

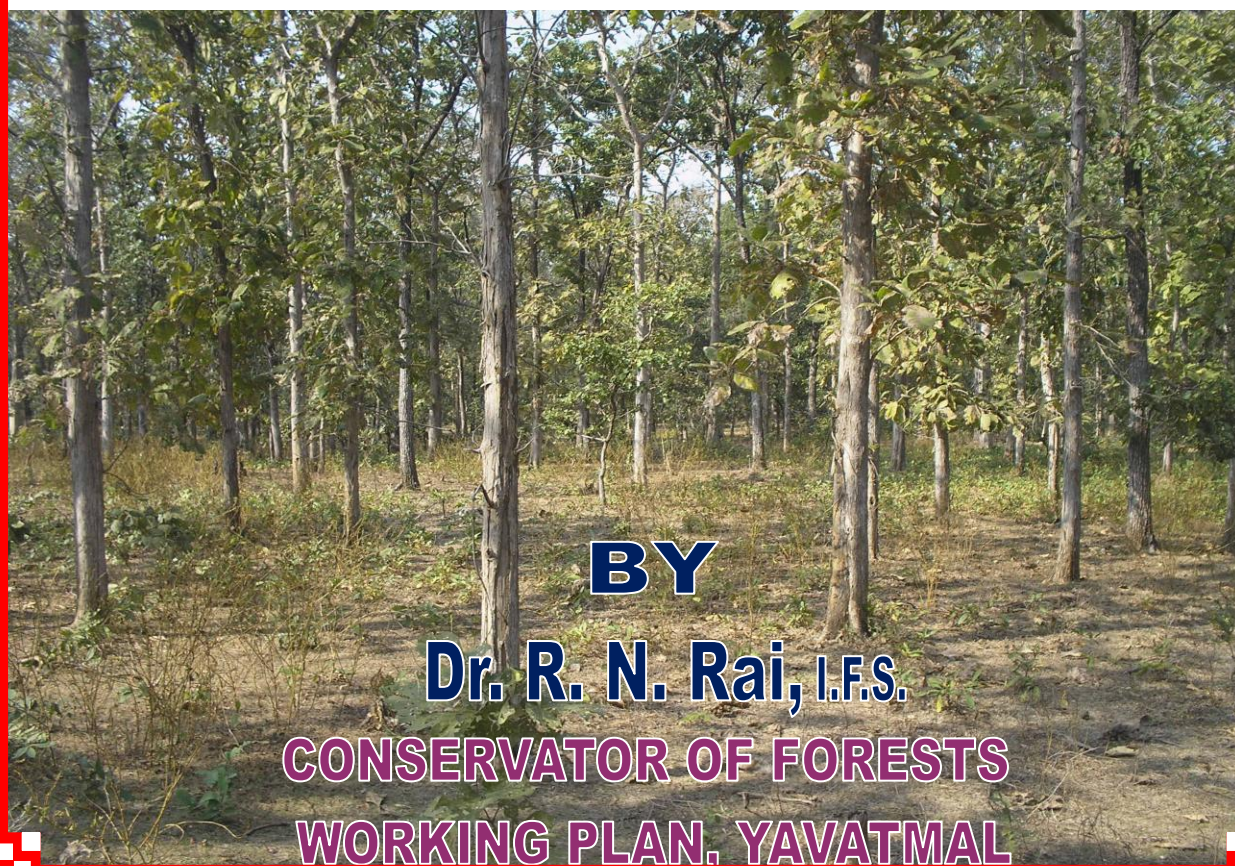


GOVERNMENT OF MAHARASHTRA

WORKING PLAN
FOR THE PERIOD 2013-14 TO 2022-23

VOLUME - I

PANDHARKAWADA FOREST DIVISION
YAVATMAL FOREST CIRCLE



BY

Dr. R. N. Rai, I.F.S.

CONSERVATOR OF FORESTS
WORKING PLAN, YAVATMAL



GOVT OF MAHARASHTRA

WORKING PLAN

FOR

**PANDHARKAWADA FOREST DIVISION
YAVATMAL FOREST CIRCLE**

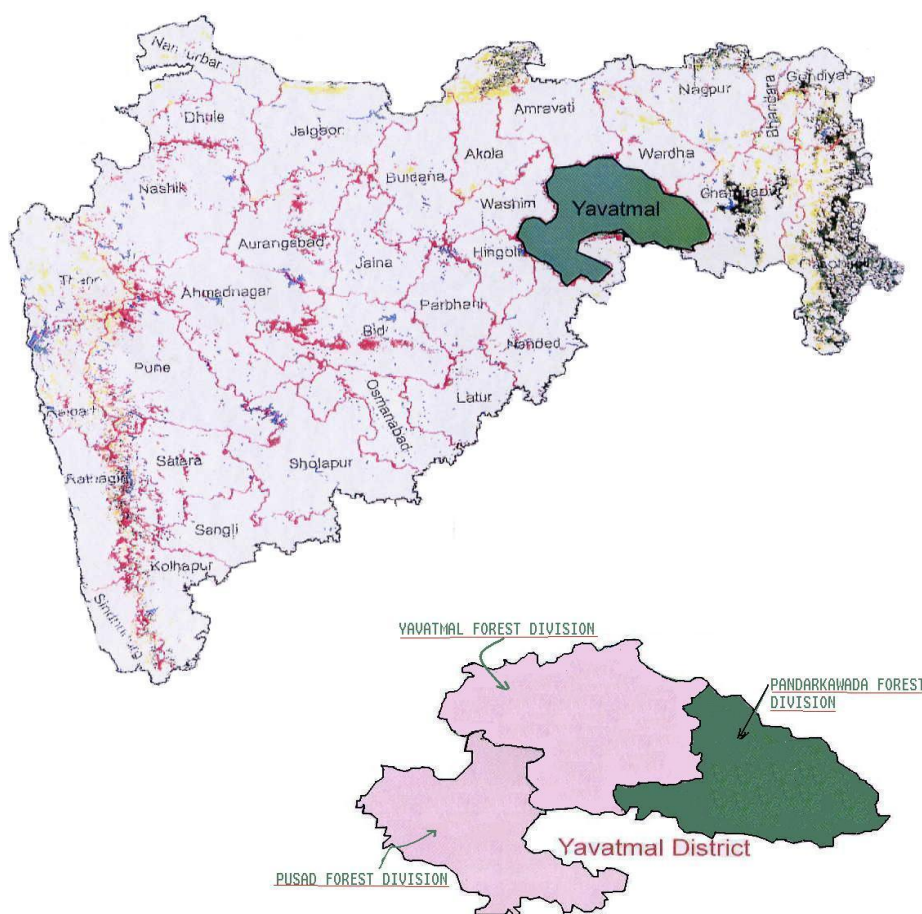
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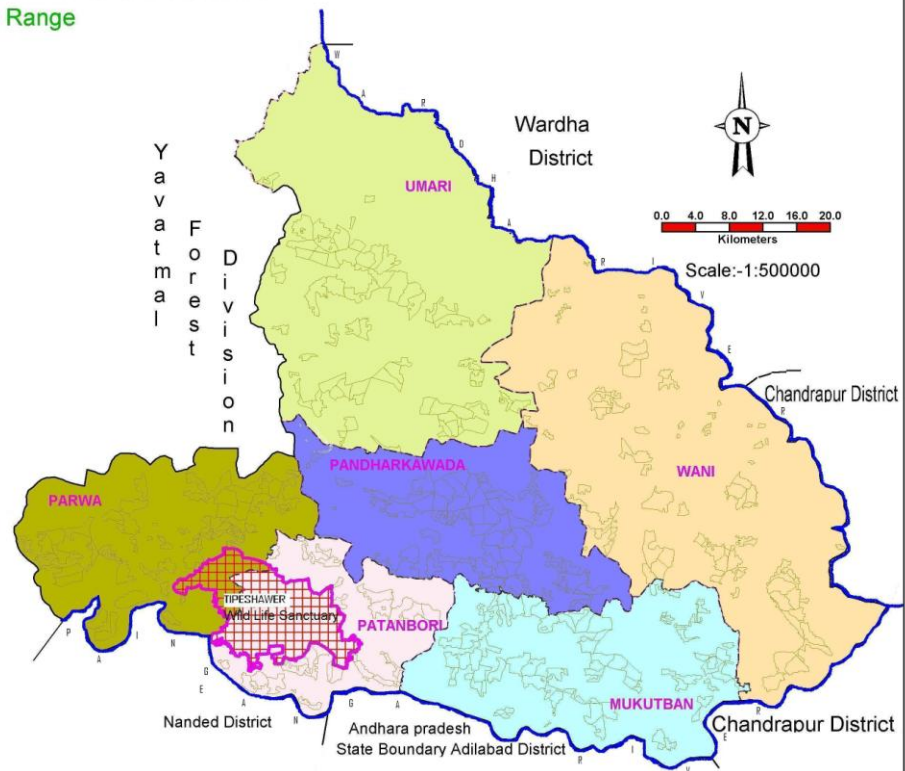
LOCATION OF PANDHARKAWADA FOREST DIVISION

**MAHARASHTRA**

Pandharkawada Forest Division

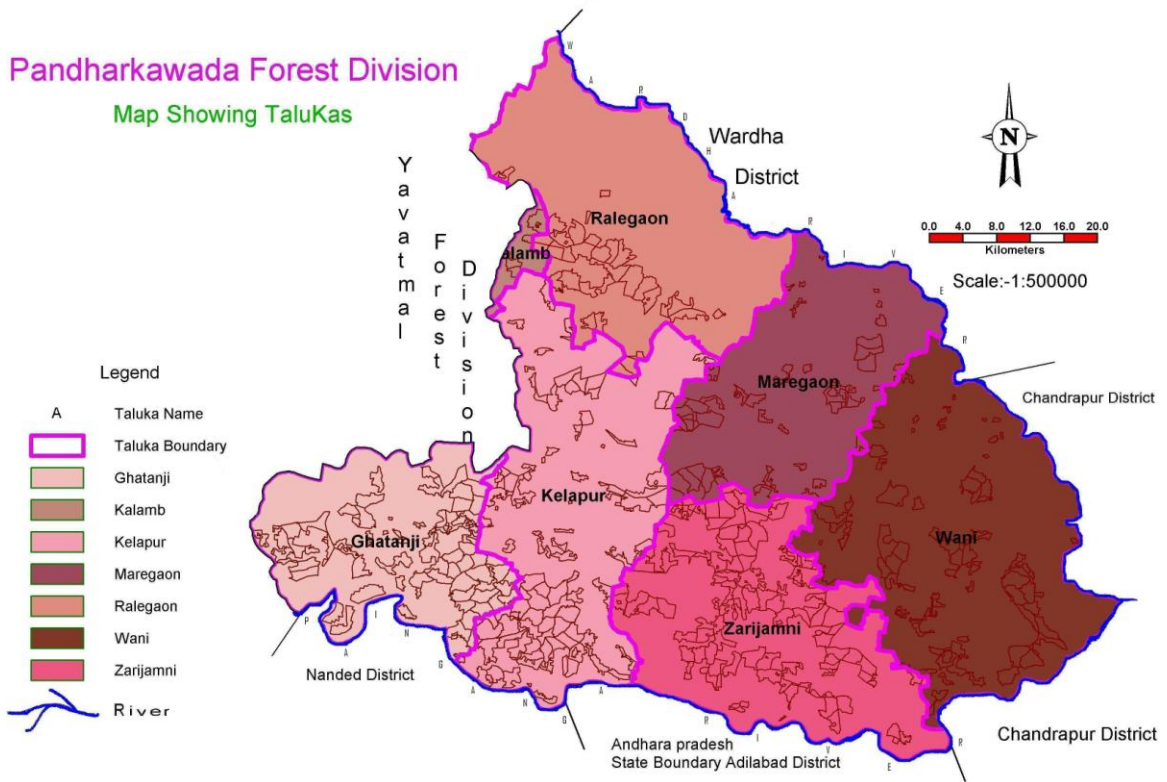
Map Showing Range

- Legend**
- A** Range Name
 -  Comptt boundary
 -  Wild Life Sanctuary
 -  Range boundary
 -  Mukutban Range
 -  Pandharkawada Range
 -  Parwa Range
 -  Patanbori Range
 -  Umari Range
 -  Wani Range
 -  River



Pandharkawada Forest Division

Map Showing Talukas



**PANDHARKAWADA FOREST DIVISION
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FOREWORD

Tasneem Ahmad, IFS,
Principal Chief Conservator of Forest,
(Production & Management)
Nagpur.

The present Working Plan for the Pandarkawda Forest Division, written by Dr. R. N. Rai, IFS, Conservator of Forest, Working Plan, Yavatmal, replaces the earlier Working plan prepared for the area of Pandarkawda Forest Division by Shri. R. S. Yadav Deputy Conservator of Forests. This is the Working Plan prepared for the Division by an officer of the rank of Conservator of Forests. All suggestion given at the time of approval of Preliminary Working Plan Report-I of Pandarkawda Forest Division in State Committee held in the month of March 2013 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 Plans. 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 Plan.

2.00 The present working plan excludes the area given to Forest Development Corporation of Maharashtra Limited (FDCM) and Wildlife wing of the Department, and only details of such areas transferred to them have been given in this Plan. A Chapter has been devoted with regard to the activities taken up by the FDCM Ltd in the forests transferred to them. The E Class forests in Pandarkawda Division were with Revenue Department so far. The State Government decided to transfer these forests to the Forest Department for proper management on scientific lines, and accordingly the transfer of these forests to the Forest Department is in progress. Only those areas which are taken into possession by the Forest Department have been taken into account for inclusion in this Working Plan and suitable prescriptions have been given. However, unless and until such forests are constituted as Reserve Forests, the real purpose of forest management on scientific lines in respect of these forests by preparing this Plan would not be served. Therefore, immediate steps must be taken to constitute all such forest lands including all Protected Forests in charge of Forest Department in respect of which Working Plan is proposed to be prepared or has been prepared as Reserved Forests as fast as possible. New compartment numbers of series "800" have been given to all E- Class forests falling in Pandarkawda Forest Division.

3.00 The present working plan highlights the deteriorating condition of forests and expresses concern over lack of natural reproduction. There are two causes for the same. One is overstocking and the other is biotic interference. In an over stocked forest, reproduction and growth of both shade intolerant as well as shade tolerant species suffer due lack of growing space above as well as below the ground, and non availability of adequate sun light on the forest floor. Overstocking also adversely affects Current Annual Increment per ha. of

the crop, and as a result growth in diameter of the trees slows down. In the process, the trees of intolerant species suffer the most and very often, specially in lower diameter classes, they become prone to attacks by various biotic agencies and tend to die due to starvation. In this Plan, for fully stocked forests, Selection System has been adopted in the Selection Cum Improvement Working Circle. For the betterment of the crop, method of treatment prescribed in Selection Cum Improvement Working Circle and the Improvement Working Circle being similar (except selection criteria), and to avoid repetition and to streamline the method of treatment, the Improvement Working Circle has been merged with Selection Cum Improvement Working Circle.

4.00 Other highlights of this Working Plan are detailed prescription for the management of wildlife. The present position regarding declaring eco- sensitive zone around the wildlife area have been discussed. Besides a Chapter on wildlife, Chapters regarding NTFP, JFM as well as Forest Protection have also been written in detail on the basis of information provided by the Pandarkawda Division. Adequate measures have been suggested and included in the prescription of the Working Plan for their implementation in the field.

5.00 GIS digital maps have been generated in Geo-media cell. Village maps were registered for generating maps for Protected Forests and in case of Reserve Forests, Survey of India sheets have been used. These digitised maps are stored permanently with Conservator of Forests, Working Plans, Yavatmal and requisite number of sets will be made available to the Division. These steps, however, do not do away with the need of having special topographical maps in respect of all such tracts of forests (which are covered under a Working Plan) prepared by carrying out special topographical surveys of these forests in the scale of at least 1:15000 with 5 meters contour interval showing all minor details available in the field required for successful execution of silvicultural prescriptions and laying sample plots for periodical enumeration etc.

6.00 The author of this Working Plan, Dr. R. N. Rai IFS and his staff has taken pains in completing the Plan of the present Pandarkawda Division in time. I wish to complement Shri Dr.R.N.Rai Conservator of Forest, Working Plan Yavatmal and the whole team under him for their hard work and sincere efforts put by them in preparing this Working Plan. Besides, I appreciate Shri.M.Karunakaran IFS APCCF Working Plan East for his sincere efforts and hard work done by him guiding the Conservator of Forests and his staff in preparation of this Working Plan.

Place: Nagpur

Date: 20.06.2013



(Tasneem Ahmad)
Principal Chief Conservator of Forests
(Production and Management)
M.S. Nagpur.



INTRODUCTION

M.KARUNAKARAN, IFS
Additional Principal Chief Conservator of Forests,
(Working Plan- East) Nagpur.

This Working Plan of Pandarkawda Forest Division covers the whole area of Pandarkawda Forest Division including reserve forest, protected forest and unclassed forest, which was earlier managed under previous plan written by Shri R.S Yadav DyCF, prepared for ten years (2002-03 to 2011-12) and came into force since 2002-03. Now, Dr. R. N. Rai CF Working Plan has made an enormous effort in revising this plan which has few changes and many additional features. The foremost of this important feature is the provision of normalcy in the selection forests. The forest will not only be harvested mechanically by removing the trees above harvestable girth, but the removal shall be from all the girth classes based on improvement of the crop. This Plan has been written for the period from 2013-14 to 2022-23.

2.00 Another effort taken here is merging Improvement Working Circle in the earlier working plan in to the Selection Cum Improvement Working Circle as the method of prescription was similar in Improvement Working Circle except selection criteria and therefore to avoid repetition and to streamline the method of treatment prescribed, the Improvement Working Circle has been merged with Selection Cum Improvement Working Circle.

3.00 As per the suggestion given in the State level committee, a new chapter has been devoted for studying the bio-diversity of Pandarkawda Forest Division and measure to be taken for the endemic species and threatened and endangered species. Likewise, another chapter has been devoted for the Forests Right Act titled "The Scheduled Tribes and other Traditional Forest dwellers (recognition of forest rights) Act, 2006 in which the rights of forest dwellers and the details of rights and land assigned to the rightful forest dwellers has been elaborated.

4.00 Full effort has been taken regarding digitization of all maps of Pandarkawda Forest Division and all digitised maps are stored permanently with CF, WP Yavatmal and required number of maps will be made available as and when required. *

5.00 The entire revision of working plan involves tremendous efforts by the working plan team of Yavatmal working plan Division and they have done it in reasonable time period for which I appreciate Dr. R. N. Rai CF Yavatmal and his team for writing this working plan.

Place: Nagpur

Date: 10.06.2013

(M.Karunakaran)

Additional Principal Chief conservator Forests,
(WORKING PLAN-EAST) NAGPUR

PREFACE



This working plan deals with the forests of entire of pandharkawada division including reserve forest, protected forest and unclass forests. Prior to 1964, Pandharkawada forest division was a part of Yavatmal Forest Division. Later in the year 1964, Yavatmal Forest Division was split into two separate forest division i.e. East Yavatmal Forest Division and West Yavatmal Forest Division at Yavatmal. Pandharkawada Forest Division was the part of East Yavatmal Forest Division. Later in the year 1983 reorganization of forest department vide G.R.No.FDM/1880/I-F-S 29th August 1983, resulting in the formation of 3 forest divisions in Yavatmal District viz. Yavatmal Forest Division at Yavatmal, Pusad Forest Division, at Pusad and Wani Forest Division at Wani. Later on Wani Forest Division was renamed as Pandharkawada Forest Division and the head quarter was shifted at Pandharkawada in the year 1987. The tract dealt with in this working plan of Pandharkawada forest division comprises 6 ranges, they are 1. Mukutban, 2.Pandharkawada, 3.Parwa, 4.Patanbori, 5.Umari, 6.Wani.

The previous plan (2002-03 to 2011-12) written by shri R.S.Yadav for period of ten years which come into force since 2002-03. For preparation of wp, shri Devendra Kumar, CCF (T) Yavatmal Circle, Prepared PWPR-I (2012-13 to 2021-22). It was placed before state level working plan committee meeting held on 22 March 2011 at ‘ Van Bhavan’ Nagpur and was accorded approval by committee as per the PCCF’s letter No.D-14/WP/CR to / (10-11)/1578/10-11 dt 28/3/2011. On the basis of approved PWPR-I the current PWPR-II has been prepared and the chapters of the PWPR-II have been prepared according to the ‘National working plan code 2004’.

The forest of Pandharkawada Division extended over 7 talukas of Yavatmal district viz. Wani, Maregaon, Ralegaon, Zari-Jamni, Pandharkawada, Part of Ghatanji and kalamb comprising mostly coppice origin teak forests with stunted and malformed growth. Some of the forests are open and degraded having density less than 0.1 in blank areas, 0.1to 0.4 in open forest areas, 0.4 to 0.6 and a few patches of forests above 0.6. The entire forest has been stock mapped with appropriate ground truth verification. The all India teak site qualities is mainly IV, and III Teak site qualities are also seen which are scattered. The C Class forests in the division are mostly opened with degraded forests and are subjected to heavy grazing pressure because of their locational disadvantage. In Tiwasala Forest Block in which teak plantations were taken during 1900 to 1909, 1923 to 1932 and 1941 to 1954 under agrisilvicultural system, pure matured to middle aged teak crops are found.

The soil is compact, dry and full of boulders at places. The natural regeneration of both teak and miscellaneous species are inadequate. The proportion of teak in growing stock is high.

The status of N R is poor in the forests as these forests are subjected to heavy biotic pressure, harsh edaphic conditions and frequent fires.

In the early period of working plan, the prescriptions were aimed at regulating the harvesting of timber on economic and sustained yield basis. In the latter period of working plan the prescriptions oriented towards protection of forests, regeneration, soil improvement, needs of people and meeting their demands, cattle grazing regulation and wildlife management with the formulation of 1988 Forest Policy the emphasis has been oriented towards people's participation (JFM) in all the stages of forest management including watershed management, Bio-diversity conservation, sharing of harvested forest produces. The emphasis has also been given on the management of non-wood forest produce and providing maximum benefits to large number of people for all times.

The present plan deals with an area of 58,801.02 ha. The main system adopted to manage the forests is SCI WC which covers 30,734.78 ha. The other system prescribed are Afforestation WC for degraded forest covering an area 25552.50 ha., Fodder Improvement WC with an area 2513.74 ha. The Overlapping WC proposed are Non-wood forest produce (Overlapping) WC, Wild life (Overlapping) WC, Joint Forest Management (Overlapping) WC, Protection (Overlapping) WC encompassing the entire forest area of the division as per the provisions of 'National Working Plan Code – 2004'

The enumeration of growing stock has been carried out by the SOFR Unit Amravati in 2008-09 and the data provided by SOFR has been analysed using Dhabekar's Software and also got the same data analysed from Chief Forest statistician in the office of the Principal Chief Conservator of Forest, Nagpur.

The Present Plan has been prepared keeping in view the guidelines from Government of India, State Government and National Working Plan Code after completion of all field works related with stock mapping, stem analysis, enumeration. All the maps including village map have been digitized and put on the computer in electronic form. The digitized map can be used as reference map in the future. The stock details will only be required to be revised during the next course of revision of this plan. The stem analysis has been carried out site quality wise i.e. site quality III and IV for coppice origin and for seed origin separately. The data obtained has been computerized and utilized this data for various applications like fixing harvestable girth, calculation of felling cycle, yield calculation etc.

I am extremely grateful to Shri A.K.Joshi, I.F.S., Head of Forest Force, M.S.Nagpur for providing valuable suggestions. I am especially thankful to Shri Tasneem Ahmed, I.F.S, Principle Chief Conservator of forests (production and management) M.S Nagpur & Dr.S.K. Khetarpal, I.F.S. (Ex-Principle Chief Conservator of forests (production and management) M.S Nagpur) for providing valuable guidance and suggestions from time to time. I express my deep sense of gratitude to Shri A.S.K. Sinha I.F.S. Chief

General Manager, Medicinal Plant Nagpur FDCM Ltd. and Shri Karunakaran, I.F.S Additional Chief Conservator of forests, (Working Plan-East) Nagpur for providing able and valuable guidance along with necessary encouragement in preparing this plan in present form.

I express my gratitude to Dr. D.K.Tyagi, I.F.S., Chief Conservator of forests(T), Yavatmal circle for guidance and suggestions from time to time. Sincere thanks are also due to Shri A P Girhepunje, Dy.Conservator of forests, Pandharkawada Forest Division for his help and cooperation in preparing this plan.

Shri. D.J.Goche R.F.O. has helped for providing able and valuable guidance from time to time. Shri D.N.Jamodkar, RFO, Working Plan Division, Amravati has helped in fine tuning the prescriptions of Regulation of yield in SCI WC. Shri V.N.Choudhary RFO, shri M.B.Gawali RFO, prepared stock maps and conducted stem analysis of teak trees. Shri A.L.Ghuge, Ranger Surveyor, worked sincerely to verify and modify the contents of WP, Shri V.A.Masram, Surveyor who has done commendable job in preparing GIS, Project, coordinations work with FSI and MRSAC. Shri S.D.Sargar, surveyor, Shri B.L.Khadse Steno Typist and Shri A.G.Thakar, Clerk had worked hard to prepare this W.P. The following staff of Yavatmal Working Plan Division has contributed for preparation of W.P.

Name

1. Shri. D.J. Goche RFO	11. Smt M.M.Walke, Clerk
2. Shri V.N.Choudhary, RFO	12. Shri. S.P.Khadke, Forest Guard
3. Shri M.B. Gawali, RFO	13. Shri S.B. Lohkare, Forest Guard
4. Shri A.L. Ghuge, Ranger Surveyor	14. Sau S.A. Rajurkar Forest Guard
5. Shri V.A. Masram, Surveyor	15. Ku. P.R.Atram , Forest Guard
6. Shri S.D. Sargar, Surveyor	16. Shri N.V. Mote , Forest Guard
7. Shri B.W.Kanaskar, Accountant	17. Shri B.M.Dhawale, Driver
8. Shri B.L. Khadse, steno typist	18. Shri R.S. Shukla , Peon
9. Shri A.G. Thakar, Clerk	19. Shri S.S.Kakde, Forest Labour
10. Shri R.V. Kamble, Clerk	20. Shri S.R. Nakhate , Forest Labour



Dr. R.N. Rai

Conservator of Forest,
Working Plan Division, Yavatmal

Place : Yavatmal

Date :

Executive Summary

Pandharkawada Forest Division, Pandharkawada

Working Plan – 2013-14 to 2022-23

Author :-Dr.R.N.Rai, Conservator of Forests, Working Plan Division, Yavatmal

1) Introduction :- Working Plan of Pandharkawada forest Division authored by Shri. R.S.Yadav expired during 2011-12. Revision of this working Plan was initiated in the year 2009. The PWPR-I prepared by ShriDevendrakumar, Chief Conservator of Forests, (T) Yavatmal was placed before State level Committee meeting held on 22-3-2011.

PWPR-II prepared by Shri. R.N.Rai, Conservator of forests, Working Plan Division, Yavatmal was placed before State level Committee meeting held on 1-3-2013. PWPR-II was approved by State level Committee subject to certain modifications and adding additional information.

Accordingly changes have been incorporated in the working plan. Brief account of working plan is given below.

2) Brief Information on Pandharkawada Forest Division:-

Geographical area of Pandharkawada Forest Division is 422506 ha (422.506 sq.km). This Working Plan deals with 58801.02 ha forest area of the division which is spread over seven talukas. There are 6 ranges, 17 rounds and 72 beats in the division. The division is headed by Dy. Conservator of Forests, assisted by 4 Assistant Conservator of Forests, 15 Range Forest Officers, 39 Foresters and 136 Forest Guards and also 48 ministerial staff. The human population of this area is 8,07,614 which includes 52090 –Schedule caste and 2,18,100 – Schedule tribes. Agriculture and its allied sector is main occupation of local people. The average annual rain fall is 1011 mm, temperature ranges from 8.2°C to 46°C.

The Tract of the division is situated on the southern uplands of the Payanghat of Berar and the eastern portion of the Ajanta hills. The tract is hilly and undulating. The forest area is drained by the rivers Painganga, Wardha & their tributaries.

The boundaries of the division are given below.

North	-	Wardha District, Wardha River.
East	-	Chandrapur District, Wardha and Painganga River.
South	-	Andhra Pradesh, (Adilabad District), Chandrapur District, Painganga River.
West	-	Yavatmal Forest Division

According to Champion & Seth's classification of forests, the forest of the division belongs to Tropical dry deciduous Forest. (i.e. Group – 5, Sub group – 5A). Teak (*Tectona-grandis*) is the principal specie. Ain, Dhawada, Lendia, Tendu, Salai, Tiwas, Bhirra, Kalam, Rohan, Semal, char, Awala, Palas, Dudhi, Lokhandi, Ghoti etc. are its associates. The forest crop is uneven aged. The site quality is mostly IV and III in very less area. About 6% of the forests have density above 0.6, 31% have density 0.4 to 0.6, 24% less than 0.4 density, while scrub and blank area constitutes about 39% of the total forest area.

3) **Wildlife:-** In the past, area of Pandharkawada Forest Division was natural abode for a variety of wild animals. The wild animals found in area are Blue bull, Blackbuck, Sambar, Spotted deer, Sloth bear, Chinkara, barking deer etc. Carnivores like Panther, hyaena, fox, Jungle cats and tiger also noticed in the area by local people. Number of birds and reptiles also occur.

Increasing human population, heavy grazing, development of road network, fire, fragmentation of habitat and encroachment adversely affected wildlife population. Wildlife has considerably declined in the recent decades.

4) **Forest Produce:-** As timber is utilized for construction, furniture and agriculture implements, demand of timber and poles is increasing day by day. Fire wood is still main source for domestic cooking in villages & small towns.

On an average annual timber production is 3028 m³ and revenue realised Rs. 578 lacs. The average rate of timber comes to Rs. 19,085/m³ and the average rate of fire wood comes to Rs. 794/m³.

5) **Non Wood Forest Produce:-** Tendu leaves is major MFP under Non wood forest produce. There are 13 tendu units which are sold by auction. Labourer's get considerable amount from collection of tendu leaves during short period, as incentive wages are distributed to labourer's deducting the administrative expenses from the royalty amount. Gum units are also auctioned. Moha flowers and seed, charoli, biba, hirda, behada, awala are some of the major NWFP.

6) **Past system of management :-** In the year 1853 Berar was assigned to British. ACF was appointed for the entire forests of Berar under the administrative control of Central Provinces in 1865. For the first few years, some forest reserves were demarcated. In 1871 for the first time forest rules were applied in this area to protect forests from encroachment, illicit felling and grazing. The first regular working plan authored by Malcom for the A class forest was introduced in 1915-16. Details of previous working plans implemented in the past are given below.

1. Malcom's Working Plan (1915-16 to 1937-38)
2. Robinson's Working Plan (1937-38 to 1955-56)
3. Thoser's Working Plan (1955-56 to 1975-76)
4. Pal's Working Plan (1976-77 to 1991-92)

5. Kanekar's Working Plan (1982-83 to 1997-98)(Panadharkawada Forest Division was created in 1983)

6. Yadav's Working Plan (2002-03 to 2011-12)

Kanekar's Plan revised by **Yadav**. This was first independent working plan for Pandharkawada forest division. Summary in brief regarding implementation of Yadav's Plan is given below.

Forests were managed under following 7 working circles. --

1. Selection Cum Improvement Working Circle
2. Improvement Working Circle
3. Afforestation Working Circle
4. Fodder reserve Working Circle
5. Joint Forest management (overlapping) Working Circle
6. Wild life (overlapping) Working Circle
7. Miscellaneous Working Circle.

1. Selection Cum Improvement Working Circle: The basic aim was to remove stunted coppice growth. It includes area which was previously managed under coppice with reserve system, Teak plantation Working Circle & Improvement Working Circle. Crop density varies from 0.4 to 0.7, site quality IV & few patches of site quality III. Selection & Improvement felling was prescribed. Selection girth for site quality IV was fixed at 75 cm (gbh) & Selection girth for site quality III & III/IV - 90 cm (gbh). 16 trees/ha from site quality III, 10 trees/ha from site quality III/IV & 14 trees/ha from site quality IV were available to harvest. 3400 M³ average annual yield from selection felling and 800 M³ from improvement felling was estimated. Area allotted to this WC was -26384.02 ha. 25 -Felling series & 10 coupes in each felling series were formed. Felling cycle of 10 year was fixed.

Results:- Marking for improvement of crop has not been done properly. Coupe no- I was not felled. Only 9% NR & AR target achieved. Plantations raised are not successful.

2.Improvement Working Circle: The basic aim was to improve the condition of crop. It includes area, which was previously managed under coppice with reserve Working Circle. Crop density varies from 0.4 to 0.6, site quality IV in general & very few patches of III, Young to middle aged crop. Improvement felling of malformed trees & thinning was prescribed. Area allotted to this working circle was - 8410.46 ha. (Planimetred area). 9-Working series & 10 coupes in each Working series were formed, estimated annual yield from improvement felling was 219 M³ per year.

Results:- Marking for improvement of crop has not been done properly. Trees of selection and above selection girth has been marked and felled in some coupes of IWC. Only 20% NR & AR target achieved. Plantations raised are not successful.

3.Afforestation Working Circle: The basic aim was to check soil erosion & improvement in vegetal cover. It includes under stocked & open forest area, Crop was young to middle aged, Crop density - upto 0.4. Area allotted this working circle was -16,785.06 ha. 17-Working series & 10 coupes in each Working series were formed, estimated annual yield from improvement felling was 201 M³ per year.

Results:- Marking for improvement of crop has not been done properly. Only 14% NR & AR target achieved. Plantations raised are not successful.

4. Fodder reserve Working Circle: It Includes area which was previously managed under fodder reserve working circle & pasture WC. Area was mostly open or sparsely wooded, Crop density less than 0.4, Site quality – IV b. Intensive SMC, removal of weeds & unpalatable grasses, introduction of high quality palatable grasses by seed sowing & planting. Area allotted to this working circle was- 5451.15 ha. Area of individual compartment was considered as working unit. Area of compartment was divided into 4 sections, worked annually one section. Treated each section was closed for grazing for 3 consecutive years, 4th year onwards control grazing permitted.

Results:- Fodder development activity and plantations has not been carried out. Only 14% NR & AR target achieved. Plantations raised under non fodder development scheme are not successful.

5. Joint Forest management (OL) Working Circle:- 30646.67 ha. area of 207 compartment was included. The main object was to seek people's participation in forestry works and forest protection through JFM Committees.

6. Wildlife (OL) Working Circle:- It included entire forest area of the division. Protection of Wildlife, digging of water holes, restricted felling in 100 metre radius area from perennial waterholes and 500 metres from natural shelter of wildlife were the main prescriptions.

7. Miscellaneous Working Circle:- 1876.34 ha. area of 20 compartment was included. The area which was not managed under any silviculture system due to various reasons was allotted.

Statistic of growth & yield: - Enumeration of growing stock has been carried out by SOFR Amaravati unit with the help of satellite imageries. Sampling area was 1 % using systematic sampling for collection of data of trees. Regeneration status was also assessed. The details of growing stock in SCI WC are given below.

No. of trees/ha.as per enumeration

Girth class	16-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	Above 150	Total
Teak	47	53	46	34	22	9	4	1	0.5	0.5	217
Non-Teak	53	32	19	11	7	4	3	2	1	1	133

On an average forest have 217 teak trees & 133 miscellaneous trees per ha. As per regeneration serve no. of seedlings/ha are – R1-75.61, R2-35.22 & R3- 16.43. The condition of regeneration is very poor due to biotic interference, illicit grazing and fire.

PART – II :Future Management discussed and prescribed :

The vegetal cover calculated with the help of enumeration carried out and satellite imageries were used as the tool for distribution of areas under various working circles in revised working plan. Taking into considerations of various guidelines following working circles have been constituted.

- I. Selection Cum Improvement Working Circle.
- II. Afforestation Working Circle.
- III. Fodder Improvement Working Circle

Overlapping Working circle includes entire forest area of the division.

IV. Non Wood Forest Produce (over lapping) Working Circle

V. Wildlife Management (over lapping) Working Circle.

VI. Joint Forest Management (over lapping) Working Circle.

VII. Forest Protection (over lapping) Working Circle

The area assigned to each working circle is given in the following table.

Working Circles and area assigned

Sr. no.	Working Circle	Area in ha	Percentage of area assigned 58801.02 ha
1	Selection-Cum-Improvement WC	30734.78	52
2	Afforestation WC	25552.50	43
3	Fodder Improvement WC	2513.74	5
	Total	58801.02	100

Demarcation of coupe & preparation of treatment map:-

Due coupes of all working circles shall demarked one year in advance. The treatment map shall prepare by RFO showing the following details for each coupe.

Method of Execution : Demarcate due coupe one year in advance & treatment map shall prepare by R.F.O. after laying 100 x 100 mtr. Plot (grid) in the area under guidance of ACF indicating –

1. Type A – Protection area : (Area with steep slopes (more than 25°), Eroded area & area liable for erosion & 20 metre wide strip on both sides of water courses)
2. Type B – (blank area or area with less than 0.4 crown density)
3. Type C – (pole crop & old plantation area – old plantation area with minimum 30% survival & minimum 1 ha. area)
4. Type D – (Well stocked area – Area with more than 0.4 crown density)

Selection Cum Improvement Working Circle:-

Total area is 30734.78 ha. of 127 compartments, 30 working series & 20 coupes in each working series. Average area of coupe is 52 ha, 20 years working cycle. The harvestable girth for site quality III is fixed as 120 cm for seed origin & 75 cm for coppice origin, the harvestable girth for site quality IV for Seed origin is fixed as 105 cm and for coppice origin – 75 cm. On average 12 trees of coppice origin from site quality III & IV, 0.5 trees of seed origin from site quality III & 1.24 trees of seed origin from site quality IV are available for selection felling in well stocked area. Selection annual yield estimated is 864 M³ and yield from improvement felling is 631 M³.

➤ **Enumeration :**

Before start marking enumerate all trees above 15 cm girth in whole area of the coupe. During enumeration in D type area origin of teak tree (coppice/seed) shall note.

➤ **Treatment prescribed:** Different types of treatment prescribed for different type of area. In

A – Type: Appropriate soil & moisture conservation works, B-Type - Improvement felling & plantation activities, C – Type: Thinning&D – Type : Selection & improvement felling is prescribed.

❖ **Marking techniques & marking rules :**

Marking shall carried out by R.F.O under close supervision of ACF, D.C.F. shall visit the coupe & guide on spot, Teak tree (above 45cm gbh) marked for felling shall bear digital no. & below 45 cm gbh coal tar number, hammer mark, geru band, On 10 x 10 cm blaze details like tree no, hammer mark, coupe no. etc. shall note. Trees showing coupe boundary demarcation shall not marked for felling. All climbers (retaining endangered, threatened & vulnerable species) shall cut in entire coupe.

1. A – Type : No marking for felling.

2. B – Type: Marking of all dead trees retaining 2 per ha.all live high stumps excluding NTFP & fruit species, multiple coppice shoots & poles retaining the most Vigorousone.

3. C – type: Marking of poles to remove congestion maintaining spacement 1/3rd height of the pole,dead, diseased & malformed trees of timber species, the multiple coppice, shoots retaining the most vigorous one

4. D – Type: Marking of all dead trees retaining 2 per ha., all live high stumps excluding NTFP & fruit species, multiple coppice shoots & poles retaining the most vigorous One, all malformed trees (straight clear bole below 2.5 mtr. Height), 50% of silviculturallyavailable teak tree of selection girth.

During marking for felling details of origin (coppice/seed) of marked tree shall-benoted. Retain healthy teak trees which are good seed bearers. Retain teak trees within 30 mtr. wide strip on both sides of large nala/river. Teak trees of coppice origin shall marked retaining seed origin. Retain trees of miscellaneous species including fruit & NWFP species. Retain plus trees of teak & other species. Retain trees within radius of 300 mtr. of historical & eco-tourism importance sites. Subsidiary silvicultural operations (S.S.O) & Plantation activity (NR & AR) shall carried out in worked coupe. Plantation under AR consists of restorative phase (S&MC, PPO/PYO) & productive phase (Planting & maintenance).

Afforestation Working Circle : -

Total area is 25552.50ha.of 205 compartments, 22 working series&20 coupes in each working series. Average area of coupe is 58 ha, 20 years working cycle& annual estimated yield is 93 m³

Treatments : As under the SCI WC except selection felling in well stocked area Improvement felling, thinning & S.S.O. & Plantation activity (NR & AR) shall carried out in due coupe. Plantation under AR consists of 2 years restorative phase &5 years productive phase.

Fodder Improvement Working Circle :-

Total area is 2513.74ha.of18 compartments, 2 working series&20 coupes in each working series.

Treatment : Extensive soil moisture conservation works, uproot and burn of obnoxious weeds, thorny shrubs & bushes, eradication of unpalatable grass like Kusal, Bhurbhusi etc. in pre-flowering stage. Sowing of seeds of superior species of fodder grasses like shedya, paunya, marvel etc. after ploughing. Seed sowing or tussocks planting of grass like shedya, paunya, marvel on the excavated and heaped soil bund, weeding if necessary is prescribed. Rotation is fixed for 3 years.

Non Wood Forest produce (overlapping) Working circle:

It includes the total forest area 58801.02 ha. Tendu is major MFP followed by moha, hirda, behada, awala, charoli, honey, gum & other medicinal species are commercial NWFP. Plantations in various working circles are recommended.

Extraction & sale of NWFP shall be regulated and in production and management, local people would involve through JFMC. Tapping rules for extraction of gum are included in this chapter.

Joint Forest Management (overlapping) Working Circle: Total no. of JFMC is 241, only 28 JFMC are registered. Area allotted for protection is 43,385.624 ha. and 2350 ha. area for plantation.

As per Govt. of Maharashtra guidelines regarding PIA in MREGS, JFMC may nominate as PIA for the forestry works. It is advisable to take advantage of above guidelines & JFMC may enroll as PIA in MREGS works of forestry operation. The microplan for each village shall be prepared with consultation of local people.

Wildlife (O)Working Circle : It includes the total forest area 58801.02 ha. Many kinds of wildlife are found in Pandharkawada Forest Division.

To educate & motivate local people for protection & conservation of wild animals thereby protecting wild animals from destruction & providing environment of security to wildlife are the main objects.

1. Eco-sensitive Zone :-

Purpose For Declaring Eco-Sensitive Zones

The main purpose is to create some kind of “Shock Absorber” for the protected Areas. It would also act as a transition zone from areas of high protection to areas involving lesser protection. It would be regulatory rather than prohibitive nature, unless and otherwise so required. Wild life conservation strategy – 2002 was adopted by Indian board for wildlife

According to wildlife conservation strategy – 2002 & Other provisions Eco-sensitive zones have to be formed in the area to conserve wildlife considering -Lands falling within 10 km of the boundaries of National parks & sanctuaries be notified as eco fragile zone.

According to National wildlife Action plan (2002-2006) all identified areas around protected areas and wildlife corridors to be declared as ecologically fragile under the environment Protection Act 1986. For strict protection of ecologically fragile habitats land & water use policies need to be accepted. Formation of eco-sensitive zone around Tipeshwar sanctuary is under preparation by DCF Pandharkawada in consultation with wildlife wing.

2. Eco-tourism :-

According to Central Government guidelines issued in 1998, special objects of management of Eco-tourism given in national wildlife action plan 2002 and Govt. of Maharashtra declared Maharashtra state ecotourism and nature tourism policy vide GR dated: 20/2/2008. Ecotourism sites have been declared accordingly. There are 11 ecotourism sites in Pandharkawada forest division.

Forest Protection (overlapping) Working Circle:-

It includes entire forest area of the division. Protection of the forest from illicit felling, encroachment, fire, grazing and poaching with the cooperation of local people & through JFM is one of the main object. Regulation of grazing and controlling fire, by improving communication & mobility of the staff with reward & informer system are the tools of forest protection.

Bio-diversity :- A) Status

Forest area of division is very rich in floral & faunal diversity. Variations in climate, good forests, topography & water reservoirs create diverse habitat for floral & faunal communities. About 250 plant species, 210 species of birds, 30 species of mammals including carnivorous, various varieties of amphibians, reptiles, invertebrates, butterflies, moths, beetles etc. are found in the forest area.

B) Legal enactment :

In lieu of biological diversity act 2002 & rules 2004, Govt. of Maharashtra created Maharashtra State Biological Diversity Board vide notification dated 2 January 2012. According to provisions contained in act, district level, Taluka level & village level biodiversity committee have to be formed.

C) Function of the Committee

Bio-diversities management committees at their level have to perform functions as mentioned in the said act to conserve, maintain and develop flora & fauna.

Forest Rights : The Scheduled Tribe & other Traditional Forest Dwellers (recognition of forest rights) Act, 2006 is enacted on 29.12.2006. Diversion of forest land for non-forestry purposes which are essential commodities of the residents in or adjoin to the forest is the purpose of this act. Individual or community rights are to be decided & maximum 1 ha land may be diverted to the dwellers.

Status

• Individual rights :

1. Claims received at village level - 1338
2. Claims forwarded to SDO (R) - 1199
3. Claims submitted to District level committee – 190
4. Claims settled by district committee – 165
5. Area accepted & assigned - 522.38 ha.

• Community rights :

1. Claims received to SDO(R) – 41
2. Claims rejected for want of proof – 41

• Claims for Forest land for common facilities :

1. Claim received -3
2. Claims settled – Nil (Claims are to be finalized.)

Miscellaneous Regulations:-

The following aspects are given to be used as regulatory tools in implementation of this Plan-

Demarcation & marking techniques, Harvesting and disposal of forest produce, Irregular harvesting, Demarcation and maintenance of boundaries, Nursery and plantation techniques, Techniques of sub-sidiary silvicultural operations such as CBO, cleaning, thinnings, Guidelines for soil and moisture conservation measures, Guidelines for forest protection from fire, Proper Implementation of working plan to avoid deviation, Tribal welfare & Maintenance of land records.

Financial Forecast:

The details regarding expenditure incurred/ to be incurred have been discussed in draft plan. Annual average expected revenue realized and expenditure incurred is 1201 lacks & 1008 lacks respectively during plan period.

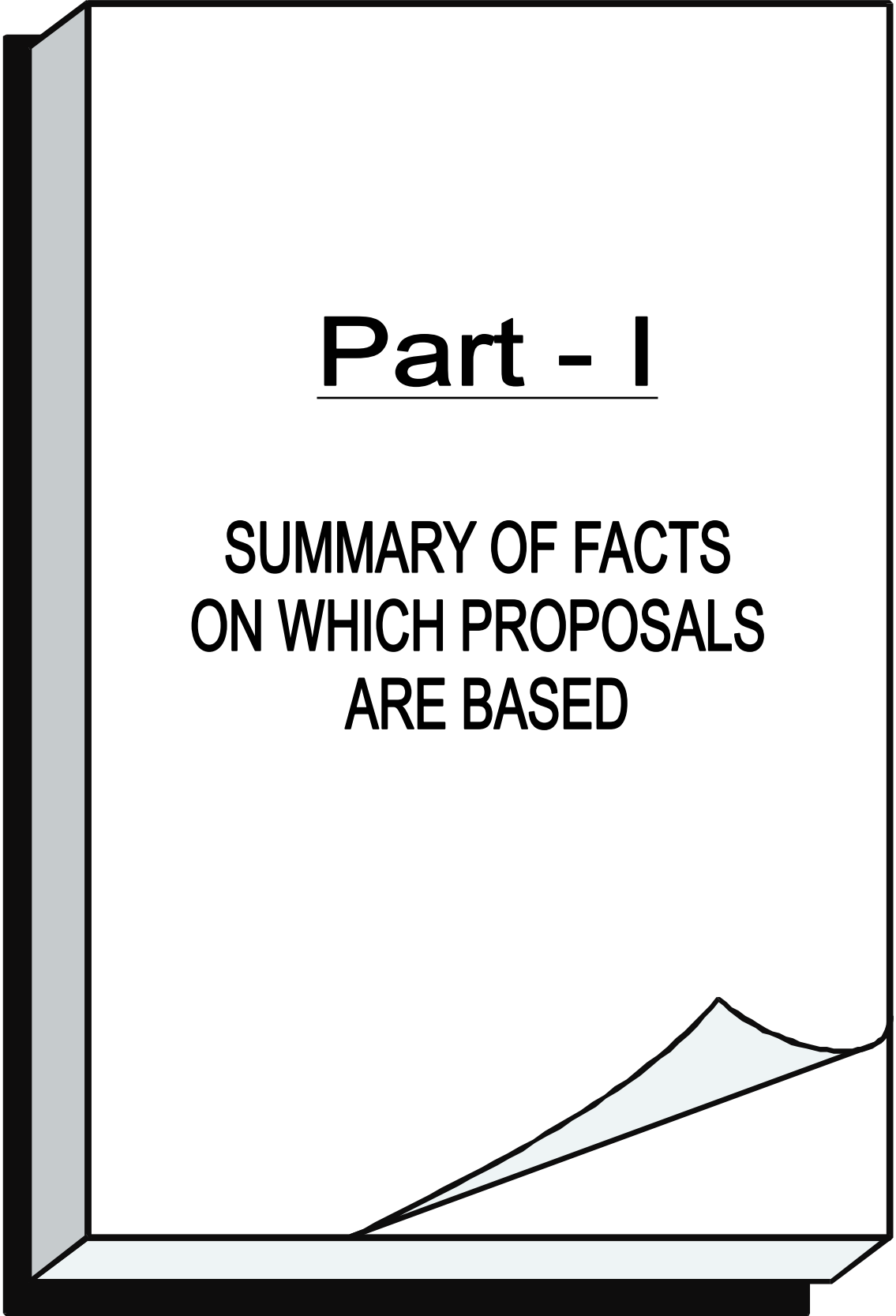
The expenditure on preparation of plan of Pandharkawada Forest Division cannot be separately worked out. Proportionate expenditure is Rs. 1,25,58,600/-. Considering forest area of Pandharkawada Forest Division, the cost of preparation of Working Plan comes to Rs. 213.58 per ha approximately.

Abbreviations Used In The Plan

ACF	:	Assistant Conservator of Forests
AWC	:	Afforestation Working Circle
AR	:	Artificial Regeneration
C.A.I.	:	Current Annual Increment
C.B.O.	:	Cut Back Operations
C.W.R.	:	Coppice With Reserve System
CWC	:	Catchment Working Circle
C.C.T.	:	Continuous Contour Trench
Cum	:	Cubic Meter
Compt.	:	Compartment
CCF	:	Chief Conservator of Forests
CF	:	Conservator of Forests
DF	:	Disforested
Dn.	:	Division
Dy.C.F	:	Deputy Conservator of Forests
FLCS	:	Forest Labourer's Co-operative Society
WLS	:	Wildlife Sanctuary
FP	:	Forest Policy
FS	:	Felling Series
FSI	:	Forest Survey of India
FV	:	Forest village
FRH	:	Forest Rest House
FYO	:	First Year Operation
gbh	:	Girth at breast height
gbhob	:	Girth at breast height over bark
gbhub	:	Girth at breast height under bark
MAI	:	Mean Annual Increment
MSL	:	Mean Sea Level
NTFP	:	Non Timber Forest Produce
NR	:	Natural Regeneration
No	:	Number
PA	:	Protection Area
PAI	:	Periodic Annual Increment
PB	:	Periodic Block
PF	:	Protected Forest
PPO	:	Pre Planting Operation
PYO	:	Preliminary Year Operation
RF	:	Reserve Forest
RFO	:	Range Forests Officer
RRSSC	:	Regional Remote Sensing Service Centre
SCI	:	Selection Cum Improvement
SYO	:	Second Year Operation
S& MC	:	Soil and moisture conservation
TYO	:	Third Year Operation
WC	:	Working Circle
WP	:	Working Plan
TWS	:	Tipeshwar wildlife Sanctuary

Glossary Of Local Names

Adjat	:	Miscellaneous Species
Geru	:	Red Ochre Or Red Earth
Ghat	:	A Road With Steep Gradient
Gairan	:	A Place For Herding Cattle
Gaothan	:	A Site Kept Reserved For Housing
Gully	:	Channel
Jamindar	:	The Holder of Zamin i.e. land
Jhiras	:	Temporary Small Well Dug in Nalas During Summer
Jawari	:	A Cultivated Millet
Jungle	:	Forest
Kharif	:	Monsoon Crop
Khasara No.	:	Serial number given to any portion of land entered in land Records
Mouza	:	A Village Area
Murram	:	A Reddish Hard Soil
Naka	:	Barrier On Road For Checking Forest Produce In Transit
Nala	:	A Water Course
Nadi	:	River
Nistar	:	Forest Produce Required For Bonafide Agriculture Or Domestic Purposes
Padit	:	A Barren Or Waste Land
Patwari / Talathi	:	Village Revenue Officer
Pansthal	:	Waterhole
Patta	:	A Sanad Granted For Use Of Land.
Pucca	:	Permanent Construction
Pulla	:	Winter Crop
Rabi	:	Winter Crop
Rahadari	:	Transit
Ramna/Kuran	:	A Grass Reserved Close To Grazing
Regur	:	Black Cotton Soil
Rith	:	A Deserted Village Site
Taluka /Tahsil	:	A Revenue Administrative Block.



Part - I

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

CHAPTER I

THE TRACT DEALT WITH

SECTION: I.1: NAME AND SITUATION:

1.1.1: This Working Plan deals with entire forests area (i.e. 58801.02 ha.) of present Pandharkawada Forest Division excluding the forest areas handed over to FDCM project Division Pandharkawada and Tipeswar wild life sanctuary. There are 7 talukas in this division namely Wani, Maregoan, Ralegoan, Jhari –Jamni, Pandharkawada, parts of Ghatanji and Kalamb of Yavatmal District. This WP replace the WP (period 2002-03 to 2011-12) written by Shri. R.S. Yadav. This WP would be operational for the period 2013-14 to 2022-2023. The Government of India has approved this Working Plan vide letter no. 192 dated 19.11.2013 (Enclosed h/w). The GOM has approved this WP vide letter no. 215 dated 25.7.2013.

Prior to 1964, Pandharkawada Forest Division was a part of Yavatmal Forest Division. Latter in the year 1964, Yavatmal Forest Division was split into two separate forest Divisions i.e. East Yavatmal Forest Division and West Yavatmal Forest Divisions at Yavatmal. Pandharkawada Forest Division was the part of East Yavatmal Forest Division. Later in the year 1983, the reorganization of forest of Yavatmal District resulted in the creation of three Forest divisions in Yavatmal District Viz Yavatmal Forest Division at Yavatmal, Pusad Forest Division at Pusad and Wani Forest Division at wani. Later on wani Forest Division was renamed as Pandharkawada Forest Division and its headquarter was shifted to Pandharkawada in the year 1987. The total geographical area of the division is 422.506 sq km.

I.1.2: BOUNDARIES :

The boundaries of the division are given below.

North	-	Wardha District, Wardha River.
East	-	Chandrapur District, Wardha and Painganga River.
South	-	Andhra Pradesh, (Adilabad District), Chandrapur District, Painganga River.
West	-	Yavatmal Forest Division.

SECTION: I.2: CONFIGURATION OF THE GROUND:

Pandharkawada Forest Division is situated on the southern up-lands of Payanghat of Berar and on the eastern portion of Ajanta hills. The tract is hilly and undulating broken by broad valleys and interspersed with gently sloping plains. Most of the land of the division is high level plateau with average elevation of 350 m to 400 m and gently sloping towards eastern portion. Pandharkawada the division head quarter is situated on the bank of river khuni a tributary of Painganga at an altitude of 263 meter above Mean Sea Level. The highest point in the area is situated in Bhiwkund forest bearing compartment no. 183 near Majara village having an altitude of 442 meters above M.S.L. The entire area of Pandharkawada Forest Division is drained by the river Painganga and the river Wardha and their tributaries.

SECTION: I.3: GEOLOGY, ROCK AND SOIL :

The forests are situated on deccan trap, with greatly varying basalts. The Archean rocks are totally covered by Puranic rocks. The prevailing rock is basalt and these formations vary from homogeneous hard belts to soft and earthy belt. The softer belts are common and patches of black sheet rock are frequently found. As a result of disintegration of basalt different types of soil are formed with considerable variation in depth and physical properties. Soil produced out of common variety of basalt, vary from sand and clay loams to a hard reddish murrum, which is frequently found mixed with boulders of various sizes. The soil formed out of above mentioned process often blends with each other in varying proportions and are found containing sand, lime and gravel in addition to soil. Two broad varieties of soil are noticed in this division – 1. Medium black soil 2. Mixed black soil. Black cotton soil is also frequently met with and supports good quality forests.

SECTION: I.4: CLIMATE AND RAINFALL:

1.4.1: This area has 3 seasons i.e. summer, rainy and winter. In summer the climate is hot and dry, where as it is moderately cool during winter. The rainy season starts from 2nd week of June and continues up to September, whereas the winter season commences form November and continues till February. At Pandharkawada the maximum temperature ranges from 44°C to 46° C and the minimum temperature ranges from 8.2°C to 11.2° C.

The precipitation is received through South-West monsoon, however little rainfall is also received through North-East monsoon. The rainfall received in this area is harvested in dams, tanks and wells and this water is then utilised for agriculture, drinking and other purposes. The dams are connected through canal network to the area of utilisation, by lifting water from tanks and wells with the help of both electric and diesel pumps. 90% of annual rainfall is received during the months of monsoon and the average rainfall is 1011 mm. Tahsil wise rainfall data is given in the table below.

Average Rainfall in Pandharkawada Forest Division (in mm)

Year	Ghatanji	Kalamb	Kelapur	Maregoan	Ralegoan	Wani	Zarijamni
1	2	3	4	5	6	7	8
2000	1100.5	999.8	1100.5	1040.5	1100.5	1040.5	1040.5
2001	1100.5	999.8	1100.5	1040.5	1100.5	1040.5	1040.5
2002	1100.5	999.8	1100.5	1040.5	1100.5	1040.5	1040.5
2003	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
2004	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
2005	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
2006	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
2007	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
2008	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
2009	1031.2	948.2	1002.3	983.6	1031.2	948.2	983.6
Avg.	1052	963.7	1031.8	1000.7	1052	975.9	1000.7

SECTION: I.5: WATER SUPPLY:

The river Painganga flows from west to east forming the southern boundary of the division. Adan, which is tributary of Painganga flows along the western boundary of the division. Wardha River which is the tributary of Painganga flows from North East to South West and merges with Painganga near Jugad.

Pandharkawada town is situated on the bank of River Khuni which flows from North to south. As a result, the area suffers from the acute shortage of water during summer. The ground water potential is generally moderate to poor

Major irrigation project does not exit in this division.

There are ten medium irrigation projects in the division. These are -

1. Adan Project	2. Antargaon Project
3. Navergaon Project	4. Saikheda Project

5. Waghadi Project

6. Wai Project

7. Wadhona Tank Project

8. Hiwara Tank Project

9. Chilai Tank Project

There are also four minor irrigation project in the division. These are

1. Chopan Tank Project

2. Wardh Tank Project

3. Yedshi Tank Project

4. Lower Painganga Project

SECTION: I.6: DISTRIBUTION OF AREA:

Particulars

Appendix no. Vol.II

The total geographical area of the division: 422506 ha

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Forest area transferred to FDCM Ltd: 11993.93 ha

I-c

Forest area under TWLS: 13917.13 ha

I-d

Forest area remaining with Pandharkawada Forest Division: 58801.02 ha

I-a

Forest area in Pandharkawada Forest Division

Sr. no.	Range	Total area		Reserved forest area in ha	Protected forest area in ha	Un-classed forest area in ha
		No. of Compt.	Area in ha			
1	Mukutban	73	11013.79	10835.00	--	178.79
2	Pandharkawada	67	13887.14	13641.73	--	245.41
3	Parwa	57	10502.93	7862.96	1167.11	1472.86
4	Patanbori	31	5044.90	5018.14		26.76
5	Umri	41	7315.72	7132.95	74.97	107.80
6	Wani	81	11036.54	10938.24	--	98.30
	Total	350	58,801.02	55429.02	1242.08	2129.92

Unclassed forest includes E-class area received for compensatory afforestation & other E-class area transferred to forest department from Revenue department.

The forest area of Pandharkawada Forest Division are covered in the 19 toposheets (scale 2"=1mile) and 15 toposheets (scale 1:50000) of survey of India. The toposheets numbers are as below.

List of toposheets of SOI

Sr. no.	Scale 2"=1 Mile Toposheet no.
1	2
1	55L/16N
2	55L/16 S
3	56I/13 S
4	56I/13 N
5	55M/1 S
6	56M/1 N
7	56P/14 S
8	56I/15 N
9	56I/15 S
10	55L/18 S
11	55I/19 S
12	56I/19 N
13	56I/1 N
14	56L/7 S
15	55L/12 S
16	55L/12 N
17	55L/11 S
18	55L/15 S

Sr. no.	Scale 1:50000 Toposheet no.
1	2
1	55I/1
2	55L/3
3	55L/7
4	55L/8
5	55L/11
6	55L/12
7	55L/15
8	55L/16
9	56I/14
10	56I/9
11	56I/13
12	56M/1
13	56H/8
14	56P/14
15	56F/14

SECTION: I.7: STATE OF BOUNDARIES:

The boundaries are maintained under 1/5th boundary demarcation scheme. The existing cairns are not properly maintained and the boundary maintenance has to be improved. The boundary demarcation of forests adjoining private lands is a matter of concern. The demarcation of Reserved Forests is well maintained as compared to the demarcation of Protected and un-classed forests. In some of the forest area survey and demarcation was carried out under Survey and Demarcation. The remaining forest area and private land boundaries need to be demarcated on the ground.

SECTION: I.8: LEGAL POSITION:

For the first time in 1871 the state forests were promulgated under the Forest Rules of 1871. In 1892 Berar Forest Law was introduced and under it the State Forests were notified. In 1911, Indian Forest Act was applied to Berar State. Since then notifications were issued constituting forest under Indian Forest Act. There were two kinds of Forests in the division namely Reserved Forests declared under Indian Forest Act and Ex-private forests. The Reserved forests were divided into 'A' and 'C' class according to the principles of forest management. In the 'A' class Reserved Forests the rules of fire protection and grazing control were stringent and felling was regulated. However in 'C' class Reserved Forests rules for fire protection and grazing were regulated with few restrictions on felling. The private forests were completely vested with the Govt. with the effect of abolition of Corporate Act 1951 and were taken over by Revenue Department. Later on these areas were declared as Reserved Forest under Indian Forest Act 1927. 231.19 ha area was transferred to the Forest Department for compensatory afforestation, action is necessary for declaring this area as Reserved Forests.

SECTION: I.9: RIGHTS AND CONCESSIONS:

In Pandharkawada Forest Division most of reserved forests are not burdened with any rights and concessions, however some area of reserved forests and protected forests are heavily burdened with grazing concessions. Due to non-availability of ample forest produce the Nistar system is not in practice now. The grazing concessions are allowed as per "Grazing Policy" of Maharashtra State depending upon the cattle units and carrying capacity of forests. The grazing policy was formulated vide GR no. MFP-1365/132211-Y dated 6th December, 1968. The Chief Conservator of Forests is empowered to close any road passing through a block by providing an alternative route. According to *The Scheduled Tribes and other Traditional forest dwellers (recognition of forest rights) Act 2006*- Forest area has been earmarked to the beneficiaries.

CHAPTER II A

FOREST FLORA

SECTION: II.1: TREES:

Pandharkawada Forest Division is mostly covered with teak forests, the principal specie is teak (*Tectona grandis*). The other associate tree species are given below.

OTHER IMPORTANT TREE SPECIES: Ain (*Terminalia tomentosa*), Dhawada (*Anogeissus latifolia*), Tiwas (*Ougenia oojeinesis*), Lendia (*Lagerstroemia parviflora*), Tendu (*Diospyros melanoxylon*), Bhirra (*Chloroxylon swietenia*), Beheda (*Terminalia bellirica*), Bija (*Pterocarpus marsupium*), Bel (*Aegle marmelos*), Amaltas (*Cassia fistula*), Awala (*Embllica officinalis*), Char (*Buchanania lanzan*), Dudhi (*Wrightia tinctoria*), Ghoti (*Zizyphus xylocarpa*), Palas (*Butea monosperma*), Dhaman (*Grewia tiliaefolia*), Moyen (*Lannea grandis*), Bartondi (*Morinda tinctoria*), Lokhandi (*Ixora parviflora*), Kalam (*Mitragyna parviflora*), Rohan (*Soymida febrifuga*), Salai (*Boswellia serrata*), Semal (*Bombax ceiba*), Sisham (*Dalbergia latifolia*), Neem (*Azadiracta indica*), Bhokar (*Caridia Macleadii*).

SECTION: II.2: GENERAL DESCRIPTION OF THE GROWING STOCK:

The Forests of Pandharkawada Forest Division belong to the following types as per the classification of Champion & Seth.

Group	Champion and Seth's Classification	Local Sub type
Group 5	Tropical Dry Deciduous Forest.	
Sub Group 5A.	Southern Tropical Dry Deciduous Forests.	
Climax Type.		
1) 5A/Cia	Dry Teak Bearing Forests.	Teak Forest.
2) 5A/Cib.	Dry Teak Forest.	Degraded Scrub Forest

The majority of the area of Pandharkawada Forest Division is covered by teak forests generally of coppice origin. The all India Teak site qualities are IV and III. The crop is stunted but mainly of straight boled. Patches of malformed and pollarded trees due to either repeated coppice working or illicit felling are also noticed intermixed with the

other crop. Teak and its associates form top canopy up to 22-23 m. height. In some area adjoining human habitations there is no under storey or under storey has sparse vegetation. The crop density varies from 0.2 to 0.7 and blank patches also frequently occur. But in Tiwsala Forest Block in which teak plantations were taken during 1900 to 1909, 1923 to 1932 and 1941 to 1954 under agrisilvicultural system, pure matured to middle aged teak crops are found. The soil is compact, dry and full of boulders at places. The natural regeneration of both teak and miscellaneous species is inadequate. The proportion of teak in growing stock is high.

The composition of species is as follows.

Sr. no	Upper Storey	
	local name	botanical name
1	Teak	<i>Tectona grandis</i> (principal species)
2	Ain	<i>Terminalia tomentosa</i>
3	Dhawada	<i>Anogeissus latifolia</i>
4	Tiwas	<i>Ougenia oojeinesis</i>
5	Lendia	<i>Lagerstroemia parviflora</i>
6	Tendu	<i>Diospyros melanoxylon</i>).
7	Satpudi	<i>Dalbergia paniculata</i>
8	Bhirra	<i>Chloroxylon swietenia</i>
9	Kalam	<i>Mitragyna parviflora</i>
10	Rohan	<i>Soymida febrifuga</i>
11	Salai	<i>Boswellia serrata</i>
12	Semal	<i>Bombax ceiba</i>
13	Beheda	<i>Terminalia bellirica</i>
14	Sisham	<i>Dalbergia latifolia</i>
15	Bija	<i>Pterocarpus marsupium</i>
16	Bel	<i>Aegle marmelos</i>
	Under Storey: The understory consists of trees, shrubs, grass and climbers. The major species are	
17	Trees	
18	Amaltas	<i>Cassia fistula</i>
19	Awala	<i>Emblica officinalis</i>
20	Char	<i>Buchanania lanzan</i>
21	Dudhi	<i>Wrightia tinctoria</i>
22	Ghoti	<i>Zizyphus xylocarpa</i>
23	Palas	<i>Butea monosperma</i>
24	Dhaman	<i>Grewia tiliaefolia</i>
25	Moyen	<i>Lannea grandis</i>
26	Bartondi	<i>Morinda tinctoria</i>
27	Lokhandi	<i>Ixora parviflora</i>
	Shrubs	
28	Bharati	<i>Gymnosporia montana</i>
29	Parijatak	<i>Nyctanthes arbortristis</i>
30	Moroghali	<i>Helicteres isora</i>

31	Dhayati	<i>Woodfordia fruticosa</i>
32	Raymuniya	<i>Lantana camara</i>
33	Tendu	<i>Diospyros melanoxylon</i>
34	Grass	
35	Bhurbhusi	<i>Eragrostis tenella</i>
36	Kodmor	<i>Apluda varia</i>
37	Marvel	<i>Andropogon annulatus</i>
38	Dub	<i>Cynodon dactylon</i>
39	Paonya	<i>Schima sulcatum</i>
	Climbers	
40	Palasvel	<i>Butea superba</i>
41	Mahul	<i>Bauhinia vahlii</i>
42	Pivervel	<i>Combretum ovalifolium</i>
43	Chilati	<i>Acacia pinnata</i>
44	Iruni	<i>Zizyphus oenoplia</i>
45	Gunj	<i>Abrus precatorius</i>
46	Rankand	<i>Dioscorea bulbifera</i>
47	Ran draksh	<i>Vitex tenuifolia</i>

Poor quality Teak forests: These forests are mostly situated in open areas of Parwa, Patanbori, Wani, Umri Ranges and in patches adjoining human habitations. These forests are subjected to illicit felling, encroachments, uncontrolled grazing, frequent fires etc. The crop is dominated by teak. Under storey of the crop is lacking or inadequate because of excessive biotic pressure. The majority of forest area of Pandharkawada Forest Division is covered by poor quality teak forests which are mainly of coppice origin. The site quality in these areas is mostly IV & also III at very few places. The area of these forests is mostly undulating and hilly. The density of the crop varies from 0.2 to 0.6. The status of natural regeneration is very poor. The soil is compact, murumy with lot of boulders and without humus. The floristic composition is almost similar to that of good quality of teak forests.

Degraded scrub forests: These forests are an extension of teak forests indicating their degree of degradation, to such an extent to be reduced to scrub forests with little or no growth of trees. The area included in this category was managed under Fodder Reserve as per previous Working Plans and also the major areas under 'C' class R.F.

These forests are affected with excessive biotic pressure of nearby villages. So the degradation of these forests has set in over the year mainly as a result of heavy unregulated grazing, frequent fires and heavy illicit felling. The soil is murumy, very dry and highly

compact and lies bare without any humus. The floristic composition is like that of good quality teak forests except that they have a very few trees and contain scrub and grass.

The following species are found in this type of forests.

Trees and Shrubs: Teak (*Tectona grandis*), Tendu (*Diospyros melanoxylon*), Khair (*Acacia catechu*), Amaltas (*Cassia fistula*), Palas (*Butea monosperma*), Bharati (*Gymnosporia spinosa*), Dhayati (*Woodfordia fruticosa*), Hiwar (*Acacia leucophloea*), Ghoti (*Zizyphus xyloperum*), Nirgudi (*Vitex negundo*)

Grass: Kusal (*Heteropogon contortus*), Kunda (*Ischoemum pilosum*), Bhurbhusi (*Eragrostis tennela*).

SECTION: II.3: STATUS OF NATURAL REGENERATION:

The natural regeneration of teak and its associates is very poor. Regeneration is found in few patches. The regeneration fails to establish. Heavy grazing, repeated fire incidents, uncontrolled cattle movements; human population pressure to meet their demands like firewood and small timber and erratic rainfall are major factors that adversely affect regeneration. The enumeration data of SOFR Unit, Amravati shows that on an average there are 75.61 seedlings of height up to 1 m, 35.22 seedlings between 1 m to 3 meters height and 16.43 seedlings of above 3 m height in a hectare. The details are shown below.

Natural regeneration – average no. of seedlings per hectare

Range	No. of Compt.	Seedlings of 0.3 m to 1 m height			Seedlings of 1m to 3m height			Seedlings of above 3m height		
		Sample Area	Total Seedlings	Seedlings / ha	Sample Area	Total Seedlings	Seedlings / ha	Sample Area	Total Seedlings	Seedlings / ha
1	2	3	4	5	6	7	8	9	10	11
Mukutban	51	72.00	4120	57.22	82.08	2727	33.22	19.80	224	11.31
Pandharkawada	56	121.32	13017	107.29	109.80	3880	35.34	35.64	606	17.00
Parwa	41	55.44	2745	49.51	71.64	1837	25.64	18.72	301	16.08
Patanbori	21	27.72	2332	84.13	34.20	1199	35.06	7.56	127	16.80
Umri	22	45.72	2603	56.93	49.68	1686	33.94	20.68	420	20.11
Wani	43	63.72	4364	68.49	57.24	2921	51.03	13.68	233	17.03
Total	234	385.92	29181	75.61	404.64	14250	35.22	116.28	1911	16.43

SECTION: II.4: INJURIES TO WHICH THE CROP IS LIABLE:

II.4.1 The forests of Pandharkawada Forest Division suffer from unregulated grazing, illicit felling, encroachments and repeated fires. The other agencies which cause injury to the forests are drought, floods, parasites and insects, but it is negligible.

II.4.2: Fire: Fire is one of the most destructive factors during summer. Most of the fires are man-made and accidental which hamper natural regeneration. The damage is very severe when timber is lying in coupes. Fire is caused by grazers intentionally or unintentionally, villagers who go for moha/ tendu/gum etc. collection and persons working in the forestry operations. Sometimes it is also noticed that while fire protection works are in progress, fire may extend to adjoining forest area accidentally. Fire incidents are generally ground and creeping fires, may not reach crown level. Further fire incidents adversely affect the wildlife population, micro fauna and microorganisms in soil and vegetation. The details of fire incidents are given below.

Number of fire cases

Sr. no.	Year	No. of fire cases
1	2006-07	11
2	2007-08	18
3	2008-09	22
4	2009-10	03
5	2010-11	01

From the details given above in the table, it is observed that though the extent of fire is presumed to be vast, but number of cases of fire recorded seems to be very less in some years.

II.4.3: Illicit felling: The illicit felling is common and is increasing day by day for commercial and domestic purposes. Considering the high price of teak timber in the market, teak is most sought species for illicit cutting. Heavy illicit felling resulted into further degradation and opening up of the forest area. Local people also indulge in illicit felling for fuel, small timber, fire wood as there is huge gap between demand and supply of forest produce. Some people indulge in illicit felling due to unemployment, high prices of

teak low investment and loss risk. Lopping of trees and shrubs for rab burning of field has further deteriorated the situation.

Position of forest offence cases

Year	Fire	Grazing	Illicit Felling	Other	Total
2006-07	11	07	648	21	687
2007-08	18	26	635	11	690
2008-09	22	04	536	150	712
2009-10	03	03	820	47	873
2010-11	01	01	295	06	303

II.4.4: Grazing: Excessive movement of domestic cattle population beyond the carrying capacity of forests leads to compaction of soil, it has been enormously affecting regeneration. Uncontrolled cattle movement is common in forests. During summer period, local people resort to lopping of trees to feed their cattle. Sheep and goats are not allowed to graze in forests; however, grazing by sheep and goats is common. The details of cattle population and grazing are given below.

Cattle population and grazing fee collected

Sr. no.	Cattle/ year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Buffalo	--	4948	--	8770	4953	4310	3021	2264	1693	2617	--
2	Cows & Bullocks	--	37849	--	27503	35280	34202	26349	23902	21751	22961	--
3	Goats & Sheep	--	--	--	--	--	--	--	--	--	--	--
4	Camel	--	--	--	45.000	--	--	--	--	--	--	--
5	Other Animal	--	--	--	--	394	--	528	751	196	765	--
Total		0	42797	0	36318	40627	38512	29898	26917	23640	26343	--
Cattle units		--	24	--	24	24	24	24	24	24	24	--
Grazing fee collected		--	49667	--	44733	49507	47484	42415	40479	32335	32295	--

II.4.5: Encroachments: Forest area adjoining agricultural fields are encroached especially during the months of monsoon. Some of the forest areas have been cleared, denuded and utilized for agricultural purposes.

