division from Revenue Department.

13.3 METHODS OF TREATMENT:

13.3.01 Protected Forests and unclassified forests not in database: Maps of some villages having the Protected Forests and the unclassified forests were not available at the time of revision of this working plan. Hence, these forest areas are not in the digital database or any other working circle.

13.3.02 The division will supply these village maps to the office of CCF Working Plan, Nagpur for inclusion in the database at the time of next revision.

13.3.03 Prescriptions of the Afforestation Working Circle will apply to these areas after inclusion in the database; as these forests are generally blank or open in stocking. Chief Conservator of Forests (T) Nagpur in consultation with, Working Plan Officer can approve the schedule of working, in all such cases.

13.3.04 Disforestation area not marked on the forest map: The division is proposed to prepare a comprehensive compilation of original disforestation maps. As the maps of disforestation areas in 47 villages are not available, disforestation maps shall be prepared by the division according to the disforestation notification and the revenue maps.

13.3.05 Area under infra-structural facilities: A number of rest houses, offices and residential facilities for field officials are situated within the forest areas. The extent of forest areas in use and locations of these buildings have not been recorded, exhaustively. The division is proposed to prepare their maps, and record present condition and occupancy of all the buildings in the forests for the purpose of their delineation on the forest maps and inclusion in the digital database. It is proposed to complete the work in first two years of the plan.

13.3.06 Religious and archaeological sites: A comprehensive inventory of sacred grooves, worship sites and archaeological sites shall be compiled in the *Register of Cultural Sites* and all such sites will be delineated on the forest maps. Their potential as sites for eco-tourism shall be explored and used to furtherance of eco-tourism in the division.

13.3.07 Areas diverted for irrigation projects and under submergence: No work is proposed for the forest areas under submergence, but the prescriptions of the Protection Working Circle will apply to the forests above the high flood level.

13.3.08 Foreshore plantation of suitable species, like *Babul and Arjun* should be carried out under the watershed and catchments development.

13.3.9 Deputy Conservator of Forests and the project authorities should jointly regulate fishing in such water bodies under existing laws to support the forest conservation activities. Net revenue from the fishing rights should be used to develop forest resources around the water body and for the development of adjoining villages.

13.3.10 Local communities through JFMCs and Village Protection Committees (VPCs) should have the first charge over the fishing rights provided members of these committees themselves carry out the fishing.

Areas under submergence are legally the Reserved or Protected Forests, cultivation shall not be allowed on such land.

13.3.11 Areas found eligible for regularisation of forest encroachment: The Government of Maharashtra had decided to regularise forest encroachments of the period of 1972–1978 in favour of the eligible persons. The process is still incomplete. Forest Department should take up this matter and bring it to a logical conclusion of either rejecting the claim or issuing the land grants in favour of the eligible persons.

Zudpi Jungle Areas: These areas have been transferred to the division as a part of the land bank to be adjusted against the compensatory afforestation in the future. These areas extend over to 21970.20 ha & it should be maintained in three categories.

1. Category I :- Areas proposed under various projects.
2. Category II :- Areas under plantations.
3. Category III :- Remaining Area.

Category I areas are characterised by blanks and sparse vegetation having few dense patches scattered over entire area. The areas should be 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. Category II areas should be proposed for scheduled cleaning and thinning operations along with other plantations, in case these plantations are successful. The

areas under Category III form the part of land bank intended to be used as areas for compensatory afforestation against future projects.

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 and other authorised village bodies.

13.3.12 Zudpi Jungle areas included in this working circle are prescribed for survey and demarcation as described in the chapter of miscellaneous regulation.

13.3.13 Areas under electric lines: The trees likely to interfere with efficient power transmission may be felled under the provisions of Forest Conservation Act 1980 & government guidelines on receipt of the written request from the Executive Engineer, Maharashtra State Electricity Board.

13.3.14 Areas under the permanent nurseries and central depots: The central nurseries will be used for producing bamboo rhizomes and teak stumps; and non-teak seedlings in poly-pots or root-trainers as required for the plantations. The central depots will be used for sale of timber and bamboo by public auctions. These areas will be strictly protected from fire.

13.3.15 Areas under mining lease: The Range Forest Officer will assess impact of the mining activities on the forest resources every year in the forests falling in 250 metres from the boundary of forest area. Immediate remedial action will be taken up to mitigate the damage. The mining activities should not be allowed unless the prescribed rehabilitation plans and environmental guidelines are followed carefully. The guidelines of Hon'ble Supreme Court in case of mining lease adjacent to forest areas should be verified by Assistant Conservator of Forests every year & report to DCF Gondia in case of any violation of FC Act 1980 or the orders of Hon'ble Supreme Court in the said matter.

13.3.16 Area diverted for non-forestry use: The progress regarding compliance of the conditions for the diversion should be monitored annually. If any project authority consistently defaults on this account, the division should recommend revocation of the diversion order and initiate legal action for violation of forest statutes. Use of diverted forestland for the purpose other than recorded in the diversion order should warrant fresh orders under the provisions of Forest (Conservation) Act, 1980.

CHAPTER XII

PROTECTION WORKING CIRCLE

12.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE:

12.1.01 Protection Working Circle extends over 11763.778 ha in 62 compartments forming 6.79 % of the division area. It includes 8155.267 ha of Reserved Forests, 3608.51 ha of Protected Forests. The allocation of area to this working circle is given in the **Table No. 12.1**.

TABLE No.12.1

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Comtt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Comtt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	0	0	0	0	0	0	0	0	0	0	0
2	Gondia	0	0	0	0	0	0	0	0	0	0	0
3	Goregaon	0	0	0	0	0	0	0	0	0	0	0
4	Amgaon	0	0	0	0	0	0	0	0	0	0	0
5	Salekasa	0	0	4	693.745	0	0	0	0	0	4	693.745
6	North Deori	2	386.5	0	0	0	0	0	0	0	2	386.5
7	South Deori	10	1695.9	3	444.127	0	0	0	0	0	13	2140.027
8	Chichgarh	14	2488.66	6	940.061	0	0	0	0	0	20	3428.721
9	Sadak Arjuni	7	1526.047	3	1079.52	0	0	0	0	0	10	2605.571
10	Nawegaonbandh	0	0	1	344.703	0	0	0	0	0	1	344.703
11	Ghothangaon	0	0	0	0	0	0	0	0	0	0	0
12	Arjuni Morgaon	7	2058.16	1	106.351	0	0	0	0	0	8	2164.511
Total		40	8155.267	18	3608.51	0	0	0	0	0	58	11763.778

12.1.02 Gondia district is known for its major and minor water tanks. The catchment areas of most of these water bodies lie in the forest. To protect these water bodies, their catchments need to be protected with good quality vegetation on it. The majority of the areas, included in this WC, have a submergence of more than 10 ha and catchments of more than 200 ha. It includes various irrigation projects of Gondia Forest Division, besides some small water bodies inside the forest have also been included in this Working Circle.

