



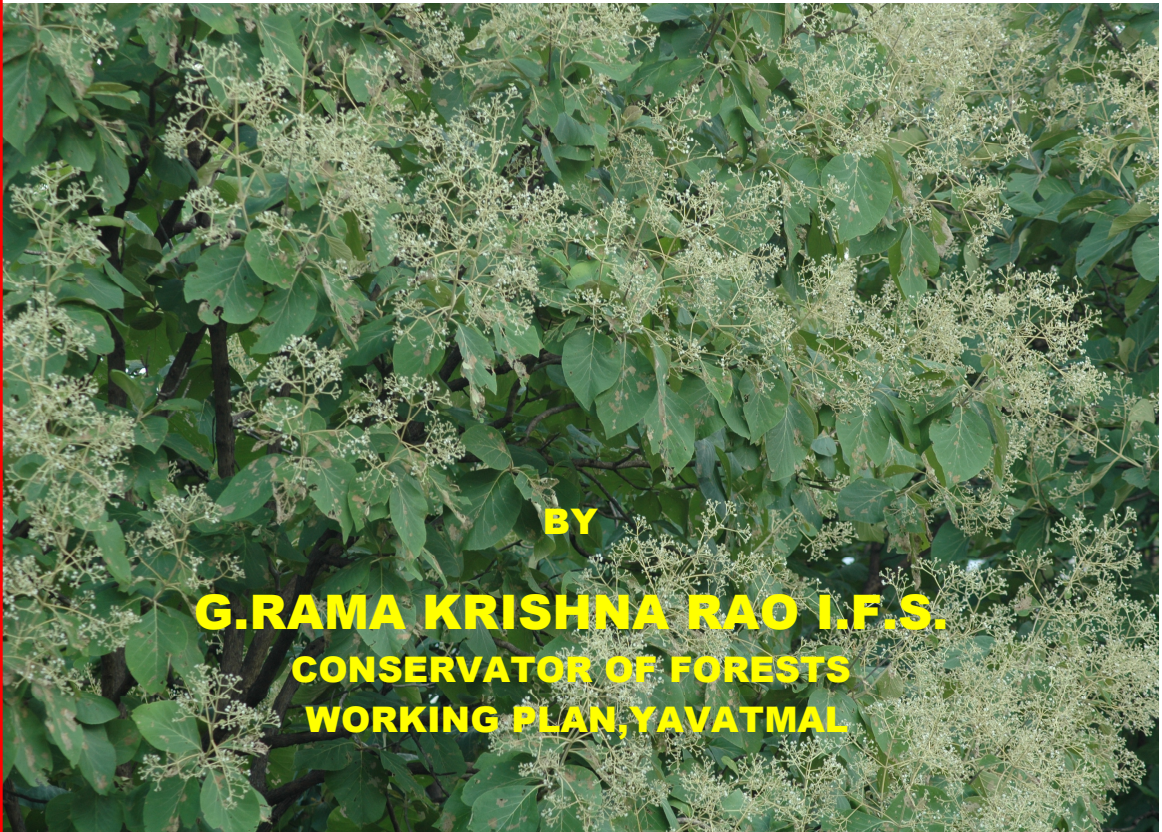
GOVERNMENT OF MAHARASHTRA

**WORKING PLAN
FOR THE PERIOD 2012-13 TO 2021-22**

VOLUME - I

**YAVATMAL FOREST DIVISION
YAVATMAL FOREST CIRCLE**

APRIL 2012



BY

**G.RAMA KRISHNA RAO I.F.S.
CONSERVATOR OF FORESTS
WORKING PLAN, YAVATMAL**



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FORWORD

Tarun Kumar Choubey, IFS
Chief Conservator of Forests
Working Plan Circle, Nagpur

Working Plan (WP) is the utmost important document for scientific management of forests. As per the instructions of Government of India and Hon'ble Supreme Court of India, green felling shall be carried out as per Working Plants. Thus WP acquired importance in management of Forests. Due to the increasing population, industrialization, expansion of agriculture, housing, communications etc. intense pressure has been built up on our forests. Further huge cattle population, fire, illicit cutting of trees for firewood and timber, encroachment etc are causing immense damage to forests. These factors have severely affected the productivity of forests, depriving the society the huge benefits of forest produce and services for our forests. The net present value of 84,602 ha Forests of Yavatmal Forest Division is about Rs. 6000 crores. Besides, forests being a renewable natural resource provide numerous services and products over years. Forest is repository to numerous plants that are used in preparation of drugs, pharmaceuticals, cosmetics etc. Forests play prime role in maintaining ecological balance, security of water, soil and agricultural resources, mitigating climatic changes, carbon sequestration etc.

2.00 It is an opportunity to the society as well as the Yavatmal Forest Division for fully utilize the provisions contained in this WP for management of forests. Implementation of WP will provide employment to local people, revenue to the state exchequer, increase the availability of timber, firewood, NWFP, fodder etc. and support protection and conservation of forests and wildlife.

3.00 I wish the Plan is implemented in the same spirits as it has been formulated by the authors and it results in the vigorous growth of natural regeneration which would bring the glorious past of these valuable forests back for sustainable use by future generations.

Preface



**Conservator of Forests,
Working Plan Division,
Yavatmal
21st April 2011**

Working Plan is the governing document for planning and executing forestry operations for sustainable management of forests. For revision and preparation of Working Plan, Shri Ramanuj Choudhary the then CCF (T), Yavatmal had prepared PWPR-I of Yavatmal Forest Division. After receiving approval of State Level Committee (SLC) to PWPR-I, Shri G.R.K.Rao, the then Conservator of Forests, Working Plan Division Yavatmal prepared PWPR-2. He worked very hard to prepare this plan. Later, I have incorporated modifications in the chapter on SCI Working Circle as per the directions of State Level Committee in the meeting held on 28.1.2011 at Nagpur. Shri Tasneem Ahmad, CCF (Protection), M.S., Nagpur has provided guidance for conducting stem analysis and determining harvestable girth of teak for SCI Working Circle. Additional information was included in other chapters as per the committee's directions. Shri Devendra Kumar, CCF, Yavatmal Circle, Shri Suresh Gairola, the then CCF (Working Plan), Nagpur, Shri T.K.Choubey, CCF (Working Plan), Nagpur and Shri S.S.Dole, DCF, Yavatmal Forest Division, have made contribution for preparing this working plan. Staff of Yavatmal Working Plan Division had put in hard work for preparing this document.

Implementation of this Working Plan would enhance productivity of forests, it will contribute to environmental stability, protection of soil and water regime, conservation of plant diversity and wildlife. Various forestry operations implemented under this Working Plan would provide employment to local people below poverty line considerable timber and fire wood also be available through the harvesting operations.


(A.R.Mande)

4.00 I appreciate the efforts put in by Shri G.R.K.Rao the then Conservator of Forests, Working Plan Division, Yavatmal & Shri A.R. Mande, Conservator of Forests, Working Plan Division, Yavatmal and his staff of Working Plan Division, Yavatmal for preparing this WP.

Place :- Nagpur

Dated :- 5th May 2011



(T.K.Choubey)

Chief Conservator of Forests
Working Plan Circle, Nagpur

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Location of Yavatmal Forest Division



Abbreviations

ACF	:	Assistant Conservator of Forests
AWC	:	Afforestation Working Circle
AR	:	artificial regeneration
bh	:	breast height
CA	:	compensatory afforestation
CAI	:	current annual increment
CBO	:	cut back operations
°C	:	degree Celsius
cm	:	centimeter, centimetres
CWR	:	Coppice With Reserve system
CCT	:	Continuous Contour Trench
Dbh ub:		diameter at breast height under bark
Dbh ob:		diameter at breast height over bark
DCF	:	Deputy Conservator of Forests
FDA	:	Forest Development Agency
FDCM:		Forest Development Corporation of Maharashtra Limited
F.G	:	Forest Guard
FIWC	:	Fodder Improvement Working Circle
FLCS	:	Forest Labourers Co-operative Society
FSI	:	Forest Survey of India
FRH	:	Forest Rest House
FYO	:	first year operation
GIS	:	Geographic Information System
GOI	:	Government of India
GOM	:	Government of Maharashtra
gbh	:	girth at breast height
ha.	:	hectare, hectares
IWC	:	Improvement Working Circle
JFM	:	Joint Forest Management
km	:	Kilometres
kg	:	Kilogram
m	:	metre, metres

m ³	:	cubic-metre, cubic metres
MD	:	man-day
mm	:	millimeter
MAI	:	mean annual increment
MOU	:	memorandum of understanding
MRSAC:		Maharashtra Remote Sensing Application Centre, Nagpur
misc.	:	miscellaneous
MSL	:	mean sea level
NDVI	:	Normalized Density Vegetation Index
NR	:	natural regeneration
NWFP:		Non-wood forests produce
no.	:	Number
PF	:	Protected Forest
POR	:	Preliminary Offence Report
PPO	:	pre-planting operation
PWPR	:	Preliminary Working Plan Report
RF	:	Reserved Forest
RFO	:	Range Forests Officer, Range Forest Officers
RRSSC:		Regional Remote Sensing Service Centre
SCI	:	Selection-Cum-Improvement
SLC	:	State Level Committee
SOFR	:	Survey of Forest Resources
SQ	:	Site quality
SYO	:	second year operation
SMC	:	soil and moisture conservation
TCM	:	trench-cum-mound
TYO	:	third year operation
WC	:	working circle, working circles
WPO	:	Working Plan Officer
WTO	:	World Tourism Organization

Working Plan 2011-12 to 2020-21

Yavatmal Forest Division

Author: Shri G.R.K.Rao, CF, Working Plan Division, Yavatmal

Executive summary

1. Introduction:

Working Plan (WP) of Yavatmal Forest Division authored by Shri R.S.Yadav expired during 2010-2011 and revision of WP was initiated in the year 2008. The PWPR-I prepared by Shri Ramanuj Choudhary, CCF, Yavatmal Circle was approved by State Level Committee (SLC) in the meeting held on 27-3-2008 (enclosure 1). PWPR-II was prepared by Shri G.R.K.Rao, CF, Working Plan Division, Yavatmal which was placed before SLC in the meeting held on 28-1-2011. PWPR-II was approved by SLC subject to certain modifications and adding additional information (enclosure 2). Accordingly changes have been made and WP was prepared. Brief account of the WP is given below.

2. Brief Information on Yavatmal Forest Division:

Yavatmal Forest Division covers geographical area of 5,748 sq km and forest area is 846 sq km constituting about 19% of geographical area, spread over 7 talukas. There are 7 ranges, 26 rounds and 108 beats in the division. The division is headed by DCF, assisted by 4 ACF, 14 RFO, 52 Foresters, 181 Forest Guards, 55 ministerial staff and 184 van majur. The total strength of staff is 491. The human population of the division is 10,70,267 (2001) and it consists considerable population of SC and ST. The main occupation is agriculture and allied sector. The average rainfall of the area is 1100 mm per year, temperature ranges from 11° to 45°.

The forests are of Tropical Dry Deciduous Forests group 5 as per the classification of Champion & Seth. *Tectona grandis* (teak) is the principal species forming 56% of the total crop. Other species that occur are *Terminalia alata*, *Anogissus latifolia*, *Ougenia oojinesis*, *Lagerstroemia parviflora*, *Acacia catechu*, *Diospyros melanoxylon*, *Chloroxylon swietenia*, *Terminalia bellirica*, *Pterocarpus marsupium*, *Aegle marmelos*, *Cassia fistula*, *Wrightia tinctoria*, *Butea monosperma*, *Boswellia serrata* etc. The forest crop is uneven aged consisting growing stock of all age classes of trees, on an average consists of 474 trees per ha. It has 269 teak trees/ha while non-teak trees are 205 per ha. The forests are mostly of SQ IV and very less area has forests of SQ III. About 38% of the forests have 0.4 and above density, while scrub and blank area constitutes about 36% of

the total forest area. The forests can produce timber of around 4600 m³ per year, NWFP, fodder, apart from contribution to environmental stability, protection of soil and water regime, conservation of wildlife and plant diversity.

3. Wildlife:

The forests of Yavatmal Forest Division possess wildlife in certain pockets. The wild animals found are sambar, barking deer, blue bull, wild dog, wolf, jackal, wild boar, spotted deer, chinkara etc. Leopards also occur in this area, but tiger is not seen. A 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. These forests used to support good number of carnivores including tiger and leopard as well as herbivores in the past, but wildlife has considerably declined in the recent decades.

4. Forest Produce:

Timber is in demand for construction, domestic use, furniture and agricultural implements, fire wood is still the main medium for domestic cooking in villages and small towns. The requirement of firewood is met from forests by cutting trees, lopping branches and also from agricultural waste. The details of production and revenue pertaining to timber and firewood are given below for the past 3 years.

year	timber			firewood		
	production m ³	revenue (Rs lakhs)	average rate per m ³	Production (Bita)	revenue (Rs lakhs)	average rate per m ³
2006-07	8,951.442	1,910.02	21,337	106.81	1.17	1,100
2007-08	7,013.335	1,339.52	19,099	318.42	4.13	1,300
2008-09	18,434.867	3,166.07	17,174	1,055.739	25.18	2,385

NWFP: Tendu leaves are important NWFP with an estimated yield of 23,700 standard bags. Labourers get considerable amount for tendu leaves collection during short period. After deducting administrative expenses, the royalty amount is paid to labourers as incentive wages, hence no revenue is accrued to the Government. The royalty amount in tendu season 2008 and 2009 is Rs. 95.42 lakhs and Rs. 158.68 lakhs respectively. Dhawada gum of about 270 quintals is produced annually and now it is collected and disposed of by Gram Panchayats. Sitafal fruit units are sold in auction yielding annual revenue of about Rs 6,000 to 89,000 depending on the season.

5. Past systems of management:

In the year 1865, ACF was appointed for the whole Berar for administration of forests. Rules for protection from encroachments, grazing and felling were introduced in the year 1871. For the first time Malcom's WP was introduced in the year 1915-16. Works were carried out as per Malcom's WP from 1915-16 to 1937-38, the forests were worked under improvement fellings forming 49 felling series and 30 annual coupes. Details of previous WP implemented in the past are given below.

- (a) Malcom's WP 1915-16 to 1937-38
- (b) Robinson's WP 1937-38 to 1955-56
- (c) Thosre's WP 1955-56 to 1975-76
- (d) Pal's WP for West Yavatmal Division 1976-77 to 1991-92
- (e) Kanekar's WP for East Yavatmal Division 1982-83 to 1997-98
- (f) Yadav's WP 2001-02 to 2010-11

6 Implementation of Yadav's WP:

Summary in brief regarding implementation Yadav's WP is given below.

6.1 Survey & demarcation WC: 1761.73 km length of boundary was to be surveyed and demarcated, village maps & land records were to be obtained and verified. During the plan period 901.079 km of boundary demarcation was completed and at many places boundary pillars were laid down, the prescriptions were implemented partially.

6.2 Selection-Cum-Improvement WC: 32,787 ha area was allotted to this WC; prescriptions are given below.

- (a) Felling series: 22, 10 coupes in each felling series.
- (b) No felling of sound miscellaneous species trees, felling of matured teak trees, removal of dead trees, thinning of old plantations, CBO etc
- (c) Yield: SQ IVB: 22.4 teak trees per ha., harvestable girth of teak of coppice as well as seed origin : 75 cm at bh

SQ IVA & III: 7.9 teak trees per ha, harvestable girth of teak of coppice & seed origin : 105 cm at bh.

During implementation of WP about 90% of the coupes were worked, but coupe no.1 could not be worked. It was noticed that the harvestable girth of 75 cm was applied uniformly to SQIII, IVA and IVB, without considering the harvestable girth of 105 cm for SQIII and IVA. This has resulted in excess felling. CBO operations were carried out partially and cleaning operation was not conducted. Works of soil & moisture conservation and artificial regeneration were carried out partially.

6.3 Improvement WC: Area allotted: 21,520 ha; working series: 22, 10 coupes in each working series, average coupe area: 100 ha

Prescriptions: Improvement felling for removal of dead, malformed trees, live high stumps, reducing multiple coppice shoots retaining one per stool, negligible yield to be realised, soil & moisture conservation works, CBO, AR, NR etc to be carried out.

Harvestable girth of 75 cm was wrongly applied to coupes and teak trees were felled causing excess felling and deviation from prescriptions of WP. The other prescriptions were implemented partially.

6.4 Afforestation WC: Area allotted: 19,236 ha., working series : 23, 20 coupes in each working series. Works to be completed in 3 year Restorative Phase and 7 years productive phase. Prescriptions of WP were implemented partially, due to paucity of funds.

6.5 Fodder Reserve WC: Area allotted: 6,248 ha, rotational grazing in sections of compartments in 4th year after closing for grazing for 3 years. Ramnas are to be closed for grazing permanently, fencing to be provided, grass to be produced and provided to local people. Prescriptions of WP were not implemented, ramnas were not maintained, the area further deteriorated to due to lack of operations as prescribed .

6.6 JFM WC: This is overlapping WC covering the entire area. Out of total 270 villages, microplans were prepared for 68 villages.

7. Enumeration & growing stock:

Enumeration was carried out by SOFR Unit, Amravati during 2006-07 and 2007-08 for estimation of growing stock. 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 as per the enumeration are given below.

No. of trees per hectare as per enumeration

girth class	teak	non-teak	total
15-30	61	67	128
31-45	65	50	115
46-60	57	33	90
61-75	41	19	60
76-90	27	14	41
91-105	11	8	19
106-120	5	6	11
121-135	2	3	5
136-150	1	3	4
151 & above	--	3	3
Total	270	206	476

On an average forests have 269 teak trees and 205 misc. trees per ha. 45 teak trees with girth at bh of 75 cm and above occur in forests and some of them would be available for harvesting. As per regeneration survey, number of seedlings per hectare is : R1: 77; R2: 26; R3: 13. The condition of regeneration is very poor due to grazing, fire and biotic interference. As per stock mapping and digital data procured from FSI, Nagpur, the details of crown density of the forests of Yavatmal division are given below.

crown density	area (ha)	Percent area
>0.6	3391	4
0.4 to 0.6	28,791	34
< 0.4	21,735	26
blank/scrub	30,687	36
total	84,604	

8. Proposals for future management:

8.1 Basis of proposals : Forest policy, Wildlife (Protection) Act 1972, other relevant Acts and instructions, growing stock, availability of harvestable trees, wildlife management, protection related issues, silviculture, improving productivity & vegetation, conservation of endangered flora & fauna, staff etc were considered and prescriptions under various WC were formulated for the WP for the period 2011-12 to 2020 -21. The details of WC prescribed are given below (area assigned to WC is given in parenthesis).

(a) SCI WC (44,825 ha)	(b) Improvement WC (10,103 ha)
(c) Afforestation WC (22,326 ha)	(d) Fodder Improvement WC (7,350 ha)
(e) NWFP (O)WC	(f) Wildlife Management (O)WC
(g) JFM (O)WC	(h) Forest Protection (O) WC

Salient features of each WC are given below.

9. SCI WC:

Working series: 28; 20 coupes in each working series, average coupe area : 80 ha

Area: 44,825 ha (58% area is >0.4 density, 42% below 0.4 density & blank)

Average no. of trees per ha: 475 (teak : 269 trees) Average no. of trees above 75 cm girth : 44.7 trees.

Prescriptions:

(1) Coupe area has to be divided into A, B, C & D categories.

(2) Treatment of coupe area:

SMC works shall be carried out in the entire coupe, closure for grazing for 5 years, fire protection etc.

A Category steep slopes, banks of nala: no felling, carry out bamboo planting,

B Category Under stocked area: Planting 50 % teak, 50% misc. species, SMC works, removal of dead trees retaining 2 dead trees per ha.

C Category Pole crop, old plantation: no planting, thinning of old plantations & congested natural pole crop, CBO.

D Category Well stocked area: No planting, area to be divided into grids, enumeration of trees, marking for felling as per marking rules, CBO, cleaning etc.

(3) Marking Rules:

Harvestable girth at bh for teak - coppice: 75 cm; seed origin: 120 cm

Harvesting of teak (coppice origin) 15 trees per ha, harvesting of teak (seed origin) 0.46 trees per ha; Felling of silviculturally available teak trees; Improvement felling of malformed trees; Felling of dead trees except 2 trees per ha; CBO, cleaning operations; No felling of non-teak species.

10. Improvement WC:

Total area: 10,102 ha; Working series: 6, 20 coupes in each working series, average coupe area: 84 ha; 52 % of area has crown density of 0.4 & above, 48% area is of less than 0.4 density & blank area. The crop is young to middle aged with no silviculturally available teak trees for harvesting.

Prescriptions:

(1) Treatment of A, B, C categories mostly on the lines of SCI WC

(2) In D category area, improvement felling for removal of dead, malformed trees; no harvestable girth is prescribed; very less yield to be realised

(3) Subsidiary silvicultural operations- CBO, thinning; AR, NR

(4) SMC works in the entire coupe

11. Afforestation WC:

Area: 22,326.05 ha; Working series: 14, each working series having 20 coupes.

Most of the forest area is blank and some area has crown density below 0.4. The area has to be treated in 2 phases, carrying out operations as prescribed below.

Restorative phase: This phase will be for minimum of one year, TCM or live hedge or barbed wire fencing, SMC works, CBO, protection from fire and grazing are prescribed.

Productive phase: Productive phase is to be implemented for 5 years immediately after completion of restorative phase. Repairs of SMC works in first year, ppo, pyo works in 2nd year, followed by planting have to be done. Treatment of coupe shall be as given below.

A category: No felling except removal of dead trees retaining 2 dead trees per ha.

B category: No felling; Cutting of all live high stumps; Removal of dead trees retaining 2 dead trees per ha; Removal of undesirable undergrowth; Tending of root stock; SMC works and planting

C category: Thinning of old plantations and natural pole crop; removal of dead, malformed poles, no planting is prescribed.

D category: Reduce multiple coppice shoots to one per stool; cutback all live high stumps; removal of dead trees retaining 2 dead trees per ha; no planting.

12. Fodder Improvement WC:

Area: 7,350 ha; Working series: 5; 20 coupes in each working series.

Treatment of area under controlled grazing: One compartment is divided into 4 sections, every year one section shall be under treatment and remain closed for grazing for next 3 years. SMC works, wire fencing or live hedge fencing, removal of obnoxious weeds, thorny shrubs, unpalatable grass, ploughing suitable area, seed sowing of sheda, marvel, paunya or planting tussocks would be carried out. From 4th year onwards rotational grazing will be allowed from October to May.

Treatment of ramnas: Complete closure to grazing with TCM or barbed wire fencing, removing weeds, unpalatable grass; promoting palatable grass, cutting of grass from ramnas, grass be offered to Gram Panchayat at rates fixed by Government; local people to cut and take grass freely, fire protection etc.

13. NWFP (overlapping) WC:

This WC covers the entire forest area. The main NWFP harvested are tendu leaves, dhawada gum, sitafal, moha etc. Other NWFP occurring in this division are awala, beheda, medicinal plants etc. Moha seed and flowers are collected by local people, most of the collection is consumed by them and remaining quantity is sold. Dhawada gum units are managed by local Gram Panchayats. Tapping rules are prescribed for extraction of dhawada gum. Sitafal units are sold by public auction. Prescriptions for sustainable management and harvesting NWFP including medicinal plants are included in this chapter.

14. JFM (overlapping) WC:

This is overlapping WC covering the entire area of Yavatmal Forest Division. There are 325 villages having forests nearby. There are 270 JFM committees in this division. MOU were signed with 97 JFM committees. 30,809.35 ha forest area is managed under JFM programme. Microplans for 97 villages were prepared and these were approved by the committee. Out of the total 270 JFM committees, 40 were graded as better and 199 were graded as good in the evaluation conducted in 2010. Some villages received first, second and third Sant Tukaram Van Gram Awards. The JFM programme is implemented as per approved microplans.

15. Wildlife (overlapping) WC:

This WC also covers the entire forest area of Yavatmal Forest Division. Prescriptions are given for conservation of wildlife, improving wildlife habitat and wildlife population. Rehabilitation centre for wildlife, forest custody, monitoring wild animals, creation of water holes, water conservation measures, meadow development, regulation of grazing, fire protection and anti-poaching measures are prescribed.

16. Eco-tourism :

There are many sites for promoting ecotourism in this division. People can be educated through various media on the issues of protection of forest and wildlife, their role in protecting environment, soil and water regime, floral and faunal diversity, medicinal plants etc. Various eco-tourism sites and activities proposed are discussed in this chapter.

17. Forest Protection (overlapping) WC:

This WC covers the entire area of Yavatmal Forest Division. Strategy for forest protection is discussed in this WC, which has the following components.

- (1) Undertaking SMC works, NR, AR, other cultural operations
- (2) Regulation of grazing and controlling fire
- (3) Seeking co-operation of local people in forestry operations
- (4) Employment generation to local people during lean season
- (5) Strengthening infrastructure and effective utilisation of existing infrastructure
- (6) Meeting demand of local people for forest produce
- (7) Improving communication facilities, mobility of staff, installation of new check nakas
- (8) Rewards and informer system

Various protection measures viz. inspection of forest produce in transit, intelligence collection, training to staff, effective utilisation of mobile squad, provision of arms, beat

checking, prevention of encroachments and strengthening JFM mechanism are included in the prescriptions.

18. Miscellaneous Regulations:

General prescriptions on coupe demarcation, treatment map, grazing control, fire protection, boundary maintenance, marking technique, planting operations, treatment map, irregular harvesting, subsidiary silvicultural operations, cleaning, thinning, maintaining records etc are included in this chapter.

19. Net present value of forests (84604.22 ha) of Yavatmal Forest Division is Rs 6,00,059 lakhs.

20. Annual expenditure ranges from Rs. 13.38 crores to 17.13 crores for carrying out operations as per WP. Expected annual revenue ranges from Rs 21.45 to 42.88 crores considering the appreciation at the rate of 8% per year.

Background information

WP (2001-02 to 2010-11) authored by Shri R.S. Yadav for Yavatmal Forest Division became due for revision. For preparation of WP, Shri Ramanuj Choudhary, the then CCF, Yavatmal Circle, prepared PWPR-I (2011-12 to 2020-21). It was placed before SLC in the meeting held on 27-3-2008 and was accorded approval by the committee as per the PCCF's letter no.D-14/WP/CR-369 (c)/102/08-09/dt.28.4.2008 (enclosure 1)

2. Based on the PWPR-1, Shri G.R.K.Rao, the then CF, Working Plan Division, Yavatmal prepared PWPR-II. The enumeration data provided by SOFR Unit, Amravati regarding growing stock and regeneration survey, extensive data furnished by DCF, Yavatmal Forest Division, data procured from FSI & MRSAC, past experience of implementation of Yadav's WP, stock maps, stem analysis etc were utilised for preparing PWPR-II. Shri G.R.K. Rao, has put in hard work to prepare PWPR-II and he tried to incorporate the issues of FMIS, digital data of MRSAC, to elucidate various aspects in detail.

3. CF, Working Plan Division, Yavatmal had submitted the PWPR- II to CCF (WP), Nagpur vide letter no.WP/Yavat/RS-2/731/2009-10 dated 31-3-2010. Subsequently Shri G.R.K.Rao, had relinquished the charge of CF, Working Plan Division, Yavatmal on 20/7/2010 upon his transfer.

4. The PWPR-II authored by Shri G.R.K.Rao was placed before the SLC in the meeting held on 28-1-2011 at Nagpur. Shri A.R.Mande, officiating CF, Working Plan Division, Yavatmal has made power point presentation before the SLC on the PWPR-II in the said meeting. After detailed discussions, PWPR-II was approved by SLC subject to the modifications and inclusion of certain additional information. SLC also directed that the issue of harvestable girth in SCI WC and stem analysis be re-examined by CF, Working Plan Division, Yavatmal in consultation with Shri Tasneem Ahmad, CCF (Protection), M.S. Nagpur and necessary changes be incorporated as per the instructions of Shri Tasneem Ahmad, CCF (Protection), M.S., Nagpur. The minutes of meeting dated 28.1.2011 were issued vide PCCF's letter no.D-14/wp/CR-10/10-11/136/dated7-2-2011(enclosure 2).

5. CF, WP Division, Yavatmal held discussions on this issue with Shri Tasneem Ahmad, CCF (Protection) on 10.3.2011, 2.4.2011, 14.4.2011 and 15.4.2011. Stem analysis of teak trees of coppice origin in SQ IV was conducted again in March 2011. Considering the stem

analysis data and relevant issues, it was decided that it is necessary to prescribe harvestable girth for teak trees of seed origin as well as teak trees of coppice origin in the SCI WC. Accordingly, upon analysing the data of stem analysis of teak trees and also examining the issues of growth, yield, harvesting mature teak trees and managing the forests under SCI WC, it was decided to prescribe harvestable girth of 75 cm at bh for coppice origin teak trees in SQ IV and 120 cm bh for teak trees of seed origin in SQ IV for SCI WC. Accordingly changes were incorporated by Shri A.R.Mande, officiating CF, Working Plan Division, Yavatmal, in SCI WC regarding harvestable girth, regulation of yield, marking rules and stem analysis in the chapter on statistics of growth. The following staff of Yavatmal Working Plan Division have contributed for preparation of WP.

Name

1) Shri A.R.Zanjad,RFO	9) Shri A.G.Thakar, clerk
2) Shri V.N.Choudhary,RFO	10) Shri R.V.Kamble, Clerk
3) Shri V.P.Joshi Ranger Surveyor	11) Smt. M.M.Walke, Clerk
4) Shri A.L.Ghughe, Ranger Surveyor	12) Shri R.H.Shendekar, Forest Guard
5) Shri V.A.Masram, Surveyor	13) Ku. P.R. Atram, Forest Guard
6) Shri S.D. Sargar, Surveyor	14) Shri S.P.Khadke, Forest Guard
7) Shri B.W.Kanaskar, Accountant	15) Shri S.B.Lohkare, Forest Guard
8) Shri B.L.Khadse, Steno typist	16) Sau. S.A.Rajurkar, Forest Guard

Shri Tasneem Ahmad CCF (Protection) provided guidance and direction regarding harvestable girth and stem analysis for chapter on SCI WC. Shri V.A.Masram, Surveyor had immensely contributed for preparing maps utilizing GIS applications, coordinating work with FSI and MRSAC. Shri A.R.Zanjad RFO, Shri V.N.Choudhary RFO, prepared stock maps and conducted stem analysis of teak trees. 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.P.Joshi, RS, Shri B.L.Khadse steno and Shri A.G.Thakar, clerk had worked hard to prepare this WP. Shri A.L.Ghughe RS worked sincerely to verify and modify the contents of WP.

CHAPTER 1

The Tract Dealt With

Section 1.1 Name and situation:

1.1.1. This WP deals with all the Reserved Forests, Protected Forests and unclassified forests of Yavatmal Forest Division. These forests occupy western and southern portion of Yavatmal District. There are 7 talukas in this division namely Yavatmal, Babhulgaon, Ner, Kalamb, Ghatanji, Darwha and Arni. This WP would replace the WP (period 2001-02 to 2010-11) written by Shri R.S. Yadav, which was approved by Government of India vide letter No.12-55/98(for) 3253 Dt. 16.10.2001. This WP would be operational for the period 2011-12 to 2021-22. The Government of India has approved this WP vide letter no..... dated (Enclosure-3). The GOM has approved this WP vide letter no.... dated (Enclosure-4).

The present day Yavatmal Forest Division was a part of old Yavatmal Forest Division. In the year 1964 the old Yavatmal Forest Division was split into two separate forest divisions i.e. East Yavatmal and West Yavatmal Forest Divisions. Subsequently in the year 1983 reorganisation of Forest Department was effected and three forest divisions were created namely Yavatmal Forest Division, Pusad Forest Division and Wani Forest Division (later on named as Pandharkawada Forest Division) out of East Yavatmal and West Yavatmal Forest Divisions. The total geographical area of the division is 5748.47 sq. km.

1.1.2 Boundaries :

The boundaries of the division are given below.

North	: Dhamangaon taluka of Amravati district
North -East	: Deoli taluka of Wardha district
North -West	: Nandgaon-Khandeshwar taluka of Amravati district
West	: Karanja taluka of Washim district.
South-East	: Pandharkawda taluka of Yavatmal district
South -West	: Digras taluka of Yavatmal district
South	: Kinwat taluka of Nanded district

Section 1.2 Configuration of the ground:

Yavatmal Forest Division is situated on the southern up-lands of Payanghat of Berar and on the eastern portion of Ajanta hills. The tract as a whole belongs to Ajanta range with plateau on its top. Yavatmal town is situated at an elevation of 434.72 m MSL. Most of the land of the division is high level plateau with average elevation of 400 m and gently sloping towards eastern portion. The part of Yavatmal, Babhulgaon, Kalamb and Kolhapur tahsils and eastern portion of Wani tahsil lie in Payanghat plains of Wardha valley. Yavatmal is the headquarters of Yavatmal district. The highest point in this area is situated in Chousala compartment no. 246, having an altitude of 495.69 m MSL.

Section 1.3 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 murum, 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.

Section 1.4 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 from November and continues till February. At Yavatmal 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, the average rainfall received in this area varies from 805 mm to 1100 mm having an average rainfall of 964.7 mm. Range wise rainfall data is given in the table below.

Average Rainfall in Yavatmal Forest Division (in mm)

Year	Yavatmal	Babhulgaon	Kalamb	Arni	Darwha	Ner	Ghatanji
1	2	3	4	5	6	7	8
2000	625	775	557	818	917	1155	963
2001	1112	1014	870	756	1099	804	59
2002	1155	765	1206	646	1068	444	1119
2003	1085	818	1162	429	609	345	1128
2004	674	464	401	283	448	334	460
2005	1254	960	1341	641	1044	602	1234
2006	1288	897	1336	737	1161	1015	1402
2007	866	772	888	468	803	697	1027
2008	684	456	483	495	570	568	853
2009	540	438	338	342	457	481	547
Avg.	950	758	881	602	842	680	799

Section 1.5 Water Supply:

In this division the Painganga and its tributaries *Pus*, *Arunavati* and *Adan* and *Waghadi* along with the river *Wardha* with its tributary *Bembla* , Nirguda drains the area. *Painganga* and *Wardha* flow throughout the year.

Bembla Project is major irrigation project in the division.

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

1. Adan Project
2. Arunavati Project
3. Kumbharkinhhi Project
4. Borgaon Project
5. Goki Project
6. Dattapur Project

There are also five minor irrigation projects in the division. These are –

1. Chapdoh Project
2. Singandoh Project
3. Waghadi Project
4. Shirajgaon Project
5. Lohi Project

Section 1.6 Distribution of Area :

The total geographical area of the division: 5,74,847 ha

Gross forest area in Yavatmal Forest Division: 95,152.30 ha

Forest area transferred to FDCM Ltd : 10,548.08 ha

Forest area remaining with Yavatmal Forest Division : 84,604.22 ha

Area to be notified as forests taken over for Compensatory Afforestation: 286.43 ha

Forest area in Yavatmal 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 Compts	Area in ha.			
1	Arni	61	15900.15	15900.15	-	0.00
2	Darwha	149	10793.43	10648.70	-	144.73
3	Ghatanji	42	11425.91	11295.19	-	130.72
4	Hiwari	74	14659.27	14538.71	-	120.56
5	Jodmoha	56	12746.79	12587.43	159.36	0.00
6	Ner	108	10823.24	10418.28	8.88	396.08
7	Yavatmal	51	8255.43	8042.13	118.19	95.11
	Total	541	84604.22	83430.59	286.43	887.20

The range wise details of the forest area transferred to FDCM are given below.