II.4.6: Damage by wild animals: Nilgai, sambar and chital cause damage to the young regeneration due to grazing. Chitals cause damage to the bark of young crop by rubbing their antlers. Wild boars, hares and porcupines cause damage to plantations. Porcupines eat the rhizome, bark of *haldu*, *moha* and *amaltas* near the base of the tree, which hampers establishment of trees. Monkeys cause damage to flowers, fruit trees. The damage caused by wild animals is not a serious problem when compared to damage caused by the domestic animals.

II.4.7: Insects and fungi: Skeletonizer- *Hepaliya mecharalis* and Teak defoliator- *Hybliya peura* are common. The insects attack is noticed during rainy season. Insects also attack young crop of dhawada, awala etc.

II.4.8: Climbers and weeds: No considerable damage due to climber is noticed in the Forest. Chilati, ironi are the main climbers which cause harm to the forests. Damage by lantana is also noticed affecting both regeneration and growth.

CHAPTER II B

FOREST FAUNA

SECTION: II .1: WILDLIFE POPULATION:

In the past Pandharkawada Forest Division was natural abode for a variety of wild animals. It was stated in the Berar gazetteer that tigers and panthers were numerous in the area and it was dangerous to travel on foot during night time in Pandharkawada Forest Division. In the past there were many instances of sighting wildlife near Pandharkawada town. Sometimes panthers used to come to area adjoining Pandharkawada town. Shooting of wild animals was officially allowed before enactment of Wildlife (Protection) Act 1972 in this area. Apart from carnivores many species of herbivores such as nilgai, wild boar, black buck, chinkara, cheetal, sambar, jungle cat etc occur in this area. Less common wild animals are wild dogs, wolves, hyaena etc. Tiger is also occur in this division. Due to increase in human and cattle population it has put immense biotic pressure resulting in habitat destruction, breaking of corridors of wildlife, shrinkage of forests. Therefore population of wild animals had been reduced. The details of animals occurring in this division are given below.

(A) Carnivores: Panther (*Panthera pardus*), hyaena (*Hyaena hyaena*), wild dog (*Cuon alpinus*), Indian forest jackal (*Canis aureus*), Indian fox (*Vulpes bengalensis*), wolf (*Canis lupus pallipes*) jungle cat (*Felis chaus*), mongoose (*Genus Herpestes*).

(B) Herbivores: (a) black buck (*Antelope cervicapra*), spotted deer (*Axis axis*), blue bull (*Boselaphus tragocamelus*), sambar (*Cervus unicolor*), chausingha (*Tetracerus quadricornis*) sloth bear (*Melursus ursinus*), wild boar (*Sus scrofa*), common langur (*Presbytis pileatus*), Indian hare (*Lepus nigricollis*) barking deer (*Muntiacus Muntjak*) chinkara (*Gazella Beennetti*) porcupine (*Hystrix Indica*) langur (*Presbytis entellus*)

(C) Birds: Pea Fowl (*Pavo cristatus*), jungle fowl (*Gallus sonneratii*), painted partridge (*Francolinus pictus*), common quail (*Coturnix coturnix*), crow pheasant (*Centropus sinensis*) spotted owl (*Athene brama*) civet (*Viverridae*).

(D) Reptiles: Red sand boa (*Eryx conicus*), Indian cobra (*Naja naja*), python (*Python molurus*), rat snake (*Ptyas mucosus*).

Detail of population estimation of wild animals in 2005 is given below.

Sr. No	Name	no. of animals
1	Blue bull	668
2	Barking deer	106
3	Chital	32
4	Black buck	40
5	Common langur	194
6	Wild bear	368
7	Hares	54
8	Fox	36
9	Mongoose	21
10	Peacock	111
11	Gray junle	19
12	Owl	178

SECTION: II.2:CROP DAMAGE AND CATTLE KILLED BY WILD ANIMALS:

The details of crop damage and cattle killing by wild animals and compensations paid as well as poaching, death to wild animals are given in the tables below, respectively.

Details of crop damage & compensation paid

Year	No. of cases	Crop damage in ha.	Compensation paid (Rs)
2005-06	1	2	4,000
2007-08	5793	632	12,64,000
2008-09	529	151	3,01,000
2009-10	135	42	84,000
2010-11	163	98	1,96,000
2011-12	17	40	79,000
2012-13	0	0	0

Death or injury to human beings & cattle due to wildlife attacks

Year	No. Of Cases				Human Beings Injured/Died	No. Of Cattle Affected/Died	Compensation Paid (Rs)	
	human beings		Cattle				human beings	cattle
	injury	death	injury	death				
2004-05	6	-	2	-	6	2	5,50,000	6,000
2005-06	4	-	5	-	4	5	1,08,000	41,000
2006-07	-	-	-	-	-	-	0	0
2007-08	8	-	14	-	8	14	86,000	1,04,000
2008-09	21	-	19	-	21	19	6,83,000	1,50,000
2009-10	11	-	15	-	11	15	2,29,000	1,40,000
2010-11	45	-	39	-	45	39	7,68,000	3,62,000
2011-12	10	-	41	-	10	41	6,42,000	3,70,000
2012-13	4	2	13	-	4	13	6,17,000	1,14,000

Details of poaching, death to wild animals are given in the table below.

Year	No. of offences booked	poaching			natural death			accidental		
		Tiger	leopard	Others	Tiger	leopard	Others	Tiger	leopard	Others
1	2	3	4	5	6	7	8	9	10	11
2000-01	-	-	-	-	-	-	-	-	-	-
2001-02	-	-	-	-	-	-	-	-	-	-
2002-03	-	-	-	-	-	-	-	-	-	-
2003-04	-	-	-	-	-	-	-	-	-	-
2004-05	-	-	-	-	-	-	-	-	-	-
2005-06	1	1	-	-	-	-	-	-	-	-
2006-07	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-
2009-10	-	-	-	-	-	-	-	-	-	-

CHAPTER III

UTILIZATION OF FOREST PRODUCE

SECTION: III.1: AGRICULTURAL CUSTOMS AND WANTS OF POPULATION:

The greater part of Pandharkawada Forest Division lies in the undulating or hilly areas. Hilly areas are uncultivable, but valleys and low lying areas have good soil cover usually sandy loam or black cotton mixed with varying proportion of sand, lime and gravel. The total numbers of villages are 729, whereas the villages adjoining forests are 241. The population from the adjoining villages depends on forests to meet their requirement of small wood, poles, fire wood and also cattle grazing. The original cultivators in Pandharkawada Forest Division are Andha, Gond, Kolam, Pradhan, Banjara but other communities like Kunbi, Mali, Teli etc., also cultivate crops. The details of population are given in the table below.

Population – 2001 (category wise)

Taluka	Total Population	SC	ST	Others	Sex ratio
1	2	3	4	5	6
Wani	193713	8840	13710	171163	940/1000
Maregaon	74879	4800	34410	35669	959/1000
Kalamb	95830	10480	32080	53270	952/1000
Ralegaon	104832	7580	29800	67452	940/1000
Ghatanji	125214	8570	30550	86154	950/1000
P'kawada	140907	6010	36880	98017	966/1000
Jari Jamani	72239	5810	40670	25759	972/1000
Total	807614	52090	218100	537484	954/1000

Irrigation facilities are available from wells, tanks, medium and minor irrigation dams. In the recent past emphasis has been given for the improvement of water conservation and desiltation of tanks, medium and minor irrigation reservoirs. Medium irrigation projects like Adan, Antargaon, Navargaon, Saikheda, Waghadi, and wai Project and Minor projects have been providing irrigation facilities to the area around these projects.

Important agricultural crops in this area are *jwari, cotton, toor* and soyabean. Wheat is generally grown over small patches in irrigated areas. The other crops grown in this area are *rice, bajra, gram, barbati, moong, udid, linseed, tilli, groundnut, etc.* In kharif season *jowari, cotton, toor, tilli, soyabean* whereas in Rabi season *wheat, gram, linseed etc.* are grown. This belt is cotton rich. The horticultural crops of Orange, Papaya and Banana are also regularly cultivated. Few farmers have raised *teak and bamboo* plantations. Big farmers cultivate farms with modern agricultural implements, whereas marginal and small farmers practice traditional farming. Agriculture is mostly rain fed. Around 70% populations depend upon agriculture and approximately 25-30% population live in urban areas. Growth of industries is meagre and due to this situation most of the population depend upon agricultural and allied sectors.

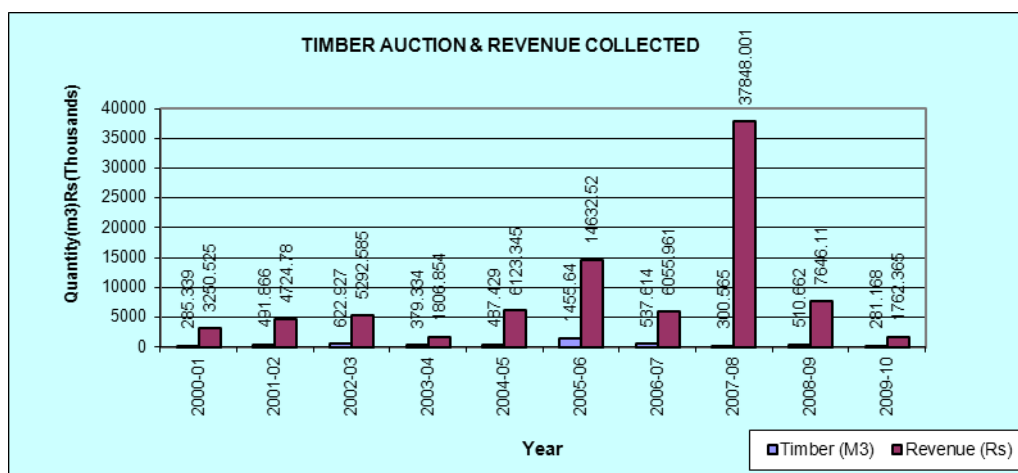
SECTION: III.2: MARKETS AND MARKETABLE PRODUCTS:

Local people utilize most of the forest produce to meet their domestic needs. Pandharkawada is a good timber market. Harvested timber is transported to local depot at Umari (Pandharkawada). Teak timber is auctioned and sent to Nagpur, Mumbai, Pune, Hyderabad and other places.

III.2.1: Timber: Timber is utilized for construction, furniture and agriculture implements. Small timber is used for different purposes. The preferred species is teak, which is followed by *Ain, Dhawda, Kalam, Tiwas, Bija, Behada & Khair*. The details of timber auctioned are given in the following table.

Details of timber auctioned & revenue collected

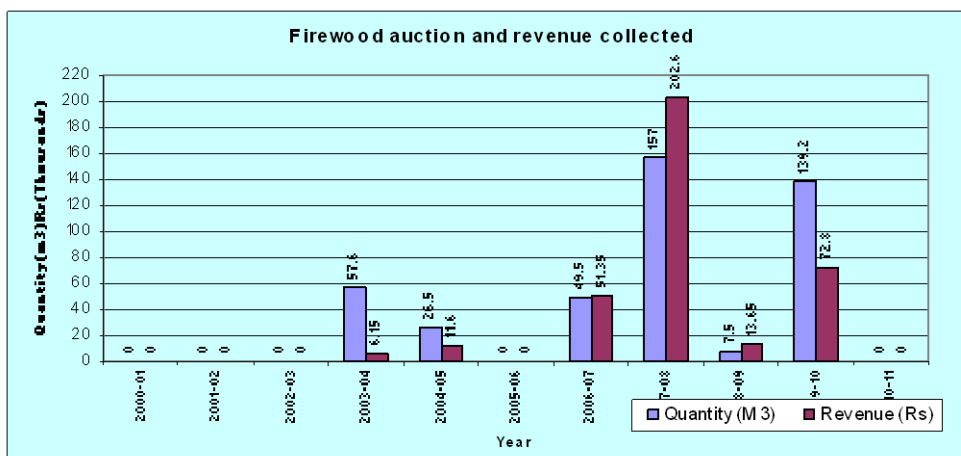
Sr. No.	Year	Timber (m³)	Revenue (Rs)
1	2000-01	285.339	3250525.00
2	2001-02	491.866	4724780.00
3	2002-03	622.927	5292585.00
4	2003-04	379.334	1806854.00
5	2004-05	487.429	6123345.00
6	2005-06	1455.64	14632520.00
7	2006-07	537.614	6055961.00
8	2007-08	300.565	37848001.00
9	2008-09	510.662	7646110.00
10	2009-10	281.168	1762365.00



III.2.2: Firewood: With the availability of LPG gas, many people have started using it, but still firewood is the main cooking fuel for most of the villagers and small towns. *Dhawada* as fuel wood is in demand and other species like *Khair*, *Ain*, *Babul* etc. are also preferred. As the demand exceeds supply, illicit lopping of the trees and carrying of head loads of lopped branches is frequently noticed. There is one fire wood depot at Wani and Pandharkawada and the firewood is sold in the open auction. The information of firewood sold is given in the table below.

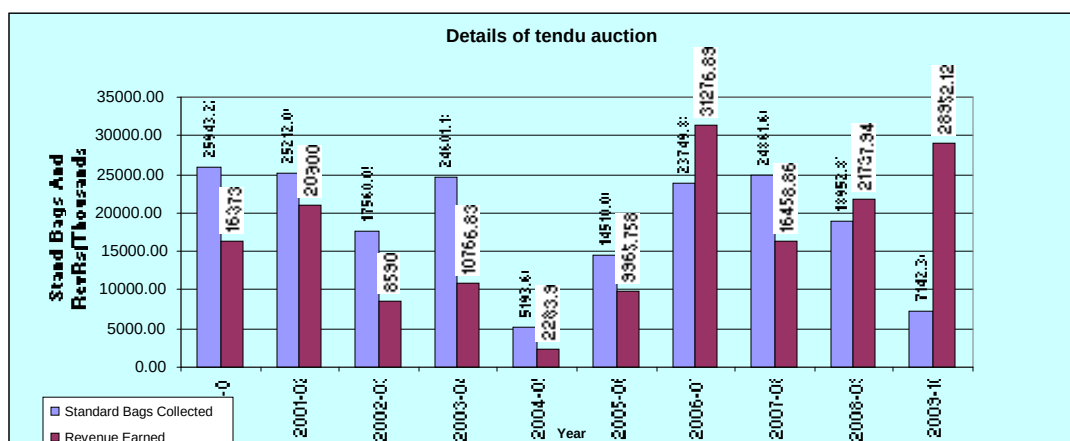
Firewood auctioned and revenue collected

Sr.no.	Year	Quantity (M3)	Revenue (Rs)
1	2	3	4
1	2000-01	0	0
2	2001-02	0	0
3	2002-03	0	0
4	2003-04	57.6	6150
5	2004-05	26.5	11600
6	2005-06	0	0
7	2006-07	49.5	51350
8	2007-08	157	202600
9	2008-09	7.5	13650
10	2009-10	139.2	72800



The details of tendu auction are given below

Sr. No.	Year	Unit Auctioned	Standard Bags Collected	Revenue Earned	Remarks
1	2	3	4	5	6
1	2001	10	25943.216	16373000	----
2	2002	13	25212.089	20900000	----
3	2003	7	17560.051	8590000	----
4	2004	10	24601.183	10766828	----
5	2005	3	5193.662	2283900	----
6	2006	13	14509.996	9965758	----
7	2007	13	23749.879	31276892	----
8	2008	13	24861.600	16458860	----
9	2009	13	18952.866	21737940	----
10	2010	13	7142.340	28952117	----



III .2.3: Minor Forest Produce: In this division under NWFP Tendu is major MFP which are sold unit wise by auction. Gum units are also auctioned.

Rosha and other grass is found mainly in Pandharkawada, Parwa, Patanbori, and Mukutban Ranges. The revenue earned out of the sale proceeds of the Rosha grass is very meagre. Sometimes units were not sold due to less yield. Other NWFP *moha flowers* and seeds, *charoli, biba, hirda and behada seeds* apart from the fruits of tendu, char, jamun, awala, imli etc. have good demand in the market. However, the production of these forest produce is less. Limited distribution of the species is the limiting factor for the production and the local people mostly utilize these items.

SECTION: III.3: METHOD OF HARVESTING AND THEIR COST:

Harvesting from coupes and thinning is carried out through ‘Forest Labourers Cooperative Societies’(FLCS) & Forest Department as per the prescriptions of WP. There are 2 FLCS working in this division. FLCS is normally given preference for coupe working and elsewhere it is carried out by Forest Department. Various operation of harvesting are carried out either on ‘daily wage’ basis or on the job works basis. The wage rates for various forestry operations are sanctioned every year by the Circle Wage Board Committee headed the CCF, Yavatmal Circle, in consultation with the FLCS. The ownership of NWFP is vested in Gram Panchayat in Scheduled Areas.

SECTION: III.4: LINES OF EXPORT:

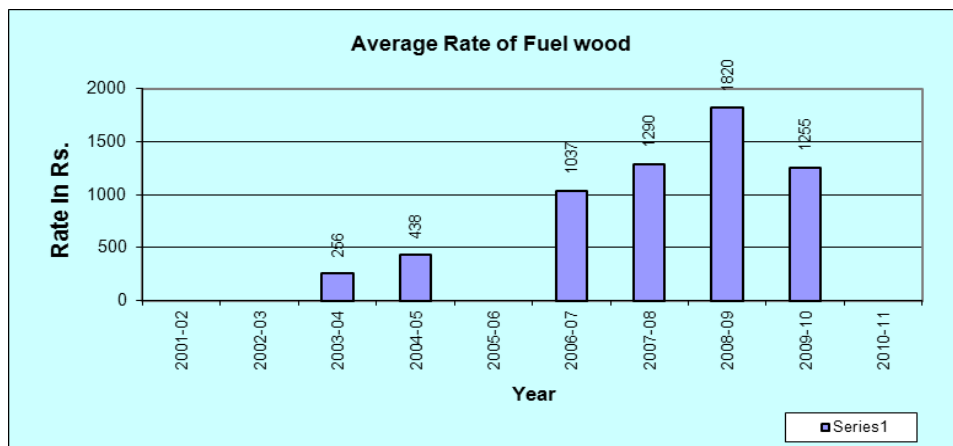
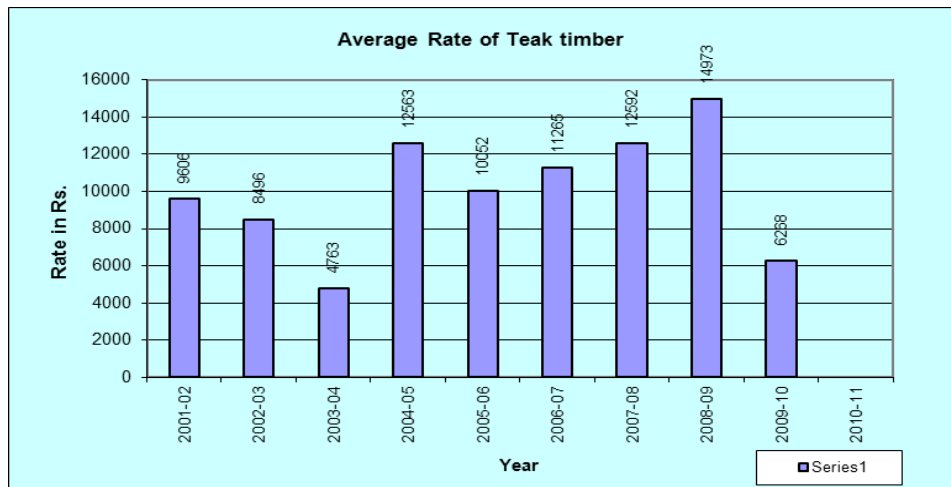
There is single railway tract (Wani to Adilabad) in the division. The entire Pandharkawada Forest Division is well connected by the National, State highways and good road network. Major transportation of forest produce is done through trucks and other vehicles.

SECTION: III.5: PAST AND CURRENT PRICES:

Average price obtained for teak timber & fuel wood in Pandharkawada Forest Division is as follows.

Average price of teak timber and fuelwood in Pandharkawada Forest Division

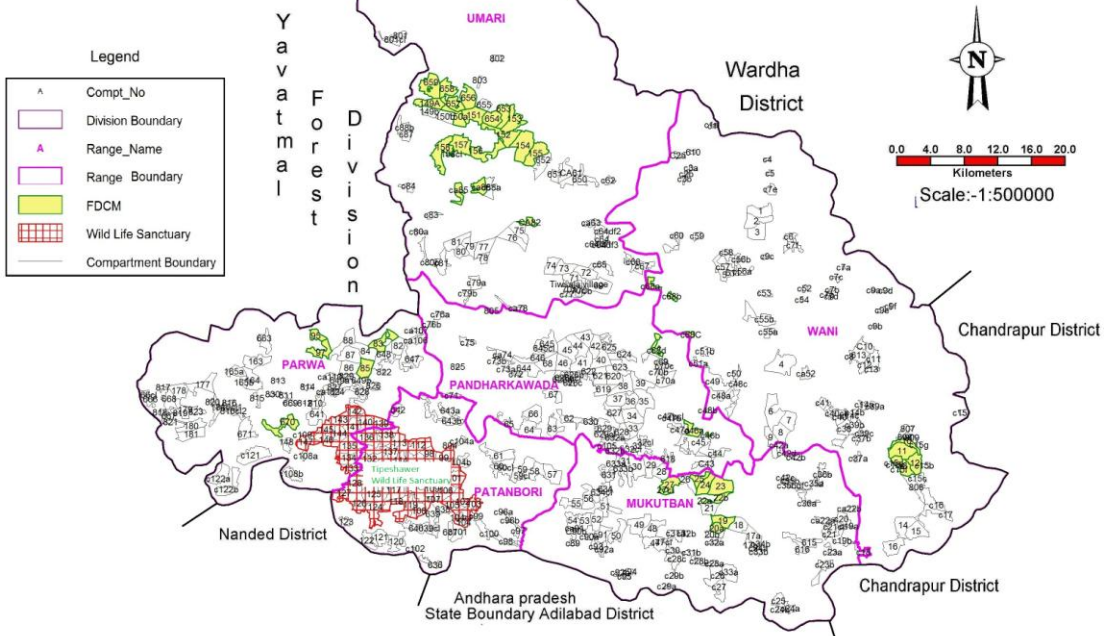
Year	TEAK TIMBER			FUEL-WOOD		
	Qty (m3)	Revenue (Rs)	Rate/m3	Qty (m3)	Revenue (Rs)	Rate/Beat
2	3	4	5	3	4	5
2001-02	491.866	4724780	9606	Nil	Nil	--
2002-03	622.927	5292585	8496	Nil	Nil	--
2003-04	379.334	1806854	4763	24	6150	256
2004-05	487.429	6123345	12563	26.5	11600	438
2005-06	1455.64	14632520	10052	Nil	Nil	--
2006-07	537.614	6055961	11265	49.5	51350	1037
2007-08	300.565	3784800	12592	157	202600	1290
2008-09	510.662	7646110	14973	7.5	13650	1820
2009-10	281.168	1762365	6268	58	72800	1255



The prices of fuel wood and timber are increasing over years and rate structure is subjected to market fluctuation.

Pandharkawada Forest Division

Map Showing Compartment Handover To F.D.C.M



CHAPTER IV

IMPACT OF ACTIVITIES BY FDCM LTD.

IV:1: Forest Development Corporation of Maharashtra Ltd (an undertaking of Maharashtra State) is having headquarters at Nagpur. It was initially constituted as Forest Development Board in 1969. Subsequently it was converted into Forest Development Corporation of Maharashtra Ltd in 1974. The FDCM was constituted with a view to converting and developing the under stocked and miscellaneous forest area with less value into productive forests by introducing valuable and production enhancing species. FDCM Ltd follows the management plans for managing forest area.

IV:2 Principles of forest management through approved management plans :

IV:2:1 The area allotted to Pandharkawada Forest Project Division Pandharkawada (FDCM) from Pandharkawada Forest Division is 11994.93 ha. Covering 42 compartments. Range wise distribution of forest area under Pandharkawada Forest Project Division is given below.

Details of area allotted FDCM Ltd.

Sr. no.	Range	Area allotted in ha.						Total
		RF	compt. No.	PF	Compt. No.	UF	compt. No.	
1	Mukutban	1861.50	8	-	-			1861.50
2	Pandharkawada	390.75	3	-	-			390.75
3	Parwa	1498.34	5	-	-			1498.34
4	Patanbori	0.00		-	-			0.00
5	Umari	6719.09	19	-	-			6719.09
6	Wani	1525.25	7	-	-			1525.25
Total		11994.93	42	---	---	---	---	11994.93

IV:2:2 To manage entire area on scientific lines a separate management Plan written by Shri V.B. Thakre, Divisional Manager for the period 2006-07 to 2015-16 is under implementation. The Management Plan is a scientific document prepared on the basis of existing forest policies, various Acts, guidelines of Government and directions of apex court from time to time. Eight WC have been formed for treatment of forests. In Teak

plantation and Reboisement WC the silvicultural system adopted is “Conversion to uniform system supplemented with artificial regeneration of genetically superior stock” as suggested by Government of India is under implementation. Under this system removal of over wood followed by raising of teak plantations is prescribed. The thinning is prescribed in Teak Plantation Management WC. Other WC are Teak Plantation and Reboisement WC, Afforestation WC, Rehabilitation of Degraded Forest WC, Protection WC, Bamboo production WC and Wildlife (Overlapping) WC.

Under the system of overwood removal followed by teak planting, the activities have been successfully carried out by Pandharkawada Forest Project Division and very good Teak plantations are raised. In the areas allotted to Pandharkawada Forest project Division the vegetal cover has increased. Under over wood removal system lot of revenue is generated to FDCM due to harvesting and disposal of timber. Studies conducted have revealed that the teak plantations after over wood removal are successful if the rains are proper, otherwise the teak plantations are partially successful and the growth rate is also not up to the mark, due to compact soil, biotic interference etc. The wildlife distributed in the areas of FDCM is similar as other areas of Pandharkawada Forest Division. In Teak plantations the diversity of the species is maintained by the nature. As far as employment is concerned in the areas of FDCM, lot of employment is generated due to activities under overwood removal followed by teak plantation, thinning in old plantations, plantation in Afforestation WC and Rehabilitation of Degraded Forest WC especially Bamboo plantation under National Bamboo Mission.

CHAPTER V

IMPACT OF FIVE YEAR PLANS

The brief account of the management during the past five year plans is given below.

SECTION: V.1: FIRST FIVE YEAR PLAN (1951-56)

Pandharkawada Forest Division was not separate unit during this period. During this period the forest was managed as per the Working Plan of Robinson. The impact of the first Five Year Plan was not noticeable, as the flow of funds was never made available for requisite achievement of management prescribed in the Working Plan.

SECTION: V.2: SECOND FIVE YEAR PLAN (1957-60)

The second five year plan also emphasized rehabilitation of degraded forests, introduction of economic species, survey and demarcation. Pandharkawada Forest Division was not separate unit during this period. During this period the forest was managed as per the working plan of Thosre. During this period systematic management of Forests was introduced. Silvicultural operation were given importance in forest management. Plan funds were not allotted for the operations of forest management some of the forests land was allotted to local villagers to raise agri-silvi plantations.

SECTION: V.3: THIRD FIVE YEAR PLAN (1961-66)

Pandharkawada Forest Division was not separate unit during this period. During this period Thosre's Plan was under implementation. Third five year plan emphasized on increasing productivity of forest by taking up plantation of fast growing species. Forest land was given to villagers for cultivation of agricultural crops and during this period lot of land had been allocated for agricultural purposes. Agri-silvi plantations were continued during this period. Scientific assessment, modern logging methods were adopted for extraction of timber. Plan funds were not allotted to any operation of forest management. The plantations were raised during this period under non-plan funds.

SECTION: V.4:THIRD FIVE YEAR PLAN (1966 TO 1969)

Thosre's Plan was under implementation during this period. There was severe drought conditions and the local people were reeling under poverty as agricultural crops had completely failed, resulted in lack of employment to agricultural labourers. The main thrust of the Government was to provide work and civil amenities to people. Efforts were made to provide employment to the people in forestry operations.

SECTION: V.5: FORTH FIVE YEAR PLAN (1969 - 1974)

Thosare's plan was under implementation during this period. This five year plan aimed at increasing productivity of forests by introducing fast growing species in plantations, assessment of forests on scientific lines and modernising logging operations. During this period the administration of forest villages was brought under Revenue Department. New approach in forestry sector emerged to divert revenue for the development of forests. Forest Development Board was formed in 1969 and it was converted into Forest Development Corporation of Maharashtra Ltd in 1974. Many successful plantations were raised during this period and no direct funding was made available from the plan components.

SECTION: V.6:FIFTH FIVE YEAR PLAN (1974 - 1979)

Thosre's plan was continued up to middle of this plan period. The forestry sector in this five year plan aimed at large scale plantations, social forestry and forest conservation. The State Government introduced Employment Guarantee Scheme (EGS) to provide employment to local people.

SECTION: V.7: ANNUAL PLAN (1979 – 1980) AND SIXTH FIVE YEAR PLAN (1980-1985)

The decision for regularising encroachments on forest land from 1/4/1972 to 31/3/1978 was taken during this period. This decision has aggravated the problem of encroachment and many people resorted to encroachment keeping in mind that these encroachments would be regularised in future. In eastern part of the division Kanekar's Working Plan was under implementation during this period, Forest (Conservation) Act 1980 was enacted. Social Forestry wing was established during this period.

SECTION: V.8: SEVENTH FIVE YEAR PLAN (1985-1990)

During this period, Kanekar's Working Plan were under implementation. Massive afforestation was taken up under EGS and other plantations were taken up under district plan schemes. The infrastructural facilities like communication, transportation, buildings etc were improved. Plan funds were allocated for the developmental activities under district plan scheme.

SECTION: V.9: EIGHTH FIVE YEAR PLAN (1992-1997)

During this Five year plan, Shri. Kanekar's Plan were in force for implementation. This plan aimed at protection of forests against biotic interference, utilisation of waste land for forestry activities, creation of awareness among people for forestry through JFM and conservation of biodiversity. Various GRs were issued for implementation of JFM from time to time. Funds from district plan schemes were made available for the various activities like plantations, roads, buildings etc. Under EGS lot of funds were made available for plantations, soil and moisture conservation works.

SECTION: V.10: NINTH FIVE YEAR PLAN (1997-2002)

During this Five year plan, Shri. Yadav's Plan for the period (2001-02 to 2011-12) were come in to force. The World Bank Project was completed during this period. The plantations of both teak and misc. species were taken up under various schemes. Funds from district plan were made available.

SECTION: V.11: TENTH FIVE YEAR PLAN (2002-2007)

During this period Yadav's Plan was under implementation. This five year plan gave thrust on JFM through Forest Development Agency. The flow of plan funds had come down drastically.

SECTION: V.12: ELEVENTH FIVE YEAR PLAN (2007-2012)

During this Five year plan by Shri. R.S. Yadav's Plan for the period 2001-02 to 2011-12 comes in to force and the new Working Plan for Pandharkawada Forest Division is being prepared and is expected to be implemented from 2013-14 onwards.

CHAPTER VI

STAFF AND LABOURERS SUPPLY

SECTION: VI.1: STAFF POSITION :

The headquarter of Pandharkawada Forest Division is at Pandharkawada which is shifted from Wani in year 1987 and it falls under Yavatmal Forest Circle. This division is headed by DCF and assisted by four ACF and 15 RFO for Forest protection, management, development and administration. There are 6 ranges, 17 rounds and 72 beats. The position of staff is given in the following table.

Details of Staff

Sr.no.	Post	Pay band	No. of posts				
			Total	Permanent	Temp.	Filled	Vacant.
Group A							
1	DCF	PB-IV- 37500-64000	1	0	1	1	0
2	ACF	PB-II-9300-34800	4	2	2	4	0
	Sub-total		5	2	3	5	0
Group B							
1	RFO	PB-II-9300-34800	15	10	5	12	3
	Sub-total		15	10	5	12	3
Group C							
1	Forester	PB-I-5200-20200	39	28	11	35	4
2	Forest Guard	PB-I-5200-20200	136	90	46	130	6
3	Chief Accountant	PB-II-9300-34800	1	1	0	1	0
4	Accountant	PB-I-5200-20200	11	10	1	11	0
5	Clerk	PB-I-5200-20200	19	15	4	17	2
6	Surveyor	PB-I-5200-20200	2	2	0	2	0
7	Jeep Driver	PB-I-5200-20200	5	5	0	5	0
8	Armed Police	PB-I-5200-20200	1	1	0	1	0
9	Truck Driver	PB-I-5200-20200	0	0	0	0	0
10	Tractor Driver	PB-I-5200-20200	1	1	0	1	0
11	Naik	1S- 4400-7440	1	1	0		1
12	Daftari	1S- 4400-7440	1	0	1	0	1
13	Peon	1S- 4400-7440	6	5	1	6	0
	Sub-total		223	159	64	210	13

Sr. no.	Post	Pay band	No. of posts				
			Total	Permanent	Temp.	Filled	Vacant.
Group D							
14	Watchman/ paharekari	1S- 4400-7440	1	0	1	1	0
15	Choukidar	1S- 4400-7440	2	1	1	2	0
16	Tractor Cleaner	1S- 4400-7440	1	0	1		1
17	Truck Cleaner	1S- 4400-7440	1	0	1	1	0
18	Office cleaner	1S- 4400-7440	1	1	0	1	0
19	Van-majur	1S- 4400-7440	49	49	0	49	0
	Sub Total – IV		62	56	6	60	2
	Grand Total		298	222	76	280	18

SECTION: VI.2: ACCOMMODATION:

The office of the Dy. CF Pandharkawada Forests Division is housed in rented private building. The residential quarter for DCF is also not available. DCF now resides in RFO's old quarter. RFO have their offices in government buildings owned by Forest Department. Details of accommodation required as per norms for forests staff and position of available accommodation are given below.

Accommodation available and required

Sr. no.	Designation	No. of Posts	Available accommodation	Required accommodation
1	DCF	1	0	1
2	ACF	4	0	4
3	RFO	15	7	8
4	Forester	39	10	29
5	Forest Guard	136	7	129
6	Chief Accountant	1	0	1
7	Accountant	11	0	11
8	Clerk	19	1	18
9	Surveyor	2	0	2
10	Driver	5	0	5
11	Police Hatyari	1	0	1
12	Truck Driver	0	0	0
13	Naik	1	0	1
14	Daftari	1	0	1
15	Peon	6	0	6
16	Paharekari	1	0	1
17	Choukidar	2	0	2
18	Tractor Driver	1	0	1
19	Tractor Cleaner	1	0	1
20	Truck Cleaner	1	0	1
21	Van-majur	49	0	49
	Total	298	25	273

SECTION: VI.3: REST HOUSES

There are one rest house and 5 inspection huts in this division. The maintenance of buildings for accommodation of staff, office buildings, forest rests houses, laboursheds, and other Government buildings is poor due to paucity of funds.

List of rest houses and inspection huts

Sr. no.	Range	Rest house / Inspection hut	Place
1	2	3	4
1	Pandharkawada	Rest house	Pandharkawada
2	Parwa	Inspection hut	Parwa
3	Umari	Inspection hut	Umari
4	Pandharkawada	Inspection hut	Karanji
5	Wani	Inspection hut	Maregaon
6	Patanbori	Inspection hut	Patanbori

SECTION: VI.4: LABOURERS SUPPLY :

The labourers supply in this division is fairly satisfactory in all seasons except some time during rainy seasons when the agricultural operations coincide with afforestation works. The labour force required for various forestry operations are available from the adjoining villages. As the agricultural practices are mostly rain fed and the labourers scarcity is seen for brief period during rainy season. Departmental works like cut back operations, road repairs etc are carried out by engaging local labourers. The labourers of some villages are skillful in carrying out forestry operations, as they have been doing these operations since ages.

CHAPTER VII

PAST SYSTEMS OF MANAGEMENT

SECTION: VII.1: GENERAL HISTORY OF FORESTS

VII.1.1: Berar was assigned to British in 1853. In 1865 an ACF was appointed for the entire forests of Berar under the administrative control of Central Provinces. For the first few years, some forest reserves were demarcated. In 1871 for the first time forest rules were applied in this area to protect forests from encroachment, illicit felling and grazing. In 1873 fire protection was introduced in these forests. In 1880 the forests and waste lands outside the regular reserved blocks were divided into A and B Class forests. Subsequently these were transferred to A Class and all these forests under A Class were set aside for production of timber, fuel and fodder. The classification of forests is as under.

A class : Reserved for production of timber and fuel and closed for grazing.

B class : Reserved for production of grass and closed for grazing.

C class : Reserved for fire wood and for the production of timber and fuel.

Class-II : For free grazing lands.

This classification appears to have been completed in 1884 but area so selected were not notified till 1892. This classification worked very well until the year 1900. The cotton prices rose with the increase of land under cultivation, the grazing area was curtailed while the livestock increased until the free grazing and class – I land could no longer sustain increasing pressure of grazing. The grazing incidences increased from 1.37 acre per head in 1896-97, 0.74 acre in 1906-07. Under these circumstances the classification was revised in Pusa Taluka, the free grazing areas of C-II was either transferred to A class or given out for cultivation or transferred to E Class (Village free grazing land not under the forests). The new class of forest “Class D” was also formed and subsequently this was amalgamated in C class in 1911. In the rest of the Yavatmal District there were no free grazing areas i.e. C-II existed and no regular enquiry was held. Land suitable for cultivation was disforested; some of the waste lands were afforested and new A Class blocks formed out of C Class on a small scale.

VII.1.2: A Class forest area was insufficient to meet the growing demand for timber and increasing population. So a major parts of 'B' class forests were transferred to 'A' class in 1913. Also during 1925-26, a portion of 'C' and 'E' class areas were transferred to 'A' class. The existing 'C' class RF are the original C-I class lands reserved for pasture. The 'C' class RF had depleted immensely due to heavy concession allowed in the past without any restriction on cutting of green wood.

VII.1.3: For a long time the ex-private forests were under the control of private owners, which were subjected to heavy felling and the grazing, resulted in gradual disappearance of tree growth and the grazing lands were degraded. During IInd World War demand for *Teak*, *Salai* and miscellaneous poles increased and heavy exploitation was carried out without considering regeneration of the forests. Some of the expropriatory forests survived even after heavy exploitation, they were subsequently taken over by the Forest Department.

SECTION: VII.2: PAST SYSTEMS OF MANAGEMENT:

VII.2.1: From 1865 to 1990: The first object of the regular forest management was to restore the forests by giving them complete rest from felling and by protection against fire and grazing. The forest in the past had suffered mainly due to unrestricted shifting cultivation, indiscriminate felling by the neighbouring villagers and overgrazing. Till 1890, "A" Class forest was worked to extract the dead wood only in the present division areas.

"C" Class forest was managed under 3 working circles, one for teak areas, one for other species and one for scrub. Purchasers were allowed to cut all the trees except the good ones and those of the marked reserve species. The system gradually became unworkable due to transfer of "C" Class forest to "A" Class complemented by heavy grazing and illicit felling leading to bad coppicing. By 1900, the working of "C" Class forest was entirely abandoned.

VII.2.2: From 1900 to 1915: By 1900, it was realized that the 'A' Class blocks were being put to loss by keeping them completely closed to felling without carrying out any improvement works. It was quite evident by then that recovery of the forests by rest alone without carrying out improvement works was slow. It was, therefore, decided to work the

blocks having sufficient demand and eventually prepare them for working as coppice with standards. The system adopted was to mark standards and to offer the rest of the trees for sale to public. The system was found to be beneficial. Due to scarcity of fodder in the famine years of 1897 and then in 1900, the “A” Class forest was thrown open to grazing and from that time onwards, a general practice of admitting cattle in “A” Class was gradually established

VII.2.3: MALCOM’S WORKING PLAN (1915-16 to 1937-38): The first regular working plan by Malcom for ‘A’ Class forest of Yavatmal Division was introduced in 1915-16. He divided the workable forest into 49 F.S. normally of 30 annual coupes each to be worked under ‘Improvement felling.’ Importance of grazing demand on forest was fully realized and so several small understocked areas were not included in the coupes and were left open to grazing for the entire period of the plan. The preservation and improvement of the pasture was ensured at the same time by prescribing the periodical closure of 5 to 15 years depending upon the intensity of grazing. C.B.O. cleaning and thinning were to follow the main felling.

Result: The increased demand after the depression of 1930 resulted into heavy felling in certain areas. The over exploitation gave a setback to the process of recovery in poorly stocked open grazing areas, which were otherwise recovering slowly and replaced the over mature and malformed crop with young to middle aged crop in the well-stocked areas.

VII.2.4: ROBINSON’S WORKING PLAN (1938-39 TO 1955-56)

Malcolm’s Plan was revised by Robinson and following 7 Working circles were formed.

- 1) Coppice Working Circle.
- 2) General High Forest Working Circle.
- 3) Penganga High Forest Working Circle.
- 4) Miscellaneous Working Circle.
- 5) Bamboo (overlapping) Working Circle.
- 6) Teak Plantation (overlapping) Working Circle.
- 7) Bamboo Plantation (overlapping) Working Circle.

The outline of the plan prescriptions and the result of working are as follows.

1) Coppice Working Circle: It included low quality teak and mixed forest generally belonging to site quality IV 'b' and 'V'. The area was divided into 48 complete and 8 half felling series with former consisting of 40 annual coupes and latter 20 annual of "Coppice With Standard" system which had been practiced earlier. The rotation age for teak was fixed at 40 years by which time, it achieved the girth of 25 inches at b.h. Upto 20 well-grown teak and miscellaneous trees per area will be retained in teak forest and upto 25 trees per acre were retained in the mixed forests which were worked only if there was a sufficient demand.

Result: The prescription proved to be quite suitable for these forests except for thinning which at times were quite heavy.

2) General High Forest Working Circle : It included medium quality teak forest, generally of site quality IV 'a' and IV 'b' with young to middle aged crop. The working circle was divided into 6 Felling series. The forest allotted to this working circle were to be converted into a series of even aged crop in 60 years. It was divided into 3 periodic blocks of 20 years each. PB-I included roughly $\frac{1}{3}$ rd of the workable area which was divided into 20 equiproductive annual coupes. Rest of the areas for PB-II were unallotted and were to be worked by compartments on a 20 years cycle where in thinnings and selection fellings (over 3 ft. gbh.) were to be carried out.

In PB-I, all teak areas capable of being regenerated from NR supplemented by coppice was to be clear felled except for the poles up to 2ft girth & above which were to be reserved and teak areas without much NR were to be thinned only. Well stocked mixed forests were to be worked only if there was sufficient demand.

Result: Heavy thinning and selection fellings in unallotted areas without any regard to future yield led to disappearance of trees of bigger girth classes. Also as a result of the exploitation under Malcom's plan and heavy selection thinnings under Robinson's plan, the area allotted to PB-I also had very low percentage of higher girth classes. Areas coming for working in PB-I after coupe No. XV, were found to be young and middle aged. The working prescribed was nothing but CWR since AR was not under taken anywhere as prescribed.

3) Penganga High Forest Working Circle: It comprised of the best teak forest along the Penganga river mostly belonging to site-quality III. The object was to convert these forests into series of even aged crop in 80 years conversion period by clear felling or concentrated regeneration fellings supplemented by AR. Only one F.S. was formed. The rotation was fixed at 80 years considering an average girth of 5ft. at bh could be attained during that time. The rotation was divided into 4 periodic blocks of 20 years each. PB-I comprised approximately $1/4^{\text{th}}$ of the workable area bearing high population of mature trees and was divided into 20 annual coupes. No regular allotment was made to the other PB's which were to be gone over once in 20 years for heavy thinnings and selection fellings (3, 5ft, & above), compartment wise.

Result: Most of the area failed to regenerate satisfactorily. Most of the crop was found to be of coppice origin only. Also heavy thinnings and selection fellings as prescribed in unallotted areas without any regard to the future yield led to the depletion of higher girth classes.

4) Miscellaneous Working Circle: The ramnas were to supply grass to the neighbouring villages and would be closed to grazing. Felling was to be carried only under the orders of Conservator of Forests.

These ramnas were found to be very useful for meeting the great demand of fodder.

b) Pasture Forests: 22 pasture series were formed. Each series was divided into groups of 4, 5 or 6 coupes closed to grazing in rotation for three years in alternation with 12, 15 and 18 years of grazing Dense patches of trees in between were to be heavily thinned.

Result : The prescriptions improved the pastures to a great extent but long periodic closure provided for improving the pastures led to the deterioration of tree growth in certain grazed blocks due to frequent severe fires.

c) In Tiwsala Reserve: 1850 acres of land had been planted with teak. The plantation are highly successful.

5) Bamboo (Overlapping) Working Circle: It included all the important bamboo bearing compartments 8 F.S. were formed with each one further divided into 4 annual coupes Bamboos were to be exploited under the standard prescriptions.

6) Teak Plantation (overlapping) Working Circle: It included part area of the Painganga Working Circle and some adjoining areas suitable for raising teak. About 40 acres were to be planted with teak every year after clear felling. Two cotton crops were also to be taken in the first two years of taking up teak plantation which covered the cost of teak plantation.

7) Bamboo Plantation (overlapping) Working Circle: Suitable areas permanently closed to grazing were chosen for bamboo plantation, *Dendrocalmus strictus* was the main species.

“C” class forests: These areas were not dealt with in the Malcolm’s plan Robinson prescribed the thinning to the congested crops wherever available and according the works were done.

Results: Heavy thinnings were carried out in certain areas for supply of teak ballies, during IInd World War. In addition, the absence of forest protection to “C” Class area resulted in the deterioration of the areas.

VII.2.5: THOSRE’S WORKING PLAN: (1955-56 TO 1970-71 EXTENDED UP TO 1975-76)

Robinson’s plan was revised by Thosare. The forests were managed under the following working circle:

- 1) Coppice With Reserve Working Circle..
- 2) Penganga High Forest Working Circle.
(Now these areas are included in Pusad Division).
- 3) Improvement Working Circle.
- 4) Plantation Working Circle.
- 5) Pasture Improvement Working Circle.
- 6) Miscellaneous(overlapping) Working Circle
- 7) Bamboo (Overlapping) Working Circle.

1) Coppice With Reserve Working Circle: It included the major workable areas of the division along with the area previously managed under “General Teak High Forest Working Circle.” The circle comprised mostly of IV ‘b’ quality teak forest. The rotation

for teak was fixed at 40 years by which time, it would achieve the girth of 24 inches (60cm) at b.h. Each felling series was divided into 40 annual coupes. The coupes were worked through the contractors except for certain area and “C” class forest transferred to “A” Class which were worked departmentally in order to supply timber and fuel to the surrounding population. The intensity of the fellings varied with the density of the crop and the thinnings were prescribed after 10 and 20 years of main felling in Teak F.S. while no thinnings were prescribed for Misc. F.S.

Result: The prescription in general proved to be quite suitable except for the following discrepancies –

- a) The contention that teak trees become unsound after the rotation age of 40 years i.e. after achieving the girth of 60 cm at b.h. was not correct since certain F.S. namely Kharbi, Korat, Chikli, Sondhabi, Morachnadi, Masalage, Bhansara were found to be capable of producing sound Teak trees upto trees 105 cm. girth at bh.
- b) The thinnings in general, were found to be heavy, more like revenue fellings than the silvicultural thinnings, resulting in over exploitation of the forest.
- c) Marking in Main felling Series Bhansara, Satara, Anjandhed, Kharbi, was to be done by gazetted officer as per the prescription but this was not attended to.

2) Penganga Selection Cum Improvement Working Circle : It included the best teak forests, mostly belonging to site quality II, situated along the bank of penganga river. The area was earlier worked under “Penganga high forest working circle”. Only one FS with two cutting section “A” and “B” were formed.

Cutting section “A” included the area which could not be worked during Robinson’s plan and had mature crop. It was divided into 10 annual coupes and only thinnings on 10 years cycle was prescribed. 16,187 ha. of Teak plantations mixed with Semal, and Siwan were prescribed each year on agri-silvi basis in cutting section “B”. Mechanical thinnings were prescribed in 5th and 10th year respectively and later on light crown thinning on 10 years cycle was prescribed in section “B”. In cutting section “A”, 10th year thinning and subsidiary silvi-cultural operations were prescribed.

Results: Since the forest to be worked under SCI, so dividing the FS into two cutting section depending upon the age of crop and suggesting different treatment was of not much consequence. It was prescribed to remove 140 teak trees of over exploitable girth per year but the defective execution led to over exploitation at times. Under the guise of improvement marking the preselection girth class trees were also marked for felling to considerable extent resulting in over exploitation. Teak plantation in coupes were not taken up systematically. Timely thinnings were also not carried out resulting in the congestion of plantation.

3) Improvement Working Circle : It included open teak forest with stunted and malformed crop suitable in Kharbi (Pusad Division) and Jaorala Plateau (Pandharkawada Division) to be managed under Improvement fellings. Felling cycle was fixed at 20 years.

Result: It was noticed that the prescriptions were not rigidly followed, resulting in over exploitation of the crop. The size of each annual coupe was about 400 ha. which was quite big for control and effective supervision.

4) Plantation Working Circle: It included old teak plantation of Tiwsala and Kinwat reserves and suitable areas for raising plantations. Method used was to clearfell the area followed by agri-silvi plantation. Cotton crop was to be taken up along with teak for the first two years.

Result: Teak and mixed plantation raised during the plan period had shown wide variations in success mainly due to soil condition, lack of timely operations and lack of tending the crop after plantation. However results obtained in Tiwasala block are encouraging.

5) Pasture Improvement Working Circle: It included large understocked areas fit for pasture lands. Pasture Series were formed and each pasture series was divide into 4 or multiple of 4 coupes. One out of every four coupes was to undergo three years of monsoon closure continuously and tends to remain open to continuous grazing for next nine years. Operations aiming at improvement of pastures were to be done one year before the closure. Similarly planting of fodder trees like Anjan, Bija, were introduced in the coupe one year before the closure.

Result: Closure to grazing could not be effectively implemented as the pasture lands were surrounded by cultivations and villages. All the areas were grazed heavily.

6) Miscellaneous Working Circle: It included all the forest-villages and areas not allotted to any other working circle.

(a) Grass birs or ramnas – There were 13 grass birs or ramnas in the entire Yavatmal District, meant for supply of grass to the neighbouring towns and villages. Grazing was strictly prohibited. The prescriptions included the introduction of better fodder grasses, opening the dense patches of shrubs and trees and planting of fodder tree species.

Result: Only two ramnas Viz Ladkhed and Gahuli were wire-fenced. The prescriptions were followed to some extent in Gahuli ramna which was the best of the lot. Other grass birs were located in Darwha range where there was no appreciable demand for grass.

(b) Forest Villages – There were 25 forest villages in the Yavatmal District. They were managed according to the instructions contained in para 68 and 69 of the “CP” and Berar Forest Manual Vol-I”, however vide govt. notification no. FLD-3269-221239-WL, dated 20.12.1969, they were disforested and were later managed by the revenue dept. under the provisions of “Maharashtra Land Revenue Code – 1966”

7) Bamboo Overlapping Working Circle: It included all the important bamboo areas. The felling cycle was fixed at 4 years. The area was divided into 11 F.S. and each F.S. was divided into 4 annual coupes. The area was to be worked as per the standard bamboo working.

Result: The prescriptions were not systematically followed resulting in the formation of malformed and congested clumps. Bamboo plantations undertaken during this plan period were almost failures.

VII.2.6: WP FOR EAST YAVATMAL DIVISION BY SHRI V.R. KANEKAR (1982-83 TO 1997-98)

For East Yavatmal Division Shri. V.R. Kanekar wrote the Working Plan, which was under implementation from 1982-83 to 1997-98. In Yavatmal Forest Division, eastern part of the forests was carved out from East Yavatmal Division and Western part was carved from West Yavatmal Division and by amalgamating these two parts, Yavatmal Forest Division had been created in 1983 vide Government Resolution No. FDM/1Bb-F-2/ dated 29th August 1983. Shri V.R. Kanekar revised WP of Shri Thosre, which was meant for entire old Yavatmal Forest Division pertaining to East Yavatmal after bifurcation of old Yavatmal Forest Division into East Yavatmal and West Yavatmal Forest Divisions. The brief narration of prescriptions and their impact is discussed below.

1) Coppice with Reserves WC: The forests capable of producing small timber, poles and firewood, site quality IVb, IVa were included in this WC. Most of these areas were managed under CWR system in the previous plans i.e. Malcom's Plan and Thosre's Plan. The crop was young to middle aged with Teak as the principal species and forms more than 50% of the crop canopy with its natural associates like ain, dhawada, lendia, khair, tendu etc. The area was divided into 42 Felling Series with a felling cycle of 40 years forming 40 annual coupes in each felling series. The rotation period was fixed at 40 years by that time teak would attain girth of 76 cm at breast height. In this system 150 trees per hectare were reserved for site protection and also as seed bearers including semal and salai trees above 100 cm girth. Further clear felling of 10 % of area with minimum of 5 ha in well stocked areas followed by AR, diffused plantation of suitable species in under stocked area were prescribed. The girth limit of reserved trees was between 25 cm and 45 cm for Teak species. While reserving trees of edible fruits and flower bearing trees of moha, char, awala, tendu and rare local species like bija, sisham, haldu, shivan and kulu were to be considered for reservation upto 60 cm girth. CBO after one year of felling and cleaning in 5th year after main felling were prescribed and thinning was prescribed into 20th year of the main felling for the general crop.

Results: The areas were repeatedly managed under CWR System since the time of Robinson's WP (1938-39), it has resulted in reduced coppice vigour of teak and its associates. The proportion of teak has increased when compared to miscellaneous species

since teak is a good coppicer. Apart from this the soil had become compact due to adverse biotic factors like illicit cutting, heavy grazing and frequent fires, adversely affecting regeneration of both teak and its associates. The prescriptions of stool dressing and reduction of coppice shoots to 1 or 2 per stool had not been scrupulously followed resulting in a number of shoots getting established from the same stool. There was no prescription for reservation of the advance growth; more over due to reservation of teak trees falling between 25 cm and 45 cm girth class the crop remained devoid of good seed reserves thereby affecting natural regeneration. The higher girth class (above 60 cm girth at breast height) was found to be selectively marked at many places even in the well stocked areas and the marking was found to be conservative without any valid reason and coincide with the CWR System. It was observed in many areas that Coppice Selection System was followed rather than CWR system in which felling was carried out as in Selection System but the regeneration is obtained by coppice. At many places, it was observed that out of 2 or 3 poles or trees arising from the same stool only one was felled while retaining the others. Later multiple shoots arose from the freshly cut stools

thereby resulting in multiple shoots, poles and trees arising from the same old stool due to bad coppicing practice. It was also noticed that CBO, cleaning and thinning prescriptions were not followed.

2) Tiwsala Plantation WC: Tiwsala Plantations raised since 1930's were included in this WC, with an object to meet the demand for medium sized Teak timber and to use the area to its fullest productive capacity. The silvicultural system followed was "clear felling and planting by agri-silvi method" with a rotation of 60 years. Only one felling series was formed with 20 coupes. In the plantation 1st and 2nd mechanical thinning were prescribed at 8th and 12th years respectively.

Results: The area was not attended and results are not known. The area presently is with over matured Teak trees at places with crop density around 0.7 to 0.8. The crop requires silvicultural operations to improve its growth and hygiene. As such the total area now is in Pandharkawada Forest Division.

(3) Pasture WC: Majority of the areas included in this WC were blank and under stocked containing stunted trees of salai, palas, dhawada, hiwar, khair, ber etc. The cattle unit prescribed was 0.4 ha. The area was formed into 25 Pastures Series with each series

divided into 4 or multiple of 4 annual coupes. One out of every 4 coupes was to be closed to grazing for 3 years continuously and thereafter the coupe was to remain open for nine years. No grass cutting was allowed in closed coupes which were to be fire protected. Introduction of superior fodder grass and fodder tree species during the closure period were prescribed.

Results: The Working Plan prescriptions were not followed. The practice of rotational grazing as prescribed could not be implemented successfully. Heavy grazing without any improvement works resulted in further deterioration of pasture areas.

(4) Kuran WC: Most of the areas managed under the same system or Pasture WC in the previous plans were included in this WC. The area was mostly without tree growth and grass present in these areas have less fodder value. Barbed wire fencing was prescribed for all areas and an area of 25 ha per year per Kuran was to be taken up for reboisement with better fodder grass. These areas were to be permanently closed to grazing and the grass was to be sold only on cutting basis after 31st October. Prescriptions were made for eradication of unpalatable grass.

Results: Most of the Kurans were not attended and maintained as per the prescriptions. The area could not be closed to the cattle since majority of them were not wire fenced, which led to the further deterioration of the sites. People's response was poor for cutting and purchasing fodder to stall feed their cattle, due to the availability of grass in the adjoining forests. However few Kurans were wire fenced and properly maintained, had luxuriant growth of fodder grasses. In many Kurans, plantation of different schemes have been raised, most of the plantations did not succeed.

(5) Afforestation WC: In this WC, area having little or no tree growth was included. In zone- I soil and moisture conservation works were prescribed, whereas zone- II area as to be treated with V- shaped furrows and grass seed beds. In zone – III area tree plantation was to be carried out either in trench pits alone or in the combination of uralis and trench pit. Closure to grazing for 5 to 10 years was prescribed.

Results: The area included in this WC was tackled under Massive Afforestation Programme since 1988 including other area. Teak and miscellaneous species plantations raised in these areas have not given encouraging results.

(6) Bamboo (Overlapping) WC : The entire areas divided into 11 cutting series with a cutting cycle of 3 years and each felling series was divided into 3 annual coupes. Prescriptions were made in the plan for raising bamboo plantations in suitable areas.

Results: Bamboo plantations raised under various schemes were not successful. They were affected by wild boar and the stocking of natural bamboo in the forest was also negligible.

(7) Wildlife (Overlapping) WC: The entire forest area of Pandharkawada Forest Division was included in this WC. The prescriptions include digging of water holes, no felling in radius of 100 meters from the natural shelter of the wildlife, construction of nala bunds, providing salt-licks and planting fruit species and other habitat improvement measures.

Result : All these prescriptions were hardly followed.

VII.2.7: SHRI R.S.YADAV'S WP (2002-03 TO 2011-12) : Shri Kanekar's WP was revised by Shri. R.S.Yadav. The details of prescriptions of WP written by Shri R.S.Yadav for Pandharkawada forest Division and results of implementation are described below.

(1) Selection-Cum-Improvement WC: It included the areas which bear coppice crop, largely of teak trees. The area included in this WC was previously managed under Coppice With Reserves system, Teak Plantation WC and SCI WC. The crop in general is young to middle aged and the crop density is 0.4 to 0.7, the site quality is IV and few patches of site quality III. Teak is dominant species along with its common associate ain, dhawada, salai, lendia, bhirra, tendu, char etc. salai dominates in dry locations. Matured teak trees are in the process of hollowing. Teak constitutes a high proportion of the total stock. The natural regeneration is inadequate. The basic aim was to replace the stunted coppice growth with high forests by encouraging seedling regeneration tending. Natural regeneration of seedling origin, supplemented with artificial regeneration was prescribed. The selection girth was fixed at 75 cm girth at breast height for site quality IV and 90 cm girth at breast height for site quality III and III/IV. The felling cycle was fixed at 10 years. Total area allotted to this working circle was 26,384.02 ha; the area was divided into 25 felling series and 10 coupes in each felling series. For treating the coupes the areas were divided into type A- protection areas, type B- under stocked area, type C- pole crop and old plantation area and type D- well stocked area. In the blank area planting of 50%

miscellaneous species was prescribed. In subsidiary silvicultural operations CBO, cleaning operations were prescribed. Tending of seedling regeneration, soil and moisture conservation measures like nala bunding, gully plugging, trenches, nala bunding etc were prescribed. It has to be supplemented by AR with suitable species.

Result:

1. Annually estimated yield was 4200 cmt. per year & estimated yield is above 3 cmt./ha. to the bottom level
2. Normally actual yield obtained is less than estimated yield.
3. Comparatively yield varies due to harvest in old teak plantation comparing to the other non-plantation teak area.
4. Tending operation and regeneration activity (NR & AR) has not been carried out as per the norms. Only 9% area have been covered. (NR 875/9670 & AR 1189/12496 ha)
5. Plantations raised under Artificial regeneration till 2006 are not successful. Desirable growth seen, is not satisfactory though 5 to 20% plants established. The current plantations which are under maintenance as per scheme are better in survival (40 to 90 %) but growth is undesirable (0.30 to 1.00 mtr.)
6. 50% teak has not been planted in the mixed plantation
7. Main reason for the shortfall is paucity of funds.
8. The coupe no.-I was not worked for want of due felling permission.

(2) Improvement WC: The area previously managed under Coppice with Reserves WC. The total area allotted to this WC was 8410.46 hectare, site quality IV with scattered patches of site quality III and density was 0.4 to 0.6 or even more at places. The crop is young to middle aged. The dominant species is teak along with its associates ain, hirda, dhawada, tendu, kalamb, mowai etc. The primary objects of management were to improve the crop, to check the soil erosion, conserve soil and moisture and to improve the forest crop. The 37 compartments have been included in this WC and divided into 9 working series, having 10 coupes in each working series. The treatment prescribed was improvement felling of malformed trees and thinning. For treating the coupes the areas were divided into type A- protection areas, type B- under stocked area, type C- pole crop

and old plantation area and type D- well stocked area. No yield regulation was prescribed. Soil and moisture conservation measures like gully plugging, nala bunding and WAT (Water Absorption Trenches) were prescribed and greater emphasis was given to soil and moisture conservation works. Tending of natural regeneration, supplemented with artificial regeneration was prescribed. In the plantations 50% teak and 50% of miscellaneous species were prescribed. In subsidiary silvicultural operations CBO, cleaning operations were prescribed.

Results:

1. Annual estimated yield as per plan was 219cmt.
2. Improvement marking has not been done in most of the coupes therefore left as unworked coupe.
3. Though improvement marking was prescribed, trees of selection harvestable girth has been felled in worked coupes (e.g.Compt. No.176,60,66,622,626a,626b,626c)
4. Regeneration activity (NR & AR) has not been carried out as per the norms. Only 20% area has been covered (NR 945/3873 & AR 595/3682 ha.)
5. Plantations raised under Artificial regeneration till 2006 are not successful. Desirable growth seen is not satisfactory though 5 to 20% plants established. The plantations which are under maintenance as per scheme are better in survival (40 to 90%) but growth is undesirable (0.30 to 1.00 m.)
6. 50% teak has not been planted in the mixed plantation
7. Main reason for the shortfall is paucity of funds.
8. The coupe no.I was not worked.

(3) Afforestation WC: Under stocked and open forest area having site quality IV have been included in this WC. The tree crop is young to middle aged. The principal species is Teak with its natural associates like ain, dhawada, char, tendu etc. These areas were subjected to heavy grazing which resulted in compaction of soil. The total area allotted to this WC was 16,785.06 ha. The special objects were to check soil erosion by adopting suitable soil and moisture conservation measures, to improve vegetal cover, to control biotic interference and to increase the productivity of forests. The status of natural

regeneration of teak and its associates was poor. The total area was divided into 17 Working Series and each series was divided into 10 coupes. Plantations have to be carried out in 2 phases.

Phase - I Restorative Phase: Restorative phase having duration for 3 years, in which TCM or live hedge fencing, soil and moisture conservation measures were prescribed. Singling and cut back of root stock and involvement of JFM Committee members were also prescribed. Phase – II Productive Phase: This phase commences in 4th year in which PPO, PYO, were prescribed. No yield was prescribed to this WC. For treatment, coupes were to be divided into 4 categories viz. A- Protection area, B- under stocked area, C- pole crop and old plantation area and D- well stocked area. No marking was prescribed except removal of dead trees. Plantations were prescribed in B- type area. Improvement of natural regeneration was prescribed by taking up tending operations, in all areas. In subsidiary silvicultural operations CBO, cleaning and thinning operations were prescribed. This phase shall be of up to 7 years duration.

Results:

1. Annual estimated improvement yield as per plan 201cmt. per year
2. Improvement marking has not been done, left all coupes unworkable.
3. Regeneration activity (NR & AR) has not been carried out as per the norms. Only 14% area has been covered (NR 600/2626 & AR 1046/8870 ha.).
4. Plantations raised under Artificial regeneration till 2006 are not successful. Desirable growth seen is not satisfactory, though 5 to 20% plants established. The plantations which are under maintenance as per scheme are better in survival (40 to 90%) but growth is undesirable (0.30 to 1.00 m.)
5. 50% teak has not been planted in the mixed plantation
6. Main reason for the shortfall is paucity of funds.

(4) Fodder Reserve WC: The area included in this WC was previously managed under Fodder Reserve WC and Pasture WC. The site quality of the area is IVb, mostly open or sparsely wooded. In most of the Ramnas grass of less fodder value like Kushal (*Andropogon contortus*) and Bhurbhshi (*Eragrostis tennela*) are available and good fodder

grass like shedra, Paunya marvel etc. sparsely occur. Total area included in this working circle was 5,451.15 ha. Compartments allotted for rotational grazing were divided into 4 sections and each section should be under treatment, closed for grazing for 3 consecutive years; from 4th year onwards controlled grazing was to be permitted during October to May. Intensive soil and moisture conservation works, removal of weeds, thorny shrubs, bushes, eradication of unpalatable grass like kusal, bhurbhushi etc., sowing seed of superior fodder grass shedra, paunya, marvel on lower side of the contour trenches etc. were prescribed. Treatment like intensive fire protection, closing of area permanently to grazing in Ramnas was also prescribed.

Results: The working plan prescriptions were not followed. The practice of rotational grazing was not implemented, therefore heavy grazing without any improvement works resulted in further deterioration of this area. There are no old fenced areas under this WC. Moreover the response of people was very poor towards cutting and purchasing of fodder to stall feed their cattle, due to the availability of adjoining forests for grazing. Many plantations taken up under various schemes did not succeed. It is evident that the fodder improvement area had been neglected.

1. Regeneration activity (NR & AR) has not been carried out as per the norms. Only 14% area has been covered (NR 150/394 & AR 286/2646 ha.)
2. Fodder development activity & plantations has not been carried out.
3. Plantations raised under Artificial regeneration. Plantations till 2006 are not very successful. Growth is not satisfactory & mostly 0.30 to 1.00 m. height of planted seedling is observed, though 5 to 20% plantation survival noticed. The current plantations which are under maintenance as per scheme are better in survival (40 to 90%) but growth is undesirable (0.30 to 1.00 m.)
4. 50% teak has not been planted in the mixed plantation
5. Main reason for the shortfall is paucity of funds.

(5) Joint Forest Management (Overlapping) WC: Area included in this WC is 30,646.67 ha in 207 compartments. The main objects were to seek people's participation especially the members of JFM committees in protection of forests, to increase vegetal

cover and to check soil erosion. The areas were to be treated as per microplan to be prepared in consultation with villagers as per the instructions of the Government.

(6) Wild life (Overlapping) WC: Area included in this WC is 58907.02 in 318 compartments. It covered the entire forest division area. The working plan prescribed digging of water holes, no felling in a radius of 100 meters, from the perennial water source, no felling in a radius of 500 meters, from the natural shelter of the wildlife, construction of nala bunds, making available salt licks at suitable place and strict protection of wildlife by erecting watch towers etc.

All these prescriptions were hardly followed. Separate wildlife sanctuary namely Tipeshwar wildlife sanctuary had been carved out for better management of wildlife which is now under administrative control of pench wildlife Division at Nagpur.

(7) Miscellaneous WC: 1,876.34 ha area was included in this WC in 20 compartment. Some of the areas have already been transferred to other departments prior to 1980, but these areas have not been disforested by issuing notification. Other areas like nursery, forest quarters etc are also included. This forest land was not managed under any silvicultural system.

SECTION: VII.3: CHANGES IN GROWING STOCK:

The forest of Pandharkawada Forest Division was brought under regular management after 1865 and a systematic working plan on scientific lines was introduced in 1915-16 with an object of improving forest crop both in quality and composition. General protection of forests, fire protection, regulated grazing were given much more emphasis. The representation of Teak has increased in growing stock due to preferential treatment in favour of Teak by sacrificing miscellaneous species was given in the prescriptions of the working plan and Teak spread even in Salai and other miscellaneous areas. In some patches of the forests Teak has become almost pure crop. The inherent qualities of Teak to withstand ill-effects of grazing, fires and other hard conditions better than its associates resulted in formation of pure Teak patches in some pockets of the forests. The system of management adopted in Malcom's WP improvement felling, the type of marking and allotment of standing coupes to contractors, growing demand for large size timber in First World War etc led to heavy felling in some pockets of the forests. These heavy felling

resulted in replacement of old crop with the new crop well grown coppice forest in well stocked and dense areas but in poorly stocked and open grass areas the treatment caused lot of damage to the process of recovery. The forests were over exploited, resulted in young to middle aged crop even in better quality areas.

In Robinson's WP prescriptions for heavy thinning and selection felling in all areas except PB-I led to over exploitation of forest and depletion of trees in higher girth classes especially during Second World War time. The areas failed to regenerate by natural regeneration and most of the crop was found to be coppice origin. Moreover heavy thinnings and selection fellings without any regard to future yield resulted in disappearance of higher girth classes. The same situation was there with the PB-I area. The system of CWS in Malcom's WP was proved to be very suitable to the forests included in CWS Working Circle, except thinning. The treatment applied in fodder reserve has given better results in quality and quantity of fodder to a great extent, however long periodic closure provided for improvement of pasture led to the deterioration of tree growth in certain grassy blocks due to repeated fires.

During implementation of Thosre's WP the prescriptions made in Painganga Working Circle resulted in over exploitation due to improper implementation of prescriptions. The thinnings were not carried out timely in the plantations resulted in congestion of Teak plantation. The prescriptions made in CWR Working Circle proved successful as far as felling operations are concerned. The thinning was aimed at revenue oriented thinning rather than silvicultural thinning which resulted in over exploitation of forests. The subsidiary silvicultural operations as prescribed in working plan were not carried out resulted in establishment of multiple coppice shoots led to heavy competition and congestion in the coppice crop. Even the prescriptions made in Improvement Working Circle were not followed scrupulously, led to over exploitation of the forests. The plantations raised during this period have shown wide variation in success as tending operations were not carried out properly. Pasture areas were subjected to uncontrolled and heavy grazing led to further deterioration of area. The prescriptions were made of Bamboo (overlapping) Working Circle were not systematically followed resulted in malformed and congested crop and Bamboo Plantation which were taken up in this period totally failed.

In Kanekar's WP most of the area was treated under CWR system and as areas have been managed under CWR system in previous plans resulted in loss of coppice vigour of Teak and increase in stocking of Teak of the crop due to better coppice capability of Teak and poor coppicing potential of miscellaneous species. These areas were subjected to heavy grazing, illicit felling, frequent fires resulted in non-establishment of natural regeneration of Teak and its associates. The prescription for reducing coppice shoots to one or two per stool was not properly followed. Reserves of Teak between 25 cm and 45 cm girth-class remained devoid of good seed reserves there by effecting natural process by seed. Subsidiary silvicultural operations were not properly followed, overall crop was subjected to deterioration under the treatment of CWR. In Pasture and Kuran Working Circles the prescriptions were neglected for implementation, resulted in heavy grazing, deterioration of soil conditions, though some of the Kurans were fenced. During this period areas of Afforestation were tackled under Massive Afforestation Programme which could not yield proper results, led to situation of further degradation of these areas with blank and opened forests. The situation in Pasture improvement and Fodder Improvement Working Circle has further worsened due to non-implementation or improper implementation of working plan prescriptions. In Bamboo (overlapping) Working Circle the Bamboo plantations did not yield encouraging results.

In general the type of treatments prescribed in CWR Working Circle with a preferential treatment in favour of Teak by sacrificing miscellaneous have resulted in stunted growth of coppice crop of Teak and miscellaneous due to repeated management under CWR system. In other working circles improper implementation of working plan prescriptions coupled with the problems of biotic interference, illicit felling, encroachment, heavy grazing, frequent fire, resulted in further deterioration of forests. Poor establishment of natural regeneration and failure of plantations under artificial regeneration is causing alarming situation about the future of these forests.

SECTION: VII.4: REGULATION OF GRAZING IN FORESTS:

The State Government vide Government resolution No./MFP/ 1365/13211-7, dated 6 December 1968 formulated the grazing policy for the state of Maharashtra. The grazing policy provided for classification of forests on functional basis, formation of grazing units,

permit of grazing etc. In the past during the revision of working plan the working plan officers used to give special emphasis on grazing policy, formation of grazing units, carrying capacity of forests for which grazing was to be allowed, closure to grazing, rotational grazing etc.

Prior to 1912-13 the C- class forest had always been opened to un-restricted and unlimited grazing to all animals, where as grazing in 'A' and 'B' class forest was allowed with some restrictions. All 'A' class forests when constituted as State Reserves, the grazing was absolutely not allowed. In 1884-85 very light grazing excluding sheep and goats was allowed and this continued till 1888-89. In 1889-90 grazing was again stopped and all reserves were closed to grazing upto 1899 and due to famine and scarcity of fodder in 1899-1900, all reserves were thrown open to grazing and the same system was continued upto 1904-05 except only exploited compartments being closed to grazing.

In Yavatmal reserves some measures were taken in 1907 to gradually reduce the number of cows and bullocks to a standard of one cow or bullock to every 1.5 acres of area of 'A' and 'B' class forests available for grazing under annual plan of operations. During this time sheep, goats and buffaloes were totally excluded from grazing in forest. The areas under "Coppice-with-Standard" system of 49 felling series of 30 coupes, with a three year closure and other felling series of 5 to 6 years and it was prescribed a ten years closure of coupes after exploitation.

SECTION: VII.5: SPECIAL WORKS OF IMPROVEMENT:

VII.5.1: INFRASTRUCTURAL FACILITIES:

(1) Roads: The road network in the division is fairly good, all the range headquarters, round headquarters, beat headquarters are very well connected with all weather roads. Many roads are maintained by P.W.D. and some of the roads are maintained by Zilha Parishad, whereas many short length roads which have been constructed in order to connect small reserves to district roads are maintained by the Forest Department. Forest Department constructs extraction paths and maintain some interior roads for the purpose of forest management. A list of forest roads are given in Appendix. No.VIII of volume II of this plan.

(2) Buildings and wells: Quarters have been constructed from time to time for field staff. In the past forest wells were constructed in range head quarters and some round head quarters for water availability to the forest staff. Cement bandhara, vantalavs were also constructed in forests. List of buildings available in the division is given in Appendix No.VII and list of wells is given in Appendix No. IV of Volume II.

(3) Forest Nurseries: Permanent forest nursery is at Gopalpur in Pandharkawada Range. This permanent nursery has been established for providing planting stock of teak and other species.

(4) Agri-silvicultural Operation:

(i) 1900 to 1936: The idea to raise forest species along with field crop was first conceived in 1900 and upto 1909 attempts in that direction were made in Ghordara and Awalgaon of the present Pandharkawada Forest Division. The forest species sown were Khair, Babul, Ain, Teak and Tiwas. All these operations were recorded to be failures mainly due to lack of supervision. A small khair area in Ghordara was found successful and the area had been worked for katha in the past. By 1911-12 all these operations were abandoned and the experiences were lost. In the 1923 land values had considerably increased and thus opportunity was made use of by starting agrisilvicultural operations in many areas which included compartments numbers 70, 71, 72 and 73 of Tiwasala Reserve of Umari Range in th area 1413 acres.

At first miscellaneous speices namely Babul, Khair, Dhaora, Nim, Bija Shisham, Senal, Tiwas, Garai, and some Chandan were tried but browsing ruined all the plantations and it was concluded to plant only khair in poor soils, Teak in well drained soils and Ain in damp localities.

In 1932 the prices of cotton came down and the operations could continue only in rich soils of Tiwsala.

(ii) After 1936 : In compartment No. 74 from 1941 to 1945 teak plantation in 442 acres 38 Gunthas areas were taken. In compartment nos. 69, 70 and 71 during 1949, 1950 and 1951 teak plantation were carried out in 511 acres and 12 gunthas. These plantations are highly successful.