12.1.03 Protection and soil conservation treatments in these forests is necessary for site protection, preserving the steep and precipitous slopes and reducing silt load to the major dams or water bodies in the division. Following criteria have been used for the allocation of compartments to this working circle:

1. The Compartments having more than half of its areas on the steep slope or in the stream buffer.
2. The Compartments close to the major dams in the catchments having less than half of the area under good forest cover.
3. The Compartments critically close to the major dams necessitating their protection.

12.1.04 Protection and soil conservation treatments in these forests is necessary for site protection, preservation of the steep and precipitous slopes and reduction of silt load to the major dams or water bodies.

12.2 GENERAL CHARACTERS OF THE VEGETATION

12.2.01 The forests covered in this working circle consists of mixed composition of species comprising *Saja, Bija, Dhaora, Tiwas, Tendu, Moha, Garari, Lendia and Teak*. Bamboo occurs at a few places in the middle storey. The species and girth class wise enumeration data is given in the **Table No. 12.2**.

Table No. 12.2 : Species-wise and Girth Class-wise Distribution in the PWC.

Species	g15 30	g31 45	g46 60	g61 75	g76 90	g91 105	g106 120	g121 135	g136 150	g151 up	Total	Basal Area
Ain	1.472	0.952	0.635	0.403	0.321	0.205	0.150	0.076	0.044	0.041	4.298	0.120
Aonla	0.037	0.065	0.071	0.073	0.046	0.020	0.014	0.007	0.003	0.000	0.338	0.012
Behada	0.027	0.030	0.035	0.022	0.035	0.027	0.019	0.009	0.003	0.015	0.222	0.013
Bel	0.009	0.011	0.007	0.013	0.013	0.023	0.010	0.000	0.000	0.000	0.085	0.004
Bhirra	0.440	0.395	0.202	0.131	0.049	0.039	0.025	0.011	0.012	0.005	1.309	0.028
Biba	0.078	0.083	0.061	0.041	0.020	0.016	0.007	0.000	0.002	0.001	0.309	0.008
Bija	0.136	0.124	0.160	0.162	0.207	0.221	0.169	0.099	0.053	0.061	1.392	0.090
Bor/Ber	0.000	0.003	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.010	0.000
Char	0.307	0.358	0.164	0.091	0.041	0.015	0.008	0.001	0.003	0.000	0.988	0.017
Chichwa	0.034	0.042	0.039	0.028	0.013	0.015	0.010	0.014	0.003	0.005	0.202	0.009
Dhaman	0.036	0.068	0.031	0.030	0.017	0.000	0.000	0.000	0.000	0.000	0.182	0.004
Dhawada	0.908	0.624	0.315	0.213	0.167	0.115	0.085	0.035	0.023	0.035	2.520	0.068
Garadi	2.174	1.494	1.000	0.560	0.273	0.089	0.051	0.015	0.003	0.003	5.663	0.099
Haldu	0.021	0.025	0.022	0.019	0.011	0.015	0.015	0.009	0.003	0.020	0.160	0.010
Hirda	0.115	0.077	0.023	0.040	0.033	0.010	0.008	0.006	0.003	0.003	0.318	0.009
Kalam	0.012	0.024	0.018	0.012	0.017	0.017	0.015	0.003	0.007	0.003	0.129	0.007
Kasai	0.052	0.044	0.069	0.057	0.044	0.011	0.009	0.004	0.002	0.005	0.298	0.011
Khair	0.017	0.096	0.035	0.023	0.007	0.001	0.000	0.000	0.000	0.000	0.179	0.003
Kulu	0.000	0.000	0.000	0.000	0.000	0.003	0.006	0.000	0.000	0.000	0.010	0.001
Lendia	1.153	0.469	0.238	0.117	0.093	0.051	0.021	0.009	0.006	0.005	2.162	0.034
Moha	0.160	0.136	0.129	0.102	0.096	0.071	0.066	0.044	0.023	0.074	0.902	0.051
Mokha	0.009	0.019	0.008	0.014	0.019	0.007	0.007	0.003	0.005	0.000	0.090	0.004
Mowai	0.137	0.174	0.133	0.137	0.127	0.090	0.058	0.023	0.011	0.009	0.900	0.037
Other	1.71	1.29	0.80	0.49	0.32	0.19	0.12	0.09	0.06	0.18	5.26	0.16
Palas	0.307	0.246	0.137	0.075	0.086	0.036	0.017	0.012	0.006	0.003	0.924	0.022
Rohan	0.166	0.218	0.165	0.104	0.088	0.037	0.015	0.010	0.005	0.000	0.809	0.022
Salai	0.033	0.026	0.025	0.027	0.053	0.057	0.048	0.037	0.016	0.039	0.361	0.029
Semal	0.000	0.011	0.003	0.008	0.010	0.003	0.010	0.011	0.000	0.006	0.063	0.005
Shisham	0.009	0.018	0.014	0.009	0.007	0.002	0.002	0.003	0.000	0.001	0.066	0.002
Shiwan	0.007	0.009	0.002	0.004	0.001	0.004	0.001	0.000	0.000	0.000	0.027	0.001
Surya	0.124	0.192	0.114	0.170	0.115	0.068	0.031	0.019	0.006	0.005	0.844	0.031
Teak	1.900	0.931	0.361	0.192	0.067	0.020	0.019	0.014	0.005	0.007	3.516	0.045
Tendu	0.466	0.101	0.031	0.034	0.036	0.025	0.021	0.015	0.003	0.007	0.739	0.015
Tiwas	0.007	0.029	0.012	0.038	0.027	0.025	0.016	0.003	0.003	0.006	0.167	0.009
Total	12.060	8.386	5.064	3.445	2.461	1.525	1.056	0.587	0.316	0.537	35.435	0.980

12.2.02 The site quality of the crop varies from IV to III. The quality is generally IVB in the upper slopes and IVA in the lower slopes. At few places, quality III is found on the planes, along streams and valleys. The density of crop generally varies from 0.3 to 0.7.

12.2.03 On the basis of enumeration results the species composition and their girth distribution in the forest areas under this working circle is given in the **Table No. 12.1**.

12.2.04 Natural Regeneration of common species is inadequate & their establishment failed in most of the places due to uncontrolled grazing and fire. The coppice regenerations of some species are found in the catchments areas, however, at places, its growth is malformed and stunted due to excessive grazing pressure, repeated hacking by the local people and regular fire.