Details of forest area transferred to FDCM

Sr. no.	Range	Area transferred				Total area	
		RF		PF.		no.of compts.	Area in ha.
		no.of compt.	Area in ha	no.of compt.	Area in ha.		
1	Arni	-	-	-	-	-	-
2	Darwha	6	831.28	-	-	6	831.28
3	Ghatanji	6	539.36	1	353.69	7	893.05
4	Hiwari	9	1686.35	-	-	9	1686.35
5	Jodmoha	9	2201.78	-	-	9	2201.78
6	Ner	-	0.00	-	-	-	-
7	Yavatmal	24	4935.62	-	-	24	4935.62
	Total	54	10194.39	1	353.69	55	10548.08

The forest area of Yavatmal Forest Division are covered in the 21 toposheets (scale 2"=1mile) and 13 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	55H/10 S
2	55H/11 N
3	55H/11 S
4	55H/12 N
5	55H/12 S
6	55H/14 S
7	55H/15 N
8	55H/15 S
9	55H/16 N
10	55H/16 S
11	55L/2 S
12	55L/3 N
13	55L/3 S
14	55L/4 N
15	55L/4 S
16	55L/7 N
17	55L/7 S
18	55L/8 N
19	55L/8S
20	56E/13N
21	56I/1N

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

Section 1.7 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 WC to the extent of 901.079 km and 17,500 precast pillars were erected. The remaining forest area and private land boundaries need to be demarcated on the ground.

Section 1.8 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 were 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. 887.20 hectares area was transferred to the Forest Department for compensatory afforestation, action is necessary for declaring this area as Reserved Forests.

Section 1.9 Rights and Concessions:

In Yavatmal 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 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.

CHAPTER 2

Forest Flora

Section 2.1 Trees :

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

Other tree species

Sr. no	Local name	Botanical name
1	Ain	<i>Terminalia alata</i>
2	Dhawada	<i>Anogeissus latifolia</i>
3	Tiwas	<i>Ougenia oojeinesis</i>
4	Lendia	<i>Lagerstroemia parviflora</i>
5	Tendu	<i>Diospyros melanoxylon</i>
6	Bhirra	<i>Chloroxylon swietenia</i>
7	Beheda	<i>Terminalia bellirica</i>
8	Bija	<i>Pterocarpus marsupium</i>
9	Bel	<i>Aegle marmelos</i>
10	Amaltas	<i>Cassia fistula</i>
11	Awala	<i>Embllica officinalis</i>
12	Char	<i>Buchanania lanzan</i>
13	Dudhi	<i>Wrightia tinctoria</i>
14	Ghoti	<i>Zizyphus xylocarpa</i>
15	Palas	<i>Butea monosperma</i>
16	Dhaman	<i>Grewia tiliaefolia</i>
17	Moyen	<i>Lannea grandis</i>
18	Bartondi	<i>Morinda tinctoria</i>
19	Lokhandi	<i>Ixora parviflora</i>
20	Kalam	<i>Mitragyna parviflora</i>
21	Rohan	<i>Soymida febrifuga</i>
22	Salai	<i>Boswellia serrata</i>
23	Semal	<i>Bombax ceiba</i>
24	Sisham	<i>Dalbergia latifolia</i>

Section 2.2 General description of the growing stock :

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

Group 5 Tropical dry deciduous Forests; Sub group 5A Southern Tropical dry deciduous forests

Climax types (1) 5A/Cia Dry Teak bearing forests and Teak Forests.

(2) 5A Cib Dry teak forests degraded scrub forests.

The forests are categorised into good quality teak forests, poor quality teak forests and degraded scrub forests based on the type of forests and local factors which influence the forest quality in this area. Majority of forest area is covered by teak forests generally of coppice origin representing site quality IV with few patches of site quality III. The crop is mainly straight-boled though there are some malformed, pollarded trees, due to either repeated management under CWR system or illicit felling and other biotic pressure. Teak and its associates form top canopy upto 20-21 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. 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.

Good quality teak forests: This type of forests are distributed as narrow strip along the bank of river Painganga and Wardha, where soil is formed from trap rock and gneiss and it is characterized by deep soil accumulated due to siltation. These type of forests are mostly situated in Ghatanji and part of Arni ranges adjoining Painganga. Teak forms 50 to 60% of growing stock in this area as per the enumeration of SOFR Unit, Amravati conducted in 2008. Density of crop varies from 0.2 to 0.7 and crop is generally middle aged to mature. The topography of the area is almost plain. The natural regeneration is poor due to biotic pressure, fire etc. The composition of species is given below.

Sr. no	Upper Storey	
	local name	botanical name
1	Teak	(<i>Tectona grandis</i>) is principal species
2	Ain	<i>Terminalia alata</i>
3	Dhawada	<i>Anogeissus latifolia</i>
4	Tiwas	<i>Ougenia oojenesis</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>Embllica 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	Morogphali	<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 Darwha, Ner, Jodmoha, Yavatmal, Arni 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 Yavatmal 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 vary from 0.2 to 0.6. Teak constitutes 55 to 60% of crop and height of the top storey is 10 to 12 metres. 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 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 tree growth. The area included in this category was managed under Fodder Reserve WC in previous WP. These forests are affected with excessive biotic pressure of nearby villages. These forests are degraded with malformed, stunted tree growth, with very little tree growth and some patches are without any tree growth. Some of these forests are managed under Pasture and Fodder Reserve WC in the previous WP. 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 soil is generally murumy, highly compact and without any humus. 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 tenella*).

Section 2.3 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 76.67 seedlings of height upto 1 m height, 26.22 seedlings between

1 m to 3 meters height and 13 above 3 seedlings 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 10 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	5	3	6	9	7	10	13	11	14
Arni	55	146.88	19763	134.55	121.32	3722	30.68	27.00	404	14.96
Darwha	94	124.20	4307	34.68	84.96	1803	21.22	9.72	43	4.42
Ghatanji	39	117.72	10017	85.09	98.28	2526	25.70	25.56	357	13.97
Hiwari	60	154.44	12437	80.53	125.28	3719	29.69	30.60	404	13.20
Jodmoha	49	138.60	10507	75.81	116.28	3140	27.00	34.56	559	16.17
Ner	80	110.88	4621	41.68	87.12	1926	22.11	9.72	53	5.45
Yavatmal	39	76.68	5006	65.28	56.88	1258	22.12	7.92	101	12.75
	416	869.40	66658	76.67	690.12	18094	26.22	145.08	1921	13.24

Section 2.4 Injuries to which the crop is liable:

2.4.1 The forests of Yavatmal Forest Division suffer from unregulated grazing, illicit felling, encroachments and repeated fires. Significant damage is caused to forests by these factors coupled with erratic rainfall in the last 4-5 years. The other agencies which cause injury to the forests are drought, floods, parasites and insects, but it is negligible.

2.4.2 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 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 and area burnt

Sr. no.	Year	No. of fire cases	Area burnt in ha.
1	2000-01	92	2154
2	2001-02	31	382
3	2002-03	18	279
4	2003-04	10	938
5	2004-05	2	12
6	2005-06	3	23
7	2006-07	24	162
8	2007-08	34	339
9	2008-09	15	217

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.

2.4.3 Illicit felling:

Illicit felling is common and is increasing day by day for commercial and domestic purposes. As the forest area is adjacent to Nanded district of Andhra Pradesh State, some local persons and also persons from adjoining state indulge in illicit felling in forests. Sandal plantations were carried out in compartment no. 470, 471, 472, 473, 474, and 492 since 1963-64. The Sandal trees have grown up now and are subjected to illicit felling. The organised gangs from within the state, Uttar Pradesh, Madhya Pradesh, Rajasthan indulge in illicit felling of sandal trees. The forest staff could not protect the sandal trees in spite of special protection measures undertaken. Sometimes the illicit cutters come in groups, cut the teak timber, transport it illegally. These organised gangs indulge in illicit felling of trees of this division. Local staff find it difficult to control such organised gangs due to lack of infrastructure, communication, transportation etc. Local people also indulge in illicit felling for fuel, small timber, fire wood, as there is a 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 less risk. Lopping of trees and shrubs for rab burning of field has further deteriorated the situation.

Position of no. forest offence cases

year	fire	grazing	illicit felling	other	total
2000-01	45	36	1534	131	1746
2001-02	29	53	1839	118	2039
2002-03	20	44	1619	203	1886
2003-04	42	27	1597	49	1715
2004-05	3	13	1269	125	1410
2005-06	5	14	1256	73	1348
2006-07	25	15	1065	103	1208
2007-08	67	8	950	353	1378
2008-09	35	2	686	69	792

2.4.4 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	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	5	6	7	8	9	10	11	12	13
1	Buffalo	9372	8003	8413	7195	8354	6882	7836	8354	8404
2	Cows & Bullocks	52274	69406	53688	47064	14355	24269	22941	14355	45878
3	Goats & Sheep	-	-	-	-	-	-	-	-	-
4	Camel	-	-	-	-	-	-	-	-	-
5	Other Animal	14137	16399	9936	11272	12217	9933	8312	14381	16364
Total		75783	93808	72037	65531	34926	41084	39089	37090	70646
Cattle units		75783	93808	72037	65531	34926	41084	39089	37090	70646
Grazing fee collected		85155	101811	80450	72726	54308	47966	46925	45444	75277

2.4.5 Encroachments:

Forest area adjoining agricultural fields are encroached especially during the month of monsoon. Some of the forest areas have been cleared, denuded and utilised for agricultural purposes.

2.4.6 Damage by wild animals:

Nilgai, sambar and chital cause damage to the young regeneration due to grazing by these animals. 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.

2.4.7 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.

2.4.8 Climbers and weeds:

Damage by climbers is mostly confined to the forests along the river bank of Painganga, Wardha and along the nala banks in this area. Chilati, ironi are the main climbers which cause harm to the forests. Damage by lantana is also noticed affecting both regeneration and growth.

CHAPTER 3

Wildlife

Section 3.1 Wildlife population:

In the past Yavatmal Forest Division was natural abode for a variety of wild animals. It was stated in the Berar gazetteer that tiger and panthers were numerous in the area and it was dangerous to travel on foot during night time in Yavatmal Forest Division. In the past there were many instances of sighting wildlife near Yavatmal town. Sometimes panthers used to come to area adjoining Yavatmal 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. 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. Now tiger is not found in this area. The details of animals occurring in this division are given below.

(A) Carnivores – Panther (*Panthera pardus*), hyaena (*Hyaena hyaena*). This species is commonly seen in this tract. 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 (*Cervinus unicolor*), chausingha (*Tetra Ceros 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*).

Details of population estimation of wild animals in May 2005 is given below.

Name	no. of animals
Sambar	29
Barking deer	362
Nilgai	1271
Chowsinga	9
Wild Dog	48
Wolf	95
Jackal	71
Wild Bore	764
Hyaena	3
Jangle Cat	14
Langur	1441
Hare	184
Mongoose	32
Peacock	421
Porcupine	5
Spotted Owlet	21
Bat	46
Civet	3
Spotted Deer	44
Black Buck	2
Chinkara	17

Section 3.2 Crop damage and cattle killing by wild animals:

The details of crop damage and cattle killing by wild animals and compensations paid are given in the table below.

Year	no. of cases	Compensation paid (Rs)
2006-07	---	--
2007-08	16,071	1,05,57,4 45
2008-09	2,815	24,31,830
2009-10	523	3,71,980

Death or injury of 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				
2006-07	21	-	4	-	21	4	84,100	1000
2007-08	3	-	7	-	3	7	7,400	40,500
2008-09	5	-	3	-	5	3	70,398	12,750
200--10	23	-	9	-	23	9	3,60,348	56,625

Details of poaching, death of 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	8	--	--	--	--	--	8	--	--	--
2001-02	9	--	1	1	--	--	5	--	--	2
2002-03	8	--	--	4	--	--	4	--	--	--
2003-04	8	--	--	--	--	--	8	--	--	--
2004-05	9	--	--	1	--	--	7	--	--	1
2005-06	2	--	--	--	--	--	--	--	--	2
2006-07	12	--	--	4	--	--	8	--	--	--
2007-08	6	--	--	--	--	--	2	--	--	4
2008-09	5	--	--	--	--	1	4	--	--	--

CHAPTER 4

Utilization of Forest Produce

Section 4.1 Agricultural customs and wants of population

The greater part of Yavatmal 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 number of villages are 802, whereas the villages adjoining forests are 231. 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 Yavatmal Forest Division are Andha, Gond, Pradhan, Banjara but other communities like Kunbi, Mali, Teli etc., also cultivate crops. The details of population are given in the table below.

Population, sex ratio and literacy rate (2001)

Taluka	Total Population	SC	ST	Others	Sex ratio	Literacy rate%
1	2	3	4	5	6	7
Arni	139861	9060	18390	12411	941/1000	69.70
Babulgaon	89153	12660	19090	57403	941/1000	75.73
Darwha	173480	12360	8800	238474	949/1000	76.71
Ghatanji	125214	8510	30550	86154	941/1000	71.28
Kalamb	95830	10480	32080	53270	952/1000	70.11
Ner	110762	18240	7190	85332	943/1000	77.30
Yavatmal	335967	11430	18770	305767	933/1000	81.90
Total	10,70,267	82740	134870	838811	943/1000	

Irrigation facilities are available from wells, tanks, major, 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, Arunavati, Borgaon, Kumbharkinhi, Goki and Dattapur Project and five Minor projects have been providing irrigation facilities to the area around these projects. Bembla Project also provides irrigation facilities.

Important agricultural crops in this area are *jwari*, *cotton*, *toor* and soyabean. Wheat is also 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. 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.

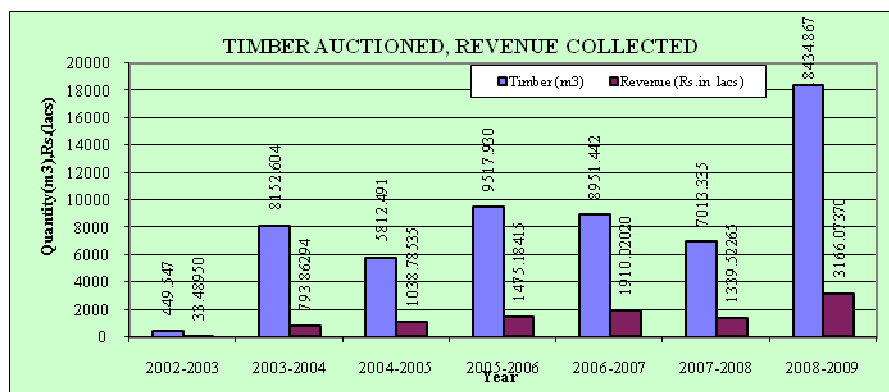
Section 4.2 Markets and marketable products:

Local people utilise most of the forest produce to meet their domestic needs. Yavatmal is a good timber market. Harvested timber is transported to local depot at Jodmoha. Teak timber is sent to Nagpur, Mumbai, Hyderabad and other places.

4.2.1 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, Kalam, Tiwas, Bija, Behada & Khair*. The details of timber auctioned are given the following table.

Details of timber auctioned & revenue collected

Sr. No.	Year	Timber (m ³)	Revenue (Rs)
1	2000-01	--	--
2	2001-02	--	--
3	2002-03	449.547	33,48,950
4	2003-04	8152.604	7,93,86,294
5	2004-05	5812.491	10,38,78,535
6	2005-06	9517.930	14,75,18,415
7	2006-07	8951.442	19,10,02,020
8	2007-08	7013.335	13,39,52,265
9	2008-09	18434.867	31,66,07,370



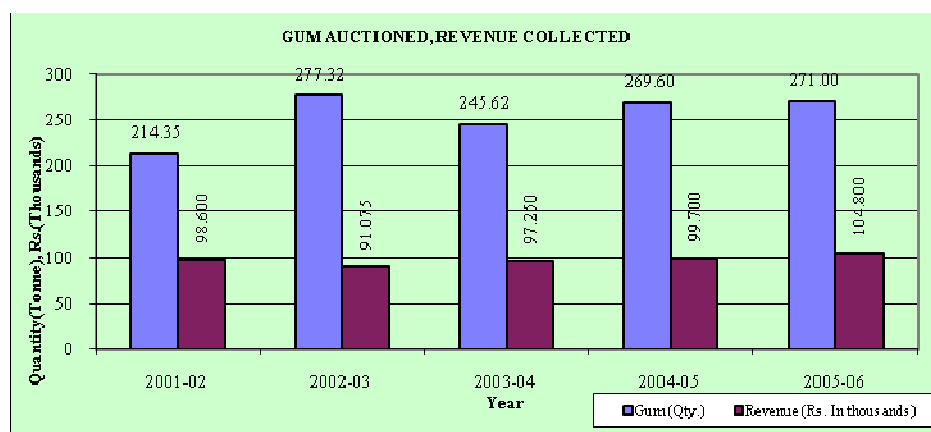
4.2.2 Firewood: With the availability of LPG gas, many people have started using it, but still firewood is the main cooking fuel for most of the villagers and small towns. *Dhawada* as fuel wood is in demand and other species like *Khair*, *Ain*, *Babul* etc. are also preferred. As the demand exceeds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

Firewood auctioned and revenue collected

Sr. no.	Year	Quantity bita	Revenue (Rs)
	1	2	3
1	2000-01	--	--
2	2001-02	--	--
3	2002-03	--	--
4	2003-04	326.17	163085
5	2004-05	873.41	611387
6	2005-06	1314.96	1183464
7	2006-07	106.81	117491
8	2007-08	318.42	413946
9	2008-09	1055.739	2518025

The details of tendu auction are given below

Sr. no.	Year	Units sold	Target (Std Bags)	Actual Yield (Std Bags)	Revenue in Rs. (Actual)
1	2001	19	23500	23410.589	16449521
2	2002	16	24100	23908.917	9562980
3	2003	16	18200	18200.00	8326530
4	2004	14	18200	18726.855	66696867
5	2005	15	13600	9332.242	5138643
6	2006	16	15700	1151.701	4340156
7	2007	19	23700	23549.037	24955755
8	2008	16	23700	20056.839	9542041
9	2009	19	23700	12885.150	15867985



4.2.3 Sitafal (custard apple): In this division under NWFP sitafal units are sold in auction to obtain the fruits of Sitafal. The production of Sitafal is from Darwha range of Yavatmal Division. The revenue collected out of the sale of sitafal is given below.

Sitafal trees Auctioned and Revenue Collected

Sr.no.	Year of Auction	Particulars	Revenue collected in Rs.
1	2001-02	1500 Sitafal trees	10000
2	2002-03	1500 Sitafal trees	18000
3	2003-04	1500 Sitafal trees	27800
4	2004-05	1500 Sitafal trees	6100
5	2005-06	1500 Sitafal trees	42500
6	2006-07	1500 Sitafal trees	66,100
7	2007-08	1500 Sitafal trees	89,000
8	2008-09	1500 Sitafal trees	15,500
9	2009-10	1500 Sitafal trees	6500

Rosha grass is found mainly in Jodmoha, Ghatanji, Hiwari and Arni 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 utilise these items.

Section:4.3: Demand and supply of forest produce and pressure on the forests:

It has been estimated that the consumption of forest produce is projected below.

Total no. of households in the division: 2,79,343

Total no. of land holders: 1,88,669

Total no. of cattle: 1,58,405

Consumption of forest produce

Sr. no.	Forest produce	Consumption per household	Total requirement
1	Firewood	1.5 MT	4,19,015
2	Small timber	8 Poles	22,34,744
3	Agri instruments	2 Poles	5,58,686
4	Fodder	3.5 / Cattle Unit	5,54,418
5	Bamboo	20 Bamboo	55,86,860
6	Mohau flowers	30 kg	83,80,290
7	Mohau Seeds	5 kg	13,96,715
8	Gum	5 kg	13,96,715

Section 4.4 Method of harvesting and their cost :

Harvesting from coupes and thinning is carried out through FLCS, Forest Department as per the prescriptions of WP. There are 20 FLCS working in this division. FLCS is normally given preference for coupe working and otherwise it is carried out by Forest Department. The harvesting cost per cubic meter comes approximately to Rs 1187 in case of FLCS working and Rs 1000 per cubic meter in case of departmental working. 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. Grass and kurans are sold on rated passes. The ownership of NWFP is vested in Gram Panchayat in Scheduled Areas.

Section 4.5 Lines of export:

Yavatmal is connected to Murtijapur in Akola district by a narrow gauge, there is no other railway tract in the division. The entire Yavatmal 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 4.6 Past and current prices:

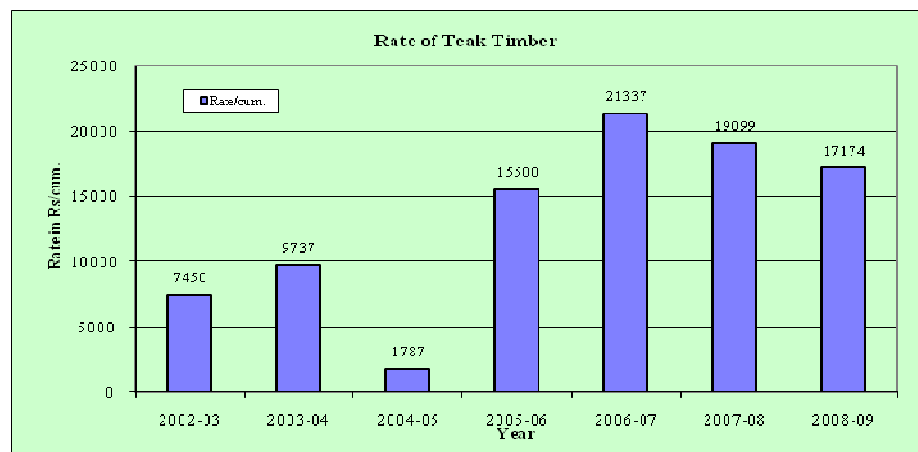
Average price obtained for teak timber & fuelwood in Yavatmal Forest Division are given below.

Average price of teak timber and fuelwood in yavatmal forest division

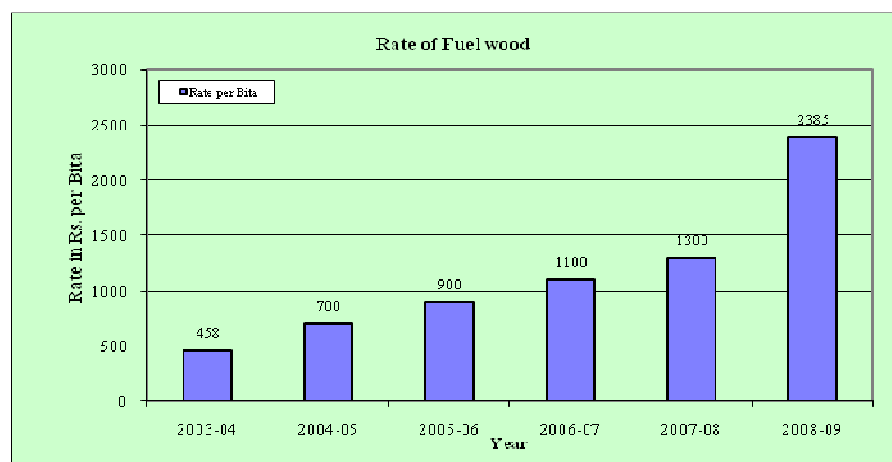
Year	Teak Timber			Fuel-wood		
	Quantity (m ³)	Revenue Rs lakhs	Rate per/ m ³ Rs	Quantity Stocks	Revenue Rs. lakhs	Rate per m ³ Rs.
2002-03	449.547	33,48,950	7,450	-	-	-
2003-04	8152.604	7,93,86,294	9,737	326.17	1,63,085	458
2004-05	5812.491	10,38,78,535	17,871	873.41	6,11,387	700
2005-06	9517.930	14,75,18,415	15,5025	1314.96	11,83,464	900
2006-07	8951.442	19,10,02,020	21,337	106.81	1,17,491	1100
2007-08	7013.335	13,39,52,265	19,099	318.42	4,13,946	1300
2008-09	18434.867	31,66,07,370	17,174	1055.739	25,18,025	2385

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

Graph indicating the trend of yearwise price of teak timber



Graph indicating trend of yearwise price of teak fuel wood



CHAPTER 5

Impact of Activities By FDCM Ltd.

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 good quality of forest area into productive forests by introducing valuable and production enhancing species. FDCM Ltd follows the management plans for managing forest area.

Principles of forest management through approved management plans :

The area allotted to Yavatmal Forest Project Division Yavatmal (FDCM) from Yavatmal Forest Division is 10,548.01 ha, covering 54 compartments. Range wise distribution of forest area under Yavatmal Forest Project Division is given as below.

Details of area transferred to FDCM Ltd.

Sr. no.	Range	Area Transferred				total area in ha.	
		RF		PF			
		no. of compt.	area in ha	no. of compt.	area in ha	no. of compt.	area in ha
1	Arni	--	--	--	--	--	--
2	Darwha	6	831.28	--	--	6	831.28
3	Ghatanji	6	539.36	1	353.69	7	893.05
4	Hiwari	9	1686.35	--	--	9	1686.35
5	Jodmoha	9	2201.78	--	--	9	2201.78
6	Ner	--	--	--	--	--	
7	Yavatmal	24	4935.62	--	--	24	4935.62
	Total	54	10194.39	1	353.69	55	10548.08

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 planting teak, the activities have been successfully carried out by Yavatmal Forest Project Division and very good Teak plantations are raised. In the areas allotted to Yavatmal 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 as good as other areas of Yavatmal 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 6

Impact of Five Year Plans

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

Section 6.1 First Five Year Plan (1951-56)

First five year plan was aimed at rehabilitation of degraded forests, introduction of economic species, survey and demarcation of the forest area. The impact of the First Five Year Plan is not noticeable, as the flow of funds was never made available for requisite achievement of management prescribed in the Working Plan. During this period the forest was managed as per the Working Plan of Robinson.

Section 6.2 Second Five Year Plan (1957-60)

The second five year plan also emphasized rehabilitation of degraded forests, introduction of economic species, survey and demarcation. During second five year plan Thosre's Plan was implemented. During this period systematic management of forests was introduced. Silvicultural operations were given importance in forest management. Plan funds were not allotted for the operations of forest management. Some of the forest land was allotted to local villagers to raise agri-silvi plantations.

Section 6.3 Third Five Year Plan (1961-66)

Third five year plan emphasized on increasing productivity of forests by taking up plantations of fast growing species. Scientific assessment, modern logging methods were adopted for extraction of timber. 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 also. Thosre's Plan was under implementation. Plan funds were not allotted to any operation of forest management. The plantations were raised during this period under non-plan funds. During this period the old Yavatmal division was bifurcated into East Yavatmal and West Yavatmal Divisions.

Section 6.4 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 were 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 6.5 Forth Five Year Plan (1969 - 1974)

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 6.6 Fifth Five Year Plan (1974 - 1979)

Thosre's plan was continued up to middle of this plan period and later Pal's plan was under implementation. The forestry sector in this five year plan aimed at large scale plantations, social forestry and forest conservation. Social Forestry wing was established during this period to involve people, to raise the plantations on the lands outside forest i.e. community land, government waste land etc. The State Government introduced Employment Guarantee Scheme (EGS) to provide employment to local people. During this period successful plantations were raised by the Forest Department.

Section 6.7 Annual Plan (1979 – 1980) and Sixth Five Year Plan (1980-1985)

During this period there was thrust to save natural forests by providing alternative sources of forest produce through social forestry activities. 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 western part of the division Pal's Working Plan was under implementation during this period, whereas in eastern part of the division Kanekar's Working Plan was under implementation. Successful teak plantations had been raised under plan scheme of GUT (General Utility Timber) during this period. However, the budget allocation under plan schemes was meagre, not even 1 % of the total plan budget of the district. During this period, Forest (Conservation) Act 1980 was enacted. The reorganisation of forest

divisions was effected, Yavatmal Forest Division was carved out from East Yavatmal and West Yavatmal Divisions.

Section 6.8 Seventh Five Year Plan (1985-1990)

During this period, Pal's and Kanekar's Working Plan were under implementation. The Emphasis was laid on forest conservation, massive afforestation and waste land development. 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. The forest management activities were affected as Government of India imposed ban on clear felling of naturally grown forests. The implementation of Forest (Conservation) Act 1980 gained momentum and the forest dwellers were of the opinion that the forests and the Acts for conservation of forests were hindering the process of development. Plan funds were allocated for the developmental activities under district plan scheme.

Section 6.9 Eighth Five Year Plan (1992-1997)

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. World Bank aided Maharashtra Forestry Project was implemented which helped in improving infrastructural facilities i.e. communication, transportation, building etc and introduction of modern techniques in forestry i.e. root trainer nursery, clonal nurseries, germ plasm banks etc. 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 6.10 Ninth Five Year Plan (1997-2002)

The aims of 8th five year plan were carried forward to 9th five year plan as far as forestry sector was concerned. The State Government initiated different schemes for development of forestry sector in consonance with Central Government schemes. 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. During this period Yadav's Plan was in force.

Section 6.11 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. In Yadav's Plan lot of soil and moisture conservation works were prescribed and accordingly some works were taken up under various schemes. The flow of plan funds had come down drastically.

The national forestry action programme was formulated to establish linkage between National Forest Policy and five year plans. The budget outlay for forestry sector was hardly 0.032 % of total outlay in 5th five year plan and it increased to 0.94 % in 8th five year plan.

CHAPTER 7

Staff and Labourers Supply

Section 7.1 Staff Position : The headquarters of Yavatmal Forest Division is Yavatmal 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 7 ranges, 26 rounds, 106 beats. The position of staff is given in the following table.

Details of Staff

Sr.no.	Post	Pay band	No. of posts				
			Total	Permt.	Temp.	Filled	Vacant.
Group A							
1	DCF	PB-IV- 37500-64000	1	0	1	1	0
2	ACF	PB-II-9300-34800	4	3	1	4	0
	Sub-total		5	3	2	5	0
Group B							
1	RFO	PB-II-9300-34800	15	9	2	11	4
	Sub-total		15	9	2	11	4
Group C							
1	Forester	PB-I-5200-20200	55	36	13	49	6
2	Forest Guard	PB-I-5200-20200	188	142	36	178	10
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	23	20	3	23	0
6	Surveyor	PB-I-5200-20200	2	2	0	2	0
7	Jeep Driver	PB-I-5200-20200	5	5	0	4	1
8	Armed Police	PB-I-5200-20200	1	1	0	1	0
9	Truck Driver	PB-I-5200-20200	1	1	0	0	1
10	Tractor Driver	PB-I-5200-20200	3	3	0	3	0
11	Naik	1S- 4400-7440	1	1	0		1
	Sub-total		290	221	53	272	18

Sr.no.	Post	Pay band	No. of posts				
			Total	Permanent	Temp.	Filled	Vacant.
Group D							
12	Daftari	1S- 4400-7440	1	1	0	1	0
13	Peon	1S- 4400-7440	4	4	0	2	2
14	Watchman/ paharekari	1S- 4400-7440	2	1	1	2	0
15	Choukidar	1S- 4400-7440	1	1	0	1	0
16	Tractor Cleaner	1S- 4400-7440	1	0	1		1
17	Truck Cleaner	1S- 4400-7440	1	1	0	1	0
18	Mali	1S- 4400-7440	1	1	0	1	0
19	Van-majur	1S- 4400-7440	184	0	184	184	0
	Sub Total – IV		196	10	186	192	4
	Grand Total		506	243	243	480	28

Section 7.2 Accommodation

The office as well as residence of the DCF, Yavatmal Forest Division is housed in the buildings of PWD. RFO have their offices in buildings of the Forest Department. Details of accommodation required as per norms for forests staff and available accommodation are given below.

Accommodation available and required

Sr. no.	Designation	No. of Posts	Available accommodation	Required accommodation
1	DCF	1	1	0
2	ACF	4	0	4
3	RFO	15	7	8
4	Forester	55	26	29
5	Forest Guard	188	108	80
6	Chief Accountant	1	0	1
7	Accountant	11	0	11
8	Clerk	23	0	23
9	Surveyor	2	0	2
10	Driver	5	0	5
11	Police Hatyari	1	0	1
12	Truck Driver	1	0	1
13	Naik	1	0	1
14	Daftari	1	0	1
15	Peon	4	0	4
16	Paharekari	2	0	2
17	Choukidar	1	0	1
18	Tractor Driver	3	0	3
19	Tractor Cleaner	1	0	1
20	Truck Cleaner	1	0	1
21	Van-majur	184	0	184
22	Total	506	142	364

Section 7.3 Rest houses

There are three rest houses and 9 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	Hiwari	Rest house	Hiwari
2	Ghatanji	Rest house	Tipeshwar
3	Darwha	Rest house	Pathrot
4	Ghatanji	Inspection hut	Ghatanji
5	Arni	Inspection hut	Arni
6	Arni	Inspection hut	Bhansara
7	Arni	Inspection hut	Sawali
8	Arni	Inspection hut	Belora
9	Darwha	Inspection hut	Sonkhas

Section 7.4 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 8

Past Systems of Management

Section 8.1 General History of Forests

8.1.1 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 Pusad 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.

8.1.2 In 1913 the CCF inspected Yavatmal forests and had concluded that *A Class* forest area was insufficient to meet the growing demand for timber and increasing population. Subsequently a joint enquiry by a Revenue Officer and the Working Plan Officer was held

and as a result of which about 1/3 area of *C Class* was transferred to *A Class*. Disforestation and exchange of land had taken place subsequently with the main object of releasing or exchanging the area suitable for cultivation, simplifying boundary and removing inconvenience to villagers with *A Class* reserved forests.

8.1.3 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 8.2 Past Systems of Management:

8.2.1 Pre-Working Plan period (1865 – 1914). Prior to 1865 there was no regular forest management and administration in this area. The regular forest administration was initiated in Yavatmal District in 1865 when forest reserves were originally formed. The main object of the forest management was to restore the degraded forests by giving them complete rest from felling and by protecting forest against fire and the grazing. However, extraction of the dead wood for meeting demand of sleepers on a small scale was carried out in *Pathrot* area. The areas were completely closed for grazing. By the year 1900 it was realised that *A Class* blocks which were completely closed to felling and grazing was run at a loss without improvement works. Subsequently a Provisional Felling Scheme was drawn up for the blocks having demand for forest produce. The system was improvement felling under 20 years rotation in order to prepare the forests for working under Coppice With Standards. The working of the forests was started in 1901 in *Pathrot*, later on in *Jamb*, *Umarda*, *Chausala*, *Dabhadi*, *Kharoni*, *Barad*, *Pokharni*, *Fiski*, *Gari* and *Lonbehel* blocks. The system adopted was to mark the trees to be retained and offer rest of the crop for sale on cost to the public. Silvicultural operations like cut back operations were undertaken. The system was in force for 14 years and it was beneficial from the point of revenue and expenditure. In the famine in 1919 due to scarcity of fodder, some of the *A Class* forest was opened for grazing and since then there has been a general practice of allowing cattle in *A Class* forests. The work was introduced with 3 working circles, one each for *teak* area, other species and one for scrub forests. The system adopted was retention of good *teak* trees, trees of reserved species and the rest of trees were permitted to be cut by the

purchasers. The system had worked very well till the year 1900 and brought considerable revenue. But the system gradually became unworkable due to transfer of areas from *C Class* to *A Class*, made the felling series incomplete and heavy grazing destroyed the coppice in worked coupes. Moreover lack of intensive supervision (as no Forest Guards patrolled C Class) resulted in heavy illicit felling coupled with bad coppicing.