All these plantations had been carried out by felling good mixed forests, extracting the saleable produce and burning the debris. After ploughing teak was sown in lines 6 feet apart and two lines of cotton in between were sown departmentally. After 1952 the areas were given on leases for a period of 3 years, after felling and burning. The forest plants were to be planted at 6X6 spacing with 2 lines of cotton in between. Later due to land grabbing by the lessee that practice was discontinued.

(5) Agri-silvicultural Plantations: The idea of agri-silvi plantations were first conceived in the year 1909, in Pathrot and Sonkhas reserves of Yavatmal Division. Khair, babul, and tiwas were sown alongwith agriculture crops. These operations were abandoned in the year 1911-12. In 1923, Shri Narsimha Rao, the then Divisional Forest officer restarted agri-silvi plantations to restock the blanks and poorly stocked areas. These operations assisted in the restocking of some forest areas and also brought substantial revenue in the form of land rent. Initially agri-silvi plantations were tried with miscellaneous species, but success was not upto the mark. Subsequently agri-silvi plantations were tried with teak, plantation gave excellent results in some of the blocks.

(6) Bamboo Plantations:

- (i) Before 1936 :- From 1901 to 1911 bamboo seeds were broadcast every year along nala banks in Pawanar, Pardi and Phiski reserves some of these areas become fairly successful. From 1911-12 nurseries were established to plant the bamboo. In 1919 bamboo cuttings were planted in Phiski reserve but without success. From 1925 bamboos were planted in Pardi compartment numbers 12 & 13 and that of Tiwasala 69 with varying results but without striking success.
- (ii) After 1937, 53 acres area was planted in C.N. 71 & 72 during 1952 & 1953 with partial results.
- (iii) After 1960s a large chunk of forest areas were planted with bamboo particularly under planting in teak plantations in various schemes but the results is not encouraging partially due to wild boar attacks and partially due to improper planting techniques and lack of supervision.

(7) Miscellaneous Species Plantation: During implementation of Thosre's WP between 1956-57 miscellaneous plantations were carried out on 225.02 ha but these plantations were not successful. Many miscellaneous plantations were been taken up under Massive Afforestation Schemes, Maharashtra Forestry Project, different district schemes, E.G.S., E.A.S etc. and most of the plantations were unsuccessful. During implementation of Yadav's WP (2002-03 to 2011-12) many miscellaneous plantations have been attempted under plan, EGS, PantPradhan -Rojgar Yojana, FDA etc. the results are not encouraging, list of plantations taken up during Yadav's WP is given in Appendix XXII of volume II.

CHAPTER VIII

STATISTICS OF GROWTH AND YIELD

SECTION: VIII.1: GROWTH RATE OF TEAK:

The growing stock of Pandharkawada Forest division is almost similar to the adjoining forests of Yavatmal Forest Division, since these areas have been managed almost under similar silvicultural systems for past 100 years. These two divisions were comparable in many aspects such as crop composition, quality of crop, site quality and climatic conditions. During the preparation of working plan by Shri Thosare the stem analysis was carried out for the first time by obtaining samples from 32 Teak trees.

Height and timber volume, the figures obtained by Shri Thosare during the stem analysis exercise is reproduced below.

Age (Years)	Height in Feet	Diameter B.H.O.B. In inches	Standard stem timber volume U.B. in cft.
10	16	2.1	0.04
20	33	6.6	0.45
30	45	10.2	10.05
40	55	13.1	18.00
50	62	15.3	25.00
60	68	16.9	32.00
70	74	17.9	39.00
80	-	18.7	44.05
90	-	-	49.00
100	-	-	52.50
110	-	-	55.50
120	-	-	57.00

During field inspections Shri Thosre took some samples of borings with Pressler's borer to determine the rate of growth of teak trees in site quality IVa and IVb and the figures obtained by Shri Thosare were almost comparable with the figures obtained by Shri K.P.Sagreiya from stem analysis of some 200 trees in the trap zone of the adjoining Nagpur and Wardha divisions in 1932. The figures obtained by Shri Sagreiya are given below.

Growth of teak as per information of Shri Sagreiya

Year	Over bark girth at B.H.			40' quality	40/50' quality	Over 50' quality	Vigorous coppice in poor localities
	Slow	Average	Vigorous				
1	2	3	4	5	6	7	8
5	6.5	705	508	8.0	13.0	18.0	13.0
10	8.0	11.5	9.0	13.5	21.0	28.0	21.0
15	10.5	17.2	13.7	18.0	27.0	35.0	26.5
20	13.7	21.2	18.3	22.0	35.5	40.0	30.0
25	17.2	23.5	22.3	25.5	35.5	45.0	33.0
30	21.2	24.7	25.9	28.5	38.5	48.0	35.0
35	23.5	25.5	28.8	31.0	41.5	51.0	36.5
40	25.0	26.2	31.2	33.5	43.7	53.5	37.5
45	25.5	26.5	33.5	35.0	45.5	55.0	38.0

During the revision of Yadav's WP studies were conducted by the office of the Conservator of Forests, Working Plan Yavatmal in the year 2011 regarding stem analysis. The stem analysis of Teak was carried out by selecting representative teak trees of site quality IV and site quality III. The total number of teak trees of seed origin selected from below mentioned compartments of site quality III and IV. The trees selected for stem analysis from 2 compartments of 2 ranges are 8. This type of selection of trees gives representative samples covering almost entire division. The results obtained out of stem analysis have been computed and the following curves were drawn.

(a) Age/ Diameter curve, (b) Height/ Age curve (c) Age/ Volume curve

The details of teak trees felled for stem analysis are given in the following table.

Details of trees felled for stem analysis

Sr. no.	Stem Analysis for teak	Range	Round	Beat	Comptt. no.	No. of trees selected	
						Seedling	Coppice
1	Site Quality III	Umari	Karanji	Tiwsala	73	1	--
2	Site Quality III	Umari	Karanji	Tiwsala	73	1	--
3	Site Quality IV	Pan'kawada	Pachpour	Sibla	628	1	--
4	Site Quality IV	Pan'kawada	Pachpour	Sibla	628	1	--
5	Site Quality III	Pan'kawada	Akoli	Akoli	67	--	1
6	Site Quality III	Pan'kawada	Akoli	Akoli	67	--	1
7	Site Quality IV	Parwa	Pahapal	Jamb	828	--	1
8	Site Quality IV	Parwa	Pahapal	Jamb	828	--	1

The details of officers who conducted stem analysis are given below.

(1) Stem Analysis for teak :- Site quality IV & III.

Team Leader : Shri. V.N. Chaudhari, RFO WP Division ,Yavatmal & Shri.M. B.Gawali,
RFO W P Division, Yavatmal

Forest Division: Pandhakawada Forest Division, Pandhakawada

Range /Round/Beat/compt. :- 1. Pandhakawada / Pachpour/ Sibla /628

2. Umari / Karanji / Tiwasala /73

3. Pandharkawada / Akoli / Akoli / 67

4. Parwa / Pahapal / Jamb / 828

The data obtained during stem analysis has been utilised to determine harvestable girth, felling cycle and expected yield. The data of stem analysis pertaining to girth, height, volume etc are given in the following tables.

STEM ANALYSIS FOR TEAK SITE QUALITY III (Coppice Origin)

Range:-Pandharkwada

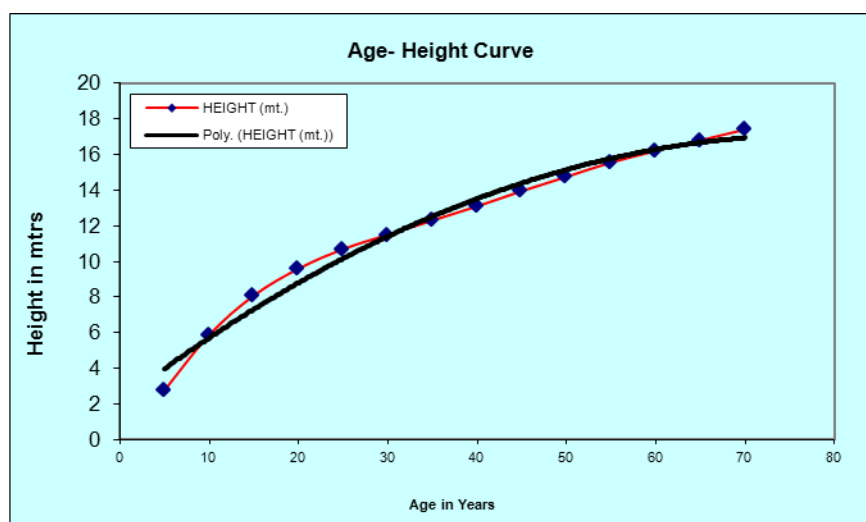
Comptt No.:-67

Maker : Shri V.N.Choudhari & M.B.Gawali R.F.O.W.P.Yavatmal

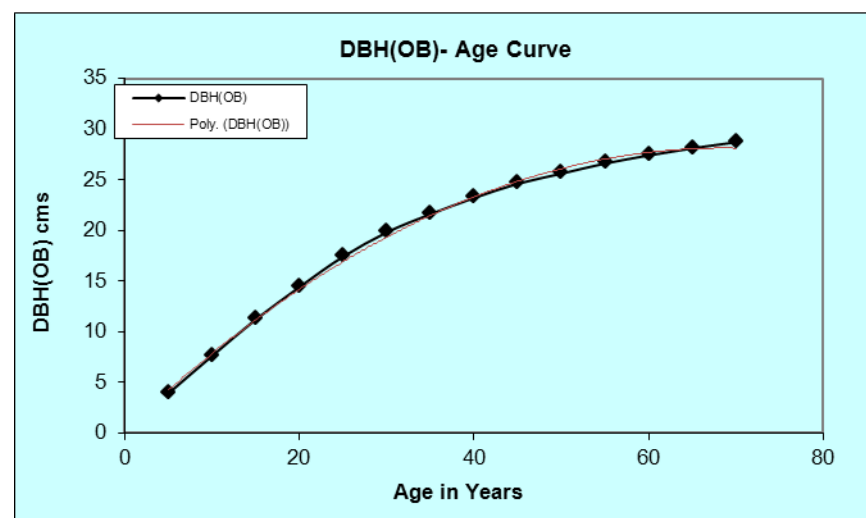
SR.NO.	AGE	HEIGHT (mt.)	DBH(OB)	GBH (OB)	VOLUME	MAI	CAI
1	2	3	4	5	6	7	8
1	5	2.80	3.90	12.25	-	-	-
2	10	5.90	7.60	23.86	0.007	0.0007	0.0007
3	15	8.10	11.20	35.17	0.020	0.0013	0.0026
4	20	9.60	14.40	45.22	0.045	0.0023	0.0050
5	25	10.70	17.40	54.64	0.070	0.0028	0.0050
6	30	11.50	19.80	62.17	0.097	0.0032	0.0054
7	35	12.30	21.60	67.82	0.139	0.0039	0.0084
8	40	13.10	23.20	72.85	0.176	0.0044	0.0074
9	45	13.95	24.60	77.24	0.208	0.0046	0.0064
10	50	14.75	25.60	80.38	0.236	0.0047	0.0056
11	55	15.55	26.60	83.52	0.258	0.0047	0.0044
12	60	16.20	27.40	86.04	0.270	0.0045	0.0024
13	65	16.80	28.10	88.23	0.280	0.0020	0.0043
14	70	17.40	28.70	90.12	0.288	0.0016	0.0041

From above mentioned Teak trees have shown the stem analysis reveals that CAI and MAI intersects at the age of 53 years, represents the girth of 82.00 cm at the breast height.

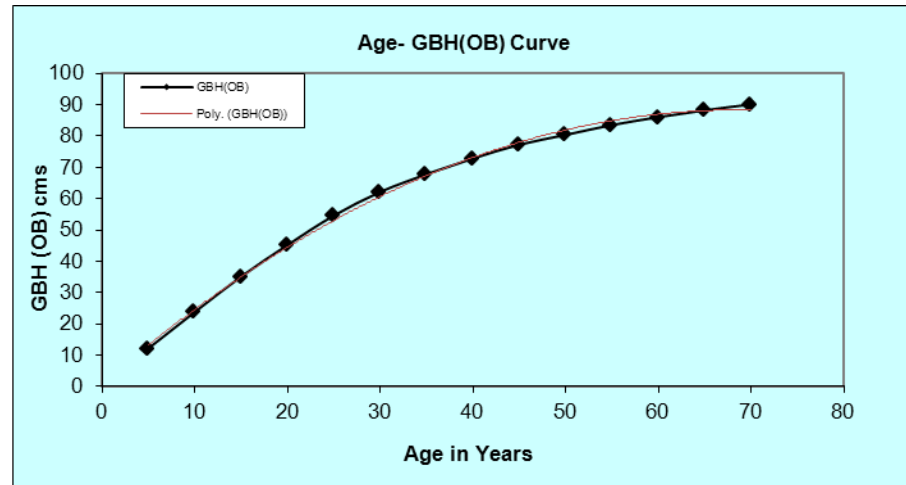
Age in Years	HEIGHT (mt.)
5	2.80
10	5.90
15	8.10
20	9.60
25	10.70
30	11.50
35	12.30
40	13.10
45	13.95
50	14.75
55	15.55
60	16.20
65	16.80
70	17.40



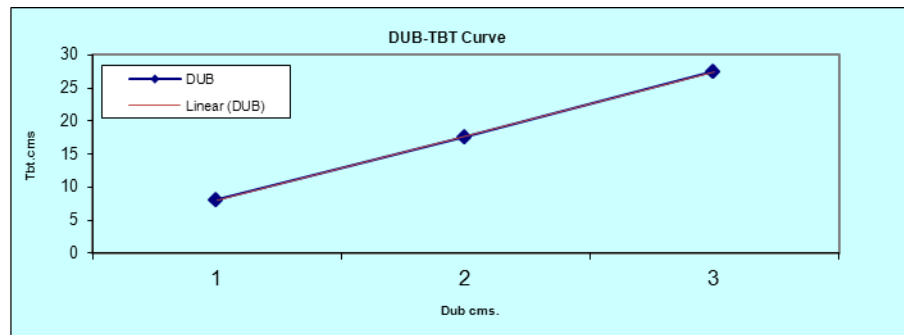
Age in Years	DBH(OB)
5	3.90
10	7.60
15	11.20
20	14.40
25	17.40
30	19.80
35	21.60
40	23.20
45	24.60
50	25.60
55	26.60
60	27.40
65	28.10
70	28.70



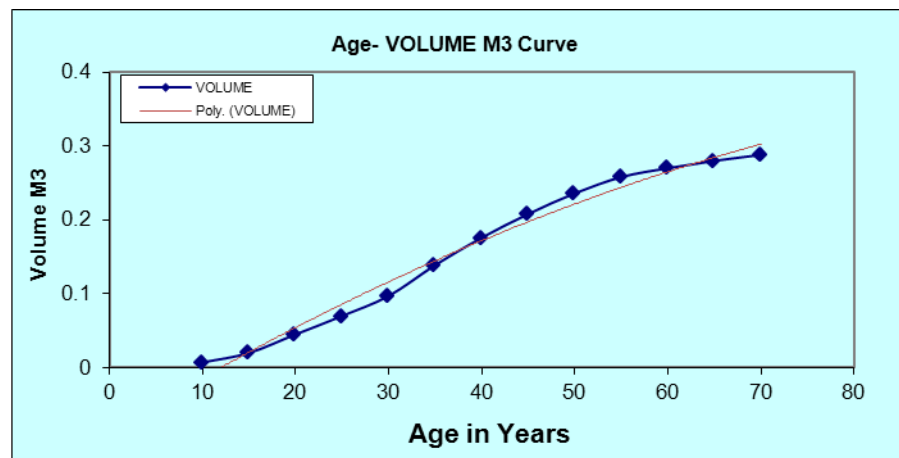
Age in Years	GBH(OB)
5	12.25
10	23.86
15	35.17
20	45.22
25	54.64
30	62.17
35	67.82
40	72.85
45	77.24
50	80.38
55	83.52
60	86.04
65	88.23
70	90.12



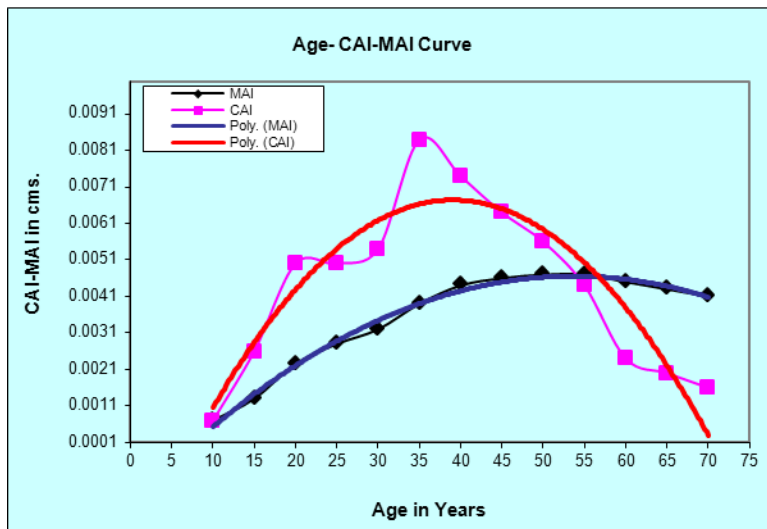
DUB	TBT
8.10	0.068
17.55	0.085
27.475	1.105



Age in Years	VOLUME
10	0.007
15	0.020
20	0.045
25	0.070
30	0.097
35	0.139
40	0.176
45	0.208
50	0.236
55	0.258
60	0.270
65	0.280
70	0.288



AGE	MAI	CAI
10	0.0007	0.0007
15	0.0013	0.0026
20	0.0023	0.0050
25	0.0028	0.0050
30	0.0032	0.0054
35	0.0039	0.0084
40	0.0044	0.0074
45	0.0046	0.0064
50	0.0047	0.0056
55	0.0047	0.0044
60	0.0045	0.0024
65	0.0043	0.0020
70	0.0041	0.0016



STEM ANALYSIS FOR TEAK SITE QUALITY III (Seed origin)

Range:-Pandharawda

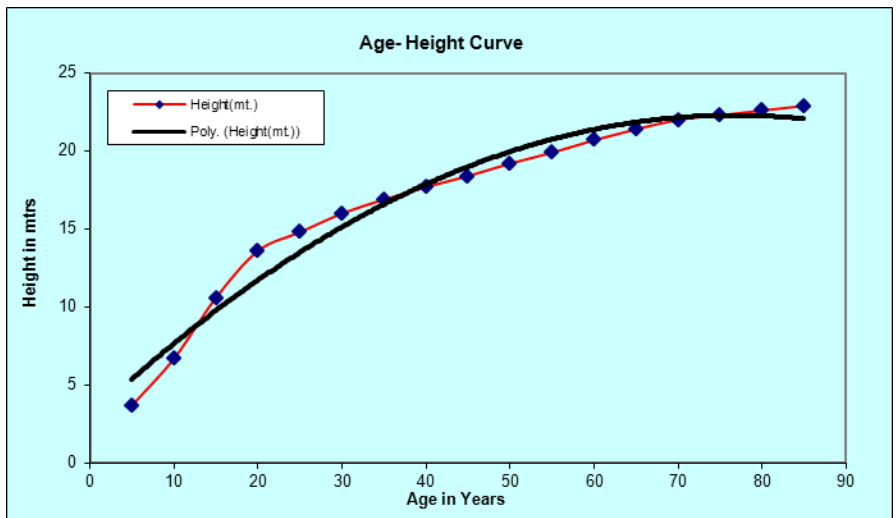
Comptt No.:-73

Conducted by Shri V.N.Choudhari & M.B.Gawali R.F.O.W.P.Yavatmal

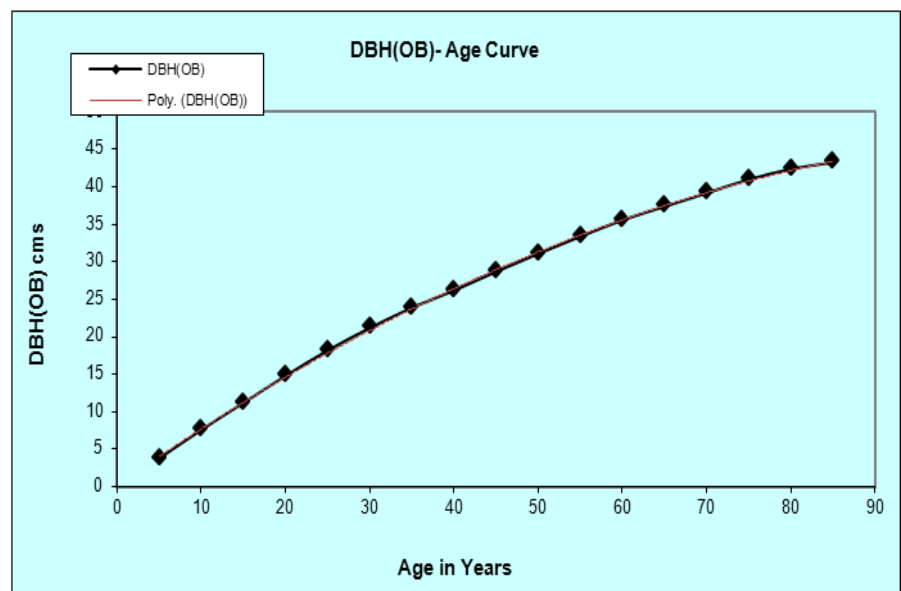
SR.NO.	AGE	HEIGHT(mt.)	DBH(OB)	GBH (OB)	VOLUME	MAI	CAI
1	5	3.70	3.80	11.93	0.0030	0.0006	0.0006
2	10	6.70	7.60	23.86	0.0060	0.0006	0.0006
3	15	10.60	11.20	35.17	0.0250	0.0017	0.0038
4	20	13.60	14.80	46.47	0.0600	0.0030	0.0070
5	25	14.80	18.2	57.15	0.1000	0.0040	0.0080
6	30	16.00	21.20	66.57	0.1400	0.0047	0.0080
7	35	16.90	23.90	75.05	0.1950	0.0056	0.0110
8	40	17.70	26.20	82.27	0.2600	0.0065	0.0130
9	45	18.40	28.70	90.12	0.3400	0.0076	0.0160
10	50	19.20	31.10	97.65	0.4350	0.0087	0.0190
11	55	19.90	33.40	104.88	0.5350	0.0097	0.0200
12	60	20.70	35.60	111.78	0.6350	0.0106	0.0200
13	65	21.40	37.40	117.44	0.7350	0.0113	0.0200
14	70	22.00	39.20	123.09	0.8350	0.0119	0.0200
15	75	22.30	41.00	128.74	0.9100	0.0121	0.0150
16	80	22.60	42.40	133.14	0.9650	0.0121	0.0110
17	85	22.90	43.30	135.96	1.0150	0.0119	0.0100

From above mentioned Teak trees have shown the stem analysis reveals that CAI and MAI intersects at the age of 78 years, represents the girth of 131.00 cm at the breast height.

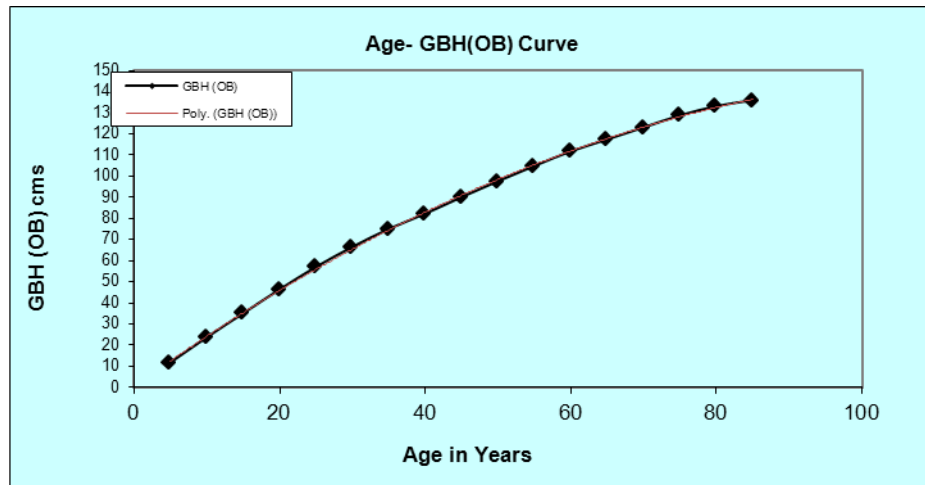
Age in Years	Height(mt.)
5	3.70
10	6.70
15	10.60
20	13.60
25	14.80
30	16.00
35	16.90
40	17.70
45	18.40
50	19.20
55	19.90
60	20.70
65	21.40
70	22.00
75	22.30
80	22.60
85	22.90



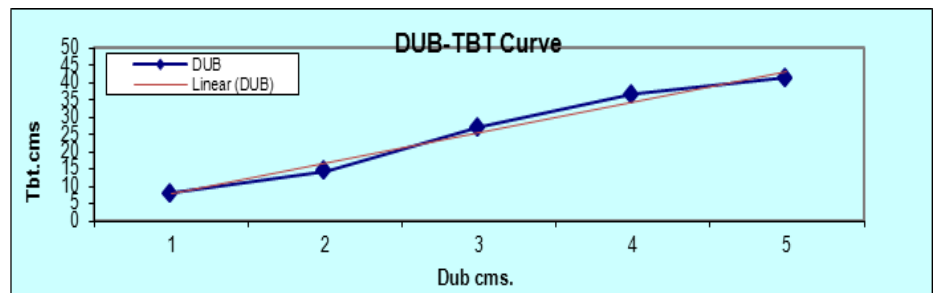
Age in Years	DBH(OB)
5	3.80
10	7.60
15	11.20
20	14.80
25	18.2
30	21.20
35	23.90
40	26.20
45	28.70
50	31.10
55	33.40
60	35.60
65	37.40
70	39.20
75	41.00
80	42.40
85	43.30



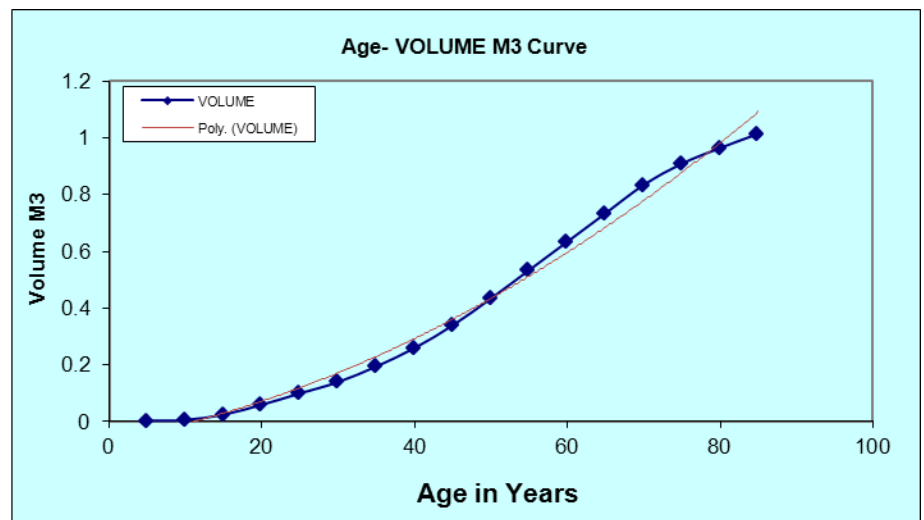
Age in Years	GBH (OB)
5	11.932
10	23.864
15	35.168
20	46.472
25	57.148
30	66.568
35	75.046
40	82.268
45	90.118
50	97.65
55	104.876
60	111.784
65	117.436
70	123.088
75	128.740
80	133.136
85	135.962



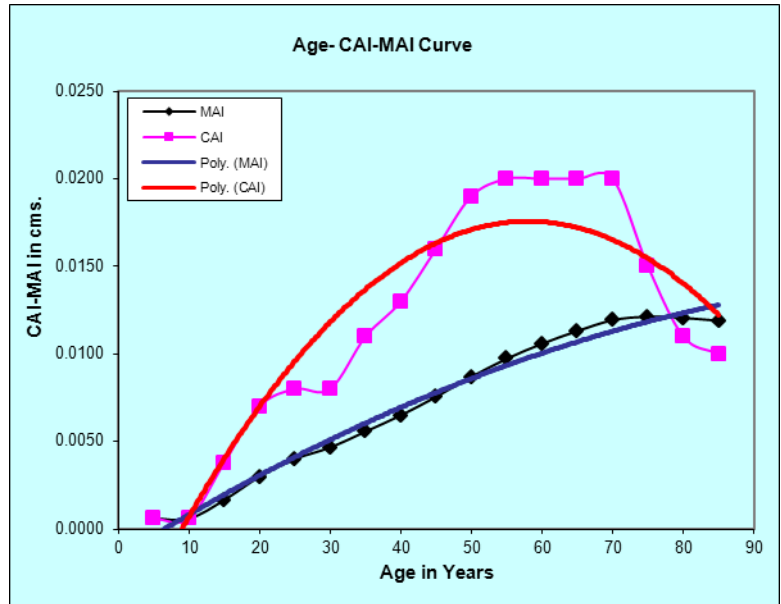
DUB	TBT
8.22	0.67
14.45	0.82
27.2	1.02
36.8	1.075
41.45	1.15



Age in Years	VOLUME
5	0.0030
10	0.0060
15	0.0250
20	0.0600
25	0.1000
30	0.1400
35	0.1950
40	0.2600
45	0.3400
50	0.4350
55	0.5350
60	0.6350
65	0.7350
70	0.8350
75	0.9100
80	0.9650
85	1.0150



AGE	MAI	CAI
5	0.0006	0.0006
10	0.0006	0.0006
15	0.0017	0.0038
20	0.0030	0.0070
25	0.0040	0.0080
30	0.0047	0.0080
35	0.0056	0.0110
40	0.0065	0.0130
45	0.0076	0.0160
50	0.0087	0.0190
55	0.0097	0.0200
60	0.0106	0.0200
65	0.0113	0.0200
70	0.0119	0.0200
75	0.0121	0.0150
80	0.0121	0.0110
85	0.0119	0.0100



STEM ANALYSIS FOR TEAK SITE QUALITY IV (Seed Origin)

Range:-Pandharawda

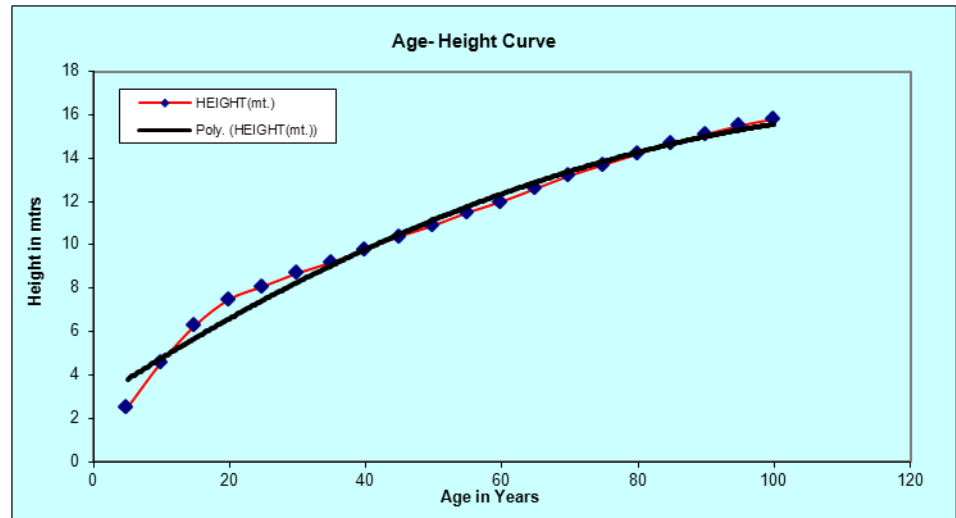
Comptt No.:-628

Maker : Shri V.N.Choudhari & M.B.Gawali R.F.O.W.P.Yavatmal

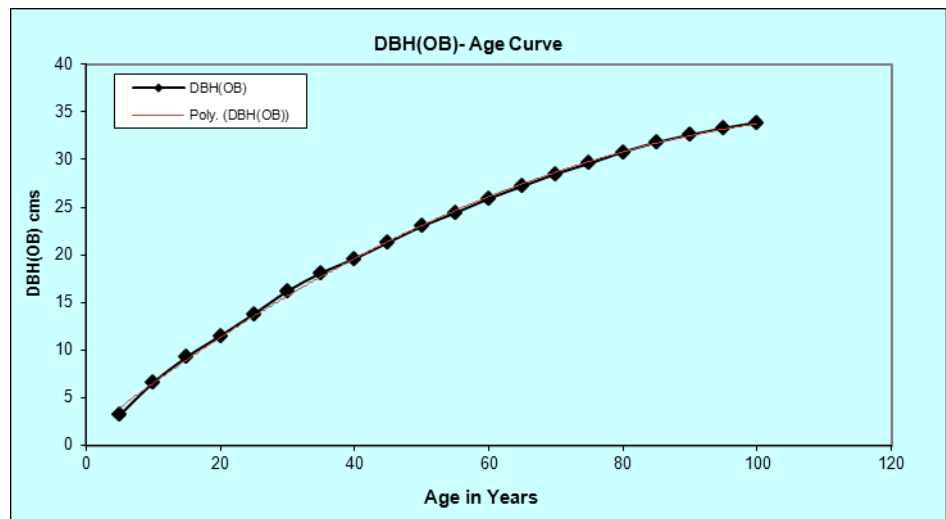
SR.NO.	AGE	HEIGHT(mt.)	DBH(OB)	GBH (OB)	VOLUME	CAI	MAI
1	5	2.50	3.20	10.04	0.0020	0.0004	0.0004
2	10	4.60	6.60	20.72	0.0070	0.0007	0.0007
3	15	6.30	9.30	29.20	0.0120	0.0010	0.0008
4	20	7.50	11.50	36.11	0.0200	0.0016	0.0010
5	25	8.10	13.80	43.33	0.0300	0.0020	0.0012
6	30	8.70	16.20	50.86	0.0450	0.0030	0.0015
7	35	9.20	18.10	56.83	0.0600	0.0030	0.0017
8	40	9.80	19.60	61.54	0.0800	0.0040	0.0020
9	45	10.40	21.30	66.88	0.1000	0.0040	0.0022
10	50	10.90	23.00	72.22	0.1200	0.0040	0.0024
11	55	11.50	24.40	76.61	0.1430	0.0046	0.0026
12	60	12.00	25.90	81.32	0.1670	0.0048	0.0028
13	65	12.60	27.20	85.40	0.1950	0.0056	0.0030
14	70	13.20	28.50	89.49	0.2230	0.0056	0.0032
15	75	13.70	29.60	92.94	0.2530	0.0060	0.0034
16	80	14.20	30.80	96.71	0.2850	0.0064	0.0036
17	85	14.70	31.80	99.85	0.3120	0.0054	0.0037
18	90	15.10	32.60	102.36	0.3350	0.0046	0.0037
19	95	15.50	33.30	104.56	0.3520	0.0034	0.0037
20	100	15.80	33.90	106.44	0.3670	0.0030	0.0037

From above mentioned Teak trees have shown the stem analysis reveals that CAI and MAI intersects at the age of 94 years, represents the girth of 104.00 cm at the breast height.

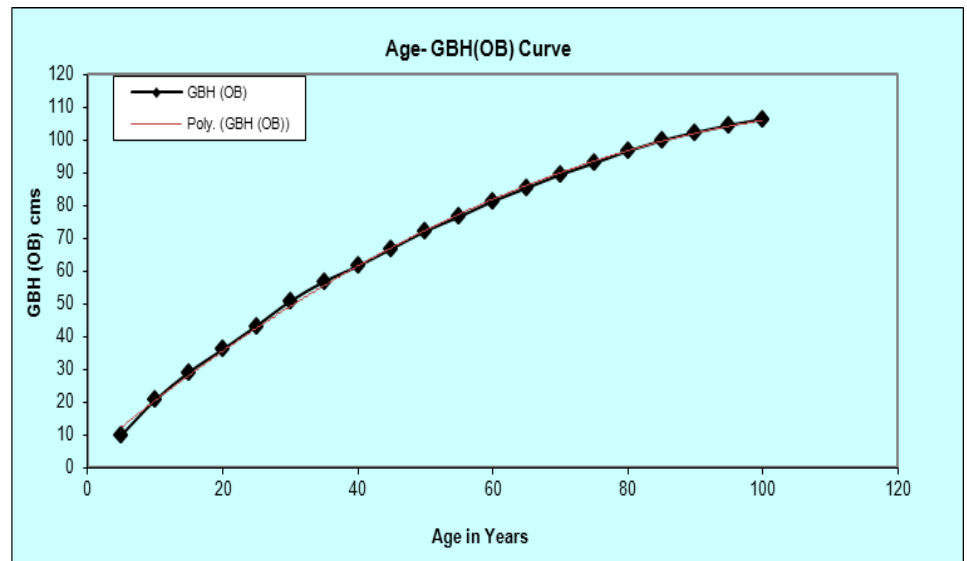
Age in Years	HEIGHT(mt.)
5	2.50
10	4.60
15	6.30
20	7.50
25	8.10
30	8.70
35	9.20
40	9.80
45	10.40
50	10.90
55	11.50
60	12.00
65	12.60
70	13.20
75	13.70
80	14.20
85	14.70
90	15.10
95	15.50
100	15.80



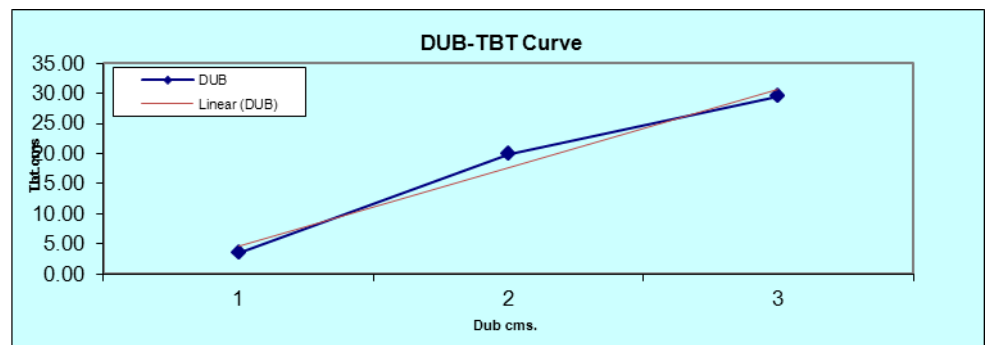
Age in Years	DBH(OB)
5	3.20
10	6.60
15	9.30
20	11.50
25	13.80
30	16.20
35	18.10
40	19.60
45	21.30
50	23.00
55	24.40
60	25.90
65	27.20
70	28.50
75	29.60
80	30.80
85	31.80
90	32.60
95	33.30
100	33.90



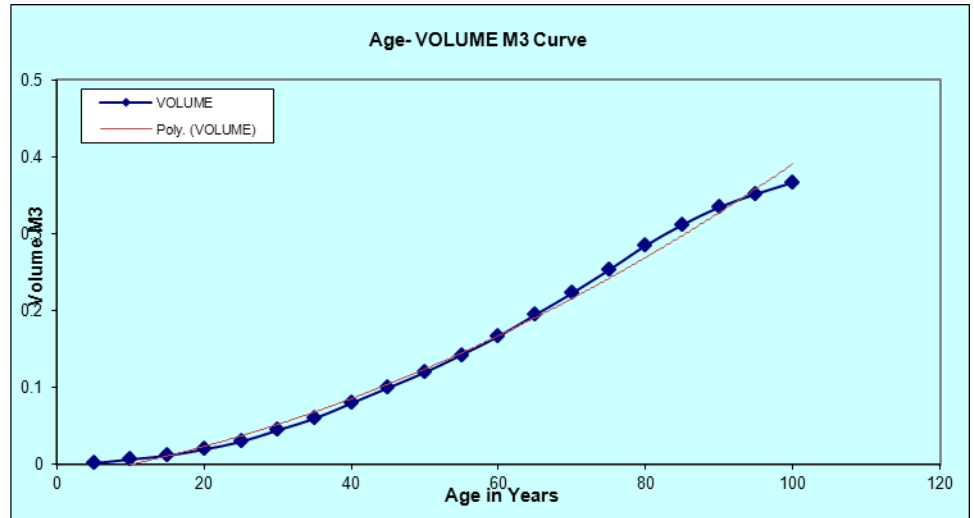
Age in Years	GBH (OB)
5	10.04
10	20.72
15	29.20
20	36.11
25	43.33
30	50.86
35	56.83
40	61.54
45	66.88
50	72.22
55	76.61
60	81.32
65	85.40
70	89.49
75	92.94
80	96.71
85	99.85
90	102.36
95	104.56
100	106.44



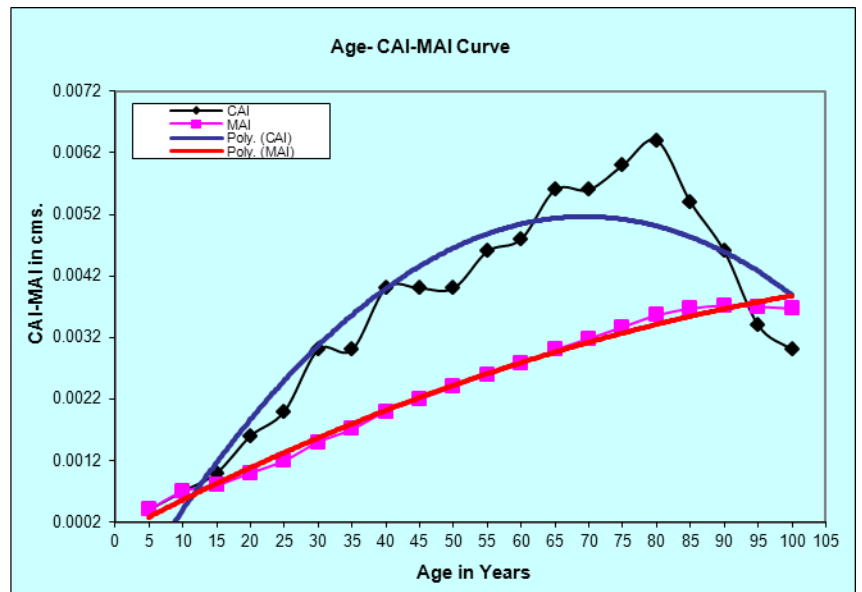
DUB	TBT
3.50	0.20
20.00	0.95
29.50	1.00



Age in Years	VOLUME
5	0.0020
10	0.0070
15	0.0120
20	0.0200
25	0.0300
30	0.0450
35	0.0600
40	0.0800
45	0.1000
50	0.1200
55	0.1430
60	0.1670
65	0.1950
70	0.2230
75	0.2530
80	0.2850
85	0.3120
90	0.3350
95	0.3520
100	0.3670



AGE	CAI	MAI
5	0.0004	0.0004
10	0.0007	0.0007
15	0.0010	0.0008
20	0.0016	0.0010
25	0.0020	0.0012
30	0.0030	0.0015
35	0.0030	0.0017
40	0.0040	0.0020
45	0.0040	0.0022
50	0.0040	0.0024
55	0.0046	0.0026
60	0.0048	0.0028
65	0.0056	0.0030
70	0.0056	0.0032
75	0.0060	0.0034
80	0.0064	0.0036
85	0.0054	0.0037
90	0.0046	0.0037
95	0.0034	0.0037
100	0.0030	0.0037



STEM ANALYSIS FOR TEAK SITE QUALITY IV (Coppice origin)

Range:-Parwa

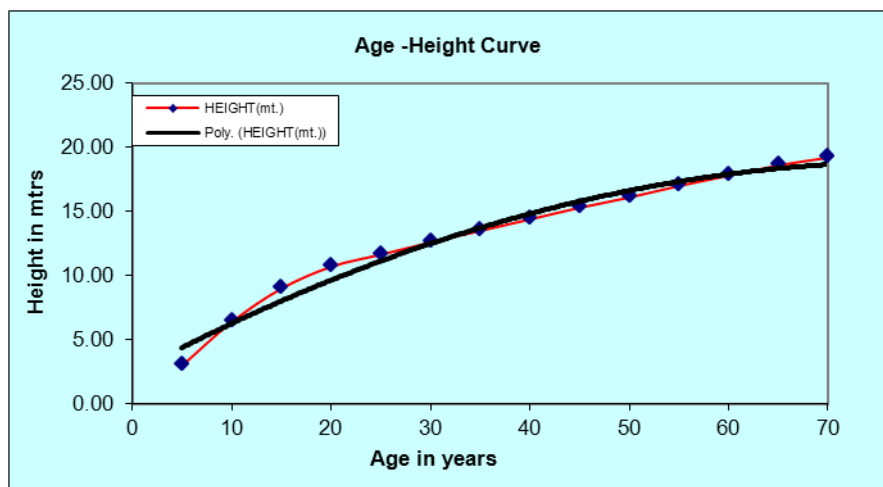
Comptt No.:-828

Conducted by Shri V.N.Choudhari & M.B.Gawali R.F.O.W.P.Yavatmal

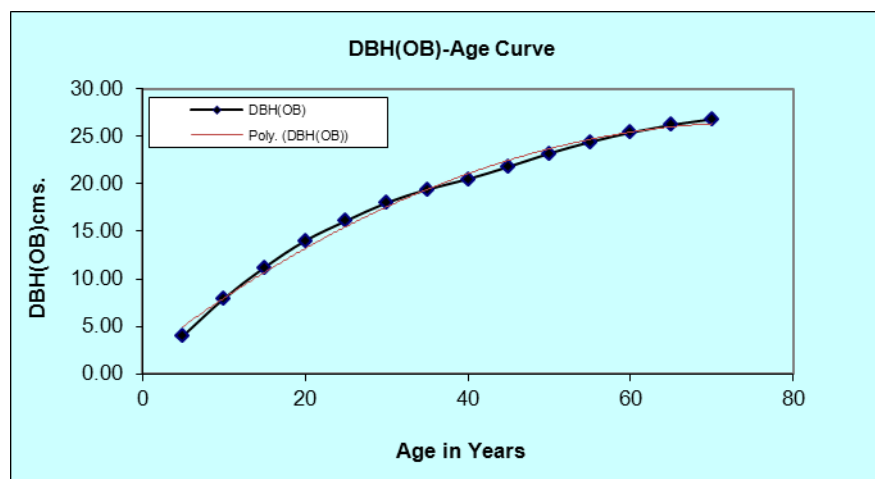
SR.NO.	AGE	HEIGHT(mt.)	DBH(OB)	GBH (OB)	VOLUME	MAI	CAI
1	5	3.00	4.00	12.56	0.0030	0.0006	0.0006
2	10	6.40	7.90	24.80	0.0070	0.0007	0.0008
3	15	9.00	11.20	35.16	0.0190	0.0013	0.0024
4	20	10.70	14.00	43.96	0.0390	0.0020	0.0040
5	25	11.65	16.10	50.55	0.0620	0.0025	0.0046
6	30	12.60	18.00	56.52	0.0870	0.0029	0.0050
7	35	13.50	19.40	60.91	0.1120	0.0032	0.0050
8	40	14.40	20.50	64.37	0.1370	0.0034	0.0050
9	45	15.30	21.80	68.45	0.1630	0.0036	0.0052
10	50	16.10	23.20	72.48	0.1920	0.0038	0.0058
11	55	17.00	24.4	76.16	0.2170	0.0040	0.0056
12	60	17.80	25.4	79.75	0.2380	0.0040	0.0042
13	65	18.60	26.2	82.27	0.2500	0.0038	0.0036
14	70	19.20	26.8	84.15	0.2630	0.0037	0.0026

From above mentioned Teak trees have shown the stem analysis reveals that CAI and MAI intersects at the age of 63 years, represents the girth of 80.00 cm at the breast height.

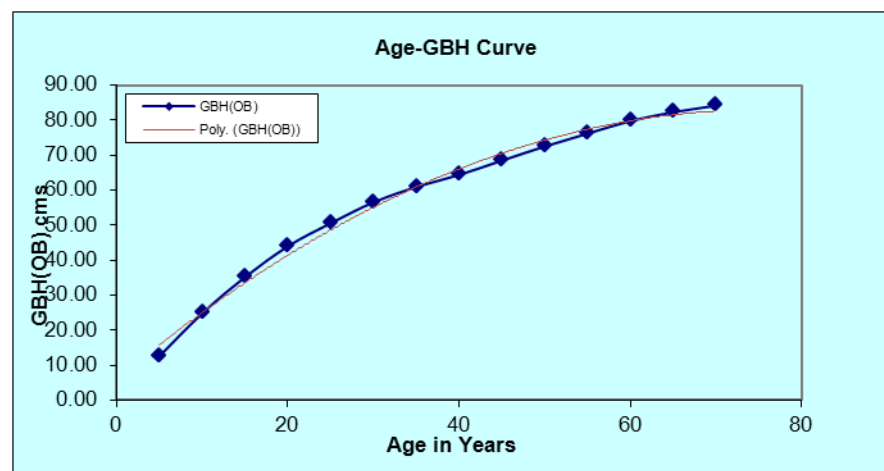
AGE	HEIGHT(mt.)
5	3.00
10	6.40
15	9.00
20	10.70
25	11.65
30	12.60
35	13.50
40	14.40
45	15.30
50	16.10
55	17.00
60	17.80
65	18.60
70	19.20



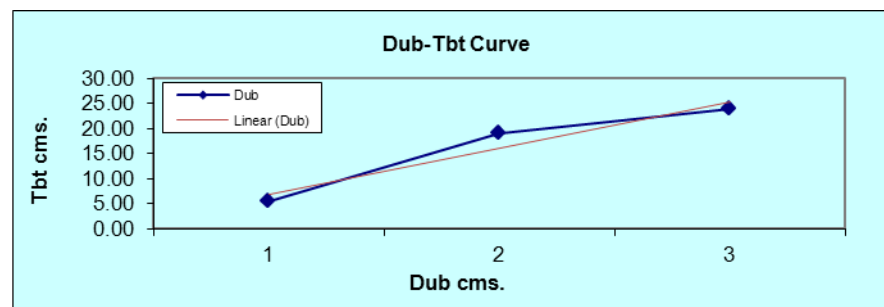
AGE	DBH(OB)
5	4.00
10	7.90
15	11.20
20	14.00
25	16.10
30	18.00
35	19.40
40	20.50
45	21.80
50	23.20
55	24.4
60	25.4
65	26.2
70	26.8



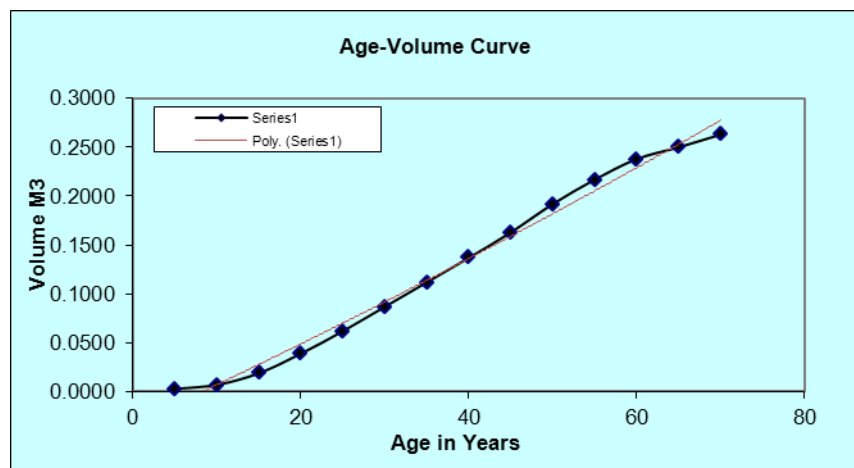
AGE	GBH(OB)
5	12.56
10	24.80
15	35.16
20	43.96
25	50.55
30	56.52
35	60.91
40	64.37
45	68.45
50	72.48
55	76.16
60	79.75
65	82.27
70	84.15



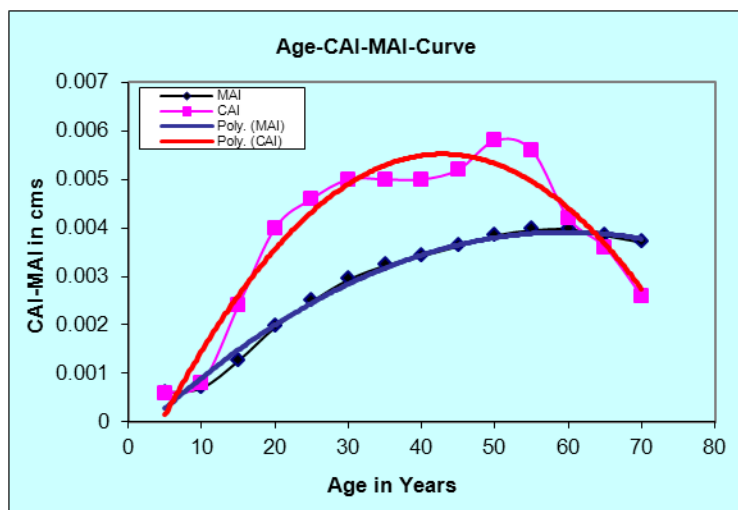
Dub	Tbt
5.50	0.63
19.13	0.93
23.90	1.03



AGE	VOLUME M3
5	0.0030
10	0.0070
15	0.0190
20	0.0390
25	0.0620
30	0.0870
35	0.1120
40	0.1370
45	0.1630
50	0.1920
55	0.2170
60	0.2380
65	0.2500
70	0.2630



AGE	MAI	CAI
5	0.0006	0.0006
10	0.0007	0.0008
15	0.0013	0.0024
20	0.0020	0.0040
25	0.0025	0.0046
30	0.0029	0.0050
35	0.0032	0.0050
40	0.0034	0.0050
45	0.0036	0.0052
50	0.0038	0.0058
55	0.0040	0.0056
60	0.0040	0.0042
65	0.0038	0.0036
70	0.0037	0.0026



SECTION: VIII.2: ENUMERATION:

VIII.2.1: Sampling: Survey of Forest Resources (SOFR) Unit, Amravati carried out enumeration of vegetation and regeneration survey in Pandharwakada forest division in the year 2007-08 and 2008-09. The method of sampling for enumeration was systematic random start sampling, covering 1% of area. The entire forest area is divided into grids of the size of 600 m x 600 m on map, in each northwest corner of the each grid, a sample plot of 60 m x 60 m is laid down with the help of latitude and longitude readings of GPS receiver. All the trees of girth of 15 cm & above are counted and data is collected species

wise. Another plot of 20 m X 20 m is laid down (in the 60 m x 60 m plot) in which regeneration survey is conducted by counting all seedlings of girth less than 15 cm.

SECTION: VIII.3: STATUS OF NATURAL REGENERATION:

Regeneration survey was carried out by the SOFR Unit, Amravati. As per the sample survey, total number of seedling per ha in R1 is 75.61 seedlings/ha, in R2 35.22 seedlings/ha, in R3 is 16.43 seedlings/ha. The average number of seedlings in R1, R2, & R3 may vary from range to range. Details of range wise average figures of regeneration are given below.

Average number of seedlings per hectare

Range.	no. of compt	R1 < 1 m height			R2 1 to 2 m height			R3 > 3 m height		
		Sample area	Total seedlings	Seedlings / ha.	Sample area	Total Seedlings	Seedlings / ha.	Sample Area	Total seedlings	Seedlings / ha.
1	2	5	3	6	9	7	10	13	11	14
Mukutbam	51	72.00	4120.00	57.22	82.08	2727.00	33.22	19.80	224.00	11.31
P'kawada	56	121.32	13017.00	107.29	109.80	3880.00	35.34	35.64	606.00	17.00
Parwa	41	55.44	2745.00	49.51	71.64	1837.00	25.64	18.72	301.00	16.08
Patanbori	21	27.72	2332.00	84.13	34.20	1199.00	35.06	7.56	127.00	16.80
Umari	22	45.72	2603.00	56.93	49.68	1686.00	33.94	20.88	420.00	20.11
Wani	43	63.72	4364.00	68.49	57.24	2921.00	51.03	13.68	233.00	17.03
Total	234	385.92	29781.00	75.61	404.64	14250.00	35.22	116.28	1911.00	16.43

Regeneration status is unsatisfactory due to unfavourable soil conditions, over grazing, frequent fires and biotic interference. It is an alarming situation of regeneration and if the same situation is continued, the future of the forests may end in failure. It is necessary to improve the edaphic conditions by intensive soil and moisture conservation works, tending of natural regeneration, subsidiary silvicultural operations, control grazing and fire. As regards the afforestation site specific afforestation schemes should be drawn and species which are suitable to this area should be selected for success of plantations. In this division most of the plantations ended in failure.

SECTION: VIII.4: STOCK MAPPING

In Pandharkawada Forest Division the reserved forests were stock mapped for the first time in the year 1915-16, during the time of preparation of WP by Shri Malcom, Working Plan Officer. Later on these stock maps were updated from time to time with each revision of the working plan. During the revision of present plan these stock maps have

been updated in 2010-11 and 2011-12 with appropriate ground verification by the staff of office of Conservator of Forests, working plan, Yavatmal

Result of stock mapping during 2010 -11 & 2011 - 12

Site Quality	Area in ha.	% Area w.r.t. total area
III Teak	3244.68	5.50
IV Teak	16686.89	28.38
III Misc.	80.00	0.15
IV Miscellaneous	1485.48	2.52
Plantation	6320.84	10.75
Under Stocked	8002.78	13.62
Blank Area	6296.50	10.71
Eroded and Scrub/hillock	16546.88	28.14
Cultivation/Village Area	0.00	0.00
Water Bodies etc.	136.97	0.23
Total	58801.02	100.00

The stocking has also been assessed with the help of normalized density vegetation index (NDVI) maps procured from Regional Director, FSI, Nagpur, which were prepared by using satellite imagery data of LISS-III and classified the patches of forests according to density. The enumeration data of SOFR Unit has been linked with compartment maps in the G.I.S. environment are cartographically accurate than traditional stock maps. The data obtained based on the comparison of classified vegetation maps, NDVI maps and manual stock mapping have been fairly standardized in the office of Conservator of Forests, Working Plan Division, Yavatmal.

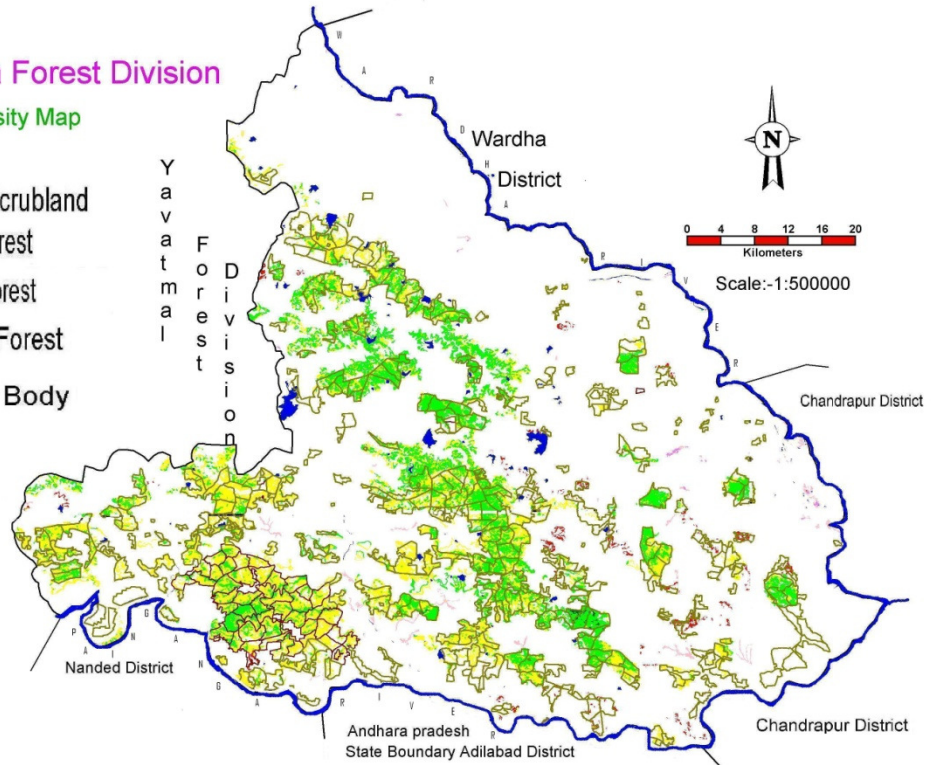
SECTION: VIII. 5: DENSITY SLICING

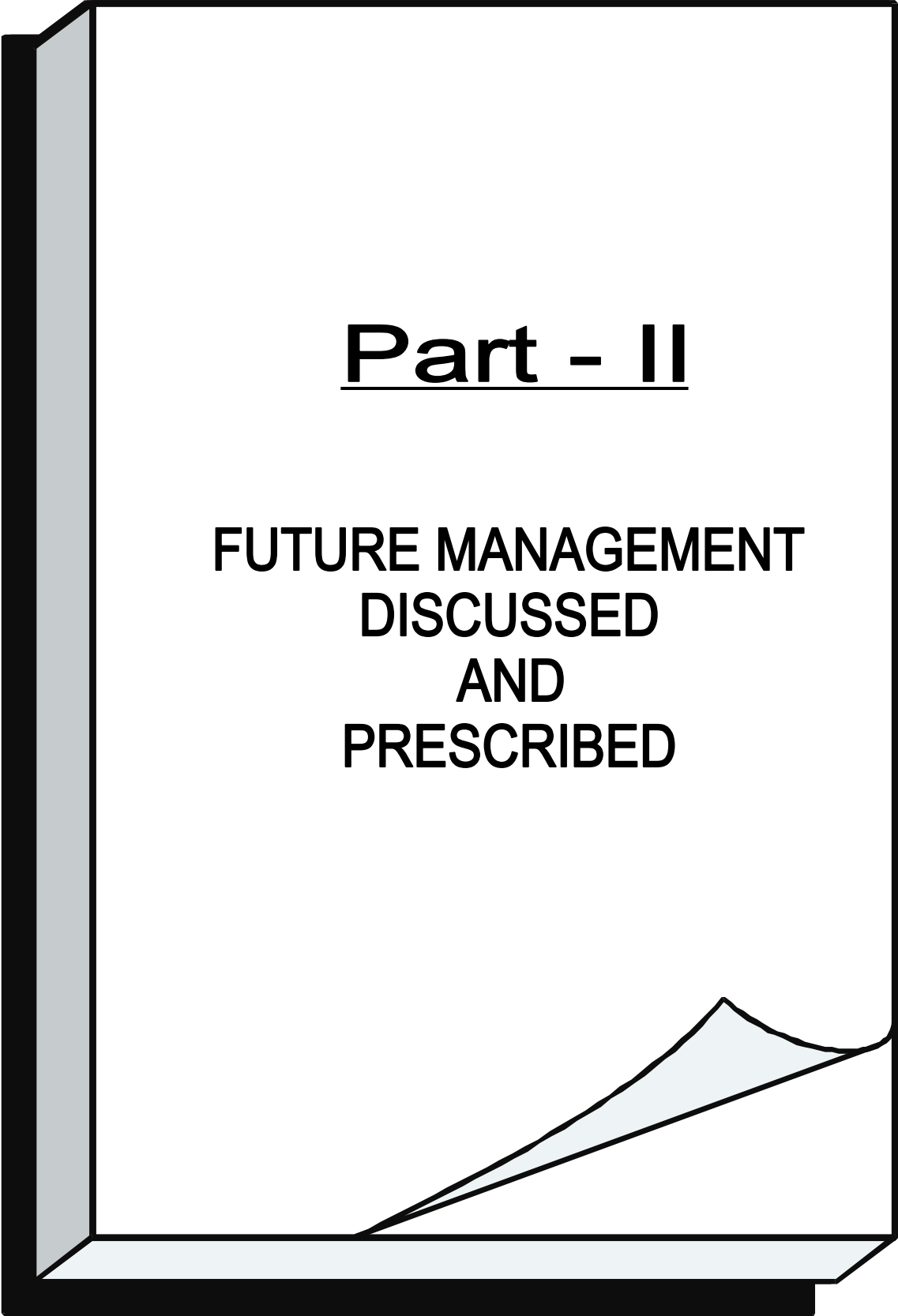
The normalized density vegetation index (NDVI) maps procured from FSI, Regional Director, Nagpur have been systematically analysed. In Pandharkawada Forest Division around many compartments forest areas as well as village area are together. Therefore it is not possible to separate the agriculture land of the village and forest area under cultivation (encroachment) and natural blank areas. However minute details of analysis of NDVI maps carried out in this office are compared with the stock mapping carried out by the staff of WP Division with adequate ground verification reveals that the data of NDVI maps are more or less comparable to the stock map carried out manually.

Pandharkawada Forest Division

Forest Density Map

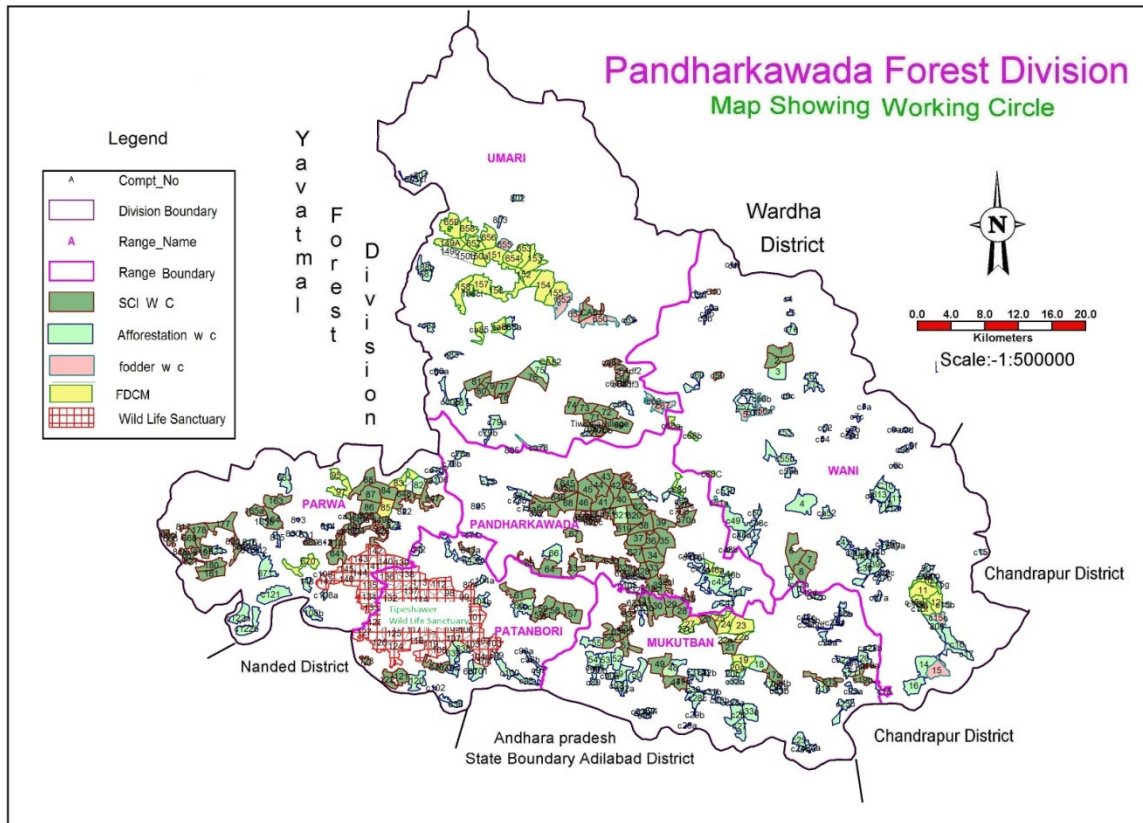
- Blank/Scrubland
- Open Forest
- Dense Forest
- Eroded Forest
- Water Body
- River





Part - II

**FUTURE MANAGEMENT
DISCUSSED
AND
PRESCRIBED**



CHAPTER IX

PROPOSALS FOR FUTURE MANAGEMENT

SECTION: IX.1: RELEVANT POLICIES AND PROGRAMMES:

The following policies & programmes were considered while formulating proposals under various WC for future management of forests of Pandharkawada Forest Division.

- (1) National Forest Policy 1988
- (2) National Forestry Action Programme
- (3) National Wildlife Action Programme
- (4) National Bamboo Mission
- (5) National Medicinal Plants Board
- (6) Maharashtra Forest Policy 2008
- (7) Maharashtra Eco-tourism Policy
- (8) Biological Diversity Act 2002

SECTION: IX.2: FACTORS INFLUENCING THE GENERAL OBJECTIVES OF MANAGEMENT:

The major factors influencing the object of management are given below.

- (1) The forests of Pandharkawada Forest Division were repeatedly managed under Coppice With Reserves system in the previous WP have suffered to a great extent due to illicit cutting, heavy uncontrolled grazing and poor coppice regeneration resulted in under stocked and open forest.
- (2) These Forests can be restored, if they are restocked under afforestation schemes along with soil and moisture conservation works and strict protection from illicit felling, fire, grazing etc.
- (3) The general site quality is poor and the crop density is also low. The large tracts of forests are open, under stocked and degraded which require vast improvement in quality and stocking.
- (4) The soil is highly compact due to heavy biotic pressure which is devoid of humus and sub soil moisture.

- (5) The drainage system of the soil is very poor.
- (6) The natural regeneration is scanty due to poor site quality, excessive biotic pressure, repeated fires and adverse climatic conditions especially these forest chunks, which are situated near human habitations.
- (7) Teak constitutes more than 60% of the total stocking of the forests.
- (8) Bamboo is an important forest produce sought by local people especially Burads. Bamboo flowering followed by non-establishment of bamboo regeneration has resulted in absence of bamboo area in the division.
- (9) In this division the medicinal plants diversity and abundance required to be protected in selected pockets of their occurrence.
- (10) NWFP species form a substantial proportion of the forest crop that contributes to a great extent to the livelihood of local people. The forest area rich in NWFP requires special focus for their sustainable management and use in the interest of local community by involving them through JFM Committees.
- (11) Demand for small timber, fire wood, fodder is much more than availability, lead to illicit felling, illegal grazing, encroachment which has to be tackled for better protection and management of forests.
- (12) Restoration of degraded environment is required to be tackled through different management schemes.
- (13) The population of wild animals needs to be conserved through habitat improvement measures and effective protection.

SECTION: IX.3: OBJECTIVES OF MANAGEMENT

Rapid depletion of growing stock especially around thickly populated habitation areas due to different biotic influences is very important factor, which influences the objectives of management. The following objectives of forest management are identified in consonance with the National Forest Policy 1988, other directives issued by the State and Central Government and rulings of Apex Court.

- (1) To preserve forest cover on hill slopes, along streams, water courses and water bodies. In order to prevent soil erosion and to check siltation in tanks and to maintain their essential protective and life supporting functions including regulation of water within and

to maintain ecological balance, to preserve the catchment of rivers originating within Yavatmal district.

(2) To preserve and enrich the growing stock in forests and to restore under stocked and degraded area of the forests with the better stocking by taking up soil and moisture conservation measures and reforestation.

(3) To effectively protect the forests with the help of local people and better infrastructural facilities.

(4) Replace poor and less vigorous stock gradually with better vigorous stock by continuous introduction of better germ-plasm.

(5) Preservation and improvement of forests in order to obtain progressively increasing yield of small timber, fire wood, poles and fodder to meet the demands of local people and to provide grazing area to local cattle.

(6) To check ill-effects of soil erosion where ever it is already started and to prescribe preventive measures.

(7) To increase the production and availability of non-wood forest produce especially medicinal plants by protecting forests and undertaking their plantations.

(8) To meet the expectations of wildlife protection and bio-diversity conservation to conserve and maintain the gene pool in natural forests and to achieve appropriate wildlife management with an emphasis of rare and endangered species like tiger, panther, sloth-bear and wild-dog etc.

(9) To provide ecological services to the area by protecting and improving the forests.

SECTION: IX.4: TREATMENT PRESCRIBED:

Based on the requirement of the crop the following treatment is prescribed for the forests dealt with.

(a) Suitable tending and soil working operations to promote natural & artificial regeneration.

(b) Timber, if silviculturally available, will be extracted from dense forests capable of producing large timber on sustainable basis.

(c) Traditional pasture and open forests will be managed with active participation of village communities and of JFM committees.

The general approach of treatment is described below.

- (1) Forests on steep precipitous slopes will be protected from harvesting. 20 meter wide strip on both sides of streams and water courses will also be protected from harvesting.
- (2) Intensive soil and moisture conservation measures are prescribed to protect forests from soil erosion to restore ecological balance and ensure bio-diversity conservation.
- (3) The rivers falling in catchments and flow from such areas and forests susceptible for erosion shall be protected.
- (4) Preference will be accorded to natural regeneration and root stock management. Suitable tending operations will be carried out to promote natural regeneration and promoting coppice regeneration in order to stimulate growth and development. The areas having good natural regeneration of valuable species shall be protected from fire and grazing. Artificial regeneration is prescribed, if natural regeneration is inadequate as per the requirement of site.
- (5) The management practices of forests close to villages will give emphasis to meet the demands of local people for small wood, fire wood, pasture, NWFP etc. Local people especially members of JFM committees will be actively involved in forest management, forest protection, plantation and development of natural resources.
- (6) High priority will be accorded to special habitat management for wildlife conservation. Special emphasis shall be given for protection and treatment of riparian zones and mesic sites, important for wildlife management. 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. Water hole management shall be given priority in forests as it is essential requirement of the wildlife.
- (7) Priority shall be given for reduction of biotic pressure on forests, especially illicit felling, unsustainable grazing, fires and encroachments.
- (8) Involvement of local people in managing forests and awareness among masses in and around forests for effective forest conservation.
- (9) Forests that are capable of producing large sized timber will be harvested under SCI System.

(10) Boundary demarcation will be carried out in time bound manner. Maintaining forest boundaries, updating land records and reconciling revenue records in accordance with forest notifications shall be carried out.

(11) The division will coordinate completion of data base of flora and fauna resources as well as ecologically fragile sites in the division.

SECTION: IX.5: ANALYSIS AND VALUATION OF FOREST:

The first stage analysis of forest crop is based on species distribution in various girth classes as per the enumeration data of 2009 provided by SOFR Unit, Amravati. The enumeration data has been analysed by using Dhabekar's software and also got the same data analysed from the Chief Forest Statistician in the office of the Principal Chief Conservator of Forests, Nagpur.

Analysis of stock mapping and NDVI maps reveals that most of the forests of Pandharkawada Forest Division is of 0.4 density out of which considerable portion is blank area. Majority of forest area of Wani, Umari, Patanbori ranges are devoid of vegetation.

Forest area to the extent of 6% belongs to Site quality III and almost 36% area is of site quality IV with mostly teak species and 19 % area is under stocked and the rest about 39 % areas are eroded and scrub forest along with and blank category.

In this division some forest area has the density between 0.4 to 0.6. The forests area above 0.6 density is approximately 6 % of the total area. The quantum of forest with density between 0.4 to 0.6 is about 31%, less than 0.4 density is about 24% and the total blank area in the division is approximately 39%. The crop density of various compartments has been worked out on the basis of stock mapping carried out by the field staff of Yavatmal WP Division and analysis of NDVI maps provided by FSI, Regional Centre, Nagpur. The analysis of above mentioned factors has been carried out in the office of Conservator of Forests, Working Plan Division, Yavatmal. The data regarding various WC are given in the table as follows.