12.2.05 Soil erosion is noticed all over the forest areas of the 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, lowers 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 increased due to excess harvesting of coupes without soil conservation works in the next year of felling, excessive grazing and repeated fires.

12.2.06 The details of the compartments included in this Working Circle has been provided in the **Appendix No. XLIV**.

12.3 SPECIAL OBJECTIVES OF MANAGEMENT.:

12.3.01 The special objectives of management of Protection Working Circle are:-

1. To protect the fragile forest sites and to reduce the silt load on the water bodies, by preventing the siltation of the dams and water bodies by checking the soil erosion in the catchment areas falling in the forests, by maintaining good vegetation and by taking soil and water conservation measures.
2. To preserve and increase the vegetal cover and to help to enhance the quantity and quality of water of this tract.
3. To develop and optimise the natural biodiversity, wildlife and aesthetic value of these areas. This is aimed to cater the nature and wildlife conservation and education through Eco-Tourism.

12.3.02 The irrigation dams and other water bodies are the life line of the agriculture in Gondia district. They play a crucial role in the development and wellbeing of the people of this tract. To check the soil erosion (siltation) and to arrest the water runoff, by maintaining very good and healthy vegetation and by taking proper soil and water conservation measures in the catchments is must for conservation of forests in the tract. This would help to increase the longevity of these water bodies.

12.4 ANALYSIS AND VALUATION OF THE CROP:

12.4.01 Stock Mapping: The stock mapping has been done by SOFR unit Amravati with the help of staff of Gondia Forest Division. Entire area under this working plan has been stock-mapped; the results of stock mapping have been given in the **Appendix No. LVI**.

12.4.02 Age and Density: The crop is mostly middle aged with scattered patches of mature and young crop. The density of the crop varies from 0.2 to 0.6 with some patches of open and degraded forest.

12.4.03 Site Quality: The site quality of the crop varies from IVA to IVB at few patches and some area of quality III is found on the plains. The information from the previous working plan has been used to delineate and digitise the various site quality classes.

12.4.04 Enumeration: Enumeration has been carried out & results have been given in **Appendix No. XXXII**. Inventory works include complete enumeration of species and girth distribution of all trees, regeneration and recording of site quality and density.

12.5 METHOD OF TREATMENTS:

12.5.01 To check the soil erosion, to improve the stocking in the under stocked area and to improve the habitat for wildlife, the following measures are proposed:

1. Silvicultural system is proposed on the pattern of *Ridge to Valley Watershed Management System*. In the eroded areas, areas prone to erosion, gullies and small nalas, appropriate soil and moisture conservation works, along with afforestation, should be taken to prevent further soil erosion, siltation of reservoirs and to enhance the vegetation cover and ground water table. Areas of each catchment should be treated as a unit.
2. No harvesting is proposed in the areas. Wind fallen trees of valuable species only should be extracted.
3. These areas are proposed to receive strict protection from grazing and fire and unwanted human interference.

12.05.02 As a matter of fact vegetative cover provides best protection to the soil and for these dibbling of seeds of suitable species in under stocked and blank areas will be done on planned basis and result of such a works will be evaluated in the following years.

12.6 FORMATION OF TREATMENT SERIES AND COUPES:

- **Working Cycle:** Treatment cycle is fixed at 20 years.
- **Treatment Series and Annual Coupes:** The area under this working circle is divided into 5 treatment series with an average area of 2352.75 ha for each treatment series. Each treatment series is further divided into 20 annual coupes with an average area of 117.63 ha. The statement showing the allotment of compartments to the treatment series and their sequence of working is given in **Appendix No. XLVI**.

12.7 METHOD OF TREATMENTS:

Demarcation, Preparation of Treatment Maps and Treatments:

- The Range Forest Officer shall inspect the coupe thoroughly then after proper demarcation, prepare the *Treatment Map* of the coupe, showing the various *Treatment Type areas*, on the compartment maps. The Assistant Conservator of Forests will check the treatment map and will make corrections in the map, if necessary. The Deputy Conservator of Forests will approve the treatment maps after careful examination.
- The treatment map will bear date of inspection, signature and official seal of the Range Forest Officer and the Assistant Conservator of Forests.

- The Treatment map will show the following areas for appropriate treatment :

Treatments Prescribed: The treatments prescribed for various treatment-type areas shall be, as follows:

A- Type Areas:

- i. **Harvesting of Trees:** No harvesting of trees is recommended in these areas except wind fallen trees of valuable species.
- ii. **Soil and Moisture Conservation:** Soil and moisture conservation works, as prescribed in the chapter of Miscellaneous Regulations shall be taken in A3 type areas.
- iii. **Bush Sowing:** Bush sowing of *Khair*, *Neem*, *Maharukh*, *Sandal*, *Babool*, *Ber* and *other local seeds* is to be carried out in the areas. Any one species should not constitute more than 25% of the total species.
- iv. **Stake planting:** Stakes of *Ficus* spp., *Pangara*, *Salai* or other suitable species will be planted at six-meter interval in the areas with sufficient moisture for these stakes.
- v. **Plantations:** If a suitable area, not less than 5 ha, is available, plantations of suitable miscellaneous species and Bamboo as per Miscellaneous Regulations shall be carried out.

B- Type Areas: Under-stocked and Open Areas: Treatments Prescribed:

i. Tending of Natural Regeneration :

- a. **Regeneration of Seed Origin: Seedlings and Saplings:** All seedlings and saplings of desirable species, more than 60 cm in height, will be nursed as future crop. Spacing out operation will be carried out, to maintain 400 saplings per ha at an average spacing of 5 m. These saplings will be nursed by carrying out soil working and mulching for the next three years as it is prescribed in the SCI Working Circle.
- b. **Tending of Root Stock:** Operations like Singling of coppice shoots and Management of damaged and malformed saplings will be carried out as prescribed in the SCI Working Circle.
- ii. No harvesting is recommended in these areas.
- iii. Required Soil & Moisture Conservation Works, like nala bunding, gully plugging, grass plantation etc. will be carried out.
- iv. Seed sowing of species like Babul, Neem, Khair, Sandal etc. will be carried out in areas where density of forest is less than 0.40.
- v. Plantation of suitable species will be carried out if an area, not less than 5 ha of degraded or open forest (excluding natural blanks), is available.

C Type Areas: Young Pole Crops:

- i. Thinning:** In case the crop is very congested (including congested Bamboo clumps not covered under Bamboo (OL) working circle) and adversely affecting the growth and health of the crop, the required thinning will be carried out as per the thinning guidelines in the Miscellaneous Regulations.
- ii.** No Plantation in this area will be taken.