8.2.2 Post Working Plan period (1915 – 16) The regular Working Plan to manage forests was started in 1915 for treatment to the forests, considering needs of the local population, policies, rules laid down by the Government.

8.2.3 Malcolm's Working Plan (1915-16 to 1937-38) In 1914 it was decided to replace the previous schemes in order to have effective management by one Working Plan. The preparation of Working Plan was entrusted to Mr.C.A.Malcolm IFS and his plan was introduced in 1915-16. These forests were managed as per the prescriptions of Malcolm Working Plan for 23 years. In this plan grazing was recognised as an important demand and efforts were made to fulfill the grazing demands. In this plan, the forests were divided into 49 felling series, dividing each felling series into approximately 30 coupes. Several small under stocked areas were not included in coupes but were left open for grazing to provide large area for grazing in view of excess cattle population. The cycle of closures to grazing and the sections of coupes were determined with a view to providing maximum grazing facilities to the local cattle. At the same time some of the blocks, where heavy grazing was noticed, closure for 5 to 6 years was prescribed in the Working Plan. In other areas the closure was increased to 10 and 15 years. In some blocks large under stocked areas were developed into additional coupes, generally large in size and which were brought under periodical closures. Cut back operations after main felling were prescribed. Cleaning & thinning were also recommended in the Working Plan but no regular system was prescribed. The method of exploitation to mark the trees for retention when the coupes were open to purchasers and allowed them to fell any unmarked tree within the coupe. Cut back operations were also carried out in the following year. As the system had inherent disadvantages, it was gradually replaced by the departmental felling which included cut back operations.

Under the previous system some coupes were marked, felled by the purchasers, coupled with poor or lack of supervision of the department led to deterioration of the crop. Practically some areas were not worked by the purchasers. Heavy exploitation was organized after the 1st World War until 1929. In every felling series the demand was full

and made it possible to carry out thinning and cleaning especially in better teak areas. These felling resulted in replacing all over matured and malformed crop with a new well grown even aged forests, with coppice. However, in poorly stocked open grassy areas, which were filling up slowly, they caused lot of damage by giving setback to the process of recovery. Moreover, as a result of heavy felling, forests were over exploited and as a result of which the crop is now young to middle aged.

Results: The growing demand for forest produce had resulted in heavy felling in certain areas. Heavy felling resulted in replacing old crop with the new, well grown coppice forests in well stocked and dense areas. But in poorly stocked and open grassy areas the process of recovery was slow. As a result of heavy felling, the forests were over exploited. The crop in the most of the better quality area was young to middle aged.

8.2.4 Robinson's Working Plan (1938-39 to 1955-56) Malcolm's Plan was revised by Shri Robinson, which came into force in 1938-39. Shri Robinson prescribed management of the forests keeping in view firstly, the interest of local population and secondly, the interest of general living. The general objects of management of Shri Robinson's Plan were as under.

- To obtain sustainable annual out turn of forest produce mostly in demand by the local people, principally timber, fuel wood, grass, bamboo and other minor forest produce.
- To meet the demand of grazing for local cattle population.
- To maximize the revenue.

All *A Class* forests had been worked according to its prescriptions under this plan. *A Class* forests were categorised into 3 types Viz (1) Good quality teak forests, (2) Medium quality teak forests, (3) Poor quality teak and mixed forests. The brief prescriptions and the results of working are given below.

(1) Coppice WC

It included low quality teak and mixed forests generally belonging to site quality IVb, 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 coupes each. The area was to be worked under "Coppice with Reserves" system, in place of "Coppice with Standards" system which was practiced earlier. The rotation age for teak was fixed at 40 years by which time it achieved the girth of 25 inches at bh. Upto 20 well grown teak and

miscellaneous trees per area will be retained in teak forests and upto 25 trees per acre were retained in the mixed forests which were worked only if there was a sufficient demand.

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

(2) General High Forest WC

It included medium quality teak forests, generally of site quality IV a and IV b with young to middle aged crop. The WC was divided into 6 Felling Series. The forests allotted to this WC 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 1/3rd of the workable area which was divided into 20 equiproductive annual coupes. Rest of the areas for PB-II and PB-III were unallotted and were to be worked by compartments on a 20 years cycle where in thinnings and selection felling (over 3 ft. gbh.) were to be carried out. In PB – I, teak areas capable of being regenerated from NR supplemented by coppice were to be clear-felled except for the poles upto 2 ft 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.

Results: Heavy thinnings and selection felling 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 WC

It comprised the best teak forests 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 felling supplemented by AR. Only one F.S. was formed. The rotation was fixed at 80 years considering an average girth of 5 ft. at bh could be attained during that time. The rotation was divided into 4 periodic blocks of 20 years each. PB – I comprised approximately 1/4th 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 PBs which were to be gone over once in 20 years for heavy thinnings and selection felling (3.5 ft & above), compartment wise.

Results: 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 felling as prescribed in unallotted areas without any regard to the future yield led to the depletion of higher girth classes.

(4) Miscellaneous WC

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 for fodder.

a) 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.

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

b) In Tiwsala Reserve, 1850 acres of land had been planted with teak. The plantations are highly successful.

(5) Bamboo (overlapping) WC

It included all the important bamboo bearing compartments. 8 F.S. were formed with each one further divided into 4 annual coupes. Bamboo was to be exploited under the standard prescriptions.

Results: The prescriptions were found to be suitable.

(6) Teak Plantation (Overlapping) WC

It included part area of the Penganga WC 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) WC

Suitable areas, permanently closed to grazing were chosen for bamboo plantation. *Dendrocalamus strictus* was the main species.

C Class Forests: This was area not dealt with in the Malcolm's Plan. Robinson prescribed thinning of congested crop wherever available and accordingly the work was done.

Results: Heavy thinning were carried out in the 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 area.

8.2.5: Thosre's Working Plan (1955-56 to 1975-76) Robinson's WP was revised by Shri Thosre. Brief prescriptions and results of working of Thosre's WP are given below.

(1) Coppice with Reserves WC: Major portion of workable forest area was placed in this WC including the forests previously managed under General Teak High Forest WC. The rotation period was fixed at 40 years at which it would achieve girth (bh) of 60 cm. Under this WC 68 felling series were formed and each felling series was divided into 40 coupes. The coupes were worked through the contractor system except the coupes of ex Izara and C Class transferred to A Class, which were worked departmentally to meet the demand of small timber and fuel wood. Thinning was prescribed at 10th & 20th year after main felling for teak. The intensity of felling varied with density and necessity of cover for soil protection. Certain species were reserved against felling.

Results: The results were proved to be quite successful except for the following discrepancies. The contention that forests are capable of producing sound teak trees up to 60 cm in girth at 40 year rotation then becoming unsound was not correct. The forests that was included in Kharbi, Korat, Chikhali, Sondabhi, Morchandi, Masalga, Bhansara felling series of this working circle are capable of producing sound teak trees up to 105 cm girth. The thinning carried out was defective as it was more of revenue oriented thinning rather than silvicultural thinning, which resulted in over exploitation. No cleaning was prescribed with the result the coppice shoots after main felling were allowed to grow, led to heavy competition of coppice shoots and consequently congestion in the crop was noticed. The working plan prescribed that the marking of the main felling coupes in Bhansara, Satara, Anjankhed, Kharbi should be done by the gazetted officer but this was never followed. The result was that the prescriptions have not been scrupulously followed.

(2) Plantation WC: Old Teak plantations in Tiwsala and Kinwat series and other suitable areas for raising teak, fuel and fodder plantations were included in this WC. The main aim was to plant under stocked and mixed forest area situated in compact blocks of more than 100 acres and capable of growing quality III to IVa teak, by agri-silvi plantations and also growing better plantations of fuel and fodder as per the suitability of site.

Results: The prescriptions in teak and mixed plantations raised during the period of the plan has shown wide variations in success. The factors, which were responsible for this are – (1) soil conditions, (2) lack of tending of crop after plantation. Only 135.415 ha. of plantations have been taken up out of proposed 530.500 ha area of plantation.

(3) Painganga Selection-cum-Improvement WC: In this WC the best quality of teak forests along the bank of Penganga river were included. Only one felling series with 2 cutting sections A and B were constituted. The crop included in this WC was of site quality III. Results of stock mapping indicate that most of the teak forests are capable of growing sound teak trees upto 5' girth. The principal associates of teak are *Ain*, *Dhawada*, *Kalam*, *Bel*, *Semal* etc. Cutting section A was divided into 20 coupes on 20 year felling cycle. The exploitation girth of teak was 135 cm at breast height over bark and the yield was regulated by area. The forests included in cutting section B were completely young crop and divided into 10 coupes and thinning on a 10 year cycle was prescribed; 16.187 ha. of teak plantation mixed with *Semal* and *Shivan* was prescribed on agro-silvi basis starting from coupe no.I of the cutting section B every year. Mechanical thinning was prescribed in 5th & 10th year respectively and subsequently light crown thinning was also prescribed on a 10 year cycle. In cutting section A regular thinning and tending operations were prescribed on the basis of 10 year cycle.

Results: It was prescribed to remove 140 teak trees of above exploitable girth per year but improper execution resulted in over exploitation. In the name of improvement, marking the pre selection girth class trees were also marked for felling, which led to the over exploitation. Teak plantations of 16.187 ha in each coupe were not taken up, which indicates the prescriptions were not followed. It was also observed that timely thinning was not carried out resulting in the congestion of plantations.

(4) Improvement WC: In this WC crooked, stunted, malformed and open teak forests situated in remote area were included. Low density, poor quality forests devoid of regeneration due to heavy growth of thick grass especially in Kharbi & Jaorala plateaus with scattered patches of better density crop along main nala was included in this WC. The

forests included in this area were largely uneven aged, unsound and malformed stems with high percentage of teak. The felling cycle was fixed at 20 years.

Results: It was observed that the prescriptions were not rigidly followed as a result of which over exploitation took place in the crop. Moreover, the size of annual coupe was approximately 400 ha which was very large to control and supervise by the staff.

(5) Bamboo (Overlapping) WC: All important bamboo areas were included in this WC. The areas was divided into 11 felling series worked under 3 years cutting cycle. Bamboo covered only a small area and it is of poor quality but of great local importance.

Results: The prescriptions were not followed which resulted in malformed and congested crop. Out of prescribed area 118.210 ha. of bamboo plantations on 122.33 ha. have been taken up. It was observed almost all bamboo plantations were practically failure.

(6) Pasture Improvement Working Circle: In this WC open or scrub forests classified as pasture land have been included. The main object of this WC was to provide grazing to the maximum possible extent in consistence with the preservation and improvement of the pasture. Each pasture series was divided into 4 or multiple of 4 coupes and 1 out of every 4 coupes was to undergo 3 years monsoon closure continuously and then remain open to continuous grazing for 9 years. Operations aiming at improvement of pasture were to be carried out one year before closure. In these areas planting of better fodder species like *Sheda*, *Paunya*, *Marvel* was prescribed. Similarly planting of fodder trees were also prescribed like *Anjan*, *Kachnar*, *Bija* etc. in these coupes one year before closure.

Results: Effective implementation of the prescriptions made in the WC could not be achieved as the area was surrounded by cultivations and villages, closure was a difficult task. The area was subjected to indiscriminate grazing. Teak plantations raised in Deulgaon and Rui pasture series have miserably failed as the prescriptions of raising teak plantations in pasture series as prescribed was not correct.

(7) Miscellaneous WC: All the grass birs, forest villages and few compartments which were not been included in any WC circle, were allotted to this WC.

(a) Grass birs: There were 13 grass bir ramnas in the division and some of the grass birs have been fenced. Prescription for the improvement of grass birs had been followed to some extent in *Gahuli ramna*. In grass birs located in Darwha Range, there was no sufficient demand for grass.

(b) Forest villages: 25 forest villages were there in the division. They were managed as per the instructions contained in Para No.68 & 69 of the C.P. & Berar Manual vide Govt. notification no.FLD-3269-221239-WI, dt.20.12.69. These forests were deforested and later transferred to Revenue Dept. as per Maharashtra Land Revenue Code 1966.

8.2.6 Pal's Working Plan (1976-77 to 1991-92)

Thosre's WP was revised by Shri B.C.Pal. As per the prescriptions of Pal's WP, the forest area of Pusad Forest Division was divided into 8 WC including 2 overlapping WC. A brief account of WC and assessment of working is given below.

(1) Selection-cum-Improvement (SCI) WC

Best quality of teak forests of site quality III along the banks of river Painganga, managed under Painganga Selection-cum-Improvement WC during the previous plan were included in this WC. These forests were also managed under Painganga High Forest WC prior to Thosre's plan. The crop was uneven aged with inadequate regeneration. The principal species was teak of site quality III and the area was mostly inaccessible & undulating. The selection girth was fixed at 130 cm at bh over bark and felling cycle was fixed at 20 years. 2 felling series namely Painganga-I and Painganga-II were formed. The yield was to be regulated by area. $1/3^{\text{rd}}$ of the total teak trees above selection girth were to be marked for felling and all miscellaneous trees above 135 cm girth except certain reserved species were to be marked for felling. In the remaining crop light thinning was prescribed to remove congestion. Diffused plantations were prescribed in patches not less than 0.5 ha as per the suitability of site. Cut back operations in the next year of the main felling and cleaning in the 6th year were prescribed. Mechanical thinning was to be carried out in the teak plantations.

Results: The condition of crop remained more or less the same. The density of the crop varies from 0.5 to 0.8 and teak constitutes main species of the crop. The crop is middle aged to mature and the regeneration of teak and other species is inadequate. Presently the area falls in Painganga Wildlife Sanctuary.

(2) Teak Plantation WC: The old Teak plantations taken up in the past and the area suitable for growing plantations of teak and other miscellaneous species were included in this WC. The basic object was to convert the existing inferior quality and less valuable mixed species forests into valuable and superior teak forests. The treatment was clear felling followed by artificial regeneration. The site quality of the forests was III and IV.

The area included in this WC for rising new plantations, has been divided into 2 felling series with 40 annual coupes whereas the area under old plantations was divided into 10 annual coupes. Thinning was prescribed in 8th, 15th, 25th, 35th and 45th year of the plantation. First 2 thinnings were mechanical, whereas the thinning at 25th, 35th and 45th year of planting was silvicultural thinning.

Results: The prescriptions regarding thinning in old teak plantations were satisfactory which were implemented during this plan. The new plantations could not be raised with desired success as most of the new sites proposed for plantations were in ripping zones or in valley depression. Proper rab burning and stump uprooting had not been carried out at the time of planting, resulting in the formation of multiple coppice shoots and the teak seedlings planted did not achieve desirable growth. Adequate no. of miscellaneous species was not maintained.

(3) Coppice with Reserves (CWR) WC: Major forest area of the region included in this WC was capable of producing small to medium size timber, poles and firewood, the site quality IVa & IVb, mostly teak as principal species, crop young to middle aged. The area was divided into 25 felling series with 40 annual coupes of each felling series. The rotation for teak was fixed at 40 years and corresponding girth expected by this time was 85 cm. Reservation of 150 trees/ha for site protection besides all sound, fruit bearing trees along with well grown advance growth of teak and other species upto 40 cm in girth was to be retained. Clear felling to the tune of 10% of the coupe area or a minimum of 5 ha in well stocked area for raising teak plantation was prescribed. Blank area, nala banks, eroded and steep slope area was excluded from the felling. The yield was regulated by the area. Under this system, regeneration of mainly of coppice origin, cutback operations after main felling, cleaning in 6th year of main felling were prescribed. As per the WP prescriptions, 1st and 2nd mechanical thinnings were to be carried out at 8th & 15th year respectively. Thereafter silvicultural thinning (3rd and 4th thinning) was to be carried out at 25th and 35th year.

Results: Since most of the area had been repeatedly managed under CWR system right from the beginning of 1938-39 as per the Robinson's WP, it resulted in reduction in coppice vigour of teak and its associates. The stocking of teak had increased over the years owing to poor coppicing of miscellaneous species. Soil had become highly compact due to adverse biotic factors, heavy grazing, illicit felling, frequent fires of adversely affecting natural regeneration of teak and its associates. The reduction of coppice shoots to

1 to 2 per stool as prescribed in WP had not been followed scrupulously. The resultant coppice crop was stunted, malformed and pollarded to a great extent, constitutes high proportion of teak.

(4) Fodder Reserve WC: It included the area adjacent to cultivations, capable of producing good fodder grass, locally called as *Ramnas*. These areas were managed under the same system of the previous working plan. These areas were situated in close proximity of towns and villages having demand for fodder grass. The basic object is to improve quality and quantity of fodder grasses, introducing better variety of grass species to improve yield. The areas of this WC were mostly devoid of tree growth. The common grass of this area were *Kusal*, *Aristidia*, *Funuculenta* and grasses like *sheda*, *paunya* are scarcely present. The area has to be protected from grazing and fires. All the *Ramnas* were to be fenced with wire fence or cattle proof trenches. They were to be permanently closed to grazing and grass was to be sold only on cutting basis after October 31st. All the areas were to be fire traced annually.

Results: Most of the *Ramnas* were worked and maintained as per the working plan prescriptions. The areas could not be closed effectively to the cattle grazing since these were not wire fenced. The situation has resulted in further deterioration of the soil. The local people did not respond properly towards the system of cutting and purchasing fodder to stall feed their cattle, mainly due to availability of grass in forests adjoining the villages. Few *Ramnas* were wire fenced and properly maintained like *Belgaon Ramna* near Singad has luxuriant growth of fodder grasses. In most of the *Ramnas* plantations under different schemes have been taken up but most of these plantations were not successful.

(5) Pasture Improvement WC: Pasture lands as per the classification made on functional basis were included in this working circle. These forests were basically open or scrub lands, do not yield even small timber but are conveniently situated for providing grazing lands to the cattle of adjoining villages. Most of the area managed under Pasture Improvement WC of Thosre's WP was included in this area. Special objects of the management of the WC were - (1) to check soil erosion, (2) to maintain and improve the existing vegetation, (3) providing grazing land. Scattered trees of *Salai*, *Palas*, *Dhawada*, *Hiwar*, *Ain*, *Lendia* and usually thorny species like *Khair*, *Acacia*, *Ber*, *Chilati*, *Bharati*, grasses of *Bhurbhushi*, *Kusal*, *Sheda* etc occur in this area. Control of grazing, improvement of pastures by closing certain area for grazing and allowing other areas open for grazing were prescribed. Cattle unit prescribed was 0.40 ha. The total area was divided

into 15 pasture series with 4 or multiple of 4 annual coupes in each series. One out of 4 coupes was to be closed for grazing for 3 years continuously and thereafter the coupe was to remain open for 9 years. No grass cutting was allowed in closed coupes and the area was to be protected from fire, introduction of superior fodder grass and tree species, contour trenches etc were also prescribed.

Results: The working plan prescriptions were not followed. The practice of rotational grazing as prescribed was not implemented. Heavy grazing without any improvement works coupled with the heavy biotic pressure had resulted in further deterioration of the pasture areas.

(6) Bamboo (Overlapping) WC: It includes forests area having bamboo established in *Kharbi, Bittergaon and Arni* Ranges. It overlaps Selection-cum-Improvement (SCI) WC, Coppice with Reserves WC and Teak Plantation WC. *Dendrocalamus strictus* is the species in this area. Method of treatment prescribed was 3 year cutting cycle i.e. A, B and C. Three cutting series were formed with each series divided into 3 annual coupes. Bamboo plantations were prescribed in suitable area along nala banks.

Results: Bamboo plantations undertaken in the past did not succeed. They were affected by wild boar at many places and no bamboo was harvested. Stocking of natural bamboo in forests is negligible.

(7) Miscellaneous WC: Poor and understocked forests out of the Coppice With Reserves WC and area of Improvement WC which did not show any sign of improvement of Thosre's WP and the area handed over to other departments but the Government did not issue any notification were included in this WC. In general the areas were open with teak and its common associates such as *ain, dhawada, lendia, tendu, salai, beheda*. Treatment prescribed was to give complete rest to the forests for natural regeneration.

Results: Heavy grazing resulted in compaction of soil with no sub-soil moisture and natural regeneration could not be established. Improvement of the area was not possible without soil and moisture conservation methods. The area deteriorated further due to heavy biotic pressure and frequent fires.

(8) Wildlife (Overlapping) WC: It covers entire forest division. The special objects of the management were to ensure and maintain viable population of wildlife, to preserve area of natural heritage for the benefit of wild life. Prescriptions emphasized digging of water

holes, no felling in a radius of 100 meters from perennial water holes, construction of nala bunds, of salt licks at suitable places and continuous patrolling, erecting watchtowers etc.

Results: All the prescriptions were hardly followed therefore no significant improvement in the wildlife management was noticed.

8.2.7 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 is 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 of Thosre's Plan 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 from 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 Yavatmal 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.

8.2.8 Shri R.S.Yadav's WP (2001-02 to 2010-11) : Shri Kanekar's WP was revised by Shri. R.S.Yadav. The details of prescriptions of WP written by Shri R.S.Yadav for Yavatmal forest Division and results of implementation are described below.

Area (scaled) allotted to various WC in Yadav's WP

Sr. no.	Working Circle	Area (ha.)	No. of compts.	% w.r.t. W.P. area	% w.r.t. total area
1	Survey and Demarcation WC (OL)	35148.72	352	39.30	35.00
2	Selection cum Improvement WC	32787.18	101	36.65	32.65
3	Improvement WC	21512.30	88	24.05	21.42
4	Joint Forest Management (overlapping) WC	40748.83	291	45.56	40.58
5	Afforestation WC	19236.53	203	21.51	19.16
6	Fodder Reserve WC	6248.55	31	6.99	6.22
7	Miscellaneous WC	9663.64	118	10.80	9.62
	Working Plan Area	89448.21	541	100	89.08
	Area Managed by FDCM	10970.68	55	--	10.92
	Total	100418.89	596	--	--

Details of coupes due and coupes worked are given below.

Year	Working Circle							
	SCI		IWC		AWC		FWC	
	Due	Actual worked	Due	Actual worked	Due	Actual worked	Due	coupes worked
2001-02	-	-	-	-	-	-	-	-
2002-03	22	-	22	-	23	-	6	-
2003-04	22	20	22	11	23	23	6	-
2004-05	22	19	22	15	23	23	6	-
2005-06	22	19	22	19	23	23	6	-
2006-07	22	20	22	17	23	23	6	-
2007-08	22	18	22	15	23	23	6	-
2008-09	22	20	22	18	23	23	6	--
Total	154	136	154	95	161	138	42	

(1) Survey and Demarcation WC (Overlapping)

This working circle was formed for effective boundary demarcation of the forests. Special objects of this WC are given below.

1. To know the exact boundaries on the ground as well as on map.
2. To remove encroachments.
3. To have proper demarcation between the government forests and other areas.

A separate programme was prescribed for the survey and demarcation of the areas as given below.

Area to be surveyed and demarcated

Sr. no.	Range	No. of comptt.	Scaled area	Length of the effective boundary in Km.
1	Arni	18	2774.86	101.714
2	Darwha	142	11652.96	685.406
3	Hiwari	28	2958.38	126.753
4	Jodmoha	35	6097.55	217.171
5	Ghatanji	7	1223.42	49.946
6	Ner	98	8644.97	474.229
7	Yavatmal	24	1796.58	106.511
	Total	352	35148.72	1761.730

As per the prescriptions the survey and demarcation programme was to be completed within a span of five years. It was prescribed to obtain village maps and land records which were to be compared with the maps and records available in the Forest Department and discrepancies were to be corrected. RCC pillars were to be established along the boundary. A copy of the corrected maps and concerned register was to be supplied to Working Plan Officer.

Results: Working plan implementation commenced during 2002-03 and during this period only demarcation and marking of coupes was carried out in the forests. The survey and demarcation works including erection of pillars in areas in different years is given below.

Pillars prepared and erected in Yavatmal Forest Division.

Sr. no.	Year	Pillars prepared			Pillars erected			Demarcation length in km
		Small pillar	Big pillar	Total pillars	Small pillars	Big pillars	Total pillars	
1	2	3	4	5	6	7	8	9
1	2002-03	2940	1176	4116	-	-	-	-
2	2003-04	2706	3894	6600	2940	1176	4116	283.831
3	2004-05	2895	4344	7239	2706	3894	6600	273.802
4	2005-06	-	-	-	-	-	-	-
5	2006-07	587	467	1054	405	259	664	51.529
6	2007-08	167	236	403	2683	3437	6120	291.917

Total length of demarcation to be covered within five years was 1761.730 km. As per the information provided by DCF, Yavatmal length of demarcation covered was 901.079 km, hence total length of demarcation was not covered. Survey and demarcation works were partially completed.

(2) Selection-Cum-Improvement WC: The area included in this WC was previously managed under Coppice With Reserves system, Teak Plantation WC and SCI WC. The crop density is 0.4 to 0.7 and the crop is young to middle aged, the site quality is IVa and IVb with few patches of site quality III. Teak is dominant species along with its associates ain, dhawada, salai lendia, bhirra, tendu, char etc. The natural regeneration is inadequate. As the crop had been repeatedly managed under Coppice with Reserves System, it resulted in poor teak forests. The basic aim was to replace the stunted coppice growth with high forests by encouraging seedling regeneration. Tending of 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 IVB and 105cm girth at breast height for site quality III and IVA. The felling cycle was fixed at 10 years. Total area allotted to this working circle is 32,787.18 ha; the area was divided into 22 felling series and 10 coupes in each felling series. The average area of each coupe is 149 ha. The trees above selection girth were to be enumerated and 50% of total teak trees enumerated above harvestable girth were to be marked for felling. In the blank areas planting of 50% teak and 50% miscellaneous species was prescribed. Tending of seedling regeneration, soil and moisture conservation measures like nala bunding, gully plugging, contour trenches, check dams etc were prescribed. It has to be supplemented by artificial regeneration with suitable species.

Result: Coupe number I of all felling series was not tackled as per WP, causing deviation.

Number of coupes worked under SCI WC

Year	Coupes due for working	No. of coupes worked	Actual yield	
			Timber in m ³	Fuel bits
2002-03	22	-	-	-
2003-04	22	20	7352.877	451
2004-05	22	19	6064.494	455.55
2005-06	22	19	9650.765	1289
2006-07	22	20	11675.35	689
2007-08	22	18	9665.92	1301
2008-09	22	20	10872.52	1592

Out of the coupes due for working every year more than 90% coupes have been worked as far as felling operation is concerned. The harvestable girth is 75 cm for site quality IVb and 105 cm for in site quality IVa and III. But the harvestable girth of 75 cm was uniformly applied to all site qualities without considering the harvestable girth of 105cm for site quality IVa and III, this resulted in excess removal of timber. In 2003-04 CBO, cleaning operations were not carried out due to paucity of funds. In 2004-05, CBO operations were carried out approximately in 2000 ha area. In 2005-06, CBO operations were carried out in about 1800 ha, in 2006-07 in 1686 ha and in 2007-08 - 500 ha, in 2008-09 1500 ha as per the information provided by the DCF, Yavatmal. Cleaning operations were not carried out where as CBO operations were carried out partially, which clearly indicates that the prescriptions have been implemented partially in case of CBO operations, where as no cleaning operations were carried out.

Soil and moisture conservation works, CCT were taken up in approximately 1100 ha and nala bunding was carried out at two places, 4 cement bandhara were constructed. In 2004-05 CCT were taken up in 148 ha and 3 cement bandhara were constructed. In 2005-06 no soil and moisture conservation works were carried out. In 2006-07, 500 CCT were dug. In 2007-08 and 2008-09 no soil and moisture conservation works were carried out. It is clear that the prescriptions regarding soil and moisture conservation works have been partially implemented upto 2004- 05 and no soil and moisture works were carried out since 2005-06. As regards natural regeneration, only CBO works were carried out as stated above and cleaning operations were not at all carried out. Under artificial regeneration 30 ha plantation was carried out in 2003-04, 40 ha in 2005-06, 100 ha in 2007-08 and 145 ha in 2008-09. In the year 2004-05 and 2006-07 no plantations were taken up.

(3) Improvement WC: The area previously managed under Coppice with Reserves WC, Miscellaneous WC of previous plan was included in this WC. The total area allotted to this

WC was 21519.71 hectare, site quality IVA & IVB, with scattered patches of site quality III and density varies between 0.4 to 0.6. The crop is young to middle aged. The dominant species is teak alongwith 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 88 compartments have been included in this WC and divided into 22 working series, having 10 coupes in each working series. The average area of each coupe comes around 100 ha. 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 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: In some of the coupes marking operations were carried out on the basis of harvestable girth of 75 cm which is serious deviation from the prescriptions. Prescriptions were given to treat the area with improvement felling supplemented by planting and tending of crop. The prescriptions were made to remove dead, malformed and live high stumps and there was no harvestable girth prescribed. However the prescription of harvestable girth has been wrongly applied in some of the coupes of this working circle and considerable timber was harvested from this WC. The details of timber harvested from this WC by marking trees of 75 cm girth and above girth classes are given in the following table.

Details of actual yield from some of the coupes of Improvement WC

Sr. no.	Range	Year	Name of FLCS	Coupe no.	Felling series	Total no of trees	Total no. of trees Felled	Actual yield in coupes		
								No.	timber (m ³)	fuel
1	2	3	4	5	6	7	8	9	10	11
1	Ner	2008-09	Hanwatkhedha	VII	Wadhona	10511	4300	7351	151.530	0
2	Yavatmal	2008-09	Nimbi Dahatre	VII	Umarda	9315	9315	11159	153.066	25
3	Hiwari	2007-08	Hiwari	VI	Saikheda	12413	12413	19149	161.440	0
4	Yavatmal	2008-09	Ghodkhindi	VII	Kharola	9170	9170	14664	162.911	0
5	Ghatanji	2006-07	Chikhali	V	Koli	2021	2021	2112	163.150	0
6	Arni	2006-07	Sondabhi	V	Pandhurna	2990	2990	4504	168.928	0
7	Yavatmal	2007-08	Kasmar	VI	Umarda	9690	9690	14488	177.729	2
8	Hiwari	2004-05	Korata	III	Pardi			6503	179.241	0
9	Hiwari	2008-09	Ghodkhindi	VII	Masola	17887	17887	9360	179.982	0
10	Hiwari	2003-04	NimbiDahatre	II	Warotapata	12850	12850	20533	185.285	31
11	Hiwari	2008-09	Loni Ghatana	VII	Kolambi	15211	15211	16476	193.356	42
12	Arni	2006-07	NimbiDahatre	V	Bhansra	4711	4711	5810	198.615	26
13	Hiwari	2008-09	Sandawa	VII	Pardi	4905	4905	5764	203.612	35
14	Jodmoha	2008-09	Wadner	VII	Dhanora	6801	6801	11947	210.160	0
15	Hiwari	2006-07	Loni Ghatana	V	Kolambi	11860	11860	19205	210.463	9
16	Hiwari	2004-05	Zarandi	III	Warotapata	13516	13516	13448	211.960	0
17	Arni	2006-07	Chikhali	V	Shiwar	2755	2755	3355	220.447	0
18	Hiwari	2005-06	Loni Ghatana	IV	Kolambi	15085	15085	16191	226.424	48
19	Arni	2008-09	Sondabhi	VII	Pandhurna	3450	3450	3383	232.589	0
20	Jodmoha	2005-06	Digras	IV	Watbori	5715	5715	6825	235.892	
21	Arni	2004-05	Chikhali	III	Shiwar	8202	8202	10662	236.100	0
22	Ghatanji	2006-07	Umargaon Poda	V	Sonkhas	21759	21759	15395	241.248	27
23	Hiwari	2004-05	Sandawa	III	Saikheda	11069	11069	15419	242.600	0
24	Ghatanji	2005-06	Uumrgaon Poda	IV	Sonkhas	10101	10101	10740	256.276	0
25	Ghatanji	2003-04	Shendona	II	Pahur	6658	6658	12171	285.330	24
26	Hiwari	2004-05	Hanawatkhedha	III	Pardi	17415	17415	8571	289.500	0
27	Hiwari	2006-07	Sandawa	V	Pardi	11675	11675	12159	304.657	

1	2	3	4	5	6	7	8	9	10	11
28	Jodmoha	2005-06	Chikhali	IV	Durg	6109	6109	7760	307.233	
29	Hiwari	2004-05	Vasantpur	III	Masola	18432	18432	20704	325.875	35
30	Arni	2005-06	Sondabhi	IV	Pandhurna	6736	6736	6856	329.878	
31	Ghatanji	2005-06	Sandawa	IV	Rampur	12388	12388	8225	336.060	
32	Ghatanji	2006-07	Korata	V	Pahur	7736	7736	9742	357.086	51
33	Hiwari	2007-08	Sandawa	VI	Warotapata	18010	18010	27790	364.897	0
34	Yavatmal	2006-07	Digras	V	Kharola	17022	17022	23499	386.359	
35	Hiwari	2005-06	Hiwari	IV	Saikheda	15371	15371	19609	391.675	--
36	Jodmoha	2007-08	Wadner	VI	Dhanora	1921	1921	13983	404.308	0
37	Hiwari	2003-04	Vasantpur	II	Kolambi	14062	14062	35373	406.005	0
38	Ghatanji	2005-06	Digras	IV	Yelabara Kad	7773	7773	10970	454.682	
39	Hiwari	2003-04	Hiwari	II	Saikheda	8730	8730	23699	458.043	65
40	Hiwari	2005-06	Loni Ghatana	IV	Warotapata	26440	26440	33578	477.506	-
41	Ghatanji	2007-08	Korata	VI	Pahur	7227	7227	12760	492.317	31
42	Ner	2008-09	Kasmar	VII	Jambhulni	12655	11691	25126	508.549	0
43	Jodmoha	2006-07	Digras	V	Sukali	6604	6604	13780	926.167	51
44	Ghatanji	2004-05	Kawadadri	III	Rampur	Division Wise		-	-	28.5
45	Jodmoha	2006-07	Wadner	V	Dhanora	Division Wise				

2081 ha in 15 coupes of coupe no. III of all felling series in 2004-05, 1386 ha. in 19 coupes of coupe no. V of all felling series 2005- 06, 755 ha. in 17 coupes in 2006-07, 364 ha. in 15 coupes in 2007-08, 1031 ha. in 18 coupes in 2008-09 have been covered under CBO operations. As per the information provided by the DCF Yavatmal, no cleaning operations were carried out. Under Artificial regeneration in the year 2006-07 -375 ha, 2007-08 in 100 ha, in 2008-09 -155 ha plantations were taken up. 649 ha in 2003-04, 52 ha in 2004-05 were covered under soil and moisture conservation works. Mati bandhara -1 and cement bandhara -2 in 2003-04 and one cement bandhara in 2006-07 were taken up under soil and moisture works. The prescriptions regarding artificial regeneration, subsidiary silvicultural operations, soil and moisture conservation works and other regulations like fire protection and grazing control have been partially implemented.