The Status of stocking in relation to density in different working circles in present plan

Sr. No.	Name of Working Circle	Total Area in ha & Percentage		stocked				Blank/ Eroded & scrub
				stocked (above 0.4)		Under stock (below 0.4)	Plantation	
				SQ III	SQ IV			
1	Selection Cum Improvement WC	Area	30734.78	3254.68	16052.92	5542.27	3560.00	2324.91
		% to total area	52.27	10.60	52.22	18.02	11.56	7.60
		% to WC area	100.00	5.51	27.31	9.43	6.06	3.96
2	Afforestation WC	Area	25552.50	70.00	2119.45	2460.51	1955.84	18946.70
		% to total area	43.46	0.28	8.30	9.64	7.63	74.15
		% to WC area	100.00	0.13	3.60	4.18	3.33	32.22
3	Fodder Improvement WC	Area	2513.74	0	0	0	805.00	1708.74
		% to total area	4.27	0	0	0	32.02	67.98
		% to WC area	100.00	0	0	0	1.37	2.90
	Grand Total		58801.02	3324.68	18172.37	8002.78	6320.84	22980.35

SECTION: IX.6: FORMATION OF WC:

Based on the objectives of management and method of treatment, the WC are prescribed. The Unit area is considered as area of the compartment. Past implementation of the prescriptions contained in Yadav's WP (2002-03 to 2011-12) has been critically examined. Other previous WP prescriptions and experience was also considered while formulating future management details. Further various factors influencing sustainable management of forests, enhancing productivity and meeting the demand of forest produce, forest protection and wildlife management, role of forests in protecting water and soil resources, climatic changes, growing stock expectations of people for problems faced by forestry sector etc. were taken into consideration while formulating the WC for future management. For better improvement of crop method of treatment prescribed in SCI & IWC was similar except selection criteria in SCIWC in Yadav's plan and teak trees of selection girth has been felled in some compartments of IWC, which was not prescribed. Therefore to streamline the methods of treatment prescribed IWC is merged in SCIWC.

the method of treatment prescribed in SCIWC & IWC was similar in Yadav's Plan. Also teak trees of selection girth has been felled in IWC. Therefore to avoid

repetition of method of treatment prescribe & unattendance towards the silviculturally available teak trees of harvestable girth, Improvement Working Circle is deleted. While assigning areas to various WC the enumeration data, stock mapping and the data of NDVI maps have been taken into consideration as discussed in section IX.5 of this chapter. The following WC are prescribed.

I. Selection Cum Improvement Working Circle.

II. Afforestation Working Circle.

III. Fodder Improvement Working Circle.

Overlapping Working Circles covering entire area of the forests:

IV. Non Wood Forest Produce (over lapping) Working Circle.

V. Wildlife Management (over lapping) Working Circle.

VI. Joint Forest Management (over lapping) Working Circle.

VII. Forest Protection (over lapping) Working Circle.

The area assigned to each working circle is given in the following table.

Working Circles and area assigned

Sr. no.	Working Circle	Area in ha	Percentage of area assigned 58801.02 ha
1	Selection-Cum-Improvement WC	30734.78	52
2	Afforestation WC	25552.50	44
3	Fodder Improvement WC	2513.74	04
	Total	58801.02	100

Details of range wise compartments allotted to various working circles and their area are given in the Appendix No XXXIX of Volume II of this Working plan.

(1) Selection-Cum-Improvement WC: In the working plans prior to Yadav's WP most of these area were treated under Coppice With Reserves system in this working circle majority of the forest area is worked under SCIWC & IWC during Yadav's plan. Also it includes area received from FDCM. These areas basically constitute both good and degraded forests mixed together in almost all the compartments and are capable of producing small size timber and fire wood. The basic aim of the treatment is to improve the condition of crop by tending existing natural regeneration, supplement it by artificial regeneration. The silviculturally available matured trees (above harvestable girth) in well

stocked patches will be harvested. To improve the site quality and crop condition soil and moisture conservation measures are prescribed. Total area included in this working circle is 30734.78 ha. This area will meet the demand of local people for small timber and fire wood.

(2) Afforestation WC: In this WC the major portion of forests were previously managed under Coppice With Reserve WC, Afforestation WC. In this WC majority of the area is worked under AWC & FIWC during Yadav's plan. The basic objective of treatment is to increase vegetation cover, both in quality and quantity and to meet the local demand for small timber, fuel wood, fodder and other forest produce by undertaking suitable plantations in blank and under stocked areas. The forests in general are very poor, representing site quality IV. The total area assigned to this WC is 25552.50 ha.

(3) Fodder Improvement WC: It includes forest area which was previously managed under Fodder Improvement WC having sparsely stocked forests not capable of yielding timber. In Yadav's Plan these areas were managed under Fodder Improvement WC and Afforestation WC. Total area included in this WC is 2513.74 ha. The main objective of this WC is to create grass Ramnas and to provide fodder of improved quality and sufficient quantity to local cattle population.

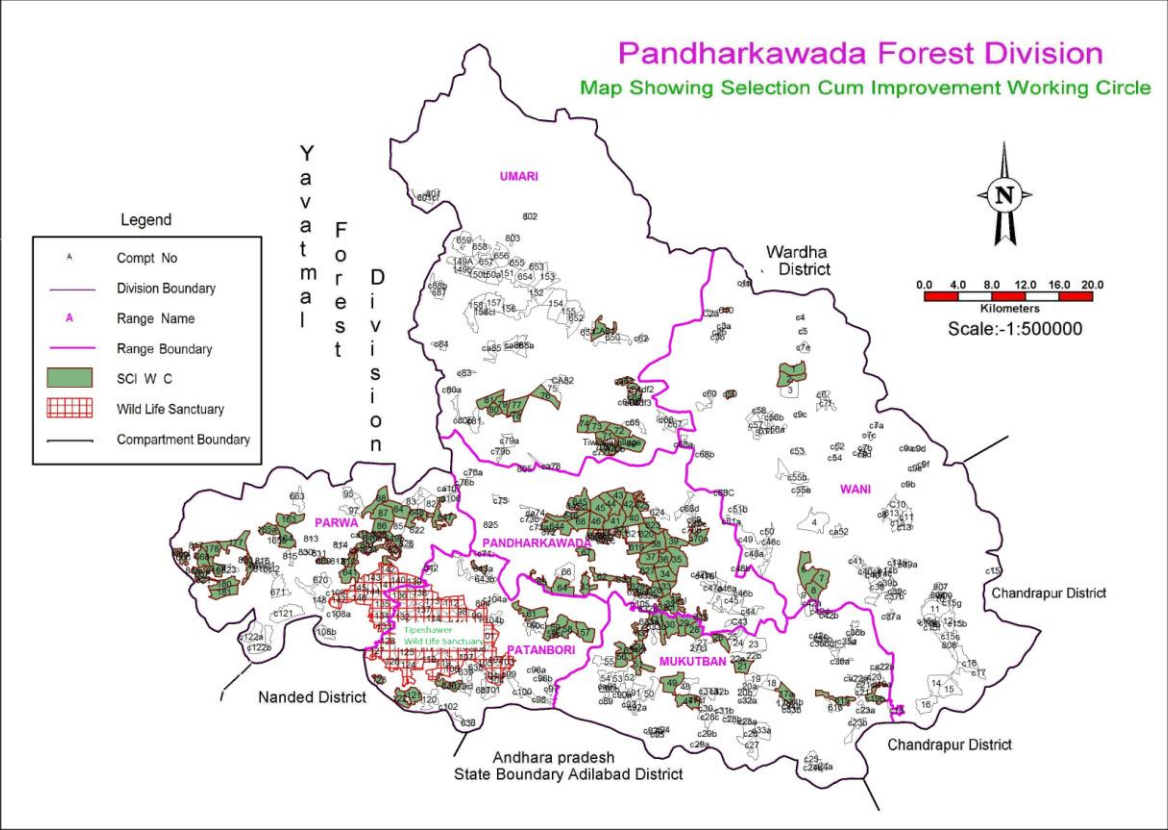
SECTION: IX.7: COMPARTMENTS:

The total area in possession of Pandharkawada Forests Division is 58801.02 ha. An area handed over to other department for various purposes is enlisted in Appendix no.XXXII of volume II. 30 compartments bearing an area 4262.89 ha., which were handed over to FDCM are returned to this division now. Total area 58801.02 ha. of 350 compartments has been included in this WP. The details of area is given in Appendix no. I-a of volume II. 6 compartments of PF bearing area 1242.08 ha., 39 compartments of Unclassed Forests bearing area 2129.92 ha. and 305 compartments of RF bearing area 55429.02 ha. (includes area possess from FDCM). Compartment no. given in Yadav's WP have confined for the convenient of management and easy identification by the field staff. New compartments number of series 800 has been given to E – Class area possessed by Dy. Conservator of Forests Pandharkawada Division.

Un - Class Forests: Un-class forests includes E- class area received for compensatory afforestation and other E-Class area transferred to Forest Department from Revenue Department. The total area of Un-classed forests included in this plan is 2129.92 ha. (Page 11 of Volume II) 499.55 ha. E –class area was taken over by DCF Pandharkawada during Yadav Plan period & 1630.37 ha E-class area was included previously in Yadav’s plan. The state Government decided to transfer these E-class forests to the Forest Department for the management, accordingly transferring of E-class forests is in progress and the area transferred to Pandharkawada Forest Division from Revenue department is 499.55 ha out of 2126.08 ha of total E-class forest which was earmarked (Appendix 1(e)).

The tahasil wise details of E- class area which are already transferred or are to be transferred to Pandharkawada Forest Division from Revenue Department is given in Appendix no. 1(e) of volume II of this Working Plan.

Period of Plan: The period of this working plan is 10 years and the implementation of this plan will commence from 2013-14 to 2022-2023. Working Plan shall come into force from 1st September. The mid-term review can be under taken after 5 years i.e. in 2017-18 if the situation demands and the proposal may be moved by CCF (T), Yavatmal circle.



CHAPTER X

SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

SECTION: X.1: GENERAL CONSTITUTION & VEGETATION:

Good quality teak forests with density of 0.4 and above, which can produce medium and large size timber and poles are included in this WC. Most of the crop under this WC is of SQ IV and few patches of SQ III also occur. Teak is dominant species and constitutes 217 trees/ha, about 62% of the total stock as per the enumeration data. The forests belong to Southern Tropical Dry Deciduous Teak Forests Type according to the classification of Champion & Seth. Apart from teak *Dhawada, moha, ain, lendia, salai, bhirra, char, hiwar, tendu, khair, palas, ghont, awala, arjun* etc also occur in these forests Salai dominates in certain dry locations. In general the crop is middle aged containing some mature trees, crown density is 0.4 to 0.7. Most of the area was worked once or twice under Coppice with Reserves System in the past. Major portion of the area was worked under SCI & IWC during Yadav's plan. The crop is mainly of coppice origin, which is stunted but straight-boled and sound to a large extent. The status of natural regeneration is poor due to grazing by cattle and fire incidence. Lantana is noticed in many compartments which hampers regeneration. The total forest area included in this WC is 30734.78 ha. Range wise distribution of area is given in the table below.

Rangewise area allotted to SCI WC

Sr. no.	Range	Area allotted in ha.						Total No.of compt	Total forest area of range in ha.
		No of compt.	RF	No of compt.	PF	No of compt.	UF		
1	2	3	4	5	6	7	8	9	10
1	Mukutban	17	4024.16	0	0	3	164.27	20	4188.43
2	Pandharkawada	41	10893.82	0	0	1	15.27	42	10909.09
3	Parwa	20	5428.37	4	1167.11	7	838.97	31	7434.45
4	Patanburi	9	2265.94	0	0	2	24.87	11	2290.81
5	Umari	16	4066.54	0	0	0	0	16	4066.54
6	Wani	7	1845.46	0	0	0	0	7	1845.46
Total		110	28524.29	4	1167.11	13	1043.38	127	30734.78

SECTION: X.2: COMPARTMENTS AND WORKING SERIES:

127 compartments are allotted to this WC, the entire area is divided into 30 Working Series, each working series having 20 coupes. The average area of coupe is 52ha. The details of compartment and coupes working series wise to this Working Circle are

given in Appendix XL-a and XLI-b of volume II of this WP. Details of compartment and working series are given in the table below.

Details of compartments allotted to SCI WC

Sr No	Working Series	Name Of Range	No. of Compt.	Total Comt.	Total Area ha.	Total area of WC ha.
1	Chinchoni	Umari	69,71,72,70A,70B,	5	1207.10	1207.10
2	Karnji	Umari	73,74,C64,CA63	4	973.23	973.23
3	Ghordara	Umari	78,79,80,81	4	828.87	828.87
4	Kinhala	Umari	76,77,CA61	3	1057.34	1057.34
5	Matharjun	Mukutban	29,30,31,633A,834	5	1139.01	1139.01
6	Mudhati	Mukutban	47,49,615,C19A,C19B	5	1096.55	1096.55
7	Mukutban	Mukutban	51,56,631,634	4	806.59	806.59
8	Pawnar	Mukutban	21,26,28,17A,831,832	6	1146.28	1146.28
9	Ambezari	Pandharkawda	40,620,622,625	4	1006.86	1006.86
10	Botoni	Pandharkawda	68,645,626A,626B,626C	5	999.24	999.24
11	Chilai	Pandharkawda	36,37,619	3	874.93	874.93
12	Dabhadi	Pandharkawda	32,33,618,632B	4	919.57	919.57
13	Durgada	Pandharkawda	44,45,46	3	1083.74	1083.74
14	Junoni	Pandharkawda	628,629,630,C70A,C70B,C70C	6	1010.79	1010.79
15	Khandani	Pandharkawda	41,42,43	3	952.23	952.23
16	Mahadoli	Pandharkawda	62,63,64,65	4	1001.60	1001.60
17	Mangurda	Pandharkawda	67,644,646	3	981.77	981.77
18	Pachpor	Pandharkawda	34,35,627	3	1139.60	1139.60
19	Wadhona	Pandharkawda	38,39,623	3	923.49	923.49
20	Pahapal	Parwa	84,647,648	3	1175.61	1175.61
21	Kharoni	Parwa	86,87,88	3	1104.79	1104.79
22	Kurli	Parwa	641,810,828,829,CA110,CA111	6	1175.82	1175.82
23	SayAtkhada	Parwa	163,164,177	3	1084.96	1084.96
24	Patapangra	Parwa	176,178,179,820,165A	5	996.09	996.09
25	Manusdhari	Parwa	180.666.667.668.817.818.821.	7	1065.95	1065.95
26	Aarli	Parwa	181.669.649A.649B	4	831.23	831.23
27	Bori	Patanbori	57,58,59,643A.837.838	6	1152.41	1152.41
28	Kegaon	Patanbori	61,121,122,123,640	5	1138.40	1138.40
29	Machindra	Wani	1,2,610,C59	4	735.41	735.41
30	Rasa	Wani	6,7,8,	3	1110.05	1125.32
		Pandharkawda	840,	1	15.27	
		Total		127	30734.78	30734.78

SECTION: X.3: OBJECTIVES OF MANAGEMENT:

The objectives of management are given below.

- (1) To enhance productivity of forests

- (2) To harvest matured teak trees and malformed trees to improve crop
- (3) To protect forests from cattle grazing and fire
- (4) Habitat improvement for wildlife conservation

SECTION: X.4: STOCK MAPING: The stock mapping of the area was carried out and was verified with enumeration data.

The table showing stocking details site quality wise and their area

Forest type	Area in ha.	% area w.r.t. to SCI WC
SQ III	3254.68	10.60
SQ IV	16052.92	52.22
U/S	5542.27	18.02
Plantation	3560.00	11.56
Density below 0.1 & blank, eroded, scrub, hillock area	2324.91	7.60

SECTION: X.5: STOCK MAPPING ANALYSIS AND VALUATION OF CROP:

The forests have well stocked patches at some places, moderately stocked at other places, under stocked and blank in some places. Stock mapping was carried out by the staff of Yavatmal Working Plan Division as well as the staff of Pandharkawada Forest Division. About 11% of the total area of this WC is of teak of site quality III and 52% of teak of site quality IV. The rest area is eroded, blank and under stocked. The stock mapping of the area was carried out and verified with enumeration data.

Natural Regeneration:

Growing stock as per enumeration data year 2009 of area under SCI WC is given in the following table.

Growing stock in SCI WC									
Sr. no.	Girth class (cm)	Teak			Non-teak			Total	
		No. of trees/ha	% wrt total teak stock	% wrt total stock	No. of trees/ha	% wrt total misc. stock of	% wrt total stock	No. of trees/ha	% wrt total stock
1	2	3	4	5	6	7	8	9	10
1	16-30	47.04	21.70	13.42	52.78	39.44	15.06	99.82	28.46
2	31-45	53.18	24.53	15.17	31.96	23.88	9.12	85.14	24.26
3	46-60	46.06	21.25	13.14	18.91	14.13	5.39	64.97	18.52
4	61-75	33.39	15.40	9.52	10.90	8.15	3.11	44.30	12.61
5	76-90	21.76	10.04	6.21	6.99	5.22	1.99	28.75	8.19
6	91-105	9.07	4.18	2.59	4.37	3.27	1.25	13.44	3.82
7	106-120	4.37	2.02	1.25	3.40	2.54	0.97	7.78	2.20
8	121-135	1.23	0.57	0.35	1.94	1.45	0.55	3.18	0.88
9	136-150	0.47	0.21	0.13	1.34	1.00	0.38	1.80	0.51
10	151 & Above	0.20	0.09	0.20	1.22	0.92	0.35	1.42	0.55
	Total	216.77	100.00	61.98	133.18	100.00	38.17	350.60	100.00

The comparative statement of enumeration data of the year 1999 and 2009 is given below.

Girth class	No. of Teak trees/ ha		Non-teak trees/ ha		Total no. of trees/ ha	
	Year 1999	Year 2009	Year 1999	Year 2009	Year 1999	Year 2009
16-30	69.66	47.04	54.68	52.78	124.34	99.82
31-45	57.20	53.17	30.27	31.96	87.47	85.14
46-60	42.83	46.06	18.86	18.91	61.69	64.97
61-75	27.65	33.39	12.56	10.90	40.21	44.30
76-90	15.23	21.76	7.46	6.99	22.69	28.75
91-105	7.23	9.07	7.46	4.37	14.69	13.44
106-120	2.84	4.37	3.33	3.40	6.17	7.78
121-135	0.98	1.24	2.08	1.94	3.06	3.18
136-150	0.46	0.47	2.27	1.34	2.73	1.80
151& above	0.00	0.20	0.31	1.22	0.31	1.42
Total	224.08	216.77	139.28	133.81	363.36	350.60

SECTION: X.6: SILVICULTURAL SYSTEM:

The forests earmarked to SCI WC had been worked previously under Coppice with Reserves System. Because of this majority of the teak trees are of coppice origin and the coppice vigour has been deteriorating over the years. It is necessary to replace the aged coppice trees. Considering various factors such as composition, density and availability of trees for harvesting, Selection-Cum-Improvement System is prescribed.

“The Selection System is defined as a silvicultural system in which fellings and regeneration are distributed over the whole of the area, except in so far as felling cycle introduces a modification, and the resultant crop is so uneven aged that trees of all ages are found mixed together over every part of the area”.

“In Selection System, the matured crop is removed either as single trees or in small groups over the whole of the felling series and consequently the resultant crop is always irregular”.

The silvicultural system is aimed at harvesting matured teak trees and carrying out improvement felling for removal of malformed trees to improve the crop. Harvesting would be carried out considering harvestable girth of teak trees of coppice origin (75 cm at bh ob) and seed origin (120 cm & 105 cm at bh ob) in site quality III & IV area as discussed later on. Teak trees of coppice origin would be felled on priority to remove old

coppice crop. There would be no felling of sound non-teak species. Silvicultural operations like CBO, thinning of old plantations, cleaning etc. are other operations of this system. Thinning would also be carried out to decongest natural regeneration pole crop and multiple coppice shoots would be cut retaining one. Artificial regeneration would be carried out to increase productivity and density of crop. Soil & water conservation works are also necessary to protect and improve soil and water regime. Habitat improvement works have to be carried out to conserve wildlife in this WC.

SECTION: X.7: FELLING CYCLE:

Felling cycle is fixed at 20 years

SECTION: X.8: HARVESTABLE GIRTH:

Site Quality III & IV area :

A selection girth of 90 cm girth at breast height had been prescribed for site quality III and III/IV areas whereas it is 75 cm for site quality IV in Yadav Plan period 2001-02 to 2011-2012. During preparation of this plan, stem analysis were carried out to ascertain harvestable selection girth for teak seed origin and coppice origin respectively, which shown different trends in intersection of CAI and MAI. In case of coppice origin, stem analysis reveals that CAI and MAI intersects at 53 years having girth of 82 cm at breast height in site quality III, where as in site quality IV CAI and MAI intersects at 63 years represents 80 cm Girth at breast height. Therefore it is convenient to prescribe selection harvestable girth 75 cm at breast height in site quality III and IV for coppice origin. In case of teak seed origin CAI intersects at 78 years represents 131cm girth breast height in site quality III and at 94 years represents 104cm girth breast height in site quality IV. Hence selection exploitable girth for seed origin teak should be 120 cm girth at breast height in site quality III and would be 105 cm girth at breast height for site quality IV.

Therefore based on the data of stem analysis following selection harvestable girths are prescribed below for site quality III & IV.

1. Teak trees of coppice origin for site quality III & IV is 75 cm girth at breast height.
2. Teak trees of seed origin for site quality III is 120 cm girth at breast height.
3. Teak trees of seed origin for site quality IV is 105 cm girth at breast height.

Tiwasala block: The forests of Tiwasala block consisting of compartment 69, 70a, 70b, 70c, 71, 72, 73 and 74 spread over 1883.79 ha are of SQ III. During 1930 this area was planted under agrisilvi pastures. The plantations were very successful, which created good forests with 0.5 to 0.7 crown density. Teak is predominant in these compartments, which is of seed origin.

SECTION: X.9: REGULATION OF YIELD:

X.9.1. In view of variations in density condition, no. of harvestable trees in forest area in SCI WC, it is not possible to prescribe clear cut rules for yield regulation. Yield is regulated by prescribing harvestable girth of teak trees. The Government of India instructed to harvest 50% of the normal yield. In addition to the yield obtained by harvesting matured trees, malformed trees, dead trees would also be removed and this would slightly add to the yield. For yield calculation in SCI WC, the method of Sagreiya's modification of Brandis formula is used. Mathematical analysis for K.P. Sagreiya's modification of Brandis' method of determining the maximum sustained yield out of trees of exploitable girth from all age class forests is given as below;

- (i) The number of trees in Class I (Exploitable girth class) is S_1 ;
- (ii) The number of trees in classes II, III ... are $s_2, s_3, \dots$;
- (iii) The fraction of the trees of classes II, III, ... that survive and are eventually available for harvesting as class trees are $x_2, x_3, \dots$, so that $x_2 s_2 = S_2$; $x_3 s_3 = S_3$;
- (iv) The trees take $Y_2, Y_3, \dots$ years in classes II, III, ..., so that the average annual recruitments in the class periods are- $S_2 / Y_2 = R_2$
 $S_3 / Y_3 = R_3, \dots$
- (v) The overall average annual recruitment for the entire enumeration period, i.e.,
 $(S_2 + S_3 + \dots) / (Y_2 + Y_3 + \dots) = S / Y$ is say R .
- (vi) The felling cycle adopted is f years and
- (vii) The accruing average annual recruitment during the 1st, 2nd, ... Cycles is $R', R'', \dots$, so that the recruitments, accruing in successive cycles, i.e. $f R', f R'', \dots$ are given by as follows:

$$f R' = a R_x + (f - a) R_{x+1}$$

$$f R'' = b R_y + (f - b) R_{y+1}, \dots$$

Then the realizable recruitments $R_{r1}, R_{r2}, \dots$ in cycles I, II, ... Will be

$$R_{r1} = \frac{1}{2} [f R' - a (R' - R_x)],$$

$$R_{r1} = \frac{1}{2} [f R'' - a (f R'' - R_y)], \dots$$

Therefore, the prescribed yield should be –

$$1/f [S_1 + f R'/2 - a (R' - R_x)/2],$$

$$1/2f [S_2 + f(R' + R''/2) - b (R'' - R_y)/2], \dots$$

As the stock in hand has to be liquidated in 1, 2, ... cycles, to obtain the maximum sustained yield, while the actual recruitment is still less than R .

From this it follows that if the overall annual recruitment R is to be realized on a sustained basis even while the realizable recruitment in a cycle is less than fR , there must be a stock in hand of –

$$S_I = f [R - R'/2] + a (R' - R_x)/2],$$

$$S_{II} = f [2R - (R' + R''/2)] + b (R'' - R_y)/2], \dots$$

as the deficiency continues for 1, 2, 3, ... felling cycles.

X.9.2: Regulation of yield of teak coppice trees in SQ III:

Harvesting girth 75 cm. The forest area in SCI WC consists of several species in all ages. The details of total trees per hectare in SCI WC are available from enumeration data. As the forests were repeatedly worked under Coppice with Reserves System, most of the teak trees are of coppice origin and the vigour of coppice trees has been deteriorated over the years. It is assumed that coppice teak trees constitute 60% of the total teak trees and yield is determined accordingly. The numbers of coppice teak trees per hectare are given in the table below.

Details of no. of trees per ha in forests under SCI WC

Girth class	Total teak trees	Non-Teak trees	No. of trees of coppice origin (60%)	No. of trees of seed origin (40%)
1	2	3	4	5
16-30	47.04	52.78	28.22	18.82
31-45	53.17	31.96	31.90	21.27
46-60	46.06	18.91	27.64	18.42
61-75	33.39	10.90	19.85	13.54
76-90	21.76	6.999	13.06	8.70
91-105	9.07	4.37	5.44	3.63
106-120	4.37	3.40	2.62	1.75
121&up	1.91	4.51	1.15	0.76
Total	216.77	133.83	129.88	86.89

In table above, details of teak and non-teak trees per hectare are given based on enumeration data 2009. As the forests were repeatedly worked under CWR system previously, the crop has considerable stock of coppice origin.

Details of period required by teak trees of coppice origin to shift to next higher girth class

(Site quality III)

Class	Girth class (cm)	Period required by teak trees to switchover to next higher girth class (years)	Corresponding symbol representing period to switchover to next higher girth class (years)
A	B	C	D
	> 91	--	--
I	76-90	--	--
II	61-75	14	Y ₂
III	46-60	9	Y ₃
IV	31-45	7	Y ₄
V	16-30	6	Y ₅
Total period		36	Y

The period required by teak trees of coppice origin to switchover to next higher girth class is worked out based on stem analysis data. For example teak trees of 16 cm girth at bh (diameter 5.1 cm) will take 7 years to attain that diameter. Teak trees of 30 cm girth (diameter 9.6 cm) will take 13 years for attaining that diameter. Therefore the number of years teak trees remain in 16-30 girth is 6 years (13 - 7 = 6). The same principle can be applied to all girth classes to know the period (years) taken by teak trees to switchover to next higher girth class. In the above table in column A, class I symbol is

given for the teak trees in girth class of harvestable girth and above, based on enumeration data. Next lower girth is named as class – II and next girth class – III and so on.

Percentage of trees of different girth classes that will attain harvestable girth and silviculturally available for removal will be as stated in table below.

Class	Girth class	Trees/ ha	% of trees available as class I in future	Corresponding symbol of column D	no. of trees available as class I in future	Corresponding symbol of column F
A	B	C	D	E	F	G
	>91	9.21	--	--	--	--
I	76-90	13.06	--	--	--	--
II	61-75	19.85	66%	x_2	13.10	S_2
III	46-60	27.64	47%	x_3	13.00	S_3
IV	31-45	31.90	41%	x_4	13.08	S_4
V	15-30	28.22	46%	x_5	13.00	S_5
	Total	129.88			52.18	S

In the table above, in column C the number of trees present in a girth class is given based on enumeration data. The trees in class I of 76-90 and above girth class are not considered here because the trees in this girth class are above harvestable girth and it is the stock in hand for harvesting. In column D percentage of trees available as a class-I in future are given based on the number of trees to be available in Column C. As the total number of class-II trees above harvestable girth are 13.06 (75-90 girth class) which means that out of 19.85 trees in class II, 13.06 trees will switch over to above harvestable girth and the percentage is 66%. In column E the symbol x_2 , x_3 etc is given for the percentage of trees available as class I in future corresponding to the column D. In column G, symbol S_2 , S_3 etc is given for number of trees available as class-I in future from each girth class (class-III, class-IV, class-V) as given in column F. In column G at the bottom S indicates the total number of trees available as class I in future from all girth classes.

For the period Y (36 years) the total recruitment is S, the mean yearly recruitment R is S/Y ,

$$R = 52.18 / 36$$

$$= 1.45 \text{ per ha.}$$

The average annual recruitment per ha during each girth class period namely, $S_2/Y_2 = R_2$, $S_3/Y_3 = R_3$ will be as given in table below.

Class	Girth class in cm	No. of trees / ha.	Years in girth class	Symbol corresponding to column D	Annual recruitment to next girth class	Symbol corresponding to column F
A	B	C	D	E	F	G
	>91	9.21				
I	76-90	13.06				
II	61-75	19.85	14	Y_2	1.07	R_2
III	46-60	27.64	9	Y_3	1.44	R_3
IV	31-45	31.90	7	Y_4	1.87	R_4
V	15-30	28.22	6	Y_5	2.16	R_5
	Total	129.88	36	Y	--	R

In the table above the column F is obtained by the formula S_2/Y_2 , S_3/Y_3 , S_4/Y_4 , S/Y . In column G, R_2 R_3 etc indicate annual recruitment to next girth class corresponding to figures in column F and R indicates average recruitment to next girth class.

There is stock in hand of 22.27 trees/ha (class- I) and there will be recruitment of 52.18 trees/ha in 36 years and thus theoretically annual yield is : $(52.18 + 22.27)/36 = 2.06$ trees/ha, assuming that the existing stock is to be distributed uniformly, the total class I trees available at the end of the first year will be only $(S_1 + R_2)$ per ha.

Of these, all the S_1 (existing class I trees) will be available for removal, but when felling proceed from one end of the annual area to the other, only half of the recruitment of $R_2/2$ trees that will come into class I in one year over the whole coupe will be realizable. Remaining trees will be passing into class I thereafter. In other words the total realizable yield from the coupe (no. of trees per ha) will be $\{S_1 + R_2/2\}$. Similarly for 2nd coupe, before felling commences it will have S_1 trees and also one year's recruitment namely R_2 trees, all of which will be available for removal. Besides this, in coupe I half of the year's recruitment $R_2/2$ will also be available. Thus in 2nd coupe trees available per ha would be $\{S_1 + R_2 + R_2/2\}$, and so on.

Thus for one ha area of each coupe, realizable and accumulating class I trees for entire felling cycle would be as given in table below.

Number of trees available for harvesting per ha, for 20 year felling cycle

Sr. no.	Coupe no.	For coupe area in ha	Nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-\frac{1}{2}) R_2$	Accruing Recruitment=
1	I	1	1	22.27	$\frac{1}{2}R_2 = 0.53$	$14R_2 + \frac{1}{2}R_2 + 5R_3 = 22.71$
2	II	1	2	22.27	$R_2 + \frac{1}{2} R_2 = 1.60$	$14R_2 + \frac{1}{2}R_2 + 4R_3 = 21.27$
3	III	1	3	22.27	$2R_2 + \frac{1}{2} R_2 = 2.67$	$14R_2 + \frac{1}{2}R_2 + 3R_3 = 19.83$
4	IV	1	4	22.27	$3R_2 + \frac{1}{2} R_2 = 3.74$	$14R_2 + \frac{1}{2}R_2 + 2R_3 = 18.39$
5	V	1	5	22.27	$4R_2 + \frac{1}{2} R_2 = 4.81$	$14R_2 + \frac{1}{2}R_2 + R_3 = 16.95$
6	VI	1	6	22.27	$5R_2 + \frac{1}{2} R_2 = 5.88$	$14R_2 + \frac{1}{2} R_2 = 15.51$
7	VII	1	7	22.27	$6R_2 + \frac{1}{2} R_2 = 6.95$	$13R_2 + \frac{1}{2} R_2 = 14.44$
8	VIII	1	8	22.27	$7R_2 + \frac{1}{2} R_2 = 8.02$	$12R_2 + \frac{1}{2} R_2 = 13.37$
9	IX	1	9	22.27	$8R_2 + \frac{1}{2} R_2 = 9.09$	$11R_2 + \frac{1}{2} R_2 = 12.30$
10	X	1	10	22.27	$9R_2 + \frac{1}{2} R_2 = 10.16$	$10R_2 + \frac{1}{2} R_2 = 11.23$
11	XI	1	11	22.27	$10R_2 + \frac{1}{2} R_2 = 11.23$	$9R_2 + \frac{1}{2} R_2 = 10.16$
12	XII	1	12	22.27	$11R_2 + \frac{1}{2}R_2 = 12.30$	$8R_2 + \frac{1}{2} R_2 = 9.09$
13	XIII	1	13	22.27	$12R_2 + \frac{1}{2}R_2 = 13.37$	$7R_2 + \frac{1}{2} R_2 = 8.02$
14	XIV	1	14	22.27	$13R_2 + \frac{1}{2}R_2 = 14.44$	$6R_2 + \frac{1}{2} R_2 = 6.95$
15	XV	1	15	22.27	$14R_2 + \frac{1}{2}R_2 = 15.51$	$5R_2 + \frac{1}{2} R_2 = 5.88$
16	XVI	1	16	22.27	$14R_2 + \frac{1}{2}R_2 + R_3 = 16.95$	$4R_2 + \frac{1}{2} R_2 = 4.81$
17	XVII	1	17	22.27	$14R_2 + \frac{1}{2}R_2 + 2R_3 = 18.39$	$3R_2 + \frac{1}{2} R_2 = 3.74$
18	XVIII	1	18	22.27	$14R_2 + \frac{1}{2}R_2 + 3R_3 = 19.83$	$2R_2 + \frac{1}{2} R_2 = 2.67$
19	XIX	1	19	22.27	$14R_2 + \frac{1}{2}R_2 + 4R_3 = 21.27$	$R_2 + \frac{1}{2} R_2 = 1.60$
20	XX	1	20	22.27	$14R_2 + \frac{1}{2}R_2 + 5R_3 = 22.71$	$\frac{1}{2}R_2 = 0.53$
	Total	20		445.40	219.45	219.45
			Average	22.27	10.97	10.97

Thus overall average number of coppice trees per ha above selection girth per year

$$= 22.27 + 10.97 + 10.97$$

$$= 44.21$$

Out of which available for selection felling per year = $22.27 + 10.97$

$$= 33.24$$

$$\text{Percentage removal} = 33.24 \div 44.21$$

$$= 75.19\%$$

Following the Guidelines of Government of India, 50% of normal available yield can be harvested.

Accordingly average number of trees to be harvested for felling on average per ha annually (37.60% of 33.24) = 12.49, say 12 trees per ha.

Volume conversion factor of teak trees in girth class 76-90 for timber = 0.188 m³ (for Wani Range)

Average annual yield per hectare (12 x 0.188) = 2.256 m³

Total average annual yield (1396 ha x 2.256) ÷ 20 = 157.47 m³ Say 157 m³/year

X.9.3: Regulation of yield of teak coppice trees in SQ IV:

Harvestable girth is 75 cm (GBH). The forest area in SCI WC consists of several species in all ages. The details of total trees per hectare in SCI WC are available from enumeration data. As the forests were repeatedly worked under Coppice with Reserves System, most of the teak trees are of coppice origin and the vigour of coppice trees has been deteriorated over the years. It is assumed that coppice teak trees constitute 60% of the total teak trees and yield is determined accordingly. The numbers of coppice teak trees per hectare are given in the table below.

Details of no. of trees per ha in forests under SCI WC

Girth class	Total teak trees	Non-Teak trees	No. of trees of coppice origin (60%)	No. of trees of seed origin (40%)
1	2	3	4	5
16-30	47.04	52.78	28.22	18.82
31-45	53.17	31.96	31.90	21.27
46-60	46.06	18.91	27.64	18.42
61-75	33.39	10.90	19.85	13.54
76-90	21.76	6.999	13.06	8.70
91-105	9.07	4.37	5.44	3.63
106-120	4.37	3.40	2.62	1.75
121&up	1.91	4.51	1.15	0.76
Total	216.77	133.83	129.88	86.89

In table above, details of teak and non-teak trees per hectare are given based on enumeration data 2009. As the forests were repeatedly worked under CWR system previously, the crop has considerable stock of coppice origin.

Details of period required by teak trees of coppice origin to shift to next higher girth class
(Site quality IV)

Class	Girth class (cm)	Period required by teak trees to switchover to next higher girth class (years)	Corresponding symbol representing period to switchover to next higher girth class (years)
A	B	C	D
	> 91	--	--
I	76-90	--	--
II	61-75	18	Y ₂
III	46-60	13	Y ₃
IV	31-45	8	Y ₄
V	16-30	7	Y ₅
Total period		46	Y

The period required by teak trees of coppice origin to switchover to next higher girth class is worked out based on stem analysis data. For example teak trees of 16 cm girth at bh (diameter 5.1 cm) will take 6 years to attain that diameter. Teak trees of 30 cm girth (diameter 9.6 cm) will take 13 years for attaining that diameter. Therefore the number of years teak trees remain in 16-30 girth is 7 years ($13 - 6 = 7$). The same principle can be applied to all girth classes to know the period (years) taken by teak trees to switchover to next higher girth class. In the above table in column A, class I symbol is given for the teak trees in girth class of harvestable girth and above, based on enumeration data. Next lower girth is named as class – II and next girth class – III and so on.

Percentage of trees of different girth classes that will attain harvestable girth and silviculturally available for removal will be as stated in table below.

Class	Girth class	Trees/ ha	% of trees available as class I in future	Corresponding symbol of column D	no. of trees available as class I in future	Corresponding symbol of column F
A	B	C	D	E	F	G
	>91	9.21	--	--	--	--
I	76-90	13.06	--	--	--	--
II	61-75	19.85	66%	x ₂	13.10	S ₂
III	46-60	27.64	47%	x ₃	13.00	S ₃
IV	31-45	31.90	41%	x ₄	13.08	S ₄
V	15-30	28.22	46%	x ₅	13.00	S ₅
	Total	129.88			52.18	S

In the table above, in column C the number of trees present in a girth class is given based on enumeration data. The trees in class I of 76-90 and above girth class are not considered here because the trees in this girth class are above harvestable girth and it is the stock in hand for harvesting. In column D percentage of trees available as a class-I in future are given based on the number of trees to be available in Column C. As the total number of class-II trees above harvestable girth are 13.06 (75-90 girth class) which means that out of 19.85 trees in class II, 13.06 trees will switch over to above harvestable girth and the percentage is 66%. In column E the symbol x_2 , x_3 etc is given for the percentage of trees available as class I in future corresponding to the column D. In column G, symbol S_2 , S_3 etc is given for number of trees available as class-I in future from each girth class (class-III, class-IV, class-V) as given in column F. In column G at the bottom S indicates the total number of trees available as class I in future from all girth classes.

For the period Y (46 years) the total recruitment is S, the mean yearly recruitment R is S/Y ,

$$R = 52.18 / 46$$

$$= 1.13 \text{ per ha.}$$

The average annual recruitment per ha during each girth class period namely, S_2/Y_2 , S_3/Y_3 , S_4/Y_4 , S/Y will be as given in table below.

Class	Girth class in cm	No. of trees / ha.	Years in girth class	Symbol corresponding to column D	Annual recruitment to next girth class	Symbol corresponding to column F
A	B	C	D	E	F	G
	>91	9.21				
I	76-90	13.06				
II	61-75	19.85	18	Y_2	0.73	R_2
III	46-60	27.64	13	Y_3	1.00	R_3
IV	31-45	31.90	8	Y_4	1.64	R_4
V	15-30	28.22	7	Y_5	1.86	R_5
	Total	129.88	46	Y	--	R

In the table above the column F is obtained by the formula S_2/Y_2 , S_3/Y_3 , S_4/Y_4 , S/Y . In column G, R_2 , R_3 etc indicate annual recruitment to next girth class corresponding to figures in column F and R indicates average recruitment to next girth class.

There is stock in hand of 22.27 trees/ha (class- I) and there will be recruitment of 52.18 trees/ha in 46 years and thus theoretically annual yield is : $(52.18 + 22.27) \div 46 = 1.62$ trees/ha, assuming that the existing stock is to be distributed uniformly, the total class I trees available at the end of the first year will be only $(S_1 + R_2)$ per ha.

Of these, all the S_1 (existing class I trees) will be available for removal, but when felling proceed from one end of the annual area to the other, only half of the recruitment of $R_2/2$ trees that will come into class I in one year over the whole coupe will be realizable. Remaining trees will be passing into class I thereafter. In other words the total realizable yield from the coupe (no. of trees per ha) will be $\{S_1 + R_2/2\}$. Similarly for 2nd coupe, before felling commences it will have S_1 trees and also one year's recruitment namely R_2 trees, all of which will be available for removal. Besides this, in coupe I half of the year's recruitment $R_2/2$ will also be available. Thus in 2nd coupe trees available per ha would be $\{S_1 + R_2 + R_2/2\}$, and so on.

Thus for one ha area of each coupe, realizable and accumulating class I trees for entire felling cycle would be as given in table below.

Number of trees available for harvesting per ha, for 20 year felling cycle

Sr. no.	Coupe no.	For coupe area in ha	Nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-1/2) R_2$	Accruing Recruitment=
1	I	1	1	22.27	$\frac{1}{2}R_2 = 0.37$	$18R_2 + \frac{1}{2}R_3 + R_3 = 14.51$
2	II	1	2	22.27	$R_2 + \frac{1}{2} R_2 = 1.10$	$18R_2 + \frac{1}{2}R_2 = 13.51$
3	III	1	3	22.27	$2R_2 + \frac{1}{2} R_2 = 1.83$	$17R_2 + \frac{1}{2}R_2 = 12.78$
4	IV	1	4	22.27	$3R_2 + \frac{1}{2} R_2 = 2.56$	$16R_2 + \frac{1}{2}R_2 = 12.05$
5	V	1	5	22.27	$4R_2 + \frac{1}{2} R_2 = 3.29$	$15R_2 + \frac{1}{2} R_2 = 11.32$
6	VI	1	6	22.27	$5R_2 + \frac{1}{2} R_2 = 4.02$	$14R_2 + \frac{1}{2} R_2 = 10.59$
7	VII	1	7	22.27	$6R_2 + \frac{1}{2} R_2 = 4.75$	$13R_2 + \frac{1}{2} R_2 = 9.86$
8	VIII	1	8	22.27	$7R_2 + \frac{1}{2} R_2 = 5.48$	$12R_2 + \frac{1}{2} R_2 = 9.13$
9	IX	1	9	22.27	$8R_2 + \frac{1}{2} R_2 = 6.21$	$11R_2 + \frac{1}{2} R_2 = 8.40$
10	X	1	10	22.27	$9R_2 + \frac{1}{2} R_2 = 6.94$	$10R_2 + \frac{1}{2} R_2 = 7.67$
11	XI	1	11	22.27	$10R_2 + \frac{1}{2} R_2 = 7.67$	$9R_2 + \frac{1}{2} R_2 = 6.94$
12	XII	1	12	22.27	$11R_2 + \frac{1}{2}R_2 = 8.40$	$8R_2 + \frac{1}{2} R_2 = 6.21$
13	XIII	1	13	22.27	$12R_2 + \frac{1}{2}R_2 = 9.13$	$7R_2 + \frac{1}{2} R_2 = 5.48$

14	XIV	1	14	22.27	$13R_2 + \frac{1}{2}R_2 = 9.86$	$6R_2 + \frac{1}{2}R_2 = 4.75$
15	XV	1	15	22.27	$14R_2 + \frac{1}{2}R_2 = 10.59$	$5R_2 + \frac{1}{2}R_2 = 4.02$
16	XVI	1	16	22.27	$15R_2 + \frac{1}{2}R_2 = 11.32$	$4R_2 + \frac{1}{2}R_2 = 3.29$
17	XVII	1	17	22.27	$16R_2 + \frac{1}{2}R_2 = 12.05$	$3R_2 + \frac{1}{2}R_2 = 2.56$
18	XVIII	1	18	22.27	$17R_2 + \frac{1}{2}R_2 = 12.78$	$2R_2 + \frac{1}{2}R_2 = 1.83$
19	XIX	1	19	22.27	$18R_2 + \frac{1}{2}R_2 = 13.51$	$R_2 + \frac{1}{2}R_2 = 1.10$
20	XX	1	20	22.27	$18R_2 + \frac{1}{2}R_3 + R_3 = 14.51$	$\frac{1}{2}R_2 = 0.37$
	Total	20		445.40	146.32	146.32
			Average	22.27	7.32	7.32

Thus overall average number of coppice trees per ha above selection girth per year

$$= 22.27 + 7.32 + 7.32$$

$$= 36.91$$

Out of which available for selection felling per year = $22.27 + 7.32$

$$= 29.59$$

$$\text{Percentage removal} = 29.59 \div 36.91$$

$$= 80.16\%$$

Following the Guidelines of Government of India, 50% of normal available yield can be harvested.

Accordingly average number of trees to be harvested for felling on average per ha annually (40.08% of 29.59) = 11.86, say 12 trees per ha.

Volume conversion factor of teak trees in girth class 76-90 for timber = 0.188 m^3 (for Wani Range)

$$\text{Average annual yield per hectare } (12 \times 0.188) = 2.256 \text{ m}^3$$

$$\text{Total average annual yield } (5585 \text{ ha} \times 2.256) \div 20 = 629.99 \text{ m}^3 \text{ Say } 630 \text{ m}^3/\text{year}$$

X.9.4: Regulation of yield of teak trees of seed origin in SQ III:

Harvestable girth: 120 cm at bh ob

As stated earlier the stock of teak trees of seed origin is relatively less in view of the fact that the forest area was repeatedly worked under coppice system during previous WP. For the purpose of calculation of yield it is assumed that the seed origin teak stock is about 40% of the total teak crop. The details of teak trees in various girth classes are given below

Details of teak stock, period required by trees to switchover to next girth class per ha

class	girth class (cm)	total no. of trees per ha as per enumeration data	total no. of trees of seed origin per ha. out of trees in col 3	years required to shift to next girth class (seed origin)	Corresponding symbol for figures in col.5
1	2	3	4	5	6
I	120 & Above	1.91	0.76	-	
II	106-120	4.37	1.75	15	Y ₂
III	91-105	9.07	3.63	12	Y ₃
IV	76-90	21.76	8.70	10	Y ₄
V	61-75	33.39	13.54	9	Y ₅
VI	46-60	46.06	18.42	7	Y ₆
VII	31-45	53.17	21.27	7	Y ₇
VIII	16-30	47.04	18.82	6	Y ₈
	Total	216.77	86.89	66	y

Details of trees available in different girth classes for harvesting per ha

class	girth class (cm)	trees per ha	% of trees available as class I in future	symbol for corresponding figures in col. 4	trees available as class I in future	symbol for corresponding figures in col.6
1	2	3	4	5	6	7
I	121 & above	0.76	-	-	-	-
II	106-120	1.75	43%	X ₂	0.75	S ₂
III	91-105	3.63	21%	X ₃	0.76	S ₃
IV	76-90	8.70	9%	X ₄	0.78	S ₄
V	61-75	13.54	6%	X ₅	0.80	S ₅
VI	46-60	18.43	4%	X ₆	0.74	S ₆
VII	31-45	21.27	4%	X ₇	0.85	S ₇
VIII	15-30	18.82	4%	X ₈	0.75	S ₈
	Total	86.89			5.43	S

Details of teak trees - annual recruitment to next girth class per ha is given below

class	girth class in cm	no. of trees per ha.	years in class	symbol for corresponding figures in column D	annual recruitment to next class	symbol for corresponding figures in column F
A	B	C	D	E	F	G
I	121 & above	0.76	-	-	-	-
II	106-120	1.75	15	Y_2	0.05	R_2
III	91-105	3.75	12	Y_3	0.06	R_3
IV	76-90	8.70	10	Y_4	0.08	R_4
V	61-75	13.54	9	Y_5	0.09	R_5
VI	46-60	18.43	7	Y_6	0.1	R_6
VII	31-45	21.27	7	Y_7	0.12	R_7
VIII	15-30	18.82	6	Y_8	0.12	R_8
	Total	86.89	66	Y	--	R

Calculation of yield number of trees per ha for 20 years felling cycle

sr. no.	coupe no.	year of operation	class I at hand S_1	realizable recruitment	accruing recruitment
1	I	1	0.76	$\frac{1}{2} R_2 = 0.025$	$4R_3 + 15 R_2 + \frac{1}{2} R_2 = 1.015$
2	II	2	0.76	$1 R_2 + \frac{1}{2} R_2 = 0.075$	$3R_3 + 15 R_2 + \frac{1}{2} R_2 = 0.955$
3	III	3	0.76	$2 R_2 + \frac{1}{2} R_2 = 0.125$	$2R_3 + 15 R_2 + \frac{1}{2} R_2 = 0.895$
4	IV	4	0.76	$3 R_2 + \frac{1}{2} R_2 = 0.175$	$R_3 + 15 R_2 + \frac{1}{2} R_2 = 0.835$
5	V	5	0.76	$4 R_2 + \frac{1}{2} R_2 = 0.225$	$15 R_2 + \frac{1}{2} R_2 = 0.775$
6	VI	6	0.76	$5 R_2 + \frac{1}{2} R_2 = 0.275$	$14 R_2 + \frac{1}{2} R_2 = 0.725$
7	VII	7	0.76	$6 R_2 + \frac{1}{2} R_2 = 0.325$	$13 R_2 + \frac{1}{2} R_2 = 0.675$
8	VIII	8	0.76	$7 R_2 + \frac{1}{2} R_2 = 0.375$	$12 R_2 + \frac{1}{2} R_2 = 0.625$
9	IX	9	0.76	$8 R_2 + \frac{1}{2} R_2 = 0.425$	$11 R_2 + \frac{1}{2} R_2 = 0.575$
10	X	10	0.76	$9 R_2 + \frac{1}{2} R_2 = 0.475$	$10 R_2 + \frac{1}{2} R_2 = 0.525$
11	XI	11	0.76	$10 R_2 + \frac{1}{2} R_2 = 0.525$	$9 R_2 + \frac{1}{2} R_2 = 0.475$
12	XII	12	0.76	$11 R_2 + \frac{1}{2} R_2 = 0.575$	$8 R_2 + \frac{1}{2} R_2 = 0.425$
13	XIII	13	0.76	$12 R_2 + \frac{1}{2} R_2 = 0.625$	$7 R_2 + \frac{1}{2} R_2 = 0.375$
14	XIV	14	0.76	$13 R_2 + \frac{1}{2} R_2 = 0.675$	$6 R_2 + \frac{1}{2} R_2 = 0.325$
15	XV	15	0.76	$14 R_2 + \frac{1}{2} R_2 = 0.725$	$5 R_2 + \frac{1}{2} R_2 = 0.275$
16	XVI	16	0.76	$15 R_2 + \frac{1}{2} R_2 = 0.775$	$4 R_2 + \frac{1}{2} R_2 = 0.225$
17	XVII	17	0.76	$R_3 + 15 R_2 + \frac{1}{2} R_3 = 0.835$	$3 R_2 + \frac{1}{2} R_2 = 0.175$
18	XVIII	18	0.76	$2R_3 + 15 R_2 + \frac{1}{2} R_3 = 0.895$	$2 R_2 + \frac{1}{2} R_2 = 0.125$
19	XIX	19	0.76	$3R_3 + 15 R_2 + \frac{1}{2} R_3 = 0.955$	$1 R_2 + \frac{1}{2} R_2 = 0.075$
20	XX	20	0.76	$4R_3 + 15 R_2 + \frac{1}{2} R_3 = 1.015$	$\frac{1}{2} R_2 = 0.025$
	Total	20	15.20	10.10	10.10
Average			0.76	0.505	0.505

Average no. of trees per ha above harvestable girth of 120 cm = $0.76+0.50+0.50$
 $=1.76$

Average no. of trees available for selection felling per ha = $0.76 + 0.50$
 $= 1.26$

Percentage removal = $\frac{1.26 \times 100}{1.76}$
 $= 72 \%$

Following the guidelines of GOI for removal of 50% of normal yield, the average annual yield (no. of trees) per ha = 36% of 1.26
 $= 0.45$ trees per ha

Volume conversion factor of teak for girth class 121-135 (Wani Range) : 0.436 m^3

Average annual yield (volume) per ha = 0.436×0.45
 $= 0.196 \text{ m}^3$

Total average annual yield for area under SCI WC = $931\text{ha} \times 0.196 \div 20$
 $= 9.124 \text{ m}^3$ Say $9 \text{ m}^3 / \text{year}$

X.9.5: Regulation of yield of teak trees of seed origin in SQ IV:

Harvestable girth: 105 cm at bh ob

As stated earlier the stock of teak trees of seed origin is relatively less in view of the fact that the forest area was repeatedly worked under coppice system during previous WP. For the purpose of calculation of yield it is assumed that the seed origin teak stock is about 40% of the total teak crop. The details of teak trees in various girth class is given below

Details of teak stock, period required by trees to switchover to next girth class per ha

class	girth class (cm)	total no. of trees per ha as per enumeration data	40% total no. of trees of seed origin per ha. out of trees in col 3	years required to shift to next girth class (seed origin)	Corresponding symbol for figures in col.5
1	2	3	4	5	6
I	120 & Above	1.91	0.76	-	-
II	106-120	4.37	1.75		Y_1
III	91-105	9.07	3.63	26	Y_2
IV	76-90	21.76	8.70	17	Y_3
V	61-75	33.39	13.54	15	Y_4
VI	46-60	46.06	18.43	11	Y_5
VII	31-45	53.18	21.27	10	Y_6
VIII	16-30	47.04	18.82	8	Y_7
	Total	216.77	86.89	87	Y

Details of trees available in different girth classes for harvesting per ha

class	girth class (cm)	trees per ha	% of trees available as class I in future	symbol for correspond ing figures in col. 4	trees available as class I in future	symbol for corresponding figures in col.6
1	2	3	4	5	6	7
I	121 & above	0.76	-	-	-	-
II	106-120	1.75	-	-	-	-
III	91-105	3.63	48%	X ₂	1.74	S ₂
IV	76-90	8.70	20%	X ₃	1.74	S ₃
V	61-75	13.54	13%	X ₄	1.74	S ₄
VI	46-60	18.43	9%	X ₅	1.66	S ₅
VII	31-45	21.27	8%	X ₆	1.70	S ₆
VIII	15-30	18.82	9%	X ₇	1.69	S ₇
	Total	86.89			10.27	S

Details of teak trees - annual recruitment to next girth class per ha is given below

class	girth class in cm	no. of trees per ha.	years in class	symbol for corresponding figures in col.D	annual recruitment to next class	symbol for corresponding figures in col.F
A	B	C	D	E	F	G
I	121 & above	0.76	-	-	-	-
II	106-120	1.75	-	Y ₁	-	R ₁
III	91-105	3.75	26	Y ₂	0.067	R ₂
IV	76-90	8.70	17	Y ₃	0.102	R ₃
V	61-75	13.54	15	Y ₄	0.116	R ₄
VI	46-60	18.43	11	Y ₅	0.150	R ₅
VII	31-45	21.27	10	Y ₆	0.170	R ₆
VIII	15-30	18.82	8	Y ₇	0.210	R ₇
	Total	86.89	87	Y	--	R

Calculation of yield number of trees per ha for 20 years felling cycle

sr. no.	coupe no.	year of operation	class I at hand S_1	realizable recruitment	accruing recruitment
1	I	1	2.51	$\frac{1}{2} R_2 = 0.035$	$19 R_2 + \frac{1}{2} R_2 = 1.308$
2	II	2	2.51	$R_2 + \frac{1}{2} R_2 = 0.102$	$18 R_2 + \frac{1}{2} R_2 = 1.241$
3	III	3	2.51	$2 R_2 + \frac{1}{2} R_2 = 0.169$	$17 R_2 + \frac{1}{2} R_2 = 1.174$
4	IV	4	2.51	$3 R_2 + \frac{1}{2} R_2 = 0.236$	$16 R_2 + \frac{1}{2} R_2 = 1.107$
5	V	5	2.51	$4 R_2 + \frac{1}{2} R_2 = 0.303$	$15 R_2 + \frac{1}{2} R_2 = 1.040$
6	VI	6	2.51	$5 R_2 + \frac{1}{2} R_2 = 0.370$	$14 R_2 + \frac{1}{2} R_2 = 0.973$
7	VII	7	2.51	$6 R_2 + \frac{1}{2} R_2 = 0.437$	$13 R_2 + \frac{1}{2} R_2 = 0.906$
8	VIII	8	2.51	$7 R_2 + \frac{1}{2} R_2 = 0.504$	$12 R_2 + \frac{1}{2} R_2 = 0.839$
9	IX	9	2.51	$8 R_2 + \frac{1}{2} R_2 = 0.571$	$11 R_2 + \frac{1}{2} R_2 = 0.772$
10	X	10	2.51	$9 R_2 + \frac{1}{2} R_2 = 0.638$	$10 R_2 + \frac{1}{2} R_2 = 0.705$
11	XI	11	2.51	$10 R_2 + \frac{1}{2} R_2 = 0.705$	$9 R_2 + \frac{1}{2} R_2 = 0.638$
12	XII	12	2.51	$11 R_2 + \frac{1}{2} R_2 = 0.772$	$8 R_2 + \frac{1}{2} R_2 = 0.571$
13	XIII	13	2.51	$12 R_2 + \frac{1}{2} R_2 = 0.839$	$7 R_2 + \frac{1}{2} R_2 = 0.504$
14	XIV	14	2.51	$13 R_2 + \frac{1}{2} R_2 = 0.906$	$6 R_2 + \frac{1}{2} R_2 = 0.437$
15	XV	15	2.51	$14 R_2 + \frac{1}{2} R_2 = 0.973$	$5 R_2 + \frac{1}{2} R_2 = 0.370$
16	XVI	16	2.51	$15 R_2 + \frac{1}{2} R_2 = 1.040$	$4 R_2 + \frac{1}{2} R_2 = 0.303$
17	XVII	17	2.51	$16 R_2 + \frac{1}{2} R_2 = 1.107$	$3 R_2 + \frac{1}{2} R_2 = 0.236$
18	XVIII	18	2.51	$17 R_2 + \frac{1}{2} R_2 = 1.174$	$2 R_2 + \frac{1}{2} R_2 = 0.169$
19	XIX	19	2.51	$18 R_2 + \frac{1}{2} R_2 = 1.241$	$R_2 + \frac{1}{2} R_2 = 0.102$
20	XX	20	2.51	$19 R_2 + \frac{1}{2} R_2 = 1.308$	$\frac{1}{2} R_2 = 0.035$
	Total	20	50.20	13.430	13.430
	Average		2.51	0.0672	0.0672

Average no. of trees per ha above harvestable girth of 105 cm = $2.51 + 0.067 + 0.067$
 $= 2.644$

Average no. of trees available for selection felling per ha = $2.51 + 0.067$
 $= 2.577$

Percentage removal = $\frac{2.577 \times 100}{2.644}$
 $= (97.46\%) \text{ i.e. } 97\%$

Following the guidelines of GOI for removal of 50% of normal yield, the average annual yield (no. of trees) per ha = 48.5% of 2.577
 $= 1.24 \text{ trees per ha}$

Volume conversion factor of teak for girth class 105(Wani Range): 0.312

Average annual yield (volume) per ha = 1.24×0.312
 $= 0.386 \text{ m}^3$

Total average annual yield for area under SCI WC = $3723 \text{ ha} \times 0.386 \div 20$
 $= 71.85 \text{ m}^3 \text{ say } 72 \text{ m}^3/\text{year}$

X.9.6: Annual yield :

A : Selection felling :

Total annual yield for coppice origin site quality III = 157 m³

Total annual yield for coppice origin site quality IV = 630 m³

Total annual yield for seed origin site quality III = 9 m³

Total annual yield for seed origin site quality IV = 72 m³

Total annual yield for area under SCI WC = 864m³

B : Improvement felling : (expected yield 0.5 m³/ year)

Total annual yield from improvement felling = 631 m³

(25234 ha x 0.5 m³ ÷ 20 years)

Total annual yield per year from SCI WC = 1495 m³

The yield would vary depending upon availability of teak trees of coppice origin & seed origin, the timber volume of trees vary in different localities. Actual yield shall be estimated by DCF, Pandharkawada Forest Division, after carrying out enumeration of D type area.

Local volume conversion table for each range shall prepare at division level to estimate the yield obtain from coupe.

SECTION: X.10: AGENCY FOR HARVESTING:

Felling operations may be departmentally, through FLCS or JFM Committees as per the instructions of the Government. Modern methods of harvesting shall be introduced to carry out harvesting operations. All other operations shall be carried out by the Forest Department.

SECTION: X.11: COUPE DEMARCATION & FENCING:

(1) The coupes shall be demarcated one year in advance of the prescribed year of working, but for coupe no. I demarcation and marking will be carried out in the same year of felling. Demarcation shall be carried out as per the prescriptions given in this chapter as well as in Miscellaneous Regulations. The coupes shall be divided into 4 sections for effective control over different operations such as marking, felling, extraction etc. The coupe area shall be divided into grids as prescribed below.

- (2) After demarcating coupe, the coupe area shall be protected by laying TCM, dry rubble wall, live hedge etc. in the year of demarcation. Planting of agave shall be carried out on TCM in the year of felling. At least 2 weedings and casualty replacement of agave shall be carried out on TCM for 3 years. The branches of trees along TCM shall be cut to allow sunlight to promote growth of agave.
- (3) Laying out grids: Laying of grids in A, B, C and D types areas shall be done after classifying area into various treatment types. In A,B,C and D type areas grids of 1 ha. size shall be laid down. For the plantations grid of 0.5 ha. size shall be laid down.
- (4) Grid wise record of enumeration, marking and felling shall be maintained. In remarks column of marking register, reasons for marking such as mature, teak trees of coppice or seed origin, dead, malformed, live high stump, singling of coppice shoot etc will be recorded. Grid wise record of operations under natural regeneration e.g. tending root stock, singling of coppice, weeding etc shall be maintained.
- (5) An expenditure of 1 MD per hectare may be sanctioned for laying of 100 m x 100 m grids, wherever no specific provision is made for this purpose.
- (6) Enumeration: Enumeration of all the trees above girth 15 cm gbh ob (all species) shall be carried out in whole area of coupe. A, B, C and D category wise enumeration data shall compile so that the population of existing stock can ascertain and suitable treatment in future can give to the area. Regarding teak trees details of seed origin or coppice origin and malformed teak trees shall be recorded during enumeration of 'D' area of coupe. Serial number with oil paint shall be written on trees, grid wise. Grid wise and section wise abstract of enumeration details shall be maintained. DCF, Pandharkawada shall submit coupe wise details of enumeration (abstract) to CCF, Yavatmal circle as well as CF, Working Plan Division, Yavatmal.

SECTION: X.12: PREPARATION OF TREATMENT MAP:

After demarcation of coupes, treatment map shall be prepared by RFO and it shall be verified by ACF. Treatment map shall be in the scale of 1:5000, showing grids. The treatment map shall be prepared with care and after intensive field inspection. Treatment map shall show all features related to categories A,B,C and D. The approximate area of this WC under each category is given below.

Various treatment types in SCI WC (Area in ha)

Category	Area in ha.	% area w.r.t. to SCI WC.
SQ III – Well stocked	3254.68	10.60
SQ IV – Well stocked	16052.92	52.22
Under Stocked	5542.27	18.02
Plantation	3560.00	11.56
Density below 0.1 & blank, eroded, scrub, hillock area	2324.91	7.60

Category A: Protection area: The following area is included in this category.

- (1) Area with steep slopes (more than 25°),
- (2) Eroded area and area liable for erosion,
- (3) 20 meter wide strip on both sides of water courses.

Category B Under stocked area: This category includes blank area or area with less than 0.4 crown density.

Category C pole crop and old plantation area: This category includes old plantations or patches of young pole crop of natural regeneration suitable for retention as future crop. The old plantations with minimum 30% survival and minimum one ha at one place are included in this category.

Category D well-stocked area: Forests of more than 0.4 density.

SECTION: X.13: TREATMENT OF COUPES:

X.13.1 The following treatment is prescribed for different categories of coupe area.

Harvesting, plantation and other operations shall be carried out with minimum breaking of soil to avoid soil erosion. The climbers that interfere with growth of desirable species shall be cut in the entire coupe, but plant species included in Red Data Book of BSI and other endangered & threatened species shall not be cut. Soil and water conservation works shall be carried out in the entire coupe considering the requirements of site condition and severity of erosion etc. Habitat improvement works for wildlife conservation are necessary.

X.13.2 Category A Protection area: Appropriate soil and moisture conservation measures shall be carried out. On either side of nala and river bank, planting of bamboo can be carried out.

X.13.3 Category B Under stocked area: Multiple coppice shoot shall be cut retaining one per shoot and malformed teak and other timber species seedlings shall be cut. Unwanted undergrowth which is hindering or likely to hinder the growth of seedlings of desirable species shall be removed. Certain blank areas can be utilised as meadows for wildlife conservation. Plantation shall be carried out with suitable species as per site conditions. 50% Teak and 50% miscellaneous species shall be planted. The area selected for planting shall not be less than 5 ha. in a patch.

Category C pole crop and old plantation area: No planting is necessary. Thinning shall be carried out in old plantations as per Stand Table and the General Regulations. In pole crop of NR, thinning shall be done to create space for better growth of plants.

Category D well stocked area: No plantation shall be taken up in this area. Felling of trees shall be as per the marking rules.

SECTION X.14 A: MARKING TECHNIQUE :

(1) All the trees to be marked for felling shall be given a geru band at breast height and on base, the impression of marking hammer shall be put at the breast height as well as at the bottom by making a clear blaze of size 10 cm X 10 cm.

(2) The following trees shall bear a digit serial number of both breast height and base. A) All trees of teak, bija, sisam, ain, tiwas, haldu, dhawada and shivan of 45 cms and above in girth at breast height over bark. B) Trees of all other species of 60 cm and above girth at breast height.

(3) Trees marked below 45 cm gbh (ob) of species Teak, Bija, Sisam, Ain, Tiwas, Haldu and shivan, and other remaining miscellaneous species below 60 cm gbh(ob) will bear serial number which will be given in coal tar. The digital and coal tar numbers will form a separate series. Only malformed trees will be recorded as fuel trees except that of teak and a tree shall be categorised as fuel tree, when it is not capable of yielding any sawn timber or poles.

(4) Trees showing the coupe boundary demarcation shall not be marked for felling.

(5) All the trees bearing serial number shall be duly recorded in marking register with the following details.

Sr.no.		Species	Girth at breast height (ob) in cms	Remarks
Digital	Coal Tar			

(6) The abstract of trees marked for felling shall be given in 15 cm girth classes. Timber, poles and fuel wood trees will be shown separately. The marking number on the trees will be put in vertical direction as shown below.

2
For example tree no. 245 ---> 4
5

(7) Trees marked for selection felling and improvement felling shall record separately in the marking register and also yield obtained shall record separately.

SECTION: X.14 B: MARKING RULES

Marking shall be carried out by the RFO under the close supervision of ACF in category D area. DCF shall personally inspect at least 30% of the coupes and give guidance to ensure proper marking and avoid deviation of prescriptions. Detailed prescriptions regarding marking rules are given in Miscellaneous Regulations. All climbers shall be cut in entire coupe. Species included in Red Data Book of BSI and other endangered, threatened and vulnerable species shall not be cut. The following marking rules shall be followed.

X.14.1. Category A Protection area:

No felling is permitted in this area.

X.14.2 Category B Under stocked area:

- (1) All dead trees retaining 2 dead trees per ha shall be marked for felling.
- (2) All live high stumps shall be marked for felling and they should be cut close to the ground and it shall be properly dressed. Fruit trees, NTFP species shall not be cut.
- (3) Multiple coppice shoots and poles shall be reduced to one per stool retaining the most vigorous one.

X.14.3: Category C pole crop and old plantation area:

- (1) In pole crop young poles shall be marked for felling to remove congestion. The spacing between two adjacent poles shall be approximately $\frac{1}{3}^{\text{rd}}$ of the height of the pole crop.
- (2) The dead diseased and malformed trees of timber species shall be marked for felling fruit trees shall not be marked for felling.
- (3) The multiple coppice shoots will be cut retaining one vigorous shoot.
- (4) Thinning in old plantation shall be carried out as per the instructions given in the chapter on Miscellaneous Regulations.

X.14.4: Category D Well stocked area:

- (1) Trees of miscellaneous species including fruit species and NWFP shall not be marked for felling.
- (2) Multiple coppice shoots of teak shall be marked for felling retaining the most promising one.
- (3) All dead, malformed trees shall be marked for felling, leaving 2 dead trees per ha for conservation of wildlife. A tree considered to be malformed if it does not have a straight clear bole exceeding 2.5 m height from ground level with defective stem occupying more space than its future value warrant. To avoid reckless felling malformed tree having straight clear bole exceeding 2.5 meter height from the ground level should not be marked for felling.
- (4) Teak trees of coppice origin preventing growth of the seedling regeneration of desired species shall be marked first for felling.
- (5) The silviculturally available teak trees with prescribed harvestable girth have to be marked for felling. A tree is considered as silviculturally available when (a) Removal will not lead to soil erosion; (b) Removal shall create appropriate gap for growth of young seedlings of desired species; (c) Alternate trees for seed source shall be available (d) Does not create a permanent gap in the canopy. A gap of more than 6 meter diameter is considered as permanent gap. e) Tends to improve the remaining crop terms of volume production.
- (6) Healthy teak trees which are good seed bearers shall be retained.
- (7) Trees shall not be marked for felling within 30 m on both side of large nala

- (8) During marking for felling, details shall be maintained for coppice and seed origin teak trees separately.
- (9) Plus trees of teak and other species shall be identified during enumeration and they should not be marked for felling.
- (10) All live high stumps of teak shall be marked for felling
- (11) There shall not be felling within the radius of 300 m of sites of historical importance and ecotourism sites situated in forests.
- (12) only estimated harvestable girth teak trees preferably of coppice origin and that of harvestable girth and above will be marked for felling.
- (13) Felling of teak tree shall be from the highest girth class to the next lower girth class.
- (14) Prescriptions given in the Miscellaneous Regulations shall be followed.

Verification of Marking :

- (1) RFO shall carry out marking and append his signature on marking register. He should also certify the marking abstract.
- (2) ACF concerned shall verify 20% of the marking work and put his signature on marking register. ACF shall inspect all the coupes to verify marking. He shall record his findings, give corrective written instructions in case of any error in marking. ACF shall organize meeting of staff and educate and clarify various prescriptions.
- (3) DCF, Pandharkawada Forest Division shall inspect 10% of the coupes to verify marking and take corrective measures for implementing prescriptions of Working Plan. DCF shall record his findings on marking register during field inspection. He shall send report of coupe inspection to the CF, WPD, Yavatmal and CCF, Yavatmal Circle, clearly stating the details of treatment map, grids, enumeration marking, felling, CBO, cleaning, soil & water conservation works as the case may be.
- (4) CCF (T) Yavatmal shall check 1% coupe marking work randomly.

SECTION: X.15: SOIL AND WATER CONSERVATION WORK:

Soil became compact due to heavy grazing and trampling by cattle, frequent fires resulting in poor drainage in forest area. To improve soil fertility and drainage for good growth of forest crop, grazing control, soil and water conservation measures are necessary.

These works shall be carried out along CBO in the next year of main felling in coupes. Nala bunding, gully plugging, earthen check dams, cement bandhara, water absorption trenches, forest tanks etc shall be taken up in coupe area considering the site conditions. These works shall be taken up on the basis of micro-watershed treatment, from upper ridge to valley. CCT and water absorption trenches shall not be taken up in the area with 25% slope or more. There shall be a break leaving 2 m after every 10 m of CCT or WAT, to a safe guard against soil erosion and formation of gully. Accuracy shall be maintained for aligning contour trenches. The prescription given in Miscellaneous Regulation shall follow strictly.

SECTION: X.16: SUBSIDIARY SILVICULTURAL OPERATION :

X.16.1 CBO: This is very important silvicultural operation for improving quality & productivity of forests. CBO shall be carried out in the next year of main felling as prescribed below.

- (1) Climbers that interfere with growth of desirable species shall be cut. However endangered and threatened species shall not be cut.
- (2) All damaged trees which are not likely to recover shall be cut.
- (3) All multiple poles shall cut retaining one vigorous shoot.
- (4) The undesirable undergrowth interfering or likely to interfere with the growth of teak and other valuable species shall be cut.
- (5) Newly coming up multiple coppice shoots of teak will be reduced to 2 per stool retaining the most promising ones.
- (6) All malformed advance growth with no future shall be cut.

X.16.2 Cleaning and Tending: Cleaning and tending operation shall be carried out in the coupe area in the 3rd year and the cleaning operation in the 6th year after main felling as prescribed below.

- (1) Climbers that hinder growth of desirable seedlings shall be cut (except endangered & threatened species).
- (2) The established natural regeneration of teak and other desirable species shall be thinned to keep appropriate spacement. Teak coppice shoots interfering with the growth of seedling regeneration of teak and other desirable species shall be cut.
- (3) Damaged and malformed teak seedlings shall be cutback.

- (4) Inferior and undesirable undergrowth interfering or likely to interfere with the growth of teak, fruit, medicinal and NWFP species shall be cut.
- (5) Only the most promising coppice shoot out of the two coppice shoots left during CBO shall be retained and all other new teak coppice shoots shall be removed.
- (6) Soil working shall be carried out around the seedlings of natural regeneration.
- (7) Section wise details of cleaning operation carried out shall be maintained in a separate register. The 20% works of all the coupes shall be verified by the ACF concerned and DCF shall record findings in the register during inspection.

X.16.3: Thinning: In natural regeneration area thinning shall be carried out to create appropriate spacing for stimulation of growth of young poles. In such young pole crop, thinning shall be carried out in such a way that 1/3rd spacing of the crop height shall be retained between two adjoining poles. In teak plantations the first and second thinnings are mechanical thinnings, if the survival percentage of plantations is 80% or more then first thinning shall be carried out in the 10th and there after every five year respectively. The silvicultural thinning shall be carried out on the basis of Stand Table. Thinning shall be carried out as per prescriptions contained in the chapter on Miscellaneous Regulations.

SECTION: X.17: NATURAL REGENERATION:

X.17.1 In the forests of Pandharkawada Forest Division the status of regeneration is very poor. The young seedlings of teak and other species usually die before getting established due to the compact soil, fire and grazing. Weeds adversely affect growth of desirable species, in some places Lantana is prevalent which hinders natural regeneration. It is necessary to control grazing, carry out weeding around the seedlings of natural regeneration. The coupes of SCI WC shall be strictly protected from grazing, once the coupe is demarcated. Minimum 1 ha. area in a patch shall select for the management.

X.17.2 Thinning and tending operations shall be carried out to create congenial atmosphere for growth of desirable species. Coppice shoots which interfere with the development of young natural seedlings shall be removed. A little opening up of canopy by felling marked trees would boost growth of teak and other desirable species.

X.17.3 The area around seedlings of natural regeneration shall be cleared of weed and grass within one meter diameter, leaf litter and branches shall be arranged in 15 cm thick layer around the seedlings within the cleared area to provide organic mulch. There after two to three spade full of earth shall be put on it, which will keep seedlings free from

weeds and help loosening of soil. In addition, stone mulching shall be done around the current year recruits in the area where sufficient stones are available. Small stones shall be arranged around young seedlings for retention of moisture and preventing trampling by cattle or others.

X.17.4 In the area having inadequate regeneration seedling should be planted keeping up to 625 per ha upcoming regenerated sampling, seed sowing of suitable species shall be done apart from tending of natural regeneration in the next year after main felling. The prescriptions given in the Miscellaneous Regulation shall follow.