D Type Areas: Well Stocked Areas:

- i. Harvesting:** No harvesting, except of dead trees, will be done.
- ii.** Suitable soil and moisture conservation works, if required, will be taken in the erosion prone areas.
- iii.** No plantation is recommended.

12.8 MARKING RULES AND PRESCRIPTIONS

12.8.01 Marking technique and prescriptions described in the chapter of the Miscellaneous Regulations shall be followed.

12.8.02 Marking shall be carried out under the close supervision of the RFO and under guidance of ACF concerned.

12.8.03 As all treatment type areas have been prescribed A-type treatment. Thus, the following, rules shall be observed for marking the trees;

A Type Areas: Protection Areas: No tree shall be marked for felling.

12.9 METHODS OF REGENERATION

12.9.01 Tending of NR and rootstock management as prescribed in the chapter of Miscellaneous Regulations will be given preference over plantations.

12.9.02 The plantation will be restricted to the best sites of the B2-type areas. The one-stage plantation approach as described in chapter on Miscellaneous Regulations is prescribed for plantations on these areas. Suitable miscellaneous species and bamboo plantations on suitable areas will be carried out.

12.10 GRAZING CLOSURE, FIRE PROTECTION AND OTHER REGULATIONS

12.10.01 Protection from fire and grazing is essential for success of natural and artificial regeneration. Following measures will be taken in this working circle

1. To protect the natural and artificial regeneration and to reduce the rate of soil erosion, leading to siltation of water bodies, protection from fire and grazing is essential.
2. Grazing closure will be enforced in the entire areas.
3. The entire area will be provided with Class-I fire line protection.
4. No new roads will be constructed in the Protection working circle areas. Cross-drains at appropriate interval should be maintained.

5. Five-year protection from the plantation year will be provided to all plantations.

12.11 MONITORING OF THE CATCHMENT AREAS:

12.11.01 As the catchments are very important for the water bodies, the results of the treatments given to these areas need to be monitored. The D.C.F with the help of Irrigation department will develop a monitoring system to assess the result of the implementation of the treatments prescribed in the plan. The main objective of the monitoring will be the quality of water and the quantity of silt in it, going to the water, bodies and the state of vegetation in this Working Circle. All these records will be provided to the Working Plan Officer as this assessment will be useful for the future planning of theses catchment areas.

CHAPTER XI

AFFORESTATION WORKING CIRCLE

11.1 GENERAL CONSTITUTION OF THE WORKING CIRCLE:

11.1.01 The open forest areas having density less than 0.4 and with rootstock and shrubby growth as well as open forests without rootstock, where artificial regeneration appears necessary to restore productivity, are included in this working circle.

11.1.02 It includes a bulk of the old Afforestation Working Circle and sizeable area of Coppice With Reserve Working Circles of previous plans. Most of these areas are located in the immediate vicinity of the villages and under very heavy pressure of grazing, which is the main reason for their deterioration.

11.1.03 Based on results of enumeration results, vegetation pattern decipherable in the satellite imageries & basal area per ha, compartments have been allotted to this working circle. The following criteria have been used for allocation of compartments to the Afforestation Working Circle:

1. Compartments having blank areas.
2. Compartments having poor quality open forests (degraded forests), which need some tending operations to become productive.
3. Compartments showing potential for natural regeneration indicated by the presence of good shrubby vegetation & rootstock.
4. Compartments having large proportion of area under forest blanks and have less than 5 sqm per ha basal area.
5. Compartments showing potential for natural regeneration indicated by the presence of good shrubby vegetation

11.1.04 Natural regeneration of common species is present but its extent is far from being adequate. 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 but die-back without getting established. Due to excessive grazing, fires and refractory nature of areas establishment of NR is very poor and issue of concern for the department.

11.1.05 The Afforestation Working Circle constitutes about 21.44 % of the forest areas of the division. It includes 37132.424 ha of the forest areas comprising of Reserved Forest to the extent of 6092.154 ha, Protected Forests 29262.69 ha including Gose PF and Unclassed Forest 1777.58

ha. The Compartment and Village wise area of this working circle allotted to various Ranges is shown in the **Table No. 11.1**

Table No. 11: Compartments Allotted to Afforestation Working Circle.

S.N.	Name of the Range	RF + NRF (Total Comp.)	RF + NRF Area (in ha.)	PF + Gose PF (Total Commt.)	PF + Gose PF Area (in ha.)	Zudpi Jangal (Total Commt.)	Zudpi Jangal Area (in ha)	UN (Total Comp.)	Un- Classed Area (in ha.)	Private Land 1980	Total Comptt.	Total (in ha.)
1	Tiroda	0	0	7	664.344	0	0	0	0	0	7	664.344
2	Gondia	3	290.02	19	2740.205	0	0	0	0	0	22	3030.225
3	Goregaon	4	602.3	24	3399.025	0	0	3	827.677	0	31	4829.002
4	Amgaon	2	209.9	24	2599.14	0	0	0	0	0	26	2809.038
5	Salekasa	5	975	20	1843.07	0	0	0	0	0	25	2818.072
6	North Deori	0	0	27	3722.09	0	0	0	0	0	27	3722.088
7	South Deori	0	0	7	513.106	0	0	0	0	0	7	513.106
8	Chichgarh	0	0	9	1650.47	0	0	0	0	0	9	1650.466
9	Sadak Arjuni	8	1728.234	39	5174.71	0	0	4	586.454	0	51	7489.395
10	Nawegaonbandh	2	629.14	13	1002.56	0	0	2	182.551	0	17	1814.249
11	Ghothangaon	5	242.4	10	2014.14	0	0	1	180.895	0	16	2437.432
12	Arjuni Morgaon	7	1415.16	28	3939.85	0	0	0	0	0	35	5355.007
	Total	36	6092.154	227	29262.7	0	0	10	1777.58	0	273	37132.424

11.2 GENERAL CHARACTER OF THE VEGETATION:

11.2.01 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*, *Kuda*, *Dikamali*, etc. are the common thorny or brushwood species. *Tarota*, *Gokhru* and *Rantulsi* are the common weeds. *Lantana* has infested in many places. At places *Parthenium* has also been noticed. The allotted areas in general are highly degraded, under stocked and open with crop density usually less than 0.4, though patches of better stocked areas are also found, in some compartments. The PF areas allotted to this WC, especially, those near the habitations, are degraded to the extreme condition and lays bare without any significant tree crop.