It is interesting to note that the prescriptions were made to carry out improvement felling through department, but some of the coupes were allotted to FLCS after marking

and estimation of yield, which is deviation from the WP prescriptions. Some of the coupes of this WC were treated on the lines of Selection-Cum-Improvement WC, deviating the prescriptions.

(4) Afforestation WC: Under stocked and open forest area having site quality IVB have been included in this WC some area under this WC was previously managed under Coppice with Reserves WC, Miscellaneous WC. 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. Total area included in this WC was 19,236.53 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 23 Working Series and each series was divided into 20 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.

Results: In this WC afforestation of 945 ha in 2006-07, 800 ha in 2007-08, 1497 ha in 2008-09 have been taken up. Seed sowing /bush sowing was carried out in 1100 ha in 2007-08. No soil and moisture conservation works were carried out. Intensive soil and moisture conservation works were prescribed, but as per the information given by DCF, Yavatmal soil and moisture conservation measures were not carried out. Under afforestation the areas had been covered partially. Therefore it is clear that the prescriptions were partially implemented.

Details of plantations, survival etc are given in the table below.

year	Total no. of coupes	No. of coupes in which plantation was carried out	Coupe no.	Area plantation (ha)	Plantation survival %	Remark
1	2	3	4	5	6	7
2005-06	23	--	II	--	--	--
2006-07	23	--	III	--	--	--
2007-08	23	--	IV	--	--	--
2008-09	23	3	V	40	81	
			V	40	38	
			V	20	--	
2009-10	23	2	VI	35	--	
			VI	35	85	

(5) 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 sheda, Paunya marvel etc. sparsely occur. Total area included in this working circle was 6,248.55 ha. Out of total 31 compartments 10 compartments are kept as Ramnas 1,475.10 ha and 21 compartments having area (4773.45 ha.) were kept for rotational grazing. 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 sheda, 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. Most of the Ramnas were not maintained as per the prescriptions. The Ramnas could not be closed effectively from entry of cattle since majority of the Ramnas were not wire fenced, nor there was cattle proof trench. 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.

(6) Joint Forest Management (Overlapping) WC: Area included in this WC is 40,748.29 ha in 291 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.

Results: While implementing JFM, DCF Yavatmal formed and registered 270 JFM committees as against 121 villages projected in the working plan. Out of 270 villages 68 microplans were prepared and these plans are under implementation.

(7) Miscellaneous WC: 9,663.64 ha area was included in this WC. 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 is not managed under any silvicultural system.

(8) Results in General:

In general during implementation of WP of Shri R.S.Yadav, the prescriptions regarding felling have not been followed properly, in the some areas of Selection-Cum-Improvement WC and the harvestable girth of 105 cm for site quality IVa and III has not been followed. In Improvement WC in some of the coupes, trees were marked for felling by applying 75cm harvestable girth which is a total deviation. Prescriptions regarding operations like subsidiary silvicultural operations, plantations, soil and moisture conservation works have been implemented partially both in Selection-Cum-Improvement and Improvement WC. In Afforestation WC few plantations have been taken up and soil and moisture conservation works have not been taken up. In Fodder Improvement WC the prescriptions were not followed in most cases.

8.3 Changes in growing stock:

The forest of Yavatmal 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 in 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 Teak plantation raised in Rui pasture have miserably failed. 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 Pal's WP majority of the area treated under CWR as these areas were repeatedly managed under CWR led to loss of coppice vigour in Teak and its associates. In these areas stocking of Teak has increased due to its better coppice vigour when compared to miscellaneous species. In Plantation Working Circle the plantations did not achieve desirable growth due to improper rab burning and stump uprooting at the time of plantation resulted in establishment of multiple coppice shoots which suppressed the growth of Teak seedlings planted. Thinning carried out during this period gave better results. Pasture area and fodder reserved area were further deteriorated due to heavy grazing pressure and improper implementation of working plan prescriptions. Bamboo plantations taken up in Bamboo (overlapping) Working Circle areas have failed to establish.

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.

8.4 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 8.5 Special Works of Improvement:

8.5.1 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. VII and list of wells is given in Appendix IV of Volume II.

(3) Forest Nurseries: New permanent forest nurseries have been established at Nandgavhan in Umarkhed range, Wai (Lingi) in Darwha range, Bhansara in Arni range. These permanent nurseries have been established for providing planting stock of teak and other species.

8.5.2 Plantation under special schemes

(1) Sandal Plantations: In Yavatmal Forest Division Sandal plantations were taken during 1963-64 in compartment no. 470, 471, 472, 473, 474 and 492 in 1121 ha by Shri Kenkare, the then Divisional Forest Officer. The plantations were established successfully with a good growth. In 1978 enumeration of sandal wood trees was carried out and estimated growing stock of sandal was 4,668 trees and subsequently enumeration were carried out in 1989 (no.of trees 5341), 1995 (no.of trees 4017), 2002 (no. of trees 2769), Jan. 2005(no.of trees 1145), July 2006 (no.of trees 89) The growing stock of sandal has come down over a period of time due to illicit felling of sandal trees by organised gangs not only from the state but also from U.P. M.P Rajasthan etc. in spite of special protection measures under taken by the staff.

(2) Agri-silvicultural Plantations: The idea of agri-silvi plantations were first conceived in the year 1909, in Pathrot and Sonkhas reserves. 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.

3) Bamboo Plantations: Bamboo seed broadcasting was taken up along nala bank in Umarda, karad, Anjankhed, Dabhdi, Pardi, Pathrot reserves and some of these areas became fairly successful. Bamboo planting was successful in Ghatanji, Darwha ranges.

4) Miscellaneous Species Plantation: Between 1900 and 1905, babul seeds were broadcast in Sonkhas and Pathrot reserves, but the efforts were not successful. Sandal seeds were sown in 1937 in compartment no. 345 of Rui reserve gave successful results. During 1937 sandal plantations were attempted in Pathrot blocks which gave varying success. 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 (2001-02 to 2010-11) 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.

5) Teak and Semal Plantations : Teak plantations were attempted in old Yavatmal Forest Division in 1879 in compartment no. 599 which gave unsuccessful result, subsequently in 1934 Teak plantations attempted in some compartments of old forest division became successful. All these plantations were carried out by felling good mixed forests and rab burning also carried out. In some areas Teak seed was sown after ploughing the area in lines 6 feet apart in between 2 - lines cotton seeds were sown departmentally. In 1952 these areas were given on lease to raise Teak plantations alongwith agriculture crop. In 1954 Semal plantations were taken up in compartment no. 603. Subsequently lot of Teak plantations were attempted as per the prescriptions of WP in SCI WC, CWR WC under Thosre's plan, Pal/Kanekar's WP by clear felling some of the area.

CHAPTER – 9

Statistics of growth and yield

Section 9.1 Growth rate of teak:

The growing stock of Yavatmal Forest division is almost similar to the adjoining forests of Pusad Forest Division, since these areas have been managed almost under similar silvicultural systems for post 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 Thosre the stem analysis was carried out for the first time by obtaining samples from 32 Teak.

Height and timber volume the figures obtained by Shri Thosre 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 Thosre 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, Yavatmal in the year 2009 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 above mentioned compartments of site quality III and IV are 10 and the total number of coppice origin teak trees selected from above mentioned compartments of site qualities are 6 and total number of trees selected for stem analysis from 6 compartments of 5 ranges are 16. 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	Hiwari	Kolambi	Nakapardi	271	2	2
2	Site Quality III	Jodmoha	Jodmoha	Nanza	339	2	2
3	Site Quality III	Yavatmal	Kinhi	Arjuna	496	1	-
4	Site Quality III	Ghatanji	Yelabara	Yelabara	215	2	-
5	Site Quality IV	Arni	Belora	Belora	24	2	-
6	Site Quality IV	Yavatmal	Kinhi	Kinhi	498	-	2
7	Site Quality IV	Yavatmal	Kinhi	Arjuna	496	1	-

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

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

Team Leader : Shri. A.R.Zanjad, RFO, Yavatmal

Forest Division: Yavatmal Forest Division

Range /Round/Beat/compt. :- 1.Yavatmal/Kinhi/Arjuna/496

2. Ghatanji/Yelabara/Yelabara/215

3. Arni/Belora/Belora/ 24 & 25

4.Yavatmal/Kinhi/Kinhi-498

(2) Stem Analysis for teak : Site quality III.

Team Leader : Shri.V.N.Chaudhari, RFO, Yavatmal

Forest Division : Yavatmal Forest Division

Range /Round/Beat/compt. :1.Hiwari/Kolambi/Nakapardi/271

2. Jodmoha/Jodmoha/ Nanza/ 339

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.

Details of stem analysis of teak trees of site quality III (coppice origin)

Range : Hiwari, Jodmoha, Yavatmal Forest Divisio, compartmentss: 271, 339							
Conducted by Shri. V.N.Choudhary R.F.O.,W.P.Yavatmal							
Sr.no.	Age	Height (m)	dbh ob cm	gbh ob cm	Volume m ³	CAI m ³	MAI m ³
1	2	3	4	5	6	7	8
1	5	4.80	4.00	12.56	0.020		0.0040
2	10	6.90	8.90	27.94	0.041	0.0042	0.0041
3	15	8.50	12.00	37.68	0.064	0.0046	0.0042
4	20	10.20	14.50	45.53	0.093	0.0058	0.0046
5	25	11.40	16.90	53.06	0.123	0.0060	0.0049
6	30	12.50	18.80	59.03	0.161	0.0076	0.0053
7	35	13.50	20.60	64.68	0.201	0.0080	0.0057
8	40	14.50	22.40	70.33	0.240	0.0078	0.0060
9	45	15.50	24.00	75.36	0.282	0.0080	0.0062
10	50	16.40	25.40	79.75	0.350	0.0100	0.0070
11	55	17.10	26.60	83.52	0.412	0.0124	0.0074
12	60	17.90	28.00	87.92	0.483	0.0142	0.0080
13	65	18.60	29.10	91.37	0.540	0.0114	0.0083
14	70	19.30	30.10	94.91	0.581	0.0082	0.0083
15	75	19.90	31.50	97.34	0.614	0.0066	0.0081
16	80	20.40	32.10	98.91	0.642	0.0056	0.0080
17	85		32.60	100.79	0.663	0.0042	0.0078
18	90		33.00	102.36	0.683	0.0040	0.0075
19	95		33.40	103.62	0.700	0.0034	0.0073
20	100			104.87	0.713	0.0026	0.0071

Stem analysis for teak of site quality III- Teak trees of (seed origin)							
Range :-Hiwari, Jodmoha				Compartment: 271,339			
Conducted by Shri. V.N.Choudhary R.F.O.,W.P, Yavatmal							
Sr.no.	Age	Height (m)	dbh(ob) cm	gbh(ob) cm	Volume m³	CAI m³	MAI m³
1	2	3	4	5	6	7	8
1	5	5.00	2.60	8.16	0.010		0.0020
2	10	7.20	5.50	17.27	0.022	0.0024	0.0022
3	15	8.90	8.00	25.12	0.033	0.0030	0.0022
4	20	10.40	10.40	32.65	0.048	0.0030	0.0024
5	25	12.00	12.60	39.56	0.063	0.0030	0.0025
6	30	13.30	14.70	46.15	0.090	0.0054	0.0037
7	35	14.60	17.00	53.38	0.130	0.0080	0.0037
8	40	15.80	19.10	59.97	0.176	0.0092	0.0044
9	45	16.90	21.30	66.88	0.228	0.0104	0.0050
10	50	17.90	23.20	72.84	0.306	0.0156	0.0061
11	55	18.80	25.00	78.50	0.393	0.0174	0.0071
12	60	19.40	26.50	83.21	0.480	0.0174	0.0080
13	65	20.00	28.00	87.92	0.523	0.0140	0.0080
14	70	20.80	29.50	92.63	0.590	0.0134	0.0084
15	75	21.20	30.90	97.02	0.650	0.0120	0.0086
16	80	21.50	32.10	100.79	0.700	0.0120	0.0087
17	85		33.40	104.87	0.740	0.0100	0.0087
18	90		34.60	108.64	0.780	0.0080	0.0086
19	95		35.70	112.09	0.810	0.0060	0.0085
20	100		36.80	115.55	0.840	0.0060	0.0084

Stem analysis for teak of site quality IV (coppice origin)							
Range: Yavatmal, Kinh beat				Compartment : 498			
Conducted by Shri. A.R. ZANJAD, R.F.O.,W.P, Yavatmal							
Sr. no.	Age	Height (m)	dbh (ob) cm	Gbh (ob) cm	Volume m³	CAI m³	MAI m³
1	2	3	4	5	6	7	8
1	5	2.6	3.1	9.73	0.006	--	0.0012
2	10	4.4	6.0	18.84	0.012	0.0012	0.0012
3	15	5.7	8.4	26.37	0.022	0.0020	0.0014
4	20	7.0	10.5	32.97	0.034	0.0024	0.0017
5	25	8.1	12.4	38.93	0.050	0.0032	0.0020
6	30	9.1	14.2	44.58	0.070	0.0040	0.0023
7	35	10.0	16.1	50.55	0.092	0.0044	0.0026
8	40	11.0	17.8	55.89	0.118	0.0052	0.0029
9	45	12.0	19.4	60.91	0.144	0.0052	0.0032
10	50	12.8	20.8	65.31	0.174	0.0060	0.0035
11	55	13.7	21.9	68.76	0.206	0.0064	0.0037
12	60	14.4	22.9	71.90	0.240	0.0068	0.0040
13	65	15.2	23.7	74.41	0.274	0.0068	0.0042
14	70	15.8	24.5	76.93	0.302	0.0056	0.0043
15	75	16.3	25.1	78.81	0.326	0.0048	0.0043
16	80	17.0	25.6	80.38	0.344	0.0036	0.0043

Stem analysis for teak of site quality IV – (Seed origin)							
Range: Yavatmal, Arni,				Compartment : 496, 24			
Conducted by Shri. A.R. ZANJAD, R.F.O.,W.P, Yavatmal							
Sr.n o.	Age	Height (m)	dbh (ob) cm	Gbh (ob) cm	Volume m³	CAI m³	MAI m³
1	2	3	4	5	6	7	8
1	5	4.3	4.6	14.46	0.016	-	0.0032
2	10	7.1	7.5	23.57	0.034	0.0036	0.0034
3	15	9.5	10.2	32.06	0.055	0.0042	0.0036
4	20	11.5	13.0	40.86	0.078	0.0046	0.0039
5	25	12.9	15.5	48.72	0.108	0.0060	0.0043
6	30	14.1	18.2	57.2	0.152	0.0088	0.005
7	35	15.2	19.8	62.23	0.200	0.0096	0.0057
8	40	16.2	21.7	68.20	0.248	0.0096	0.0062
9	45	17.0	23.1	72.6	0.296	0.0096	0.0065
10	50	17.7	24.3	76.37	0.348	0.0104	0.0069
11	55	18.3	25.3	79.52	0.408	0.0120	0.0074
12	60	18.8	26.2	82.34	0.456	0.0096	0.0078
13	65	19.3	27.0	84.86	0.492	0.0072	0.0076
14	70	19.7	27.7	87.06	0.517	0.0050	0.0074
15	75				0.537	0.0040	0.0071
16	80				0.552	0.0030	0.0069

Section 9.2 Enumeration:

9.2.1 Sampling: Survey of Forest Resources (SOFR) Unit, Amravati carried out enumeration of vegetation and regeneration survey in Yavatmal forest division in the year 2006-07 and 2007-08. 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 north west 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.

Analysis of data: The enumeration data supplied by SOFR Unit, Amravati was fed into computer in the office of the Conservator of Forests, Yavatmal Working Plan Division and

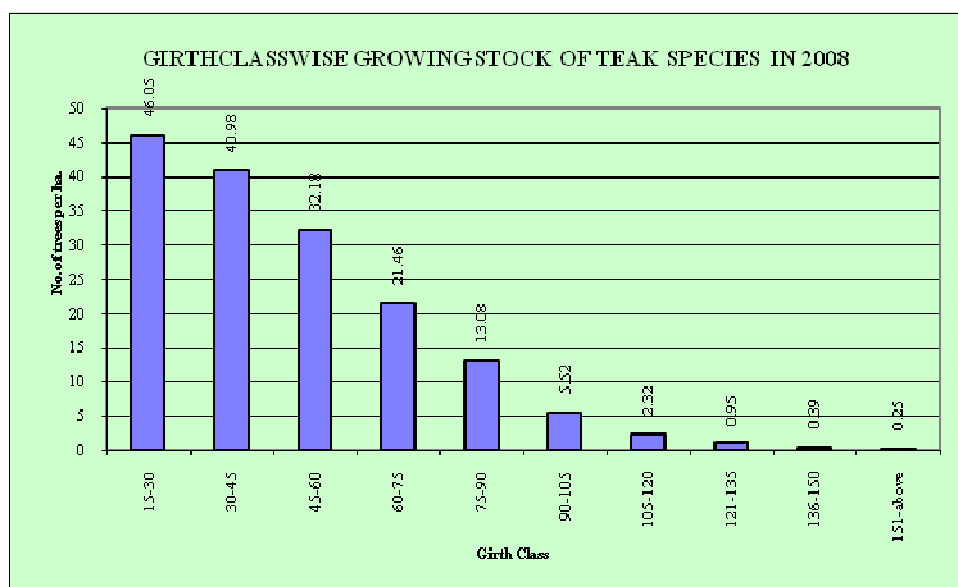
the data was sent to Chief Forest Statistician, Nagpur. The analysed data was received from the Chief forest Statistician. The data provided by SOFR Unit was also analysed WP office, Yavatmal using the programme developed by Shri Dhabekar, RFO. The analysis reflects that the total growing stock on an average is 334.80 trees/ha, out of which 163.18 trees/ha (49%) are of teak and 171.62 trees/ha (51%) are of miscellaneous species. The results of analysis of enumeration data is given in the following table.

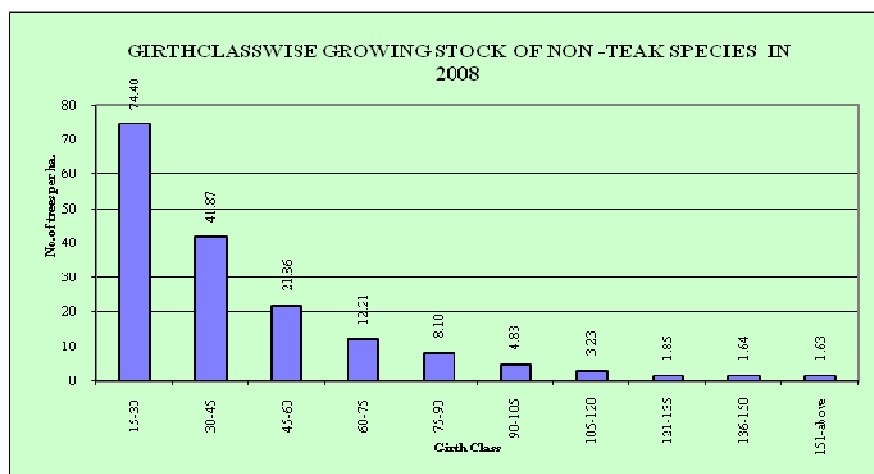
Composition of teak and other species (no. of trees per ha)-2008 enumeration

Name of the Species	Girth Class										Total	%
	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150-abo		
1	2	3	4	5	6	7	8	9	10	11	12	13
Group A:- SPECIES OF GENERAL UTILITY												
Teak	46.05	40.98	32.18	21.46	13.08	5.52	2.32	0.95	0.39	0.25	163.18	48.74
Ain	4.19	2.40	1.98	1.51	1.42	0.82	0.60	0.32	0.24	0.17	13.65	4.08
Bija	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tiwas	0.00	0.00	1.04	0.00	0.98	0.42	0.22	0.00	0.00	0.07	2.73	0.82
Lendia	9.86	4.51	1.97	0.76	0.35	0.06	0.06	0.02	0.01	0.01	17.61	5.26
Total	60.10	47.89	37.17	23.73	15.83	6.82	3.20	1.29	0.64	0.50	197.17	58.89
Group B:- SPECIES OF SPECIAL UTILITY												
Salai	0.19	0.30	0.46	0.48	0.42	0.48	0.46	0.26	0.09	0.12	3.26	0.97
Beheda	2.17	1.46	1.06	0.62	0.45	0.22	0.15	0.12	0.03	0.05	6.33	1.89
Kalamb	0.50	0.38	0.92	0.76	0.58	0.41	0.37	0.18	0.31	0.25	4.66	1.39
Khair	4.30	2.44	2.28	1.04	0.45	0.17	0.07	0.09	0.01	0.00	10.85	3.24
Shivan	1.59	1.19	0.60	0.20	0.20	0.00	0.00	0.00	0.00	0.00	3.78	1.13
Total	8.75	5.77	5.32	3.10	2.10	1.28	1.05	0.65	0.44	0.42	28.88	8.63
Group C:- SPECIES OF SPECIAL UTILITY												
Awala	0.22	0.50	0.67	0.78	0.58	0.23	0.13	0.00	0.00	0.11	3.22	0.96
Moha	0.37	1.11	0.51	0.82	0.66	0.47	0.38	0.29	0.27	0.34	5.22	1.56
Medshing	0.12	0.59	0.63	0.55	0.14	0.21	0.08	0.07	0.10	0.07	2.56	0.76
Dhawada	4.23	3.64	2.48	2.01	0.99	0.76	0.43	0.24	0.15	0.09	15.02	4.49
Chinchola	0.93	0.99	0.26	0.40	0.08	0.10	0.08	0.10	0.12	0.14	3.20	0.96
Char	0.74	1.16	1.00	0.88	0.23	0.08	0.04	0.02	0.01	0.01	4.17	1.25
Bor	0.53	0.21	0.09	0.12	0.01	0.00	0.00	0.00	0.00	0.00	0.96	0.29
Bel	0.43	0.35	0.59	0.58	0.07	0.18	0.12	0.04	0.15	0.01	2.52	0.75
Biba	0.98	1.29	1.00	0.36	0.40	0.06	0.02	0.05	0.09	0.00	4.25	1.27
Total	8.55	9.84	7.23	6.50	3.16	2.09	1.28	0.81	0.89	0.77	41.12	12.28
Group D:- OTHER SPECIES												
Total 'D'	43.05	19.35	4.32	0.34	0.09	0.16	0.02	0.05	0.06	0.19	67.63	20.20
G. Total	120.45	82.85	54.04	33.67	21.18	10.35	5.55	2.80	2.03	1.88	334.80	100.00

The enumeration results have been computed separately for each WC and discussed in the chapters of respective WC. The stem density, basal area and frequency of each species have been calculated girth class wise and the results are given in Appendix XXXVd of volume II. The species wise distribution of stock in various WC is given in Appendix XXXVb of volume II.

The enumeration data reveals that the overall growing stock of the division is 334.80 trees/ha out of which teak constituted 163.18 trees/ha (49%) and miscellaneous species constituted 171.62 trees/ha (51%). In SCI WC overall growing stock is 474.49 out of which Teak constituted 268.93 trees/ha (57%) and miscellaneous species constituted 205.56 trees/ha (43%). From the two data it is evident that overall growing stock of the entire forest is 334.80 trees/ha whereas the growing stock in the compartments allotted to SCI WC is 474.49 trees/ha. Overall growing stock of teak in entire forest area is 163.18 trees/ha, whereas the growing stock of Teak in SCI WC is 268.93 trees/ha. In case of miscellaneous species total average growing stock is 171.62 trees/ha and in SCI WC it is 205.56 trees/ha. It is evident that in better quality of forests which are allotted to SCI WC the growing stock Teak is more than that of average growing stock of teak in entire forest. Whereas in miscellaneous species the better quality forests allotted to SCI WC the growing stock is less than that of average growing stock per ha of entire forest area. Graphic presentation and details of growing stock are given below.





9.2.2 Comparison of Growing Stock in SCI WC Based on Enumeration Data of Thosre's Plan (1955) and Pal/Kanekar's Plans (1972) Yadav's Plan (1998) And Current Plan (2008) :

The details regarding growing stock is given in the following table

Girth class	Thosre's plan (1955)			Pal/Kanekar's plan (1972)			Yadav's plan (1998)			Current plan (2008)		
	Teak	Non Teak	Total	Teak	Non Teak	Total	Teak	Non Teak	Total	Teak	Non Teak	Total
31-60 (4"-8")	129.08	127.03	256.11	102.44	84.28	186.72	144.84	42.42	187.26	121.69	82.89	204.58
61-90 (8"-12")	44.53	37.45	81.98	26.31	25.76	52.07	57.85	25.58	83.43	67.73	33.69	101.42
91-120 (12"-16")	12.28	11.55	23.83	3.75	8.41	12.16	17.13	14.53	31.66	16.00	13.95	29.95
121 above (16"above)	2.58	5.86	8.44	0.70	4.70	5.40	2.53	8.39	10.92	2.59	8.12	10.71
Total	188.47	181.89	370.36	133.20	123.15	256.35	222.35	90.92	313.27	208.01	138.65	346.66

9.2.3 Comparison of Growing Stock in SCIWC Based on Enumeration Data of Thosre's Plan (1955) And Pal's/Kanekar's Plans (1972)

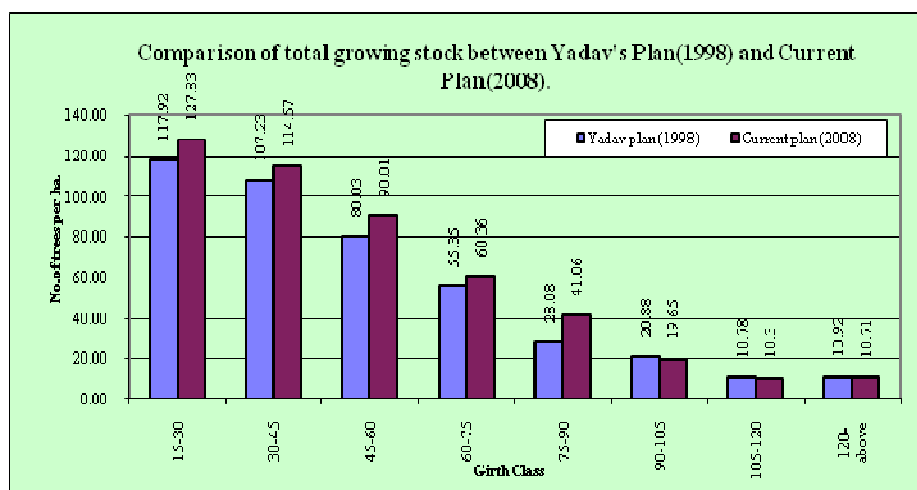
Girth class	Thosre plan (1955)			Pal'/Kanekar plan (1972)			Difference		
	Teak	Non Teak	Total	Teak	Non Teak	Total	Teak	Non Teak	Total
31-60 (4"-8")	129.08	127.03	256.11	102.44	84.28	186.72	-26.64	-42.75	-69.39
61-90 (8"-12")	44.53	37.45	81.98	26.31	25.76	52.07	-18.22	-11.69	-29.91
91-120 (12"-16")	12.28	11.55	23.83	3.75	8.41	12.16	-8.53	-3.14	-11.67
121 above (16"above)	2.58	5.86	8.44	0.70	4.70	5.40	-1.88	-1.16	-3.04
Total	188.47	181.89	370.36	133.20	123.15	256.35	-55.27	-58.74	-114.01

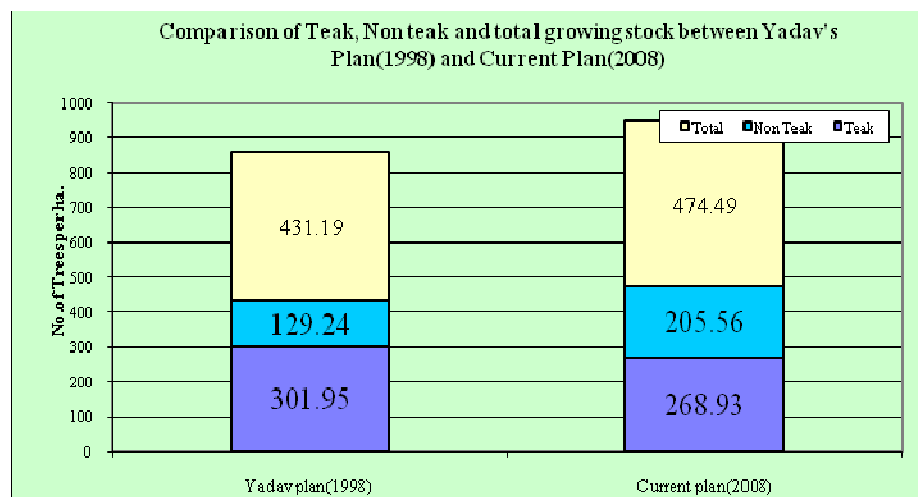
9.2.4 Comparison of Growing Stock in SCI WC Based on Enumeration Data of Pal/Kanekar's Plan (1972) And Yadav's Plan(1998)

Girth Class	Pal/Kanekar's plan (1972) (CWR)			Yadav's Plan (1998)(SCIWC)			
	Teak	Non Teak	Total	Girth Class	Teak	Non Teak	Total
15-30	108.12	88.04	196.16	15-30	79.60	38.32	117.92
30-45	67.14	56.57	123.71	30-45	85.85	21.38	107.23
45-60	35.30	27.71	63.01	45-60	58.99	21.04	80.03
60-75	18.38	15.60	33.98	60-75	38.61	16.74	55.35
75-90	7.93	10.16	18.09	75-90	19.24	8.84	28.08
90-105	2.77	5.37	8.14	90-105	11.76	9.12	20.88
105-120	0.98	3.04	4.02	105-120	5.37	5.41	10.78
120-above	0.70	4.70	5.40	120-above	2.53	8.39	10.92
Total	241.32	211.19	452.51	Total	301.95	129.24	431.19

9.2.5 Comparison of Growing Stock in SCI WC between Yadav's Plan (1998), Current Plan (2008) :

Yadav's Plan (1998)				Current Plan (2008)			Difference		
Girth Class	Teak	Non Teak	Total	Teak	Non Teak	Total	Teak	Non Teak	Total
15-30	79.60	38.32	117.92	60.92	66.91	127.83	-18.68	28.59	9.91
30-45	85.85	21.38	107.23	64.90	49.67	114.57	-20.95	28.29	7.34
45-60	58.99	21.04	80.03	56.79	33.22	90.01	-2.20	12.18	9.98
60-75	38.61	16.74	55.35	41.05	19.31	60.36	2.44	2.57	5.01
75-90	19.24	8.84	28.08	26.68	14.38	41.06	7.44	5.54	12.98
90-105	11.76	9.12	20.88	11.37	8.28	19.65	-0.39	-0.84	-1.23
105-120	5.37	5.41	10.78	4.63	5.67	10.30	-0.74	0.26	-0.48
120-above	2.53	8.39	10.92	2.59	8.12	10.71	0.06	-0.27	-0.21
Total	301.95	129.24	431.19	268.93	205.56	474.49	-33.02	76.32	43.30





The results of analysis of growing stock of forests (1998) in Yadav's WP and enumeration in 2008 indicate that there is increase of 43 trees per hectare of growing stock. In case of teak there is reduction of 33 trees per ha i.e. (11%), whereas there is substantial increase of 76 miscellaneous trees/ha (59%). The observations made and inferences drawn during the analysis of enumeration data of 2008 indicate that the percentage of growing stock of Teak has come down when compared to the data of Yadav's WP, whereas in miscellaneous species the percentage of growing stock has substantially increased because of the prescriptions made in Yadav's WP which are given below.

- (1) The system of treatment of forests under CWR was discontinued.
- (2) Most of the area to be treated under SCI WC with selection felling of Teak only.
- (3) No removal of misc. species except dead trees with a view to increasing miscellaneous species.
- (4) No clear felling for diffused plantations in SCI WC.

Section 9.3 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 76.67 trees/ha, in R2 26.22 trees/ha in R3 is 13.2 trees/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			
		no. of sample plot	Sample area	Total seedlings	Seedlings / ha.	no. of sample plot	Sample area	Total Seedlings	Seedlings / ha.	no. of Sample plot	Sample Area	Total seedlings	Seedlings / ha.
1	2	4	5	3	6	8	9	7	10	12	13	11	14
Arni	55	408	146.88	19763	134.55	337	121.32	3722	30.68	75	27.00	404	14.96
Darwha	94	345	124.20	4307	34.68	236	84.96	1803	21.22	27	9.72	43	4.42
Ghatanji	39	327	117.72	10017	85.09	273	98.28	2526	25.70	71	25.56	357	13.97
Hiwari	60	429	154.44	12437	80.53	348	125.28	3719	29.69	85	30.60	404	13.20
Jodmoha	49	385	138.60	10507	75.81	323	116.28	3140	27.00	96	34.56	559	16.17
Ner	80	308	110.88	4621	41.68	242	87.12	1926	22.11	27	9.72	53	5.45
Yavatmal	39	213	76.68	5006	65.28	158	56.88	1258	22.12	22	7.92	101	12.75
	416	2415	869.40	66658	76.67	1917	690.12	18094	26.22	403	145.08	1921	13.24

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 without merely applying the existing schemes 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 9.4 Stock Mapping

In Yavatmal Forest Division the reserved forests were stock mapped for the first time in the year 1915-16, during the time of preparation of WC 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 2008-09 and 2009-10 with appropriate ground verification by the staff of office of Conservator of Forests, working plan, Yavatmal. The results of stock mapping have been given in the following table.

Result of stock mapping during 2008 –09 & 2009 – 10

Site Quality	Area in ha.	% Area wrt total area
III Teak	2296.26	2.71
IV A Teak	17703.03	20.92
IV B Teak	22113.15	26.14
III Misc	556.8	0.66
IV A Miscellaneous	1420.78	1.68
IV B Miscellaneous	2590.82	3.06
Under Stocked	7699.78	9.10
Blank	11927.3	14.10
Eroded and Scrub	17626.29	20.83
Water Bodies etc.	670.01	0.79
Total	84604.22	100

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: 9. 5 : Density Slicing

The normalized density vegetation index (NDVI) maps procured from FSI, Regional Director, Nagpur have been systematically analysed and the results obtained are given in the following table. In Yavatmal Forest Division many compartments have village forest areas as well as village area 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. Density wise and WC wise distribution of area is given in the following table.

Status of stocking in relation to density in different WC in the year 2008, 2009

Sr. no.	Name of Working Circle	Total Area in ha. & Percentage		Density			Blank
				0.6 and above	0.4 to 0.6	0.1 to 0.4	
1	Selection Cum Improvement W.C.	Area	44825.32	3083.80	23249.03	14437.30	4055.19
		% to total area.	52.98	3.64	27.48	17.06	4.79
		% to W.C. area.	100.00	6.88	51.87	32.21	9.05
2	Afforestation W.C.	Area	22326.05	0.00	343.85	1599.59	20382.61
		% to total area.	26.39	0.00	0.41	1.89	24.09
		% to W.C. area.	100.00	0.00	1.54	7.16	91.30
3	Improvement W.C.	Area	10102.61	306.95	4899.76	3751.13	1144.77
		% to total area.	11.94	0.36	5.79	4.43	1.35
		% to W.C. area.	100.00	3.04	48.50	37.13	11.33
4	Fodder Improvement W.C.	Area	7350.24	0.00	298.30	1947.34	5104.60
		% to total area.	8.69	0.00	0.35	2.30	6.03
		% to W.C. area.	100.00	0.00	4.06	26.49	69.45
Total			84604.22	3390.75	28790.94	21735.36	30687.17

Density distribution of area

Crown Density	Area in ha	% wrt total area
>0.6	3390.75	4.01
0.4 to 0.6	28790.94	34.03
Below 0.4	21735.36	25.69
Blank / Scrub	30687.17	36.27
Total	84604.22	100

CHAPTER 10

Proposals for Future Management

Section 10.1 Relevant Policies and Programmes:

The following policies & programmes were considered while formulating proposals under various WC for future management of forests of Yavatmal 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

Section 10.2 Factors influencing the general objectives of management:

There are number of factors which influence the general objectives of management as given below. These factors were considered while evolving proposals for future management.