SECTION: X.18: ARTIFICIAL REGENERATION:

- (1) Area available in SCI WC is about 30% for artificial regeneration. Artificial activities can be undertaken. Artificial regeneration is very important operation in forestry, to enrich the forest crop and enhance productivity of forests. Species shall be selected considering the soil conditions, slope, economic importance etc., 50% teak and 50% non-teak species shall be planted in artificial regeneration activity. Peltophoram, gulmohar, jacaranda, kashid, glyricidia, subabul, babul etc. shall be avoided in planting activities. The number of non-teak species shall be limited to 2 – 3 species in a given coupe. The species preferred for planting are- bel, behada, chinch, amba, sitaphal, anjan, chandan, moha, kullu, sissoo, saptaparni teak etc. Importance shall be given to economically important NWFP. Concentration of 2-3 important species in a coupe would facilitate easy harvesting and collection of NTFP. Certain areas are suitable for planting sitaphal, planting of this species in a coupe would give promising production in perpetuity. Minimum 5 ha. area in a patch shall select for the plantation activity.
- (2) Miscellaneous tall poly pot seedling shall be planted in pits of 60cm X 60 cm at a suitable spacement. Teak stumps & seedlings shall plant at a spacement of 2m X 2m. in open area. The size of pit for bamboo may be 45 cm X 45 cm X 45 cm and for other species pit size is 30 cm X 30 cm X 30 cm. Pre-planting operations shall be carried out in the year of felling and planting of seedlings is to be carried out along with CBO in next year of felling operation.
- (3) While digging pits care shall be taken not to dig pits in the shadow of standing trees or within 3 meter distance from existing established seedlings of desirable species.

The standing trees have influence zone of spreading shadow and pits should not be dug either in the shadow or in the influence zone of the standing trees. Influence zone for various sizes of trees are given in the following table.

Zone of influence of trees

Sr.no	Girth class in cm	Influence zone in metres
1	< 30	2
2	30 - 60	3
3	60-90	4
4	90-120	5
5	> 120	6

- (4) While carrying out planting operations the prescriptions given in Miscellaneous Regulations shall be followed thoroughly.

SECTION: X.19: OTHER REGULATIONS:

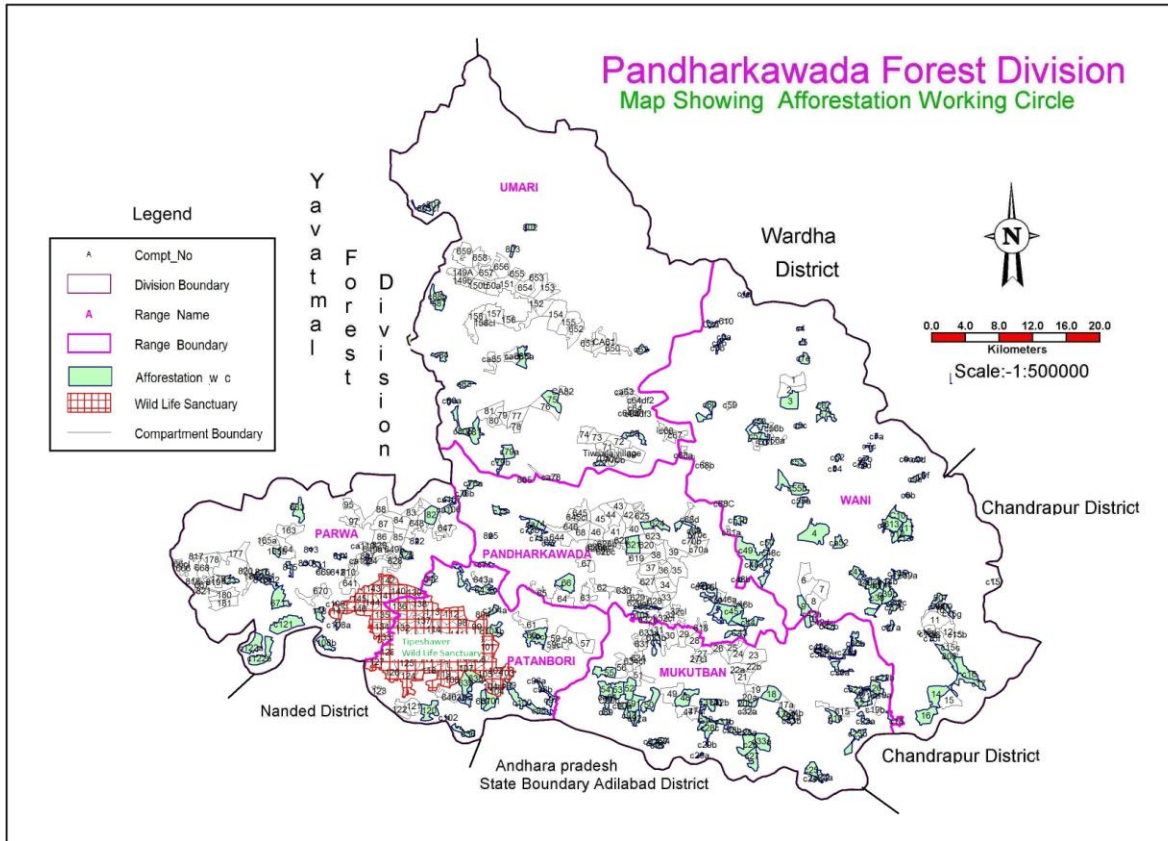
X.19.1: Grazing: The entire coupe shall remain closed to grazing for six years from the year of demarcation. The closed area should specially be mentioned in the grazing license and villagers shall be informed of such closure by suitable means.

The performance of CCF, Yavatmal circle, DCF Pandharkawada Forest Division, ACFs, RFOs, Forester and Forest Guards shall be judged by the extent of grazing control. Further the local people shall be motivated to buy high milk yielding cattle with the assistance of other line departments. JFMC shall also be involved in grazing control. CCF, Yavatmal shall closely monitor the grazing control activity.

X.19.2: Fire protection: After demarcation, entire coupes shall be rigidly protected from fire. The prescriptions contained in the chapter Miscellaneous Regulations shall be followed regarding fire protection and maintenance of fire lines.

Pandharkawada Forest Division

Map Showing Afforestation Working Circle



CHAPTER XI

AFFORESTATION WORKING CIRCLE

SECTION: XI.1: GENERAL CONSTITUTION & VEGETATION:

XI .1.1 Open, degraded, understocked forest area is included in this WC. These areas were earlier known as ‘C’ class Forests. Earlier also these areas were kept under afforestation working circle as per the working plan of Shri. V.R. Kanekar. Most of the areas have been planted under massive Afforestation programme without much success. The regeneration and improvement of degraded forest area have been difficult and challenging task due to bad edaphic conditions, inadequate rainfall, in hospitable climatic condition and uncontrolled biotic interference.

XI.1.2 General Constitution: 25552.50 ha forest area is included in this WC which is mostly eroded, scrub, blank & density less than 0.4 area. Most of these areas were previously managed under Afforestation WC in Yadav’s Plan.

Range wise distribution of forest area in Afforestation WC

Sr. no.	Range	Area allotted in ha.						Total No.of compt	Total forest area of range in ha.
		RF		PF		UF			
		No of compt.	Area in ha	No of compt.	Area in ha	No of compt.	Area in ha		
1	2	3	4	5	6	7	8	9	10
1	Mukutban	51	6769.76	0	0	1	14.52	52	6784.28
2	Pandharkawada	19	2747.91	0	0	6	230.14	25	2978.05
3	Parwa	13	2434.59	0	0	13	633.89	26	3068.48
4	Patanbori	19	2752.20	0	0	1	1.89	20	2754.09
5	Umari	14	1674.83	2	74.97	2	107.80	18	1857.60
6	Wani	61	8011.70	0	0	3	98.30	64	8110.00
Total		177	24390.99	2	74.97	26	1086.54	205	25552.50

XI .1.3. Vegetation:

The areas included in this working circle in general are under stocked and open with crop density less than 0.4 having some better stocked areas in a few compartments to a limited extent. The site quality is IV. Reserved Forests allotted to this working circle are degraded without significant tree growth. The main species crop is teak along with its common associates like dhawada, ain, char, tendu etc. Excessive grazing pressure has resulted in compaction of soil with little or no sub-soil moisture. Natural regeneration of

species like teak, ain, dhawada, etc. are noticed in many compartments especially in rainy season, but die back without getting established. Therefore the status of natural regeneration is poor.

XI.1.4. Reasons for assigning the area to Afforestation WC are:

- (1) The areas in general are under stocked and open with crop density mostly less than 0.4.
- (2) The site quality of these areas is poor which represents mostly site quality IV.
- (3) The soil is compact with little or no soil moisture and highly impervious due to heavy grazing.
- (4) The status of natural regeneration is poor.
- (5) The under stocked and open areas will be restocked through afforestation schemes thereby achieving national goal of 33 % of area under forests.

SECTION: XI.2: SPECIAL OBJECTIVES OF MANAGEMENT:

The special objects of management are as follows.

- (1) To check further degradation of area and to increase vegetation cover in the area, to improve quality and composition of the crop
- (2) To check the loss of top soil by taking up suitable soil and moisture conservation measures.
- (3) To increase the water absorption capacity of the soil
- (4) To meet the local demand for fuel wood, fodder, small timber increasing the availability of NWFP and employment opportunities
- (5) To increase the productivity of the land.

SECTION: XI.3: COMPARTMENTS ALLOTTED TO AWC:

The compartments allotted to this WC are given in the following table. Details of compartments, working series and coupes are given in Appendix XL-b and XLII-b of volume II of this Plan.

Allotment of compartments to felling series in Afforestation WC

Sr No	Working Series	Name Of Range	No. of Compt.	Total Comt.	Total Area ha.	Total area of WC ha.
1	Jamni	Mukutban	C18,C20,C21C23A,C23B,C24A,C24B,C25	8	1199.77	1199.77
2	Mukutban	Mukutban	616,C35A,C35B,C36A,C36B,C42A,C42B,C42C,CA22A,CA22B	10	991.71	991.71
3	Hirapur	Mukutban	C28A,C28C,C29A,C29B,C30,C31A.C31B,C26,C27,C33A	10	1462.09	1462.09
4	Chichghat	Mukutban	18,48,50,17B,C33B,C34A,C34B	7	1016.31	1016.31
5	Rudhe	Mukutban	52,53,54,55	4	932.81	932.81
6	Ardhawan	Mukutban	633B,C89,C90A,C90B,C91,C92A,C92B,C93,C94,C95,CA91,20B	12	1167.07	1167.07
7	Saiphall	Pandharkawda	632A,C105,C43,C44,C45,C47A,C47B,C69,C71	9	1442.30	1442.30
8	Kodori	Pandharkawda	825,C72,C73A,C73B,C75,C76A,C76B,CA74,842,839,841,843,844,	13	630.00	644.52
		Mukutban	833	1	14.52	
9	Jamb	Parwa	82,663,811,812,813,814,815,816,822,824,826,827,830,165B,C108A,C108B,C109	17	1538.58	1538.58
10	Parwa	Parwa	148,671,819,823,C121,C122A,C122B,CA106,CA107,	9	1529.90	1529.90
11	Mandvi	Patanbori	60,636,C100,C101,C102,C103,C104B,C96A,C96B,C97,C98,C99	12	1414.08	1414.08
12	Khairi	Patanbori	120,637,638,639,642,804,643B,C104A,	8	1340.01	1340.01
13	Warna	Umari	75,801,802,803,805,C62,C87,C88B,	8	875.08	875.08
14	Kinhi	Umari	70C,C65,C77,C79A,C79B,C80A,C80B,C81,C83,C84,	10	982.52	982.52
15	Phulora	Wani	3,C1A,C1B,C2A,C2B,C3A,C3B,C4,C5,C6,C7F	11	841.20	841.20
16	Slebhatti	Wani	611,C53,C54,C57,C58,C60,C52,C7A,C7B,C7C,C7D,C7G,C9D	13	887.39	887.39
17	Sukhaneg aon	Wani	4,C55A,C55B,	3	1070.95	1070.95
18	Palsoni	Wani	613,C10,C11,C12,C13,C14A,C14B,C14C,C8,CA52	10	1250.28	1250.28
19	Mendholi	Wani	9,C37A,C37B,C38,C39B,C39C,	6	1106.45	1106.45
20	Borda	Wani	C40,C41,C48A,C49,C50,C51B,C48B	7	1379.30	1379.30
21	Yenak	Wani	14,16,806,807,808,809,C16,C17,C15D,C15E,C15F,C15G,835,836,	14	1574.43	1574.43
22	Mahadoli	Pandharkawda	66,621,624	3	905.75	905.75
			Total	205	25552.50	25552.50

SECTION: XI.4: ANALYSIS AND VALUATION OF CROP:

The stock maps available in the office have been updated and stock is assessed with the help of NDVI maps provided by Regional Director, FSI, Nagpur. The enumeration survey of forest crop has been done by the SOFR Unit, Amravati in 2009 and the analysis of enumeration data was carried out by Chief Forest Statistician, Nagpur and the results of enumeration data are given in the following table.

Growing Stock in Afforestation WC

Sr.No.	Girth Class	Teak			Others			Total	
		No.	%age wrt Total teak spp.	%age wrt Total stock	No.	%ageTotal Misc.species	%age wrt Total Stock	No.	%age wrt Total stock
1	2	3	4	5	6	7	8	9	10
1	15-30	9.43	35.63	5.39	90.93	61.27	52.00	100.35	57.35
2	31-45	6.44	24.35	3.68	32.85	22.13	18.79	39.29	22.45
3	46-60	3.58	13.53	2.05	10.56	7.12	6.04	14.14	8.09
4	61-75	2.27	8.58	1.30	5.53	3.73	3.16	7.80	4.44
5	76-90	1.85	7.01	1.06	3.27	2.20	1.87	5.12	2.92
6	91-105	1.34	5.06	0.77	1.76	1.19	1.01	3.10	1.77
7	106-120	0.79	3.00	0.45	1.17	0.79	0.67	1.96	1.12
8	121-135	0.25	0.96	0.15	0.89	0.60	0.51	1.15	0.66
9	136-150	0.29	1.11	0.17	0.53	0.36	0.30	0.82	0.47
10	151above	0.21	0.79	0.21	0.91	0.61	0.52	1.12	0.73
Total		26.45	100.00	15.13	148	100.00	84.87	174.86	100.00

SECTION: XI.5: METHOD OF TREATMENT:

XI.5.1: Area available for afforestation is more than 50% of AWC. As per the observations the earlier efforts of afforestation have not been proved successful to a large extent, therefore it is expected that proper care shall be taken to afforest these areas. The area should be treated with intensive soil and moisture conservation measures with site specific treatment plan on the basis of site conditions, therefore for the purpose of afforestation, treatment in these areas is in two phases.

XI.5.2 Phase - I Restorative Phase:

The period of this phase will be two year. The area of the coupe shall be protected completely from biotic interference by digging TCM or live hedge fencing or barbed wire fencing. Appropriate soil and moisture conservation measures like nala bunding, gully

plugging, CCT and WAT wherever necessary shall be taken up. These water conservation measures shall be taken up on watershed basis i.e. ridge to valley approach. Singling of root stock and cut back operations shall be carried out to improve root stock. Sowing seeds of maharukh, glyricedia, khair, bamboo, sagargoti and other local species may be useful for live hedge fencing. The P.P.O./P.Y.O operation shall be undertaken in second year of restorative phase along with felling. Motivation of local people for JFM as an important work shall be taken up. The villagers shall be allowed to cut and carry grass at nominal rates in the area which was allotted to JFM Committee.

XI.5.3 Phase II Productive Phase:

The period of the phase II shall be of 5 years immediately after completion of restorative phase. The RFO shall thoroughly inspect the area and prepare treatment map for that area. If any minor repairs are required for soil and moisture conservation works which were already taken up in restorative phase shall be undertaken. After thorough inspection by the RFO if he finds favourable improvement in the area as well as in the social climate, he shall select suitable species for plantation in the coupe. The treatment map shall be prepared as per the site conditions indicating which species to be planted in a particular area, existing crop density, soil type, topography and natural regeneration areas of at least one ha. at one place. The treatment maps shall indicate the treatment to be given grid wise and species to be planted grid wise on the basis of suitability of soil.

Species selection should be invariably in consultation with JFM Committee and preference shall be given for local species rather than introducing exotic or non- local species. The members of JFM Committee shall be motivated and involved for raising successful plantation with their active participation and cooperation. Before taking up plantation the natural regeneration areas shall be properly identified and preference shall be given to naturally regenerated seedlings and tending operations shall be carried out to obtain healthy natural regeneration. Wherever natural regeneration is not sufficient, in blank and less density areas, the areas shall be supplemented with artificial regeneration. The number of plants to be planted per ha shall be decided on the basis of available natural regeneration, root stock, blank area and also considering soil factors, rainfall, temperature etc. It is prescribed that proper managerial inputs (better nursery stock, soil working, mulching, fertilizer application etc.) shall be applied to the naturally regenerated seedlings

rather than planting more number of seedlings. Artificial regeneration shall not be taken up in those areas in which the established regeneration is adequately available and results of seed sowing are excellent.

SECTION: XI.6: FORMATION OF COUPES AND PLANTATION SERIES:

The entire WC is divided into 22 working series and each working series consists of 20 coupes. The details about working series and coupes are given in Appendix XL-b of volume II of this plan.

SECTION: XI.7: REGULATION OF YIELD:

Since majority of the area is degraded, open and under stocked, no appreciable yield will be realized except improvement felling. Approximately 0.4 m³ per ha. yield from improvement felling is expected.

SECTION: XI.8: IMPLEMENTING AGENCY:

All the prescribed operations will be implemented departmentally including plantation works by active co-operation and involvement of JFM Committee.

SECTION: XI.9: METHOD OF EXECUTING WORKS:

XI.9.1 Demarcation: All annual coupes shall be demarcated and marked one year in advance, except coupe no. I in which the demarcation and marking will be carried out in the same year of working.

XI.9.2 Laying of grids: Laying of grids in A, B, C and D type areas shall be done after classifying areas into various treatment types. In A,B,C and D type areas grids of 1 ha. size shall be laid down. For the plantations grid of 0.5 ha. size shall be laid down. An expenditure of 1 MD per ha shall be sanctioned for laying of 100 m x 100 m grids, wherever no specific provision is made for this purpose.

XI.9.3 Preparation of treatment map: After the demarcation of coupe, treatment map will be prepared by the RFO and it will be verified by the ACF with an emphasis of the suitability of sites for plantation, as well as the promising natural regeneration area. The treatment map will show contours along with important features like nala, streams, other

protected areas, open and less density area, natural regeneration area, old plantation area and the area more than 0.4 density in A,B,C,D types. Treatment map will be prepared on graph paper in 1:5000 scales. Approximate category wise area of this WC is given below.

Category	Area in ha.	% area w.r.t. to SCI WC. (25552.50ha.)
SQ III – Well stocked	70.00	0.28
SQ IV – Well stocked	2119.45	8.30
Under stocked	2460.51	9.64
Plantation	1955.84	7.63
Density below 0.1 & blank, eroded, scrub, hillock area	18946.70	74.15

(1) Category A - Protection area: This category includes the following area:

1. The area with the steep slope i.e. more than 25°
2. Area already eroded or prone to soil erosion.
3. 20 meter wide strip on both sides of rivers, water courses and around water tank.

(2) Category B- under stocked area: It includes areas with density less than 0.4 and exceeding 5 ha at one place.

(3) Category C- Group of young poles and old plantation area: It includes pole crop of established regeneration of teak and other species suitable for retention as future crop and old plantations. The survival in old plantation areas will be more than 30 % and extent of area should not be less than 1 ha. at one place.

(4) Category D- Well stocked area: This category includes the area with crop density more than 0.4.

SECTION: XI.10: TREATMENT PRESCRIBED:

Different kinds of treatment are prescribed for various categories as under.

XI.10.1: The climber cutting shall be carried out in entire coupe area. Care should be taken to avoid cutting of species included in Red Data Book of BSI and other endangered, threatened, vulnerable species.

XI.10.2: The entire coupe shall be treated with soil and moisture conservation works such as nala bunding, gully plugging, CCT wherever necessary.

XI.10.3: Category A- Protection area: No felling is prescribed, intensive soil and moisture conservation measures shall be undertaken. Bamboo plantation will be taken up on the both sides of nala if the soil conditions are suitable. In eroded areas cuttings of Nirgudi and other soil binders will be planted to control soil erosion. The area to be planted shall be not less than 5 ha at one place. While taking up plantations care should be taken that the plantation work will not lead to any soil erosion.

XI.10.4: Category B- under stocked area: Intensive soil and moisture conservation measures shall be carried out to increase the productivity and check soil erosion. In blanks plantation with Teak and other species will be under taken and seed dibbling will be under taken wherever it is needed as per the soil conditions.

XI.10.5: Category C- Group of young poles and old plantation area: Thinning shall be carried out in young pole crop of natural regeneration in order to create appropriate spacement to stimulate growth of the crop. In old plantations thinnings are prescribed as per the stand table. In this category of area, no plantation shall be taken up.

XI.10.6: Category D- Well stocked area: No planting will be done in this area. Natural regeneration will be facilitated to enrich the area. Improvement felling wherever possible is prescribed.

SECTION: XI.11: MARKING TECHNIQUE AND MARKING RULES

XI.11.1: Marking technique for the trees to be marked for felling is prescribed in chapter on Miscellaneous Regulations. Marking of tree will be done by the RFO under the guidance of ACF concerned. The DCF will inspect himself as many coupes as possible to give guidance and instructions to staff and also to check against excess marking if any. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Grid wise record of operations mentioned under Natural Regeneration e.g. tending, root stock management, singling of coppice, weeding etc shall be maintained. The marking rules of various categories of areas are given below.

XI.11.2: Category A- Protection area: No tree will be marked for felling.

XI.11.3: Category B- under stocked area:

- (a) No live tree will be marked for felling.
- (b) All live high stumps shall be cut-back.
- (c) All dead trees will be marked for removal retaining 2 trees per ha. which will act as snag and dens for wildlife. Multiple coppice shoots will be reduced to one per stool retaining the most vigorous one.
- (d) The undesirable under growth which is preventing or likely to prevent the development of the natural seedling will be removed and all possible efforts shall be made to protect and develop rooted stock.

XI.11.4: Category C- Group of young poles and old plantation area:

- (a) The congested pole crop will be marked for thinning in order to create proper spacement in the crop preferably $1/3^{\text{rd}}$ spacement of crop height will be retained between two adjoining poles.
- (b) All dead, diseased and malformed poles will be marked first before thinning.
- (c) In old plantations thinning will be carried out to maintain appropriate spacement as per the stand table. Care shall be taken to retain the poles of seedling origin and coppice origin poles will be removed first.
- (d) No plantation shall be taken up in this category of area.

XI.11.5 Category D- Well stocked area:

- (a) Multiple coppice shoots will be marked for felling to reduce the number of stems or poles to 1 per stool retaining the most promising one.
- (b) All live high stumps shall be cutback.
- (c) All dead trees shall be removed retaining 2 per ha.

SECTION: XI.12: SOIL AND MOISTURE CONSERVATION WORKS:

Soil and moisture conservation measures shall be under taken in the restorative phase. These works shall be taken up along with marking and completed before the onset

of monsoon of the next year. Detailed descriptions regarding soil and moisture conservation works given in Miscellaneous Regulations shall be followed.

SECTION: XI.13: REGENERATION:

Regeneration will be of two types I) Natural regeneration and II) Artificial regeneration.

XI.13.1: Natural Regeneration: Natural regeneration is the best source of getting better quality stock provided the sufficient natural regeneration is available. The available natural regeneration area shall be demarcated and properly protected from its worst enemies such as weed growth, fire, grazing and other biotic interference. In the forests of Pandharkawada Division it has been observed that in many compartments lantana invaded which hinders the growth of natural regeneration of desired species. The seedlings of natural regeneration can be secured only by means of systematic weeding commencing in the first rainy season and continued there after till the plants of natural regeneration are free from the suppression. Due to deciduous nature of the forests the natural regeneration in these forests has greatly suffered because of frequent fires coupled with inhospitable soil conditions. As a result of frequent fires the seedling suffer a lot from desiccation which needs proper mulching for each plant to reduce the effect of desiccation. The natural regeneration areas shall be categorised into 2 types.

Area with adequate regeneration: In this category, regeneration is considered adequate if the area contains more than 625 seedlings per ha. In order to stimulate growth and development of young recruits of Teak and miscellaneous species the following prescriptions shall be adopted for tending of natural regeneration. Minimum 1 ha. area in a patch shall select for the management.

- (1) Identification of the area containing promising natural regeneration shall be done inside the coupe.
- (2) The unwanted under growth, which is preventing or likely to prevent the growth of natural regeneration of desired species shall be removed.
- (3) Identified patches of natural regeneration shall rigidly be protected from fire, grazing and other interferences. Suitable thinning and tending operations will be carried out to create congenial atmosphere for the growth of crop. Coppice shoots which interfere with

the development of young natural seedlings shall be removed. A little opening up of canopy by felling marked trees and ground cover at some places shall boost establishment of natural regeneration of Teak and other species by providing better light and aeration.

The natural regeneration shall be cleared out within the diameter of one meter and these weeds and grasses, leaf-litter and branches shall be arranged in 15 cm high layer around the seedlings within the cleared area to provide organic mulch. There after two to three spadeful of earth shall be thrown to the mulch in place. Therefore it will keep the soil around the plants free from weeds as well as help securing the loosening of soil. In addition, stone mulching shall be done around the current year recruits in the areas where surface stones are available. Small stones shall be arranged in a circle closed around every young seedling, which will help in retention of surface moisture as well as avoid accidental trampling by cattle or others. Wherever natural regeneration is not sufficient, it shall be supplemented with artificial regeneration.

Area with inadequate regeneration: In these areas seed sowing of suitable species shall be done by staff apart from tending of available natural regeneration in the next year of the main felling. In this area seedlings should be planted keeping upto 625 seedlings per ha.

XI.13.2 Artificial Regeneration: Most of the area under this WC is suitable for artificial regeneration. In these areas wherever natural regeneration is not sufficient or in open and blank areas, plantation with suitable species shall be taken up under artificial regeneration. The number of seedlings to be planted is decided on the basis of soil conditions, rain fall, temperature variation and rate of evapo-transpiration. The choice of species to be planted will depend upon suitability of species, its local demand and will be decided in consultation with JFM Committee or local village community. Various details about pre-planting, planting and post-planting operations given in artificial regeneration of Miscellaneous Regulations are to be referred. Minimum 5 ha. area in a patch shall select for the plantation activity.

XI.13.3: PRE-PLANTING OPERATIONS:

(1) The PPO/PYO will be carried out one year before actual planting works are to be taken up. The planting stock in the nurseries should be tended with great care so that seedlings of various species grow into healthy and hardy planting stock and attain sufficient height when planted out. The seeds for raising nursery stock shall be from known source

especially from the plus trees of high forests and preferably certified seeds. The seedlings shall be raised with improved technique preferably the seedlings raised under root- trainer technology may be used as planting stock.

(2) Fencing: The area to be planted will be fenced by TCM or live hedge or barbed wire fencing to protect plantation from cattle and wild animals. While digging of TCM care shall be taken when the boundary pass across the contour in such areas no TCM shall be dug and live hedge fencing will be provided. The size of TCM shall be of 1.9 m X 0.6 m X 1 m

(3) Digging pits: For raising plantations other than bamboo, the size of pits will be 30cm X 30cm X 30 cm whereas for bamboo plantation the size of pits will be 45cm X 45cm X 45cm. For tall poly pot seedling the size of pits shall be 60 cm X 60 cm X 60 cm.

XI.13.4 Choice of Species: The choice of species will be depending upon climatic and edaphic conditions and also preference of local people. The species for planting which occur locally and of the proven fodder grass species, fruits, NWFP and some of the timber species shall be preferred. 50% Teak species and 50% Bamboo and miscellaneous species to be planted depending upon the suitability of sites. 25% tall poly pot seedling of medicinal, fruit and fodder species shall be planted in area. Plantation model shall select as per site's requirement. The palatable grass species of shedha, paunya and marvel shall be preferred. Bamboo can be planted in suitable areas especially along nala bank.

XI.13.5: FIRST YEAR OPERATION

(1) Planting: Planting operation will be completed within a fortnight of onset of monsoons. The Teak seedlings or stumps should be planted after first monsoon showers. Whereas in case of miscellaneous species poly-pot or root-trainer plants are to be planted. Tall poly pot seedlings of medicinal, fruit and shadowed species are to be planted.

(2) Weeding and Casualty Replacement: The weeding shall be carried out as per the schedule given below.

1st weeding shall be completed before end of July. The 2nd weeding shall be completed in the beginning of September, whereas 3rd weeding shall be completed by mid of October. Along with 3rd weeding mulching shall be carried out. Casualty replacement shall be

carried out along with 1st weeding, if required. The natural regeneration is properly tended. However the coppice shoots preventing or likely to prevent the development of seedling regeneration will be removed.

XI.13.6 Planting on TCM and live-hedge fencing: On the TCM Agave bulbils in 2 rows in 1 meter spacing and bamboo seedling at 2 meter spacing and tussocks of fodder grass in 2 rows in 0.6 meter and seed sown of suitable fuel wood species like Acacia species. For live hedge fencing the species should be planted as follows. The outer 2 rows of Agave at 0.5 meter spacing and inner 3 rows by fast growing thorny trees and shrubs, such as Acacia species by sowing or planting at 0.5 meter spacing. If necessary on TCM Sagargoti will be planted or seeds of Sagargoti will be sown.

XI.13.7 Second year operation: In the 2nd year of plantation casualty replacement should be carried out immediately after the onset of monsoon and having sufficient rainfall before mid-July. During 2nd year two weedings, one by end of August and the other is by end of October shall be carried out. Mulching and hoeing shall be done along with second weeding. During the time of 2nd weeding mulching with leaves is preferable, especially leaves of leguminous species, which will facilitate recycling of the nutrients in the soil and effective mulching will be associated in reduction of sub-soil moisture loss.

XI.13.8: Third year operation: In 3rd year weeding shall be carried out in the month of September along with soil working. One more soil working shall be carried out in the month of October for proper retention of soil moisture. Natural regeneration shall be properly tended. In the 3rd year of the plantation cleaning shall be carried out. Coppice shoots of Teak will be removed if NR and AR are successful otherwise coppice shoots will be cutback and reduced retaining one vigorous coppice shoot per stool. The established advance growth of Teak and other valuable species will be spaced out suitably, through tending operations.

XI.13.9: Fourth & Fifth year operation: Fire line, watch & ward shall be carried out during fourth & fifth year of the plantation.

XI.14: SUBSIDIARY SILVICULTURAL OPERATIONS:

XI.14.1: CBO: Cut Back Operation shall be carried out next year after main working of the coupe and the following prescriptions shall be followed.

- (1) All climbers shall be cut. However care shall be taken to avoid cutting of species included in Red Data Book of BSI and other threatened & vulnerable species.
- (2) All established multiple coppice shoots and poles shall be reduced to one per stool retaining the most promising one.
- (3) The established advance growth of teak and valuable species will be spaced out suitably.

XI.14.2: Cleaning and Tending : Cleaning and Tending operation shall be carried out in the coupe area in the 3rd year and cleaning operation in the 6th year after main felling as prescribed below.

- (1) All climbers shall be cut and the unwanted undergrowth including lantana interfering or likely to interfere with the growth of Teak and other valuable species will be cut. Threatened, endangered species shall not be cut.
- (2) Most promising shoots out of previously retained shoots will be retained and all other new coppice shoots of teak will be removed.
- (3) Established and natural regeneration of teak and other species shall be spaced out with appropriate tending operations.
- (4) All coppice shoots interfering with the growth and development of seedlings regeneration of Teak and other species will be cut back.
- (5) Soil working shall be carried out around the seedling of natural regeneration.

XI.14.3: Thinning: In old plantations thinning shall be carried out as per Stand Table based on age and site quality of the plantation. 1st and 2nd thinnings shall be carried out in 10th and 15th year of planting respectively. These two thinnings are preferably mechanical if the survival percentage of the plantation is more than 80 %. Silvicultural thinning shall be carried out after every five years of planting respectively. The detailed procedure for carrying out thinning given in Miscellaneous Regulations shall be followed. The other operations are

- (1) All dead, badly damaged and uprooted trees shall be felled.
- (2) All climbers shall be cut. However, species included in Red Data Book of BSI and other vulnerable, threatened species shall be cut.

(3) Lantana and other unwanted undergrowth which is interfering or likely to interfere with the seedlings of natural regeneration and artificial regeneration shall be removed, coppice shoots will be cut back.

(4) In groups of young poles of Teak which are naturally regenerated, thinning shall be carried out keeping average spacement between two poles at $1/3^{\text{rd}}$ of the height of the adjoining poles.

(5) In case of Teak plantations thinning will be carried out as per the principles of Stand Table based on the age and site quality.

SECTION: XI.15: OTHER REGULATIONS:

XI.15.1 Fire Protection: The coupes shall be fire traced and rigidly protected from fire. The area will remain closed for grazing for a period of five years from the main working. In the month of October/November after the fire tracing is over, all the undergrowth of Lantana will be cut. The area shall be cleared off all the dry and cut bushes, leaves etc. by end of February to avoid fire hazard. Effective protection shall be ensured against fire during the fire season so that survival and establishment of the seedlings for development as future growing stock can be achieved. Fire protection shall be achieved successfully by involving JFM Committee. To ensure effective fire protection a workable fire protection scheme should be chalked out in which huge share of people (JFM Committee members) those who have effectively protected forests from fire shall be given. A meaningful participation and modalities shall be worked out to protect forest from fire and impart training to members of JFM Committee.

The techniques of fire protection will be adopted as given in Protection WC. Plan shall be chalked out so that effective fire fighting force is in place for protection of forests for the period of 15th February to 15th June and 24 hours duty on the suitable area from where areas can be tackled easily the prescriptions given in Miscellaneous Regulation shall be followed.

XI.15.2: GRAZING CONTROL:

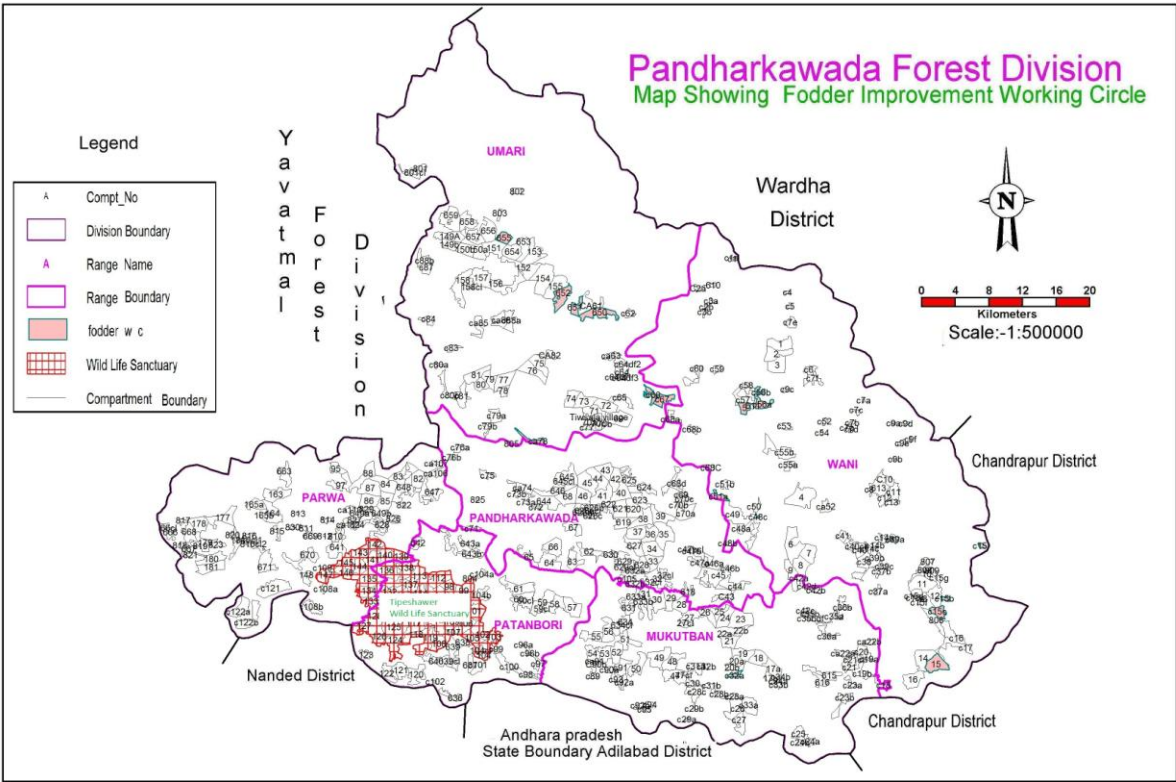
Closure to grazing and raising fodder:

The areas of main felling coupes shall remain closed to grazing for five years from the year of main planting, by taking up plantations in the under stocked areas. Palatable

fodder grass, suitable for that area will be sown or planted by tussocks, so that palatable grass will be available at the end of five years when the coupes are opened for grazing and the villagers would have enough fodder for their cattle on rotational harvest basis from such coupes. The rotational harvest or grazing will facilitate the opening up of area on rotational basis. The rotation is fixed for three years. The closed areas should be specially mentioned in the grazing licence and the villagers be communicated of such closure by suitable means such as drum beating, notices on common places, village Panchayat places, offices etc.

The local people shall be made aware of the importance of forest protection from illegal grazing and fire. Participation and active involvement of local people especially members of JFM Committees shall be encouraged in protection of forests. Regular awareness camps or campaign shall be arranged to explain the people about its importance, benefit of regeneration and protection. The prescription for regulation of grazing is given in Miscellaneous Regulation.

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CHAPTER XII

FODDER IMPROVEMENT WORKING CIRCLE

SECTION: XII.1: GENERAL CONSTITUTION & VEGETATION:

This WC includes the area situated amidst agricultural cultivation and are capable of producing qualitative fodder and grass. These areas are locally called as “Ramnas”. The areas included in this WC was previously managed under Fodder Reserve WC and Pasture WC in various plans. Some areas of grass land near towns and big villages have also been included in this WC. It would meet the fodder and grazing requirement of cattle of adjoining villages. The site quality of the area included in this WC belongs to IV and these areas are mostly devoid of tree growth. These are sparsely wooded with species like teak, palas, bor, khair, hiwar etc. Majority of these areas generally have grass species of less fodder value like kusal (*Andropogon contortus*) and bhurbhusi (*Eragrostis tennela*). Good fodder grass like shedha, paunya and marvel etc. are sparsely met with. These forests are classified as local subtype ‘Degraded Scrub Forests’. The total area included in this working circle is 2513.74 ha. Range wise allotment of area to FIWC is given below.

Area of Fodder Improvement WC

Sr. no.	Range	Area allotted in ha.						Total No.of compt	Total forest area of range in ha.
		No of compt.	RF	No of compt.	PF	No of compt.	UF		
1	2	3	4	5	6	7	8	9	10
1	Mukutban	1	41.08	0	0	0	0	1	41.08
2	Pandharkawada	0	0.00	0	0	0	0	0	0.00
3	Parwa	0	0.00	0	0	0	0	0	0.00
4	Patanbori	0	0.00	0	0	0	0	0	0.00
5	Umari	7	1391.58	0	0	0	0	7	1391.58
6	Wani	10	1081.08	0	0	0	0	10	1081.08
Total		18	2513.74	0	0	0	0	18	2513.74

The reasons for assigning the area to Fodder Improvement Working Circle (FIWC)

- (1) These areas have been traditionally managed for fodder improvement.
- (2) These areas are located closely to towns and big villages so that these can cater to the needs of fodder and grass.
- (3) The areas are open and sparsely wooded and it is necessary to manage this area to protect and conserve the ecology and vegetation of these grass lands.

SECTION: XII.2: COMPARTMENTS ALLOTTED TO FIWC:

The compartments allotted to this WC are given below.

Compartments allotted to Fodder Improvement WC

Sr No	Working Series	Name Of Range	No. of compartment	No. of Compt	Total Area ha.	Total area of WC ha.
1	Karanji	Umari	650,651,652,C66,C67,CA78,C55	7	1391.58	
2	Wani	Mukutban	C32A	1	41.08	1122.16
		Wani	5,15,C15A,C15B,15C,C39A,C48C,C51A,C56A,C56B	10	1081.08	
				18	2513.74	2513.74

SECTION: XII.3: SPECIAL OBJECTIVES OF MANAGEMENT:

- (1) To improve the quality and quantity of fodder in the forest area by introducing palatable species of grass.
- (2) To meet the demand of local cattle population for palatable grass and fodder to reduce grazing pressure on adjoining forests.
- (3) To improve site conditions through intensive soil and moisture conservation works.

SECTION: XII.4: ANALYSIS AND VALUATION OF THE CROP:

Based on the data collected by SOFR, the details of stock of forest area under FIWC is given as follows.

Enumeration data in FIWC

Sr. No.	Girth Class	Teak			Others			Total	
		No.	%age wrt Total teak spp.	%age wrt Total stock	No.	%ageTotal Misc. species	%age wrt Total Stock	No.	%age wrt Total stock
1	2	3	4	5	6	7	8	9	10
1	15-30	14.88	30.08	7.25	66.91	42.96	32.60	81.79	39.84
2	31-45	11.93	24.12	5.81	36.40	23.37	17.73	48.33	23.54
3	46-60	9.36	18.92	4.56	21.50	13.80	10.48	30.86	15.04
4	61-75	6.62	13.38	3.23	12.20	7.83	5.94	18.82	9.17
5	76-90	3.20	6.46	1.56	8.07	5.18	3.93	11.26	5.48
6	91-105	1.77	3.58	0.86	4.00	2.57	1.95	5.76	2.81
7	106-120	0.97	1.96	0.47	2.23	1.43	1.08	3.20	1.56
8	121-135	0.49	1.00	0.24	1.86	1.20	0.91	2.36	1.15
9	136-150	0.19	0.38	0.09	1.24	0.79	0.60	1.43	0.70
10	151above	0.06	0.12	0.07	1.37	0.88	0.67	1.43	0.74
Total		49.47	100.00	24.10	155.76	100.00	75.90	205.23	100.00

SECTION: XII.5: PREPARATION OF TREATMENT MAP:

Treatment map should be prepared by RFO showing A,B,C and D type of area. Treatment map will be prepare on graph paper in 1:5000 scale. Depending upon density, area of WC having different type of categories are as given below.

Category	Area in ha.	% area w.r.t. to SCI WC. (2513.74ha.)
SQ III – Well stocked	--	--
SQ IV – Well stocked	--	--
Under stocked	--	--
Plantation	805.00	32.02
Density below 0.1 & blank, eroded, scrub, hillock area	1708.74	67.98

SECTION: XII.6: METHOD OF TREATMENT:

Since these areas are prone to illegal grazing, fire and other biotic pressures, it is important to protect the area either by live hedge fencing or wire fencing. All these areas have to be effectively fire traced every year and closed for grazing for three consecutive years, rotational & controlled grazing shall be allowed from 4th year onwards depending upon carrying capacity of the area. The rotational grazing will be allowed from 4th year during the month October to May. The rotation is fixed for 3 years.

As these areas are open and exposed, intensive soil and moisture conservation works, nala bunding, gully plugging, cement plugs etc. are prescribed. Treatment shall be on the basis of watershed, depending upon site conditions. The following works shall be carried out in the coupes while carrying out treatment to develop meadow and grass land.

1. As it is degraded area extensive soil and moisture conservation measures work shall be prescribed like Gully Plugging, Nalah Bunding at suitable places and Contour trenches as per the agro climatic models of the Soil Conservation department (1000 to 1200 Rmt/ha) depending upon the site quality is advocated.
2. All obnoxious weeds and thorny shrubs and bushes shall be uprooted and the unpalatable grasses shall be removed by ploughing in the area in pre flowering stage.
3. Broadcasting of seed of superior grass species shall be taken up after ploughing along with contour trenches at the onset of monsoon. The tussocks of palatable grass species of freshly excavated and heaped soil bund on the lower side of trenches.
4. The fodder grasses shall be allowed to be cut only from 4th year onwards after seeding.
5. Plantation of tree species like Anjan, Babul, Kusum, Sirus, Tiwas etc. of fodder value shall be taken up by poly pot planting keeping 200 plant population per ha along with sowing of grass seed on grass bed.
6. The area shall be completely protected from uncontrolled grazing, fire, etc. The area shall be closed with barbed fencing or cattle proof trenches in order to have a complete protection.
7. The area shall be effectively fire traced and protection from fire every year.
8. The cutting of grasses for stall feeding of cattle shall not be allowed in these areas for 1st three years after planting to allow them to seed and multiply. The grazing shall be regulated as per Government policy on rotation basis. Rotation is fixed for 3 years.

SECTION: XII.7: Treatment for Ramnas :

- (1) If areas of Ramnas required to be declared it should be identify at level of DCF and shall follow the procedure for declaration of Ramna.
- (2) Ramnas shall be completely closed with barbed wire fencing or with TCM or live hedge fencing and shall be completely closed to grazing permanently.
- (3) A treatment map shall be prepared by RFO for the coupe.
- (4) These areas shall be kept closed for cutting of grass for the same year of working only.
- (5) Ramnas shall be auctioned in the month of June and July.

The disposal of the grass from the closed coupes will be done as per the GR.no. MFD/1169/ 118931(6)F-2/Dt. 29/10/1976, in which it is mentioned that, the grass from closed coupes will be offered on cutting terms to Gram Panchayat or public bodies or FLCs at reasonable rates fixed by the Department. If Gram Panchayat and other local bodies are not interested to purchase grass then it may be disposed off by public auction or may be allowed to remove at nominal rate decides time to time without damaging the crop. As per the instructions contained in the GR.no./MAC/2000/C.N.143/F-2 dated 25/4/2003, regarding utilization of Non-Timber Forest Produce, as fodder is Non-Timber Forest Produce it is made available (except from Protected Areas) to the members of the JFM Committee for domestic use at the rates fixed by the JFM Committee. The provisions contained Government Resolution no./MAC/2000/C.N.143/F-2 dated 25/4/2003.

SECTION: XII.8: FORMATION OF COUPES:

The entire area is divided into 2 working series and 20 coupes in each working series and the detailed statement showing working series and coupes in each series given in Appendix XL-c and XLIIIb of Volume II.

Implementing Agency: All the prescriptions will be carried out through department.

SECTION: XII.9: CHOICE OF SPECIES:

Seed broadcasting of good palatable grass like shedha (*Schima nervosum*), paunya (*Schima sulcatum*), marvel (*Dicanthium annulatum*), neel gavat (*Panicum antidotale*) etc shall be favoured. Mix species should be planted in FIWC. The final selection of species shall be as per the site requirement.

SECTION: XII.10: SOIL AND MOISTURE CONSERVATION WORKS:

The areas allotted to this WC are open, blank and suffered from excessive biotic pressure resulted in compaction of soil, gully formation, nala formation etc. To control soil erosion and to retain moisture, soil and moisture conservation works are prescribed, such as gully plugging, nala bunding, cement plug etc. For details regarding soil and moisture conservation works the chapter on Miscellaneous Regulations may be referred.

SECTION: XII.11: REGENERATION:

As these areas are basically ear-marked for raising grass and fodder, superior palatable grass seed of paunya, shedha, mushan, marvel etc shall be sown to raise palatable grass in order to meet the demand for grass. Non fodder tree species shall not be planted as to maintain grassland ecosystem. 200 tall poly pot seedlings of fodder, shadow, fruit bearing species shall be planted preferably in each ha. area of plantation.

Natural regeneration and artificial regeneration along with cut back operation, tending, thinning and cleaning activity shall be followed as prescribed in Miscellaneous Regulation.

CHAPTER XIII

NON-WOOD FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

SECTION: XIII.1: GENERAL CONSTITUTION:

This WC includes total forests of Pandharkawada Forest Division. The Non-Wood Forest Produce (NWFP) also includes medicinal plants available in forests.

SECTION: XIII.2: GENERAL CHARACTERS OF VEGETATION:

The species of NWFP are scattered all over the forest area, mixed with other species. Tendu is a major NWFP species followed by moha seed, moha flower, myrabalon (hirda, behda, awala) charoli, kulu, honey, broom-grass etc.

SECTION: XIII.3: SPECIAL OBJECTIVES OF MANAGEMENT:

The special objects of management of NWFP are given below.

- (1) To identify and conserve the forest areas rich in NWFP and medicinal plants.
- (2) To improve the stocking of NWFP yielding species in forests
- (3) To generate employment through NWFP thereby improving socio-economic conditions of local people.
- (4) To manage NWFP and medicinal plants scientifically and to utilise the existing potential optimally and thereby to enhance the productivity and production of the same.
- (5) Sustainable harvest and use of NWFP, scientific and non-destructive extraction of medicinal plants.

Some of the medicinal plants in the division are not identified which requires surveys and studies. At macro level do not give proper picture about most of the medicinal plants. Many medicinal plants appear during rainy season and if the survey is not carried out in that season, such plants may not appear in the survey report of SOFR because of their life cycle. More over most of the field staff do not have knowledge to identify medicinal plants. The field staff are required to be oriented towards medicinal plants in identification, conservation, harvesting, uses and knowledge about lifecycle. It is necessary

to impart training to the field staff about such aspects of medicinal plants. Some of the important medicinal plants identified are given in the following table.

List of Medicinal plants identified in Pandharkawada Forest Division

Sr. no.	Local name	Botanical name	Part used	Uses, diseases treated
1	2	3	4	5
1	Aain	<i>Terminalia crenulata</i>	Bark	Skin diseases
2	Adulsa	<i>Adhatoda vasica</i>	Fruits & seeds, flower	Cough, asthma, tonic
3	Agadha	<i>Achyranthes aspera</i>	Seeds & oil	Cough, rabies, tonic
4	Akkalkara	<i>Anacyclus pyrethrum</i>	Root	Tooth decay, fever, heart tonic
5	Amaltas	<i>Cassia fistula</i>	Seeds, flower & root	Asthma, cancer, antidote, blood purification
6	Amarbel	<i>Cuscuta reflexa</i>	Whole plant	Burns, eye diseases, tonic
7	Anantmool	<i>Hemidesmus</i>	Roots	Skin diseases, fever
8	Anjan	<i>Hardwickia binata</i>	Leaves, barks.	Skin diseases
9	Antibala	<i>Abutilon indicum</i>	Seeds, leaves & root	Demulcent, bronchitis, leprosy, piles & ulcers
10	Awala	<i>Phyllanthus emblica</i>	Fruits	Asthma, bronchitis, cold, constipation, liver tonic
11	Apta	<i>Bauhinia racemosa</i>	Flowers & leaves bark, root	Eye treatment, headache, cough
12	Arati	<i>Acacia caesia</i>	Fruit, leaves, bark	Tooth decay
13	Arjun	<i>Terminalia arjuna</i>	Bark & leaves	Asthma, heart tonic
14	Arni	<i>Clerodendrum multiflorum</i>	Plant, root	Bodyache, cholera & fever, cardiac disorders, cough, asthma & bronchitis
15	Asvagandha	<i>Withania somnifera</i>	Root	Leucoderma
16	Austrelian Babul	<i>Acacia auriculiformis</i>	Seed, bark	Animal use
17	Bajradanti	<i>Tephrosia purpurea</i>	Plant	Asthma, snake bite
18	Bakain	<i>Melia azedarach</i>	Leaves & flowers	Against skin diseases
19	Bakul	<i>Mimusops elengi</i>	Bark, flowers & fruits	Plant parts are used small pox.
20	Bala	<i>Sida cordifolia</i>	Whole plant	Dysentery, gonorrhoea
21	Bartondi (podophul)	<i>Morinda pubescens</i>	Fruit, root & leaves	Small pox, urinary complains
22	Behada	<i>Terminalia belerica</i>	Bark, Fruits, leaves	Aniemia, cough, fever, tonic
23	Bel	<i>Aegle marmelos</i>	Fruits, leaves & roots	Laxative & heart & brain tonic
24	Bhira	<i>Chloroxylon swietenia</i>	Roots,leaves, & bark	Aphrodisiac, & neck pains
25	Bhokar	<i>Cordia dichotoma</i> ,	Fruits, barks & seeds	Dyspepsia, Dysentery, Urinary disorders
26	Bhuiawalla	<i>Phyllanthus fraternus</i>	Whole plant	Allergy, dysentery, jaundice, gastro, urinal disorders
27	Bhuriningani	<i>Solanum surattense</i>	Roots, flowers & fruits	Bronchitis, chest pains cold, paralysis & snake bite
28	Bibba	<i>Semecarpus anacardium</i>	Seed	Cough & cold headache, body ache
29	Bibla	<i>Pterocarpus marsupium</i>	Wood	Body pain, diarrhoea
30	Brahmi	<i>Cantella asiatica</i>	Whole plant	Asthma, fever & leprosy, tonic
31	Chilahar	<i>Caesalpinia sapiaria</i>	Seed	Uterine
32	Chinch	<i>Tamarindus indica</i>	Seed, barks & leaves	---
33	Chirati	<i>Mukia maderaspatana</i>	Root	Tooth decay,
34	Datura	<i>Datura metel</i>	Leaves, fruits	Narcotice, antispasmodic, tooth decay
35	Dhaman	<i>Grewia tiliaefolia</i>	Bark, root	Dysentey, itching, syphilis, blood purification
36	Dhawada	<i>Anogeissus latifolia</i>	Seeds, gum, bark	Desentry, tonic
37	Dudhavel	<i>Lettsonia setosa</i>	Leaves	

38	Dukkerkand	Dioscorea bulbifera	Tubers	Abdomen pains, bone fracture, skin diseases & jaundice
39	Gajkarni	Rhinacanthus nasuta	Root, leaves	Anti cancer
40	Ghingan	Lannea coromandelica	Bark & leaves	Wounds, swelling
41	Ghotbor	zizyphus xylopytus	Fruits, bark	Fruits juice
42	Girisidiya	Gliricidia sepium	Leaves	Leaves Juice
43	Gokarna	Barleria cristata	Leaves & roots	Body pains, swelling
44	Gokarni	Clitoria ternatea	Root	Snake bite
45	Gokharu	Tribulus terrestris	Seed, whole plant	
46	Gorakhmundi	Sphaerantus indicus	Whole plant	Cough, gastric problem
47	Gulvel	Tinospora cordifolia	Whole plant	Asthma, bone fracture, diarrhea, fevers,
48	Gunj	Abrus precatorius	Roots, plants	Aphrodisiac, blood purifier eczema, asthma, cough
49	Hadjod	Cissus quadrangularis	Root	Bone fracture
50	Hirda	Terminalia chebula	Fruits	Skin diseases, fever
51	Jamalgota	Baliospermum montanum	Leaves, seeds	Asthma, bronchitis, purgative,
52	Jambhul	Syzyium cumini	Leaves, seeds,& bark	Decentry, urinal problem, diabetes
53	Jangli-methi	Sida rhombifolia	Roots	Child birth, tonic, dysentery, gonorrhea, heart ailments.
54	Jasvant	Hibiscus rosasinensis	Bark	Skin diseases
55	Kadai	Sterculia urens	Gum, roots, barks & flowers	Tonic bone dislocation & fractures, dysentery
56	Kadhineem	Murraya Koenigii	Leaves	
57	Kadujire	Cntratherum anthelminiticum	Whole plant	Worms
58	Kala Kuda	Wrightia tinctoria	Bark & leaves	Snake bite
59	Kalamb	Mitragyna parvifolia	Bark, leaves	Skin diseases
60	Kali musali	Curculigi orchioides	Root	Asthma, blindness, cough, cold, epilepsy & jaundice
61	Kalmegh	Andrographis paniculata	Whole plant	Rabbies & snake repellent
62	Kanchan	Bauhinia varniegat	Bark & flower	Dysentery, leprosy
63	Kangni	Solanum nigrum	Leaves, fruits	Antidot to opium toxications skin infections swellings
64	Karanj	Pongamia pinnata	Seeds & leaf, bark	Skin problem, wound stomach problem
65	Karwad	Caria Carnda	Root, fruits	Snake bite
66	Katsawar	Bombax ceiba	Bark, gum, flowers & roots	Gyenic problem, tonic, decency
67	Kavath	Feronia elephantum	Roots & fruits, bark	Asthma, bronchitis relieving body pains
68	Keokand, Kust	Costus speciosus	Rhizomes	Skin iseases,leprosy,asthma
69	Kevada	Pandanus odoratissimus	Roots, leaves & fruits	Miscarriage, scabies, leprosy,snake bite
70	Khair	Acacia catechu	Leaves, seed & bark	Skin,mouth problem
71	Kallawai	Gloriosa superba	Flower & roots	Skin diseases
72	Khirmi	Manilkara hexandra	Bark & fruits	Body ache, stomachache & chest pains
73	Kuda	Holarrhena antidysenterica	Bark & seeds	Cough, fever & dysentery
74	Kurmudi	Tridax procumbens	Whole plant, flower	Wounds, skin diseases, scorpion bite
75	Lajkuli	Mimosa pudica	Roots & leaf	Antifertility, boils, child-birth,
76	Lemon grass	Cymbopogon citratus	Leaves	Against fever, headache, vomiting, dysentery
77	Lokhandi	Ixora Parviflora	Fruits, bark, leaf	Tooth decay,
78	Madang	Dendrophthoe falcata	Leaf	Antifertility, skin diseases
79	Maharukh	Ailanthus excelsa	Bark	Tonic & treatment of cough skin diseases
80	Maka	Eclipta alba	Whole plant	Skin diseases, jaundice, hairs tonic
81	Maniphal	Catunargegam nutans	Roots & fruits	Cramps
82	Medsing	Gymnema sylvestre	Whole plant	Diabetes, leucodрма
83	Mogali Yerand	Jatropha curcus	Root, gum	Tooth decay
84	Moha	Madhuca (latifolia) Congifolia	Flowers, seed, leaf & bark, gum	Urinal problem, decency, heel crack, urinary
85	Mothi-ringani	Solanum ferox	Roots, fruit, leaf	Against ashthma, blood purification ,stomach disorders
86	Muradshenga	Helicteres isora	Flowers & seed	Stomach problem & ear problem

87	Musta	Cyperus rotundus	Tubers.	Dysentery, cough
88	Nagvel, Pan	Piper betel	Root & leaf	Antiseptic, asthma & eye disorders.
89	Neem	Azadarachta indica	Leaf & seed	Antiseptic, antipyretic, jaundice, skin diseases, insect repellent
90	Nirgudi	Vitex negundo	Leaf	Body ache, headache
91	Palas	Butea monosperma	Seeds, flowers & root bark	Pregnacy, urinal problem, scorpin bite, urinary
92	Pandhara Chappha	Plumericaumnita	Latex	Scabies & gum
93	Parijat	Nyctanthes arbor	Leaves & flowers	Bone fracture, rheumatism, malaria, sciatica, ulcers.
94	Patharchur	Coleus aromaticus	Whole plant	Urinary problems, asthma & ulcers
95	Phanas	Artocarpus heterophyllus	Leaf, root & fruit	Latex is used against skin diseases
96	Rakta-rohida	Tecomella andulata	Bark, leaf	Skin diseases, Injuries
97	Raktchandan	Pterocarpus marsupium	Wood	Dycentry, skin diseases
98	Rampahal	Annona reticulata	Fruits, bark, leaf	Skin diseases
99	Ranjai	Clematis triloba	Whole plant.	Treatment of boils, itching & skin diseases
100	Ran-kanda	Drimia indica	Bulb.	Cardic stimulator fevers & skin diseases
101	Ratan Gunj	Adenanthera pavonina	Seeds.	Wounds & swellings
102	Ratanjot	Jatropha curcus	Roots, latex.	Burns, cancer & inflammation.
103	Ritha	Sapindus trifoliatius	Bark & roots.	Bodyache, headache, hair treatment
104	Rohini	Mallotus philippinensis	Seed.	Treatment of blisters
105	Rui	Calotropis gigantea	Whole plant.	Asthama, leprosy & antidote
106	Sadafully	Catharanthus roseus	Whole plant.	Cancer, diabetes
107	Safed chandan	Santalum album	Bark.	Malaria, perfumes
108	Safed musali	Chlorophytum tuberosum	Tuberous root.	Sex tonic for men & women, leu corroca
109	Sagargota	Caesalpinia bonducella	Seed, roots.	Malaria, fever
110	Salaparni	Desmodium gangeticum	Roots.	Chronic fever, vomiting & general debility
111	Samudraphal	Barringtonia acutangula	Bark, seeds.	Liver, disorders
112	Saptaparni	Alstonia scholaris	Bark.	Asthma, ,malaria & child birth
113	Sarpagandha	Rauwolfia serpentina	Root	Snake bite, fever
114	Satavari	Asparagus racemosus	Tubers root.	Tumors, cardiac debility,
115	Shevga	Moringa oleifera	Bark, fruit & root.	Snake bite
116	Shivan	Gmelina arborea	Bark & leaf fruit, root.	Bone fracture, cough, bronchitis
117	Sitafal	Anona squamosa	Fruits & leaf seed, flower	Killing lice, wounds
118	Suran	Amorphophallus paeoniifolus	Corm	Piles, throat, weakness
119	Surankanda	Tacca leontopetaloides	Tubers	Bodyache, headache
120	Takla	cassia tora	Seed	Deafness
121	Tarwata	cassia auriculata	Seed, flower	Katha
122	Teak	Tectona Grandis	Seed, leaf, bark	Barks tonic
123	Tendu	Diospyros melanoxylon	Fruit	Skin diseases, urinary disease germicidal
124	Tiwas	Ougeinia oojensis	Bark, leaf	Diarrhoea & dysentery
125	Umbar	Ficus racemosa	Seeds, leaf, laticus	Mouth, skin problem
126	Vacha	Acorus calamus	Rhizome	Asthama, dysentery, analgesic
127	Vala - Khus	Vetiveria zizanioides	Roots	Treating burns, sensation, ulcers, skin diseases
128	Van tulsi	Ocimum basilicum	Entire plant	Cholera, snake bites & detoxication of alcohol
129	Vasan vel	Cocculus hirsutus	Leaf & root	Dysentery, cuts, eczema, fever
130	Vidanga	Embelia ribes	Roots, fruits & leaf	Cough, diarrhoea, fever, skin diseases
131	Waghati	Capparis moonii	Fruit	Cough
132	Widang	Embelia tsjeriam	Bark & root	Tonsils & pneumonia
133	Zizurti	Sida spinosa	Seed	Goshuradi powder

SECTION: XIII.3.1: Dy. Conservator of Forests, Pandharkawda Forest Division, should maintain invariably the list of following in the division.

- a) A list of Red data plants of Maharashtra vis-a-vis that of the district in which the said forest division fall.
- b) A List of endemic plants of Maharashtra vis-a-vis that of the district in which the said forest division fall.
- c) A list of flora (published by BSI) of the district in which the said division fall, highlighting the flora of the division, most traded medicinal plants and traditionally used medicinal plants along with their trade name, Marathi and local names.

SECTION: XIII.3.2: GENERAL PRESCRIPTIONS:

For better scientific management of the existing NWFPs in the division Dy. Conservator of Forests, Pandharkawada Forest Division should strictly follow the following prescriptions.

- a) To maintain the record of NWFP harvested legally /illegally from the forest along with the quantities and the collection charges paid to the labourer from 10 year before and after, the starting of working plan.
- b) To select the representative area, in each beat comprising of around one ha and continuous efforts be made by the territorial forest officers to visit this plot every month and to identify and record the occurrence of flora along with flowering and fruiting periods.
- c) To select plus Trees/stand/seed plot of trees, climbers, shrubs, herbs as well as rhizome and tuber species of NWFP / medicinal plant/commonly used by the local people for their livelihood and food vegetable, and commercially traded in Maharashtra.
- d) To collect the information regarding all types of forest produce, their quantities and the sale price during the weekly bazar days throughout the year during the working plan period in the division. The help of local schools situated at bazar places be taken to collect the said information and prescribe a system of recording, reporting,

collecting documenting information at weekly bazaar places, at Beat, Round, Range and Division level.

- e) To collect and document the traditional knowledge about the use of wild plants/ Animal product by the locals /Tribal as traditional medicine/food/fruit/vegetable etc.
- f) To engage all the Vanmajurs and Forest Guards to collect minimum 100 kgs of seed in a year of most traded and economical important medicinal plants and use the same for bush sowing/ sowing in vacant areas in the beat, without involving any cost and arranging SHRAMDAN as prescribed by 25th April, 2003 G.R. regarding JFM
- g) To maintain a register at every Beat, Round, Range and Division level noting the present unscientific and destructive harvesting practices and to collect the information regarding correct scientific harvesting of NWFP for sustainable production from various journals, institutes within and outside Maharashtra State (like IIFM Bhopal, CIMAP Lucknow, ICFRE, Dehradun etc.)
- h) To maintain a register at every village level regarding the domestic consumption of NWFP family wise and computerized programmed be prepared at state level so that the consumption of NWFP can be accurately assessed and corrective measures to streamline the production as a action point under Bio-diversity Act 2003.
- i) To maintain a register at Beat, Round, Range and Division level regarding names of barefoot botanists and field taxonomists, traditional and educated vaidyas along with their names, address, phone numbers, E-mail addresses etc.
- J) To prescribe a register to be maintained by the purchaser at every collection center having following information, viz. serial number, the full name of the collector of forest produce, approximate place of collection, village, name of forest produce, quantity rate at which F.P. sold to vendor/purchaser, name of purchaser, and all other forward linkages.
- K) It is to prescribe that the range shall consider as management unit for the production and collection of MFP other than tendu and gum.

SECTION: XIII.4: METHOD OF TREATMENT:

Different types of treatments are prescribed for various NWFP as given below.

(1) Tendu leaves: Tendu leaves are important NWFP providing gainful employment to the local people. Tendu leaves are used for manufacturing bidi. During Tendu season local people pluck tendu leaves and almost all the members of family go to forests for plucking tendu leaves. The plucked leaves are sold at authorised tendu fadies at the rate fixed by the Government. Further the royalty amount is paid to the labourers in the form of incentive wages after deducting administrative expenses. For 2009 tendu season, Rs 21,73,800/- and for 2010 tendu season Rs 28,95,200/- allotted to different Range Forest Officers for further distribution to the labourers who have participated in tendu season 2009-10. Year wise production and revenue obtained in the last 10 years are furnished in table given in Appendix no.XVII of Volume II. In order to increase production of tendu pruning and pollarding of tendu trees are carried out every year to get good flush of tendu leaves. No other scientific efforts are made to improve the production of tendu. Sometimes local people put fire to forests to get good flush of tendu leaves in connivance with tendu contractors which causes adverse impact on regeneration. While carrying out pruning all small size plants are cut every year which resulted in threat to future seed bearers. If the pruning of trees is carried out repeatedly, the seed bearers will diminish which will lead to vanishing of the species.

Details of production of tendu leaves

Sr. no.	Tendu season	Units sold	Standard bags collected	Royalty amount (Rs lakhs)
1	2	3	4	5
1	2001	10	25943.216	163.73
2	2002	13	25212.089	209.73
3	2003	7	17560.051	85.90
4	2004	10	24601.183	107.67
5	2005	3	5193.662	22.84
6	2006	13	14509.996	99.66
7	2007	13	23749.879	312.77
8	2008	13	24861.600	164.59
9	2009	13	18952.866	217.38
10	2010	13	7142.340	289.52

The entire division is divided into 24 tendu units for the purpose of regulation of trade of tendu leaves. The tendu units formed in this division are given below.

Tendu units in Pandharkawada Forest Division

Range	Name of Tendu Unit
Mukutban	6.Mohad, 7.Mukutban, 8.Pavnar, 9.Jamani,10.Matharjun, 16.Magurda
Pandharkawada	5.Shindola, 15.Pachpor,17.Pandharkawada
Parwa	22Jamb, 23.Sayatkharda, 24.Chikhalwardha
Patanbori	11.Karegaon, 12.Bori, 13.Sunna
Umari	18.Ghodadara, 19.Tiwsala, 20. Wadki, 21.Mohada
Wani	1.Mardi, 3.Mandar, 2.Maregaon, 4.Shipur, 14.Ghonsa

Other regulations : To improve tendu stocking, soil around tendu trees should be dug up 15 to 20 cm depth in a circular ring of diameter to the extent of crown so as to promote regeneration through the root suckers. The trees above 45 cm girth shall be selected for such operations. Yearly pruning and lopping will adversely affect the future crop, therefore pruning and lopping are suggested once in three years and such an interval will allow some seedlings to establish.

(2) Moha : Moha flower is rich source of food for forest dwellers which contains sugar, vitamins and calcium. Ripen mahua flowers have almost 73% sugar and are eaten raw or in cooked form and also eaten after frying or baking into cakes. After removing the stamens, corolla are boiled for about 6 hours and left to simmer until water evaporates completely. The odour disappears as a result of cooking and the material becomes soft and jelly like. It is often eaten with rice, tamarind, rai seed, grains or other food as sweet meat. Dried mahua flowers are boiled with rice and mixed with wheat and this provides a total food for local people. Moha alcohol is prepared by local people by distillation of liquid containing fermented moha flowers. The flowers are also used for preparation of certain kinds of non-alcoholic food drinks by some tribes. The flowers are used for the preparation of vinegar.

Moha fruit is cream in colour and which is eaten either raw or cooked. The seed of moha is rich in oil content. Oil is extracted by local people for their domestic consumption as well as for sale. The moha fruits are also eaten by cattle, sheep, goats, monkey and parrots. These fruits have medicinal value and these are easily attacked by insects and ants, once they are fallen on the ground which become unfit for human consumption. Moha oil is extracted from seeds which is light yellow in colour used for cooking, for lighting in

place of kerosene and for applying to hair by the local people. It is also used for manufacture of soaps. In some places it is adopted in place of ghee. The crude oil of mahua has a deep colour, highly acidic, unpleasant odour and bitter taste. After treatment it is used for cooking oil. Oil is also used in preparing lubricants, candles, as a batching oil in Jute Industry and as a raw material for production of stearic acid. 20 to 30% oil out of weight of the Kernels can be extracted depending upon the efficiency of the equipment used. The mahua cake which is a byproduct of moha seed after extraction of oil has got highly nutritive value and it is being exported to foreign countries as cattle feed specially to European countries. Moha oil has got a set of specific characteristics. For this purpose ISI standards has been prescribed which are given in the following table :-

Characteristics of moha seed oil as per ISI standards

Sr. no.	Characteristics	Grade		
		I	II	III
1	Moisture and insoluble impurities % by mass maximum	0.10	0.25	0.50
2	Colour in a ¼ in cell on the Loviband scale expressed are Y+ 5R not deeper than	20	30	50
3	Refractive index at 40° c	1.459	To	1.460
4	Specific gravity at 30° c	0.852	To	0.875
5	Saponification	187	To	196
6	Iodine value	58	To	70
7	Unsaponification matter % by mass	2.0	3.0	3.0
8	Acid value maximum	0.5	20	720

Market : Local people after collecting mahua flowers and seed, majority of the collection is consumed locally and excess quantity is sold in the market to private purchasers.

Other Regulations :

- (1) Enumeration of all mahua trees shall be conducted compartment wise and record of the same shall be kept at beat, round and range level.
- (2) The marked mahua trees should be allotted to individual family for collection of flowers and fruits depending upon the number of trees and number families around it under JFM.
- (3) During the collection of mahua flowers and seed, local people burn the leaf litter, which may sometimes lead to accidental fire in forests. Therefore families who have been allotted trees may be educated to fire trace around mahua trees, then go for burning of leaf

litter on ground within the radius of crown of mahua trees. This process must be closely supervised by the concerned beat guard.

(4) Efforts shall be taken to plant mahua species in plantation programme.

(3) GUM : Dhawada gum (*Anogeissus latifolia*) is the main source of gum in this area. This gum is used for medicine, chemical, cosmetic and food industries.

Tapping rules: The tapping rules of gum prescribed by the FRI, Dehradun are as follows

- (1) The tapping season is from November to May each year.
- (2) Tapping will be confined to the main bole of trees between 15 cm from ground level to the point at which first branch is given off. Only trees above 90 cm girth at breast height will be tapped.
- (3) Each tree shall be tapped continuously for 3 years and thereafter it shall be given rest for 3 years. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.
- (4) The initial blaze of 20 cm wide and 30 cm length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edged tool having 75cm wide blade, the blaze is made 6 cm deep in the bark. Blaze may be made horizontally leaving equal space between two blaze, the blazes should not have any loose fiber. The lower surface of the blaze should be slightly slopping to avoid guggul in the blaze pocket in case initial blazing is done by adze.
- (5) The guggul starts oozing out soon after blaze is made and may be collected initially after a month, i.e. about December when the blaze may also be freshened. Subsequent collection and freshening may be done fortnightly up to May. Thus 12 freshenings may be required during the year.
- (6) In each freshening the lower surface is not to be freshened. The age may be scraped so that only 38 cm increase is on either side in width at the end of 12 freshening. This means that about 3 cm should be scrapped off on either side in width in each freshening.
- (7) The lowest row of blaze will be at 1 metre above the ground level. The next row of blaze will be made at the height of 60 cm from the lower i.e. at a total height of 1.6

m from the ground level, the vertical portion of the blaze of upper row will alternate with similar portion of the row and no 2 blazes of the two rows will be directly one above the other.

- (8) The number of blazes to be made on each tree will depend on its girth at breast height as given in the following table:

Table showing the number of blazes on tree for gum

Sr. no.	Girth at breast height	Maximum no. of blazes to be made on each tree.
1	0.9 m to 1.3 m	2
2	1.3 m to 2 m	3
3	2 m to 3 m	4
4	Over 3 m	1 blaze for every 45 cm girth in addition to category 3 above.

- (9) No fresh blaze shall be made on the partially healed up surface or old wounds. Each blaze shall be in a shape of parabola with a 2.5 cm side base. The curved side of parabola shall be up wards and of height not more than 7.5 cm and depth of the blaze shall not be exceed 0.6 cm in wood.

- (10) At the end of the season, the height of blaze shall not be greater than 12.5 cm. Maximum permissible dimension of each blaze shall be 10 X 12.5 X 0.6 cm in width, height and depth respectively. Since tapping is to be done continuously for 3 years the total height of blaze at end of 3 years of tapping will be 37.5 cm, width and depth remaining same. In the second cycle i.e. in the 7th year (after 3 years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portion of the first cycle. This blazing will continue for another 3 years in the manner described above and operation will be repeated till unblazed is fully covered.

Other Regulations

- (i) It is prescribed that compartment wise list of dhawada trees should be prepared and maintained at Beat, Round, Range and Division level.
- (2) Proper cleaning around the tree is necessary to facilitate gum collection and to avoid fire hazard.
- (3) The gum yielding trees should be reserved from felling.
- (4) The tapping rules shall be strictly implemented.

(4) Medicinal plants: Rich variety of medicinal plants is found in Pandharkawada Forest Division which yields a variety of medicines that are used for curing diseases by the local people. The medicinal plants play vital role in socio-economic and medicinal arena of local villagers or tribes. Conservation and sustainable management can help in maintenance of bio-diversity retaining human and environmental health, generate employment and earn foreign exchange by way of exports. There are many species in the forest of this division about which the knowledge available at present is very meagre. The method of extraction of medicinal plants is not favourable for future conservation due to lack of scientific harvesting of medicinal plants. Some of the medicinal plants are still to be identified. Many medicinal plants do not find place in enumeration survey of SOFR because of their seasonality. It is suggested that a separate survey should be conducted with the help of experts on medicinal plants to assess the distribution of medicinal plants in this area. Hirda, Aola, Bel, Behada etc. medicinal species should be planted in NWFP.

Method of treatment: In Pandharkawada Forest Division no systematic method of treatment for the management of medicinal plants has been adopted so far. There is lot of potential of medicinal plants in this division and approximately 133 species have been identified and their extracts are used as medicine in different parts by local Vaidyas (Local Ayurvedic Doctor).