11.2.02 The crop consists mainly of scattered trees or patches of open forests. The principal species is *Teak*, *Saja* and its common associates are *Dhaoda*, *Bhirra*, *Rohan*, *Tendu*, *Lendia*, *Salai*, *Mowai*, *Char*, and *Palas*, etc. *Arjun*, *Jamun* and *Ficus* are found along the streams. (**Table 11.2**). The dominant site quality is IV. The canopy density of the vegetation varies from blank to 0.4. The crop is generally young with occasional middle aged or mature trees. Natural regeneration of common species is very less due to compactness of soil because of uncontrolled grazing & fire and hence their establishment is poor.

Table No.11.2: Species and Girth-wise Distribution in Afforestation Working Circle.*(Source : Enumeration Data)*

Species	g15 30	g31 45	g46 60	g61 75	g76 90	g91 105	g106 120	g121 135	g136 150	g151 up	Total	Basal Area
Ain	2.446	1.194	0.434	0.319	0.206	0.130	0.118	0.074	0.036	0.059	5.017	0.106
Aonla	0.145	0.059	0.030	0.024	0.018	0.016	0.003	0.000	0.001	0.000	0.297	0.006
Behada	0.077	0.099	0.046	0.027	0.020	0.010	0.006	0.000	0.001	0.006	0.292	0.007
Bel	0.099	0.076	0.019	0.014	0.013	0.001	0.002	0.011	0.000	0.000	0.234	0.005
Bhirra	0.797	0.526	0.272	0.150	0.092	0.047	0.014	0.010	0.004	0.008	1.919	0.034
Biba	0.087	0.073	0.026	0.008	0.019	0.003	0.005	0.005	0.000	0.000	0.226	0.005
Bija	0.471	0.199	0.130	0.106	0.123	0.096	0.112	0.085	0.024	0.056	1.401	0.062
Bor/Ber	0.026	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.000
Char	1.424	0.706	0.293	0.082	0.051	0.008	0.012	0.002	0.000	0.000	2.578	0.029
Chichwa	0.059	0.070	0.058	0.031	0.020	0.015	0.004	0.001	0.000	0.001	0.258	0.006
Dhaman	0.023	0.009	0.010	0.009	0.016	0.001	0.000	0.000	0.000	0.000	0.066	0.002
Dhawada	2.134	0.975	0.359	0.178	0.126	0.066	0.081	0.045	0.007	0.033	4.004	0.068
Garadi	1.446	0.610	0.337	0.132	0.071	0.026	0.011	0.004	0.000	0.001	2.638	0.033
Haldu	0.006	0.013	0.015	0.016	0.010	0.000	0.005	0.003	0.016	0.015	0.099	0.008
Hirda	0.209	0.037	0.015	0.015	0.011	0.006	0.006	0.003	0.005	0.006	0.314	0.006
Kalam	0.099	0.023	0.003	0.009	0.007	0.008	0.001	0.000	0.000	0.000	0.151	0.002
Kasai	0.059	0.060	0.081	0.079	0.043	0.003	0.004	0.001	0.000	0.003	0.333	0.009
Khair	0.303	0.120	0.088	0.032	0.019	0.000	0.000	0.000	0.000	0.000	0.562	0.007
Kulu	0.004	0.006	0.002	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.018	0.000
Lendia	2.682	1.044	0.405	0.223	0.186	0.126	0.021	0.004	0.000	0.002	4.694	0.064
Moha	1.211	0.717	0.190	0.107	0.048	0.049	0.033	0.039	0.050	0.124	2.569	0.069
Mokha	0.008	0.011	0.022	0.006	0.000	0.002	0.001	0.005	0.004	0.000	0.060	0.003
Mowai	0.415	0.225	0.183	0.143	0.126	0.066	0.037	0.035	0.004	0.016	1.249	0.038
Other	3.14	1.23	0.66	0.38	0.25	0.12	0.07	0.04	0.03	0.07	5.99	0.11
Palas	1.146	0.405	0.284	0.151	0.072	0.033	0.019	0.006	0.011	0.011	2.137	0.034
Rohan	0.436	0.222	0.118	0.069	0.036	0.006	0.007	0.001	0.000	0.000	0.897	0.013
Salai	0.031	0.061	0.051	0.054	0.052	0.040	0.011	0.017	0.010	0.024	0.351	0.020
Semal	0.039	0.026	0.020	0.027	0.017	0.005	0.003	0.003	0.003	0.006	0.150	0.006
Shisham	0.025	0.016	0.010	0.005	0.008	0.000	0.000	0.000	0.000	0.000	0.065	0.001
Shiwan	0.036	0.030	0.022	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.092	0.001
Surya	0.181	0.209	0.116	0.087	0.044	0.017	0.019	0.000	0.000	0.000	0.673	0.015
Teak	5.203	2.221	0.548	0.160	0.077	0.024	0.010	0.003	0.005	0.009	8.260	0.076
Tendu	1.007	0.202	0.084	0.042	0.018	0.011	0.004	0.003	0.001	0.006	1.379	0.014
Tiwas	0.023	0.031	0.024	0.047	0.025	0.007	0.006	0.001	0.002	0.005	0.171	0.007
Total	25.494	11.502	4.948	2.744	1.829	0.940	0.627	0.402	0.216	0.461	49.163	0.866

11.3 BLOCKS AND COMPARTMENTS: Details of Blocks and compartments allotted to this working circle have been given in **Appendix No. XLI**.

11.4. SPECIAL OBJECTIVES OF MANAGEMENT:

11.4.01 The special objective of management of this working circle is to restore the vegetative cover of these degraded and open areas, primarily, by tending of existing natural regeneration and rootstock and supplementing it with plantations, wherever, necessary. The term *afforestation* includes *reforestation and rootstock management* for the purpose of this working circle.

11.4.02 The site protection will induce natural regeneration; and tending operations will lead to improvement and establishment of existing saplings, rootstock and poles. The successful results would provide services of the life-support system, along with providing small timber, poles and firewood to meet *bona fide* future needs of the local people, including the *nistar*.

11.4.03 The special objects of management of this working circle are, as follows:

1. To restore the vegetative cover of the degraded and open areas.
2. To increase their productivity by site protection and tending of natural regeneration and rootstock, supplementing it with plantations of desired species, wherever, necessary, preferable through JFM.

3. 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.
4. To meet the local demands of fuel wood, small timber and poles through active involvement of Gram Panchayats and other village institutions.
5. To improve the habitat of wild animals and birds.

11.5 ANALYSIS AND VALUATION OF THE CROP:

Stock Mapping: The stock mapping has been done by the territorial staff of Gondia Division and the results are given in **Appendix No. LVI**.