- (1) The forests of Yavatmal Forest Division are in general poor in quality and density and are capable of producing mainly small timber except some patches of forests which represents site quality III, where the forests are capable of producing large timber, due to the favourable edaphic and climatic conditions. These forests were repeatedly managed under Coppice With Reserves system in the previous WP which resulted in degradation of forests. As a result of repeated management under Coppice With Reserves system the forests lost their coppice vigour and it is coupled with illicit felling, heavy uncontrolled grazing, and poor coppice regeneration lead to under stocked and open forests. The status of natural regeneration is not satisfactory in many patches of forests. These forests can be restored, if they are restocked under afforestation schemes along with soil and moisture conservation works and strict protection from grazing, fire, illicit felling, encroachment etc.
- (2) There is increase in demand for firewood, small timber, fodder and grass. Adequate provision needs to be made for meeting the demands and alternatives have to be provided for demand beyond carrying capacity.

- (3) Most of the forest area situated near thickly populated habitations is open, under-stocked and degraded which needs to be improved by tending of natural regeneration root stock and supplemented by artificial regeneration.
- (4) The forests in catchments of various irrigation projects are subjected to soil erosion, which requires intensive soil and moisture conservation works to check soil erosion and to protect catchment area.
- (5) The Natural regeneration is unsatisfactory due to low site quality, excessive biotic pressure, repeated fire incidents, adverse climatic conditions especially those forest chunks, which are situated near human habitations. The seedlings of natural regeneration though noticed during rainy season fail to establish due to above mentioned factors. Provisions to mitigate the problem of natural generation will have to be made in the plan for soil moisture conservation, protection and tending of natural regeneration.
- (6) Some of the forest tracts are undulating with fragile drainage system and the areas situated along water courses are liable for soil erosion, hence provisions have to be made in the plan to check them.
- (7) Teak constitutes more than 60% and in some patches teak represents as a pure crop, hence there is a need to improve miscellaneous species in 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. Bamboo area was managed under Bamboo Overlapping WC in previous WP. These areas require special focus to regenerate bamboo area through large scale bamboo plantations.
- (9) In many patches of forests in the division, there is abundant medicinal plant diversity which requires proper attention to protect and manage it on scientific lines.
- (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.
- (13) Some of the forests are rich in wildlife, especially the forests situated along water courses, around lakes, ponds, irrigation projects etc. As a result of habitat disturbance wild animals visit agriculture fields and cause damage to agricultural crops resulting in public

resentment. The wild animals need to be protected and conserved through habitat improvement measures and effective protection.

(14) Restoration of degraded environment is required to be tackled through different management schemes.

Section 10.3 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 induction 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 10.4 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 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 10.5 Analysis and valuation of crop:

The first stage analysis of forest crop is based on species distribution in various girth classes as per the enumeration data 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. The details of crop are given below based on enumeration data of the year 2007 and 2008.

Status of stocking in different WC

Working Circle	Total area in ha. & Percentage		Crop density			Blank area
			0.6 and above	0.4 to 0.6	0.1 to 0.4	
SCI WC	Area	44825.32	3083.80	23249.03	14437.30	4055.19
	% to total area.	52.98	3.64	27.48	17.06	4.79
	% to WC area.	100.00	6.88	51.87	32.21	9.05
AWC	Area	22326.05	--	343.85	1599.59	20382.61
	% to total area.	26.39	--	0.41	1.89	24.09
	% to WC area.	100.00	--	1.54	7.16	91.30
IWC	Area	10102.61	306.95	4899.76	3751.13	1144.77
	% to total area.	11.94	0.36	5.79	4.43	1.35
	% to WC area.	100.00	3.04	48.50	37.13	11.33
FIWC	Area	7350.24	--	298.30	1947.34	5104.60
	% to total area.	8.69	--	0.35	2.30	6.03
	% to WC area.	100.00	--	4.06	26.49	69.45
Total		84604.22	3390.75	28790.94	21735.36	30687.17

A comparative statement of enumeration data of Pal's WP, Yadav's WP and current plan reveals that total stocking is under degradation where as in case of miscellaneous species there is some increase. The enumeration data of 2008 provided by SOFR Unit indicates that forest crop has about 334.80 trees/ha., out of which 291.01trees/ha are in girth classes lower than 75 cm and 43.79 trees/ha are above 75 cm and Teak tree represents approximately 48.73 % of the total crop.

Analysis of stock mapping and NDVI maps reveals that most of the forests of Yavatmal Forest Division is less than 0.4 density out of which considerable portion is blank area. Majority of forest area of Ner, Darhwa, Jodmoha, Arni ranges are devoid of vegetation. In this division some forest area has the density between 0.4 to 0.6. The forests area above 0.6 density is approximately 4 % of the total area. The quantum of forest with density between 0.4 to 0.6 is 34%, less than 0.4 density is 26% and the total blank area in the division is approximately 36%. 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 following table.

Results of stock mapping

Site Quality	Area in ha.	% wrt wp area
III Teak	2296.26	2.71
IV A Teak	17703.03	20.92
IV B Teak	22113.15	26.14
III Misc	556.8	0.66
IV A Misc.	1420.78	1.68
IV B Misc.	2590.82	3.06
Under Stocked	7699.78	9.10
Blank	11927.3	14.10
Eroded and Scrub	17626.29	20.83
Water bodies etc.	670.01	0.79
Total	84604.22	100

Section 10.6 Forest Management Information System (FMIS):

An Integrated Approach to the Management of Forest Division

Introduction: Indian forests are managed through the working plans, which are revised once in 10 years. Conventionally forest working plans are prepared for each forest division with 5-10% sampling intensity for ground inventory involving one to two years of time frame. Generally it takes 2-3 years to prepare the draft plan and management maps. The conventional

method of making inputs for working plan using ground survey is tedious process and time consuming. The treatment map is prepared based on ocular estimation. This process results in rather inaccurate and inconsistent treatment maps. The other major problem with manual systems is that of retrieval. Information is generally collected from various sources and at various times, which not only overloads the system but makes it very unreliable and inconsistent too. Managers for land-based systems have to invariably deal with multitude of maps. At present information about forest resources are being collected by forest administration at various levels by manual methods with little mechanical aids such as calculating machines. This information is stored in operation records, registers, history sheets, control forms and reports. However in few cases, the use of personal computer is also in vogue for storing the above information. In most of the cases, the lowest administrative level where the data is collected is range office and decisions are taken at much higher levels. The data required at the time of taking management decisions cannot be retrieved because of lack of uniformity in storage procedures and facilities for storage and retrieval of data. These maps are available on different scales and at times even in different projection systems, which makes it very difficult to manipulate geographical information. Because of these and many more problems it is much more convenient to capture data digitally and centrally.

Preparation of working plan in a conventional way involves large manpower, who is trained in collecting data from ground. Further sufficient time and resources are required to collect and analyze these data in coming out with an operational working plan. Since the inputs are mostly based on human interpretation and not involving sufficient scientific methods, hence the accuracy and efficacy of working plans cannot be measured with sufficient confidence. A more holistic approach to solve the problem is evolved by introducing methodology of utilizing remote sensing inputs and GIS analysis in a new platform. Though commercial packages provide facilities to customize the above modules in their own environment, exorbitant cost of such an approach becomes a limiting factor for providing the utilities to a large number of users. Present system tackles this problem by customizing the package on low cost third party liabilities, which can cover all the functionality envisaged in the system. Software modules incorporating the functionality to view, query and analyse these data as per the requirements of users has been developed. Further report generation utilities for providing inputs to working plan as per the need and convenience of the user department is developed and integrated into the system. This will enable any time anywhere availability of data, analysis and visualization system. Forest Management Information System encompass data visualization module for visualizing

administrative units, natural resources as per the coding standards for each theme. Charting module provides an insight into the present condition of regeneration in comparison to the ideal growth. Reporting module provides administrative boundary wise analysis of the parameters like density, slope, treatment types, and suitability for various silviculture practices categories along with area covered by each. Since this is available on the fly for any area, preparing inputs for working plan is made faster, more affordable, more accurate with RS inputs.

Integration of remote sensing data with GIS related decision support systems could make the job of land managers very easy. A good query, processing and analysis system would be able to efficiently perform once the above are systematically followed in creating a comprehensive database. Though commercial packages provide facilities to customize the above modules in their own environment, exorbitant cost of such an approach becomes a limiting factor for providing the utilities to a large number of users. Present system tackles this problem by customizing the package on low cost third party liabilities, which can cover all the functionality envisaged in the system. Software modules incorporating the functionality to view, query and analyse these data as per the requirements of users has been developed. Further report generation utilities for providing inputs to working plan as per the need and convenience of the user department is developed and integrated into the system. This will enable any time anywhere availability of data, analysis and visualization system.

Methodology in general: A total of four working circles have been demarcated for site-specific treatment of the division. For the purpose of formation of working circles, and felling series compartments have been used as units for allocation to various working circles based on the preponderance of suitability to a specific working circle. Density maps, Slope maps, compartment wise growing stock (volume in cu.m./ha) compartment wise regeneration status, compartment wise stem number distribution in various girth classes, site potentiality (soil depth) factors/parameters have been used to allocate various compartments into various working circles. Treatment types are delineated based on the slope map, drainage map, density map and plantation maps so as to maintain the forests on the steep slopes and river banks without causing soil erosion, to identify the open forest areas for the afforestation purpose and to carry out timber harvesting operations in a sustainable manner in the remaining area. Areas having more than 25 degree slope and more than a quarter hectare in extent have been classified as protection area A1-type. This area has been estimated from the slope coverage prepared for the area by using GIS. Protection area A2 type is coming under

twenty-meter strip on either side of the drainage line or around water bodies. This area has been prepared from the drainage and water body cover by giving twenty meter buffer region in GIS. Rivers and streams shown on the base map are digitized and updated using satellite image for generating the drainage cover. Protection area A3 type has been taken from the severe to very severe erosion category of soil erosion coverage. The entire forest coming under protection areas A1, A2 and A3 will be protected from harvesting. Areas coming under open forest in the integrated cover excluding the protection areas is considered for open forest – B type. Distinct patches of the B type are having a minimum area of 2 hectare in extent. Pole crop and old plantation areas would include groups of naturally grown poles having < 15 cm. gbh, suitable for retention as future crop. This area and old plantations come under this type. This area again could not be delineated from satellite imagery. For generating these areas, well-stocked areas prepared from satellite image and plantations digitized from the old working plan map have been used with the ground truth information. The minimum extent prescribed for the C-type is 1 hectare. Scheduled cleaning and thinning operations are expected in these areas. The teak plantation from teak forest through supervised classification, first a mask has been prepared from the existing working plan map for teak plantation and under this mask the density classification of teak has been done. Well-stocked areas, with a minimum area of two hectare in extent, have been taken from > 40% crown density by excluding the protected areas and dense teak plantation. Area susceptible to high erosion and the catchments of high water bodies are included in protection working circle (protection areas A1, A2 and A3). The compartments that are dominated by the above-mentioned class and in continuation with similar other compartments have been demarcated for this type. Likewise, compartments having more than 50% areas having sparse tree growth, open areas without tree growth and isolated small forest patches are included in the Afforestation Working Circle. In such areas the focus will be upon tending of existing root stock supplemented by seed sowing and plantations wherever necessary.

Compartments having more than 0.4 density (dense tree cover) trees with all age classes, mature trees fit for harvesting with adequate regeneration are allotted to the selection-cum improvement-working circle. This working circle is expected to produce big sized timber. This area has been demarcated from the density coverage with enumeration data. Compartments having preponderance of pole crop, dense tree covers without enough mature trees are allocated to improvement-working circle. Integrated layers of administrative boundaries, slope, drainage, forest type, density, soil, site quality and non-spatial data would help the managers for identifying suitable areas for site specific treatment and identifying the

potentials & limitations of each compartment. A suitability map depicting potentials and limitations of each compartment was prepared for site-specific treatment in the division. The potential areas for plantations, afforestation, reforestation, meadow development, gap filing, tending, selection felling, percolation tanks, continuous contour trenches/discontinuous contour trenches, etc were generated by modeling in GIS by the guidelines given for the working plan preparation of Maharashtra. Present system provides the inputs in a more efficient and interactive way for working plans by integrating remote sensing and GIS based data and methods. A GIS software module is developed using cost effective software solutions that can run as a standalone application on any laptop or desktop. This provides a convenient way of visualizing, analyzing and preparing inputs for working plans at various administrative levels as required by the user. The application software is built using third party GIS libraries and runs on windows platform of any version. Entire package is self-installable along with the necessary data that is customized for different forest divisions. Minor variations in the functionality are also provided to different departments to personalize the usage in accordance with routinely used methods and data. Software requires a minimum of 256 MB RAM and 100 MB hard disk space with more disk space in accordance with the data of a particular region

Results: The present study has demonstrated that remote sensing (RS) and Geographical Information System (GIS) in conjunction with forest mensuration data can be successfully used for the generation of various inputs for the preparation of forest working plan.

Updating of forest administrative boundaries; generation of stock map; preparation of treatment types; zonation of working circles, felling series & coupes based on treatment types; site suitability analysis for coupe operations & site specific treatment; generation of grazing closure & fire control areas etc can be achieved with greater accuracy, timeliness and cost-effectiveness with the use of geo-informatics than the conventional method. Due to its capability to provide timely, synoptic and repetitive coverage over large areas across various spatial scales, frequent and periodical monitoring and evaluation of the forest resources would be possible for proper maintenance and management. Integrated layers of administrative boundaries, slope, drainage, forest type, density, soil, site quality and non-spatial data would help the managers for identifying suitable areas for site specific treatment and identifying the potentials & limitations of each compartment.

Present system tackles this problem by customizing the package on low cost third party libraries, which can cover all the functionality envisaged in the system. Software

modules incorporating the functionality to view, query and analyse these data as per the requirements of users has been developed. Further report generation utilities for providing inputs to working plan as per the need and convenience of the user department is developed and integrated into the system. This will enable any time anywhere availability of data, analysis and visualization system. FMIS application software is designed with user friendly GUI especially targeting all levels of users ranging from highly computer literates to non-experts who can be trained with simple click and get information. The software is broadly divided into visualization module, which can show GIS and RS data on a mouse click without any cumbersome selection of folders and files and reporting modules in which user only selects the data required in the reports.

Forest Management Information System encompass data visualization module for visualizing administrative units, natural resources as per the coding standards for each theme. Charting module provides an insight into the present condition of girth volume in comparison to the ideal growth. Reporting module provides administrative boundary wise analysis of the parameters like density, slope, treatment types, and suitability for various silviculture practices categories along with area covered by each. Since this is available on the fly for any area, preparing inputs for working plan is made faster, more affordable, more accurate with RS inputs. The above mentioned integration of management information system (FMIS) is not only a powerful planning tool for the working plan officer but these digital data bases are very potent decision support and monitoring tools for the implementing managers in the real time mode also. In FMIS package they can make innumerable queries to find answers to their day-to-day management questions.

The present study has demonstrated that remote sensing (RS) and Geographical Information System in conjunction with a stand-alone software package (FMIS) can be successfully used for the generation of various inputs for the preparation of forest working plan. FMIS incorporating the functionality to view, query and analyse the data as per the requirements of users has been developed. Further report generation utilities for providing inputs to working plan as per the need and convenience of the user department is developed and integrated into the system. This will enable any time anywhere availability of data, analysis and visualization system.

FMIS for Yavatmal Forest Division: FMIS software has been prepared for Yavatmal division in geomedia professional software in this office. In order to prepare FMIS software different maps are necessary which are digitized toposheet on 1:50000 scale indicating natural

features, map on 1:25000 scale with compartment and coupe boundaries prepared during Yadav's Plan and digitized in this office and administrative map on 1: 125000 scale indicating division , range, round, beat, boundaries which are digitized in this office. All these maps are scanned and registered. After registration of above mentioned maps a project has been prepared in the name of Yavatmal FMIS and Geoworkspace is created in geomedia professional in which above mentioned maps of Yavatmal Forest Division can be seen without data and another file known as Geoware house meant for storing of different data related to various administrative, management and thematic features.

Under Geowork space 1:50000 map indicating compartment boundaries and coupe boundaries is digitized and also administrative map of division digitized under the same work space. Later on different maps such as NDVI, i.e. maps indicating density of forests procured from FSI, Nagpur, digitized maps of slopes, water potential, soil maps (soil erosion, soil texture, soil depth) and cadastral map procured from MRSAC have been integrated under Geowork space. All these features have been digitized compartment wise and various data obtained compartment-wise about all these features are in Geomedia warehouse. In other words these features are integrated layer wise in Geoworkspace and relevant data of maps have been transferred from Geowork space of Geomedia professional to Geowork space to Geomedia viewer. The data related to different features have been transferred from Geowarehouse of Geomedia professional to Geoware house of Geomedia viewer. By using Geomedia viewer the digitized maps and data can be viewed. The features such as soil erosion, soil depth, soil texture, slopes, ground water potential, density can be viewed compartment-wise and estimate about the extent of these features compartment wise in the forests. These features can be viewed very easily and data shall be obtained compartment wise which is a very useful tool for planning and implementation of management activities in the forest. By using above mentioned features various treatment types (A1,A2,A3: B1,B2 and D) can be obtained compartment-wise which will be used in preparation of treatment map after demarcation and to prescribe which area requires what type of treatment for the management of forests. The parameters like site suitability classes can be obtained from the FMIS by a simple click about treatment to be applied to various categories of forests including eroded areas, plantations, protection areas, fodder improvement etc.

As it is given in the 2 para by using FMIS planning, for forest management can be prepared by all levels based on the parameters of soil type, soil depth, soil erosion, ground water potential, slopes, density treatment types, site suitability classes etc. which is a very important tool in the management of forests and data can be easily obtained by a simple

mouse click. There are different parameters in FMIS broadly classified into 1. Administrative parameters, 2. Thematic parameter 3. Management parameters which are given below.

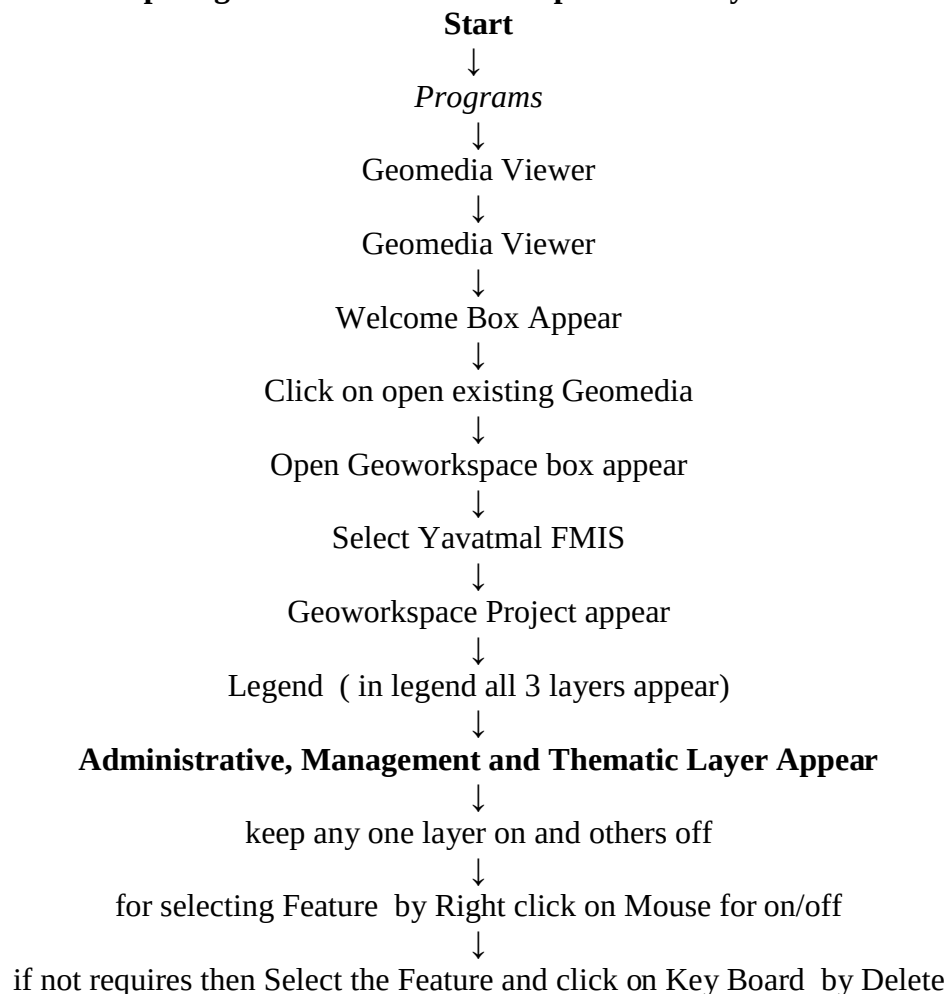
Sr no.	Administrative parameters	Management parameters	
1	Division Boundary	Compartment No.	
2	Range Boundary	Sensitive Beat	
3	Round Boundary	Hyper sensitive Beat	
4	Beat Boundary	Normal Beat	
5	Name of Division	Coupe No.	
6	Name of Range	Selection Cum Improvement Working Circle	
7	Name of Round	Improvement Working Circle	
8	Name of Beat	Afforestation Working Circle	
9	Range Head quarter	Fodder Improvement Working Circle	
10	Round Head quarter	Types of Forest" A "Class Reserve Forest	
11	Beat Head quarter	'C" Class Reserve Forests	
12	Circle Head quarter	'E" Class Forests	
13	Rest House	Compartment Allotted to F.D.C.M.	
14	i) B & C Rest House	Fire Watch tower/ fire line	
15	ii) Forest Rest House	1/5 th Boundary Demarcation Pillar	
16	iii) Irrigation	Nursery	
17	iv) Agriculture	I) Social forestry	
18	v) Z . P	ii) Territorial Normal forest Department	
19	Sub.Divisional officers Head quarter	iii) F.D.C.M	
20	Taluka Boundary	Nala Bunding, Cement Plug , Check Dam	
21	Nala of Taluka	Tendu Unit	
22	Revenue Sub Divisional officer Head	Gum Unit	
23	Check Naka	Rosha Unit	
24	National Highway Road	JFM Villages	
25	Major Road	Saw mills (Number & Distance from forest)	
26	Minor Road	Result of Stock mapping	
27	Village Road	Enumeration	
28	Village Boundary		
29	Village Name		
Sr.no	Thematic- Layers	Sr.no	Thematic- Layers
I	Black / Scrub land	VI	Ground Water
	Open Forest		Excellent
	Dense forest		Very Good

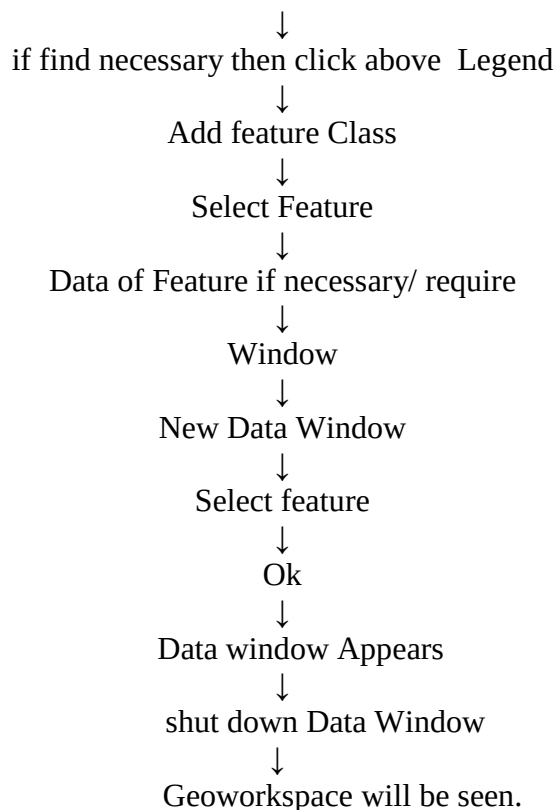
	Water body		Good
II	SLOPE		Moderate
	Moderately Steep to		Moderate to Poor
	Strongly Sloping		Poor
	Water body		Poor to Nil
	Steep Sloping		Habitation Mask
	Moderately Sloping		Water body Mask
	Habitation	VII	Treatment Types
	Gently Sloping		A 1,
	Very gently Sloping		A2
	Nearly level		A3
III	Soil Depth		B1
	Moderately deep (25 to 50cm)		B2
	Deep (50 to 100 cm)		D
	Shallow to very shallow (< 25 cm)	VIII	Suitability Class
	Habitation Mask		Protection Area
	water body Mask		Water body
	Very deep (> 100 cm)		Fodder Improvement
IV	Soil Erosion		Teak Plantation
	Moderate to Severe		Gap filling / Enrichment plantation
	Severe to very severe		Tending / Section felling
	Moderate		Bamboo Plantation (seeding)
	Habitation Mask		Miscellaneous Plantation
	water body Mask		Afforestation / Reforestation
	Slight to moderate		Percolation Tank
	Slight		Masonry /Cement/Earthen Dam
	Very Severe		Meadow Development/Aromatic Gra
Vi	Soil Texture	Ix	Drain - Buffer 20 Meter
	Gravelly sandy clay Loam	X	Contour
	Gravelly clay	XI	Value of Contour

	Clay loam	XIII	Grid line (1: 50000 TopoSheet survey India)
	Sandy clay loam	XIII	Grid line (1: 25000 Toposheet survey India)
	Gravelly Sandy loam	XIII	Grid Point (1: 50000)
	Habitation Mask		A Latitude
	Water body Mask		B Longitude
	Clayey Gravelly loam	XIV	Grid Point (1: 25000) A –Latitude
	Silty loam		B –Longitude
	Silty Clay	XV	Water Shed
			i) Micro Watershed ii) Mini watershed

The FMIS software is user friendly and it can be operated very easily on desktop of any computer or laptop. By using this software various types of digitized maps and data can be obtained by a simple click. To open and operate FMIS the below given path shall be followed.

The path given below is useful to open and study of FMIS.





Application of Various Parameters in Treatment Forests: The thematic parameters (layers) such as soil texture, soil depth, soil erosion, ground water potential, crop density, slopes, watershed, treatment types and suitability classes are some of the very important tools that can be applied in treatment of forests thereby improving the forest management. Different applications of various thematic parameters are as given below.

(1) Soil Texture: This feature class indicates about the type of soil availability compartment-wise in the forest. It gives details about the extent of soil and type of soil in a particular area. It is one of the edaphic factors based on which the species selection for taking up plantation shall be decided. The soil type will also decide the type of vegetation in the forest. In general, it is a very important tool to decide the type of plantation to be undertaken in the forest. For example to take up Teak plantation sandy loamy and well drained soils are necessary.

2) Soil Depth: It is another important parameter which will decide the type and distribution of crop in the forests. For Massive Afforestation Programme, the Sarwate Committee report suggested three types of zones based on soil - depth i.e. zone-1, zone-2, zone-3 for taking up different models of plantations. Depending upon the depth of soil selection of species for planting shall be done for example in refractive and shallow soil plantation of Xerophyte species shall be taken up(ex. Glyricidia). In deep soil plantation of deep rooted species shall

be taken up for ex. babul plantations. In moderate deep soil shallow rooted species plantation shall be taken. (for ex. Teak plantation).

(3) Soil erosion: This feature class gives details about the type of soil erosion (sheet erosion, run-off, gully formation etc.) and the extent of soil erosion compartment wise in the forest areas. Based on the extent of soil erosion, wherever soil erosion is moderate to severe and severe to very severe these areas shall be grouped into protection (A3) areas. This parameter gives an idea and extent of treatment to be undertaken under soil and moisture conservation measures to bring the soil to normal condition. It will also indicate the type of plantation to be undertaken in eroded areas.

(4) Ground water potential: This feature class indicates about availability of water in the sub-surface of the soil especially extent of availability water in a particular area and depth at which water is available. This feature class will also decide type of crop in a particular area. In high rainfall area where the ground water is available in super-facial soil-layers the crop pattern is different from the areas where the ground water is in deep layers of soil. For example Bamboo occupies moist areas. Jamun and Arjun comes up very well where ground water potential is very high, these species come up very well along the bank of nala. Depending upon the ground water prospects the type of species shall be selected for plantations.

(5) Slope: Slopes is another important feature class which decides the type of area and the type of crop. Based on the slope the areas can be divided into different treatment types, for example if the slope is above 25° that area is treated as protected area and unworkable area. To take up soil and moisture conservation works on watershed basis the approach of treatment is from ridge to valley.

(6) Watershed: These forests are well drained by the river Painganga and Wardha and their tributaries. In this Forest Division there are 3 major watersheds and 26 minor watersheds. These watersheds will decide the type and extent of drainage in the area. Treatment of forest area through soil and moisture conservation works always based on watershed management.

(7) Crop density: Crop density is one of the most important thematic parameters which gives details about crown density. Based on density the forest areas are divided into different categories such as category B (area less than 0.4 density) and category D (areas 0.4 and above). As per the density the crop density different treatments are proposed. In blank and open areas plantations and soil and moisture conservation works are prescribed. In the areas

above 0.4 density the treatment of harvesting and tending of Natural regeneration are prescribed based on the silvicultural system.

(8) Treatment Types: By applying this parameter the forest shall be divided into protection areas type-A, open or blank areas : B and dense forests areas type : D. Type- A are further divided into A1: above 25° slope, A2 : 20 meters area on either side of nala, A3 : eroded areas. B is further divided into B1: blank areas, B2: Open areas. This parameter is very important tool in preparation of treatment map especially for treating the coupe and the plantation areas. The treatment map prepared on the basis of this parameter gives an idea which area should be treated as protected areas, which areas require plantation and the type of treatment to be adopted in D, based on silvicultural system. This parameter can be obtained on the basis of feature classes, slope, density of the crop, drainage, soil erosion etc.

(9) Site suitability classes: This parameter shall be prepared on the basis of soil type, soil depth, soil erosion, drainage, watershed, ground water prospects, density of crop, slopes etc. This is a very important tool to decide what type of treatment to be undertaken in which category of forests. It indicates about the activity to be undertaken as per the treatment type

for example: protection areas indicated are the areas above 25°, buffer areas and eroded areas. Sandy loamy and well drained soils are indicated for teak plantation. Moist areas are suitable for Bamboo plantations, especially areas along the nala. Blank and open areas are indicated for miscellaneous plantations, gap filling or enrich plantations. The low lying areas adjacent to nala are indicated Percolation tanks. Depending upon the nala type masonry, cement earthen dams are indicated. In completely open areas and near villages Kuran development is proposed. Various Data obtained from FMIS related to different parameters are given in following tables.

Working circle wise details of various treatment types (in ha.)

Working Circle	A1	A2	A3	B1	B2	D	Total
1	2	3	4	5	6	7	8
SCI	233.73	4045.79	2944.45	2483.00	4663.80	30454.55	44825.32
IWC	47.04	969.47	648.61	1057.37	1611.00	5769.12	10102.61
AWC	0.00	2332.49	13107.63	4347.53	1709.05	829.35	22326.05
FIWC	0.00	758.38	252.18	1464.53	2772.95	2102.20	7350.24
Total	280.77	8106.13	16952.87	9352.43	10756.80	39155.22	84604.22

NOTE: A-1 type: Area having more than 25° slope,

A-2 type: Twenty m wide strip on both sides of stream,

A-3 type: Area susceptible to excessive erosion (Very severe),

B-1 type: Open forests (density < 0.4), B-2 type Under stocked area including blank area.

C type: Area having pole crop, D type: Area having density 0.4 and above. Working Circle wise and compartment wise details about various treatment types is given in Appendix No.LI of volume II of this Working Plan.

Details of site suitability for different applications (area in ha)

WC	Water body	Protection areas	Tending/Improvement felling	Bamboo plantation (Seedings)	Percolation tank	Teak plantation	Miscellaneous plantation	Reforestation/Afforestation	Meadow development/aromatic grasses	Gap filling/Enrichment planting	Tending/selection felling	Fodder Improvement	Masonry/cement/earthen Dam	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SCI	367.99	222.01	0.00	4045.79	147.17	216.24	201.70	2290.11	77.81	5438.00	31175.07	234.11	409.35	44825.32
IWC	72.40	47.02	3271.20	969.47	20.62	993.47	1462.83	280.16	249.46	66.96	2343.44	228.28	97.31	10102.61
AWC	252.55	0.00	326.68	2332.49	10.54	643.94	1285.26	11763.40	3564.93	1237.00	556.48	115.41	237.74	22326.05
FIWC	115.60	0.00	6.15	758.38	24.48	27.53	106.03	225.34	605.28	1187.56	1506.81	2711.25	75.84	7350.24
Total	808.54	269.03	3604.03	8106.13	202.81	1881.18	3055.82	14559.01	4497.47	7929.52	35581.80	3289.05	820.23	84604.22

The working circle-wise and compartment-wise details about the site suitability for different applications is given in Appendix No. LII of Volume II of this Working Plan.

Details of soil depth(area in ha)

WC	Deep (50-100cm)	Moderately deep (25-50)	Shallow (10-25)	Shallow to very shallow (< 10)	Shallow to very shallow	Very deep (> 100)	Habitation & Water body	Comptt. Area
1	2	3	4	5	6	7	8	9
SCI	282.59	11798.63	20868.91	2933.93	4564.54	3988.69	388.04	44825.33
IWC	7.17	2322.55	5751.95	0.00	1031.94	916.6	72.4	10102.61
AWC	515.89	1832.83	12293.68	595.17	1623.57	5016.54	448.37	22326.05
FIWC	24.30	1636.59	3417.55	0.00	311.05	1845.25	115.50	7350.24
Total								84604.22

The working circle wise and compartment wise details about soil depth is given in appendix no. LIII of volume II .

Details of soil texture (area in ha)

WC	Clay loam	Clayey	Gravelly clay	Gravelly clay loam	Gravelly sandy clay loam	Gravelly sandy loam	Habitation Mask	Sandy clay loam	Silty loam	Water body	Total
1	2	3	4	5	6	7	8	9	10	11	12
SCIWC	10080.39	2458.82	271.28	13517.58	6025.47	11378.03	99.84	598.19	--	395.72	44825.32
IWC	2229.08	971.17	57.08	3453.31	780.35	2448.02	21.37	75.53	--	66.7	10102.61
AWC	1418.25	2471.71	926.35	6267.8	3158.32	6378.96	220.15	1082.11	149.5	252.9	22326.05
FIWC	1153.81	625.3	256.84	1862.06	554.86	2258.25	--	484.62	39	115.5	7350.24
Total											84604.22

The working circle wise and compartment wise details about soil Texture is given in appendix no.LIV of volume II .