It is necessary to study occurrence, area, phenology and judicious utilization of medicinal plants. It is prescribed to involve the JFM Committees in the management of medicinal plants and to augment their income. It is necessary to organise training to the members of JFM Committees on various aspects related to NWFP and medicinal plants. Basically the following prescriptions are made for sustainable management of medicinal plants. Coupe/compartmentwise inventory should be prepared for medicinal plants.

- (1) Identification of suitable patches of medicinal plants in which the collection of medicinal plants is already under way.
- (2) Organisation of local community through competent NGO.
- (3) Establishing a system of sustainable harvest based on collection guidelines for specific species.

- (4) JFM committees shall be involved in harvesting, marketing and sustainable management of medicinal plants.
- (5) Establish market links for sale of produce.
- (6) Removal of plants or parts of plants other than specified species shall totally be prohibited. Lopping of branches to collect fruits, leaves and buds shall be totally prohibited. The fruits or seed that have fallen on the grounds shall be collected and branches can be gently shaken to collect fruits and seed.
- (7) The rich medicinal plants or species about 1 to 2 % of population shall be left as seed bearers to encourage the natural regeneration. These shall be properly marked for identification.
- (8) Proportion of medicinal plants shall be increased in the plantation programme. Tending of rooted stock or coppice shoots of existing crop shall be carried out and natural regeneration shall be encouraged.
- (9) The medicinal plant species like climbers shall be planted close to the natural host trees or shrubs.
- (10) In swamp areas especially along nala, streams, water spread areas, check dams and percolation tanks, hydrophytes like Neerbrahmi (*Bacopa monnerieri*), Vallarari (*Centella asiatica*), Vasambu (*Acorus calamus*), Arathai (*Alphinia calcarata*) etc. can be planted.
- (11) The norms regarding sustainable harvest shall be worked out by DCF, Pandharkawada division.
- (12) Harvesting the parts of medicinal plant species shall not be permitted in a way which will affect natural regeneration. In case where roots, tubers, rhizomes and other specific parts are used in medicine, natural regeneration of these species shall be ensured by leaving well distributed and adequate number of seed bearers. Destructive collection of plant parts, seed and fruits, uprooting of old trees or plants should be prohibited.
- (13) The estimation of annual collection of NWFP and medicinal plants shall be based on experience i.e. averaging of previous annual collection. The annual estimates of

NWFP and medicinal plants collection shall be approved by the CCF Yavatmal Circle.

(5) Myrabalon: hirda, behda, awala are commonly called as Triphala. These minor forest produce are used in many ways in Pandharkawada Forest Division. Hirda species is very rare therefore plantation of this species should be encouraged while behda and awala are commonly found in this division. These are used in many Ayurvedic medicines. Hirda and behda are administered to children in villages invariably for cold, cough and stomach disorder. Hirda and behda are used in tanning industry. Many products are prepared out of Awala fruits such as awala achar, supari, sharbat, chavanprash etc and it is rich in Vitamin C and used in many Ayurvedic medicines.

Choice of species:

While taking mix plantation of medicinal plant of tree species in different WC, big size poly bag tall planting of Hirda (*Terminalia chebula*), Behada (*Terminalia belerica*), Awala (*Phyllanthus emblica*), Ritha (*Sapindus trifolius*), Raktachanda (*Pterocarpus marsupium*), Biza (*Pterocarpus marsupium*), Arjun (*Terminalia arjuna*), Maidalakadi (*Cestrus panuculatus*), Kuchla (*Strychnos nuavomica*), Tetu (*Oroxylum malicum*), Padal (*Stereospermum suaveolens*), Bel (*Aegle marmelos*), Siwan (*Gmelina arborea*), Saptaparni (*Alstonia scholaris*), Jamune (*Syzygium cumini*) Biba (*Semecarpus anacardium*), etc., should be undertaken in pit size to 60cm x 60cm x 60 cm. at common spacing of 6 x 6 mt. in between miscellaneous plantations. Planting methodology already prescribed in AWC.

Seed of medicinal plants of different categories of shrubs, herbs, climbers and root suckers species such as Aswangandha, Kalmagh (*Andrographis paniculata*), Shanduri (*Bixa orellana*), Malkangani (*Celastrus panuculatus*), Sarpghandha (*Rauwolfia serpentina*), Satavari (*Asparagus racemosus*) etc., of high value should be broadcast in low density area of different WC.

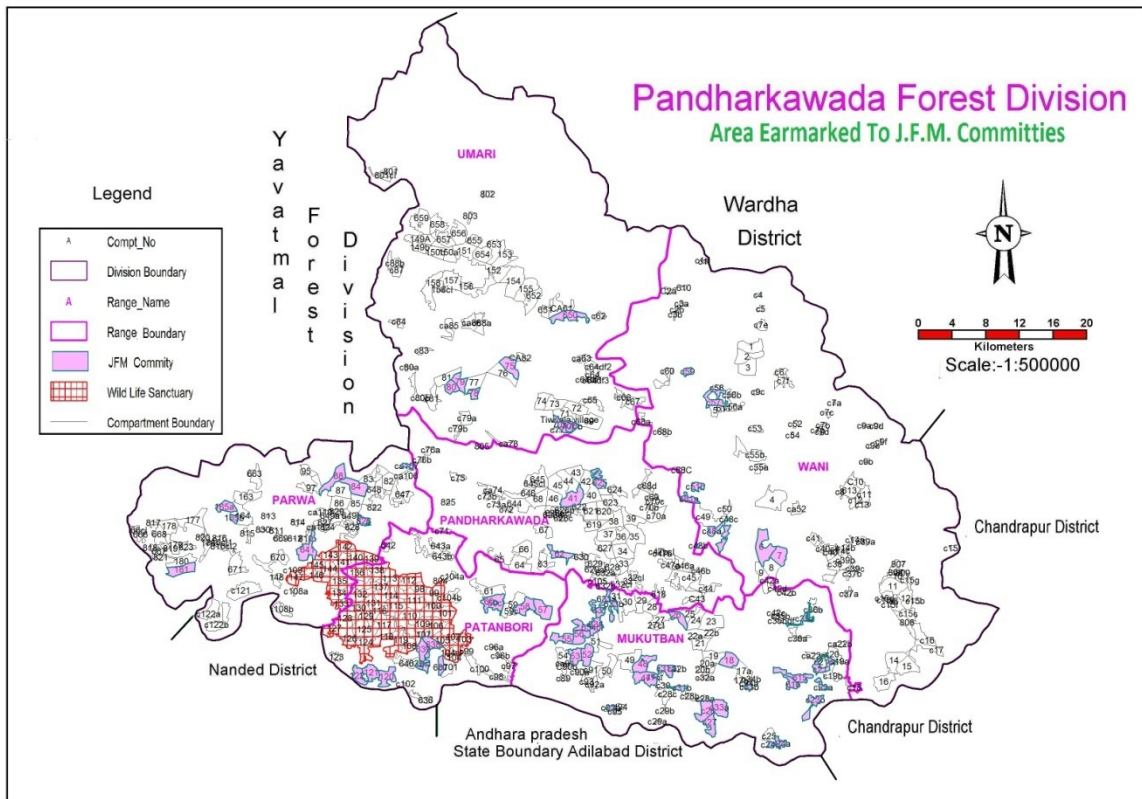
Seed of medicinal grass such as Lemon grass (*Cymbopogon citratus*), Palmrosa (*Cymbopogon martinii*), Vala – Khus (*Vetiveria zizanioides*) etc. should also broadcast in open area.

Yield: There are no specific studies regarding the yield of fruits from such species so far. The compartment-wise distribution of these major species is given in Appendix XXXIV-b

of Volume-II of this Plan on the basis of enumeration data of forest resources. It is envisaged that JFM Committee members in the area should enumerate the trees of these species and yield should be recorded yearly and the collected data should be updated at divisional level.

Other regulations:

- (1) The annual out-turn of these forest produce should be maintained at range level and division level.
- (2) The list of such species should be prepared and maintained at coupe and compartment wise Beat, Round, Range and Division level.
- (3) These species should be excluded from felling.



CHAPTER XIV

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION: XIV.1: BACKGROUND:

XIV.1.1: The National Forest Policy 1988 envisages massive people's movement for conservation of forest resources. The Govt. of India issued directions to all the State Governments vide letter no. 621/89-PP dated 1st June 1990. To involve local people in protection and development of forest. Participation management strategy envisaged in forestry sector is known Joint Forest Management (JFM)

XIV.1.2: The Ministry of Environment & Forests of Govt. of India issued circular no. 22-8/98-FPD dated February 11, 2000 and no. 22-8/2000-JFM (FPD) dated February 21, 2000 in which detailed guidelines are incorporated for the Joint Forest Management Programme. The Govt. of Maharashtra also issued guidelines vide Government Resolution no. SLF-1091/ PK119/F-11 dated March 16, 1992 to constitute "JFM Committees realising the fact that forest protection can not be achieved without active participation and cooperation of local people. As per the guidelines of G.R. of 16th March 1992 instructions were issued for preparation of management plans for implementation of Joint Forest Management. GOM issued revised guidelines and framework for implementation of JFM programme vides G.R. dated 25-4-2003. Latter Government of Maharashtra also issued Guidelines and for implementation of JFM programme vide Government Resolution no. FDM-2011/no 100/F-2 dated 22-12-2011. The Govt. of Maharashtra under MREGS issued guidelines regarding implementing agency. Joint Forest Management committee may nominate as implementing agency vide Govt. Resolution no.MREGS/2012/PK63/EGS-1/ Planning/ Bombay, dated 8-1-2013. The GR is enclosed in Vol.II as appendix no.LXII.

XIV.1.3: Pandharkawada Forest Division is having 729 villages; and 241 villages have forest area adjacent to them. The quality of forests is degraded near human habitations and protection of these areas cannot be achieved unless there is people participation and cooperation. The villagers with homogenous population and forest areas having sizable population of SC and ST and other economically dependent people shall be given preference to be included in JFM.

SECTION: XIV.2: NEED FOR IMPLEMENTATION OF JFM:

In consonance with National Forest Policy 1988, special emphasis is given to JFM due to increasing biotic pressure, depletion of soil due to soil erosion and degradation of forests. Demand is increasing for timber and fuel wood. Heavy grazing pressure, repeated forest fires, diversion of forest land for agriculture, industries, housing and irrigation projects etc are putting strain on forests. To check further loss of forest cover and forest area and to regenerate the degraded forests, the below mentioned aspects are given thrust while implementing JFM Programme.

- (1) Protection and management of forests by developing a sense of ownership and belongingness of forests among the local people, to regenerate degraded forest areas with the active participation of local people.
- (2) Increasing the vegetation cover and to carry out soil and moisture conservation works with the active co-operation of local people.
- (3) Involving local people in forest protection and to provide tangible and intangible benefits in lieu of their cooperation in forest protection.

SECTION: XIV.3: SOCIO-ECONOMIC CONDITIONS

The total human population of entire division is 1,40,907 as per 2001 census. Population density is 163 per sq. km ST population constitutes 36.38% and SC population 6.01% of total population.

SECTION: XIV. 4: STATUS OF JFM:

XIV.4.1 The JFM in Pandharkawada Forest Division was started in the year 1998-99 under Maharashtra Forestry Project. The details of JFM implementation are given in the table below.

Details of villages under JFM in Pandharkawada Forest Division

Number of JFM committees in division	Number of Registered committees	Area allotted for protection	Plantation area (ha)
		(ha)	
241	28	43,385.624	2350

The population depends on agriculture and allied activities for the livelihood and most of the SC, ST population are land less and work as agricultural labourers. The population adjoining forests mostly depend upon forests for day to day needs, naturally causing pressure on forests. The cattle populations also cause lot of pressure on forests for grazing, though there is a separate fodder development WC. The local people hardly utilise this area for stall feeding of their cattle. In some pockets grazing by sheep and goats is noticed and they cause extensive damage to the regeneration. Apart from local cattle, migratory cattle also exert pressure on forests in this Division. The most important factor for the implementation JFM is willingness of the local people to participate in these activities. In this regard the guidelines of Govt. of Maharashtra GR no. MSC/ 2000/ C.N. 143/ F-2 dated 25th April 2003.

XIV.4.2 The details of grading of JFM Committees are given below

No. of villages Good : 234; Better : 7; Total : 241

XIV.4.3 The following villages received Sant Tukaram Award

(1) 2006-07 Hiwari – First	(4) 2009-10 Deodari - Second
(2) 2007-08 Khandni – first	(5) 2009-10 Dabhadi – Third
(3) 2009-10 Awalgaon First	(6) 2010-11 Ghoddara – Second
	(7) 2010-11 Pandharkawada - Third

XIV.4.4 The participation of woman in JFM is good. There are women in Executive Committees in JFMC in this division. 86 Microplans were approved.

The details of plantation taken up and survival percent are given in table below.

Sr. No.	Name of Sheme	Year	Range	Place of Plantation	Comptt. No.	Area in Hact.	Survival %	As On Date
1	2	3	4	5	6	8	9	10
1	Natural Reganaration	2004	Wani	Godgaon	8	25	40.62	31.May2009
		2004	Pandharkwada	Khandni	42	25	34.54	31.May2009
		2004	Umari	Ghordara (U)	80	25	40	31.May2009
		2004	Umari	Avalagaon	70A	25	40	31.May2009
		2004	Parawa	Kinhi (Van)	88	25	26.3	31.May2009
		2004	Mukutban	Mudhati	53	25	24.32	31.May2009
		2004	Mukutban	Khapari	47	25	35	31.May2009
		2004	Patanbori	khairi	638	25	33.53	31.May2009
2	Reganaration	2004	Wani	Ijasan	6	25	26.2	31.May2009
		2004	Wani	Kegaon	C 51	25	10.5	31.May2009
		2004	Wani	Sukegaon	7	25	7.9	31.May2009
		2004	P'Kawada	Botoni	626	25	38.17	31.May2009
		2004	Umari	Ghondara(Kha)	C-67	25	40	31.May2009
		2004	Umari	Kinhi(Nand)	81	25	49.53	31.May2009
		2004	Umari	Umarvihir	75	25	39.97	31.May2009
		2004	Parawa	Kaleshwar	641	25	40	31.May2009
		2004	Mukutban	Parsodi	53	25	21.55	31.May2009
		2004	Patanbori	Hiwari	120	25	45.17	31.May2009
3	Mix/Medicin Planttation	2004	Umari	Avalagaon	72	5	223.5	31.May2009
		2004	Patanbori	Hiwari	121	5	38.63	31.May2009
4	Natural Reganaration	2006	P'Kawada	Botoni	626A	25	48.72	31 Oct.2010
		2006	P'Kawada	Khandni	42	25	35.08	31 Oct.2010
		2006	Wani	Suknegaon	7	25	60.5	31 Oct.2010
		2006	Mukutban	Parsodi	53	25	36.14	31 Oct.2010
		2006	Parawa	Kaleshwar	641	25	41.66	31 Oct.2010
		2006	Parawa	Kinhi(van)	88	25	10	31 Oct.2010
		2006	Umari	Ghoddara(Kha)	C-67	25	0	31 Oct.2010
		2006	Patanbori	Hiwari	122	25	44.5	31 Oct.2010
		2006	Patanbori	Pivardol	57	50	44.85	31 Oct.2010
5	Reganaration	2006	Pandharkwada	Ambezari	64	25	48.65	31 Oct.2010
		2006	Wani	Godhani	C 48 A	25	66.36	31 Oct.2010
		2006	Wani	Madnapur	C-59	25	37.89	31 Oct.2010
		2006	Mukutban	Khapari	47	25	43.91	31 Oct.2010
		2006	Mukutban	Dhunki	C21	25	22.16	31 Oct.2010
		2006	Parawa	Raysa	164	25	64.86	31 Oct.2010
		2006	Umari	Kinhala	78	25	0	31 Oct.2010
6	Mix/Medicin Planttation	2006	Wani	Suknegaon	7	5	66.2	31 Oct.2010
		2006	Umari	Ghoddara(Kha)	C-67	5	0	31 Oct.2010
		2006	Patanbori	khairi	639	5	38	31 Oct.2010
7	Joint Forest Managament	2007	P'Kawada	Wagdara	43	30	53.57	31 Oct.2010
		2007	P'Kawada	Rampur	62	30	25.88	31 Oct.2010
		2007	Umari	Devdhari	650	30	0	31 Oct.2010
		2007	Patanbori	Karegaon Pa.	59	30	43.69	31 Oct.2010
		2007	Mukutban	Muchi	48	30	48.66	31 Oct.2010
		2007	Parawa	Villayat	181	30	0	31 Oct.2010
		2007	Parawa	Kusal	84	30	15.75	31 Oct.2010
		2007	Wani	Bhalewadi	5	30	29.45	31 Oct.2010
8	Natural Reganaration	2008	P'Kawada	Velad	644	25	30.6	31 Oct.2010
		2008	P'Kawada	Kondi	46	25	55.46	31 Oct.2010
		2008	P'Kawada	Majra	628	25	49.12	31 Oct.2010

		2008	P'Kawada	Rajni	630	25	47.76	31 Oct.2010
		2008	P'Kawada	Darara	C 47	25	42.1	31 Oct.2010
		2008	P'Kawada	Bandi Bargaon	C 39	25	41	31 Oct.2010
		2008	Parawa	Pardi	C 110	25	0	31 Oct.2010
		2008	Parawa	Zuli Poda	826	25	44.4	31 Oct.2010
		2008	Parawa	Devdhari	163,164	25	64	31 Oct.2010
		2008	Parawa	Rohipeth	C 122 B	25	56.68	31 Oct.2010
9	Reganaration	2008	Wani	Shewala	C 15	50	59.34	31 Oct.2010
		2008	Wani	Salebhatti	C 56	50	44.62	31 Oct.2010
		2008	Wani	Badarapod	C 60	50	38.4	31 Oct.2010
		2008	Wani	Mchhindra	2	50	46.65	31 Oct.2010
		2008	Mukutban	Chilai	615	25	48.64	31 Oct.2010
		2008	Mukutban	Chalbardi	50,51	25	68.71	31 Oct.2010
		2008	Mukutban	Kospakhindi	634	25	68.27	31 Oct.2010
		2008	Mukutban	Sawali	C 32 A	25	45.89	31 Oct.2010
		2008	Umari	Kothoda	73	25	29.24	31 Oct.2010
		2008	Umari	Anji	655	25	18.52	31 Oct.2010
		2008	Umari	Khekwaida	C 66	25	0	31 Oct.2010
		2008	Umari	Sakhi Bu.	77	25	0	31 Oct.2010
		2008	Patanbori	Dhoki	643 b	25	44.47	31 Oct.2010
		2008	Patanbori	Nagezari	643b	25	44.11	31 Oct.2010
		2008	Patanbori	Gondwakadi	643A	25	45	31 Oct.2010
		2008	Patanbori	bhallarpur	61	25	39.5	31 Oct.2010
10	Mix/Medicin Planttation	2008	Patanbori	Dhoki	643b	5	42	31 Oct.2010
		2008	Patanbori	Nagezari	643b	5	45.2	31 Oct.2010
		2008	Patanbori	Gondwakadi	643A	5	43	31 Oct.2010
		2008	Patanbori	Ballarpur	61	5	0	31 Oct.2010
		2008	Umari	Kothoda	C-73	5	23.64	31 Oct.2010
		2008	Umari	Anji	655	5	20.46	31 Oct.2010
		2008	Umari	Sakhi Bu.	77	5	0	31 Oct.2010
		2008	Umari	Khekwaida	C-66	5	0	31 Oct.2010
11	Joint Forest Managament	2009	Umari	Zadkinhi	-	30	20.73	31 Oct.2010
		2009	Parawa EGS	Mejda	88	30	0	31 Oct.2010
		2009	Parawa Pra.	Rajegaon	82	30	55.5	31 Oct.2010
		2009	Wani	Chargaon	C-14	30	75.63	31 Oct.2010
12	State Yojne antargat jalav mrud sandharnachu kame	2010	P'Kawada Zone-II	Nimani	34	15	96.45	31 Oct.2010
		2010	P'Kawada Zone-III	Nimani	34	15	95.86	31 Oct.2010
		2010	P'Kawada Zone-II	Pandharwani	632B	15	96.8	31 Oct.2010
		2010	P'Kawada Zone-III	Pandharwani	632B	15	99.46	31 Oct.2010
		2010	P'Kawada Zone-II	Shibala	627	15	96.02	31 Oct.2010
		2010	P'Kawada Zone-III	Shibala	627	15	92.25	31 Oct.2010
		2010	P'Kawada Zone-II	Pardi	619	15	90.37	31 Oct.2010
		2010	P'Kawada Zone-III	Pardi	619	15	93.04	31 Oct.2010
		2010	P'Kawada Zone-II	Pachpor	622	15	87.5	31 Oct.2010
		2010	P'Kawada Zone-III	Pachpor	622	15	85.75	31 Oct.2010
		2010	P'Kawada Zone-II	Palgaon	67	15	94.87	31 Oct.2010
		2010	P'Kawada Zone-III	Palgaon	67	15	95.8	31 Oct.2010
		2010	P'Kawada Zone-II	Tokwanjri	65	15	96.19	31 Oct.2010
		2010	P'Kawada Zone-III	Tokwanjri	65	15	97.76	31 Oct.2010
		2010	P'Kawada Zone-II	Ambezari Bu.	63	15	96.69	31 Oct.2010
		2010	P'Kawada Zone-III	Ambezari Bu.	63	15	96.33	31 Oct.2010
		2010	P'Kawada Zone-II	Dabhadi	32	15	96.06	31 Oct.2010
		2010	P'Kawada Zone-III	Dabhadi	32	15	93.89	31 Oct.2010
		2010	P'Kawada Zone-II	Wadhona	35	15	95.58	31 Oct.2010
		2010	P'Kawada Zone-III	Wadhona	35	15	92.71	31 Oct.2010

SECTION: XIV.5: SPECIAL OBJECTIVES OF MANAGEMENT:

- (1) To protect forests and to utilise degraded forest areas for productive purposes in order to meet the demand for fuel, fodder and timber requirements, of the people.
- (2) To rehabilitate and regenerate degraded forests
- (3) Check soil erosion.
- (4) To seek the cooperation and active participation of local people in forest protection, management and development activities.

SECTION: XIV.6: COMPARTMENTS AND FELLING SERIES:

Implementation of the prescriptions under this WC is completely voluntary and it is based on willingness of the villagers, therefore neither compartments are allotted nor felling series are formed. It is an overlapping WC which encompasses the entire forest area of the division. The microplans prepared for the area allotted to a particular village of JFM committee shall be in consonance with the prescriptions given for that area under this working plan. Any deviation from the plan requires permission of the competent authority.

SECTION: XIV. 7: PRINCIPLES AND ETHICS:

Certain principles and ethics should be as follows as per guidelines for the implementation of JFM in any village.

- (1) Eco-system conservation and sustainable use of resources is the goal of resource management.
- (2) To enable development of strong institutional system in the long run for JFM implementation it is necessary to have participatory and democratic structure.
- (3) Open communication system and gender equity is of the prime concern.
- (4) Management responsibility and benefit sharing in relation to traditional usage should be ensured.
- (5) The community shall take the responsibility to maintain the system.

- (6) Effective conflict resolution should be ensured.
- (7) Traditional rights and uses shall be respected and rational approach should be adopted in accepting or rejecting same.
- (8) Discrete jurisdiction and proper terms of agreements should be ensured.
- (9) Effective monitoring and appraisal systems should be adopted.

SECTION: XIV.8: TREATMENT PRESCRIBED FOR JFM:

In the system of JFM the forest staff must know the principles and approach of JFM. The first and foremost thing is to convince the local people about the importance of forestry and their role in meeting daily needs of them. The villagers who are willing to take part in JFM programme a memorandum of understanding shall be signed. DCF of Pandharkawada Division shall prepare Microplans for the area to be assigned to concerned JFM Committee as provided in the GR dated 25th April 2003 and guidelines issued by Govt. of India from time to time.

- The microplan prepared for the particular village shall be in consonance with the prescriptions contained in Working Plan, the microplans shall be sanctioned by competent authority.
- The assigning of forest area to JFM committee and execution of works shall be strictly in accordance with the guidelines issued by Government of India as well as Government of Maharashtra.
- MOU shall be signed regarding forest area assigned to JFM Committee and there should not be any ambiguity in terms and conditions.
- The area allotted to JFM committee should be shown on the map and incorporated in the memorandum of understanding.
- The Micro Plan should be prepared with active involvement of members of JFM Committee on scientific lines and the site specific estimates shall be prepared for the works which would be taken up and sanctioned by competent authority before implementation.

SECTION: XIV.9: ACTIVITIES TO BE TAKEN UP:

JFM Committees should be involved to take up the under mentioned activities in the area assigned to them.

- (1) Stringent protection of forests allotted to JFM committee.
- (2) Active participation of members of JFM committee in protecting, improving and developing forests.
- (3) Protection of forests from fire, grazing and encroachment, collection of NWFP on scientific lines or non- destructive collection methods.
- (4) Helping forest officials in patrolling and enforcement of law for forest protection.

For protection of forests from grazing integrated efforts should be taken to improve the breed of cattle so that, the income may be increased with less number of cattle. In this regard the Rural Development and other departments should be requested to help the JFM committees. The forest officials will have to play the role of facilitator for implementation of various development works. The fire protection should be achieved through JFM Committee by assigning certain fire lines and forest area to the JFM Committee. The grant for protection of forest from fires i.e. burning of fire lines, wedges for fire works shall be directly remitted to JFM Committee after successful protection of forests from the fire. Necessary legal and moral help should be provided to members of JFM Committee for the protecting forests from illicit felling, encroachment, grazing, fire protection etc.

SECTION: XIV.10: ACTIVE COOPERATION AND PARTICIPATION OF PEOPLE:

It is the duty and responsibility of forest officials to create awareness among the members of Forest Protection Committee as well as villagers about the importance of forests, its intangible benefits and protection of the forest from fire, illicit felling, encroachment, grazing, etc. The active participation of local people must be encouraged in management, protection and developmental activities of the forest assigned to them. For achieving effective results in this regard it is required to take up regular efforts like

conducting meetings, workshops and visits to successful areas shall be arranged to explain about the protection of forests and achievements in other villages. A comprehensive fire protection scheme shall be prepared and explained to JFM members for prevention and protection of forest from fire. The Forest Protection Committee's members shall be made to aware of their duties and responsibilities to have their active participation in the protection and management of the forests. The produce obtained from the assigned areas will play an important role for the improvement of economy of JFM members as well as restoration and improvement of the forest area.

SECTION: XIV.11: ROLE OF FOREST OFFICIALS:

The role of forest officials in implementing of JFM is as the facilitator as given below.

- (1) Providing technical inputs and support for the activities under JFM and ensure implementation of scientific forest management.
- (2) Creation of awareness amongst the members of JFM Committee about the role and various benefits may be available in the forest management.
- (3) The forest officials shall act as a facilitators for implementation of various development activities by other departments.
- (4) The responsibility and benefit of local people should be thoroughly briefed by forest officials.

Joint Forest Management requires strong institutional capacity to make collaborative to efforts for forest protection activities and make it successful in ultimately at the end in getting the economic returns and regeneration of the forests. The efforts must be to the extent which will yield sufficient income to sustain the activities of management on perpetual basis. Therefore the forest officials have to take adequate measures and precautions in formalizing participatory management in particular forest area. Various Government Resolutions, Orders and guidelines in relation to JFM are given in Appendix LVII of Volume II.

CHAPTER XV

WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION: XV.1: GENERAL CONSTITUTION:

This WC comprises total forests of Pandharkawada Forest Division having an area 58801.02 ha. This area used to house many wild animals before 3- 4 decades. However in the past few decades these have been decline of wildlife population due to various factors. The nature of the forest is mainly Teak forest which constitutes more than 60 % of the crop. Herbivores like nilgai, sambar, chinkara, black-buck etc occur in this area. Important factors for reduction in wildlife is shrinkage of habitat, breaking of corridors, human habitation around forests, liberal issue of crop protection licences, poisoning etc. Various developmental activities that are been taken up in this tract also caused to dwindling of wild animal population.

XV.1.1: STATUS AND DISTRIBUTION OF WILDLIFE

The wild animals are usually restricted to dense patches of forests except few herbivore species which moves in open area. The wild animals commonly found in the tract are given in the following table as data provided by DCF Pandharkawada as per the estimation of wildlife population in 2005.

Wild animals found in Pandharkawada Division (2005)

Sr. No	Name	no. of animals
1	Blue bull	668
2	Barking deer	106
3	Chital	32
4	Black buck	40
5	Common langur	194
6	Wild bear	368
7	Hares	54
8	Fox	36
9	Mongoose	21
10	Peacock	111
11	Gray junle	19
12	Owl	178

(1) Tiger (Panthera tigris) : Tiger is occasionally sighted 5 to 6 times in Parwa and Patanbori ranges of Pandharkawada Forest division.

1) Leopard (Panthera pardus): It is a very less common animal in this division. Panthers were not reported in the last estimation of wildlife population. Panthers are confined to limited pockets and are noticed in Parwa and Pandharkawada ranges.

(2) Barking deer (Muntiacus muntjak) : Barking deer are commonly found in this division.

(3) Blue bull (Boselaphus tragocamelus): Nilgai is commonly found in the entire tract of this division. These animals are often found in open areas of all the ranges. The population of Nilgai is more in Pandharkawada & Parwa Ranges, part of Patanbori, part of Mukutban as the forests are open and with less density. These animals frequently move around human habitation and cause lot of damage to the agricultural fields.

(4) Sambar (Cervus unicolor): These animals are found in small numbers and mostly confined to dense forests of the division. These animals usually seen moving individually or in pairs, but seldom seen in herds. These animals often visit agriculture fields and cause lot of damage.

(5) Chowsinga (Tetra ceros quadricornis): Four horned antelope is rarely seen animal in this division and is limited to a very few pockets of the division.

(6) Wild dog (Cuon alpinus): These animals move in pack of 10-12 animals, they are limited to few pockets of the division.

(7) Indian Wolf (Canis lupus pallipes): The number of wolves in the division are fairly good. Wolf sometimes lifts lambs of goat and cause injuries to human being.

(8) Black buck (Antelope Cervicapra): These animals are rarely seen in this division limited to certain pockets of the forests and they prefer to be in open areas mostly.

(9) Sloth bear (Melursus ursinus) : This is a very dangerous animal in forests. People are afraid of this animal as it attacks unprovoked. These animals are mostly confined to cool and sheltered places of thick forest patches.

(10) Wild boar (Sus scrofa): These are commonly found in this area and sometimes attack agricultural fields causing lot of damage. Frequently these animals attack bamboo

plantations for rhizome causing extensive damage to the bamboo plantations. The local farmers often complaint about the crop damage caused by this animal.

(11) Spotted deer (*Axis axis*): Chitals are found in some of the pockets of forests especially in open area. These animals move in herds of 20 to 30.

(12) Chinkara (*Gazella gazella bennetti*): These animals are limited to certain pockets of forests and found on dry hill side of scrub forests.

(13) Hyaena (*Hyaena hyaena*): It is also rarely seen animal in this division. This animal acts as scavenger and follows tiger or panther for left over meat.

Other common animals: Other common animals found in this division are Jackal (*Canis aureus*), porcupine (*Hystrix indica*) Langur, Bandar, monkey (*Rhesus macaque*), Jangle cat (*Felis chaus*), mongoose (*Herpestes spp*) Indian hare (*Lepus nigricollis*) etc.

Birds: Commonly found birds in this division are Peafowl (*Pavo cristatus*), ducks, titar (*Francolinus pondicerianus*), biter (*Coturnix coromandelicus*) saras crane (*Antigone antigen*)

Birds and their locations found in this division are as follows.

List of Birds Of Pandharkawada Forest Division

PHEASANTS ,PARTRIDGES, QUAILS, FOWLS ((Phasianidae कुक्कुटाद्य)		
Black Francolin	<i>Francolinus francolinus</i>	कृष्णलावा
Painted Francolin	<i>Francolinus Pictus</i>	जंगल तितिर
Grey Francolin	<i>Francolinus Pondicerianus</i>	गाव तितिर
Common Quail	<i>Coturnix coturnix</i>	मोठा लावा
Rain Quail	<i>Coturnix coromandelica</i>	शहारे लावा
Jungle Bush-Quail	<i>Perdicula asiatica</i>	जंगल लावा
Red Jungle fowl	<i>Gallus gallus</i>	लाल रानकोंबडा
Grey Jungle fowl	<i>Gallus sonneratii</i>	राखी रानकोंबडा
Indian peafowl	<i>Pavo cristatus</i>	मोर
DUCKS, GEESE, SWANS, TEALS, PINTAILS, POCHARDS[Anatidae पदंभाद्य]		
Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	अडई
Brahminy Shelduck	<i>Tadorna ferruginea</i>	चक्रवाक
Cotton Teal	<i>Nettapus coromandelianus</i>	बहुती
Spot-billed Duck	<i>Anas crecca</i>	धनवर
Northern pintail	<i>Anas acuta</i>	सरस बाहु

Common Teal	<i>Anas crecca</i>	संदुर बाहु
Red-crested Pochard	<i>Rhodonessa rufina</i>	शेंद्रया बाहु
GREBES (Podicipedidae ग्रीबाघ)		
Little Grebe	<i>Tachybaptus ruficollis</i>	टिबुली
STORKS [Ciconiidae बलाँघ]		
Asian Open bill-Stork	<i>Anastomus oscitans</i>	घोगल्या फोडा
White-necked Stork	<i>Ciconia episcopus</i>	कामय्या ढोक
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	चन्ना ढोक
IBISES AND SPOONBILLS [Threskiornithidae अवाकाद्य]		
Glossy Ibis	<i>Plegadis falcinellus</i>	चिमणा कंकर
Oriental White Ibis	<i>Threskiornis melanocephalus</i>	पूर
Black Ibis	<i>Pseudibis papillosa</i>	पळा पूर
Eurasian Spoonbill	<i>Platalea leucorodia</i>	चमच्या
BITTERNS , HERONS, EGRETS [Ardeidae बँघ]		
Little Egret	<i>Egretta garzetta</i>	लहान बँळा
Grey Heron	<i>Ardea cinerea</i>	राणी पीहळा
Purple Heron	<i>Ardea purpurea</i>	जांभळा कोहकाळ
Large Egret	<i>Casmerodius albus</i>	मोठा बगळा
Median Egret	<i>Mesophoyx intermedia</i>	मध्यम बगळा
Cattle Egret	<i>Bubulcus ibis</i>	पूय बँळा
Indian Pond-Heron	<i>Ardeola grayii</i>	ढोकरी
Little Green Heron	<i>Butorides striatus</i>	खोरी ढोकरी
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	अंधारी ढोकरी
Little Bittern	<i>Lxobrychus minutus</i>	कुबडी ढोकरी
Yellow Bittern	<i>Lxobrychus sinensis</i>	पिवळी ढोकरी
Black Bittern	<i>Dupetor flavicollis</i>	काळी ढोकरी
CORMORANTS (Phalacrocoracidae कर्मोराघ)		
Little Cormorant	<i>Phalacrocorax niger</i>	पापूवळा
DARTERS i.e. Anhingas(Anhingidae)		
Darter	<i>Anhinga melanogaster</i>	सर्पमान्या /करोता /पाणला
FALCONS, FALCONETS, KESTRELS (Falconidae श्येनाघ)		
Common Kestrel	<i>Falco tinnunculus</i>	खरूची /नारझिन
HAWKS, KITES, EAGLES, HONEY-BUZZARD, BAZA, VULTURES, HARRIER (Accipitridae ध्रुवाद्य)		
Black Kite	<i>Milvus migrans</i>	मोठी घार
Brahminy Kite	<i>Haliastur Indus</i>	ब्राह्मणी घार
Crested Serpent-Eagle	<i>Spilornis cheela</i>	मोर घार
Shikra	<i>Accipiter badius</i>	शिफा
RAILS, CRAKES, COOTS, WATERHEN, MOORHEN (Rallidae कारंडवाघ)		
White-breasted waterhen	<i>Amaurornis Phoenicurus</i>	पांढ-या छातीची पाणकॉबडी
Watercock	<i>Gallicrex cinerea</i>	केम कुकडी
Purple Moorhen	<i>Porphyrio Porphyrio</i>	जांभळी पाणकॉबडी

Common Moorhen	<i>Gallinula chloropus</i>	काळी पाणकौबडी
Common Coot	<i>Fulica atra</i>	चांदी
BUTTONQUAILS (Turnicidae दुर्लभाघ)		
Small Buttonquail	<i>Turnix Sylvatica</i>	बट लावा
Yellow-legged Buttonquail	<i>Turnix tanli</i>	गवती लावा
Common Buttonquail	<i>Turnix Suscimator</i>	ठिपक्या लावा
AVOCETS, STILTS (Recurvirostridae)		
	<i>Himantopus himantopus</i>	घोंगर टिलवा
PLOVERS, LAPWINGS (Charadriidae टिट्टभाघ)		
Little ringed plover	<i>Charadrius dubius</i>	टिटवा /कंठरी चिलखा
Yellow-Wattles Lapwing	<i>Vanellus malabaricus</i>	पिवळ्या गाठीची टिटवी
Red-wattled Lapwing	<i>Vanellus indicus</i>	लाल गाठीची /ताम्र मुखी टिटवी
SANDPIPERS, STINTS, CURLEWS, SNIPES, GREENSHANK (Scolopacidae)		
Common Sandpiper	<i>Actiris hypoleucos</i>	तुतवार
Little Stint	<i>Calidris minuta</i>	लहान टिलवा
SKUAS, GULLS, TERNS(Laridae सुर्याघ)		
River Tern	<i>Sterna aurantia</i>	नदी कुररी
Common Tern	<i>Sterna hirundo</i>	ताम्र मुखी कुररी
Little Tern	<i>Sterna albifrons</i>	चिमण कुररी
PIGEONS AND DOVES (Columbidae कपोताघ)		
Blue Rock Pigeon	<i>Columba livia</i>	कबुतर
Oriental Turtle-Dove	<i>Streptopelia orientalis</i>	घूघु कवडी
Little Brown Dove	<i>Streptopelia Senegalensis</i>	लहान कवडी
Spotted Dove	<i>Streptopelia chinensis</i>	चित्रक कवडी
Red Collared-Dove	<i>Streptopelia tranquebarica</i>	गेरवी कवडी
Eurasian collared-Dove	<i>Streptopelia decocto</i>	पिठोळ कवडी
Yellow-legged Green-Pigeon	<i>Treron phoenicoptera</i>	पिवळ्या पायाची हरोळी. हरियल
PARAKEETS, LORIKEETS (Psittacidae शुकाघ)		
Alexandrine Parakeet	<i>Psittacula eupatria</i>	करण पोपट
Rose-ringed Parakeet	<i>Psittacula krameri</i>	चन्ना पोपट
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	टोई पोपट
CUCKOOS, MALKOCHAS, DRONGO-CUCKOO, HOOK-BILL CUCKOO (Cuculidae कोकिलाघ)		
Pied Crested Cuckoo	<i>Clamator jacobinus</i>	चातक
Brain fever Birds	<i>Hierococcyx varius</i>	पाउस पियू , पावशा
Indian Cuckoo	<i>Cuculus micropterus</i>	श्वेत कोकिल
Indian Plaintive Cuckoo	<i>Cacomantis passerinus</i>	पावश्या
Asian Koel	<i>Eudynamis scolopacea</i>	कोळ
Greater Coucal	<i>Centropus sinensis</i>	भारद्वाज
BARN OWLS (Tytonidae उलकाघ)		
Barn Owl	<i>Tyto alba</i>	कोठीचे घुबड
TYPICAL OWLS, OWLETS(Strigidae घूकाघ)		
Dusky Eagle-Owl	<i>Bubo coromandus</i>	जंगली हूमा घुबड
Spotted Owlet	<i>Athene brama</i>	ठिपक्यांचा पिंगळा

NIGHT JARS (Caprimulgidae रात्रिचराद्या)		
Indian Jungle Nightjar	<i>Caprimulgus indicus</i>	रातवा
Common Indian Nightjar	<i>Caprimulgus asiaticus</i>	छोटा रातवा
SWIFTS (Apodidae पंगुलाघ)		
House Swift	<i>Apus affinis</i>	गृह आभोळी
ROLLERS (Corciidae चासाघ)		
Indian Roller	<i>Coracias benghalensis</i>	नीलपंख /चास
KINGFISHERS [Alcedinidae]		
Small Blue Kingfisher	<i>Alcedo atthis</i>	छोटा खंडया
White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	खंडया
Lesser pied Kingfisher	<i>Ceryle rudis</i>	कवडया खंडया
BEE-EATERS(Meropidae पत्रिपिद्य)		
Small Bee-eater	<i>Merops orientalis</i>	पाण पोपट /वेडा राघू
HOOPOES (Upupidae उपूपाय)		
Common Hoopoe	<i>Upupa epops</i>	हुदहुधा
HORNBILLS (Bucerotidae धनचंचवाघ)		
Indian Grey Hornbill	<i>Ocyrceros birostris</i>	लहान धनेश
BARBETS [With Ramphastide family in IUCN]		
Coppersmith Barbet	<i>Megalaima heamacephala</i>	तांबट
WOODPECKERS (Picidae ताम्रकाराद्य)		
Yellow-fronted Pied Woodpecker	<i>Dendrocopos mathrattensis</i>	मराठा सुतार
Lesser Golden-backed Woodpecker	<i>Dinopium benghalense</i>	सोनपाठी सुतार
Black-Shouldered Woodpecker	<i>Chrysocolaptes festivus</i>	पूषपाठी सुतार
PITTAS [Pittidae]		
Indian Pitta	<i>Pitta branchyura</i>	नवरं
IORAS (Aegithinidae सुभपिद्य)		
Common lora	<i>Aegithina tiphia</i>	सुभ
CUCKOO-SHRIKES,WOOD-SHRIKES, MINIVETS		
Black-headed Cuckoo-Shrike	<i>Coracina melanoptera</i>	काळया डोक्याचा पिपिळ-कसाई
Small Minivet	<i>Pericrocotus cinnamomeus</i>	लहान गोमेट
White-bellied Minivet	<i>Pericrocotus erythropygius</i>	पांढ-या पोटाचा गोमेट
SHRIKES (Laniidae सैनिकाघ)		
Bay-backed Shrike	<i>Lanius vattatus</i>	छोटा खाटीक
Rufous-backed Shrike	<i>Lanius schach</i>	लालपाठी खाटीक
Great Grey Shrike	<i>Lanius excubitor</i>	मोठा भूरा खाटीक
ORIOLES[Oriolidae पीलपिद्य]		
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	हळघा
Black-heated Oriole	<i>Oriolus xanthornus</i>	काळया डोक्याचा हळघा

DRONGOS [Dicruridae कोष्ठपालाद्य]		
Black Drongo	<i>Dicrurus macrocercus</i>	कोतवाल
White-bellied Drongo	<i>Dicrurus paradiseus</i>	पहाडी कोतवाल
Greater Racket-tiled Drongo	<i>Dicrurus paradiseu</i>	मोठा कोतवाल
FANTAIL [Rhipiduridae]		
White-throated Fantail-Flycatcher	<i>Rhipidura albicollis</i>	नाचण
White-browed Fantail-Flycatcher	<i>Rhipidura aureola</i>	सितभू नाचण
MONARCH FLYCATCHERS [Monarchidae]		
Asian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	स्वर्गीय नर्तक
CROWS, RAVENS, TREEPIE [Corvidae कृष्णच]		
Indian Treepie	<i>Dendrocitta vagabunda</i>	भेरा / टकाचोर
House Crow	<i>Corvus splendens</i>	कावळा
Jungle Crow	<i>Corvus macrorhynchos</i>	डोमकावळ
TITS [Paridae टीटाद्य]		
Great Tit	<i>Parus major</i>	रामती
Black-lored Yellow Tit	<i>Parus xanthogenys</i>	पित रामगंगा I
SWALLOWS AND MARTINS [Hirundinidae पंजातुपाद्या]		
Common Swallow	<i>Hirundo rustica</i>	सामान्य देवकन्हई
House Swallow	<i>Hirundo tahitica</i>	भांडीक
Wire-tiled Swallow	<i>Hirundo smithii</i>	काडीवाली देवकन्हई
Red-rumped Swallow	<i>Hirundo daurica</i>	देवकन्हई
LARKS [Alaudide चंडोलद्य]		
Singing Bush-Lark	<i>Mirafra cantillans</i>	भट चंडोल
Red-Winged Bush-Lark	<i>Mirafra erythroptera</i>	तांबडा भट चंडोल
Ashy-crowned Sparrow-Lark	<i>Eremopterix grisea</i>	गोरली चंडोल
Rufous-tailed Finch-Lark	<i>Ammomanes phoenicurus</i>	देशी गोरली चंडोल
Indian Short-toed Lark	<i>Calndrella raytal</i>	भारतीय लाल चंडोल
Common Crested Lark	<i>Galerida cristata</i>	तुरेबाज चंडोल
Eastern Skylark	<i>Alauda gulgula</i>	भरत
BULBULS [Pycnonotidae बल्लुवदाद्य]		
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	शिपाई बुलबुल/ नारद बुलबुल
Red-vented Bulbul	<i>Pycnonotus cafer</i>	लाल बुडया बुलबुल
White-browed Bulbul	<i>Pycnonotus luteolus</i>	हर बुलबुल
WARBLERS [Sylviide विजल्पकाद्य]		
Jungle Prinia	<i>Prinia sylvatica</i>	छोटा वन वटवटया
Ashy Prinia	<i>Prinia inornata</i>	राखी वटवटया
Plain Prinia	<i>Prinia inornata</i>	छोटा वटवटया

Paddy field Warbler	<i>Acrocephalus agricola</i>	धान वटवटया
Indian Great Reed-Warbler	<i>Acrocephalus stentoreus</i>	मोठा शर वटवटया
Common Tailorbird	<i>Orthotomus sutorius</i>	शिंपी पंढी
Common Chiffchaff	<i>Phylloscopus collybita</i>	तपकीरि चिकचिक
BABLERS (imaliide जल्पकाद्य)		
Common Babbler	<i>Turdoides caudatus</i>	सात भाई
Jungle Babbler	<i>Turdoides striatus</i>	जंगली सात भाई
WHITE-EYES (osteropidae चक्षुष्याद्य)		
Oriental White-eyes	<i>Zosterops palpebrosus</i>	चश्मेवाला
STARLINGS (turnidae सारिणीद्य)		
Brahminy Starling	<i>Sturnus pagodarun</i>	ब्राह्मणी मैना
Rosy Starling	<i>Sturnus roseus</i>	पळस मैना /भोरडी
Asian Pied Starling	<i>Sturnus contra</i>	अबलख मैना
Common Myna	<i>Acridotheres tristis</i>	मैना /साळुणी
THRUSHES, ROBINS, CHTS, REDSTRT, SHAMA [Turdidae]		
Blue-headed Rock-Thrush	<i>Monticola cinclorhynchus</i>	निळया डोक्याची कस्तुरिणी
Blue Rock-Thrush	<i>Monticola solitarius</i>	निल कस्तुरिका
Orange-headed Thrush	<i>Zoothera citrina citrina</i>	भू-कस्तुरिका
White-throated Ground Thrush	<i>Zoothera citrina cyanotus</i>	पांढ-या गळयाची भू -कस्तुरिका
Blue throat	<i>Luscinia svecica</i>	निलकंठी / शंकर
Oriental Magpie-Robin	<i>Copsychus saularis</i>	दयाळ
Indian Robin	<i>Saxicoloides fulicata</i>	नीळशी
Black Redstart	<i>Phoenicurus ochruros</i>	नीळ थिरथिरा
Common Stonechat	<i>Saxicola torquata</i>	भारतीय कंठी गोजा
Pied Bushchat	<i>Saxicola caprata</i>	कबरा गोजा
Indian Chat	<i>Cercomela fusca</i>	तपकिरी
FLYCATCHERS (Muscicapidae मणिदाद्य)		
Verditer Flycatcher	<i>Eumyias thalassina</i>	मोरकंठी लिटकुरी
Tickell's Blue-Flycatcher	<i>Cyornis tickelliae</i>	टिकेलची निळी लिटकुरी
Grey-headed Flycatcher	<i>Culicicapa ceylonensis</i>	राखी डोक्याची लिटकुरी
LEAFBIRDS [Chloropseidae]		
Jerdon's Chloropsis	<i>Chloropsis cochinchinensis</i>	जेर्डनचा निळपोपट
Gold-fronted Chloropsis	<i>Chloropsis aurifrons</i>	निळपोपट
FLOWERPECKERS [Dicaeidae]		
Thick-billed Flowerpecker	<i>Dicaeum agile</i>	जाड चोचीचा फुलटोचा
Tickell's Flowerpecker	<i>Dicaeum erythrorhynchos</i>	टीकेलचा फुलटोचा
SUNBIRDS AND SPIDERHUNTERS([Nectariniidae शिंजिराद्य)		
Purple-rumped Sunbird	<i>Nectarinia zeylonica</i>	पंचरंगी सूर्यपक्षी
Purple Sunbird	<i>Nectarinia asiatica</i>	जांभळा सूर्यपक्षी
SPARROWS (Passeridae चटकाद्य)		
House Sparrow	<i>Passer domesticus</i>	चिमणी
Yellow-throated Sparrow	<i>Petronia xanthocollis</i>	पीतकंठी चिमणी /रान चिमणी

WEAVERS (Ploceidae वयाळ्या)		
Black-breasted Weaver	<i>Ploceus benghalensis</i>	मोठी सुगरण
Baya Weaver	<i>Ploceus philippinus</i>	सुलु
MUNIAS [Estrildidae]		
Red Munia	<i>Amandava amandava</i>	लाल मनोली
White-throated Munia	<i>Lonchura malabarica</i>	पांढ-या कंठाची मनोली
Spotted Munia	<i>Lonchura</i>	ठिपकेवाली मुनिया
WAGTAILS AND PIPTS([Motacillidae रजकाद्य)		
White Wagtail	<i>Motacilla alba</i>	पांढरा धोबी
Large pied wagtail	<i>Motacilla maderaspatensis</i>	अबलख धोबी
Citrine Wagtail	<i>Motacilla citreola</i>	पिवळ्या डोक्याचा धोबी
Yellow Wagtail	<i>Motacilla flava</i>	हळदी परीट
Grey Wagtail	<i>Motacilla cinerea</i>	करडा धोबी
Paddyfield Pipit	<i>Anthus rufulus</i>	धान तिरचिमणी
Brown Rock Pipit	<i>Anthus similes</i>	शैल तिरचिमणी
FINCHES (Fringillidae अरुणचटकाद्य)		
Common Rosefinch	<i>Carpodacus erythrinus</i>	सुलोही
BUNTINGS [Eringillidae]		
Crested Bunting	<i>Melophus lathami</i>	तुरेवाला भारीट
Black-headed Bunting	<i>Emberiza melanocephala</i>	काळ्या डोक्याचा भारीट
Red-headed Bunting	<i>Emberiza bruniceps</i>	तांबड्या डोक्याचा भारीट

Reptiles: Snakes and many species of other reptiles are found all over the tract.

SECTION: XV.2: SPECIAL OBJECTIVES OF MANAGEMENT:

The special objectives of management are as follows.

- (1) To protect and conserve wildlife in this area.
- (2) To ensure maintenance of viable population of wildlife
- (3) To increase the population of wildlife by providing proper habitat management including shelter, water, food etc.
- (4) To preserve area of biological importance for all times to come as natural heritage for the benefit of education, research and enjoyment of the people.
- (5) To involve local people in wildlife conservation.
- (6) To educate and motivate local people for protection and conservation of wild animals there by providing an environment of security to wild animals.

- (7) To enhance the scope of employment potential and additional income generation by promoting eco-tourism.
- (8) To control illegal trade and poaching in wildlife and their products.
- (9) To reduce biotic interference affecting the growth of wildlife and regulate cattle grazing in wildlife rich area.

SECTION: XV.3: RIGHTS AND CONCESSIONS:

There are no rights and privileges granted to any person over wildlife. However a member of schedule tribes can pick, collect or possess in the district where he lives, any specified plants or plant derivatives thereof for his bonafide personal use, subject to the provisions of Chapter III of Wildlife (Protection) Act 1972. The Chief Wildlife Warden can permit with prior approval of the State Government for special purposes, which are education, scientific research and collection of specimen for recognized zoos, museum and similar institutions.

SECTION: XV.4: ECO-SENSITIVE ZONE:

XV.4.1 IBWL DECISION:

- 1) During the Xxi meeting of the Indian Board for Wildlife held on 21st January 2002, a “Wildlife Conservation Strategy-2002” was adopted where in point No. 9 envisaged that “Lands falling within 10 km of the boundaries of National parks and sanctuaries should be notified as eco-fragile zones under section 3 (V) of the Environment (Protection) Act and Rule 5 sub rule (Viii) & (X) of the Environment (Protection) Rules”.
- 2) The Additional Director General of Forest (WL) vide letter dated 6 February 2002, had requested all the chief wildlife wardens for listing out such areas within 10 km of the boundaries of National Parks and Sanctuaries and furnish detailed proposals for their notification as eco-sensitive areas under the Environment (Protection) Act, 1986.
- 3) In response, some of the State Governments had raised concern over applicability of the 10 kms range from the Protected Area boundary and informed that most of the human habitation and other areas including important cities in these states would come under the purview of eco-sensitive zone and will adversely affect the development.

XV.4.2: National Wildlife Action Plan (2002-2006)

A) The National Wildlife Action Plan (NWAP) 2002-2016 indicates that “Areas outside the protected area network are often vital ecological corridor links and must be protected to prevent isolation of fragments of biodiversity which will not survive in the long run. Land and water use policies will need to accept the imperative of strictly protecting ecologically fragile habitats and regulating use elsewhere.

XV.4.3: DECISION OF NATIONAL BOARD FOR WILDLIFE:

Considering the constraints communicated by the state, the proposal was re-examined by the National Board for wildlife in its 2nd meeting held on 17 march 2005 and it was decided that the “delineation of eco-sensitive zones would have to be site specific and relate to regulation, rather than prohibition of specific activities”. The decision was communication to all the state Governments for compliance vide letter dated 27th May 2005.

XV4.4: STATUTORY PROVISIONS:

- 1)** Section 5 C (1) of the Wildlife (Protection) Act, 1972 states that it shall be the duty of the National Board for Wildlife to promote the conservation and development of Wildlife and forests by such measures as it thinks fit.
- 2)** Section 3 of the Environment (Protection) Act 1986 (EPA) gives power to the Central Government i.e. the Union Ministry of Environment and Forests to take all measures that it feels are necessary for protecting and improving the quality of the environment and to prevent and control environmental pollution. To meet this objective, the Central Government can restrict areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards [Section 3 (2) (v)]
- 3)** Section 5 (1) of the Environment (Protection) Rules, 1986 (EPR), states that the central government can prohibit or restrict the location of industries and carrying on certain operations or processes on the basis of considerations like the biological diversity of an area (clause v) maximum allowable limits of concentration of pollutants for an area (clause

ii) environmentally compatible land use (clause vi) proximity to protected areas (clause vii).

XV.4.5: PURPOSE FOR DECLARING ECO-SENSITIVE ZONES :

The purpose of declaring Eco- sensitive zones around National Parks and Sanctuaries is to create some kind of “Shock Absorber” for the protected Areas. They would also act as a transition zone from areas of high protection to areas involving lesser protection. As has been decided by the National Award for wildlife the activities in the Eco-sensitive zones would be of regulatory nature rather than prohibitive nature, unless and otherwise so required.

In view of IBWL decision, National wildlife action plan & Hon’ble supreme court’s direction DCF Pandharkawada Forest Division should demarcate area within 10 km of Tipeshwar Wildlife Sanctuary and get approved from the competent authority.

SECTION: XV.5: INJURIES TO WILDLIFE:

The wild life in this area dwindled over a period of time due to various reasons like poaching, fire, water etc.

XV.5.1 Poaching: Poaching is increasing due to development of infrastructural facilities, specially roads and communication facilities in the interior area lead to easy accessibility of the areas of wild life. The out side poachers or the poachers adjoining forests and the meat lovers can easily reach the interior areas and kill the animals for various purposes.

XV.5.2 Fire: The tract of Pandharkawada Division is subjected to repeated fires every year which cause extensive damage to the wild life and its habitat. Repeated fire cause accessibility of wild animal to human habitations and provides opportunity to be hunted. Fires in vegetation bring about changes in vegetal cover and quality in vegetation which may be detrimental to the survival of wild life in perpetuity due to destruction of the habitat.

XV.5.3: Water: In this tract most of the streams and water courses become dry during summer except a few water bodies. The wild animals are required to visit limited water

holes at least twice in a day. The fact is that the water holes will become hunting places for poachers during summer season.

SECTION: XV.6: PRESCRIPTION TO BE UNDERTAKEN TO PROTECT AND MANAGEMENT OF WILDLIFE:

The wild animal population in this division has been dwindling because of fragmentation of habitation, biotic interference, breaking of corridors, water scarcity, food scarcity, contagious diseases etc. To mitigate the problem of dwindling wildlife the following measures are prescribed for better management of wildlife in the division since it is a Non - Protected Area. Before taking up special measures for the management and development of wildlife, it is necessary to identify wildlife rich pockets, corridors for the movement of wildlife, riparian zones, waterholes available in the tract and their potential to provide water in all seasons, availability of meadows and other amenities for the betterment of viable population of wildlife. For effective protection and management of wildlife the following measures shall be adopted. 1) Protection measures 2) Habitat improvement measures 3) Monitoring of wildlife health 4) Other activities.

XV.6.1: Protection measures: Special protection measures should be undertaken by the territorial staff is as follows.

- (a) **External boundary:** The identification of wildlife rich pockets of the forests riparian zone and demarcation of the same by erecting RCC pillars on the lines of 1\5th boundary demarcation scheme.
- (b) **Internal boundary:** In wildlife rich areas beat, round and compartment boundaries and boundary between forests and village should be maintained properly on the lines of 1/5th boundary demarcation.
- (c) **Restriction of entry to the public:** The riparian zones are fragile and are surrounded by number of villages and it is necessary to restrict entry of general public in these areas for any activity.
- (d) **Illicit felling, poaching and fishing:** These areas should be protected from illicit felling, poaching of wild animals, fishing and any other activities which disturb

wildlife to achieve well-controlled protection status in these areas. The Mobile Squad RFO concerned shall be assigned a special task to protect wildlife in these areas and for combing the area apart from regular territorial staff. The territorial staff as well as Mobile Squad staff would frequently camp in jungle and gather information about network of roads, bridle paths used by illicit cutters and poachers. The wildlife offences and enquiries would be done carefully with legal assistance.

- (e) **Grazing regulations:** Grazing regulations should be implemented by developing awareness among the villagers about the ill-effects of grazing and stall feeding of cattle and strict prohibition of grazing by migratory cattle.
- (f) **Fire protection:** Strict fire protection measures shall be undertaken in such areas.
- (g) **Encroachment:** These areas are strictly protected from encroachment in the interest of wildlife management.

XV.6.2: Habitat improvement measures:

- (i) **Preparation of compartment wise cover maps:** In these eco-sensitive zones, composition of crop, information about caves, burrows etc. used by wild animals be collected. The systematic information about wild animals movement and type of vegetation should be collected. All palatable grasses, herbs and endangered and endemic species of flora and fauna should be listed out.
- (ii) **Water management:** In the habitat improvement water management is one of the most important aspects, which covers the maintenance and strengthening of all the existing waterholes, creation of new waterholes and artificial supply of water. The existing water holes would be cleaned every year and bandharas construction and de-siltation of waterholes shall be taken up. Special budgetary provisions shall be made for these waterholes. Artificial supply of water is necessary especially in summers where there are no natural waterholes available. Creation of saucer-shaped cement ponds, arrangement of half cut hume pipes sealed on one side and some places bore-wells with the hand pump would be provided.

- (iii) **Maintenance of waterholes:** To ensure longer and reliable water availability the following measures may be undertaken:
 - (a) De-siltation and removal of debris would be done in the month of December and January.
 - (b) Removal of leaf litter from waterholes during April and May.
 - (c) The approach ways to waterholes could be made by providing rough surface and smooth slopes.
 - (d) Regular maintenance of bore-wells
 - (e) The springs or aquifers shall be tackled with a small trough constructed near such source of discharge, so that there is pool of water available to wildlife.
- (iv) **Soil conservation works:** To check soil erosion and increase water availability, intensive soil and moisture conservation measures shall be taken up in these areas, such as loose boulder structures, Gabian structures, gully plugging, pitching, inverted bandhara etc in nalas.
- (v) **Meadow development:** The existing grass lands, open areas in forest areas should be increased and palatable grass species shall be improved. Unpalatable grass species shall be removed from such areas. The seeds of palatable perennial grass and legume species would be sown after ploughing in some of the open areas and important fruit species like Pipal, Ber, Awala, Jamun, Mahua etc. will be planted in such areas to provide food to wild animals.
- (vi) **Management of wetlands and unique habitats:** The existing wetlands in these forest areas and inhabitant flora and fauna would be studied. These wetlands are the abodes of aquatic fauna such as fish, aquatic birds and migratory birds which visit these wetlands. The nesting sites should be identified and protected without disturbances and for this purpose planting of suitable species shall be taken up along the boundaries of wetlands. Unique habitats like caves, cliffs would be studied and protected from the management point of wild animals.

XV.6.3: Monitoring of wildlife health: Wildlife health should be monitored regularly because communicable diseases of viral, bacterial, protozoan origin may lead to dwindling

of wild animal population due to death and increase in vulnerability to perdition, reduction in competitive ability etc. In order to maintain health of wild animals the following measures would be adopted.

- (i) Assessment of cattle population in near forests.
- (ii) Vaccination of domestic cattle.
- (iii) Studies to be conducted on cattle and wild animal common diseases.
- (iv) Hot stamping of cattle permitted for grazing.
- (v) Proper hygienic conditions shall be maintained in the habitat of wild animals.
- (vi) The common waterholes used by both cattle and wildlife would be identified and disinfected, so that the communicable diseases are not transferred to wild animals.
- (vii) Mud bath shall be provided at suitable places.

XV.6.4: Monitoring of wildlife population : Estimation of wildlife population shall be carried out periodically as decided by the Govt. to estimate and monitor the wildlife population of various species and their distribution and migration shall be noted periodically. Multipurpose watch towers shall be erected to observe the movement of wild animals and to trace fire incidences for controlling fires.

XV.6.5: Establishment of secret information network:

Effective informer network is necessary to prevent and investigate into offences related to wildlife. In this connection local villagers, Van Majurs and Forest Guards form an important linkages in the network. The senior officers should interact more with the local staff and villagers for important information and they should also offer suitable rewards to the officers and staff, who excel in curbing illegal poaching and trade in wildlife. A note of such matter should be taken in their Service Books.

XV.6.6 Considering gradual decrease in the wildlife population DCF, Pandharkawada division and CCF Yavatmal circle will identify the areas, where endangered and Schedule-I animals such as tiger, leopard, bear, wild dog are normally found and their shelter and

breeding grounds. Such area should be declared as “Sensitive area” and special measures should be taken in such area by making budgetary provision. These measures are:

- (1) A critical report shall be prepared at divisional level for sensitive area regarding population of existing animals, their status and whether they are on the verge of extinction at local level.
- (2) The information gathered about the sensitive area to be shown on each range map depicting the animal’s habitat, breeding ground, movements etc. the perceptible threats to their survival must be identified and measures to be implemented to overcome those problems.
- (3) The information about the availability of water fodder and measures must be implemented to overcome these problems.

XV.6.7 Other Measures:

(1) Keeping tract of wild animal’s movement: The movement of wild animal inside or even outside the forest area should be traced by the local staff, especially tiger, panther and black buck. Wild animals stay out side the forest specially in summer and rainy seasons are highly prone for hunting and poaching and the local forest staff must keep track to prevent any unwanted incidence.

(2) Help of the local forest protection committees:

There are number of Forest Protection Committees which have been established, the local staff must seek their cooperation in preventing wildlife offences especially on the boundaries of National Parks and Sanctuaries. There are number of JFM Committees established and a Sub- Committee will be formed under JFM Committee termed as “Wild Animal Protection Committee” which will help in protection of wild animals.

(3) Illegal trade in wild animals: Many number of wildlife cases are pending in various courts which are not maintained regularly by the forest officers, it may result in acquittal of offenders and therefore all these cases must be monitored closely. A list of accused and suspicious offenders must be maintained at division level and a list with

photograph of all habitual offenders must be maintained and kept in range office as well as division office.

(4) Man- animal conflict : Herbivores visit the agricultural field due to shrinkage of their natural abode, thus causing damage to the agricultural fields, resulted in man- animal conflict. Moreover enhancement of human habitation within and outside forest area led to braking of natural corridors of wild animals, is also another aspect of man-animal conflict. Due to intensive protection of PA areas, the population of herbivores is on increasing trend and these herbivores increasingly raiding the adjoining fields and cause severe crop damage. To mitigate this problem a Secretary Level Committee under the chairmanship of Chief Secretary (Maharashtra State) has taken the following three decisions :

- (a) Insurance against crop damage
- (b) Raising stonewall between fields and forest to prevent crop-damage
- (c) Hunting wild-pigs, if it is unavoidable

(5) Establishing control cell at circle level: A Tiger cell has been formed vide Govt. Resolution dated 7.11.2000 under the chairmanship of Additional Director General of Police (Head quarters) for co-ordination between the Police, Forest and other Departments to check poaching and illegal trading of wildlife. Similar committees have been formed at commissionerate and district levels for proper coordination for controlling wildlife offences.

(6) Apart from above mentioned measures, the following measures to be undertaken for protection and management of wildlife.

(a) Periodical estimation or survey of wild animals is a must to assess the population of wild animal and their distribution which help in taking up appropriate measures to protect and manage habitat.

(b) In summer most of the water bodies and streams dry up and wild animals are required to visit water holes twice a day for drinking water and the water bodies may be vulnerable spots for poaching, therefore alternative water resources and water shall be provided in the form of water holes at appropriate places where the wild animals can meet their water

demand safely. In Pandharkawada Forest Division in some of the areas alternative water sources are provided by means of anicuts, van-talav and water holes. These water holes will be filled up with water on a regular basis and these should be strictly protected from poaching.

(c) Multipurpose watch towers will be erected to observe the movement of wild animals and to trace the fire incidence for fire control and to check grazing.

(d) Dust and mud bath shall be provided at suitable places.

(e) Vaccination of the cattle grazing in the forest shall be carried out in order to prevent contagious diseases to wild animals and grazing passes shall be verified regularly.

(f) The cattle kill and human kill cases are required to be decided promptly and the compensation shall be paid as per the Government policy.

SECTION: XV.7: INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT:

XV.7.1: DCF Pandharkawada made a proposal for the protection of wildlife outside the protected areas in Pandharkawada Forest Division under centrally sponsored scheme in the name of “*Integrated development of wildlife habitat.*” In this division majority of forests are fragmented in small patches especially in Umari, wani, part of parwa, part of Pandharkawada where these patches are surrounded by zones of intensive anthropogenic activities mount much pressure on biodiversity which disturbs the prime objectives of biodiversity conservation. Some of the rare and endangered flora and fauna are situated in the patches outside protected area needs to be protected, restored and developed. The local communities depend on such areas for their needs. Restriction on utilization of bio-resources causes hardship to the local communities resulting in retaliatory action against wild animals. In the Pandharkawada Forest Division few species have been selected for Integrated Development of wildlife habitat which are nilgai, chital, sambar, blackbuck, wild boar. For the improvement of wildlife in such Integrated Development of Wildlife Habitat the following measures are suggested.

- a) Food and shelter improvement, b) Creation of waterholes
- c) Improvement of grass lands, d) Boundary demarcation
- e) Protection of flora and fauna

XV.7.2 Rehabilitation centre: DCF Pandharkawada proposed to have a Rehabilitation Centre in the division in which infected and injured wild animals will be kept in rehabilitation centre for treatment. Some of the epidemic diseases like anthrax, foot and mouth diseases may spread to wild animals. Therefore it is necessary to regulate grazing in such areas. The wild animals which are kept in rehabilitation centre for treatment and necessary care will be taken through veterinary doctor nearby. There are some incidences where leopards migrate to villages and cause lot of panic among the people and staff. The division at present is not equipped with the facilities to catch leopard by tranquilising animal and keep in cage and leave in the Jungle. Therefore, it is necessary to provide at least one modern cage with all the facilities to trap disturbed wild animal. It is also necessary to provide tranquilising gun along with trained manpower to handle tranquilising gun at the time of need. There is a need to provide training to few selected staff in Wildlife Institute of India, Dehara Dun, in the matter how to tranquilise a disturbed animal, how to trap in a cage, how to administer drug, monitoring and how to release the trapped animal in its natural abode.

XV.7.3 Forest Custody: The offender indulging in forests and wild life offences are required to be kept in forest custody for further investigation. Under such circumstances, in case forest custody is granted by a magistrate, it is difficult to keep the offender in rest house or in Range Office. It is the need of hour to have a separate forest custody as proposed by DCF, Pandharkawada at Umari or with every range headquarter. Therefore it is necessary to sanction a separate forest custody with appropriate man power to handle forest and wildlife offences. It is also necessary to have a Special Counsel for pleading the wildlife offences in court of law.

XV.7.4 Public Awareness and Eco-tourism: In order to have effective conservation of wildlife people's support and involvement is necessary. By keeping this in view the villages around these patches will be brought under JFM committee and educate them about the importance of wildlife and conservation of same in the interest of public. An information centre known as "Chetna Kendra" will be established in which wildlife photos and information regarding wildlife existing in that area will be displayed. Awareness will be created regarding the boundaries of wild animals and human beings and how wild

animals are useful for human being in food chain and their role in food chain through print-media, videoclips and movies.

XV.7.5 Involvement of JFM Committee in protection of wildlife:

Man-Animal conflict has been there in the nature since the time immemorial. The developmental activities for the benefit of human always cause damage to wild animals' existence. To protect wild animals effectively, the co-operation and active participation of local people is necessary. In JFM the wildlife protection should be a focal point. The wildlife should not be considered as competitor in utilisation of resources in forests but it is to be looked upon as co-sharer of common resources. It is the need of the hour that there should be a symbiotic relationship between mankind and wildlife. Efforts shall be made to have a fair competition among various JFM Committees for their involvement in protection of wildlife as well as other natural resources.

SECTION: XV.8: NEED OF ECO-TOURISM:

XV.8.1 The Government of Maharashtra have declared “Maharashtra State Eco-tourism and Nature Tourism Policy vide Government resolution no.WLP/1002/CNo.53/F-1/dt. 20th Feb 2008. The entire forest area of Pandharkawada Forest Division is covered under Eco-tourism. The forests of Pandharkawada Forest Division are situated on undulating terrain with diverse flora and fauna, natural resources, natural landscape, natural scenic beauty of various irrigation projects etc, which have tremendous potential towards eco-tourism. In light of the above mentioned potential a chapter on Eco-tourism has been formulated.

XV.8.2 The nature interpretation, conservation and education are integral parts of ecotourism. There is need for evolving policy for wildlife tourism amalgamated at national level and accordingly National Ecotourism policy has been evolved by Government of India. As per “Eco-tourism in India – Policy and Guidelines 1998”, Ministry of Tourism, Government of India : Eco - Tourism can be defined as follows : “The activities of persons traveling to and staying in places outside their usual place of residence for not more than one consecutive year for leisure, business or other purposes constitute tourism. Such visits for being close to enjoy its enormous creations, both biotic and non-biotic, in most environment friendly manner, without any adverse impact on the ecosystem, is

particularly known as eco-tourism.” The tract of Pandharkawada division forms a distinct vegetation cover with important rivers like the Penganga, Khuni, waghadi etc.

XV.8.3 According to World Tourism Organization (WTO), “Tourism that involves traveling to relatively undisturbed natural areas with specified object of studying, admiring and enjoying the scenery and its wild plants and animals, as well as existing cultural aspects (both of the past or the present) found in this area” is defined as eco-tourism. Nature tourism (eco-tourism) is distinguished from mass tourism or resort tourism by having a lower impact on the environment and by requiring less infrastructure development.

XV.8.4 The key elements of eco-tourism include a natural environment as the prime attraction, an optimum number of environment friendly visitors, activities which do not have any serious impact on the ecosystem and positive involvement of local community in maintaining ecological balance. Eco-tourism provides pleasure of beautiful natural forests or landscape, watching of animals, birds and trees in forests and engaging in trekking, boating or rafting, wandering in sand dune zones are some of the common forms of ecotourism.

XV.8.5: ECO-TOURISM SITES:

Major irrigation project does not exist in this division 10 medium and 4 minor irrigation projects are present in this Division. Therefore many spots with beautiful vegetation can be developed into eco-tourism spots. This division is drained by the rivers Painganga, Wardha, Khuni, Waghadi etc. Large variety of wild animal population is also witnessed in this Division such as Panther, Nilgai, Black-buck, Chital, Sambar, Chinkara, Chowsinga, Sloth bear, peacock, Jungle fowl and variety of birds. Pandharkawada Forest division has got many spots with beautiful vegetation. Some following spots can be developed into ecotourism sites.

1) BRIDAVAN ECO CONSERVATION AND INTERPRETATION CENTER PANDHARKAWADA:



Brindavan environmental conservation and interpretation center, Pandharkawada. The conservation center will be developed by forest department. The conservation center will have watershed works. (Like CCT) Nalabunds, water holes Earthen dam, Checkdam and cement plugs), a Rock garden with fossils of the area, Smriti van, developed Eco friendly huts, Sacred structures and jungle trail in the area.

2) BIO DEVERSITY CONSERVATION CENTRE- GOPALPUR:

The Bio diversity conservation centre at Gopalpur which is about 6 km distance from Pandharkawada has arboretum, medicinal plants plot, climbers plot and sacred structures like Panchavati Nakshatra van, Navagraha van and Shiva Panchayatana can be seen in this centre.

3) HIWARI DOH IN COMP. NO. 120:



Hiwari village is selected for Joint Forest Management under Forest Development Agency programme of Government of India. The villagers are very actively involved in forest protection. There are about 40 families in the village who live by catching fish in the DOH nearby. Forest department is helping these fishermen by providing new nets and also bringing fisheries Department officers and training them the

scientific techniques of catching fish and also adding new varieties of fish which will improve the fishing catch of the fishermen. The DOH is a beautiful place with the banks of the doh formed by slaty structures and over that thick forest can be seen all along the DOH banks. Wide variety of water birds can be seen as you move along the banks of the DOH. This will be an ideal place for bird watching while moving the boat. The eco tourist inflow will improve the fisherman's economic status as tourists can purchase their boats.

4) TIPESHWAR WILD LIFE SANCTUARY:



The Tipeswar wild life Sanctuary is located at a distance of 20 kms from Pandharkawada. The Sanctuary has very good forest cover. The Sanctuary is home for Wild animals like Neelgai, Black Cheetas, Wild Bears and Panthers. A lucky visitor can sight some of these animals

during the eco tour. Water Park near Tipeswar village will be developed by doing desiltation and bund stabilization and beautification works. Facilities to erect tents for visitors to stay are being developed by the wild life division. An interpretation center is also being developed by the wild life division at Sunna. Tipeswar forest area is also an ideal place for forest trekking.

5) TIWASALA MAN MADE FOREST AND PANDAVDEVI TEMPLE COMP.NO.

73: Tiwasala forest block is a very famous man made teak forest. The present teak forest



ware earlier mixed forest and since 1927 they have been converted into pure teak forest. The ecotourist will get a feel of the good dense forest. Within the forest area there is a Lord Shiva's Temple which is very ancient beside that

Pandavdevi Temple is situated at a distance of 22 kms from Pandharkawada. Pandavas visited at Pandavdevi and

they stayed for a Month and established Pandavdevi Temple in side the thick forest of comp.no.73 in Pandhararkwada. Forest division. Many peoples from surrounding areas visited this temple in big numbers and particularly during Mahashivratri festival, Navratri and daily visitors are in big numbers. The temple has a historical and strong religious background. District Planning Development committee declared this ancient temple a 'C' class tourism



place and development work are in Progress through forest department.