- **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.
- **Site Quality:** Site quality governs the harvestable girth. The information from the previous plan has been used to delineate and digitise the various site quality classes. Site quality wise area distribution is given in table below:
- **Enumeration:** Most of the areas under this Working Circle are degraded with little vegetation growth. It includes complete enumeration of species and girth distribution of all trees, regeneration and recording of site quality and density. Analysis of the data collected from these sample plots is given in **Appendix No. XXXII**.

11.6 SILVICULTURAL SYSTEM:

11.6.01 The area will be regenerated with Teak, Miscellaneous tree species and Bamboos. No harvesting is required in this working circle. Only improvement felling and tending of existing natural regeneration, i.e. the saplings, coppice shoots and poles, will be carried out and if the NR is absent it will be supplemented by plantations, would be the main activities in this working circle.

11.6.02 Large areas of this working circle have inadequate sub-soil moisture, highly compact soil structure and heavy biotic pressure. These are the main limiting factors for the establishment of seedlings in this area. Top soil has been washed away and as a result vast areas do not have even adequate soil-depth to support tree crop. As a consequence, a large chunk of these areas lay bare without any significant vegetation. Hence, intensive soil and moisture conservation measures and tending of existing rootstock have been proposed to be given priority over plantation.

11.6.03 In addition, concept of '*Ecological Index*' has been proposed for deciding the number of seedlings to be planted per hectare, over the traditional method of planting based only on *soil-depth zonation approach*. Ecological Index of a site gives an idea as to number of plants which could be sustained per hectare on a particular site depending upon the various locality factors of

the area. It is based upon the climatic and edaphic conditions prevailing in the area and is determined by the formula, as follows:

$$\text{Ecological Index} = P \times D / Tr \times EPT$$

Where,

P = Annual precipitation in mm.

D = Number of rainy days in a year.

Tr = Range of maximum temperature averages.

EPT = Potential Evapo-transpiration in mm.

11.6.04 There is no need for planting more seedlings per ha than those could be sustained on a particular site. The emphasis is to grow the optimum number of seedlings per ha, which should grow into a healthy future stock with little mortality. Ecological Index for these areas is calculated on the basis of data of *Bhandara* to determine the number seedlings to be planted per hectare in these areas. *The ecological index for Gondia division is 13.15. Therefore, 2500 seedlings per hectare shall be planted in these areas.* A sample calculation of the Ecological Index has been shown in the **Appendix No. XLIX**.

11.7 CHOICE OF SPECIES:

- i. Valuable local species suitable for the site and favoured by the local village communities will be preferred in plantations. *Teak, Shisham, Khair, Shiwan, Sissoo, Siras, Kullu, Karanj, Chichwa, Aonla, Chinch, Neem, Babul, Sitaphal, Jamun, Karnaj, etc.* shall be considered. Seedlings of NTFP including, edible fruit-yielding forest species and medicinal plants may constitute up to 10 percent of the plantation. For the benefit of wildlife, *Ficus* species (2 seedlings per ha) shall also be used in plantations. An officer not below the rank of Assistant Conservator of Forests in consultation with the Dy. Conservator of Forests will approve the final choice of species. The broad information of different species growing in different Types of soil conditions is given in **Appendix No. XLIX**.
- ii. Mixed species plantations should include up to 50 % of Teak and fairly good proportion of timber, fodder, firewood fruits and MFP yielding species as mentioned in the above para.
- iii. Bamboo plantation should also be taken on suitable land but with a precaution that it should not suppress other valuable species. In case of bamboo plantation in Teak or misc. plantations, it should be taken in the sixth year of the previous plantations (Teak or Mixed).
- iv. Nurseries of Root Trainer/Poly pots should be raised in the previous financial year just after monsoon.

- v. Seedlings of species like Neem, Jamun, etc. should be raised on the mother beds during the rainy season and subsequently transferred to poly-pots.
- vi. Seedlings of slow growing species like *Bija*, *Haldu*, *Mahua*, *Hirda* etc. should be planted after two monsoons.
- vii. Bamboo seeds should also be sown on the mother beds. The rhizomes should be transplanted on the same bed for at least twice then after one year they should be transplanted to poly pots of suitable size. Seed sowing directly in the pots should be avoided as it may lead to a clump with more than one species.
- viii. Seeds of all planting stock must be from a known healthy source and it should be recorded in the seed register of the nursery as well as the concerned plantation registers.

11.8 FELLING CYCLE, SERIES AND ANNUAL COUPES:

1. **Felling Cycle:** The treatment cycle for this working circle has been fixed at 20 (twenty) years.
2. **Felling Series and Annual Coupes:** The areas of RF, PF & Un-classed forest have been allotted to 19 felling series with an average area of 1954.33 ha. Each felling series has been further divided into 20 (twenty) annual coupes with an average area of 97.71 ha. Details of the felling series, coupes & sequence of working in this working circle have been given in the **Appendix No. XLII and XLIII**.
3. **Regulation of Yield:** No yield is prescribed for this working circle. The treatment will be regulated by area. The Dy. Conservator of Forests, Gondia should instruct the Forest Guards to make entry of all the produce, like grass, fodder, fuel-wood etc. into the plantation registers.

11.9 DEMARCATION, TREATMENT MAPS AND PRESCRIPTIONS:

11.9.01 The demarcation of coupe will be carried out, along with other coupes, as per the prescriptions mentioned in the chapter of Miscellaneous Regulations.

11.9.02 TREATMENT MAP: Delineation of areas falling under various treatment Types will be mentioned in the treatment maps under the following general guidelines:

1. 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: steep slope**. Smaller areas of steep slope, even if not marked on the map, will also receive the prescribed treatment.
2. 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 water bodies and tanks.
3. The **A3-Type (excessive erosion prone)** includes seasonally flooded areas.

4. In **B-Type** areas the crop is degraded and open. Natural regeneration would be considered adequate if at least 400 good established saplings per hectare are present. The same criterion will be applied for the rootstock. **B1-Type** will include the areas with sufficient Natural Regeneration, whereas **B2-Type** will include degraded lands without sufficient Natural Regeneration.
5. The **C-Type areas** would include groups of naturally grown poles of 15 to 45 cm GBH and old plantations.
6. The **D-Type areas** have dense vegetation and need proper treatment if found.

11.9.03 PREPARATION OF TREATMENT MAPS: The Range Forest Officer shall prepare the Treatment Map of the coupe after a thorough inspection of the area, showing the various Treatment Type areas. The Assistant Conservator of Forests will check the treatment map and will make corrections in the map, if necessary. The Deputy Conservator of Forests will approve the treatment maps after careful examination.

The treatment maps will bear date of inspection by the Range Forest Officer and the Assistant Conservator of Forests under their official seals and signatures.