Details of areas prone to soil erosion (area in ha)

WC	Moderate	Moderate to severe	Severe to very severe	Slight	Slight to moderate	Very severe	Habitation & Water body	Total
1	2	3	4	5	6	7	8	9
SCI	2147.51	27216.5	3445.23	1773.41	6904.46	2950.17	388.04	44825.32
IWC	186.96	6435.23	678.67	521.64	1810.92	396.79	72.4	10102.61
AWC	402.29	14105.43	3718.04	1927.05	1195.93	528.94	448.37	22326.05
FIWC	132.17	5049.7	471.66	214.89	1344.29	22.03	115.5	7350.24
Total								84604.22

The working circle wise and compartment wise details about soil erosion is given in Appendix No.LV of volume II.

Details of ground water potential (in ha)

WC	Excellent	Good	Moderate	Moderate to poor	Poor	Poor to nil	Habitation & Water body	Total
1	2	3	4	5	6	7	8	9
SCIWC	--	809.94	1156.67	61.7	35367.92	7041.05	388.04	44825.32
IWC	--	402.2	242.7	1.06	8072.78	1311.47	72.4	10102.61
AWC	--	695.97	1530.32	12.96	15714.87	3923.56	448.37	22326.05
FIWC	--	321.22	55.69	17.4	5950.59	889.84	115.5	7350.24
								84604.22

The working circle wise and compartment wise details about ground water potential is given in Appendix no.LVI of volume II.

Details of the slope (area in ha)

WC	Very Gently sloping	Gently sloping	Moderately sloping	Strongly sloping	Moderately steep to steep sloping	Habitation & Water body	Total
1	2	3	4	5	6	7	8
SCI	1706.59	21822.27	14236.44	1920.84	4751.14	388.04	44825.32
IWC	471.23	5452.92	2525.91	573.64	1006.51	72.40	10102.61
AWC	2179.84	10116.49	7492.28	1071.13	1017.94	448.37	22326.05
FIWC	120.05	3017.25	2606.64	535.48	955.32	115.50	7350.24
							84604.22

The working circle wise and compartment wise details about slope is given in Appendix no.LVII of volume II.

Section: 10.6: Formation of WC:

Based on the objectives of management and method of treatment, the WC are prescribed. Past implementation of the prescriptions contained in Yadav's WP (2001-02 to 2010-11) 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. While assigning areas to various WC the enumeration data, stock mapping and the data of NDVI maps have been taken into consideration. The following WC are prescribed.

- I Selection Cum Improvement Working Circle.
- II Improvement Working Circle.
- III Afforestation Working Circle.
- IV Fodder Improvement Working Circle.
- V Non Wood Forest Produce (over lapping) Working Circle.
- VI Wildlife Management (over lapping) Working Circle.
- VII Joint Forest Management (over lapping) Working Circle.
- VIII 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 84604.22
1	Selection-Cum-Improvement WC	44825.32	53
2	Improvement WC	10102.61	12
3	Afforestation WC	22326.05	26
4	Fodder Improvement WC	7350.24	9
	Total	84604.22	--
5	Area handed over to other departments	3388.85	--
6	Area handed over to FDCM ltd.	10548.08	--
	Total	13936.93	--

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 was treated under Coppice With Reserves system. 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 44,825.32 ha. This area will meet the demand of local people for small timber and fire wood.

(2) Improvement WC: In this category the forest area which requires treatment for improvement of crop is included and this area may be switched over to SCI WC in future. The total area included in this working circle is 10,102.61 ha. These areas were previously managed under SCI WC, Improvement WC, Afforestation WC and Miscellaneous WC. Some area was mostly managed under Coppice With Reserves WC in the plans prior to Yadav's Plan.

(3) Afforestation WC: In this WC the major portion of forests were previously managed under Coppice With Reserves WC, Afforestation WC, SCI WC, Improvement WC and Fodder Improvement WC. In Yadav's WP these forests were treated under Afforestation,

Fodder Improvement and few compartments in Improvement WC. 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 22,326.05 ha.

(4) **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 7,350.24 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 10.8 Compartments:

The total area of Yavatmal Forests Division is 84,604. 22 ha. 334 compartments of Reserved Forests compartments of Yadav's WP have been continued for the convenience of management and easy identification by the field staff. The Total number of compartments of Protected Forests are 11 out of which one compartment was handed over to FDCM and 10 compartments remain with this division. The Total area of unclassed forest is 887.20 ha situated in 22 compartments.

E Class Forests: The E Class forests in Yavatmal district were with the Revenue Department until recent past. The state Government decided to transfer these forests to the Forest Department for the management, accordingly transferring of E class forests is in progress and the area transferred to Yavatmal Forest Division from Revenue department is 613.12 ha out of 4,522 ha of total E class forests. In the PWPR I, it was mentioned by the CCF (T) Yavatmal to include this area in the management. As transfer of area is under progress and transfer of E class forest area is not completed so far, it is not possible to include this area in management plan until the total area is transferred to this Forest Division.

Period of Plan: The period of this working plan is 10 years and the implementation of this plan will commence from 2011-12 to 2020-2021. The mid-term review can be under taken after 5 years i.e. in 2015-16 if the situation demands and the proposal may be moved by CCF (T), Yavatmal circle.

CHAPTER 11

Selection-Cum-Improvement Working Circle

Section 11.1 General Constitution & Vegetation:

This WC comprises good quality teak forests which can produce medium and large size timber and poles. Most of the crop under this WC is of SQ IV and very few patches of SQ III also occur. Teak constitutes 269 trees/ha, about 56% of the total stock. The forests belong to Southern Tropical Dry Deciduous Teak Forests Type 5A/C1 according to the classification of Champion & Seth. Teak is dominant species with its associates such as *dhawada*, *moha*, *ain*, *lendia*, *salai*, *bhirra*, *kalam*, *char*, *hiwar*, *tendu*, *khair*, *palas*, *ghont*, *awala*, *arjun* etc. In general the crop is young to middle aged, crown density is 0.4 to 0.7 in about 59% area, 32% area has below 0.4 density and 9% blank area. The crop is mainly of coppice origin which is stunted but straight-boled and sound to a large extent. However in some area malformed and pollarded crop is also noticed. In some patches teak is seen as pure crop. The status of natural regeneration in forests is poor. Lantana is noticed in many compartments which hampers regeneration. The forests included in this WC were managed under improvement felling on 30 years cycle under Malcom's WP (1915-16 to 1937-38).



Forests in SCI WC Compt. no.24, Belora Beat, Arni Range

In few patches clear felling followed by teak plantations were also carried out. During Robinson's WP (1938-39 to 1955-56) these areas were managed under Coppice System with

preferential treatment in favour of teak, sacrificing miscellaneous species except some species like semal, kullu, moha etc. During Thosre's Plan (1956-57 to 1974-75) these areas were treated under CWR WC with a rotation of 40 years, 150 trees of teak and specified miscellaneous trees were reserved per ha and all other trees were felled. Most of these areas were managed under CWR system in Pal/Kanekar's WP (1976-77 to 1991-92/1982-83 to 1997-98). In Yadav's WP (2001-02 to 2010-11) majority of the area was treated under SCI WC and Improvement WC. As the area was repeatedly managed under CWR system in the past, it resulted in deterioration of crop quality, composition and coppice vigour. The percentage of teak in the growing stock has also increased. The total forest area included in this WC is 44,825.32 ha. Range wise distribution of area is given on the next page.



Forests in SCI WC Compt. no.271, Nakapardi Beat, Hiwri Range

Abstract of area allotted SCI WC

Sr. no.	Range	Total forest area of range (ha)	Area allotted (in ha)		
			RF	PF	Total
1	2	3	4	5	6
1	Arni	15,900.15	11,528.57	--	11,528.57
2	Darwha	10,793.43	--	--	--
3	Ghatanji	11,425.91	10,120.75	--	10,120.75
4	Hiwari	14,659.27	9,037.70	--	9,037.7
5	Jodmoha	12,746.79	7,606.98	--	7,606.98
6	Ner	10,823.24	1,203.98	--	1,203.98
7	Yavatmal	8,255.43	5,241.74	85.60	5,327.34
TOTAL		8,4604.22	44,739.72	85.60	44,825.32

Based on stock mapping, enumeration data and NDVI maps, some area of Afforestation WC, Improvement WC and Miscellaneous WC of Yadav's WP is included in this WC. Reasons for assigning area to this WC are given below.

- (1) In Yadav's WP majority of the area was treated under SCI WC.
- (2) The crown density of major portion of the forests is 0.4 to 0.7 and teak trees of harvestable girth are available for harvesting
- (3) As per enumeration data more than 16.83 % of teak trees fall in girth classes above 75 cm and out of these, the silviculturally available trees can be harvested.
- (4) The crop is uneven aged, most of the area was treated under Coppice With Reserve System prior to Yadav's WP, and it is prudent to continue SCI system to replace the teak coppice crop with regeneration of seed origin.

Section 11.2 Compartments and Working Series:

148 compartments are allotted to this WC, the entire area is divided into 28 Working Series each working series having 20 coupes. The average area of coupe is 80 ha, the details of working series and coupes are given in Appendix XLIIb of Volume II. The compartments allotted to this WC are given in following table.

Statement showing the compartments allotted to SCI WC (area in ha)

Sr. no.	Name of working Series	Name of Range	Compartment numbers	No. of compts.	Total area of compts.	Total area of WS
1	2	3	4	5	6	7
1	Kelzara	Arni	20,21,23,28,30	5	1621.63	1621.63
2	Belora	Arni	22,24,25,36,39	5	1655.22	1655.22
3	Anjankheda	Arni	12,43,44,45,49	5	1452.87	1452.87
4	Hiwaleshwar	Arni	13,16,17,18	4	1519.24	1519.24
5	Sawali	Arni	1,2,5,7,48	5	1709.45	1709.45
6	Bhansara	Arni	31,37,38,41	4	1387.13	1387.13
7	Ghui	Arni	46,47	2	561.91	1498.37
		Jodmoha	345	1	373.12	
		Ner	406,409	2	563.34	
8	Sakhara	Ghatanji	224,228,229,556	4	1594.05	1594.05
9	Kopra	Ghatanji	210,211,230,236	4	1545.91	1545.91
10	Ramgaon	Ghatanji	212,213,231,275	4	1376.73	1612.66
		Hiwari	253	1	235.93	

Sr. no.	Name of Working Series	Name of Range	Compartment numbers	No. of compts.	Total area of compts.	Total area of WS
11	Yelabara	Ghatanji	214,215,217,218	4	1334.61	1608.44
		Jodmoha	339	1	273.83	
12	Undarni	Ghatanji	227,238,239,241	4	1063.66	1604.93
		Hiwari	308	1	541.27	
13	Hiwari	Hiwari	272,302,303,306	4	1454.85	1673.79
		Ner	407	1	218.94	
14	Jawala	Hiwari	268,271,276,277,287,300	6	1660.04	1660.04
15	Shakalgaon	Hiwari	256,257,264,282,298,315	6	1634.85	1634.85
16	Ghatana	Hiwari	269,273,279,307	4	1409.12	1712.23
		Jodmoha	337	1	303.11	
17	Watbori	Jodmoha	323,338,373,374,375	5	1583.13	1583.13
18	Sukali	Jodmoha	324,329,333,334,336,376	6	1710.15	1710.15
19	Rajur	Jodmoha	331,340,344,346	4	1590.41	1590.41
20	Manpur	Yavatmal	495,496,498,499,504	5	1581.52	1581.52
21	Kharad	Ghatanji,	223	1	236.41	1593.73
		Yavatmal	500,501,502	3	1357.32	
22	Waghapur	Yavatmal	470,471,472,474,475,477,492, 506,533	9	1580.35	1580.35
23	Malegaon	Arni	4,6,8,14,26,27,29	7	1586.43	1586.43
24	Sonkhas	Arni	42	1	34.69	1703.39
		Ghatanji.	216,219,220,226,235,237, 244	7	1668.70	
25	Koli	Ghatanji	221,233,240,242	4	1039.98	1575.49
		Hiwari	270,311	2	535.51	
26	Dhanora	Ghatanji	245	1	260.70	1586.86
		Hiwari	278,301,310	3	664.09	
		Ner	335	1	310.39	
		Yavatmal	408	1	168.35	
		Jodmoha	473	1	183.33	
27	Kolambi	Hiwari	309,313	2	902.04	1630.07
		Jodmoha	378	1	365.84	
		Yavatmal	497	1	362.19	
28	Durg	Jodmoha	332,341,368	3	1097.00	1612.98
		Ner	413	1	238.37	
		Yavatmal	507	1	277.61	
			Total	153	44825.32	44825.32

Section 11.3 Special objectives of management

The special objectives of management are given below.

- (1) To gradually replace low vigour, stunted coppice crop with high forests for enhancing productivity
- (2) To improve the forest density and composition of the crop by harvesting mature teak trees, improvement felling, supplemented by natural regeneration, artificial regeneration, CBO, soil moisture conservation measures etc.
- (3) To protect forests from grazing, fire etc.

Section 11.4 Analysis and valuation of crop

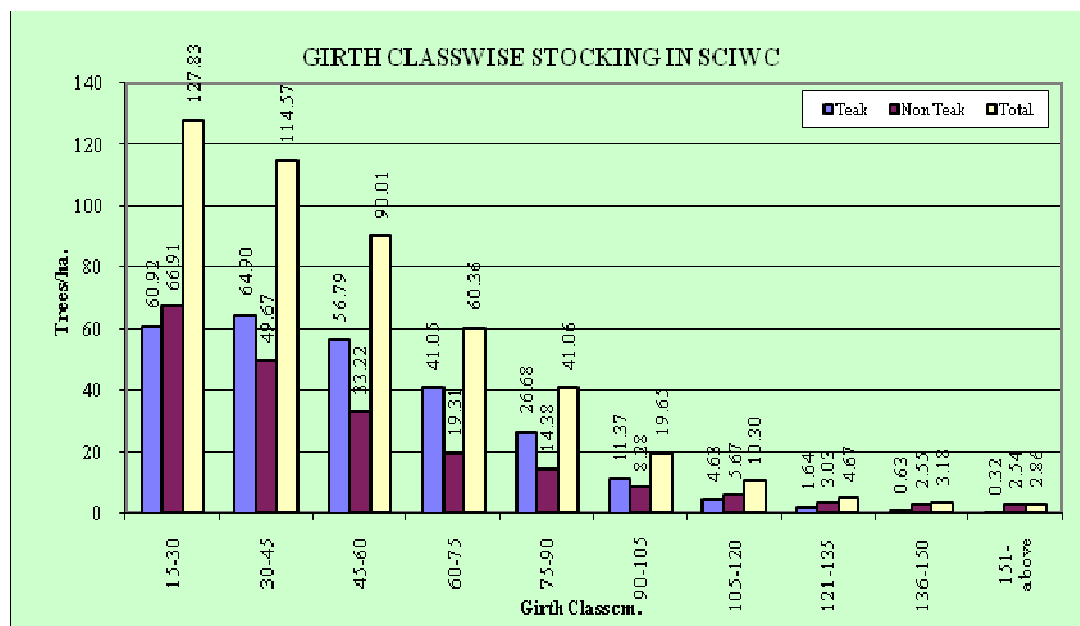
The forests have well stocked patches at some places, moderately stocked at other places, under stocked and blank in some places. The details of stock assessed by using stock maps prepared manually and NDVI maps indicate the position given in the table below.

Crown density of forest area under SCI WC (area in ha)

Total area	Density			
	0.6 and above	0.4 to 0.6	0.1 to 0.4	Blank
44,825 ha	3,084 ha	23,249 ha	14,437 ha	4,055 ha
percent →	7%	52%	32%	9%

Growing stock as per enumeration data (2008) of area under SCI WC is given in the following table.

Growing stock in SCI WC									
Sr. no.	Girth class (cm)	Teak			Misc.			Total	
		No. of trees/ha	% wrt total teak stock of 269	% wrt total stock	No. of trees/ha	% wrt total misc. stock of 205	% wrt total stock	No. of trees/ha	% wrt total stock
1	2	3	4	5	6	7	8	9	10
1	15-30	60.92	22.65	12.84	66.91	32.55	14.10	127.83	26.94
2	31-45	64.90	24.13	13.68	49.67	24.16	10.47	114.57	24.15
3	46-60	56.79	21.12	11.97	33.22	16.16	7.00	90.01	18.97
4	61-75	41.05	15.26	8.65	19.31	9.39	4.07	60.36	12.72
5	76-90	26.68	9.92	5.62	14.38	7.00	3.03	41.06	8.65
6	91-105	11.37	4.23	2.4	8.28	4.03	1.75	19.65	4.14
7	106-120	4.63	1.72	0.98	5.67	2.76	1.19	10.3	2.17
8	121-135	1.64	0.61	0.35	3.03	1.47	0.64	4.67	0.98
9	136-150	0.63	0.23	0.13	2.55	1.24	0.54	3.18	0.67
10	151 & Above	0.32	0.12	0.07	2.54	1.24	0.54	2.86	0.60
	Total	268.93	100.00	56.69	205.56	100.00	43.33	474.49	100.00



Section 11.5 Silvicultural System:

Considering the composition, density and availability of trees for harvesting, Selection-Cum-Improvement system is adopted. The silvicultural system is aimed at harvesting matured teak trees and carrying out improvement felling for removal of malformed trees to improve the crop. Harvestable girth of teak trees of coppice origin is 75 cm at bh ob while it is 120 cm in case of teak trees of seed origin. Teak trees of coppice origin would be felled on priority to replace the age old coppice trees with teak trees of seed origin. There would be no felling of non-teak species. Silvicultural operations of 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 reduced. This would be supplemented with artificial regeneration to increase productivity and density of crop. Soil & moisture conservation works are also necessary to protect and improve soil and water regime. Felling would yield timber and firewood.

Section 11.6 Felling cycle :

Felling cycle is fixed at 20 years

Section 11.7 Harvestable girth:

As felling is restricted to the teak trees only, harvestable girth is prescribed for teak species. Stem analysis of teak trees of seed and coppice origin was carried out for determining harvestable girth. Based upon the information of stem analysis exercise, harvestable girth is determined as stated below for SQ IV forests.

Harvestable girth for teak trees of coppice origin: 75 cm at bh ob

Harvestable girth for teak trees of seed origin: 120 cm at bh ob

The forest area of SQ III is limited to the extent of 2,853 hectares out of total 44,825.32 ha forest area earmarked to SCI WC. As the SQ III area is very less, which is about 6% of total area of SCI WC it is not practically convenient to apply separate harvestable girth for SQ III. The harvestable girth prescribed above would be applicable to SQ III area also.

Section 11.8 Regulation of yield:

11.8.1. Annual coupes shall be regulated by area. 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.

11.8.2 Regulation of yield of teak coppice trees in SQ IV:

The area included in SCI WC consists of crop of all ages. The details of total trees available per hectare in SCI WC are available from enumeration data as given in the table below. The area of SQ III is about 6% of the total area under this WC, hence it is not practicable to prescribe separate yield for SQ III area. It would be treated as SQ IV area for the purpose of coupe working. The prescriptions for regulation of yield are given for SQ IV as narrated below.

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

Girth class	Total teak trees	Non-Teak trees	No. of trees of coppice origin (65%)	No. of trees of seed origin (35%)
1	2	3	4	5
16-30	60.91	66.91	39.59	21.32
31-45	64.90	49.67	42.19	22.71
46-60	56.79	33.22	36.91	19.88
61-75	41.04	19.31	26.68	14.36
76-90	26.67	14.38	17.34	9.33
91-105	11.36	8.28	7.39	3.97
106-120	4.62	5.67	3.00	1.62
121&up	2.58	8.12	1.68	.90
Total	268.87	205.56	174.78	94.09

In table above, details of teak and non-teak trees per hectare are given based on enumeration data (2008). As the forest were repeatedly worked under CWR system previously, the crop has considerable stock of coppice origin. For the purpose of calculating yield of coppice trees, it is assumed that 65% of the teak stock consists of coppice origin.

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

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	20	Y ₂
III	46-60	14	Y ₃
IV	31-45	12	Y ₄
V	16-30	10	Y ₅
Total period		56	Y

The number of years required by teak trees (of coppice origin) to switchover to next higher girth class is worked out based on stem analysis and graphical curves of age & diameter. For example teak trees of 16 cm girth at bh (diameter 5.1 cm) will take 8 years to attain that diameter. Teak trees of 30 cm girth (diameter 9.6 cm) will take 18 years for attaining that diameter. Therefore the number of years teak trees remain in 16-30 girth is 10 years (18 - 8 = 10). 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, which is 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	12.07	--	--	--	--
I	76-90	17.34	--	--	--	--
II	61-75	26.68	65%	x_2	17.34	S_2
III	46-60	36.91	47%	x_3	17.35	S_3
IV	31-45	42.19	41%	x_4	17.30	S_4
V	15-30	39.59	44%	x_5	17.42	S_5
	Total	174.78			69.41	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 and F. As the total number of class-II trees above harvestable girth are 17.34 (61-75 girth class) which means that out of 26.68 trees in class II, 17.34 trees will switch over to above harvestable girth and the percentage is 65%. 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 (56 years) the total recruitment is S, the mean yearly recruitment R is S/Y ,

$$R = 69.41/56$$

$$= 1.24 \text{ per ha.}$$

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	12.07				
I	76-90	17.34				
II	61-75	26.68	20	Y_2	0.87	R_2
III	46-60	36.91	14	Y_3	1.24	R_3
IV	31-45	42.19	12	Y_4	1.44	R_4
V	15-30	39.59	10	Y_5	1.74	R_5
	Total	174.78	56	Y	1.24	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 which gives annual recruitment to the next class. 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 29.41 trees/ha (class- I) and there will be recruitment of 69.41 trees/ha in 56 years and thus theoretically annual yield is : $69.41 + 29.41/56 = 1.76$ 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	29.41	$\frac{1}{2}R_2 = 0.435$	$19R_2 + \frac{1}{2} R_2 = 16.965$
2	II	1	2	29.41	$R_2 + \frac{1}{2} R_2 = 1.305$	$18R_2 + \frac{1}{2} R_2 = 16.095$
3	III	1	3	29.41	$2R_2 + \frac{1}{2} R_2 = 2.175$	$17R_2 + \frac{1}{2} R_2 = 15.225$
4	IV	1	4	29.41	$3R_2 + \frac{1}{2} R_2 = 3.045$	$16R_2 + \frac{1}{2} R_2 = 14.355$
5	V	1	5	29.41	$4R_2 + \frac{1}{2} R_2 = 3.915$	$15R_2 + \frac{1}{2} R_2 = 13.485$
6	VI	1	6	29.41	$5R_2 + \frac{1}{2} R_2 = 4.785$	$14R_2 + \frac{1}{2} R_2 = 12.615$
7	VII	1	7	29.41	$6R_2 + \frac{1}{2} R_2 = 5.655$	$13R_2 + \frac{1}{2} R_2 = 11.745$
8	VIII	1	8	29.41	$7R_2 + \frac{1}{2} R_2 = 6.525$	$12R_2 + \frac{1}{2} R_2 = 10.875$
9	IX	1	9	29.41	$8R_2 + \frac{1}{2} R_2 = 7.395$	$11R_2 + \frac{1}{2} R_2 = 10.005$
10	X	1	10	29.41	$9R_2 + \frac{1}{2} R_2 = 8.265$	$10R_2 + \frac{1}{2} R_2 = 9.135$
11	XI	1	11	29.41	$10R_2 + \frac{1}{2} R_2 = 9.135$	$9R_2 + \frac{1}{2} R_2 = 8.265$
12	XII	1	12	29.41	$11R_2 + \frac{1}{2} R_2 = 10.005$	$8R_2 + \frac{1}{2} R_2 = 7.395$
13	XIII	1	13	29.41	$12R_2 + \frac{1}{2} R_2 = 10.875$	$7R_2 + \frac{1}{2} R_2 = 6.525$
14	XIV	1	14	29.41	$13R_2 + \frac{1}{2} R_2 = 11.745$	$6R_2 + \frac{1}{2} R_2 = 5.655$
15	XV	1	15	29.41	$14R_2 + \frac{1}{2} R_2 = 12.615$	$5R_2 + \frac{1}{2} R_2 = 4.785$
16	XVI	1	16	29.41	$15R_2 + \frac{1}{2} R_2 = 13.485$	$4R_2 + \frac{1}{2} R_2 = 3.915$
17	XVII	1	17	29.41	$16R_2 + \frac{1}{2} R_2 = 14.355$	$3R_2 + \frac{1}{2} R_2 = 3.045$
18	XVIII	1	18	29.41	$17R_2 + \frac{1}{2} R_2 = 15.225$	$2R_2 + \frac{1}{2} R_2 = 2.175$
19	XIX	1	19	29.41	$18R_2 + \frac{1}{2} R_2 = 16.095$	$R_2 + \frac{1}{2} R_2 = 1.305$
20	XX	1	20	29.41	$19R_2 + \frac{1}{2} R_3 = 16.965$	$\frac{1}{2}R_2 = 0.435$
	Total	20		588.20	174.00	174.00
			Average	29.41	8.700	8.700

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

$$= 29.41 + 8.7 + 8.7$$

$$= 46.81$$

Out of which available for selection felling per year = $29.41 + 8.7$

$$= 38.11$$

Percentage removal = $38.11 \div 46.81 \times 100$

$$= 81.41\%$$

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

Accordingly number of trees for felling on average per ha annually (40% of 38.11) = 15.24, say 15 trees per ha.

Volume conversion factor of teak trees in girth class 76-90 and 91-105 for timber = 0.219 m³

Average annual yield per hectare (15 x 0.219) = 3.285 m³

Total average annual yield (26332 ha x 3.285) ÷ 20 = 4325 m³

11.8.3 Regulation of yield of teak trees of seed origin in SQ IV:

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 35% of the total teak crop. The details of teak trees in various girth class 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	2.58	0.90	-	Y ₂
II	106-120	4.62	1.62	35	Y ₃
III	91-105	11.36	3.97	33	Y ₄
IV	76-90	26.67	9.33	30	Y ₅
V	61-75	41.04	14.36	15	Y ₆
VI	46-60	56.79	19.88	10	Y ₇
VII	31-45	64.90	22.71	8	Y ₈
VIII	16-30	60.91	21.32	9	Y ₉
	Total	268.87	94.09	140	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	0.90	-	-	-	-
II	106-120	1.62	56%	X ₂	0.91	S ₂
III	91-105	3.97	23%	X ₃	0.91	S ₃
IV	76-90	9.33	10%	X ₄	0.93	S ₄
V	61-75	14.36	6%	X ₅	0.87	S ₅
VI	46-60	19.88	5%	X ₆	0.99	S ₆
VII	31-45	22.71	4%	X ₇	0.91	S ₇
VIII	15-30	21.32	4%	X ₈	0.85	S ₈
	Total	94.09			6.37	

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	0.90	-	-	-	-
II	106-120	1.62	35	Y ₂	0.026	R ₂
III	91-105	3.97	33	Y ₃	0.028	R ₃
IV	76-90	9.33	30	Y ₄	0.031	R ₄
V	61-75	14.36	15	Y ₅	0.058	R ₅
VI	46-60	19.88	10	Y ₆	0.099	R ₆
VII	31-45	22.71	8	Y ₇	0.114	R ₇
VIII	15-30	21.32	9	Y ₈	0.094	R ₈
	Total	94.09	140	Y	0.045	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	0.90	$\frac{1}{2} R_2 = 0.013$	$19 R_2 + \frac{1}{2} R_2 = 0.507$
2	II	2	0.90	$1 R_2 + \frac{1}{2} R_2 = 0.039$	$18 R_2 + \frac{1}{2} R_2 = 0.481$
3	III	3	0.90	$2 R_2 + \frac{1}{2} R_2 = 0.065$	$17 R_2 + \frac{1}{2} R_2 = 0.455$
4	IV	4	0.90	$3 R_2 + \frac{1}{2} R_2 = 0.091$	$16 R_2 + \frac{1}{2} R_2 = 0.429$
5	V	5	0.90	$4 R_2 + \frac{1}{2} R_2 = 0.117$	$15 R_2 + \frac{1}{2} R_2 = 0.403$
6	VI	6	0.90	$5 R_2 + \frac{1}{2} R_2 = 0.143$	$14 R_2 + \frac{1}{2} R_2 = 0.377$
7	VII	7	0.90	$6 R_2 + \frac{1}{2} R_2 = 0.169$	$13 R_2 + \frac{1}{2} R_2 = 0.351$
8	VIII	8	0.90	$7 R_2 + \frac{1}{2} R_2 = 0.195$	$12 R_2 + \frac{1}{2} R_2 = 0.325$
9	IX	9	0.90	$8 R_2 + \frac{1}{2} R_2 = 0.221$	$11 R_2 + \frac{1}{2} R_2 = 0.299$
10	X	10	0.90	$9 R_2 + \frac{1}{2} R_2 = 0.247$	$10 R_2 + \frac{1}{2} R_2 = 0.273$
11	XI	11	0.90	$10 R_2 + \frac{1}{2} R_2 = 0.273$	$9 R_2 + \frac{1}{2} R_2 = 0.247$
12	XII	12	0.90	$11 R_2 + \frac{1}{2} R_2 = 0.299$	$8 R_2 + \frac{1}{2} R_2 = 0.221$
13	XIII	13	0.90	$12 R_2 + \frac{1}{2} R_2 = 0.325$	$7 R_2 + \frac{1}{2} R_2 = 0.195$
14	XIV	14	0.90	$13 R_2 + \frac{1}{2} R_2 = 0.351$	$6 R_2 + \frac{1}{2} R_2 = 0.169$
15	XV	15	0.90	$14 R_2 + \frac{1}{2} R_2 = 0.377$	$5 R_2 + \frac{1}{2} R_2 = 0.143$
16	XVI	16	0.90	$15 R_2 + \frac{1}{2} R_2 = 0.403$	$4 R_2 + \frac{1}{2} R_2 = 0.117$
17	XVII	17	0.90	$16 R_2 + \frac{1}{2} R_2 = 0.429$	$3 R_2 + \frac{1}{2} R_2 = 0.091$
18	XVIII	18	0.90	$17 R_2 + \frac{1}{2} R_2 = 0.455$	$2 R_2 + \frac{1}{2} R_2 = 0.065$
19	XIX	19	0.90	$18 R_2 + \frac{1}{2} R_2 = 0.481$	$1 R_2 + \frac{1}{2} R_2 = 0.039$
20	XX	20	0.90	$19 R_2 + \frac{1}{2} R_2 = 0.507$	$\frac{1}{2} R_2 = 0.013$
	Total	20	18	5.200	5.200
Average			0.90	0.26	0.26

Average no. of trees per ha above harvestable girth of 120 cm = $0.90 + 0.26 + 0.26$
 $= 1.42$

Average no. of trees available for selection felling per ha = $0.9 + 0.26$
 $= 1.16$

Percentage removal = $\frac{1.16 \times 100}{1.42}$

$= 81.69 \%$

Following the guidelines of GOI for removal of 50% of normal yield, the average annual yield (no. of trees) per ha = 40.84% of 1.16
 $= 0.46$ trees per ha

Volume conversion factor of teak for girth class 121-135(Ghatanji Range) : 0.453

Average annual yield (volume) per ha = 0.465×0.453
 $= 0.211 \text{ m}^3$

Total average annual yield for area under SCI WC = $26,332 \text{ ha} \times 0.211 \div 20$
 $= 277 \text{ m}^3$

11.8.4 Annual yield from area under SCI WC :

The existing stock of trees per hectare is arrived at based on enumeration data provided by SOFR Unit, Amravati. This is the average figure considering the entire area of SCI WC. However, harvesting would be limited to D area of coupes. The number of trees and yield vary from coupe to coupe, hence it is not possible to forecast the exact yield. However assuming the average number of trees to be felled in both categories - coppice & seed origin, the yield may be around 4600 m³ per year. The yield would vary depending upon availability of teak trees of coppice origin and seed origin. The actual yield would vary because the timber volume of trees vary in different localities in Yavatmal division. Actual yield shall be estimated by DCF, Yavatmal Forest Division, after carrying out enumeration.

Section 11.9 Agency of harvesting:

The coupes shall be worked departmentally or through FLCS or JFM Committees as per the instructions of the Government. Modern methods of harvesting shall be introduced to carry out harvesting operations.

Section 11.10 Demarcation:

The annual coupes due for felling will 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 and marking will be carried out as per the prescriptions in this chapter as well as Miscellaneous Regulations. The coupes shall be divided into 4 sections for effective control over different operations such as marking felling, extraction etc. In general each section shall not exceed 20 ha leaving section line between two sections. The coupe area shall be divided into grids as prescribed below.

Section 11.11 Dividing coupe area into grids & carrying out enumeration:

- (a) Treatment map will be prepared on graph paper in 1:5000 scale. Laying of grids in B, C and D type areas shall be done after classifying area into various treatment types. In B1 area grids of 1 ha size shall be laid down. In B2 areas, where plantations are prescribed, grids of 0.5 ha size shall be laid down. In C and D type areas grids of 1 ha size shall be laid down.
- (b) 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 mentioned under natural regeneration e.g. tending, root stock, singling of coppice, weeding etc shall be maintained.

(c) 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.

(d) Enumeration of all the trees above 15 cm gbh ob shall be carried out in 'D' area of coupes. Regarding teak trees, details of seed origin or coppice origin shall be recorded during enumeration of 'D' area of coupe. Grid wise details shall be maintained for enumeration.

Section 11.12 Preparation of treatment map: After demarcation of coupes treatment map shall be prepared by RFO and it will be verified by ACF. Treatment map shall display the area of promising natural regeneration, area needs soil and moisture conservation works, site suitable for plantation, protection area, old plantation area, sample plots for research etc. Grid wise details shall be shown in treatment map. The treatment map shall be approved by the DCF, Yavatmal after thorough discussion with RFO, ACF and after field inspections. 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 details of various categories in SCI WC are given in the following tables based on satellite digital data provided by MRSAC for giving on overall idea of the area.

Various treatment types in SCI WC (area in ha)

A1	A2	A3	B1	B2	D	Total
234	4046	2944	2483	4664	30454	44825

NOTE A-1 : Area having more than 25⁰ slope; A-2 : 20 meter wide strip on both sides of stream; A-3 : Area susceptible to excess erosion,

B-1: Open forests (density < 0.4); B-2 : Under stocked area including blank area.

C : Area having pole crop and old plantations; D : Area having density 0.4 and above.

The compartment-wise details about various treatment types in SCI WC are given in Appendix LI of volume II.

Details of site suitability for different applications in SCI WC (area in ha)

Water body	Protection areas	Tending /Improvement felling	Bamboo plantation (Seeding)	Percolation tank	Teak plantation	Miscellaneous plantation	Reforestation/Afforestation	Meadow development /aromatic grasses	Gap filling/Enrichment planting	Tending/selection felling	Fodder Improvement	Masonry/Cement/Earth Dam	Total
368	222	00	4046	147	216	208	2290	78	5438	31175	234	409	44825

The compartment-wise details about the site suitability for different applications in SCI Working Circle is given in Appendix LII of Volume II.

Details of the soil depth in SCI WC (area in ha)

Deep (50-100cm)	Moderately deep (25-50)	Shallow (10-25)	Shallow to very shallow (< 10)	Shallow to very shallow	Very deep (> 100)	Habitation & water body	total
282	11799	20869	2934	4564	3989	388	44825

The compartment wise details about soil depth is given in Appendix no.LIII of volume II.