6) GURUDWARA BAGHOUD SAHEB- WAI :



Wai Gurudwara is situated at joining comp. no. 73 of Tiwsala Forest and at a distance of 10 kms from Pandharkawada. In the year 1707 shri Gurugovind Singh visited Wai and stayed for a Month. About 200 years ago Shri Giridhar Singh Muniji visited Wai and stayed in a room and did

Tapasya. Shri Bhupendra Singh Kongarekar, Chairperson of the trust constructed the Gurudwara in the year 1983. It is a holy place for Sikha community in Pandharkawada.



7) DEODHARI DATTATRYA TEMPLE:

Located in comp.no.163. It is very old temple of Dutta Digambar, with Perinial water source. Once upon a time saint Lalitadevi warship the God and she observed three child infrant of her and after some time they disappear. Saint Lalitabai accompanied by Tiger in Jungle in those days has been seen by the villages and temple was constructed 30 year back. Yatra being celebrated at the time of Dutta Jayanti in every December. As many as more than 15000 Pilgrims attended the Yatra in Jungle.

8) DEVRAI SACRED GRAVE- DAPORA COMP.NO. 610:

Dapora Sacred Grave is protected by the Tribal villagers of Dapora in the name of Lord Persapen Devrai on an area of 15.78 hectares of forest land. The forest is protected in the name of Adivasi daitya and the local Tribals are mainly Kolams and Pradhans. The people believe that cutting trees or harming trees is like disrespecting the Daitya. It is an amazing place where people's fillings are reflected for such noble cause like forest protection.

9) RANGANATH TEMPLE –WANI:

Ranganath temple at Wani is very ancient Temple. Lord Ranganath is in sleeping



posture in this temple. This is very famous temple and people from all over Maharashtra come on pilgrimage to take darshan of Lord Ranganath. Starting with Holi festival, a month long Jatra is conducted in Wani which is very famous all over Vidharabha region. During this Jatra wrestling contests are conducted in wani and wrestlers from all over

Maharashtra participate in this contest.

10) WANI ENVIRONMENT CONSERVATION AND INTERPRETATION CENTER. COMP.NO. C 13:



Wani Environment conservation and interpretation center will be developed at Mandar by forest department which is about 6 kms form Wani town. In this conservation center children play area, Environment interpretation center, jungle trail, Rock garden, Sacred structures like Nakshatra van, Navgraha van, Panchavati, Shiva Panchayatana etc, and water shed development works soil and moisture conservation will be

developed by forest department. The visit to this conservation center will be an environmental education tour for ecotourism.

11) WAGHARA WATERFALL:



Wagara natural water fall is located in Waghadi River. In Parwa Range. It is near to waghara village. It is very near to forest area will have developing scope for eco -tourism.

SECTION:XV.9: SPECIAL OBJECTIVES OF MANAGEMENT:

In the National Wild Life Action Plan 2002, the special objects of management of eco-tourism states that tourism should become a unifying force nationally, internationally fostering better understanding through travel. It should also help to preserve, retain and enrich the life style and cultural expression and heritage in all its manifestations. The policy objective of eco-tourism could involve a selective approach, scientific planning, effective control and continuous monitoring. To develop the process of eco-tourism shall meet the following cardinal principles.

- (1) It should involve the local community and lead to the overall development area.
- (2) It should identify likely conflicts between resource use of tourism and livelihood of local inhabitants.
- (3) The development of tourism should be compatible in environment and the socio-cultural aspects of local people.
- (4) It should focus overall development strategy with better land use plan and expansion of public services.

The special objects evolved on the basis of above mentioned cardinal principles are given below.

- (1) Development of eco-tourism without disturbing socio-cultural and ecological environment of the area or with low impact on it.
- (2) Involvement of local people and over all socio-economic development by maintaining ecological balance.
- (3) Exposure to ethnic groups to the main stream of social, cultural life and involve them in harnessing potential of eco tourism for their development.
- (4) Involvement of government and non-government organizations to create awareness for environment.

SECTION: XV.10: IDENTIFICATION OF ROUTES :

Approach routes: Wardha, Adilabad, Chandrapur, Yavatmal can be approached through Pandharkawada, Ghatanji and Patanbori

Internal tourist routes

A few routes for tourist vehicles are identified

- (a) From Chandrapur to TWLS Via Wani, Maregaon, Karanji, Pandharkawada, Sunna.
- (b) From Nagpur to TWLS Via Hinganghat, Pandharkawada, Sunna.
- (c) From Yavatmal to TWLS Via Ghatanji, Parawa, Mathani
- (d) From Hyderabad to TWLS Via Adilabad, Patanbori, Sunna.

XV.10.1 Proposed Ecotourism activities:

A) Ecotourism should be able to cater larger of visitors' profile such as students' groups, low-cost package tours as well as high-end nature tours. Some of the concepts are as followed.

- Circuits out of the routes considered suitable for vehicle movement, cycling, trekking etc. (See the map). Specific entry and exit points, distance, duration, regulation of stay and other associated items along with day halting points will be selected in consultation with the local communities along the routes.
- Camping facilities already available in the eco tourism area such as rest houses, dormitories, tents etc can be use for camping/ night halts.

Camps: Educational tourism sites and nature camps should be selected to cater weekend/holiday campers.

- **Traditional Camping:** Traditional home stay facilities should be promoted to strengthen ecotourism-based support to local economy, these will be linked with other concepts like 'Mamachi Wadi Bullock cart safari, traditional village food outlets, local dance festivals, etc.

- Water sports/ angling: Saikheda dam, is one of the sites, where non-destructive, non-polluting water sports like paddling boats, anagling, etc., can be explored / promoted within the frameworks of applicable regulations.
- Bird watching: Important aquatic sites will be promoted for watching migrant birds. Regular bird watching tours may also be organized rickshaw / bullock cart rides.

XV.10.2: Community participation & employment generation:

There are 44 villages inside TWLS Eco-sensitive zone area. One of the main considerations in buffer area notification is to create employments opportunities for the local villagers, so that they actively participate in the management and conservation of wildlife. Keeping this in mind, it is essential to actively involve villagers in every eco-tourism activity. Local people through EDC, JMFC and Woman self help groups, etc., should be actively involved in the decision-making process related to development of sites, infrastructure, fee structure, etc.

XV.10.3: Eco-friendly activities:

ESZ area tourism will be completely eco friendly. All necessary steps should be taken to make it garbage free, plastic free, pollution free etc. Promoting gas based or petrol vehicles, not allowing plastic bottles inside and supplying packaged water by SHG; following strict tourist code etc should be implemented.

XV.10.4: Natural Resources in Non-forest Area:

- Large-scale constructions of resorts and hotels and other commercial buildings are likely to disturb local environment, therefore such construction should not be allowed close to Eco sensitive areas.
- Construction of any commercial building shall not be allowed within 500 meters of high flood line of any perennial water body or perennial river.
- Home stay facilities, referred above, should be wholly owned by Gram Panchayats / Eco-development Committees or permanent resident (s) of the village actually residing there for more than a decade. Do's and Don'ts of the home stay arrangement shall be further worked out in detail and made public.

- Fencing (other than vegetative fences) creates barrier curtailing access to water bodies. It also adversely affects dispersal of wild animals. Hence, permanent fencing (barbed wire fencing, chain-linked fencing or masonry / concrete wall fencing) shall not be allowed in the Eco sensitive zone area. The Gram Panchayat may allow chain-linked fencing of any area not larger than 0.20 ha in exceptional cases, but two such patches should be at least 500-meter apart. However, agriculturists may have seasonal fencing (temporary but excluding barbed wire fencing or any means perceived as dangerous to wild animals) for period not exceeding six months in year for the purpose of crop protection.
- The convergence of development programmes should be used for creating conducive environment for local communities having interests in wildlife conservation.
- Mining activity shall not be allowed in the TWLS eco-sensitive zone area.

SECTION: XV.11: ROLE OF FOREST DEPARTMENT:

XV.11.1: The Forest Department will develop centers of ecotourism with controlled accessible points at strategic places. Ecotourism centre includes roads, self guided nature trails, transport options, interpretation centers, signs, observation towers, adequate lodging and dining facilities, garbage disposal facility and other amenities as per the requirement. Any development of buildings and other infrastructural facilities shall be eco-friendly.

XV.11.2: Specify environmental, physical and social carrying capacity to limit the developmental activities. The division will provide information regarding 1) What to see?. 2) How to see?, 3) How to behave ?, by providing brochures, leaflets and guides and visitor information centres.

XV.11.3: Division will prepare and distribute code of conduct to all visitors, organise training programme for forest personnel and general public and JFM Committees to enhance the eco-tourism.

SECTION: XV.12: CODE OF CONDUCT FOR VISITORS:

Proper guidelines shall be prepared and the visitors shall abide by the following guidelines.

- (1) The habitats of flora, fauna and any sites of natural or cultural shall not be affected by tourism.
- (2) Make no open fires and discourage others from doing so. If water is to be heated with scarce firewood, use as little as possible. Wherever feasible, use kerosene or fuel efficient wood stove.
- (3) Remove litter, burn or bury paper and carry back non-degradable litter.
- (4) Keep local water clean and avoid using pollutants such as detergents in streams or springs. If no toilet facilities are available, try to relieve yourself at least 30 meters away from water sources and bury or cover the waste.
- (5) Plants should be left to flourish in their natural environment and avoid taking away cuttings, seeds and roots.
- (6) Leave the camp site clean after use.
- (7) Remember that another party will be using the same camp site after your departure.
- (8) Help guides and porters follow conservation measures. Do not allow groups / porters to throw garbage in streams or rivers.
- (9) Respect the natural and cultural heritage of the area and follow local customs.
- (10) Respect local etiquette and wear loose cloths. Kissing in public is disapproved.
- (11) Respect privacy of individuals and ask permission before taking photographs of local inhabitants.
- (12) Respect holy places. Do not remove religious objects.
- (13) Strictly follow the guidelines for personal safety and security and always take your own precautions and safety measures.

**SECTION: XV.13: ROLE OF NON-GOVERNMENT ORGANIZATIONS/
SCIENTIFIC AND RESEARCH INSTITUTIONS:**

(1) The NGOs will be allowed to take lead in eco-tourism in this tract and harness the potential of eco-tourism for the development of local people. The role of NGO will be creation of awareness in all aspects of ecotourism, motivation of local community for sustainable eco-tourism activity. Conducting trainings in guiding eco-tourism, catering, transportation, affordable housing etc. Motivate local community to increase their involvement in sustainable ecotourism.

SECTION: XV.14: ROLE OF LOCAL COMMUNITY:

- (1) The local people by participating in all aspects of eco- tourism development and make the outsiders aware about, without disturbing ecological and biological balance available in the tract.
- (2) Realise and react to potential threat of investors, who see the opportunities in development but lack of sensitivity to local values.
- (3) JFM committee members shall act as efficient caterers and guides to eco-tourists.
- (4) To be friendly with visitors and help them in eco-tourism.
- (5) Practice conservation of nature and culture as a way of life.
- (6) Respect the values of environment, flora and fauna, the monuments and their cultural heritage.
- (7) Become effective nature guides and conservationists by enhancing the practical and ancestral knowledge of the natural features of the area.

SECTION: XV.15: THE ENVIRONMENTAL PLEDGE:

In course of promoting ecotourism in the tract following environmental pledge should be displayed at strategic places

- (1) We will introduce the use of recycled paper for our stationery and other publicity items such as brochures and establish recycling programmes.
- (2) We will convert to, wherever possible, from use of polythene bags to paper bags, cloth bags and other alternatives.

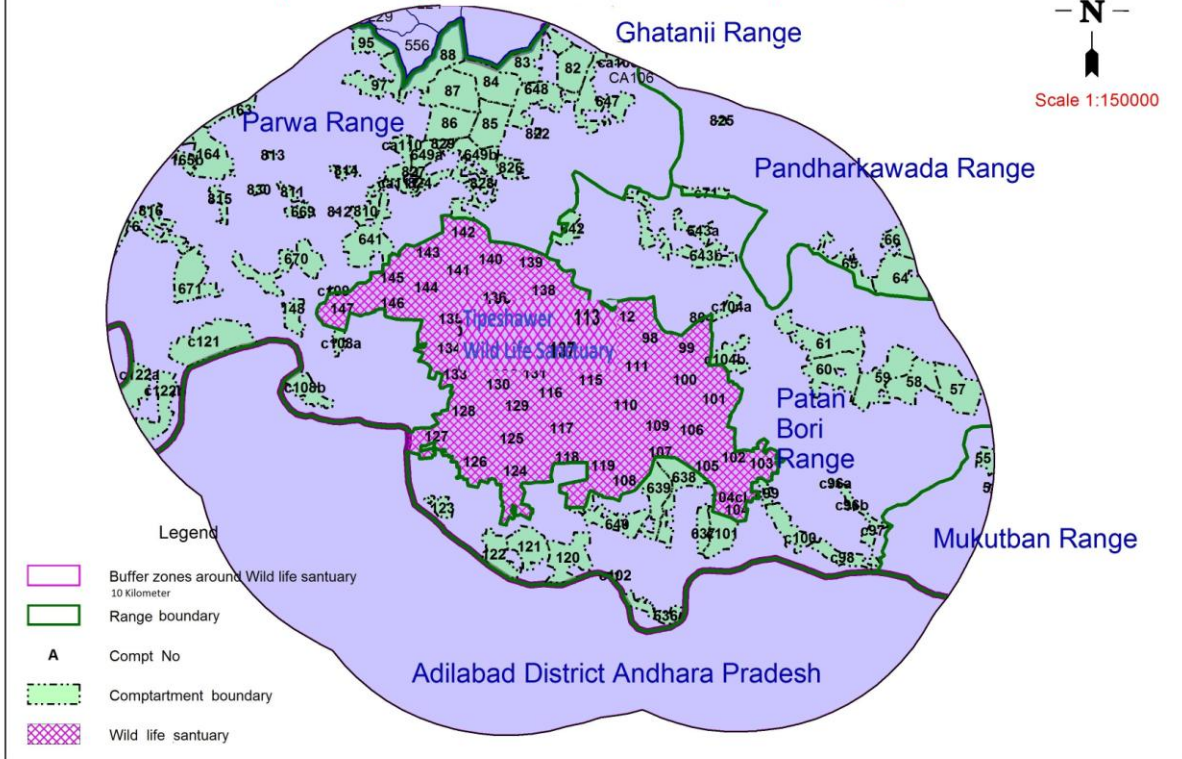
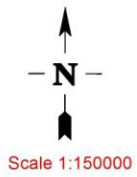
- (3) Wherever possible, we will convert to solar power such as solar heating and lighting.
- (4) We will introduce the system of separating recyclable and non-recyclable garbage emanating from our operations and dispose nonrecyclable garbage in a responsible way.
- (5) Whenever possible we, will recycle water by incorporating water treatment schemes. We will also harvest, store and use rain water for our operations.
- (6) We pledge to conserve ecology, animal and birdlife of the area where our properties are located in.
- (7) We will encourage planting of saplings and greening of the local environment. We will take saplings and encourage our tourists to help plant them near our camp sites or on trails.
- (8) We will limit the burning of firewood and use alternate sources of fuel for both cooking and heating.
- (9) In keeping with the local landscaping we will incorporate architectural styles typical to the area, thus blending with environment.
- (10) Where ever possible, we will hire locals for our business, to enhance the economy of our area.
- (11) We will make no open fires and discourage others from doing so. Wherever water is heated using scarce firewood, we will not use it, or use the bare minimum. Wherever possible, we will choose accommodation that uses kerosene or fuel-efficient firewood stoves.
- (12) We will leave common sites clean and take back all non-biodegradable litter for proper disposal. We will bury only biodegradable food waste.
- (13) Toilet facilities will be pitched at least 30 meters away from the water source and all waste will be covered properly. We will not allow detergents to be used in streams and springs.
- (14) We will not take away cuttings, seeds and roots of plants if not permitted to do so.

SECTION: XV.16: PRECAUTIONS DURING IMPLEMENTING ECOTOURISM ACTIVITIES:

- (1) Works shall be implemented only after obtaining permission on case to case basis under Forest (Conservation) Act 1980.
- (2) The guidelines of National Tiger Conservation Authority shall be scrupulously followed.
- (3) Efforts shall be made to create awareness among public on conservation and protection of forests and wildlife.
- (4) Directions of Hon'ble Supreme Court and High Court shall be scrupulously followed.

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Pandharkawada Forest Division Map Showing Eco Sensitive Zone Area (T.W.L.S.)



CHAPTER XVI

FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

SECTION: XVI.1: INTRODUCTION:

The forest protection is one of the most important and difficult aspects of forest management. Lot of degradation of forest has already taken place due to increase of human and cattle population. The developmental works required diversion of forest land for cultivation, irrigation projects, industries etc. which resulted in shrinkage of forest area. This situation has created huge gap in demand and supply of forest produce. The forest of Pandharkawada division has tremendous pressure of illicit felling, encroachment, grazing and fire because of excessive biotic pressure of the adjoining villagers and nature of vegetation, climate and social factors. Because of predominance of teak species in forests, the problem of illicit felling and transport of timber is severe in the forests of Parwa, Umari, Pandharkawada, Mukutban and Patanbori ranges. Out of 72 beats, 20 beats are considered hyper sensitive and 15 are sensitive beats and 37 beats are normal. There are 5 saw mills at Pandharkawada, 2 saw mills at Ralegaon, 10 saw mills at Wani and one saw mills each at Wadki, Patanbori and Maregaon.

The forest offenders are agricultural labourers and the intensity of forest offences increases during lean season of agriculture, particularly during July to September when there is no work for agriculture labourers. Offenders indulge in forest offences prior to festival occasions such as Aakhadi, Pola, Dasehra, Diwali etc they resort to illicit felling of teak for easy money for festival celebration. Illegal wood is mostly consumed at Pandharkawada town and other towns like Umri, Wani, Kelapur, Parwa etc. The general modus operandi of disposal of smuggled wood from forests is mainly to carpenters and saw mill owners. The DCF is assisted by 4 ACFs, 6 Territorial RFOs, 17 Round Officers, 72 Forest Guards for protection of forests. They have been provided with 6 vehicles. There are 5 Check Nakas established at strategic points with 24 hours working. In some of the places the forest offenders indulge in offences in groups and it is very much difficult to control them by a Forest Guard.

SECTION: XVI.2: SPECIAL OBJECTIVES OF MANAGEMENT:

- (1) To protect the forests from illicit felling, encroachment, fire and grazing.
- (2) To sensitize local people about forest protection and involve them in preventing forest offences.
- (3) To raise the moral of staff and strengthen their capabilities to deal with illicit Felling, encroachment, poaching etc.
- (4) To develop database to monitor various offence cases.

SECTION: XVI.3: STRATEGY FOR FOREST PROTECTION:

The strategy to be adopted to protect forest is of integrated approach and it shall be applied at various fronts by undertaking collective measures based on situation and time. The strategy shall be direct / field oriented in a participatory manner with active involvement and co-operation of local people specially members of JFM Committees. Total villages in this division are 729 whereas 136 Forest Guards are placed at various places to protect forests. For effective protection there is a need to seek the co operation and involve local people in forest protection. Some of the effective measures are given below.

- (1) Existing forest needs to be well protected and developmental works like soil and moisture conservation measures; natural and artificial regeneration works and other cultural operations shall be carried out in order to increase productivity of forests.
- (2) Regulation of grazing and controlling fire.
- (3) Seeking co-operation and active participation of local people in all operations of forest management and
- (4) Employment generation to local people during lean period.
- (5) Fulfilling the demands of local people for forest produce.
- (6) Effective utilization of existing infrastructure, strengthen and updating infra-structural facilities.
- (7) Improvement in communication facility and mobility of the forest staff.
- (8) Installation of new Check Nakas at hyper sensitive and sensitive points.

- (9) Patrolling sensitive forest areas along with the local people/ JFM Committee members.
- (10) Introducing Rewards, Awards and informer system and making forest offences high risk low gain process.

SECTION: XVI.4: PROTECTION MEASURES:

Before describing different prescription DCF Pandharkawada will prepare a protection plan at the start of new year in January for taking strict protection measures in pursuance of GR dated 8.5.2003. Protection plan will cover following issues.

1. Covering of furniture marts, private depots, small carpenter units etc. and monitoring through monthly returns, surprise checks and also prescribing registration and maintenance of records for such units.
2. Checking weekly markets for prevention of illegal trade of NTFP and wildlife parts and products.
3. Inspection and regular checking of water holes
4. Monitoring the activities of habitual offenders
5. Joint patrolling with JFM committee members and staff of adjoining range, round and beat.
6. Armory and custody at every range headquarters. The personnel who have undergone arms training be provided with regular firing practice facilities with co-ordination of police department.
7. Empowering officers above the rank of RFO with magisterial powers such as grant of custody, remand and for prevention of offences on lines of revenue deptt.
8. Forest allowance to Police Patils in villages adjoining forests organizing Police Patil's meetings at range level.
9. Creation of secret fund for reward to informers, creation of intelligence network etc.
10. Keeping round the clock vigilance in border area through deployment of special protection force comprising of staff, ex-army personnel and laboures at the protection huts constructed at strategic points. Also outsourcing protection work to an independent agency such as security guards may be considered.

11. Inter State joint patrolling and meetings for exchange of information about offenders and more effective co-ordination through Tiger Cell.
12. Mobile phone sets, and easy access of information to Beat Guards, Round Officers, and RFO in sensitive area.
13. A special force comprising Forest Guards be deployed in every village along the state boundary to check the pilferage of illicit material across the border.
14. Owing to the spurt of encroachments with the enforcement of the Scheduled Tribes and Forest Dwellers (Recognition of Forest Rights) Act 2006, the area under encroachment and those susceptible to encroachment need to be dealt with on priority.
15. A legal cell constituted under the control of DCF with the engagement of prosecutor on contract basis on lines of Police Department.
16. In dealing with organized gangs engaged in theft of timber across the border and also in encroachment removal operations a special Task Force comprising of one Police Inspector, two Head Constables, two Constables, two Lady Constables be placed at the disposal of DCF for specific period during the year.

XVI.4.1 Inspection in transit: There are 5 check nakas in Pandharkawada Forest Division under the control of concerned RFO. Whenever on tour RFO should inspect the vehicles which are carrying forest produce, if they find any irregularities they must take prompt action. Illegal transportation of forest produce should be checked by concerned staff as well as RFO Mobile Squad.

XVI.4.2 The DCF shall organize “Nakabandi” at places like Pandharkawada, Parwa, Umri, Pantanbori, Wani, Mukutban at least once in a month and specific duties shall be allotted to RFO and staff at these places for 12 – 24 hours. The results of Nakabandi must be discussed in monthly meeting. Special surprise checking shall be organised on state highways, major district roads and known routes from Jungle to town through RFO Mobile Squad once in month. DCF shall obtain monthly report from RFO Mobile Squad.

XVI.4.3 Collection of intelligence and information:

The RFO/ Round Officers should frequently interact with villagers to collect information regarding illicit felling, encroachment, poaching, illegal grazing etc. through

its intelligence network and keep that information, suggestions in a register in his personal custody. Through the intelligence network, village wise record of habitual offenders must be prepared by RFO in consultation with Beat Guard and Round Officer in the proforma given below and this register must be updated regularly.

Register of habitual offenders

Name & address of the offender	Previous record POR No./Qty/Action taken	Modus – operandi	Photograph if available
1	2	3	4

XVI.4.4 Disposal of petty offence cases: Many forest offences are petty in nature and these can be tried summarily for easy disposal as per the provisions of Indian Forest Act 1927. The petty offence cases had been pending for long time on large scale. These cases should be disposed off by taking special drive.

XVI.4.5 Provision of lock-ups: Some forest offences are of non-bailable nature and for prosecution of offenders it is necessary to provide lock-up cells at every range head quarter. It is prescribed that lock-up cells shall be established at every range head quarter and will be manned with two Forest Guards in three shifts.

XVI.4.6 Creation of legal cell: In order to have speedy disposal of forest offences to file and pursue court cases, a legal cell headed by one Forest Prosecutor may be constituted at Pandharkawada with supporting staff.

XVI.4.7 Rewards: The existing provisions of rewards to subordinate staff for exemplary work in detection and prevention of offence cases need to be reviewed. The reward amount may be enhanced and maximum amount may be granted. It is proposed that the scheme may be extended to gazetted officers also. A secret fund to gather intelligence and information is proposed to setup under the control of DCF.

XVI.4.8 Training : Training to field staff shall be organised by DCF from time to time on the issues of various Acts, preparation of offence cases, tackling assault on staff, framing charge sheets, filing court cases, recording evidence etc. For this purpose help of police officers, ex-army men, advocates, forest officers, NCC officers should be sought to train field staff especially Forest Guards and Round Officers. Three trainings are proposed

in one year for a batch of 25 Forest Guards and 5 Round officers in each batch. Necessary budget provision shall be organised for training.

XVI.4.9 Check Nakas: Presently 5 Check Nakas are established at various strategic points to control the transportation of illicit forest produce. The Check Naka must be duly notified by competent authority and published for the benefit of public as well as law enforcing authorities

List of Check Nakas

Sr. no.	Range	No. of check naka
1	2	3
1	Pandharkawada	1
2	Wani	1
3	Parwa	1
4	Umari	1
5	Patanbori	1

These Check Nakas are manned by Forest Guards and Van majur and they do not have modern system of communication like Walky-Talky or Wireless connection. It is required to strengthen existing Check Nakas with manpower and modern communication system.

XVI.4.10 Patrolling : To control illicit felling regular patrolling is essential in sensitive and hyper sensitive beats where illicit felling takes place. Separate day and night patrolling around the sensitive, highly sensitive areas and on roads leading from jungle to towns shall be carried out. Record or register should be kept in range office regarding patrolling. ACF should supervise this type of patrolling and also he should participate in such patrolling at least once in the month.

XVI.4.11 Mobile Squad : DCF has been provided one Mobile Squad with the staff of Range Forest Officer 1, Forester 1, Forest Guard 4, Forest Labourers 1, Armed Police Constable 1, And Driver 1 along with a Jeep. Mobile Squad RFO with head quarter at Pandharkawada looks after forest protection under the control of the DCF, Pandharkawada Forest Division. The DCF should closely monitor the work of mobile squad and should obtain weekly reports to monitor the protection activities.

XVI.4.12 Inspection of area of illicit felling: The following time schedule has been prescribed for inspection of illicit felling area by the concerned officers vide Government Circular dated 8/5/2003.

In situ value of illicit cutting at a place	Designation of inspecting officer	Period within which inspection should be completed
Up to Rs.50,000	RFO	3 days from detection/ receipt of intimation of detection
Above Rs. 50,000 but not exceeding Rs. 2,00,000	ACF	3 days from the receipt of information
Above Rs. 2,00,000 but not exceeding Rs. 5,00,000	DCF	3 days from the receipt of information
Above Rs. 5,00,000	CF	7 days from the receipt of information

XVI.4.13: The Government vide its letter No. TRS-1082/36/F-6, Dt. 8th September 1982 directed the department to launch the offence cases above Rs. 2,000/- in court of law for prosecution unless the prosecution is difficult to succeed.

XVI.4.14: Wireless network: Presently there is no wireless network in this division. In the present day society type of communication has become easy and faster and the offenders making use of modern communication systems like mobile phones in committing forest offences and transporting forest produce. Cellular phones were provided to 1 DCF, 3 ACF, 10 RFO's 1 Chief Accountant and 1 Forest Guard. However the cellular phones may be provided to the entire staff for effective protection of the forests.

XVI.4.15: Mobility of staff: In Pandharkawada Forest Division Government vehicles 3 Tata sumo, 1 jeep, and 2 gypsy are provided to DCF, ACF and RFO mobile squad. With the existing road network by using modern speedy vehicles, the forest offenders easily transport the illicit material. Some of the territorial RFOs have been provided with vehicles seized in offence cases. It is necessary to provide jeeps to the territorial RFOs for effective forest protection.

The distribution of vehicles is as under

Sr. no.	To whom the vehicle is allotted	No. of vehicles
1	DCF	Tata - Sumo - 1
2	RFO, Mobile Squad 1 and 2 ,Pandharkawada	Sumo -1, Gypsy -1
3	ACF (Forest)	Marshal - 1
4	ACF (FLCS)	Tata sumo - 1
5	ACF (Tendu) Wani	Gypsy – 1

XVI.4.16: Provision of Arms: Some times offenders use modern weapons like fire arms in committing forest offences. For forest staff without modern weapons, it is difficult to prevent those offenders from committing forest offences. With a view to providing weapons to the forest staff the Government sanctioned pistols and five rifles to the staff for forest protection and for self protection in the division. The fire arms provided to the staff members are not sufficient to deal with the offenders and the fire arms may be provided even to the lower rank staff those who involve in forest protection.

A) Pistols – In Pandharkawada division 9 Pistols are provided. The forest officers are trained in handling weapons.

B) The 5 rifles are given for forest protection to trained Forest Guards (FG),

XVI.4.17: Territorial Inspections:

1. Beat checking :- In order to have stringent protection of forest it is necessary that the protective staff required to carry out patrolling in their respective jurisdictions and the officers concern will exercise effective supervision and control at all levels. It is utmost necessary to report every forest offence promptly as per directions given in the standing order 37, chapter 9. The instructions issued for the guidance and strict compliance with a view to take effective measures in relation to efficient forest protection as given below.

- i. **Beat Guard :-** Every Beat Guard must carry out patrolling in his beat regularly. After thorough, inspection of entire forest area of his jurisdiction of every fortnight and issue POR for all the damages detected in his beat within the 1st instant.
- ii. **Round Officer :-** The Round Officer of a round is required to inspect each beat at least once in 3 months and he should verify and enumerate

the damage not reported by the concern Beat Guard . His report must reach to the Dy. Conservator of Forests through Range Forest Officer after thorough inspection.

- iii. **Range Officer :-** The primary responsibility of the Range Forest Officer is to verify whether the Round officer and Forest Guard are carrying proper patrolling of the forests of their jurisdiction or not. He should inspect a specific portion covering at least 1/4th of the area of the Beat once in 6 months and the findings are required to be submitted to Dy. Conservator of Forests and Conservator of Forests punctually. In case of the quantum of illicit felling is more the Range Forest Officer will take appropriate measures to inspect Beat thoroughly.
- iv. **Supervisory Officer :-** The supervisory officer while on tours will inspect the specific areas of illicit felling. It is prescribed that the supervisory officer must spend one day for inspection of such vulnerable area within 15 days.

The forest offences shall be reviewed regularly at various levels regarding the nature of offence, quantum of offence, whether the case is compoundable or required to launch in court of law, etc.

While dealing forest offences the offences not only booked under the provisions of Indian Forest Act 1927, Wild Life (Protection) Act 1972, Forest Conservation Act 1980 but also these cases shall be dealt in content in IPC, CRPC, etc for effectiveness of the case.

2. Transit rules for Forest Produce :- The regulation of transportation of forest produce under Bombay Transit of Forest Rules 1960 published by the Agriculture and Forest Department under No. IFA-1057/22947-(VI), Dt. 23rd April 1960. The Government of Maharashtra vide its notification no. 1083/91822/(II)/CR 87/F-6, Dt. May 30th 1995 has amended Section 61 of Indian Forest Act 1927 making the law more stringent. Under this amendment some of the Assistant Conservator of Forests and above have been designated as Authorised officers for the purpose of this act who are competent to confiscate the

vehicles, instruments, forest produces, etc. involve in forest offences related to the illicit removal of notified forest produce.

The provisions of Government vide letter no. TRS-1089/PK-27/89/F-6, Dt. May 14th 1990 stated that the transit pass shall be issued within 45 days from submission of application.

XVI.4.18: PRESCRIPTION FOR PROTECTION : For effective protection of forest the following prescriptions are made.

- (1) Review the offence cases beat wise, every month. Review the *varas*, *bevaras* offence cases monthly, efforts shall be made to find out the offenders in each *bevaras* case.
- (2) Every *varas* case having more than Rs.10,000 worth forest produce/loss to the forest is invariably submitted to the court within the prescribed time. Delay in the submission of charge sheets in the courts is viewed seriously.
- (3) Use IPC provisions for the effective control of the illicit felling.
- (4) The data related to offence cases shall be analyzed with the help of computers using available software.
- (5) Monitor the occurrence of all the offence cases daily through wireless.
- (6) Identify and list all the paths used for the transportation of illicit material.
- (7) Place effective patrolling squad at all important routes to prevent the transportation of illicit material.
- (8) Emphasis shall be made to arrest and prosecute the offenders rather than seizing the material.
- (9) Plan in such a way to have young guards in the hyper sensitive areas.
- (10) History sheets of all the offenders along with their photo and bio-data are maintained at Round, Range and Division level.
- (11) Prepare list of offenders, showing the offence cases involved by him, against each offender.
- (12) Use Cr. P.C. 110 provisions with respect to habitual offenders.

- (13) Provisions of IPC 395 shall be used by registering the complaint in the police station for the offences wherein five or more than five offenders are involved. The DCF shall co-ordinate with the Superintendent of Police to see that stringent sections of IPC will be used in the F.I.R.
- (14) Every beat guard shall maintain a register of stumps in the following proformae. Every stump is registered by a serial number followed by and year, for example, if tree number is 129/08. Here 129 is tree number and 08 - is year. Every year from January 1st, onwards start the new series. After one year all the high stumps be dressed to ground level to obtain good coppice. 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.
- (15) Every range and division office shall maintain the Xerox copies of the judgement of all forest cases for the guidance and improvement purposes.
- (16) Court Guard duties be assigned to a special duty FG for each Range Office and as well as Division office to monitor the dates and for timely communication to the witnesses.
- (17) The RFO shall collect the beat *khairiyat* report from each Forest Guard and Round Officer monthly and shall submit Range *khairiyat* report to the DCF every month and DCF should monitor the report for constant vigilance.

SECTION: XVI.5: FIRE PROTECTION:

XVI.5.1 The areas of Pandharkawada Forest Division are prone to repeated fires due to heavy biotic pressure and due to deciduous nature and the dry climate. Fire caused extensive damage to the forest specially regeneration, forest growth, ground flora, soil organisms and the soil productivity. Prevention of fires and effective control of fires as prescribed in the plan is essential for forest development. The leaf litter on the ground and highly combustible under growth of grasses etc. catch fire and spread instantly. In summer high speed of winds spread fire easily before it could be brought under control. The areas needed to be protected from fire are classified into the following categories based on purpose of fire protection.

XVI.5.2 Class I : Forest completely protected this area includes.

- i. All main felling coupes, thinning coupes, all the forest area under Protection WC, Afforestation WC and Improvement WC and Fodder Improvement WC.
- ii. All regenerated coupes of all WC till the young crop has attained the age of 10 years.
- iii. All plantations.
- iv. All forest nurseries
- v. All government timber depots
- vi. Special habitat areas of any other special important areas as specified by the concerned circle in charge.
- vii. These areas are cleared with appropriate width of fire line as per the guide lines and patrolled by fire watchers. If any fire incidence takes place in this area is treated as calamity and should be reported to the concerned DCF in detail.

XVI.5.3: Class II (General fire protection):

- i. The remaining areas of SCI WC.
- ii. All the other areas as specially directed by the CCF(T) of Yavatmal Circle on special grounds.
- iii. These areas are separated from surrounding areas by means of external fire lines and will be divided into suitable blocks with interior fire lines and no trees shall be cut. Fire watchers may be engaged as sanctioned by the concerned circle in charge.

XVI.5.4 Class III (forests Protected by law only): Those categories which are not included in class I and II are included in this class. Generally deliberate burning is prohibited and no special measures of fire protection will be undertaken. The following categories of fire lines will be maintained, kept clean of all growth and combustible material.

- i. All external boundaries of reserved forests to the extent of width of 12 meters.
- ii. 6 meter width around all the plantations up to 10th year from planting.

- iii. 3 meter wide coupe lines up to 10 years of main felling.
- iv. 6 meter wide lines on both sides all along the roads and car tracts that are passing through forests.
- v. 40 meter wide fire lines around timber and fuel wood depots.

To control and reduce fire the following operations shall be undertaken.

- (1) The cutting and cleaning of fire lines shall be completed by end of December and controlled burning shall be completed by the end of February.
- (2) Leaf litter on the fire lines shall be collected from time to time and burn before the fire season starts.
- (3) No fire line shall be burnt after February unless there is a special order from the concerned DCF.

XVI.5.5: Fire control measures :

- (1) A consolidated fire protection scheme shall be prepared as per the prescriptions of WP with the provisions of watch point, strategic location, fire watchers, deployment of vehicles and the supervisory staff.
- (2) The fire watchers and the forest staff are required to be given training in fire protection and handling of fire fighting tools.
- (3) The fire watchers shall constantly patrol the areas of class -I and class- II.
- (4) The fire watching towers shall be erected at strategic points where the fire watchers sit on towers and observe location of fire.
- (5) After receiving information the fire watchers move in group to particular location and extinguish fire with the help of fire fighting tools.
- (6) The office of DCF shall maintain a register of fire lines showing length and width of fire lines, the period of cutting & burning and a consolidated map shall be prepared based on the actual position of fire lines. Any negligence in fire protection duty shall be viewed as dereliction of duty and the supervisory officer must extensively tour in the area and verify the fire control measures.
- (7) The members of JFM committees shall be involved in the fire protection.

(8) The vehicles that are available will be deployed at strategic locations where the fire protection gangs can reach easily.

XVI.5.6: Responsibility of officers in fire protection:

The Range Forest Officer is personally responsible for efficient fire protection in his range. If there is a common boundary between 2 ranges, the responsibility of clearing fire line will be decided by the DCF. In case of common boundary between 2 divisions, the fire line cutting and maintenance will be decided by the CCF (T), Yavatmal Circle. The DCF is personally responsible for carrying out efficiently all protective measures. The DCF must satisfy himself that external fire lines and other fire lines are prepared before February by carrying out extensive tours in the area. He is required to move in the jurisdiction extensively

During fire season and during his tour, must keep a strict watch on fire protection by means of interaction with local people and inspections. A constant watch should be kept on Tendu contractors and their agents who engage local labourers to put fire to forests to get good flush of Tendu leaves.

XVI.5.7 Fire reports:

If any fire incidence takes place the concerned RFO must inform DCF, Pandharkawada at once. RFO must keep a proper communication and co-ordination with the DCF, Pandharkawada. After fire is extinguished, RFO shall submit a detailed report to DCF, Pandharkawada on extent of area damaged, value of damage with detailed map within 15 days. The DCF, Pandharkawada shall submit monthly return in prescribed proforma (no. IX-74) to the CCF (T), Yavatmal Circle showing serial number of fire, date of occurrence, cause, area burnt, extent of damage and the steps taken to extinguish fire. A register of fire record shall be maintained by DCF, Pandharkawada giving details of length of fire line of Class I, II and III. The fire incidents that take place in class I, II, III areas shall be indicated with different marks on map. Deliberate burning of debris on silvicultural principles to encourage regeneration need not be included in fire protection scheme and fire should not spread outside the targeted area.

SECTION: XVI.6: GRAZING CONTROL:

Grazing causes lot of damage to regeneration due to trampling. To control grazing, 23 grazing units were formed in the division. The number of cattle heads per each unit was fixed as per the carrying capacity of the area. The incidence of grazing is high in and around the forest areas where the villages are situated and the impact of grazing, illicit felling, fire encroachment is also tremendous around the villages. Therefore the forest area around villages are deprived of regeneration. In many places especially areas around villages, the ground story is completely missing. Number of various offence cases is given in the following table.

Statement showing number of offence cases registered

Sr. no.	No. of offences registered								
	Year	Illicit felling	Encroachment	Grazing	Illegal transport	Fire	wildlife	Others	Total
1	2005-2006	792	4	7	2	11	1	10	829
2	2006-2007	630	7	26	9	18	1	20	705
3	2007-2008	617	7	4	6	22	1	19	675
4	2008-2009	536	166	3	3	03	1	39	780
5	2009-2010	820	12	12	10	01	15	6	878

Two major menaces like fire and grazing hamper the success of regeneration of forests to a great extent. The 'C' class Reserve Forests are excessively grazed, therefore these forests are mostly open or scrub type. There are 23 grazing units in the division. The Government of Maharashtra formulated the grazing policy vide its resolution no. MFP-1365/1322-Y, Dt. 6/12/1968 and the grazing rules were framed vide its G.R. no. MFP/137/237035-Z, Dt. 3/11/1973. Grazing shall be allowed as per the carrying capacity of each class of forests.

SECTION:XVI.7: ENCROACHMENT:

The problem of encroachment is common in almost all the areas specially the forest areas located adjoining human habitations. The problem of encroachment is mainly because of lack of survey and demarcation on the ground, the greed of people and apathy of local people towards government lands. Small isolated patches forestland are often neglected and become vulnerable to encroachment. In order to mitigate the problem, it is essential to take up survey and demarcation works on top priority. Precast pillars of 1st and

2nd class type shall be erected after the survey is over which can be completed in a phased manner. The existing cairns shall be repaired and maintained under 1/5th boundary demarcation scheme. The powers vested in the officers of ACF and above rank under Section 53 and 54 of Land Revenue Code shall be effectively utilized. The encroachment if any can be tried summarily and evicted as early as possible. The following instructions shall be followed regarding encroachments.

(1) Special care shall be taken to ensure protection of such patches from encroachment. The civil powers of eviction are entrusted to ACF and DCF. The procedure laid out in the Land Revenue Code shall be followed before the execution of eviction. Habitual encroachers shall be prosecuted as per Indian Forest Act.

(2) All external boundaries shall be demarcated with concrete pillars. All sensitive and important boundaries and wherever disputes are there, be surveyed and concrete pillars be laid immediately.

(3) All encroachments shall be listed with their names, age, residence, profession whether belongs to SC, ST, OBC/NT, extent of encroachment, s.no. and location of encroachment, village/block.

(4) A detailed report of the case be prepared for each encroacher and submitted to ACF to obtain summary eviction orders in a time bound programme.

(5) After the completion of due procedure of Land Revenue Code and after giving a reasonable opportunity of being heard to the encroacher, ACF shall pass a summary eviction order if he satisfies so quoting the findings.

(6) The concerned RFO shall execute the eviction order.

(7) If the encroachments in a village are more in number, police protection be obtained for the operation. Use of Cr. P.C. provisions like section 106 and 110 be used to smoothen the eviction operations as well as to prevent the tendency of future encroachments.

(8) For the encroachments on the un-classed forests (though 7/12 shows clear possession of the department) FIR shall be lodged in the concerned police station for the prosecution.

(9) To prevent the tendency of encroachments, improved crop techniques be propagated in the problem villages to enhance the crop productivity with the help of Agricultural Department.

(10) Regularisation of the encroachments made earlier to 1980 be settled as early as possible and necessary proposals be submitted to Government.

(11) After the listing of all encroachments, sample verification shall be carried out by all supervisory officers to detect unregistered encroachments.

(12) 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.

(13) Keep a watch on all the sites meant for debris cleaning, plugging etc., in the month of May, so that encroachments are removed even before the sowings.

In the recent past the tendency for encroaching forest land for cultivation increased the actual encroached area is higher than that of recorded one. The eligible encroacher's encroachment is under enquiry by the District Magistrate Committee in relation to regulation of the Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 (STOTFDRR Act 2006) and Act 2008. The causes of forest encroachments shall be examined thoroughly and corrective measures be taken. All necessary support should be extended to evict the encroachments as early as possible. The boundary management and standard administrative guidelines will help to control the encroachment. RFO must inspect at least 50% of the boundary demarcation, ACF at least 10% of the boundary demarcation, DCF at least 2% of the boundary demarcation. RFO Mobile Squad shall check 2 % of the boundary demarcation.

XVI.7.1. Boundary Maintenance:

Hundreds of patches of forests are spread over the entire division. To manage such areas effectively, survey of areas was proposed in R.S.Yadav's WP. The Survey of area and boundary demarcation of outer boundaries has been done. Precast reinforced cement concrete pillars have been fixed. Even though the said work has been done on priority basis it has come to notice that in most of the places the RCC pillars were destroyed for the purpose of stealing mild steel bars by unknown persons, as every pillar constructed cannot be rendered protection in the forest for all the time. Also due to difficulties in execution of this work in remote places and keeping control on the quality & quantity the purpose of the scheme has been defeated in most of the places.

It is therefore recommended that demarcation of such areas by digging TCM around the area in a phased manner be included in this WP under revision and old system of cairns be enforced strictly. It is necessary to take up the work of updating maps, updating entries in 7/12 record of rights, tallying the area by checking village maps, forests notifications, form 1 A of village patwari/Talathi etc. shall be taken up. DCF shall take up monthly review of progress of these works. All the maps must be updated and supplied for better management. The update maps shall be provided to WPO. The damaged old loose stone cairns should be repaired and wherever necessary new cairns be made and provision for the same be made in WP. Maintenance programme of 1/5 boundary maintenance should continue as per the old practice of cutting of demarcation line 12 m wide and erection of loose boulder cairns

SECTION: XVI.8: ROLE OF JOINT FOREST MANAGEMENT:

JFM committee will contribute to a large extent in protection of the forest from illicit felling, encroachment fire, grazing, etc provided if the forest staff has a constant dialogue with the JFM committees and involve them for joint patrolling, management and development of the forests. The JFM committees shall be entrusted with specific area earmarked for the protection, management and development of the area. The JFM committee members need to be given training in technical matters of protection at the same time they should be provided with gainful employment by taking up management and developmental activities. In the areas entrusted to them.

There is also tiger cell at district level to monitor and control wildlife offences.

SECTION: XVI.9: POACHING:

A programme for of checking of weekly bazar be chalked out to control the sale of titer, biter and servoline in during festival season like Pola, Holi, particularly tribal community resort to hunting of wild animals and appropriate measures should be taken under Wildlife Protection Act 1972.

SECTION: XVI.11: CONTROL OF UNAUTHORISED COLLECTION OF NWFP:

In this division a number of NWFP is available, out of these Tendu, Moha, Gums and Behada etc. are available in large quantity. To control unauthorised collection of NWFP apart from the patrolling in forests checking should be organized by RFO in some marketing places like weekly bazar and monitor by DCF.

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CHAPTER XVII

BIODIVERSITY

SECTION: XVII.1 Biodiversity of Pandharkawada Forest Division:

XVII.1.1::STATUS OF BIODIVERSITY: Pandharkawada forest division is situated in biodiversity rich part of central India. Extreme seasonal variations, diverse topographical characters, thick forest with good canopies and various small and large sized dams of annual and perennial type creates diverse habitat for floral and faunal communities. Therefore different kinds of plants, animals including varieties of zooplanktonic and phytoplanktonic species harbor in this forest division. Representative big cat species of Vidarbha are also found in this forest division. Primitive tribes like Kolam and Gond are sharing common habitat with wildlife of this area as these tribal communities resides adjacent to the forest, it creates tremendous biotic pressure from both the sides resulted in to man animal conflict frequently as poaching is a part of the culture of these tribes . Increasing encroachment is another problem to be addressed.

This forest division is very rich in floral diversity pertaining to this area. The forest type is 'Southern Tropical Dry Deciduous Forests' and it is grouped as 5A/Cia under revised classification of the forests by Champion and Seth. It serves as a living reparatory of various economical, medicinal, aromatic and ornamental plant species. Due to the hilly Terrance, water bodies, grasslands, open lands different plant species from phytoplanktons to mosses to timbers and medicinal plants listed are found with some endemic species.

This is very good habitat of various chordate species like Chital, Nilgai, Black buck, Leopards, Civets, Hyena, Tiger, Jackal, Wolf, Porcupine, Deers and Beers, such more than 30 species of mammal including schedule I species like Tigers, Wolf, Panther, Sloth bear, Black buck, four horned Antelope are found with varieties of residential and migratory bird species harbors in this forest area, more than 210 species of birds including 20 species of migratory status. Some species amongst them are found to be threatened according to the IUCN list. Great diversity of Raptors is the characteristic feature of this forest land.

Varieties of amphibian, reptilian and Piscean species listed below are found in this area. fish is an important tropic level of the aquatic ecosystem and there is threat on local fish fauna because of uncontrolled, un-scientific ways of fishing, takes place on some important water bodies resulted in to the threatful conditions in the distribution of large no of invertebrates, amphibian, reptilian species in general and avian species in special that it affecting distribution of local and migratory species of birds as lot amongst them are in endangered categories.

Kinds of invertebrates from zooplanktons varieties of butterflies, moths, beetles, odonates, crabs, prawns, spiders, shells are found in this forest division. It is very essential to make inventory of the floral and faunal diversity of this rich and diverse habitat as no scientific study has been undertaken. To highlight the loss of habitat and to conserve genetic diversity of this scientific interventions are the need of the time.

XVII.1.1::LEGAL ENACTMENT :

In view of above consideration, the Biological Diversity Act, 2002 has been enacted to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits. In pursuance of Biological Diversity Act, 2002, Biological Diversity Rule 2004 framed and came into force into 15th April 2004. The Act provides for statutory bodies like National Biodiversity Authority at the National level and State Biodiversity Boards at State levels, to regulate access to biological diversity. Maharashtra Biological Diversity rules 2008 was notified under section 63(1) of Biological Diversity Act 2002 on 10th December 2008. Government of Maharashtra vide their notification dated 2.1.2012 has created Maharashtra State Biological Diversity Board Under the provision of Rule no. 23 of Maharashtra Biological Diversity rules 2008, District level, Taluka level & village level Biodiversity should be formed. District level committee has been formed on 5th July 2012 at Yavatmal who's members are as follows :-

1. Mr. Ashwini Mudgal, I.A.S. District Collector Yavatmal – President
2. Mr. Naval Kishor Ram, Chief executive Officer Z.P., Yavatmal – member
3. Mr. G.K. Ranchkuntwar, District health Officer, Yavatmal- member

4. President, Agriculture & animal husbandary committee, Z. P.Yavatmal – member
5. Mr. DattaKulkarni, Ward member, Nagar Parishad, Yavatmal- Member
6. Ku. SarikaSahebraoButle, Micro biologist, Yavatmal – member
7. Dr. Anil loya, Drugs & chemist society – member
8. Dr. Anil Joshi, Aurvedic society – member
9. Mr. JayantAtre, Ornithologist – member
10. Mr. A.G. Sarode, Asstt. Commissioner, fishiries business, Yavatmal – member
11. Executive Engineer, Irrigation Dept. ZilhaparishadYavatmal – member
12. Dy. Director, social forestry division, Yavatmal- member
13. District superintendent, Agriculture Officer, Yavatmal - member

At every local level, every local body shall constitute a Biodiversity Management committee within its area of jurisdiction.

Function of the Committee:-

- The main function of BMC is to prepare people biodiversity register in consultation with local people. The register shall contain comprehensive information on availability and knowledge of local biological resources, their medicinal or ma other use or may other traditional knowledge associated with them.
- The other functions of the BMC are to advice on any matter referred to it by the State Biodiversity Board or Authority for granting approval, to maintain data about the local **Vaidus** and practitioners using the biological resources.
- The Authority shall take steps to specify the form of the people's Biodiversity Registers, and the particulars it shall contain and the format for electronic database.
- The Authority and the state Biodiversity Boards shall provide guidance and technical support to the Biodiversity Management Committees for preparing Peoples Biodiversity Registers.

- The People's Biodiversity Registers shall be maintained and validated by the Biodiversity Management Committees.
- The committee shall also maintain a Register giving information about the details of the access to biological resources and traditional knowledge granted, details of the collection fee imposed and details of the benefits derived and the mode of their sharing.

It is learned that at Taluka level & village level biodiversity Management Committee yet to be formed in Pandharkawada forest division. Taking into consideration the ecological value and biological diversity of the landscape in the Pandharkawada Forest Division and also the challenges faced by it, constitution of local level Biodiversity Management Committees need to be done at the earliest.

The Faunal Diversity of Pandharkawada Forest Division is given in Vol – II of Appendix no LXIII

CHAPTER XVIII

FOREST RIGHTS

SECTION: XVIII. The Scheduled Tribes and other Traditional forest dwellers (recognition of forest rights) Act, 2006 :

1.00 The Scheduled Tribes and other Traditional forest dwellers (recognition of forest rights) Act, 2006 is enacted on 29.12.2006 & pursuance of this The Govt. of India Ministry of Tribal welfare Notification dated 1.1.2008 to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded. This act provides for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land.

2.00 For the purpose of this act, the following rights which secure individual or community tenure or both shall be the forest rights of forest dwelling Scheduled Tribes and other traditional forest dwellers on all forest lands. This includes....

- a) Right to hold and live in the forest land under the individual or common occupation for habitation or for self cultivation for their lively hood.
- b) Community rights.
- c) Right to ownership, access to collect, use and dispose of minor forest produce.
- d) Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers.
- e) Not with standing anything contained in the Forest (Conservation) Act-1980, the Central Government shall provide for diversion of forest land for school, hospital, anganwadi, fair price shop, electric and telecommunication lines, tanks, drinking water supply, minor irrigation projects, canals, roads and community centres etc. provided that the land should be less than one hectare in each case and which do not involve felling of trees exceeding seventy five trees per hectare.

3.00 The recognition and vesting of rights under this Act shall be subject to the condition that such Scheduled Tribes or Tribal Communities or other traditional forest dwellers had occupied forest land before the 13th of December 2005.

4.00 The right conferred shall be heritable but not alienable or transferable.

5.00 The forest rights recognized and vested in respect of land which shall be under the occupation of an individual or family or community on the date of commencement of this act i.e. 31/12/2007 and shall be restricted to the area under actual occupation and shall in no case exceed than an area of four hectares.

6.00 The holders of forest rights, Gram Sabha and village level institution in area are bound to protect wildlife, forest and biodiversity, adjoining catchment area, water resources and other ecological sensitive areas as well.

7.00 Status of individual rights:- In all 1338 claims were received at village committee level and 1199 claims were forwarded to the Sub Divisional Officer level committee. District level committee received 190 claims, out of which 165 claims pertaining to 522.38 ha of forest land were accepted.

8.0 Status of Community rights:- No any claim of community right has been accepted so far. There were 41 claims at received at the level of Sub Divisional Officer (Revenue)Wani. They were rejected for want of proof.

9.00 Status of claims for forest land for common facilities :- Three such claims are received in Kelapur taluka. These are to be decided.

CHAPTER XIX

MISCELLANEOUS REGULATIONS

SECTION: XIX.1: DEMARCATION AND MARKING TECHNIQUES:

XIX.1.1: Coupe demarcation & treatment map:

The coupes due for felling shall be demarcated one year in advance of its due year. But for coupe no. I demarcation, marking and main operation of felling will be carried out in the first year of operation of WP.

The coupes due for felling will be demarcated by cutting and clearing the bushy under growth with a 3 meter width of line. Pillars of 2 meter height will be erected in the middle of the line at suitable intervals (one pillar should be visible from the other) except where the coupe boundary coincides with a permanent feature like a big nala, fire line or road. the pillars will bear coupe details like coupe number, name of felling series, compartment number, year and working circle on the side away from the coupe area. The boundary trees of coupes will be given 2 coal tar bands and Geru band in between after scraping dead bark. The lower coal tar band shall be at breast height while upper coal tar band will be 15 cm above it. These trees so selected shall be above 45 cm. girth and selected at suitable intervals. These trees will be numbered serially and numbered to be at just below lower coal tar band and the numbers will be entered in the marking register in the following form.

Table

Sr. no.	Species	GBH	Remarks
1	2	3	4

After demarcation having been certified by the RFO, stock map and treatment map shall be prepared by the RFO concerned as per the prescriptions and it should be verified by ACF.

After the coupe is demarcated coupe demarcation certificate shall be furnished by concerned RFO in the following format.

F O R M A T

I, -----, RFO, -----range-----certify that I have personally inspected the demarcation of coupe no. -----in compartment no ----
-----of ----- FS ----- WC on ----- (date)-----
and have prepared the treatment map as per the prescriptions of the working plan for Pandharkawada Forest Division.

The area of the coupe is ----- ha.

Place -----

Date-----

Signature

(-----)

(Range Forest Officer-----

-----Range)

Place

Verified

Date-----

(-----)

Assistant Conservator of Forests,-----)

XIX.1.2: Demarcation of Sections:

(1) For the effective management of coupes each coupe shall be divided into 4 sections having an equal area approximately. The section line shall have 1.5 m width line and the lines are prepared by cutting and clearing brush wood except when the section line coincides with permanent features. In each section A,B,C & D type area should be mentioned grid wise in treatment map.

(2) The trees above 45 gbh selected at suitable intervals and the inner edge of 1.5 m wide cleared section line will be given 2 coal tar bands 15 cm apart, the lower one being at the breast height just below lower coal tar band. Section number will be given on the side away from the area of coupe.

XIX.1.3: Demarcation of protection area: On the periphery of protection area trees shall be selected and given 2 geru bands, 15 cm apart and lower band at breast height. Apart from this a cross (X) in geru colour between 2 bands will be given on the opposite side of protection area. All these trees shall be serially numbered and the number will be given below the lower geru band on the side bearing the cross. All protection area will be numbered in Roman numerals and standing trees on the periphery of each protection area shall be numbered. Identification with separated series in each area so that the periphery trees of each protection area will be a separate series of Roman numerals. The periphery trees marked with number should not be felled.

Table

Sr. no.	Species	Girth at bh(ob) in cms	Remarks
1	2	3	4
1/1	Ain		Not to be felled
11/1	Dhawada		Not to be felled
111/1	Teak		Not to be felled

XIX.1.4: Treatment map and dividing coupe into grids:

(1) Treatment map of coupe will be prepared on graph paper in 1:5000 scale. Laying of grids in A,B, C and D type areas shall be done after classifying coupe area into various treatment types. In B1 area grids of 1 ha size shall be laid. In B2 area, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid down.

(2) Grid wise record of enumeration, marking and felling shall be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoots etc will be recorded. Grid wise record of operations mentioned under natural regeneration e.g. tending, root stock management, singling of coppice, weeding etc shall be maintained.

(3) An expenditure of 1 MD per hectare shall be sanctioned for laying of 100 m x 100 m grids, wherever no specific provision is made for this purpose.

(4) The coupe area shall be classified into A- protection area; B- under-stocked area; C- old plantations & pole crops and D- well stocked type area. These details shall be shown in treatment map.

XIX.1.5.1: Marking Technique:

- (1) All the trees to be marked for felling shall be given a geru band at breast height and on base, the impression of marking hammer shall be put at the breast height as well as at the bottom by making a clear blaze of size 10 cm X 10 cm.
- (2) The following trees shall bear a digit serial number of both breast height and base. A) All trees of teak, bija, sisam, ain, tiwas, haldu, dhawada and shivan of 45 cms and above in girth at breast height over bark. B) Trees of all other species of 60 cm and above girth at breast height.
- (3) Trees marked below 45 cm gbh (ob) of species Teak, Bija, Sisam, Ain, Tiwas, Haldu and shivan, and other remaining miscellaneous species below 60 cm gbh(ob) will bear serial number which will be given in coal tar. The digital and coal tar numbers will form a separate series. Only malformed trees will be recorded as fuel trees except that of teak and a tree shall be categorised as fuel tree, when it is not capable of yielding any sawn timber or poles.
- (4) Trees showing the coupe boundary demarcation shall not be marked for felling.
- (5) All the trees bearing serial number shall be duly recorded in marking register with the following details.

Sr.no.		Species	Girth at breast height (ob) in cms	Remarks
Digital	Coal Tar			

- (6) The abstract of trees marked for selection felling and improvement felling shall be given in 15 cm girth classes. Timber, poles and fuel wood trees will be shown separately. The marking number on the trees will be put in vertical direction as shown below.

2

For example tree no. 245 ---> 4

5

XIX.1.5.2: Marking Rules:

Marking shall be carried out by the RFO under the close supervision of ACF. DCF shall personally inspect at least 30% area of the coupe and give guidance to ensure prefer marking and avoid deviation of prescriptions. All climbers shall be cut in entire coupe.

Species included in Red Data Book of BSI and other endangered, threatened and vulnerable species shall not be cut. The following marking rules shall be followed.

XIX.14.1. Category A Protection area:

No felling is permitted in this area.

XIX.14.2 Category B Under stocked area:

- (1) All dead trees retaining 2 dead trees per ha shall be marked for felling.
- (2) All live high stumps shall be marked for felling and they should be cut close to the ground and it shall be properly dressed. Fruit trees, NTFP species shall not be cut.
- (3) Multiple coppice shoots and poles shall be reduced to one per stool retaining the most vigorous one.

XIX.14.3: Category C pole crop and old plantation area:

- (1) In pole crop young poles shall be marked for felling to remove congestion. The spacement between two adjacent poles shall be approximately $1/3^{\text{rd}}$ of the height of the pole crop.
- (2) The dead diseased and malformed trees of timber species shall be marked for felling fruit trees shall not be marked for felling.
- (3) The multiple coppice shoots will be cut retaining one vigorous shoot.
- (4) Thinning in old plantation shall be carried out as per the instructions given in section **XIX.6.3** of this chapter.

XIX.14.4: Category D Well stocked area:

- (1) Trees of miscellaneous species including fruit species and NWFP shall not be marked for felling.
- (2) Multiple coppice shoots of teak shall be marked for felling retaining the most promising one.
- (3) All dead, malformed trees shall be marked for felling, leaving 2 dead trees per ha for conservation of wildlife. A tree considered to be malformed if it does not have a straight clear bole exceeding 2.5 m height from ground level with defective stem occupying more space than its future value warrant. To avoid reckless felling malformed tree having straight clear bole exceeding 2.5 meter height from the ground level should not be marked for felling.
- (4) Teak trees of coppice origin preventing growth of the seedling regeneration of desire species, shall be marked first for felling.

- (5) The silviculturally available teak trees with prescribed harvestable girth have to be marked for felling. A tree is considered as silviculturally available when (a) Removal will not lead to soil erosion; (b) Removal shall create appropriate gap for growth of young seedlings of desired species; (c) Alternate trees for seed source shall be available. d) Does not create a permanent gap in the canopy. A gap of more than 6 meter diameter is considered as permanent gap. e) Tends to improve the remaining crop terms of volume production.
- (6) Healthy teak trees which are good seed bearers shall be retained.
- (7) Trees shall not be marked for felling within 30 m on both side of large nala
- (8) During marking for felling, details shall be maintained for coppice and seed origin teak trees separately.
- (9) Plus trees of teak and other species shall be identified during enumeration and they should not be marked for felling.
- (10) All live high stumps of teak shall be marked for felling
- (11) There shall not be felling within the radius of 300 m of sites of historical importance and ecotourism sites situated in forests.
- (12) only estimated harvestable girth teak trees preferably of coppice origin and that of harvestable girth and above will be marked for felling.
- (13) Felling of teak tree shall be from the highest girth class to the next lower girth class.

SECTION: XIX.2: HARVESTING AND DISPOSAL OF FOREST PRODUCE:

XIX.2.1: Regulation of yield: Considering the old volume conversion table for teak trees average yield per ha. has been calculated to formulate the yield. But volume conversion factor varies from site to site. Therefore it is recommended that local volume conversion table for each range may be prepare and consider such volume conversion factor while estimating yield.

XIX.2.2: Timber and fire wood: All the marked coupes of main felling will be worked departmentally or allotted to FLCS as per the policy of Government. However, tending operations like thinning shall be carried out only through department as it is highly technical. All the timber and firewood shall be transported to government depot or duly sanctioned depots by the competent authority for sale or auction. Timber, poles and fire

wood to be given to people on Nistar at concessional rate shall be kept separately in these depots, and dispose off as per the Government guidelines.

The demand of timber wood and firewood of the villager shall meet on priority at local level. It may contribute reducing illicit felling to some extent.

XIX.2.3: Tendu leaves: Prescriptions for pruning coppicing, regeneration given in NWFP WC shall be followed.

XIX.2.4: Grasses: The instructions contained in G.R.No.MFP-1169/118931- (6) - F-2, Dt. 29/10/1976 will facilitate the disposal of grass available in coupes. The grass from closed coupes will annually be offered on cutting terms to Gram Panchayats, public bodies or FLCS of adjoining area at a reasonable price fixed by the department. If the Gram Panchayat or the public bodies are not interested in purchasing grass, it may be auctioned or be sold or may sale by rated passes. To encourage stall feeding the villagers may be allowed to cut and take grass at nominal rates to be decide time to time without damaging forests.

XIX.2.5: Other NWFP, medicinal plants: The collection and disposal shall be in accordance with the instructions issued by the government from time to time and as per the legal provisions.

SECTION: XIX.3: IRREGULAR HARVESTING:

Irregular harvesting of any forest produce such as timber, fire wood, NWFP etc. is prohibited except in the following cases. Removal of dead, fallen and fire wood and wind fallen trees except in coupes due for working shall be carried out as per the procedure mentioned below.

(1) The Beat Guard shall prepare coupewise availability of dead, fallen fire wood and wind fallen timber and report to concerned RFO. The RFO shall then prepare coupewise estimates for such material by marking these trees for extraction. While marking 2 dead trees per ha. shall be left for the benefit of wild life. The material shall extract by RFO after obtaining sanction of DCF. The material so extracted from forests may be given to Gram Panchayat or Forest Protection Committee at concessional rates as sanctioned by the CCF (T) Yavatmal Circle or disposed off as per the instructions of Government. The

details of material extracted and the manner in which it is disposed off shall be entered in compartment history form.

(2) The felling of trees on fire lines if necessary may be carried out with the permission of DCF after referring it to CCF, Yavatmal Circle.

(3) Approval of felling of trees under electric line and telephone line existing prior to enforcement of Forest (Conservation) Act 1980 or after that may be given by the DCF as per the sanction accorded by the competent authority.

(4) Removal of trees on forest land by other agency or departments like Irrigation, PWD etc shall be undertaken after their proposals for the use of forest land for non-forestry purposes are sanctioned by GOI under Forest (Conservation) Act 1980. The cost of removal shall be borne by concerned department.

(5) Disposal of forest produce obtained from submergence area of dams and tanks and from construction of roads etc shall be carried out as per the instructions of competent authority.

(6) Felling of trees for the purpose of study, research, for preparation of volume tables, yield tables shall be carried out by the WPO after obtaining permission from CCF, Yavatmal Circle.

(7) Irregular harvesting shall not be carried out for the purpose of undertaking plantations/ afforestation works under various schemes and which is outside the scope of the WP.

(8) Sometimes due to insects and fungus attacks there is a large scale mortality of pole or tree crop and removal of such trees shall be permitted as a part of irregular harvesting, after following the procedure prescribed by the Government. In such cases, the matter shall be investigated with the assistance of Research wing, Tropical Forest Research Institute, Jabalpur or other Government agency.

(9) The live high stumps left over by the illicit cutters shall be cut and flushed to the ground after preparation of inventory of such stumps, after verification by ACF.

(10) Sometimes the leaning trees may become dangerous to public as well as private property, these shall be removed as under irregular harvesting.

SECTION: XIX.4: MAINTENANCE OF BOUNDARIES:

XIX.4.1: The present state of boundary maintenance in Pandharkawada Forest Division is not up to the mark and the Reserved Forest boundaries though they are clearly demarcated on the ground, the boundary marks are not seen at many places. The survey and demarcation of 'C' class Reserved Forests has not been yet completed. The observations made that the boundary demarcation between the reserved forests and adjoining private agriculture fields or revenue land is not clearly distinguishable therefore it is necessary that DCF Pandharkawada Forest Division should take up the work on top priority and get the area demarcated and prepare accurate maps. The maps shall be updated incorporating corrections and kept in Division office and Range Office. The maps of the division showing boundary pillars should be given to working plan division. The external and internal boundaries shall be maintained in accordance with the 1/5th boundary demarcation scheme as given in Appendix XLVI of volume II, the boundaries of the forests shall be maintained as per details given below.

XIX.4.2: The outer boundary of government forests shall be maintained with a clear cut width of 12 m. The under growth that inhibits the view and prevents one forest boundary marks being seen from the neighbouring one shall be cleared. The boundary trees shall not be removed so long as they do not obstruct the view of boundary marks one from the other except where natural features form the boundaries. After clear cut demarcation on the ground cairns shall be erected. Instructions issued by Principal Chief Conservator of Forests regarding specifications such as shape, description, foundation, dimensions, colour wash, etc of boundary marks (cairns) shall be followed. The boundary marks shall be erected at such a convenient place both can be seen from one place to another place. Generally the distance between 2 cairns is of 500 m if the line is straight. Each boundary pillar shall bear serial number and a fresh series shall be given to each adjoining village.

XIX.4.3: Boundary mark specifications:

- (1) The boundary mark specifications shall be as approved by PCCF, Maharashtra State.
- (2) Apart from boundary marks tin plates will be fixed on the boundary trees at a height of 3 m preferably at the boundary of the compartments. These plates will indicate the compartment number with an arrow and below them will be pillar numbers on either side of plate. The metal plate will be of 45 cm x 45 cm size. This will be painted with white,

compartment number and pillar number will be written in red colour. Special attention shall be taken in annual maintenance of boundary marks and the following shall be ensured.

Whether

- (a) the boundary pillars are correctly located as per the map and demarcation register.
- (b) The boundary width is to the extent of required measurement or not.
- (c) Regular maintenance of cairns and wooden post is replaced wherever necessary.
- (d) That the boundary post bears the correct number and same is engraved and written in coal tar or paint.
- (e) If any encroachments are there, the matter should be pursued and removed.

XIX.4.4: Rules for inspection and maintenance of forest boundaries

(1) The Forest Guard of the concerned beat is mainly responsible to protect and maintain the boundary pillars every year. He himself shall colour wash them annually after rains and make a special report after completing this job. All boundary marks shall be specially inspected by the Beat Guard at least once in year. The boundary marks inspection shall be mentioned in his diary and send it to RFO.

(2) Round Officer is also responsible for protection and maintenance of all boundary marks in the forest in his round. He is required to ensure proper maintenance and colour wash by the Beat Guard as directed. Round Officer is responsible to inspect all boundary marks in a year which are due for maintenance and repairs as per 1/5th boundary demarcation scheme. This matter shall be mentioned in diary and send it to RFO. Round officer shall submit report annually in the following format.

I, ----- R.O. -----
certify that the annual length of the boundary lines have been verified by me personally and that boundary lines and marks are found to be correct as per the maps. I further certify that each cairn bears a correct serial number and next cairn is visible from either side of each cairn. There are no encroachments /encroachments as detailed below.

Signature of the R.O. with date

(3) RFO is required to check 25% of annual boundary line as per the 5 year programme and 5% verification shall be done by ACF.

(4) DCF shall monitor and carry out 2 % inspection of the boundary demarcation works, shall check up the periodic returns.

XIX.4.5: Maintenance of compartment boundaries: The compartment boundary shall be maintained regularly by clearing under growth to the extent of 3 m width except where the boundary coincides with the natural features. Tin plates of compartment boundaries with a size of 30 cm x 30 cm indicating compartment numbers should be affixed on the trees at a height of 3 m. These plates are painted with white and number shall be put in red colour paint.

XIX.4.6: Legal provisions available for maintenance of boundary marks

(1) Section 63 (C) of Indian Forest Act 1927

(2) Section 68 of Indian Forest Act 1927

SECTION: XIX.5: REGENERATION : There are two types of regeneration 1. Natural regeneration and 2. Artificial regeneration.

XIX.5.1: Natural Regeneration: Natural regeneration is the best source of getting better quality stock provided the sufficient natural regeneration is available. The available natural regeneration area shall be demarcated and properly protected from its worst enemies such as weed growth, fire, grazing and other biotic interference. In the forests of Pandharkawada Division it has been observed that in many compartments lantana invaded which hinders the growth of natural regeneration of desired species. The seedlings of natural regeneration can be secured only by means of systematic weeding commencing in the first rainy season and continued there after till the plants of natural regeneration are free from the suppression. Due to deciduous nature of the forests the natural regeneration in these forests has greatly suffered because of frequent fires coupled with inhospitable soil conditions. As a result of frequent fires the seedling suffer a lot from desiccation which needs proper mulching for each plant to reduce the effect of desiccation. The natural regeneration areas shall be categorised into 2 types.

Area with adequate regeneration: In this category, regeneration is considered adequate if the area contains more than 625 seedlings per ha. In order to stimulate growth and development of young recruits of Teak and miscellaneous species the following prescriptions shall be adopted for tending of natural regeneration.

(1) Identification of the area containing promising natural regeneration shall be done inside the coupe.

(2) The unwanted under growth, which is preventing or likely to prevent the growth of natural regeneration of desired species shall be removed.

(3) Identified patches of natural regeneration shall rigidly be protected from fire, grazing and other interferences. Suitable thinning and tending operations will be carried out to create congenial atmosphere for the growth of crop. Coppice shoots which interfere with the development of young natural seedlings shall be removed. A little opening up of canopy by felling marked trees and ground cover at some places shall boost establishment of natural regeneration of Teak and other species by providing better light and aeration.

The natural regeneration shall be cleared out within the diameter of one meter and these weeds and grasses, leaf-litter and branches shall be arranged in 15 cm high layer around the seedlings within the cleared area to provide organic mulch. There after two to three spadeful of earth shall be thrown to the mulch in place. Therefore it will keep the soil around the plants free from weeds as well as help securing the loosening of soil. In addition, stone mulching shall be done around the current year recruits in the areas where surface stones are available. Small stones shall be arranged in a circle closed around every young seedling, which will help in retention of surface moisture as well as avoid accidental trampling by cattle or others. Weeding and soil working mulching shall be carried out at least for 3 years in natural regeneration patches till the seedlings are established.

Wherever natural regeneration is not sufficient, it shall be supplemented by artificial regeneration to restock the area.

Area with inadequate regeneration: In these areas seed sowing of suitable species shall be done by field staff apart from tending of available natural regeneration in the next year of the main felling wherever natural regeneration is not sufficient, it shall be supplemented by artificial regeneration to restock the area keeping 625 tree population per ha. .

XIX.5.2: Artificial regeneration: Plantation of local suitable species will be taken up in the following year of main felling as per the suitability of site. Since teak is a predominant species in area at least 50% poly pot seedlings of miscellaneous species will be planted. Out of which 25% tall poly pot seedlings of medicinal, shadow, fruit and seed bearing species shall be planted invariably.

Grids shall be laid down in the plantation area and treatment map shall be prepared as specified in this chapter. The N.R. and A.R. work shall be carried out as per the guidelines given by P.C.C.F. M.S. vide letter No.D-1/c/Plan/C.N.23/13th PC/550/12-3 dated 25.6.2012.

Considering the density of the crop in the area the plantation shall be raised. On the basis of density the number of plants shall be assigned with respect to site. Overall the number of plants which are to be planted density wise are given below.

Sr. No.	Density of crop in area	No. of seedlings to be planted	Spacement
1	< 0.1	2500	2m x 2m
2	0.1 to 0.2	1111	3m x 3m
3	0.2 to 0.3	625	4m x 4m
4	0.3 to 0.4	278	6m x 6m

The planting work will be carried out as given below.

Pre-monsoon works: These operations will be done in the year of main felling. Fencing or TCM will be prepared for protection of plantations. The TCM with standard cross section 1.90 X 0.60 X 1.0 m will be dug along the boundary. No TCM will be aligned which runs across the contour and in that case live hedge fencing shall be undertaken with thorny shrubs like Acacia senegal, babul and cuttings of shrubs like vitex and Dodonea.

Pits digging: The size of pit will be generally 30 cm X 30 cm X 30cm, for bamboo 45cm X 45cm X45 cm whereas the size of pit for tall poly pot seedling will be 60cm x 60 cm x 60 cm. The pits digging will be completed before March and it should be allowed to weathering during summer. The refilling of pits will be completed before end of May. The number of plants may be decided on the basis of site and model of scheme as cited in the para. The formula of ecological index shall be taken into consideration while deciding number of plants to be planted in a particular locality. It shall be ensured that

seedlings are not planted under shade of existing trees. It shall be ensured that no seedling is planted within 3m distance from an established tree.