11.9.04 TREATMENTS PRESCRIBED: The treatment prescribed for various treatment-Type areas are as follows:

A- Type Areas: Protection 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 **A1** and **A3-Type** areas. Such works may be taken up in the **A2-Type** areas, if not detrimental to the riparian ecosystem.
- ii) **Regeneration:** Bush sowing of *Khair*, *Neem*, *Maharukh*, *Sandal*, *Babul* and other local seeds is prescribed to be carried out. Any one species should not constitute more than one fourth of the disseminated seeds. A proper coupe wise record should be maintained for the bush sowing operation.

In the **A2** and **A3-Type** areas, 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.

If necessary, plantation of desired miscellaneous species shall be taken on suitable areas.

- iii) **Harvesting Prohibited:** Harvesting of standing trees (dead or alive) is strictly prohibited.

B- Type Areas: Under-stock Areas: These areas are categorised into 2 types:

B1-Type: Land with sufficient Natural Regeneration

B2-Type: Land without sufficient Natural Regeneration

1) Treatments for B1-Type Area: Natural Regeneration Management: Guidelines for the Natural Regeneration Management:

- 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 in favour of valuable species, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5 metre spacing. The natural regeneration shall be assisted and encouraged by soil working and mulching around them, in the following manner. Such identified areas suitable for tending of natural regeneration should be shown on the treatment maps & grid wise recording of such valuable species should be done along with GPS reading.
- ii. Singling of Coppice Shoots:** One healthy and promising coppice shoot will be retained on the stumps and the rest be removed to serve as future crop. However, coppice shoots interfering with promising saplings of seed origin shall be removed. Such coppice shoots should also be close enough to the ground so that it would not topple after gaining volume and weight and would be able to, subsequently, develop root system of its own.
- iii. Coppice Management of Damaged and Malformed Saplings:** The saplings and poles 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.
- iv. Subsequent operation for B1-type of areas:- Seedling of seed origin will be given preference.**
 - a. First year Operations:** Weeds in one-meter diameter around saplings of valuable species shall be cleared during the first week of July. Uprooted weed, grasses and leaf-litter shall be mixed in the upper layer of soil as the organic mulch to facilitate loosening and aeration of the soil by worms and insects. One soil working will be carried out in October.
 - b. Second year Operations:** The soil working in October will be repeated in the following year. However, one scrape weeding of one-meter diameter will be carried out in the first week of August around the seedlings.
 - c. Third year Operations:** Singling of coppice shoots, climber cutting and shrub clearance shall be repeated in third year.

2) Treatments for B2-Type Area: Artificial Regeneration (Plantations): Suitable sites of the B2-Type areas shall be brought under Artificial Regeneration. Teak stumps and saplings of suitable miscellaneous species shall be planted as per site suitability. Stump planting of

Teak shall be considered only in areas with well drained soil with crown density less than 0.2. All planting operations shall follow the guidelines described in the chapter of Miscellaneous Regulations.

Local species of Bamboo shall be planted only when the Teak or Miscellaneous species get established and there is no risk of getting suppressed by bamboo clumps.

C & D- Type Areas: Pole Crop and Matured Crop:

1. **Thinning:** Thinning of young and pole crop will be carried out maintaining average spacing of one-third of the crop height in such patches. Thinning is to be carried out as per guidelines prescribed in the miscellaneous regulations.
2. No planting shall be done in these areas.
3. Over matured, malformed and dead trees to be removed
4. **Tending of Natural Regeneration:** Singling and spacing out will be carried out among saplings of Teak and other valuable species. Spacing operations should leave nearly 400 saplings per hectare. The natural regeneration shall be encouraged by soil working and mulching around them as per the chapter of Miscellaneous Regulations.

11.10 METHODS OF REGENERATION:

11.10.01 Natural Regeneration: Natural Regeneration shall be given preference over plantation. The existing NR and rootstock shall be tended as per the prescriptions on Natural Regeneration given in the chapter of Miscellaneous Regulations Management. Plantations shall be taken as a supplementary activity to NR in the under stocked areas.

11.10.02 Tending operations for Natural Regeneration in the D-Type and rootstock management in the B1-Type shall be taken up along with the coupe operations as given in the chapter of Miscellaneous Regulations.

All the operations required for the tending Natural Regeneration shall be carried out in accordance with guidelines given in the chapter of Miscellaneous Regulations.

11.10.03 ARTIFICIAL REGENERATION: Plantations shall be taken only in the B2-Type and A-Type areas of the Afforestation Working Circle having inadequate Natural Regeneration. Plantations are proposed to be undertaken in accordance with the Ecological Index of the site and Plantation Guidelines described in the Chapter of Miscellaneous Regulations. Plantation register is to be maintained as per **Appendix No. LXLVII**. Bamboo plantations should also be given priority and areas suitable for bamboo will be brought under the Bamboo plantation. Necessary precautions should be taken so that no other plantation or young crop of valuable species is suppressed by the planted Bamboo.

Stump planting of Teak shall be considered in areas with crown density less than 0.2 and found suitable for Teak planting. The remaining plantation area will be brought under the

mixed species plantations using suitable species. One Stage Plantation has been proposed for entire Gondia Division.

11.10.04 ROLE OF JFM COMMITTEES : Involvement of the Joint Forest Management Committees, Village Forest Protection Committees, Village Panchayats or other active Village Organisations would be an integral component of all the plantation activities as per Government guidelines for implementation of JFM scheme. The modified guidelines to implement various activities under JFM programme issued by government vide Government Resolution dated 5th October 2011 & 22nd December 2011 should be followed while formulating micro-plan under JFM. These JFM committees should be encouraged and motivated for the protection of the Plantations.

11.11 CLOSURE TO GRAZING AND FIRE PROTECTION:

11.11.01 Protection from fire and grazing is essential for the success of any natural and artificial regeneration.

11.11.02 Plantations will be provided fire protection and complete closure to grazing for 5 years or more as per the provisions in BFM Vol. II depending upon the growth and establishment of seedlings so that when the areas are open for grazing; the established seedlings are beyond the reach of cattle from browsing. The DCF Gondia will examine the area closed for grazing at the end of 5th year operation and decide whether the coupe requires further closure depending upon growth of seedlings and recommend to CCF (T) Nagpur for its further closure for a specific period, so that the seedlings get established.

CHAPTER XXI

THE ESTABLISHMENT AND LABOUR

21.1 THE ESTABLISHMENT

21.1.01 The range, round and beat reorganisation during 2000-2001 was based on the policy of separating protection and development functions at the range-level. However, it was found that the system was not very effective and the Govt. decided to discontinue with this system a new proposal for reorganisation of Bhandara and Gondia Divisions, coinciding with the newly created districts of Gondia and Bhandara district. In the process a proposal was moved to the Government for 12 ranges, 39 rounds and 163 beats in the newly reorganised division. The Government vide letter No. R&F /L.No.FDM-2003/C.R.No.168/F-2, dated 13/04/2007 granted the approval to the reorganisation proposal.