Details of soil texture in forests allotted to SCI WC (area in ha)

Other	Clay loam	Clayey	Gravelly clay	Gravelly clay loam	Gravelly sandy clay loam	Gravelly sandy loam	Habitation Mask	Sandy clay loam	Silty clay	Silty loam	Water body mask	Grand Total
0	10,080	2,459	271	13,517	6,025	11378	100	598	0	0	396	44,825

The compartment wise details about soil Texture is given in Appendix no LIV of volume II

Details of area prone to soil erosion in SCI WC (area in ha)

moderate	moderate to severe	severe to very severe	slight	slight to moderate	very severe	habitation & water body	Total
2,147.51	27,216.5	3,445.23	1,773.41	6,904.46	2,950.17	388.04	44,825.32

The compartment wise details about soil erosion is given in Appendix LV of Volume II.

Details of ground water potential in SCI WC (area in ha)

Excellent	Good	Moderate	Moderate to poor	Poor	Poor to nil	Habitation & Water body	Total
0	809.94	1156.67	61.7	35,367.92	7,041.05	388.04	44,825.32

The compartment wise details about ground water potential is given in Appendix LVI of Volume II.

Details of slope in SCI WC (area in ha)

very gently sloping	gently sloping	moderately sloping	strongly sloping	moderately steep to steep sloping	habitation & water body	total
1,706.59	21,822.27	14,236.44	1,920.84	4,751.14	388.04	44,825.32

The compartment wise details about slope is given in Appendix LVI of volume II

The treatment map prepared by RFO shall indicate the following features:

1. **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, 20 meter wide strip on both sides of water courses.

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

3. **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.

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

Section 11.13 Treatment of coupes:

11.13.1 The following treatment is prescribed for different categories of coupe area. The activities of harvesting, plantation and other operations shall be carried out with no or minimum breaking of soil to avoid soil erosion. All the climbers shall be cut in the entire coupe. Precaution should be taken to avoid cutting of plant species included in Red Data Book of BSI and other endangered & threatened species. Soil conservation works shall be carried out in the entire coupe considering the site conditions and severity of erosion etc.

11.13.2 Category A Protection area: Appropriate soil and moisture conservation measures shall be carried out. In moist area especially on either side of nala and river bank, bamboo plantations are prescribed.

11.13.3 Category B Under stocked area: Plantation shall be taken up in blanks and gaps with suitable species as per site conditions. 50% Teak and 50% miscellaneous species shall be used for planting. The area selected for planting shall not be less than 5 ha.

11.13.4 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 Miscellaneous Regulations. In pole crop of NR, thinning will be done to create space for better growth of plants.

11.13.5 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 11.14 Marking Rules

Marking shall be carried out by the RFO under the close supervision of ACF. DCF shall personally inspect as many coupes as possible and give guidance to the staff to avoid any 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.

11.14.1. Category A Protection area:

(1) No felling is permitted in this area.

11.14.2 Category B Under stocked area:

(1) All dead trees retaining 2 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.

- (3) The unwanted growth which is hindering or likely to hinder the growth of seedling regeneration of desired species, shall be removed.
- (4) Multiple coppice shoots and poles shall be reduced to one per stool retaining the most vigorous one.
- (5) Malformed seedlings shall be marked for felling and they shall be cut back.

11.14.3. Category C pole crop and old plantation area :

- (1) Young poles will be marked for thinning to remove the 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 shall be marked first for thinning.
- (3) The multiple coppice shoots will be reduced to one per stool retaining the vigorous one.
- (4) In old plantations first two thinnings are mechanical if the survival percentage is minimum 80%.
- (5) The detailed instructions for carrying out thinning are given in Miscellaneous Regulations. The following prescriptions should also be followed for thinning operations.
 - (a) The age and site quality of crop shall be ascertained.
 - (b) Wedge prism of suitable factor (for young and middle aged crop the wedge prism of form factor- 1 is convenient) shall be used and basal area per ha of the crop is obtained by averaging 3 to 4 counts at various representative sites.
 - (c) The basal area so obtained shall be compared with the basal area given in the Stand Table and if the basal area is more than that given in Stand Table for the corresponding age and site quality, the crop is suitable for thinning. Whereas the average basal area is less than that of basal area given in Stand Table the plantation is not suitable for thinning.
 - (d) Thereafter, the additional basal area required to be removed from the girth classes which have more number of trees are compared to the Stand Table.
 - (e) Marking for thinning shall be carried out as per the procedure mentioned above. Once marking for thinning is completed, it is necessary to cross check the basal area obtained in the crop by measuring of basal area by using wedge prism at representative sites and by averaging these measurements, the basal area of thinned crop is obtained.

- (f) The basal area of thinned crop will be compared with the basal area obtained before thinning which will give the position whether the thinning is carried out properly or not on the basis of Stand Table. While carrying out thinning priority should be given to remove poles of coppice origin, retaining the poles of seedling origin.

11.14.4 Category D Well stocked area : Marking for felling shall be carried out as per marking rules given below.

- (1) All climbers shall be cut. However, care should be taken to avoid cutting of species included in Red Data Book of BSI, endangered and threatened species.
- (2) No miscellaneous species including edible fruit species and NWFP shall be marked for felling.
- (3) Multiple coppice shoots of teak shall be marked for felling retaining the most promising one.
- (4) All dead, malformed trees shall be marked for felling, leaving 2 dead trees per ha for conservation of wildlife. A tree shall be considered as malformed, if it does not have straight clear bole exceeding 2.5 meters height from the ground level, with defective stem occupying more space than its future value warrants. To avoid reckless felling malformed trees having straight clear bole exceeding 2.5 meter height from the ground level should not be marked for felling.
- (5) Teak trees of coppice origin with harvestable girth of 75 cm at bh ob and above shall be first marked for felling. Harvestable teak trees of coppice origin preventing growth of the seedling regeneration of desired species, shall be marked first for felling in preference to others.
- (6) The silviculturally available teak trees of seed origin with harvestable girth of 120 cm at bh ob and above 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 the improvement of young seedlings of desired species; (c) Alternate trees for seed source shall be available; (d) Removal of a tree will not cause damage to other trees.
- (8) Felling of teak trees shall be from the highest girth class to the next lower girth class.
- (9) The undesirable undergrowth which is preventing or likely to prevent growth of seedling regeneration of desired species shall be removed.
- (10) Trees shall not be marked for felling within 30 m on both side of large nala.
- (11) During marking for felling, details shall be maintained for coppice and seed origin teak trees separately.

- (12) Marking for felling of trees of harvestable girth shall be as per the regulation of yield prescribed in this chapter.
- (13) Plus trees of teak shall be identified during marking and they should not be marked for felling.

Section 11.15: Soil and moisture conservation works :

Soil in forests became compact due to heavy grazing, frequent fires resulting in poor drainage. To improve soil fertility and drainage for good growth of forest crop, intensive soil and moisture conservation measures have been prescribed in the areas, wherever necessary. These works shall be carried out along CBO in the next year of main felling in coupes. Nala bunding, gully plugging, inverted bandhara, cement bandhara, CCT etc are prescribed under soil and moisture conservation measures. These works shall be taken up on the basis of micro-watershed treatment, from upper ridge to valley. The distance between two consecutive CCT will vary based on the slope pattern as given below.

<u>Slope</u>	<u>Distance</u>
0 to 10°	: 10 m
0° to 25°	: 5 m
Above 25°	: No CCT

There are number of models for soil and moisture conservation works prescribed by the Department of Soil Conservation as per the agro-climatic conditions, suitable to local sites as per slope and rain fall. It shall be the bench mark for carrying out contour trenching work in forest area. In general the average length of CCT is approximately 1000 to 1200 m. CCT should not be taken up in steep slope area. There shall be a break in CCT leaving 1.5 m after every 10 m of CCT, as a safe guard against soil erosion and crumbling of soil during heavy rains. Accuracy shall be maintained for aligning counter trenches.

Section 11.16 Subsidiary silvicultural operations :

11.16.1 CBO: This is a very important silvicultural operation for hygiene and improving quality & productivity of forests. CBO will be carried out in the next year of main felling and the following activities are prescribed.

- (1) All climbers except endangered, threatened species shall be cut in the entire coupe.
- (2) All standing trees marked for felling but not felled shall be felled.
- (3) All damaged trees which are not likely to recover shall be cut.
- (4) All malformed advance growth shall be removed.
- (5) All multiple poles shall be reduced to one per stool retaining the most promising one.

- (6) The undesirable undergrowth interfering or likely to interfere with the growth of teak and valuable miscellaneous species shall be cut.
- (7) Newly raising multiple coppice shoots will be reduced to 2 per stool retaining the most promising ones.
- (8) Mulching shall be carried out around the seedlings of natural regeneration.

11.16.2 Cleaning: Cleaning operation shall be carried out in the 6th year of the main felling as prescribed below.

- (1) Climbers cutting in entire area (except endangered, threatened species)
- (2) The established natural regeneration of teak and miscellaneous species shall be thinned with appropriate spacing.
- (3) Damaged and malformed seedlings shall be cutback.
- (4) All inferior and undesirable undergrowth interfering or likely to interfere with the growth of teak, miscellaneous fruit, medicinal and NWFP species will be cut back.
- (5) Only the most promising coppice shoot out of the two coppice shoots left during CBO will be retained and all other new teak coppice shoots will be removed.
- (6) The established natural regeneration of teak and miscellaneous species shall be thinned for appropriate spacing.

11.16.3 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, so that 1/3rd spacing of the crop height shall be retained between two adjoining poles. While carrying out thinning undesirable undergrowth should be removed first. Dead and malformed poles should be removed and preferential treatment should be given in favour of teak and other desired miscellaneous species by removing unwanted growth and inferior species. In teak plantations the first and second thinnings are mechanical thinnings, if the survival percent of plantations is more than 80%, and these thinnings shall be carried out in the 8th and 15th year respectively. Subsequent thinnings are silvicultural thinnings to be carried out in the 25th and 35th year of planting. The silvicultural thinning shall be carried out on the basis of Stand Table. Detailed prescriptions on thinning are available in Miscellaneous Regulations.

Section 11.17 Regeneration:

In the forests of Yavatmal Forest Division the status of regeneration is very poor. The young seedlings of teak and other species are noticed in some compartments, usually these seedlings die before getting established due to the highly compact soil, fire and grazing. The status of natural regeneration as per the regeneration survey, the young recruits in R1 is

unsatisfactory, whereas seedlings in R2 and R3 are very unsatisfactory. The regeneration shall be promoted in two ways 1.natural regeneration 2.artificial regeneration.

11.18 Natural regeneration:

11.18.1 Natural regeneration is the best way of ensuring future growing stock. The natural regeneration area shall be identified and rigidly protected from weeds, grazing, fire and biotic interference. 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 systematic weeding commencing in rainy season and continued thereafter until the plants are free from suppression.

11.18.2 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.

11.18.3 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 spadefulls 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 in retention of moisture and preventing trampling by cattle or others.

11.18.4 In the area having inadequate regeneration, seed sowing of suitable species shall be done apart from tending of natural regeneration in the next year after main felling.

Section 11.19 Artificial regeneration:

Artificial regeneration with suitable species is prescribed in areas without natural regeneration and blank area, as per the soil conditions and choice of local people.

11.19.1 Choice of species : The choice of species shall be based on site conditions and preference of local people. Locally occurring fodder fruit and NWFP species shall be preferred. Some preferred species are arjun, bel, behda, bamboo, chinch, dhawada, jamun, apta, anjan, moha, bija, hirda, kulu, shivan, tiwas, ber, amba etc. In the plantations 50 % teak, about 20 % fruit & fodder species and 30 % of other species shall be planted in such a way that it tends towards natural species distribution. Teak will be planted with stumps and miscellaneous species be planted using root trainer seedlings, based on the performance in the

adjoining similar areas. Bamboo can be planted along nala and moist area at a spacement of 6m x 6m and species like jamun, arjun etc. with a spacement of 3m x 3m. In blank area plantations shall be taken up at the spacement of 2m x 2m. In C and D type of area no plantation shall be taken up. While taking up plantations existing root stock and natural regeneration shall be considered to decide the number of seedlings to be planted per ha.

11.19.2 Pre-planting operations : The pre-planting operations (PPO) will be carried out one year before the actual planting of seedlings. Nursery stock should be raised and tended with care so that seedlings of various species grow healthily and good planting stock is ready for planting. The seeds obtained for raising nursery stock shall be from known source especially from the plus trees. Various operations of pre-planting, planting and post-planting have been prescribed in Miscellaneous Regulations.

11.19.3 First year operation :

(1) Planting : Planting shall be completed within a fortnight from the outbreak of monsoons in the year of pre-planting operation. The teak seedlings or stumps shall be planted after first monsoon showers. The poly-pot plants will be used in case of miscellaneous species plantation.

(2) Weeding and casualty replacement : Weeding shall be done in the first year as per the following schedule. 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-October. Casualty replacement shall be carried out along with 1st weeding if required. Natural regeneration shall be properly tended. The plant population of both NR and AR shall be kept around 1000 seedling per ha, the size of the pits shall be of 30cm x 30cm x 30cm for poly pots seedlings. While digging pits care shall be taken not to dig pit in the shadow of standing trees or within 2 meter distance from existing established seedlings. The standing trees are having influence zone of spreading shadow and pits should not be dug either in the shadow or in the influence zone of the standing tree. 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

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

11.19.5 Third year operation: In third year weeding shall be carried out in September along with soil working. One more soil working shall be carried out in October for retention of soil moisture and 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 AR and NR are successful, otherwise coppice shoots will be cutback to retain one well grown coppice shoot per stool. The established advance growth of teak and other valuable species will be spaced out suitably.

Section 11.20 Other regulations :

11.20.1 Grazing: The area of main felling coupe shall remain closed to grazing for five years from the year of planting. While taking up plantation in the understocked area, seed of palatable fodder grass will be sown or planted by tussocks, so that the villagers will have enough fodder for their cattle on rotational harvest basis from such coupes. The closed area should specially be mentioned in the grazing license and villagers shall be communicated of such closure by suitable means. The prescriptions contained in Miscellaneous Regulations shall be implemented.

11.20.2 Fire protection : The main felling coupes and plantation sites shall be fire traced and rigidly protected from fire. In the month of October/November after the fire tracing is over, all the undergrowth of Lantana will be cut. Effective protection shall be ensured against fire during the fire season so that survival and establishment of seedlings can be achieved. Fire protection shall be achieved by involving JFM Committee. To ensure effective fire protection fire protection scheme should be chalked out. The prescriptions contained in Miscellaneous Regulations shall be followed regarding fire protection, maintaining fire lines etc.

CHAPTER 12

Improvement Working Circle

Section 12.1 General constitution and vegetation:

This WC consists of the area which requires improvement in the crop through improvement fillings and artificial regeneration, which could be treated in future under Selection-Cum-Improvement WC. The total forest area included in this WC is 10,102.61 hectares. The range wise allotment of area is given in the table mentioned below.

Area allotted to Improvement WC

Sr.no.	Range	Area of Range	Area allotted (in ha.)			
			RF	PF	Un-classed forests	Total
1	2	3	4	5	6	7
1	Arni	15900.15	2907.39	0	0	2907.39
2	Darwha	10793.43	1268.61	0	0	1268.61
3	Ghatanji	11425.91	88.79	0	130.72	219.51
4	Hiwari	14659.27	3295.5	0	0	3295.5
5	Jodmoha	12746.79	278.1	0	0	278.1
6	Ner	10823.24	827.42	0	0	827.42
7	Yavatmal	8255.43	1273.49	32.59	0	1306.08
Total		84604.22	9939.3	32.59	130.72	10102.61



Forests in I.W.C. Compt. no.15. Beat- Pabhal, Range– Arni



Forests in IWC compt. No.305, Beat- Zola, Range- Hiwri

The forest area included in this WC is young to middle aged, teak is principal species and its associates are *behada*, *hirda*, *ain*, *moyen*, *dhaoda*, *salai*, *tendu*, *kalam*, *char*, *palas*, *hiwar*, *awala*, *moha*, *arjun*, *kulu*, *tiwas*, *kusum*, *dhaman*, *mokha* etc. The forests belong to “Southern Tropical Dry Deciduous Type”. The site quality of forests is IVb and there are IVa and few patches of the site quality III. The density of crop varies from 0.4 to 0.6. Majority of these areas were previously worked under Coppice-With Reserves System. The status of natural regeneration is very poor, due to heavy biotic pressure, hostile soil regime and frequent fires. The growth of coppice of teak has become stunted due to loss of coppice vigour as these areas were managed repeatedly under CWR system.

Reasons for allotment of area to Improvement WC:

- (1) The forest crop is young to middle aged.
- (2) Matured trees are not available for selection felling.
- (3) The stock has more of young crop which needs improvement through silvicultural operations, improvement felling and remove congestion, singling of coppice shoots.

Section 12.2 Special objectives of management:

- (1) To improve the crop quality, density and bring normalcy through appropriate silvicultural operations.
- (2) To maintain and improve soil cover through intensive soil & moisture conservation measures and encourage regeneration.

Section 12.3 Compartments and working series:

47 compartments have been allotted to this WC and these are allotted to 6 Working Series, each having 20 coupes, average area of coupe is 84 hectares. The working cycle is fixed at 20 years.

The details of working series, compartments and coupes are given in Appendix XLC. The abstract of allotment of compartments to this WC is given in the following table.

Details of compartments allotted to Improvement WC

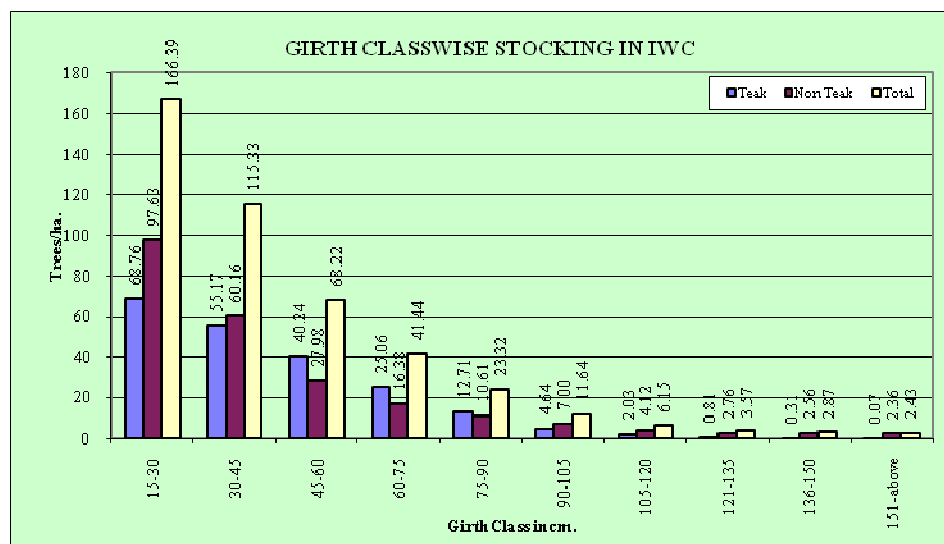
Sr. no.	Working Series	Name of Range	No. of compartments	Total compartments	Total area (ha)	Total area of WC (ha)
1	2	3	4	5	6	7
1	Shiwar	Arni	9,10,19,32,33,35	6	1569.20	1719.34
		Darwha	75	1	150.14	
2	Karegaon	Arni	34	1	372.98	1664.85
		Darwha	60,61,76,98	4	681.27	
		Ghatanji	234	1	63.79	
		Hiwari	285,286,305	3	339.08	
3	Saikheda	Arni	15	1	317.69	1772.96
		Hiwari	254,255,284,299,304,316	6	1455.27	
4	Jambhurni	Hiwari	314,317,322	3	542.78	1648.30
		Jodmoha	359	1	278.12	
		Ner	404,405,411	3	827.42	
5	Karalgaon	Arni	40	1	286.12	1584.61
		Yavatmal	467,469,485,486,487,514,583, 584	8	1273.49	
		Ghatanji	592	1	25.00	
6	Masola	Arni	11	1	361.40	1712.55
		Darwha	77	1	229.47	
		Hiwari	259,260,267	3	958.37	
		Ghatanji	531	1	130.72	
		Yavatmal	532	1	32.59	
			Total :	47	10102.61	10102.61

Section 12.4 Analysis and valuation of the crop

The existing stock maps have been updated through field inspections and the stock is assessed with the help of NDVI maps procured from FSI, Nagpur with adequate ground verification. The enumeration data received from SOFR Unit, Amravati was analysed and details are given below.

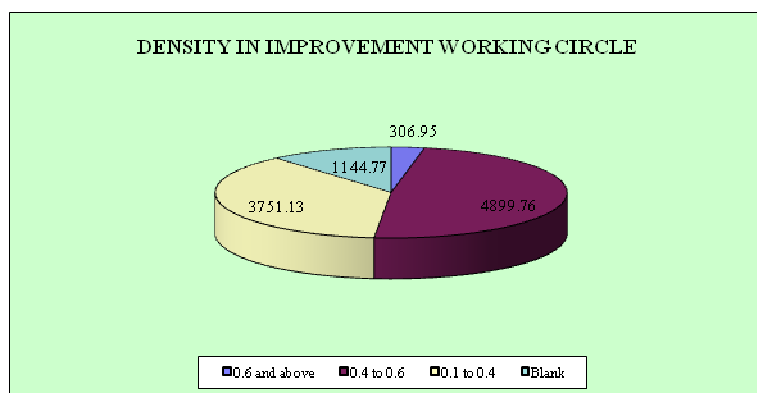
Growing stock in Improvement WC (no. of trees per ha) based on enumeration data 2008

Sr. no.	Girth class (cm at bh)	Teak			Miscellaneous species			Total	
		No. of trees/ ha.	% wrt total teak	% wrt total stock of	No. of trees/ ha.	% wrt total misc spp.	% wrt total stock.	No. of trees/ ha.	% wrt total stock.
1	2	3	4	5	6	7	8	9	10
1	15-30	68.76	32.77	15.58	97.63	42.16	22.12	166.39	37.70
2	30-45	55.17	26.3	12.5	60.16	25.98	13.63	115.33	26.13
3	45-60	40.24	19.18	9.12	27.98	12.08	6.34	68.22	15.46
4	60-75	25.06	11.94	5.68	16.38	7.07	3.71	41.44	9.39
5	75-90	12.71	6.06	2.88	10.61	4.58	2.40	23.32	5.28
6	90-105	4.64	2.21	1.05	7.00	3.02	1.59	11.64	2.64
7	105-120	2.03	0.97	0.46	4.12	1.78	0.93	6.15	1.39
8	121-135	0.81	0.39	0.18	2.76	1.19	0.63	3.57	0.81
9	136-150	0.31	0.15	0.07	2.56	1.11	0.58	2.87	0.65
10	151/above	0.07	0.03	0.02	2.36	1.02	0.53	2.43	0.55
	Total	210	100	48	231	100	52	441	100



Density of forest area in Improvement WC (area in hectares)

Total area	Density			Blank
	0.6 and above	0.4 to 0.6	0.1 to 0.4	
10,102.61	306.95	4,899.76	3,751.13	1,144.77
Percentage →	3%	48%	37%	11%



Section 12.5 Silvicultural system

12.5.1 Considering the features of forest crop viz. density, regeneration, quantity of harvestable trees etc., it is necessary to carry out improvement felling to remove dead, malformed trees. Besides, tending of natural regeneration, cut back operations, removing congestion in young pole crop, singling of coppice shoots etc. are necessary. These operations would be supplemented with artificial regeneration, soil & moisture conservation works, grazing & fire control etc. The yield of timber, firewood etc. may be very negligible as output is not expected from these forests during the silvicultural operations. This working approach would improve the overall composition, quality, hygiene and productivity of forests.

12.5.2 Working cycle

Working cycle has been fixed at 20 years based on quantum of work available, infrastructure and budget provision.

12.5.3 Harvestable girth & regulation of yield

As the method of treatment is improvement felling in order to prepare crop to be treated under SCI system in future, there is no need of fixing harvestable girth. Improvement felling, thinning, singling etc. would not yield much of timber & fire wood. As the yield is negligible, regulation of yield is not prescribed.

Section 12.6 Agency for working

The coupes have to worked through department only, since the prescriptions are for Improvement felling and very small quantity of yield would be realised. However protection and plantation works may be carried out through JFM or as per the directions of the Government.

Section 12.7 Method of execution of works

12.7.1. Demarcation: The annual coupes due for work should be demarcated one year in advance except coupe no. I in which the demarcation, marking will be carried out in the same year. The site should be thoroughly inspected by RFO and demarcation certificate be issued by RFO concerned. Demarcation of coupe, preparation of treatment map and marking for improvement felling should be carried out as per the prescriptions in the chapter Miscellaneous Regulations and marking rules. For effective control of various operations such as improvement felling, extraction and other operations the coupe shall be divided into 4 sections having approximately 20 ha in each section leaving section lines between two sections.

12.7.2 Preparation of treatment map :

- (1) The treatment map should be prepared by the RFO. It will be thoroughly verified by the concerned ACF after field inspections. The treatment map shall be examined by the DCF, after holding discussions with RFO and ACF, the treatment map shall be approved by the DCF after field inspections of majority of coupes.
- (2) The treatment map shall indicate the categories of area under A,B,C and D.
- (3) Treatment map will be prepared on graph paper in 1:5000 scale.
- (4) Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B1 area grids of 1 ha size shall be laid. In B2 areas, where plantations are prescribed, grids of size 0.5 ha shall be laid, down In C and D type areas grids of 1 ha size shall be laid.

(5) Grid wise record of enumeration and marking shall 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.

(6) An expenditure of 1 MDs per hectare may be sanctioned for laying of 100 m x 100 m grids, wherever no specific provision is made for this purpose.

Area of various treatment types in Improvement WC (ha)

A1	A2	A3	B1	B2	D	Total
47.04	969.47	648.61	1057.37	1611.00	5769.12	10,102.61

A-1: Area having more than 25° slope, A-2: 20 metre wide strip on both sides of stream, A-3 : Area susceptible to excessive erosion (very severe),

B-1: blank area (density < 0.4),

B-2 : Under stocked area including blank area.

C: Area having pole crop and old plantations,

D: Areas having density 0.4 and above.

The compartment-wise details about various treatment types in Improvement WC is given in Appendix LI of volume II for general idea. The details of various treatment types are given in the following tables.

Details of soil depth in forest area under Improvement WC (area in ha)

Deep (50-100cm)	Moderately deep (25-50)	Shallow (10-25)	Shallow to very shallow	Very deep (> 100)	Habitation & Water body	Total area
7	2322	5752	1032	916	72	10,102.61

The compartment wise details about soil depth is given in Appendix LIII of volume II.

Details of soil texture in Improvement WC (area in ha)

Clay loam	Clayey	Gravelly clay	Gravelly clay loam	Gravelly sandy clay loam	Gravelly sandy loam	Habitation Mask	Sandy clay loam	Silty clay	Silty loam	Water body Mask	Grand Total
2229	971	57	3453	780.35	2448	21	75	0	0	67	10,102.61

The compartment wise details about soil Texture is given in Appendix LIV of volume II.

Details of the areas prone to soil erosion in Improvement WC (area in hectares)

Moderate	Moderate to severe	Severe to very severe	Slight	Slight to moderate	Very severe	Habitation & water body	Total of WC
186.96	6435.23	678.67	521.64	1810.92	396.79	72.4	10,102.61

The working Circle wise and compartment wise details about soil erosion is given in Appendix.LV of volume II.

Ground water potential in Improvement WC (area in hectares)

Excellent	Good	Moderate	Moderate to poor	Poor	Poor to nil	Habitation & Water body	Total area
-	402	242	1	8073	1311	72	10,102.61

The compartment wise details about ground water potential is given in Appendix LVI of volume II .

Details of slope of forest area in Improvement WC (area in hectares)

Very Gently sloping	Gently sloping	Moderately sloping	Strongly sloping	Moderately steep to steep sloping	Habitation & Water body	Total
471	5453	2526	573	1006	72	10102.61

The compartment wise details of slope is given in Appendix LVII of volume II.

(7) The following categories shall be shown in treatment map and treatment, marking, thinning and other operations shall be carried out as per prescriptions.

Category A Protection area : The areas with steep slopes i.e. more than 25°; area eroded or prone for erosion; twenty meter wide strip on both sides of water courses and around water bodies are included in this type.

Category B Under stocked areas : Blank area or the area with less than 0.4 density are included in this category.

Category C Old plantations or pole crop: This category includes old plantations as well as areas of young pole crop of natural regeneration suitable for retention as future crop. Old plantations with minimum 30 % survival and minimum of one hectare area at one place shall be considered.

(4) Category D Well stocked areas : The area having more than 0.4 density

Section 12.8 Treatment

Treatment for different categories of areas are prescribed below. It should be ensured that important NTFP, medicinal plants, species included in Red Data Book of BSI, threatened or endangered species are not cut during silvicultural operations. The coppice shoots interfering with natural regeneration of desired species should be removed.

12.8.1 Category A Protection area: No felling is prescribed. Appropriate soil and moisture conservation measures are prescribed on the lines of watershed management. Planting of bamboo has to be taken up along nala, river, water streams etc.

12.8.2. Category B Under stocked areas: All dead trees shall be marked for felling except two trees per ha, which will act as dens and snags to wildlife. All live high stumps shall be cut close to the ground and should be properly dressed. The multiple coppice shoots on old stools shall be reduced to one per stool retaining the vigorous one. The unwanted undergrowth hindering seedling regeneration shall be removed. Teak and miscellaneous species shall be planted as per the suitability of site in blank and low density area. Soil & water conservation measures should be under taken as per site conditions.

12.8.3 Category C Old plantations or pole crop: No plantation shall be carried out in this area. Marking for thinning in old plantations shall be done with the help of stand table and wedge prism as prescribed in the Miscellaneous Regulations. The established natural regeneration shall be thinned to remove congestion and spacing between poles may be approximately 1/3 of the height of the crop. Soil and water conservation works have to be carried out as per site requirement.

12.8.4. Category D Well stocked areas: All dead, malformed trees, all live high stumps and all coppice shoots except one vigorously growing coppice shoot per stool shall be marked for felling. No planting shall be carried out in this area.

12.8.5 Soil and moisture conservation works:

The forest area is drained by many water courses and the area adjoining these water courses are prone to soil erosion. It is observed that in Ner, Darwha, part of Jodmoha are susceptible to soil erosion. Care should be taken to avoid soil erosion while carrying out TCM, water absorption trenches, pits for planting etc. Soil conservation measures like nala bunding, inverted bandhara, cement plugs etc. are prescribed. Treatment of Nala shall be on the basis of micro watershed i.e. from ridge to valley.

Section 12.9 Regeneration:

There are two types of regeneration (i) Natural Regeneration (ii) Artificial regeneration

12.9.1 Natural Regeneration: Natural regeneration is the best way of obtaining growing stock. Whatever natural regeneration is available, it should be demarcated as C type area, protected and tended so that it will become future growing stock. The status of natural generation is very poor due to biotic pressure, grazing, weeds, frequent fires etc. In some patches of the forest, the ground is completely devoid of regeneration, which is an alarming situation. In some of the compartments there is extensive spread of Lantana adversely affecting natural regeneration.

The identification and demarcation of the patches of natural regeneration shall be taken up. These areas should be protected through a rigid fire protection scheme where teak regeneration is suppressed due to unwanted undergrowth, cutting and burning the undergrowth be taken up. The seedlings of teak which spring-up shall be protected. Cleaning and weeding shall be carried out and it shall be continued for 3 years till the plants are established.

Natural regeneration of desirable species should be cleared-off weeds within a diameter of one meter and mulching should be done by spreading twigs, debris leaves etc. and put sufficient earth over it (about two or three ghamelas) around the seedling. Such an arrangement will facilitate protection from fire also. The seedlings of species like Bija, Ain, Haldu, Tiwas, Behda etc. shall be rigidly protected from fire and biotic pressure. Weeding and soil working shall be carried out at least for 3 years till the seedlings are established.

12.9.2 Artificial Regeneration: Natural regeneration shall be supplemented with artificial regeneration as per the soil conditions and rain fall.

12.9.2 Choice of species: Species have to be selected for planting considering site conditions and the species shall be naturally occurring in those areas, fruit species, fodder species and species of NWFP. Some of the native species are teak, ain, arjun, shivan, behda, dhawada, bija, hirda, kulu, apta, tiwas, bamboo, bor, chinch, anjan, moha, bel, jamun, amba etc. are to be preferred. In general 50% teak and 50 % non-teak shall be planted. In the miscellaneous species 20% fruit and 30 % fodder species shall be maintained. Teak shall be planted with stumps or polythene bag seedlings or root trainer seedlings. In blank areas the plantations shall be taken up with espacement of 2m x 2m where as species like jamun, arjun etc. espacement shall be 3m x 3m. Bamboo shall be planted with a espacement 6m x 6m. While taking up plantation existing root stock and natural regeneration shall be considered to decide number of seedlings to be planted per hectare. It shall be ensured that no seedling is planted within 2 metres distance from an established seedling or existing tree.

12.9.3 Pre-Planting, planting and post planting operations

Various aspects of pre-planting, planting and post planting operations have been discussed in detail under Afforestation WC and they shall be followed.

Section 12.10 Subsidiary silvicultural operations

Subsidiary silvicultural operation includes CBO and cleaning. These operations shall be carried out in the next year after the main felling. These operations shall be carried out departmentally as given below.

12.10.1 CBO :

- (1) Climber cutting shall be carried out in the entire coupe, but care should be taken to avoid cutting of threatened and endangered species.
- (2) All damaged trees which are not likely recover shall be felled.
- (3) The all standing trees marked for improvement felling, but not felled shall be felled.
- (4) Multiple coppice shoots shall be reduced to one per stool retaining the most promising one.
- (5) The unwanted undergrowth interfering with the growth of teak and other valuable species shall be cut.
- (6) All malformed advance growth shall be cut.

12.10.2 Cleaning: Cleaning shall be carried out in 6th year after main felling. The following operations are prescribed.

- (i) All climbers except those of NTFP shall be cut in the entire coupe if necessary. Species included in Red Data Book of BSI, other endangered and threatened species shall not be cut.
- (ii) Multiple coppice shoots shall be reduced to one per stool or removed if it is interfering with the natural regeneration of seed origin of important species.
- (iii) All damaged and malformed seedlings shall be cut back.
- (iv) All inferior species including the undesirable undergrowth interfering or likely to interfere with the growth of seedling regeneration of teak and valuable miscellaneous species will be cut back.

12.10.3 Thinning: In natural regeneration thinning shall be carried out to create space for the growth of young poles. Thinning shall be carried out in such a way that 1/3rd spacement of the crop height shall be retained between two adjoining poles. While carrying out thinning, dead, diseased and malformed poles shall be marked first for felling. The multiple coppice shoots shall be thinned retaining the most promising one. Care shall be taken to remove the poles of coppice origin first. In old teak plantations the 1st and 2nd thinnings are mechanical. If the survival percentage in the plantation is more than 80 % and thinning shall be carried out in 8th and 15th year of planting respectively. The first mechanical thinning consists of removal of trees in alternate diagonal lines. In general the average girth of the crop will be approximately 25 cm. The second mechanical shall be carried out when the average girth of plantation is around 35 cm and it is expected to reach at the 15th year of plantation. This operation comprises the removal of trees in alternate lines. If the survival percentage is not up to 80 %, then it is prescribed to follow thinning on the basis of stand table, instead of mechanical thinnings. There after silvicultural thinning shall be carried out in the 25th and 35th year of planting, it shall be based on the principles of stand table as given in Miscellaneous Regulations.