XIX.5.2: Nursery operations

(1) Teak Stumps: These will be prepared from one year old seedlings raised on beds as per standard nursery technique. The seed source must be from a known place and duly certified by the competent authority. The stumps will be prepared by following standard technique and 'A' class root shoots shall be used for raising plantations.

(2) Teak seedlings : For raising teak plantation poly pot teak seedlings shall be raised in nursery. The seed source must be from a known place and duly certified by the competent authority.

(2) Miscellaneous plants: Misc. and medicinal plants of tall seedling will be raised in polythene bags by following standard miscellaneous nursery techniques. Standard size of poly bags shall be used for raising miscellaneous plants to obtain optimum size of plants. Tall poly pot seedling may raised in nursery as per the nursery model sanctioned under MREGS by state government vide GR.No.MGR-2011/C.N.-28/EGS-1/Planning (EGS)/dt.10th may 2011.

The nursery will be started by October of the previous year of the planting. The height of plants will vary from species to species. Shifting of poly bags will be taken up within nursery every 15 days once the plant attains 10 cm height, however while shifting care should be taken that the plants are not damaged. The potting mixture shall be managed properly and application of suitable mixture and fertilizer will be carried out at appropriate intervals. Before planting good quality, healthy and appropriate size plants will be selected and these will be inspected by the officer not below the rank of ACF.

XIX.5.3: 1st Year operations: The seed sowing of live hedge species shall be taken up in three rows. Planting of Agave on the outer two rows of two edges of fencing at a espacement of 50 cm and planting of shrub cutting in inner three rows will be done. The teak stump planting will be done in crowbar holes whereas the polythene bag planting will be done in pits after the onset of monsoon. The polythene bags will be planted in such a manner that their collars are at the ground level and it will be covered with soil up to a height of 5 cm above collar.

XIX.5.4: Subsequent operations: First weeding along with causality replacement shall be completed within 20 to 25 days after planting. 2nd and 3rd weeding will be carried out in the month of September and October respectively. The 3rd weeding shall be coupled with soil working and mulching to reduce evaporation loss. One more soil working will be done in the month of January if there are winter rains, based on availability of funds. Weeding and soil working to seedlings in live hedge shall be ensured to improve the growth and survival of plants on live hedge. In the second year plantation the causality replacement will be carried out after the onset of monsoon and weeding will be done in the month of August and October respectively. Soil mulching will be carried out along with 2nd weeding. In case of teak, dibbling will be done in the month of May. In 3rd year plantation only one weeding along with soil mulching will be done in the month of September. Debudding in Teak plantation will be done in 2nd year plantation.

XIX.5.5: Bamboo Plantations

(1) Take up Bamboo plantation at suitable area at a espacement of 5 m to 6 m in the 4th year from the year of main plantation as per prescriptions.

(2) Pre-monsoon works: In 3rd year of main plantation pits of the size of 45 cm X 45 cm X 45 cm will be dug before March and allow the soil for weathering. Pits refilling will be done at the end of May.

(3) Nursery: To raise the stock for bamboo planting the nursery will be started two years in advance of planting and maintain in the nursery till the rhizomes are formed and these rhizomes will be used for planting. The bamboo rhizome bank will be established at suitable sites in each range and bamboo seeds shall be obtained from known sources and sown on beds. After one month small seedlings shall be transplanted to polythene bags after cutting their branches above 3 to 4 nods. Suitable fertilisers will be applied to achieve proper growth and rhizome formation.

(4) 1st year operation: With the onset of monsoon bamboo polypots will be transported to the site and planted in pits. The casualty replacement will be done at the end of July or August 1st week, weeding and soil working will also be carried out. At the time of planting, suitable fertilisers, insecticides will be given to each plant in the pits. In the first year three weedings and one soil working will be done.

(5) Subsequent operations: In the 2nd year two weedings and soil working, in 3rd year one weeding and soil working are prescribed and if necessary, insecticide may be applied to protect bamboo from termites.

SECTION: XIX.6: SUBSIDIARY SILVICULTURAL OPERATIONS:

All these operations shall be carried out departmentally. These operations shall include –

XIX.6.1: Cut back operations: CBO shall be carried out in the following year of the main felling.

- (1) Climber cutting of entire area.
- (2) Care shall be taken to avoid cutting of species included in Red Data Book of BSI and endangered and threatened species.
- (3) Removal of badly damaged or broken trees during main felling.
- (4) Cutting back of malformed advance growth.
- (5) The unwanted under growth interfering with the Teak and other valuable miscellaneous species shall be removed.
- (6) The multiple coppice shoots or poles shall be reduced to one per stool.

XIX.6.2: Cleaning and Tending: Cleaning and Tending operation shall be carried out in the coupe area in the 3rd year and cleaning operation in the 6th year after main felling as prescribed below.

- (1) Climber cutting of entire area of the coupe. It shall be ensured that no species listed in Red Data Book of BSI and no endangered or threatened species are cut.
- (2) Removal of damaged and malformed saplings in teak plantation area.
- (3) All coppice shoots shall be completely cut except in area where planting stock has not come up successfully and in such area multiple coppice shoots shall be reduced to 1 per stool which is vigorous one.
- (4) The undesirable growth interfering with teak and other valuable species will be cut.
- (5) In the patches of advance growth of teak and other valuable species proper espacement will be created by removing inferior under growth.

(6) Cleaning of weeds at the base of teak plants and intensive soil mulching shall be carried out immediately after rainy season is over.

(7) In eroded area or area liable for erosion, soil conservation measures shall be taken up by way of gully plugging, nala bunding, check dams etc.

XIX.6.3: Thinning: (1) Thinning in plantations is an essential silvicultural requirement, keeping in mind the number of plants required in a site in relation to age of crop. For appropriate utilisation of soil many of the original number of plants of planted have to be removed when they are of little sale value to permit satisfactory development of those retained. Thinning operation shall be carried out as per standard technique in teak plantations.

(2) Thinning in Teak plantations: First thinning shall be carried out at the age of 10th year, and after that every subsequent thinnings should done after every five years of plantation as per site requirement.

(3) Demarcation, preparation of treatment map and cleaning: The area due for thinning shall be demarcated on the ground and a treatment map shall be prepared by RFO. He will prepare a grid map of 100 m X 100 m. Grid wise enumeration of teak trees of seed origin and coppice origin and other species will be carried out. The treatment map shall be verified by concerned ACF and DCF, Pandharkawada. Treatment map shall show following categories.

Type – 1: fully stocked areas i.e. successful plantation area.

Type – 2 : patches of failure plantation.

Type – 3: partially successful and partially failure area having teak trees not conforming to stand table.

Cleaning in teak plantation is essential as teak is highly susceptible to root competition and removal of unwanted growth will allow the valuable and promising stumps to attain proper growth. In plantation area lot of unwanted bushes and weeds come up which will be removed for healthy growth of existing plants.

(4) Thinning procedure for old plantations: 1st thinning shall be carried out at the age of 10th year and it is of mechanical thinning and 2nd thinning at the age of 15th year which is also mechanical thinning if the survival of the plantation is more than 80%. But if the

survival is less than 80%, thinning shall be carried out based on the principles of stand table. In 1st mechanical thinning, the operation consists of removal of trees in alternative diagonal lines, whereas in 2nd mechanical thinning, the thinning operation consists of removal of alternate lines. In order to carry out thinning based on stand table, first of all age of plantation shall be ascertained with available data of plantation or carrying out stem analysis of few stumps. In plantations grid wise enumeration of trees shall be carried out and these will be listed in the following table.

Enumeration of old plantations

Sr. no.	gbh ob	Species		Origin	Status	Remarks
		Teak	Non – Teak	Seed/ Coppice	D/CD/ S/M/I	
1	45	Teak		Seed	D	To be retained
2	51		Ain	Seed	D	To be felled
3	36	Teak		Coppice	S	To be felled

gbh ob: girth at breast height over bark, D: Dominant, C: Co-dominant, S: Suppressed, M: Malformed, I: Intermediate.

The grid wise average girth of the crop will be computed. The basal area will be ascertained with the help of wedge prism. The basal area is the average of basal area obtained from at least 3 places and after obtaining average girth and basal area, the data will be compared with the stand table. If the basal area of the crop is more than that in stand table for corresponding age then the thinning will be carried out in the following procedure. If the basal area of the crop is equal to or less than that of stand table then no thinning shall be carried out except removal of trees.

The non- teak species will be marked for felling except fruit bearing species. The teak trees of coppice origin will be marked first for felling. After that the malformed, suppressed, intermediate, co-dominant and dominant species will be marked for felling in respective order to the extent of number of marked trees for felling are available, leaving behind retained trees confirming to stand table data of crop girth and basal area. The retained stumps shall be uniformly distributed over the area. After confirming marking with the stand table these marked trees shall be felled. After that the basal area will be obtained with the help of wedge prism by means of stand table leaving the marked trees from total count. If it is comparable to stand table then marking is perfect.

In case of old teak plantations in which thinning had not been carried out and the crop is congested, the above principle shall not be applicable. Instead of that, the average girth of the stand will be worked out on the basis of average girth of the corresponding age nearest to the multiple of 5 m higher side will be read from stand table then the thinning will be carried out as if the crop is of that age. Care shall be taken that excess thinning will not be carried out. Thinning shall be carried out though department and thinning area shall be protected from fire and grazing. The stand table is given in Appendix L of Volume II can be used as reference to carryout thinning. If any prescriptions regarding the activity of N.R./A.R./SSO required to modify it must be dully approved by the P.C.C.F M.S.

SECTION: XIX.7: FIRE PROTECTION:

Repeated fire causes intensive damage to forests damaging flora and fauna, young crop, regeneration and fertility of soil. The forests of Pandharkawada division shall be protected from fire by taking up effective protection measures. For the purpose of fire protection the forest area is classified into three categories Class-I, Class-II and Class-III and regular maintenance of fire lines and specific prescriptions given in Protection WC should be strictly followed as given in section XVI.5- fire protection.

SECTION: XIX.8: GRAZING CONTROL:

XIX.8.1: Grazing in forests is a menace which hampers regeneration to a great extent. In this division heavy cattle population pressure causes lot of damage to the forests. The total number of villages in this division is 729 and there are 241 villages situated adjoining forest. There are 23 grazing units in Pandharkawada Forest Division. The Govt. of Maharashtra formulated grazing policy vide its resolution no. MFP-1365/1322-Y, dt. 6/12/1968 and the grazing rules were framed vide G.R. no. MFP/137/237035-Z, dt. 3/11/1973, according to which grazing be allowed as per the carrying capacity. The grazing incidence in SCI WC area comes to 1.2 ha and for Improvement and Afforestation WC it comes about 0.6 and 0.8 cattle per ha. The Government Resolution no MFP-1371/1237035-Z is given in Appendix LVIIIb of volume II. In the area where grazing settlement has been effected will be governed by the new grazing policy where as in unsettled areas the old grazing rules of Central Provinces and Berar Forest Manual volume II shall apply.

XIX.8.2: The State Government vide Govt. Resolution No.MFP/2103/C.No.135/ F-1/ dated 21st March 2005 directed the Department to submit a proposal for sheep grazing policy from all the forest divisions. The Government in the above said Govt. Resolution also directed to appoint Grazing Settlement Officer. Accordingly ACF (FLCS) was appointed as Grazing Settlement Officer.

(1) Grazing is not allowed in Kuran and Ramna areas. The coupes which were worked are closed for grazing for 5 years.

(2) In Pandharkawada Forest Division the available area for grazing is not sufficient to meet the grazing demand of cattle in the division.

(3) Details regarding maximum admissible cattle units to various categories of agriculturist, non-agriculturist, cow/cattle etc. are given in Govt. Resolution dt. 2nd August 1971. As per Govt. Resolution dt. 6th December 1968 cattle units are decided for different kinds of cattle are given below. For grazing in the forests the following classification has been evolved.

1 - buffalo: 2 unit 1 calf: 0.5 unit

1 - cow/bull: 1 unit 1 sheep: 1 unit

(4) Based on the above mentioned classification cattle units for sheep was decided as per the Govt. Resolution dated 2nd December 1971 i.e. 1 sheep – 1 unit.

List of grazing units

Sr.No.	Name of Grazing Unit	Name of Village in Grazing Unit
1	Fiski	Umardara, Pandharkwada, Mardi, Amani, Fefarwada, Kegaon, Kegaon, Dapora
2	Borgaon	Korambi, Mendholi, Virkund, Maregaon
3	Ghandir	Mandar, Wagdara, Kesurli, Lalguda
4	Suknegaon	Suknegaon, Godgaon, Umari, Parsoda, Maregaon, Rasa
5	Kalamana	Kalamana, Shindola, Pathri, Chanakha, Paramdoh, Murtibori, Dhakori, Govari
6	Adegaon	Adegaon, Chilai, Kutramundha, Khed
7	Ruikoth	Mukutban, Kosara, Khadki, Ganeshpur
8	Girjapur	Botoni, Kundi, Khandni, Mendhan, Palgaon, Wagdara, Pachhur, Katali, Borgaon
9	Khandni	Khandani, Rohapat, Ambezari, Katali, Borgaon, Pachpur

10	Muchi	Birsapeth, Kharbada, Patan Bu., Rampeth, Digras, Shekapur, Muchi, Raypur, Marki Bu, Jamni
11	Mudhati	Chalbardi, Surdapur, Aamb, Demaddevi, Parsoda, Umari, Stpalli, Mudhati, Gawara
12	Paramba	Wazari, Mandvi, Ballarpur, Nimbadevi, Karegaon, Paramba, Chatvan, Kawatha, Karegaon, Junoni, Piwardol
13	Hiwara	Takwanjari, Adkoli Bu, Borgaon, Hiwara, Baggi, Mahandoli, Chalbardi, Ambezari Ku., Ambezari bu.
14	Zolapur Pardi	Kanhalgaon, Avalgaon FV, Khairgaon, Botoni, Kothodi, Dhoki, Jalaka
15	Ghoddara	Dabha, Mira, Wrudavan, Takali, Pathri, Umari, Kinhi, Kinhala, Sakhi bu., Ghoddara
16	Vihirgaon	Vihirgaon, Kinhi, Khairgaon, Devdhari, Aikurli, Palsakund
17	West Kharoni	Kinhi, Mandvi, Airandgaon, Chincholi, Sakhara, Mukti, Inzala, Pimpri, Wadhona Su., Dorli
18	Mathani	Mangi Savergaon, Sawangi, Koleshwar, Jamb, Mathani, Bhadumari, Waghartakali, Shard
19	Sunna	Sunna, Kopamandvi, Tembhi, Dhoki, Pendhari, Marathwakdi, Susri, Nagezari
20	Arli	Arli, Pimpalshenda, Hiwari, Ganeri, Karegaon, Daryapur
21	Bukaai	Anji, Sawner, Dongargaon, Zargad, Tejani, Warud
22	Kurli	Kurli, Taroda, Waghartakali, Shard, Zatar
23	Patapangra	Patapangra, Talsawali, Khadka, Rahati, Bilayat, Majari

XIX.8.3: Regulation of grazing: The main felling coupes of all WC will remain closed for a period of 5 years from the main felling as the felling cycle is fixed at 20 years, 1/4th area of the felling series will remain closed for grazing at any time. All the forests are not possible to open for grazing at a time and as the cattle population is not uniformly distributed therefore it is prescribed the cattle exceeding carrying capacity of an area open for grazing should not be allowed to enter into forests. The excess cattle units can be managed through fodder development activity on common community lands and wastelands. The villagers shall be persuaded to go for stall feeding of some of their cattle which are more than carrying capacity of the forest adjoining them and the local people shall be educated and made aware of ill-effects of excessive grazing on forest growth. Apart from this the forest staff should open dialogue with the local villagers to discuss

Grazing Policy, carrying capacity of forests and the area available to graze their cattle in the adjoining forests. The DCF Pandharkawada Division should prepare a consolidated grazing plan based on area, cattle units, carrying capacity, rotational grazing and avenue for excess cattle units.

The grazing policy formulated by the Government of Maharashtra vide its resolution No.MFP-1365/13221-Y, dt. 6-12-1968 and the grazing rules formulated by Govt. of Maharashtra vide resolution no. MFP-/1371/237035-Z, dt. 3.11.1973. The grazing in the forests will be controlled as per the prescribed grazing incidence for each class of forests. In view of provisions the grazing will be regulated in different WC of this plan as given below.

(1) **Selection- Cum-Improvement WC:** This WC comprises the tree forests and grazing incidence is 1.2 ha. per cattle unit. Natural regeneration which is poor due to large scale damage due to uncontrolled grazing in all the compartments allotted to this WC. The area shall be permanently closed to grazing for a period of 5 years and worked coupes will be closed for another five years from the year of main felling.

(2) **Improvement WC:** As prescribed in SCI WC in the above paragraph.

(3) **Afforestation WC:** The grazing incidence in area under this WC should not be more than 1 cattle unit per 0.8 ha. The main coupes will remain closed for a period of 7 years from the year of restorative phase implementation.

(4) **Fodder Reserve WC:** The forests included in this WC can be classified as Grass Reserves under miscellaneous forests. In the compartments of Ramnas grazing shall be completely eliminated, however cutting of grass is permitted. In other compartments of this WC rotational grazing is permitted. The rotation is fixed for three years.

The following guidelines shall be followed for utilization of grass.

- (1) The demand for grass should be assessed yearly and the production of grass should be recorded in separate registers and these records shall be maintained at beat, round, range level.
- (2) For collection of grass each range is considered as one unit.
- (3) The collection and disposal shall be as per the procedure laid down by the Government.

- (4) Villagers are allowed to cut the palatable grasses from the closed plantation sites as per the procedure laid by the Government.
- (5) Good and palatable grasses like paunya, shedra, marvel shall be introduced in fodder improvement area as well as grazing units earmarked for grazing.

SECTION: XVII.9: MAINTENANCE OF MAPS:

As per the provisions contained in National Working Plan Code 2004, the following maps shall be prepared, maintained and supplied to implementing officers and other officers as given below.

(1) Stock Maps: All the compartments of forests dealt with under this plan have been stock mapped on 1: 50000 scale toposheets, 3 sets of uncut and un-mounted maps have been prepared showing stocking details as per the standard conventional signs. Stock map shows details of blank area, crop composition, density etc. Out of these sets one set will be retained in the office of the WP and one set of each stock map submitted to APCCF, Working Plan, (East), Nagpur and one set will be sent to DCF, Pandharkawada.

(2) Management Maps: These are prepared on 1:50000 scale 2 sets of uncut and un-mounted and 2 sets of cut and mounted maps on 1:50000 scale showing divisional, range, block, compartment boundaries etc. Working Circles, Felling Series and coupe number other important features are shown on these maps. These maps prepared in the Working Plan office.

(a) One uncut and un-mounted set of maps will be kept in the office of the Working Plan Officer, Yavatmal for record. During the plan period any alteration in the map due to afforestation and disforestation will be shown in this copy from time to time.

(b) Second uncut and un-mounted set will be supplied to DCF Pandharkawada Forest Division. Any alteration will be shown on the maps by DCF Pandharkawada and furnish it to WPO.

(c) One uncut and un-mounted set of copy will be submitted to APCCF Working Plan, (East) Nagpur. The master copy will be kept in the Working Plan Office, Yavatmal. Additional copies have to be prepared by the Territorial Divisional surveyor for the use of field staff. DCF Pandharkawada must keep one copy in his office for field use and used by

divisional surveyor for laying out of the coupes annually in the field. Trace of plantation area after field survey should be sent to divisional office by the RFO so as to update the uncut and mounted master set of maps in the divisional office. Similarly one copy of traced map should be sent to Working Plan Office, Yavatmal.

(3) Working Plan Maps: These maps are prepared on 1:15000 scale cut and mounted. These maps show WC, felling series and management, administrative and physiographic features. One set of these working plan maps will be submitted to APCCF Working Plan, (East), Nagpur and one set will be sent to DCF Pandharkawada.

(4) Reference Map: The reference map shows the details of WC, range boundaries, canal, railway lines, rest- houses, neighbouring town/villages, etc. This is attached to the printed volume in such a way that when it is unfolded it will be completely outside the volume of the working plan. The reference map is a miniature mix of working plan and management maps.

(5) Grazing maps : Grazing maps showing the details of grazing units prepared on 1:15000 scale, one copy of this map will be supplied to DCF Pandharkawada and another copy will be retained in the office of the working plan.

SECTION: XVII.10: SOIL AND MOISTURE CONSERVATION MEASURES:

To rejuvenate the soil conditions of the area of Pandharkawada Forest Division the soil and moisture conservation works are of utmost importance. The DCF will prepare a consolidated plan for soil and moisture conservation measures for the entire division including contour trenching, nala bunding, check dams etc. after thorough survey of the entire division.

XIX.10.1: Nala bunding and check dams:

The main purpose of nala bund or check dams is to reduce the run off of water and to arrest siltation. Nala bunding will be from ridge to valley. Nala bunds and check dams will be constructed by using loose boulders available. No blasting or digging will be done if boulders are not available, but brush wood may be used for this purpose. Simple nala bunds will be effective to the extent of 8 m lengths, beyond that these structures are not useful and permanent engineering structures will be required to design nala bunds. The

nalas have been divided into 3 categories. 1) upto 4 m width. 2) 4 to 6 m width, 3) and 6 to 8 m width. The nala bunds shall be approved by competent authority and the design must be from one side of bed to the other side of bed. The boulder pitching in a semi circular fashion on the top of the bunds so that the stones are compact and are not washed away by water. The distance between two successful bunds will be such that standing on the site of lower bund the base of upper bund should be the line of eye sight of the person standing on nala. In general the distance between successive bunds for different slopes will be the same as that for contour trenches. These nala bunding and check dams shall be on the basis of watershed management.

Some of the designs of nala bunding are given in Appendix XLIXa (a) of volume II. The check dams may be cement bandhara. At suitable site construction of cement bandhara shall be taken up. In small gullies construction of brush-wood bandharas will be sufficient. In nalas in which nala beds are complete with sands, inverted bandhara shall be taken up. Apart from the above mentioned models there are many models available with soil conservation department and they may be consulted to have appropriate models suitable for forest area for taking up intensive soil and conservation measures.

XIX.10.2: Contour trenching: Effective long contour trenches (CCT) with a length of 30 meter with baffle walls at 5 meter interval will be dug in coupe in the area of crop density less than 0.4. The baffle wall shall be of 1.5 m length as a precaution to prevent formation of nalas or soil erosion. The interval between two contour trenches may be kept approximately 6 meters, which may vary depending upon the line to line distance between contours as per the prevailing topography. CCT shall not be dug in area with slope of 25°. The total length of the trenches shall not be more than 1200 m per ha. The trenches will be of 30 cm deep and 60 cm wide and length may vary from 1000 to 1200 m per ha. depending on the site. The soil and boulders dug out from trenches will be heaped on their lower side, on these heaps planting of grass tussocks, sowing of seed of grass, seeds of trees and shrubs species Sesbania, Hamata, Sitafal, Chandan and planting of cuttings Ipomea and Agave bulbils etc. for the stabilization of soil of heaps. The trenches near the nalas will be discontinued and will be curved upwards on both sides of the nala at an angle of 45° in order to prevent run off of stored water in the trenches into nala. The curved portion will be of 5 meter length on either side of nala.

SECTION: XIX.11: FORESTRY EXTENSION:

The ever growing human and cattle population mount lot of biotic pressure on the forests of Pandharkawada Forest Division resulted in degradation of forests especially in the forest pockets adjoining human habitations. Illicit felling, heavy lopping of trees for fuel and unregulated grazing cause lot of harm to forests and these bad trends can be curbed if the people are made aware of the harm, they perhaps unknowingly inflicting on forests and in turn to themselves.

In order to mitigate such problems forestry extension work should be chalked-out by the DCF with detailed programme for holding the awareness camps at regular intervals in different villages with active participation of voluntary agencies and gram panchayats. The DCF along with his team of officers will try to participate in as many awareness camps as possible. In such camps the forest officers will interact with the villagers highlighting importance of forests, alternative fuel source, self reliance of villagers to meet their fuel requirements without much dependence upon forests. The people should be made aware of the points given below.

- (1) Various uses of forests to the people, consequences of vanishing forests to them and their future generations.
- (2) To make villagers aware about the alternatives available for fuel wood like biogas, LPG, fuel efficient chullah like Vanjyoti, solar cookers etc.
- (3) Stall-feeding to the cattle should be propagated and the benefits derived there from.
- (4) All land owners in the village should be convinced to grow fuel wood and fodder trees species on the field bunds or unutilized or under-utilized area of their own land so as to reduce the pressure on forests.
- (5) Villagers should be actively involved in the forest protection and various afforestation schemes. Village school teachers and educated children will be involved in all these activities as the resource personnel and motivators.

SECTION: XIX.12: DEVIATION OF WP PRESCRIPTIONS:

XIX.12.1: The following works will not constitute deviation from the WP.

- (1) Removal of dead fallen wood.
- (2) Petty felling carried out as mentioned in irregular harvesting.
- (3) In 2 hectares area, the side branches of teak trees of 75 cm girth bh or more, shall be cut retaining the branches at the top. The grids in which side branches are cut shall be in the marking register. The timber, firewood shall be properly estimated and recorded in the marking register. The details of impact of cutting of side branches on the health of trees, promoting regeneration, output of fire wood, timber & in all wood shall be maintained. The data and opinion there of shall be submitted to CF WPD, Yavatmal. The branches of Plus Trees shall not be cut. CF, Working Plan Division, Yavatmal shall inspect this work and assess the impact of branches cutting.
- (4) Certain unimportant species (from economic point of view) such as moyin (Lannca species) interferes with the regeneration of teak and other desirable species. In such cases, few branches of moyin etc. shall be cut in the 2 ha. area, where in the teak branches are cut. The impact of such branch cutting shall be studied and reported to CCF, Yavatmal Circle and CF, Working Plan Division, Yavatmal.
- (5) Any research activity or work study required to conduct.

XIX.12.2: The following works will constitute a deviation from the working plan.

- (1) The felling and disposal of forest produce in submergence area of dams, canal sites, road sides and other areas falling under the purview of Forest (Conservation) Act 1980. The necessary sanction shall be obtained before undertaking felling.
- (2) All other deviations can be classified into following categories as per the draft amendment to article 191 and article 192 of Working Plan Code vide G.R.no. FWP-10625625 (ii) – J, dt. 25th May 1962 of Agriculture and Forest Department.
 - (a) Deviation which would alter the schedule of working given in WP, the examples of which are both non-working of coupe in the prescribed year or working the coupe in the year not prescribed by WP. Changes in the areas of coupe on account of disforestation or undertaking areas for execution of any special scheme under plan programme.

(b) Deviations which would involve alteration in the silvicultural treatment, for example stopping or curtailing felling for planting because of shortages of labourers, funds, material for plantation works or unsuitability of terrain and soil for undertaking up plantations to the extent prescribed in WP; Extensive felling of dry trees killed by fire, fungus, insect attack or other natural calamities; Felling of unusual size and extent for special departmental works, special felling to meet a sudden new demand of a particular industry; Felling involving modifications in the prescribed marking rules.

(c) The sanction to all these deviations shall be obtained. Application for sanction to such deviation shall be submitted sufficiently in advance by CCF (T), Yavatmal so that such proposals are received as far as possible before the deviation occurs and is submitted along with the control forms.

XIX.12.3: Procedure for obtaining sanction for deviation as per the National Working Plan Code 2004:

The DCF Pandharkawada Forest Division will submit deviation proposals to CCF (T), Yavatmal in prescribed form in triplicate, alongwith copy of control forms. CCF (T), Yavatmal shall verify the proposals and send the deviation proposals to Working Plan Officer for submitting it to APCCF Working Plan, (East), Nagpur. Following is the format of deviation statement:

Statement showing deviations Working Plan prescriptions'

Year..... Division

Serial No. of deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring PCCF's sanction.
		Paragraph	Nature of prescription	
1	2	3	4	5

Deviation Proposal for the year

Sr. no.	Working Circle	Felling series	Coupe no.	Area (ha)	Comptt. no.	Nature of operation in w.p.	Year of operation prescribed in w.p.	Actual year of operation	Designation of inspecting Officer	Reason for deviation
1	2	3	4	5	6	7	8	9	10	11

XIX.13: INSPECTION OF WP IMPLEMENTATION:

The CCF (T), Yavatmal circle shall ensure all the prescriptions of working plan are scrupulously implemented by the DCF, Pandharkawada. The work shall be inspected in the following manner :-

Chief Conservator of Forests (T), Yavatmal: 2%

Deputy Conservator of Forests, Pandharkawada division: 5%

Asstt. Conservator of Forests: 20%

RFO/Forester: 100%

The norms for inspection of works are as per the standing orders and circulars issued by Government of Maharashtra and the department in this behalf. Any lapses in discharging responsibilities shall be treated as dereliction of duties and the erring staff is liable for disciplinary action. The CCF (T) shall be the competent authority to decide any technical matter prescribed in WP and he will guide the subordinate staff in all such matters. WFO may be consulted for any clarification of prescriptions.

SECTION: XIX.14: SAW MILLS:

XIX.14.1: The rules for regulating saw mills in the state are incorporated in Bombay Forest Rules 1942 and these rules have been updated from time to time.

(1) No person shall establish a saw pit for cutting or converting of timber or manufacturing charcoal without prior sanction in writing of the RFO under Sec. 4 of Indian Forest Act 1927. If the Government declares that it has been decided to constitute any land as Reserved Forest and for this also above rule is applicable.

(2) Within the limits of 10 km of any Reserved or Protected Forest any land required in clause (I), no person shall erect or operate any machinery or saw mill for cutting or converting timber without obtaining license in this behalf. In this regard direction have been issued vide R&FD, G.R. dated 16/7/1981.

(3) Any person intends to establish a saw pit or manufacturing charcoal under class (I) of sub rule (1) shall make an application in that behalf to RFO and DCF.

(4) If the applicant fails to receive sanction within one month under clause (I) of sub rule (1) the applicant may proceed to establish the saw pit or to manufacture char coal without violating the provisions of the act or any rule made there under.

(5) On receipt of an application under sub rule (2) RFO, DCF shall make such enquiry as he deems fit after satisfying himself regarding the safeguard of forest protection and sanction license in scheduled E, subject to the conditions set out there in or refuse to grant the sanction of license.

(6) Every license granted is renewed under this rule subject to the provisions contained in this rule regarding cancellation, be effective for a period not beyond the day of 31st December from next month following date, the date of issue or renewal. DCF may on application made to him renew the license issued under sub rule (3) with effect from the date of its expiry.

(7) If the licensee does not make application before expiry or failed to renew the license is liable for punishment and cannot operate licensee without renewal.

(8) DCF, not with standing the forgoing sub-rules may, where he has reason to believe that a licensee is operating a saw mill in contravention of the provisions of these rules and the conditions of rule or the license, is indulging in illegal activity which may be detrimental to forest protection, can revoke the license granted under the sub rules.

(9) If the DCF refuses to issue or renew or any matter related to license, the order shall be communicated to the concerned in writing.

(10) Any person aggrieved by an order made under sub rule (8), may within 30 days after receipt of order, appeal the CCF (T) who shall decide the appeal after giving opportunity for personal hearing. The decision of CCF (T) shall be final.

XIX.14.2: Subsequently, the State Government has issued amendment vide notification No SWM 1081/ 106836/ F-6, dated 16th July , 1981, the State Government put a ban on issue of new license However, if the applicant has already spent the money and completed the formalities, license can be issued vide SWM 1081/ 106836 (A) F-6, dated August 18, 1981. The license of saw mill can be suspended for three months. Saw mill owners are required to maintain three registers by the Government Order dated February 22, 1984. No saw mill can operate after sunset to sunrise without the written prior permission of the

Divisional Forest Officer. The Govt. vide letter no. TRS 1081/ 102380/ F-2 R & F D dated July 18, 1981 has laid down the inspection norms of saw mills by the officers of various ranks. RFO shall inspect twelve, ACF 6 DCF 3 and CCF (T) one scale mill in a month. Apart from above mentioned Govt. Resolutions there are number of G.R.s, circulars issued by the Government from time to time regarding issue of saw mill license, restoration of license, shifting of saw mills, issue of duplicate license, maintenance of timber account in saw mills etc. A list of different Government Resolutions and circulars is given as below.

Sr. no.	Govt. Resolution/circular	Subject
1	SWM-1091/ 106836/ F-6, dt. 29.8.1981	Grant of licenses for erecting or operating machinery or saw mills for cutting or converting of timber.
2	Circular No.SWM-1081/ 106836/ F-6/ Dt.26.10.1981	Grant of license for erecting or operating machinery or saw mills for cutting or converting of timber.
3	Circular No.SWM-1081/ 106836/ F-6/ Dt.31.10.1981	1. The Bombay Forest (Amendment) Rules, 1981. 2. The Bombay Transit of Forests Produce (Vidarbha Region and Saurashtra and Katch areas) (Amendment) Rules 1981.
4	Govt. letter No. SWM-1081/ 132654/ F-6/ Dt.19.11.1981	Scrutiny of application of Grant of sawmill license.
5	Notification SWM – 4582 / 200/ F-6/ Dt. 8.7.1982	Restorations of License
6	Gazette- SWM - 1082/ 96225- (i)/ F-6, dated. 1/8/1982.	Amendment on notification dated 16/7/81.
7	Circular – SWM - 1080/ 112274/ F-6, dated. 20/9/1982.	Precautions and measures to take while issuing license.
8	Notification - SWM- 183/ A- 61/ CR-4(iii) / F-6, dated. 30/6/1983.	Change in decisions taken by Chief Conservator of Forests / Forest Officers
9	Circular No. - SWM- 183/ A- 61/ CR-4(iii) F-6, dated. 7/7/83.	Grant of saw mill license Procedure regarding.
10	Gazette – Dt. 18.8.1984	Grant of licenses within the forest limit
11	Notification - SWM- 1084/ CR-12 / AF-6, dated. 17/5/1985.	Provisions of Mumbai Forest Act, Rule No. 8 (3)
12	Gazette - SWM- 1084/ CR-12 / AF-6, dated. 17/5/1985.	Provisions of Mumbai Forest Act, Rule No. 8 (3)
13	Notification - SWM- 1084/ CR-32 / A/F-6, dated. 22/1/1986.	Issue of duplicate licenses
14	Gazette - SWM- 1084/ CR-32 / A/F-6, dated. 22/1/1986.	Issue of duplicate licenses
15	Govt. letter No.SWM/1085 / CR-134 /F-6/ Dt. 3.2.1986	Saw mill Rules
16	Circular SWM-1082/CR-20/ F-6 Dt.8.11.1989	Registers maintained by private Saw mill owner.
17	Govt. letter SWM-1090/CR-57 /F-6/ Dt.1.10.1989	Mumbai Forest Rules 1942 – Sawmill license Rule No. 88
18	Gazette SWM-1090/CR- 57/F-6/ Dt.	Transfer and shifting of Sawmill license –

	28.8.1991	instructions
19	Notification- SWM-1090/CR- 57/F-6/ Dt. 28.8.1991	Transfer and shifting of Sawmill license – instructions
20	Notification- SWM-192/CR –94/ (i)/ F-6/ Dt. 14.7.1992	Regarding fixation of Fees for Transfer/ shifting and issuing of Sawmill license
21	Gazette -SWM/1093/CR-271(L)/ F-6 Dt. 16.6.1993	Definition of small scale works does not include carpentry of sawmill operate.
22	Govt. letter No.SWM-1094/CR-40/ F-6/ Dt. 15.9.1994	Permission for fixing additional horizontal band saw to Sawmill.
23	Gazette – SWM-1096/CR –123(1)/ F-6 Dt. 31.7.1997	Modification in License fee / Revised fees for the period of 10 years.
24	Gazette - SWM-1096/ CR-123 (1) / F-6 Dt. 6.11.1998	Modification in License fee / Revised fees for the period of 10 years.
25	Notification – TRS-1095/ CR –109/ F-6/ Dt. 22/9/1999	Indian Forest Act – 1960, The Bombay Transit of Forests Produce (Vidarbha & Katch areas) Rule 1960, The Hyderabad Transit of Forests Produce (Mumbai) Rules 1958 (Amendment) Bombay Forest Rules 1942 (Amendment)
26	Govt. letter SWM/1090/CR-57/F-6 Dt. 13.1.2000	Guidelines for Transfer/ shifting and issuing of Sawmill license.
27	Gazette – TRS- 11/ 2000/ CR –534/ F-6 / Dt. 7/6/2001	Fixation of fees for Transfer/ shifting and issuing of Sawmill license
28	Gazette- SWM/1090/CR-57/F-6 Dt. 6.11.2001	Guidelines for Transfer/ shifting and issuing of Sawmill license.
29	Notification dt. 15.3.2003	Para No. 16(ii) and (iv) and guidelines by the order passed on dt.7/2/2002 in Writ Petition 3652/2001.
30	Gazette- SWM-1097/CR-379/F-6/ dt. 17.3.2003	Order passed in Writ Petition no. 3652/2001 dt. 7/2/2002.
31	Govt. letter No.S-30/122/2001/ CR – 505/ F-6/ dt. 20.3.2003	Order passed in Writ Petition no. 3652/2001 dt. 7/2/2002.- 10 Km distance -
32	Gazette – SWM-1093/CR-331/ F-6/ dt. 3.11.2003	Concessions for 12 inch or less than diameter round band
33	Govt. letter No. SWM-03/ 2001/ CR-154/ Part-2/F-6/ dt.11.1.2005	Bombay High Court – Bench Nagpur - order passed on 7/2/2002, Para 16(iv) ----
34	Govt. letter No. SWM-03/ 2001/ CR-154/ Part-2/F-6/ dt.12.1.2005	Bombay High Court – Bench Nagpur - order passed on 7/2/2002, Para 16(iv) ----
35	Govt. letter-SWM-09/2001/CR- 350/ F-6/ dt. 23.6.2006	Decision taken by Central High Power Committee regarding Plywood/ Veneer.

XIX.14.3: Section 129 Bombay Forest Rules 1942 states that who so ever contravenes the provisions of Rule 88, shall be punishable with imprisonment for a term which may extend to six months or with fine which may extend to five hundred rupees or both.

SECTION: XIX.15: CHARCOAL KILNS:

Permission shall not be granted to manufacture charcoal to private persons in Reserved Forests or Protected Forests or in private areas up to ten kilometer boundary from forests.

SECTION: XIX.16: USE OF HAMMER:

CCF (T) shall issue guidelines and orders regarding the shape and size of various types of hammers which will be used for the following works.

- (1) Marking of coupes.
- (2) POR cases material to be marked by Forest Guard
- (3) POR cases material to be marked by Forester
- (4) POR cases material to be marked by RFO
- (5) POR cases material to be marked by ACF
- (6) Marking of material from jungle depot to coupe depot
- (7) Marking of material from coupe depot to sale depot.
- (8) Marking of sold material.
- (9) Marking of malki material / timber by ACF

SECTION: XIX.17: TRIBAL WELFARE:

The forests and tribals coexist and their bond is inseparable. In order to maintain ecological balance, it is necessary to take care of socio-economic well being and culture of the tribals. It is extremely difficult to protect forests without active participation and cooperation of local people. To improve economic standard of tribals it is necessary to take up various programmes, industries, safe guarding their domestic needs for forest produce like bamboo, fire wood and small timber. For all the activities of NWFP a separate NWFP WC has been constituted. Care has been taken to retain fruit trees from felling and in the plantations 20% fruits trees are to be planted for the purpose of local tribals of the forests, while treating forests under various WC. In the 73rd amendment of Constitution of India facilitated extension of Panchayat Raj Act in Scheduled Area has opened new avenues for tribal development. In the said amendment the Gram Panchayats are given rights over NWFP in Scheduled Areas.

The Government of India has enacted “ The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, which recognised and vested the forest rights and occupation in forest lands in forest dwelling Scheduled

Tribes and other traditional forest dwellers who have been residing in forests for generations but whose rights could not be recorded, to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. The recognised rights of the forest dwelling Scheduled tribes and other traditional forest dwellers include the responsibility and authority for sustainable use, conservation of bio-diversity and maintenance of ecological balance and thereby strengthening the conservation regime of forests while ensuring livelihood and food security of above mentioned groups. The forests rights on ancestral lands and their habitat were not adequately recognised in the consolidation of State Forests in pre-independence and post independence period resulted in historical injustice to these groups, who are integral part to the very survival and sustainability of the forest ecosystem. The act also recognised the necessity to address the long standing insecurity of tenurial and access rights of forest dwelling Schedule Tribes and other traditional forest dwellers including those who are forced to relocate their dwelling due to state development interventions. This act has enabled for recognition, protection and transfer of rights to these groups who have been deprived of the legal rights for centuries together.

SECTION: XIX.18: PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE:

The National Forest Policy 1988 indicated that the local people shall have first charge on forest produce. The forest produce obtained from forests will first be supplied to local people at the rates fixed by Government. The arrangement should be made at such places near the villages where the villagers can approach easily.

SECTION: XIX.19: SMALL TIMBER, POLES AND FIRE WOOD:

Small timber and poles are used by local people for agriculture as well as house construction. Firewood shall be supplied from the local depots at concessional rates. To meet the demand of local people for forest produce such as small timber, poles, fire wood etc. for construction, repairs to house, agriculture purposes and fire wood for domestic use will be supplied at concessional rates from local depots. The demand of local people shall

be obtained through Gram Panchayat and their demand for above mentioned material shall be met.

SECTION: XIX.20: METEOROLOGICAL OBSERVATIONS :

Since there is a well established Meteorological Department in the state with its offices in the rural areas, it is unnecessary to incur expenditure on instruments meant for meteorological observations. The necessary meteorological observations can be obtained from Meteorological Department. However it is necessary to know about number of rainy days and quantum of rain for plantation activities, therefore instruments regarding the same are required to be installed at suitable places. Automatic self recording rain gauge may be used in this connection.

SECTION: XIX.21: BUILDINGS:

Pandharkawada Forest Division was created in 1983. There is no building for office of DCF and presently DCF office is accommodated in rental building. Therefore the DCF will have to prepare special scheme for the construction of office building. The residential buildings available in the division are not sufficient to accommodate the entire staff. Therefore the DCF will have to prepare a scheme for construction of residential buildings for accommodating staff in phased manner and obtain necessary sanction from competent authority. The details regarding available buildings are given in Appendix VII of volume II of this plan.

Presently maintenance of existing buildings, offices, rest houses and residential quarters is very poor due to paucity of funds and these buildings require regular maintenance.

SECTION: XIX.22: ROADS, CART TRACTS AND CULVERTS:

The details of roads, cart tracts and culverts have been given in Appendix VIII of Volume II. Construction of new roads on the forest land is not permitted under Forest (Conservation) Act 1980 without prior permission of Government of India. These roads, cart tracks and culverts require regular maintenance for effective management of forests.

SECTION: XIX.23: ESTABLISHMENT AND LABOURERS:

The total area of the division is 58,801.02 ha, some patches of forest are prone for illicit felling. In those pockets the protection staff shall not be entrusted with other activities of management. In other pockets where problems are less for illicit felling, the staff can better implement WP operations. The RFO and subordinate staff shall be properly placed for implementation of working plan operations. As per the protection problems of the forest the following norms have been fixed for Beat, Round and Range.

Beat Norms: 400 to 800 ha in thickly populated area, well connected to adjoining cities and industries and 800 to 1100 ha for other areas.

Round Norms: 2,000 to 3,000 ha in the area with heavy biotic pressure and for other areas it is 3,000 to 4,000 ha.

Range Norms: 95 to 150 sq km in thickly populated area and 180 to 225 sq km in other areas

SECTION: XIX.24: RE – ORGANIZATION:

The re-organization of East Yavatmal and West Yavatmal Division was effected in the year 1983 forming three divisions i.e. Yavatmal, Pusad and Pandharkawada. The Pandharkawada Forest Division having head quarters at Pandharkawada with 6 Ranges, 17 Rounds and 72 beats. The average area of beat is 803 ha. which may be beyond the control of the Forests Guard due to demand of small timber, fire wood and other forest produce of increasing population. Such a situation leads to illicit felling, encroachment, illegal grazing etc. which may be beyond the capacity of the Forests Guard to control.

A) Before reorganization the number of ranges, rounds and beats is as follows.

1) Total number of Ranges – 6, these are 1) Pandharkawada 2) Parwa 3) Patanbori 4) Umari 5) Mukutban 6) Wani.

2) Total number of Rounds – 17, Total number of beats – 72 Average area of Range – 9800 ha., Average area of Round – 3459 ha. Average area of Beat – 816 ha.

B) After reorganization the number of ranges rounds, beats may be as follows:-

1) Total number of Ranges – 7, these are 1) Pandharkawada 2) Parwa 3) Patanbori 4) Umari 5) Mukutban 6) Wani. 7) Maregaon.

2) Total number of Rounds – 21, Total number of beats – 75, Average area of Range – 8357.12 ha., Average area of Round – 2785.70 ha. Average area of Beat – 780 ha.

The details regarding reorganization of Pandharkawada Forest Division is given in table below.

STATEMENT SHOWING THE DETAILS OF RANGE, ROUND, BEAT (EXISTING AND PROPOSED REORGANIZATION)

EXISTING							AFTER REORGANIZATION						
Sr. No.	Range	Round	Average	Beat	Average	Total Area(ha)	Sr. No.	Range	Round	Average	Beat	Average	Total Area(ha)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	P'kawada	3	4629.05	14	991.94	13887.14	1	P'Kawada	2	3408.18	9	757.37	6816.35
2	Mukutban	3	3671.26	14	786.70	11013.79	2	Patanbori	2	1982.19	6	660.73	3964.38
3	Wani	4	2759.14	15	735.77	11036.54	3	Mukutban	3	2708.30	8	1015.61	8124.90
4	Umari	3	2438.57	12	609.64	7315.72	4	Jamni	3	3154.67	12	788.67	9464.02
5	Patanbori	1	5044.90	6	840.82	5044.90	5	Wani	3	3352.70	10	1005.81	10058.10
6	Parwa	3	3500.98	11	954.81	10502.93	6	Maregaon	5	2181.25	16	681.64	10906.27
							7	Parwa	3	3055.29	14	654.71	9165.88
		17		72		58801.02			21		75		58499.90

SECTION: XIX.25: MAINTENANCE OF LAND RECORDS :

The DCF Pandharkawada is responsible for maintenance of land records which will constitute

- (1) 7/12 record of all survey numbers belonging to Forest Department.
- (2) Village maps on 1:5000 scale shall be procured.
- (3) A comparative chart of 3 surveys i.e. 'Jamabandi', resurvey and consolidation and different area of forest survey numbers in each survey shall be prepared.
- (4) 7/12 extract on which the record of right is not mutated in the name of Forest Department earlier, shall be persuaded to transfer it in the name of Forest Department. It shall be pursued to make necessary mutation in 7/12 extract regarding the area transferred to the Forest Department.
- (5) It shall be ensured that in each 7/12 extract the following entries were recorded: The Government of Maharashtra, Forest Department, Reserved Forests and Protected Forests.

The above entries shall be written in hand writing and no stamps shall be used to show these prescriptions.

(6) The forest area 1827.83 ha.(mentioned in Yadav's plan) handed over to other department should be updated and verified and denotify compartment wise.

(7) 499.55 ha E-class forests area transferred to Pandharkawada Forest Division out of 2126.08 ha from Revenue department which notification yet to be decided. Remaining area of E class forest is still with Revenue department. Therefore efforts should be made to get rest of the E class area and notification of all 2126.08 ha area should be completed within given frame time.

(8) Reconciliation of all type of forest areas along with compartment and survey number wise with respect to Reserved forest, Protected forest, Un classed forests and other forest area should be verified and updated during plan period.

SECTION: XIX.26: ENCROACHMENT:

Encroachment is a constant problem for forest protection. The Government of Maharashtra had taken decision in 1978 and 1979 to regularize encroachments pertaining to period 1/4/1972 to 31/3/1978 and certain conditions were laid down to confirm eligible encroachers. Accordingly most of the encroachments pertaining to that period were regularized. However some of the encroachments of that period remain without regularization due to various reasons of non-availability of record, encroachments not pertaining to that period etc. The description is given in section VII of chapter XIX of this text.

SECTION: XIX.27: WORKING PLAN NOTE:

CCF (T), Yavatmal in consultation with DCF Pandharkawada Forest Division shall prepare a note on WP at the end of WP period and the note shall be sent to the Working Plan Officer and APCCF Working Plan, (East), Nagpur for revision and preparation of working plan of Pandharkawada Forest Division.

CHAPTER XX

CONTROL AND RECORDS

SECTION: XX.1: CONTROL AND RECORDS

The following records shall be maintained in the division office.

1. Control forms
2. Compartment History
3. Plantation and Nursery Registers
4. Divisional Note Book.

XX.1.1: CONTROL FORMS:

(1) Control forms should be prepared regarding implementation of WP prescriptions as well as definite suggestions regarding other operations. For the control of all harvesting, subsidiary silvicultural operations, cleaning, thinning, regeneration works and soil and moisture conservation works carried out as per the working plans prescription, it will be maintained in the control forms for controlling and maintaining record. The prescribed proforma of the following forms is given in Appendix no. LII of Volume II of this plan.

(2) DCF Pandharkawada Division shall submit coupe control forms to CCF (T), Yavatmal circle by December every year. CCT (T), Yavatmal circle after verifying them, would send them to Working Plan Officer by January every year. All the entries showing the deviation from prescriptions of Working Plan will be underlined in red ink.

SECTION: XX.2: COMPARTMENT HISTORY FORMS

Compartment history is the record of various activities and observations made in the past year will be maintained in forms no. 1 to 5 as given in Appendix LIII of Volume II of this Working Plan.

1. Form no.1: Compartment description written by Conservator of Forests, Working Plan Division Yavatmal as per his inspections and forest proceeds.
2. Form no.2: Record of changes in the growing stock and plantations.
3. Form no.3: Trees marked for felling.

4. Form no.4: Compartment out- turn.
5. Form no.5: Compartment History.

Each compartment must have a separate file and compartment history must be maintained by the division since they keep the record of past management practices and their effects on the growing stock. Every year in July the RFO should fill the necessary information and will send to the DCF, Pandharkawada for scrutinizing and editing through the concerned ACF who after doing so will get them typed and sign them. One copy of the forms will be filed in the divisional compartment history file while one copy of each will be sent to Range Forest Officer and Conservator of Forests, Working Plan Division, Yavatmal.

SECTION: XX.3: PLANTATION AND NURSERY REGISTERS:

Plantation register will be maintained for all the areas regenerated artificially in the form no. 1 to 9 as given in the Volume II Appendix no. LIV. Nursery registers will be maintained in Form no. 1 to 10 as given in the Volume II Appendix no. LV of this Working Plan.

SECTION: XX.4: DIVISIONAL NOTE BOOK:

The matters of divisional importance will be recorded under standard heading for records and ready reference in the divisional note book. A brief note on plantations will also be recorded by the DCF under the appropriate heads. The forms of Divisional Note Book are given in the Volume – II, Appendix no. LVI.

* * * *

CHAPTER XXI

THE ESTIMATED VALUE OF FORESTS

The forests are of tropical dry deciduous type dominated by Teak (*Tectona grandis*) distributed throughout the area along with its associates like Dhawada, Ain, Lendia, Tiwas, Tendu, Behada, Salai, Bija etc. Teak is mostly of coppice origin. There are about 101 timber species and all of them may not be economically profitable. An attempt has been made here to calculate total capital value of forests by using standard deviation method. The capital value has been calculated for various WC as the stocking position is different in various WC.

Capital value of forests under SCI WC

Sr. no.	Girth Class cm	Number of trees/ha		Stumpage value		Capital value of forest/ha	
		Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	15-30	47	53	108.14	33	5082.58	1749
2	31-45	53	32	726.2	214.5	38488.60	6864
3	46-60	46	19	1584.74	474	72898.04	9006
4	61-75	33	11	3248.46	975	107199.18	10725
5	76-90	22	7	5717.66	1716	125788.52	12012
6	91-105	9	4	9894.38	2667.3	89049.42	10669.2
7	106-120	4	3	14194.16	4256.7	56776.64	12770.1
8	121-135	1	2	16318.02	4886.18	16318.02	9772.36
9	136 & above	1	1	17818.02	5346	17818.02	5346
	Sub-Total	216	132			529419	78913.66
	Grand Total (total value per ha)					608332.68	

The value per hectare = Rs 6,08,332.66

Total Value (Area x Value per hectare) = 30734.78 ha. X 6,08,332.66

= Rs 1,86,970 lakhs

Capital value of forests under Afforestation WC

Sr. no.	Girth class cm	No.of trees/ha		Stumpage value		Capital value of forest/ha	
		Teak	Non-Teak	Teak	Non- Teak	Teak	Non- Teak
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	15-30	9	91	108.14	33	973.26	2211
2	31-45	6	33	726.2	214.5	4357.2	7722
3	46-60	4	11	1584.74	474	6338.96	10428
4	61-75	2	6	3248.46	975	6496.92	11700
5	76-90	2	3	5717.66	1716	11435.32	13728
6	91-105	1	2	9894.38	2667.3	9894.38	10669.2
7	106-120	1	1	14194.16	4256.7	14194.16	8513.4
8	121-135	1	1	16318.02	4886.18	16318.02	9772.36
9	136 & above	0	1	17818.02	5346	0	5346
	Sub-total	26	149			70008.22	46116.98
	Grand Total (value per ha.)					116125.2	

The value per hectare = Rs 1, 16,125.2

Total Value (Area x Value per hectare) = 25552.50 ha X 1, 16,125.2

= Rs 29,673 lakhs

Capital value of the forests allotted to the Fodder Improvement WC

Sr. no	Girth Class cm	No.of trees/ha		Stumpage value		Capital value of forest/ha	
		Teak	Non Teak	Teak	Non Teak	Teak	Non Teak
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	15-30	15	67	108.14	33	1622.1	2211
2	31-45	12	36	726.2	214.5	8714.4	7722
3	46-60	9	22	1584.74	474	14262.66	10428
4	61-75	7	12	3248.46	975	22739.22	11700
5	76-90	3	8	5717.66	1716	17152.98	13728
6	91-105	2	4	9894.38	2667.3	19788.76	10669.2
7	106-120	1	2	14194.16	4256.7	14194.16	8513.4
8	121-135	1	2	16318.02	4886.18	16318.02	9772.36
9	136 & above	0	1	17818.02	5346	0	5346
	Sub-total	50	154			114792.3	80089.96
	Grand Total (value per ha.)					194882.26	

The value per hectare = Rs 194882.26

Total value(Area x Value per hectare) = 2513.74 ha X 1,94,882.26

= Rs 4,899 lakhs

Total capital value of the forest of Pandharkawada Forest Division

Working Circle	Area ha.	Value of forests in Lac
SCI WC	30734.78	1,86,970
AWC	25552.50	29,673
FIWC	2513.74	4,899
Total	58801.02	2,21,542

The total forest area of Pandharkawada Forest Division is 58801.02 ha. The capital value of the forest estimated is Rs.2215.42 crores by using the standard deviation method, without considering other intangible benefits. The Government issued G.R.No./FLB-1002/C.No. 199/ F-10, dt. 9/12/2003 in which the procedure is given how to calculate Net Present Value (NPV) based on quality, density and species. In view of instructions in above mentioned G.R. an attempt has been made to calculate Net Present Value (NPV) of Pandharkawada Forest Division.

The extent of area density wise is given in the following table.

Density wise area of Pandharkawada Forest Division

Density	Area in ha.
0.6 and above	3324.68
0.4 to 0.6	18172.37
0.1 to 0.4	14317.78
0.1 and below (blank)	22986.19
Total	58801.02

As per the G.R. different rates are given for different density classes and different WC. The NPV calculated is given in the below mentioned table.

NPV of forests

WC	Density	Area in ha.	NPV per ha (Rs. lakhs)	NPV in lakhs
SCI	0.6 & above	3254.68	9.20	29943
	0.4 to 0.6	16052.92	9.00	144476
AWC & FIWC	0.6 & above	70.00	7.70	539
	0.4 to 0.6	2119.45	7.13	15112
SCI, AWC and FIWC	0.1 to 0.4	14317.78	6.56	93924
	0.1 & below (blank)	22986.19	5.80	133320
	Total	58801.02		417314

The net present value (NPV) of forest of Pandharkawada is Rs 417314 lakhs.

Estimated value of out turn of forests:

The forests of this division are managed on a sustained annual yield basis. The net annual realisation represents the return on the capital out turn calculated by formula

$$\text{Capital out-turn} = \frac{r}{0.0p}$$

Where 'r' is the net annual income and 'p' is the rate of interest.

The average annual income from this division for last 10 years is

Rs. @ 7 % interest the capital out-turn of this net income is.

$$\text{Capital out-turn} = r/0.0p = \frac{33239935}{0.07} = 47485621$$

The total area covered under this plan is 58801.02 ha.

$$\text{Hence capital value per ha is : } \frac{47485621}{58801.02} = \text{Rs. 807.56}$$

CHAPTER XXII

ESTIMATE OF CAPITAL VALUE OF FORESTS

SECTION: XXII.1: IN TERMS OF TANGIBLE AND INTANGIBLE BENEFITS:

XXII.1.1: IN TERMS OF TANGIBLE BENEFITS:

Since the market rates for timber and firewood and also the production and extraction cost is increasing every year an attempt has not been made to find out the exact capital value of the forests in terms of rupees. However, the existing growing stock per hectare is already discussed in detail in the previous chapter XXI.

XXII.1.2: INTANGIBLE BENEFITS:

As the forests are depleting fast, the intangible benefits of the forests are getting more and more important day by day. During an unique research done in the Banaras University, it is found that a single tree of about fifty years age is worth.

a) Exhales oxygen worth	Rs. 2.50 lakh
b) Inhales CO ₂ and thus purifies air worth	Rs. 5.00 lakh
c) Prevents soil erosion worth	Rs. 2.50 lakh
d) Regulates water supply worth	Rs. 3.00 lakh
e) Provides shelter to wildlife worth	Rs. 2.50 lakh
f) Causes synthesis of proteins worth	<u>Rs. 0.20 lakh</u>

XXII.2: Thus from a middle aged tree we get intangible benefits worth about Rs. 15.7 lakhs. It is also estimated that well stocked wood land on one hectare area absorb 3.7 tone of CO₂ from atmosphere and give about 2.5 tone of life sustaining oxygen.

XXII.3: As per the guidelines issued by the Government of India in the Ministry of Environment, Forest and Wildlife vide No. 11-6/85/FRY(Cons.) dt.13th January 1986 regarding cost benefit analysis for dereservation of forest land under Forest Conservation Act, 1980, they have given a thumb rule as follows:

ONE HA. OF FULLY STOCKED FORESTS (DENSITY = 1.00)

- (i) Avoids soil erosion,
- (ii) Affects hydrological cycle,
- (iii) Provides wildlife habitat,
- (iv) Improves micro climate, and
- (v) Maintains ecological balance

Worth Rs.126.74 lakhs to accrue over a period of 50 years. This shows the tremendous value of the forests.

CHAPTER XXIII

FINANCIAL FORECAST

Working plan for the Pandharkawada has been prepared with specific objectives in respective working circles. Various prescriptions have been given to achieve these objectives. Execution of works needs proper planning and adequate financial provision for that. Execution of works will generate some services and revenue to exchequer. That is why we need financial forecast for the plan.

SECTION: XXIII.1: EXPENDITURE

XXIII.1.1: Expenditure on establishment :

To run the proper administration, an efficient administrative set up is required. It is recurring expenditure on the set up of organization i.e. on salary and other benefits to officials and staff, maintenance of offices, vehicles, roads, buildings, machines, communications.

XXIII.1.2: Expenditure on harvesting forest produces and other activities:

During the implementation of prescriptions of the draft report, some forest produce are going to be harvested. In SCI WC and NWFP WC, forest produce in the form of timber, firewood or other produce like tendu leaves, gums etc will be harvested, it will need expenditure to be incurred on various activities.

XXIII.1.3: Expenditure Details :

Since the expenditure on various items are linked with minimum wage rate for wages and the prevailing salaries of staff and officers, it is not possible to work out expenditure on specific item at a point of time. We can have the glimpses of it based on certain assumptions. First of all we assume that wage rate and salaries and other commodities consumption are going to be static. The quantum of works to be carried out is also going to be constant and furthermore the areas to be tackled yearly are also not going to vary. Based on these assumptions, the calculations are made. These are symbolic and not final.

(A) Timber: Cost of exploitation per cubic meter timber = Rs. 1800/-
 Cost of exploitation per beat firewood = Rs. 180/-

Details of yield and expenditure under SCI WC

Working Circle	Area in ha.	Average Area per year in ha.	Yield per year			Expenditure in rupees lakhs per year	
			Timber	Poles	Fire wood	Timber, Firewood	Total
SCI	30734.78	1536.74	1495 m ³	2000	200 beats	27.27	27.27
AWC	25552.50	1277.63	93 m ³	250	25 beats	1.72	1.72
		Total	1588 m ³	2250	225 beats	28.99	28.99

(B) Regeneration

(i) Natural Regeneration:

Natural regeneration will be carried out in SCI WC, Afforestation WC, Improvement WC and Fodder Improvement WC. The expenditure will be incurred as per the rate sanctioned by PCCF, M.S.

Projection of Expenditure in Various WC

Sr. no.	Working Circles	Area in ha.	Workable Area per year in ha.	Expenditure (rupees in lakhs (Rate @ Rs. 7800/ ha , daily wage Rate Rs.230/MD))	No. of man-days to be generated.
1	2	3	4	5	6
1	SCIWC	30734.78	1000	78.00	33913
2	AWC	25552.50	175	13.65	5935
3	FIWC	2513.74	25	1.95	848
	Total	58801.02	1200	93.60	40696

(ii) Artificial Regeneration:

Artificial regeneration works are required in under stocked and suitable blank areas. The expenditure will be incurred as per the rate sanctioned by PCCF, MS.

Plantation Under A.R. in SCI

Plantation work	Total area in ha. during this Plan period	Area available per year in ha.	Operation	Expenditure in rupees lakhs (daily wage rate 230/)	no. of man-days to be generated
1	2	3	4	5	6
Teak Plantation and others	4000	200	PPO/PYO	139.93	60838
			FYO	44.01	19136
			SYO	18.86	8200
			TYO	18.86	8200
			4 th YO	8.53	3708
			5 th YO	8.53	3708
			Total	238.72	103790

(C) Soil and moisture conservation and other items

Exhaustive plan will be prepared and expenditure will be incurred from Employment Guarantee Schemes and Rural Development Schemes and Water Conservation Schemes of Central and State Government. Hence no quantification has been attempted.

S & MC Works with A.R. Expenditure in Rs Lakhs in AWC and FIWC (Rate - 230)

Plantation work	Total area in ha. during this Plan period	Area available per year in ha.	Operation	Expenditure in rupees lakhs. (daily wage rate 230/-)	No. of man-days to be generated.
1	2	3	4	5	6
Teak & misc. Plantation	8000	400	PPO/PYO	279.85	121676
			FYO	88.03	38272
			SYO	37.72	16400
			TYO	37.72	16400
			4 TH YO	17.06	7416
			5 TH YO	17.06	7416
			Total	477.44	207580

Year wise details of expenditure: Expenditure to be incurred during Plan period is summarized in following table.

Artificial Regeneration expenditure in SCI

Year	Artificial Regeneration expenditure in Rs. lakhs						Total expdr. in Rs lakhs	No. of man-days to be generated
	P P O	F Y O	S Y O	T Y O	4 th Y O	5 th Y O		
1	2	3	4	5	6	7	8	9
2012-13	140	--	--	--	--	--	140	60838
2013-14	140	44	--	--	--	--	184	79974
2014-15	140	44	19	--	--	--	203	88174
2015-16	140	44	19	19	--	--	212	96374
2016-17	140	44	19	19	9	--	221	100082
2017-18	140	44	19	19	9	8	239	103790
2018-19	140	44	19	19	9	8	239	103790
2019-20	140	44	19	19	9	8	239	103790
2020-21	140	44	19	19	9	8	239	103790
2021-22	140	44	19	19	9	8	239	103790

SMC Works with artificial regeneration expenditure (AWC & FIWC)

Year	Artificial Regeneration expenditure in Rs. lakhs						Total expdr. in Rs lakhs	No. of man-days to be generated
	P P O	F Y O	S Y O	T Y O	4 th Y O	5 th Y O		
1	2	3	4	5	6	7	8	9
2012-13	280	--	--	--	--	--	280	121676
2013-14	280	88	--	--	--	--	368	159948
2014-15	280	88	38	--	--	--	406	176348
2015-16	280	88	38	38	--	--	444	192748
2016-17	280	88	38	38	17	--	461	200164
2017-18	280	88	38	38	17	17	478	207580
2018-19	280	88	38	38	17	17	478	207580
2019-20	280	88	38	38	17	17	478	207580
2020-21	280	88	38	38	17	17	478	207580
2021-22	280	88	38	38	17	17	478	207580

Total Expenditure in Rs lakhs

Year	Establi shment	Boundary, demarcati on fire protection	Timber	S & m work	N.R	artificial regeneratio n expenditure Rs lakhs	Total expdr. in Rs lakhs	No. of man- days to be generated
1	2	3	4	5	6	7	8	9
2012-13	13	40	29	32	94	420	628	267391
2013-14	13	40	29	32	94	552	760	324783
2014-15	13	40	29	32	94	609	817	349565
2015-16	13	40	29	32	94	656	864	370000
2016-17	13	40	29	32	94	682	890	381304
2017-18	13	40	29	32	94	717	925	396522
2018-19	13	40	29	32	94	717	925	396522
2019-20	13	40	29	32	94	717	925	396522
2020-21	13	40	29	32	94	717	925	396522
2021-22	13	40	29	32	94	717	925	396522

SECTION: XXI.2: ANNUAL REVENUE EXPECTED FROM ALL SOURCES:

Exploitation of forest produce not only leads to incurring expenditure but also generates revenue in the form of services and goods. Revenue would be received from exploitation of timber, firewood, bamboo, services of grazing, eco-tourism, NWFP etc.

Revenue from all sources:

Sr. no.	Item	Quantity	Rate	Revenue in Rs lakhs
1	2	3	4	5
1	Timber (Selection)	864 m ³	45000/ m ³	389
2	Timber (Improvement)	724 m ³	20000/ m ³	145
3	Fuel Beats	225 beats	2500/beat	6
4	Poles	2250 Nos.	250/pole	6
5	Tendu	18000 Std. bags	700 Rs./Std.bag	126
6	Miscellaneous	--	Lump-sum	10
	Total			682

SECTION: XXIII.3: STATEMENT OF REVENUE AND EXPENDITURE FOR THE ENTIRE PLAN PERIOD

(in rupees lakhs; 8 % additional rate per year)

Sr. no.	Year	Timber	Fuel Beat	Pole	Tendu	Other	Total Revenue	Total Expenditure	No. of man-days to be generated
1	2	3	4	5	6	7	8	9	10
1	2012-13	682	6	6	126	10	830	628	267391
2	2013-14	737	6	6	136	11	896	821	324783
3	2014-15	796	7	7	146	12	968	882	349565
4	2015-16	860	7	7	158	13	1045	933	370000
5	2016-17	929	8	8	170	14	1129	961	381304
6	2017-18	1002	9	9	183	15	1218	999	396522
7	2018-19	1083	9	10	198	16	1316	1078	396522
8	2019-20	1170	10	11	212	17	1420	1164	396522
9	2020-21	1262	11	12	230	18	1533	1257	396522
10	2021-22	1364	12	13	248	19	1656	1358	396522

SECTION: XXI.4: EXPENDITURE ON PLAN PREPARATION:

Expenditure on Plan of Pandharkawada Forest Division cannot be separately worked out. Working Plan Division has been given the responsibility of preparing plan of various forest divisions. Revision of working plan for Pandharkawada Forest Division was taken up in 2010-11 and simultaneously, revision of Yavatmal Forest Division had been carried out since then. Office of the APCCF, (Working Plan-East), Nagpur also incurs expenditure on GIS works and instruments. Hence actual expenditure on preparation of this Plan cannot be segregated. Proportionate expenditure has been worked out as given below.

Proportionate Expenditure - Rs. 1,25,58,600/-
Working Plan Area. - 58801.02 ha.
Per Unit Area Cost. - Rs. 213.58/ ha.

* * *

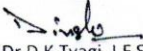
State Level Committee Meeting held on 1st & 2nd March 2013

Ref : (1) G.R. Revenue and Forest Department no. MSC2004/CR-102/F2, dated 25.6.2004

(2) PCCF M.S., Nagpur's letter no. D-14/WP/SLC1&2.3.13/86/13-14/dated 15.5.2013.

Draft Working Plan (PWPR-II) of Pandharkawada Forest Division was discussed and approved by the State Level Committee under the chairmanship of Principal Chief Conservator of Forests, M.S., Nagpur in the meeting held on 1st & 2nd March 2013.


(A.V. Giripunjee)
Dy. Conservator of Forests
Forest Division Pandharkawada


(Dr. D.K. Tyagi, I.F.S.)
Chief Conservator of Forests (T)
Yavatmal

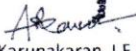
(Ashwin Mudgal, I.A.S.)
District Collector, Yavatmal
Member, State level Committee


(R.R. Sahay, I.F.S.)
Addl. Principal Chief Conservator of Forests
(Policy, Technology & Strategic Planning)
M.S. Nagpur
Member, State level Committee

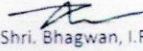

(Tasneem Ahmed, I.F.S.)
Principal Chief Conservator of Forests
(Production & Management)
M.S. Nagpur
Member, State level Committee

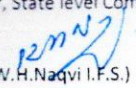

(A.K. Joshi, I.F.S.)
Principal Chief Conservator of Forests
(HOFF) M.S. Nagpur
Member, State level Committee


(Dr. R.N. Rai, I.F.S.)
Conservator of Forests,
Working Plan Division, Yavatmal


(M. Karunakaran, I.F.S.)
Addl. Principal Chief Conservator of Forests
(Working Plan-East) Nagpur
Member, State level Committee


(N.B. Majumdar, I.F.S.)
Addl. Principal Chief Conservator of Forests
(Conservation) M.S. Nagpur;
Member, State level Committee


(Shri. Bhagwan, I.F.S.)
Addl. Principal Chief Conservator of Forests
(Budget, Planning & development)
M.S. Nagpur
Member, State level Committee


(S.W.H. Naqvi, I.F.S.)
Principal Chief Conservator of Forests
(Wildlife) M.S. Nagpur
Member, State level Committee

(Laxmendar Singh, I.F.S.)
Addl. Principal Chief Conservator of Forests,
Regional Office, G.O.I., Western Region, Bhopal
Member, State level Committee



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

Speed Post

क्षेत्रीय कार्यालय, पश्चिम क्षेत्र,
Regional Office, Western Region,
"केन्द्रीय पर्यावरण भवन"

"Kendriya Paryavaran Bhavan"

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फोन- 2466525, 2463102, 2465496

अणुडाक /E-mail: apccfbhopal@gmail.com

File No. 12-30/2013(FOR)/1921

Dated: 19/11/13

To,

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

अपर प्रधान मुख्य वनसंरक्षक
(कार्य आशोजना-पूर्व) नागपुर

29 NOV 2013

आवक क्रमांक 3041

कक्ष D-14

Sub. : Working Plan proposal for Pandharkawada Forest Division, written by Dr. R. N.Rai, IFS for the period of 2013-14 to 2022-23.

Ref. : 1. Your letter No.-FDM-2013/CR No.215/F-2 dated 25-07-2013.

2 PCCF (P&M), Nagpur's letter No. D-14/WP/Pkd/2013-14/661/2013-14 dated 14.10.2013.

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 :

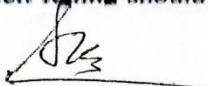
1. The currency of the Working Plan shall be for a period of 10 years i.e. from 2013-14 to 2022-23.
2. The orders of Hon'ble Supreme Court in the matter of Godaverman Therumalkpad Vs Union of India in W.P. (Civil) No. 202/95 and related Interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
3. Further, in compliance with orders of Hon'ble Supreme Court dated 22.09.2000, the state government shall ensure that regeneration of forests is commensurate with felling carried out under this working plan.

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4. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with felling. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.
5. Following the directions of the Hon'ble Apex Court in their order dated 22.09.2000, a Core group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with felling.
6. Instructions/directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling is 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 Working Circles other than Selection – cum – Improvement W.C.
9. Prescriptions of micro plans for JFM (if made) should not deviate from the broad framework/guidelines of the working plan and shall be in accordance with various orders of Hon'ble Supreme Court.
10. Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/future years to compensate this removal.
11. No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval of the Central Government under Forest (Conservation) Act, 1980, However, deviations of positive nature i.e. out of turn plantation carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.
12. Growth statistics of regeneration, record of its survival will be appended in Working Plan from time to time.
13. Midterm review of Working Plan shall be undertaken after five years so as to make any changes, if needed to meet the objectives, with the approval of Regional Office, Bhopal.
14. The exploitable girth of tree species and period of felling cycle shall not be lower than the approved in previous working plan.
15. In the vicinity of Nalas and water bodies felling shall not be undertaken.
16. Felling shall not be undertaken near the known resting places of wild animals.
17. 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 compiled along with the estimation of

Wp approval


09/11/13

their stand volumes as per the same volume table used for the assessment of growing stock. This report shall be prepared annually working circle and compartment wise by the territorial DFO and shall be submitted to the C.F, Working Plan for this purpose with in 02 months of the end of control year. Such removal shall be accounted for against the prescribed felling yield of the relevant year.

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. Execution of Working Plan shall be in conformity with the National Forest Policy.
22. A definite plan has to be made remove encroachment and plant the vacated area by panting suitable local species.
23. Eco-tourism shall be undertaken on sustainable basis No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed for public. Such sites will be declared Plastic free zones and these eco-tourism sites will be managed by the forest department as per the prescriptions of the working plan.
24. Demarcation and consolidation of Forest Boundaries will be done adequately.
- # 25. The exploitable girth in SCI W.C. will not be less than that of Yadav's Working Plan for stands of similar nature. Only 50% of normal yield will be harvested as per the direction of Government of India.
- # 26. No felling except standard Silvicultural operations will be done in other Working Circles.
27. Proper management plan should be in place for areas under control of FDCM Ltd.
28. Since fire in one of the most destructive factors during summer, adequate arrangements are to be put in place including preparation of fire plan.
- # 29. Efforts should be made to undertake artificial regeneration of local species in such a way that it both serve the purpose of biodiversity conservation and meeting the demand of fuel wood, fodder and timber.
30. Proper mechanism is to be put in place so that NTFPs are collected in a sustainable manner.
- # 31. Standard silvicultural operations under the strict supervision of Assistant Conservator of Forests and above will be allowed to improve the health of growing stock.
32. Exotic species should not be planted in plan areas.
33. Documents and appendices mandated in National Working Plan Code will be incorporated in the Working Plan.
- # 34. Socio-economic survey is to be conducted with in first year of implementation of plan and the same be appended with the Working Plan.

Wp approval


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35. The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented or relevant modification in the working plan is required so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy.

Yours faithfully,


(S.K. Bhandari)

Chief Conservator of Forest (Central)

19/11/13

Copy to :

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


(S.K. Bhandari)

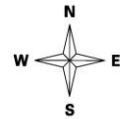
Chief Conservator of Forest (Central)

19/11/13

REFERENCE -MAP PANDHARKAWDA FOREST DIVISION

WORKING PLAN (2013-14 to 2022-23)

WRITTEN BY :-Dr. R.N.Rai, I.F.S.



Scale :- 1: 2,50,000

Legend	
	Division Boundary
	Range Boundary
	Round Boundary
	Beat Boundary
	Comptt. Boundary
	Division Headquarter
	Taluka Headquarter
	Range Headquarter
	S.C.I.w.c.
	Afforestation w.c.
	Fodder w.c.
	Major Road
	Minor Road
	Round Name
	Compartment No.
	Range Name
	Taluka Name
	F.D.C.M.
	Wild Life Sanctuary