21.1.02 The division has a cadre of 507 'Van Mazdoors', whose nature of duties changes quite frequently. Hence, it is recommended that the Deputy Conservator of Forests, Gondia should identify and assign their services to different schemes for efficient utilisation of their services. Major proportions of the Forest Labourers are engaged in execution of plantation, fire protection.

21.1.03 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 minor children of the field staff.

21.1.04 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.

21.1.05 Training in GIS/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 and even treatment maps. This sort of training can be imparted by working plan office, provided, necessary funds given by territorial division and territorial staff be sent to working plan division regularly for this purpose.

21.1.06 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:

21.2.01 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.

21.2.02 Different forestry operations require about 5,00,000 man days each year. Temporary manpower shortage may be experienced in Gondia division during the paddy transplanting and harvesting seasons. However requirement of labourers can be met from Tahsil offices.

21.2.03 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.

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. Funds will also be required for developing eco-centres and camping facilities for eco-tourists as prescribed in the chapter of Wildlife Management (Overlapping) Working Circle.

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

22.1 COST OF THE PLAN: The cost of preparing this plan is worked out by summing the expenditure incurred from 2010-11 to 2011-12 that amounts to Rs.101.00 Lacs including the cost of enumeration works carried out by SOFR unit, Amravati. The cost of plan per ha worked out is about Rs.58.00 only. The cost of the plan increase by Rs.36.00 Lacs to include the expenditure incurred from March 2012 to July 2012. Thus the total cost of the Plan is Rs.137.00 Lacs.

22.2 COST BENEFIT RATIO OF THE PLAN:

22.2.01 INTANGIBLE BENEFITS: It is an acknowledged fact that forests ecosystems have both the tangible and the intangible benefits to the mankind. They contribute to a great extent in term of intangible benefits. However, it is not easy to assign economic value to the intangible effects of the forests ecosystems. Professor T M Das (1980) has quantified the environmental services, provided by a medium sized tree of 50 tons over a period of 50 years, by assigning notional values by using surrogate market techniques, as given in the **Table 22.1** (Proceedings of the Indian Science Congress, 1980).

**Table No. 22.1 Environmental Benefits Derived From a Medium Sized
Tree of 50 Tons during its 50 Years Life Span**
(Excluding the Value of Timber, Fruits and Flowers)

S. N.	Environmental Benefits	Single tree (Rs. in lac)	Forest Type	
			Tropical (in Rs. lac/ha)	Sub-tropical (in Rs. lac/ha)
1	Oxygen Production	2.50	22.50	20.50
2	Conversion to Animal protein	0.20	1.80	1.64
3	Control of Soil Erosion	2.50	22.50	20.50
4	Recycling of Water & control of humidity	3.00	27.00	24.60
5	Shelter for Birds, Squirrels, Insects etc.	2.50	22.50	20.50
6	Control of Air Pollution	5.00	45.00	41.00
	Total	15.70	141.30	128.74

22.2.02 Thus, according to Professor Das, one ha of subtropical forests accrues environmental benefits of worth Rs.128.74 Lacs over a period of 50 years i.e. benefits of worth Rs. 2.60 Lacs per ha per year.

22.2.03 INTANGIBLE BENEFITS: The forest of Gondia Division having average density 0.5 extend over an area 173178.50 ha. Therefore Its intangible benefits are worth **Rs.2,22,950.00 lac** per year.

22.2.04 TANGIBLE BENEFITS: The tangible benefits accruing from forests are, however, computed in economic terms from various goods and services ensuing from forests. The estimation/forecast of timber, poles, fuel wood, Bamboos, Tendu, gum and other non-wood forest produce accruing from forests is made with reasonable accuracy with the help of yield regulating formulae. In this Plan, major yield of wood will be obtained from the SCI Working Circle. Improvement Working Circle may contribute in form of small timber, fuel and teak beats, to some extent.

23.1.02 The estimated future annual yield and revenue, as part of the tangible benefits derived from the forests, has been given in Table 23.3 (b). The abstract of tangible benefits and costs as a result of this plan is given as follows:

- *Annual estimated expenditure for the prescribed operations = Rs.1100.00 Lacs.**
- *Annual estimated Revenue from the forest, = Rs.1200.00 Lac.*
- *Annual intangible benefits = Rs.222950.00 Lacs.*

Total benefits accrue from the forests of Gondia Division = Rs.224150.00 Lacs per annum

** This amount is excluding Rs.1800.00 Lacs of establishment expenditure.*

Cost- Benefit Ratio is Rs.1100.00 Lacs : 224150.00 Lacs or 1 : 203

Thus, the above Cost-Benefit Ratio favours the scientific management of forests, as prescribed, in this Working Plan.

22.3 REVENUE:

22.3.01 Scientific management of forest permits removal of some trees from some of the working circle as per the prescription of the plan. The major yield obtained from Selection-cum-Improvement working circle. Improvement working circle also contributes to yield. The yield from Afforestation Working circle, Protection working circle & Miscellaneous working circle will be negligible. Yield from thinning has been included under total yield. Among the MFP Tendu will be major produce.

22.3.02 Natural Bamboo is found in the area as well as in the plantations of the Bamboo taken in the past. On average Rs.153.00 Lacs per annum revenue is obtained from the Bamboo during the operation of the plan. The accurate forecast of revenue is not possible as the prices of timber, fuel wood and other forest produce are increasing day by day.

STATE LEVEL COMMITTEE MEETING HELD ON 26th & 27th NOVEMBER 2012.

Ref : Government Resolution Revenue & Forest Department No. MSC- 2004/CR-102/F2, dated 25th June 2004.

With reference to the above mentioned Govt. Resolution, the PWPR-II of Gondia Forest Division was discussed and approved by the Committee under the Chairmanship of The Principal Chief Conservator of Forests (HoFF), M. S. Nagpur.


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Collector,
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Chief Conservator of Forests,
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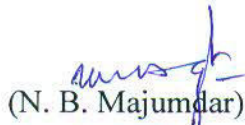
Chief Conservator of Forests (T)
Nagpur


(M. Karunakaran)

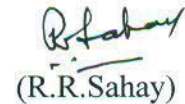
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**Principal Chief Conservator of Forests
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Maharashtra State, Nagpur**

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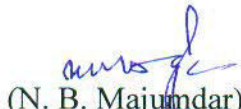
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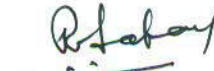
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