Section 12.11 Other regulations

12.11.1 Fire protection: The coupes including plantations shall be fire traced and rigidly protected from fire. These areas will remain closed for grazing for a period of five years from the main felling. In the month of October/November after 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 to well grown crop, NR and AR. Effective protection shall be ensured against fire during the fire season. Fire protection shall be achieved successfully by involving the members of JFM committee. Fire protection measures shall be taken up as prescribed in Miscellaneous Regulations.

12.11.2 Grazing:

The area of main felling coupes shall remain closed to grazing for five years from the year of planting. While taking up plantations in the understocked area, palatable fodder grasses suitable for that area will be sown or planted by tussocks so that a palatable grass is available after five years. The rotational harvest or grazing will facilitate the opening up of area on rotational basis. The closed area should specifically be mentioned in the grazing licence and the villagers shall be communicated of such closure.

CHAPTER 13

Afforestation Working Circle

13.1. General Constitution & Vegetation:

13.1.1 Open, degraded, understocked forest area is included in this WC. These areas are mostly from Ner and Darwha ranges. These forest areas were allotted to Miscellaneous WC in B.C. Pal's WP, however some 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, inhospitable climatic conditions and uncontrolled biotic interference.

The properties and potentialities of soils with different structure, texture and depth express a wide range of variations. The prevailing afforestation techniques could not be applied in general throughout the forests. The protection measures for the survival of plantations were ineffective especially the technique of Trench Cum Mound could not give encouraging results for the protection of plantations from cattle as well as wild animals. It has been observed that neither a single species nor any particular technique could be uniformly applied to all these areas, since these techniques and selection of species were adopted by taking soil factors into consideration. In general 2500 plants per ha in afforestation schemes are planted which may vary depending upon the type of afforestation scheme. These plantations could not establish in moisture deficient areas of Ner and Darhwa ranges resulted in failure of many plantations. In such areas it is necessary to maintain proper soil moisture by way of intensive soil and moisture conservation works. It is necessary to take other factors in to consideration like rainfall, range of temperature and evapo-transpiration rather than usual practice of planting 2500 seedlings per ha which tend to over stocking of plantations and ultimately results in competition for soil moisture and nutrients and the end results could be of natural thinning and growth retardation.

While planting existing root stock shall be properly tended and based on the sustainability of soil moisture and number of plants, species shall be selected considering soil conditions, number of rainy days, temperature variation and evapo-transpiration. The basic approach before taking up of plantation is preparation of soil conditions by taking up intensive soil and moisture conservation measures like gully plugging, nala bunding, inverted bandhara etc. in order to support growth of plantation. In many areas included in this WC

number of plantations had been taken up under Massive Afforestation Programme, as per the Sarwate Committee's Report the number of seedlings to be planted purely based on depth of soil without considering other local factors like rainfall, temperature variation, number of rainy days and rate of evapo-transpiration. In order to take up plantations in a particular area it would be appropriate to plant number of seedlings which a site can sustain based on edaphic efficiency and other local factors coupled with intensive soil and moisture conservation measures, so that the entire precipitation is properly harvested.



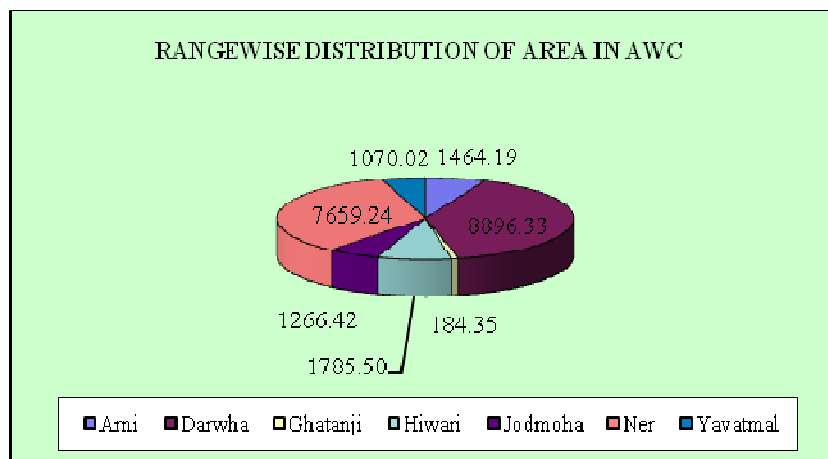
Forests in AWC Compt. No.57, Beat- Kosdani, Range– Arni

3.1.2 General Constitution:

22326.05 ha forest area is included in this WC which is mostly less than 0.4 density and blank area. These areas were previously managed under Afforestation WC in Yadav's Plan, Improvement WC, Afforestation WC, Miscellaneous WC and in Pal's Plan, some of the areas were managed under CWR WC, Miscellaneous WC.

Range wise distribution of forest area in afforestation WC

Sr. no.	Range	Forest area of Range	Area allotted (in ha.) to AWC			
			RF	PF	Unclass	Total
1	2	3	4	5	6	7
1	Arni	15900.15	1464.19	-	-	1464.19
2	Darwha	10793.43	8751.6	-	144.73	8896.33
3	Ghatanji	11425.91	184.35	-	-	184.35
4	Hiwari	14659.27	1664.94	-	120.56	1785.5
5	Jodmoha	12746.79	1107.06	159.36	-	1266.42
6	Ner	10823.24	7254.28	8.88	396.08	7659.24
7	Yavatmal	8255.43	974.91	-	95.11	1070.02
TOTAL		84604.22	21401.33	168.24	756.48	22326.05



13.1.3. 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.

13.1.4. 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.

13.2 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, increase the water absorption capacity of the soil
- (3) To control biotic interference
- (4) To meet the local demand for fuel wood, fodder, small timber increasing the availability of NWFP and employment opportunities



Forests in AWC Compt. No.87, Beat- Ladheda Range- Darwaha

13.3 Compartments allotted to AWC:

The compartments allotted to this WC are given in the following table. Compartment wise details and felling series are given in Appendix XLVc of volume II of this Plan.

Allotment of compartments to felling series in Afforestation WC

Sr. no.	Name of Working Series	Name of Range	Compartment number	No. of Compt.	Total area of compt.	Total area
1	2	3	4	5	6	7
1	Dolamba	Arni	3, 50, 51, 52, 53,54, 55, 56, 57, 58, 59, 557,595	13	1464.19	1634.99
		Darwha	84, 85, 140	3	170.80	
2	Murzadi	Darwha	96, 97, 109, 113, 117, 135, 137, 179,	8	563.79	1587.17
		Yavatmal	476, 482, 488, 489, 490, 491, 513, 516, 517, 518, 519, 520, 521,522, 523, 524, 555, 574, 575	19	1023.38	
3	Titwi	Darwha	180, 184, 186, 188, 191, 585	6	155.24	1606.01
		Ghatanji	250, 251	2	184.35	
		Jodmoha	360,361, 362, 363, 365, 366, 367, 369, 370, 371, 372, 534, 535, 536, 537, 538, 539, 565	18	1266.42	
4	Chandani	Darwha	189	1	75.96	1558.97
		Hiwri	265, 280, 283, 288, 291, 292, 293, 294, 295, 296, 297, 312, 321, 364, 542, 543, 544, 545, 546, 547, 548, 566	22	1483.01	
5	Khopdi (Bk)	Darwha	103, 110, 124, 125, 128, 131, 132, 138, 139, 142, 146, 147, 148, 149, 162, 163, 164, 192, 193, 196, 197, 206, 443, 529, 530	25	1580.40	1580.40
6	Dhamangaon	Darwha	63, 101, 104, 106, 107, 136, 154, 155, 156, 157, 158, 159, 160, 161, 175, 178, 181, 182, 190, 204, 558, 561, 588, 590	24	1671.64	1671.64
7	Ghatkinhi	Darwha	114, 116, 118, 119, 120, 121, 122, 123, 127, 129, 130, 133, 134, 141, 143, 144, 145, 150, 167, 171, 594	21	1651.99	1651.99
8	Banayat	Darwha	68, 69, 79, 81, 83, 86, 87, 91, 92, 94, 100, 108,112, 166, 173, 174, 176, 177, 183, 194, 195, 205, 432	23	1629.49	1629.49

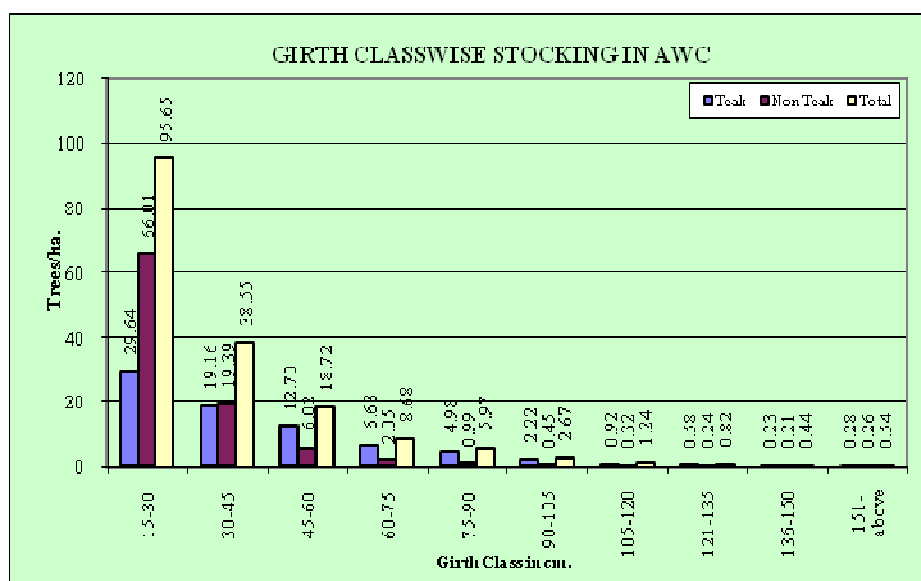
1	2	3	4	5	6	7
9	Tiwsa	Darwha	172	1	147.50	1632.30
		Ner	403, 410, 414, 416, 449, 450, 452, 453, 455, 540, 541, 549, 550, 551, 552, 553, 554, 560, 576, 577, 578, 579	22	1484.80	
10	Sirasgaon	Darwha	165	1	481.79	1733.48
		Ner	199, 380, 402, 419, 420, 441, 446, 447, 461	9	1251.69	
11	Asola	Ner	385, 386, 387, 388, 389, 390, 392, 393, 394, 397, 427, 428, 429, 430, 431, 440, 456, 457, 458, 459, 569, 570, 572.	23	1682.83	1682.83
12	Gharefal	Ner	417, 433, 434, 435, 436, 437, 438, 439, 442, 462.	10	1523.52	1523.52
13	Ner East	Ner	395, 418, 421, 422, 424, 425, 451, 460, 571.	9	1318.85	1318.85
14	Ner West	Darwha	126, 152, 153, ,	3	767.73	1514.41
		Ner	200, 201, 202, 203, , 391, 396, 398, 401, 423, 426, 444, 445, 454	13	397.55	
		Hiwri	318, 319, 320	3	302.49	
		Yavatmal	512	1	46.64	
			Total	280		22326.05

13.4. 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 2008 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.

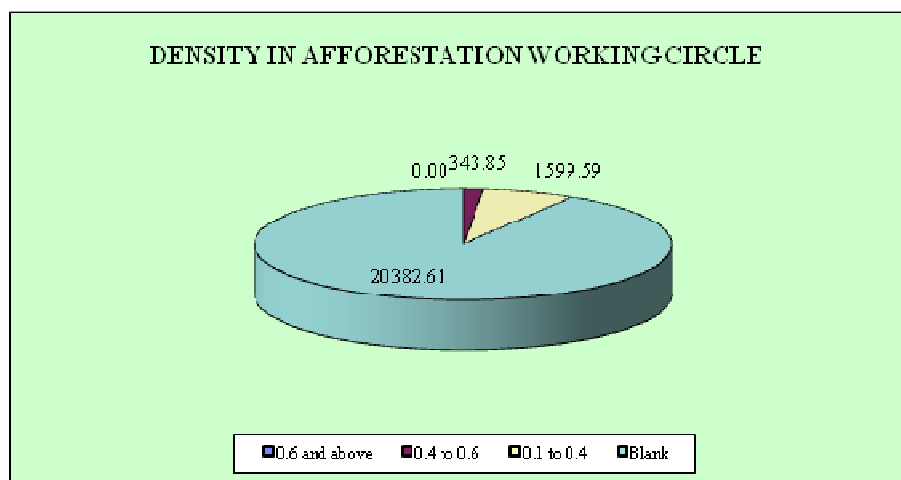
Growing Stock in Afforestation WC

Sr. no.	Girth Class (cm.)	Teak			Misc. species			Total	
		No. of trees/ha.	% wrt total teak stock.	% wrt total stock	No. of trees/ha.	% wrt total misc. species	% wrt total stock	No. of trees/ha	% wrt total stock
1	15-30	29.64	38.32	17.11	66.01	68.8	38.09	95.65	55.20
2	30-45	19.16	24.77	11.06	19.39	20.21	11.19	38.55	22.25
3	45-60	12.70	16.42	7.33	6.02	6.27	3.47	18.72	10.80
4	60-75	6.63	8.57	3.83	2.05	2.14	1.18	8.68	5.01
5	75-90	4.98	6.44	2.87	0.99	1.03	0.57	5.97	3.45
6	90-105	2.22	2.87	1.28	0.45	0.47	0.26	2.67	1.54
7	105-120	0.92	1.19	0.53	0.32	0.33	0.18	1.24	0.72
8	121-135	0.58	0.75	0.33	0.24	0.25	0.14	0.82	0.47
9	136-150	0.23	0.3	0.13	0.21	0.22	0.12	0.44	0.25
10	151-above	0.28	0.36	0.16	0.26	0.27	0.15	0.54	0.31
	Total	77.34	100.00	44.63	95.94	100.00	55.35	173.28	100.00



Density of forest area in Afforestation WC

Total area in ha.	Density percentage to the WC area			blank
	0.6 and above	0.4 to 0.6	0.1 to 0.4	
22326.05	0.0	343.85	1599.59	20382.61
100%	0.0	2%	7%	91%



13.5 Method of Treatment:

13.5.1 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.

13.5.2 Phase I Restorative Phase:

The period of this phase will be minimum one 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, glyricidia, khair, bamboo, sagargoti and other local species may be useful for live hedge fencing. Motivation of local people for JFM as an important work

shall be taken up. The villagers shall be allowed to cut and carry grass in the area which was allotted to JFM Committee.

13.5.3 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. The P.P.O/P.Y.O operations shall be undertaken in 2nd year onwards. 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 area 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, fertiliser 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.

13.6 Formation of coupes and plantation series:

The entire WC is divided into 14 working series and each working series consists of 20 coupes. The details about working series and coupes are given in Appendix XLc of volume II of this plan.

13.7 Regulation of yield:

Since majority of the area is degraded, open and under stocked, no appreciable yield will be realised.

13.8 Implementing agency:

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

13.9 Method of executing works:

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

13.9.2 Laying of grids: Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B1 areas grids of 1 ha size shall be laid. In B2 areas, 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. 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.

13.9.3 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 scale. The treatment map will indicate the distinctive features which are as follows.

Details about various treatment types in Afforestation WC (area in ha)

A			B		D	Total
A1	A2	A3	B1	B2		
0.00	2332.49	13107.63	4347.53	1709.05	829.35	22326.05

A-1 type: Area having more than 25° slope;

A-2 type: Twenty meter wide strip on both sides of stream;

A-3 type: Area susceptible to excessive erosion (Very severe),

B-1 type: Open forests (density < 0.4);

B-2 type: Under stocked area including blank area;

C type: Area having pole crop; D type: Areas having density 0.4 and over. The compartment-wise details of treatment types are given in Appendix LI of volume II.

Details of site suitability for different work in Afforestation WC (area in ha)

Water body	Protection areas	Tending/Improvement felling	Bamboo plantation (Seeding)	Percolation tank	Teak plantation	Miscellaneous plantation	Reforestation/Afforestation	Meadow development/aromatic grasses	Gap filling/Enrichment planting	Tending/selection felling	Fodder Improvement	Masonry/Cement/Earth Dam	Total
252.55	0.00	326.68	2332.49	10.54	643.94	1285.26	11763.40	3564.93	1237.00	556.48	115.41	237.74	22326.05

The compartment-wise details about the site suitability for different applications in Afforestation WC is given in Appendix LII of Volume II.

Details of soil depth in Afforestation WC

(depth in cm & area in ha)

Deep (50-100cm)	Moderately deep (25-50)	Shallow (10-25)	Shallow to very shallow (< 10)	Shallow to very shallow	Very deep (> 100)	Habitation & Water body	Compt Area
515.89	1832.83	12293.68	595.17	1623.57	5016.54	448.37	22326.05

The compartment wise details of soil depth are given in Appendix LIII of volume II.

Details of soil texture in Afforestation WC (area in ha)

Clay loam	Clayey	Gravelly clay	Gravelly clay loam	Gravelly sandy clay loam	Gravelly sandy loam	Habitat Mask	Sandy clay loam	Silt clay	Silt loam	Water body Mask	Grand Total
1418.25	2471.71	926.35	6267.8	3158.32	6378.96	220.15	1082.11	0	149.5	252.9	22326.05

The compartment wise details about soil texture is given in Appendix LIV of volume II.

Details about the areas prone to soil erosion in Afforestation WC (area in ha)

Moderate	Moderate to severe	Severe to very severe	Slight	Slight to moderate	Very severe	Habitation & Water body	Grand Total
402	14105	3718	1927	1196	529	448	22326

The compartment wise details about soil erosion are given in Appendix LV of volume II.

Details of ground water potential in Afforestation WC (area in ha)

Excellent	Good	Moderate	Moderate to poor	Poor	Poor to nil	Habitation & Water body	Total
0	696	1530	13	15715	3923	448	22326

The compartment wise details of ground water potential are given in Appendix LVI of volume II.

Details of slope in Afforestation WC (area in ha)

Very Gently sloping	Gently sloping	Moderately sloping	Strongly sloping	Moderately steep to steep sloping	Habitation & Water body	Total
2180	10116	7492	1071	1018	448	22326

The compartment wise details of slope are given in Appendix LVII of volume II. Treatment map shall show the following details.

(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 density.

13.10 Treatment Prescribed:

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

13.10.1 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.

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

13.10.3 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.

13.10.4 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 dribbling will be under taken wherever it is needed as per the soil conditions.

13.10.5 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.

13.10.6 Category D Well stocked area: No planting will be done in this area. Felling will be carried out as prescribed in marking rules.

13.11 Marking rules

13.11.1 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.

13.11.2 Category A Protection area: No tree will be marked for felling, except removal of dead trees leaving 2 trees per ha which will act as snag and den to wildlife.

13.11.3 Category B under stocked area:

- (a) No tree will be marked for felling.
- (b) All live high stumps shall be cut-back.
- (c) All dead trees will be marked for removal except 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.

13.11.4 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 espacement 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.

13.11.5 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.

13.12 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.

13.13 Regeneration

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

13.13.1 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 Yavatmal 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. 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.

13.13.2 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.

13.13.3 Pre-Planting Operations:

(1) The PPO 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.

13.13.4 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. Some of the species suggested for afforestation are *teak*, *dhawada*, *khair*, *jamun*, *anjan*, *biba*, *behda*, *hirda*, *neem*, *babul*, *nilgiri*, *glyricidia*, *bel*, *apta*, *bamboo* etc. The palatable grass species of *sheda*, *paunya* and *marvel* shall be preferred. Bamboo can be planted in suitable areas especially along nala bank.

13.13.5 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.

(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.

13.13.6 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.

13.13.7 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.

13.13.8 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.

13.14 Subsidiary silvicultural operations:

13.14.1 CBO: Cut Back Operation shall be carried out one 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.

13.14.2 Cleaning: It will be carried out in the 6th year of the main working of coupe.

(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.

13.14.3 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 8th 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 in 25th and 35th year 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 spacing 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.

13.15 Other Regulations:

13.15.1 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.

13.15.2 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

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.

CHAPTER 14

Fodder Improvement Working Circle

Section 14.1 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 Ramnas 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*) except a few well maintained Ramnas. Good fodder grass like sheda, 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 7350.24 ha. Range wise allotment of area to FIWC is given below.

Area of Fodder Improvement WC

Sr. no.	Range	Area of Range	Area allotted to FIWC (in ha.)			
			RF	PF	Unclassed	Total
1	2	3	4	5	6	7
1	Arni	15900.15	--	--	--	0
2	Darwha	10793.43	628.49	--	--	628.49
3	Ghatanji	11425.91	901.3	--	--	901.30
4	Hiwari	14659.27	540.57	--	--	540.57
5	Jodmoha	12746.79	3328.2	267.09	--	3595.29
6	Ner	10823.24	1132.6	--	--	1132.6
7	Yavatmal	8255.43	551.99	--	--	551.99
Total		84604.22	7083.15	267.09	--	7350.24

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

- (1) These areas have been traditionally worked 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.
- (4) The Ramnas have good fodder grass like shedra, paunya, marvel etc.

Section 14.2 Compartments allotted to FIWC:

The compartments allotted to this WC are given below.

Compartments allotted to Fodder Improvement WC

Sr. no.	Working series	Range	Comptt. number	No. of Comptt.	Total area of the compt.	Area under FIWC
1	2	3	4	5	6	7
1	Darwha	Darwha	62, 64, 65, 66, 67, 70, 71	7	628.49	1180.48
		Yavatmal	463, 464	2	551.99	
2	Hiwari	Ghatanji	209, 222, 243	3	901.30	1441.87
		Hiwri	, 263, 266	2	540.57	
3	Kalamb	Jodmoha	327, 342, 347, 352, 353, 354	6	1797.87	1797.87
4	Mendhala	Jodmoha	325, 326, 328, 355, 356, 357, 377, 567	8	1797.42	1797.42
5	Ner	Ner	185, 187, 198, 381, 382, 383, 384, 412, 415, 448, 591	11	1132.60	1132.60
			Total	39		7350.24

Section 14.3 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 14.4 Analysis and valuation of the crop:

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

Enumeration data in FIWC									
Sr. no.	Teak			Misc.			Total		
	Girth Class (cm.)	No. of trees/ha.	% wrt total teak spp.	% wrt total stock	No. of trees/ha.	% wrt total misc. spp.	No. of trees/ha	% wrt total stock.	% wrt total stock.
1	15-30	24.89	25.77	9.96	67.05	43.71	26.82	91.94	36.78
2	30-45	24.68	25.55	9.87	38.25	24.94	15.30	62.93	25.17
3	45-60	19.00	19.67	7.6	20.20	13.17	8.08	39.20	15.68
4	60-75	13.09	13.55	5.24	11.11	7.24	4.44	24.20	9.68
5	75-90	7.96	8.24	3.18	6.42	4.19	2.57	14.38	5.75
6	90-105	3.83	3.96	1.53	3.59	2.34	1.44	7.42	2.97
7	105-120	1.69	1.75	0.68	2.81	1.83	1.12	4.50	1.80
8	121-135	0.77	0.8	0.31	1.36	0.89	0.54	2.13	0.85
9	136-150	0.38	0.39	0.15	1.22	0.8	0.49	1.60	0.64
10	151-above	0.31	0.32	0.12	1.37	0.89	0.55	1.68	0.67
	Total	96.60	100.00	38.64	153.38	100.00	61.35	249.98	100.00

The density of the forest crop is ascertained with the help of stock mapping. The details are given below.

Crown Density in FIWC

Total Area in ha. & percentage		Density			Blank
		0.6 and above	0.4 to 0.6	0.1 to 0.4	
Area	7350.24	--	298.30	1947.34	5104.60
Percentage →	8.69%	--	4.06%	26.49%	69.45%

Section 14.5 Method of treatment:

14.5.1 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 October to May. For rotational grazing, each compartment shall be divided into four sections and every year one section of the compartment shall be under treatment and remain closed for next three consecutive years. Treatment map shall be prepared in the first year for treatment of these areas. 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 sections of the compartments while carrying out treatment of Ramnas.

- (1) All obnoxious weeds, thorny shrubs and bushes except endangered, threatened, vulnerable species will be uprooted and burnt. Tree growth in grassland shall not be encouraged to conserve ecology of ramnas.
- (2) The unpalatable grasses like kusal, burbhusi etc will also be eradicated in pre-flowering stage.
- (3) Seeds of superior species of fodder grass like shedra, paunya, marvel etc. will be sown after ploughing the area at suitable places at the onset of monsoon. Seed sowing or tussock planting of grass like shedra, paunya, marvel etc will be done on the excavated and heaped soil bund.
- (4) Tree species shall not be planted in this area, efforts shall be made to maintain and conserve grasslands.
- (5) Weeding will be carried out if necessary.
- (6) Fodder grass so raised should not be cut in first three years, to allow them to seed and multiply.
- (7) All existing trees will be retained except dead trees. It shall be ensured that number of trees in ramnas is not increased due to protection, in the interest of conserving vegetation of ramnas.

- (8) The area will effectively fire traced every year and it will be closed for grazing for three consecutive years during treatment. In the fourth year controlled grazing will be allowed from October to May.

14.5.2 Various treatment type areas under FIWC:

Based on the digital data obtained from MRSAC pertaining to slope, soil depth, soil texture pertaining to the forest area under FIWC are given in the following tables.

Treatment types in FIWC (area in hectares)

A			B		D	Total
A1	A2	A3	B1	B2		
-	758.38	252.18	1464.53	2772.95	2102.20	7350.24

A-1: Area having more than 25° slope, A-2: Twenty metre wide strip on both sides of stream, A-3: Area susceptible to excessive erosion (Very severe), B-1: Open forests (density < 0.4), B-2: Under stocked area including blank area. C type: Areas having pole crop, D type: Areas having density 0.4 and over.

The compartment-wise details about various treatment types in Fodder Improvement WC is given in Appendix LI of volume II.

Details of soil depth in FIWC (area in hectares)

Deep (50-100cm)	Moderately deep (25-50)	Shallow (10-25)	Shallow to very shallow (< 10)	Shallow to very shallow	Very deep (> 100)	Habitation & Water body	Compt. Area
24.30	1636.59	3417.55	--	311.05	1845.25	115.50	7350.24

The compartment wise details about soil depth is given in Appendix no. LIII of volume II.

Details of soil texture FIWC (area in hectares)

Clay loam	Clayey	Gravelly clay	Gravelly clay loam	Gravelly sandy clay loam	Gravelly sandy loam	Sandy clay loam	Silty loam	Water body	Grand total
1153.81	625.3	256.84	1862.06	554.86	2258.25	484.62	39	115.5	7350.24

The compartment wise details about soil Texture is given in Appendix no. LIV of volume II.

Details of area prone to soil erosion in FIWC (area in hectares)

Moderate	Moderate to severe	Severe to very severe	Slight	Slight to moderate	Very severe	Habitation & Water body	Grand total
132.17	5049.7	471.66	214.89	1344.29	22.03	115.5	7350.24

The compartment wise details of soil erosion are given in Appendix LV of volume II.

Details of slope in FIWC (Area in hectares)

Very Gently sloping	Gently sloping	Moderately sloping	Strongly sloping	Moderately steep to steep sloping	Habitation & Water body	Total
120.05	3017.25	2606.64	535.48	955.32	115.50	7350.24

The compartment wise details of slope are given in Appendix LVII of volume II.

14.6 Treatment for Ramnas

- (1) All the Ramnas shall be completely closed with barbed wire fencing or with TCM or live hedge fencing and shall be completely closed to grazing permanently.
- (2) A treatment map shall be prepared by RFO for the coupe.
- (3) These areas shall be kept closed for cutting of grass for the same year only.
- (4) 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 of by public auction or may be allowed to be removed free of cost 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 and other instructions should be followed.

Details of Ramnas

Sr. no.	Range	Compartment number	Scaled area in ha
1	Darwaha	67	127.64
2	Darwaha	70	116.37
3	Darwaha	64	53.35
4	Darwaha	65	160.06
5	Darwaha	62	128.56
6	Jodmoha	327	471.85
7	Ner	382	61.69
8	Ner	384	67.23
9	Ner	412	259.17
10	Ner	381	29.18
	Total		1475.10

The area for rotational grazing is given in the following table.

Area for rotational grazing

Sr. no.	Range	Comptt. no.	Scaled area in ha.	Sr. no.	Range	Comptt. no.	Scaled area in ha
1	Darwaha	71	76.99	16	Jodmoha	356	234.77
2	"	66	9.61	17	"	357	360.92
3	Ghatanji	209	124.75	18	"	377	220.75
4	"	243	18.98	19	"	448	105.37
5	"	222	444.00	20	"	325	264.66
6	Hiwari	263	372.27	21	"	326	305.14
7	"	266	231.32	22	Yavatmal	463	467.57
8	Jodmoha	328	372.27	23	"	464	96.95
9	"	342	352.06	24	Ner	383	66.12
10	"	348	359.71	25	"	185	5.17
11	"	352	314.08	26	"	187	54.08
12	"	353	184.96	27	"	198	158.24
13	"	354	314.08	28	"	415	278.29
14	"	567	30.98	29	"	591	50.00
15	"	355	403.81			Total	7350.24

Section 14.7 Formation of coupes:

The entire area is divided into 5 working series and 20 coupes in each working series and the detailed statement showing working series and coupes in each series given in appendix XLd and XL IV(b) of Volume II.

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

Section 14.8 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. The final selection of species shall be as per the site requirement. Tree species should not be planted in FIWC for conserving the grassland ecosystem and also considering the shallow soil.

Section 14.9 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 14.10 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. Tree species shall not be planted to maintain grassland ecosystem.

CHAPTER 15

Non-wood forest produce (overlapping) working circle

Section 15.1 General Constitution:

This Working Circle includes total forests of Yavatmal Forest Division. The Non-Wood Forest Produce (NWFP) also includes medicinal plants available in forests. The number of trees of some NWFP species is given below.

NWPF Species in Yavatmal Forest Division

Sr.no.	Species	Total number of trees
1	Anjan	6,56,529
2	Awala	3,87,487
3	Behda	10,91,394
4	Biba	4,36,558
5	Char	4,90,704
6	Dhawada	18,87,520
7	Kadai	2,58,889
8	Khair	2,38,584
9	Moha	5,22,854
10	Salai	1,80,207
11	Tendu	19,12,901
12	Jambhul	2,35,200
13	Umbar	3,51,954
14	Sitafal	5,87,153
15	Medshing	5,16,086
16	Amaltas	4,92,397

Section 15.2 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. The compartment wise distribution of few important Non-Wood Forest Produce species in different girth classes based on enumeration data is given in Appendix XXXV of volume II.

Bidi Rolling



Section 15.3 Special objectives of management

The special objects of management of NWFP are given below.

- (1) To improve the stocking of NWFP yielding species in forests
- (2) To protect and manage NWFP and medicinal plants to enhance the productivity
- (3) To generate employment through NWFP thereby improving socio-economic conditions of local people.
- (4) 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, many species of medicinal 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 Yavatmal 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, lever 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>Tephrosea purpurea</i>	Plant	Asthma, snake bite
18	Bakain	<i>Melia azedarch</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	Grewia tiliaefolia	Bark, root	Dysentey, itching, syphilis, blood purification
36	Dhawada	Anogeissus latifolia	Seeds, gum, bark	Desentry, tonic
37	Dudhavel	Lettsomia setosa	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 variegata	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, leucodma
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 ashtma, 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 Chapha	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 trifoliatus	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 oojeinensis	Bark, leaf	Diarrohoea & dysentery
125	Umbar	Ficus racemosa	Seeds, leaf, laticus	Mouth, skin problem
126	Vacha	Acorus calamus	Rhizome	Asthama, dysentery, anlegesic
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 15.4 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 2006 tendu season, Rs 26,53,246/- have been distributed to 10,268 labourers and for 2007 tendu season Rs 2,25,91,768/- allotted to different Range Forest Officers for further distribution to the labourers who have participated in tendu season 2006-07. 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	1997	11	23058.420	167.49
2	1998	19	22118.196	135.90
3	1999	19	23305.251	
4	2000	19	24125.753	177.61
5	2001	19	23410.589	164.49
6	2002	16	23908.917	95.63
7	2003	16	18200.000	83.26
8	2004	14	18726.855	666.97
9	2005	15	9332.242	51.39
10	2006	16	1151.701	43.40
11	2007	19	23549.037	249.56
12	2008	16	20056.839	95.42
13	2009	19	12885.150	158.68

N.W.F.P. in Yavatmal Forests



Bidi making

The entire division is divided into 19 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 Yavatmal Forest Division

Range	Name of tendu unit
Jodmoha	1 Nanza, 2 Kalamb, 3Jodmoha.
Ghatanji	4 Yelabara, 5 Mowada, 6 Sakhara(Kh), 7 Kinhi.
Hiwari	8 Dabhadi, 9 Salod, 10 Pardi-Halza, 11 Jawla
Yavatmal	12Arjuna 13 Karalgaon.
Arni	14 Lonbehel, 15 Bhanasara-Belora, 16 Sawali
Darwha	17 Darwha/Karajgaon, 18 Pathrot
Ner	19 Ner

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	>20

Studies conducted by MVSS, regarding production of mahua flowers and seeds are given in the following table.

Production of moha flower and seed

Sr. no.	girth class (cm at bh)	Weight in kg	
		Flower	Seed
1	76 - 90	800	120
2	91-105	1000	100
3	106-120	1125	200
4	136-150	1330	275
5	151-175	1300	380
6	176-190	1500	400
7	191-220	2000	430
	Average	1234	272

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. For disposal of dhawada gum, 16 units have been constituted in Yavatmal division and these units are sold in public auction. The details of dhawada gum collection and revenue are given in the table below.

Dhawada gum production & revenue

Sr. no.	Year	Quantity(Qtl.)	Revenue (Rs.)
1	2	3	4
1	2000-01	252.65	98,150
2	2001-02	214.35	98,600
3	2002-03	277.32	91,075
4	2003-04	245.62	97,250
5	2004-05	269.60	99,700
6	2005-06	271.00	1,04,800
7	2006-07	----	Handed over to Gram Panchayat
8	2007-08	----	Handed over to Gram Panchayat
9	2008-09	----	Handed over to Gram Panchayat

Yield: Year wise production of Dhawada gum is given in Appendix XX of Volume II of this plan. The tapping of gum is through traditional methods as scientific tapping or non-destructive method of tapping is not in practice.

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 scrapped 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.

Formation of units: At present there are 16 units in the division for collection and disposal of Dhawada gum. The gum units are as below.

Gum units in Yavatmal Division

Range	Number and name of Unit
Ghatanji	1. Sakhara, 2. Ghatanji, 3. Yelabara
Jodmoha	4. Ramavakadi, 5. Kalamb, 6. Jodmoha, & Khorad
Yavatmal	7. Jamb, Yavatmal & Kinhi, 8. Karalgaon
Hiwari	9. Dhabhdi & Jawala, 10. Kolambi & Rui, 11. Hiwari
Arni	12. Lonbehel 13. Sawali 14. Bhansara & Belora
Ner	15. Ner range
Darwha	16. Darwha Range

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) **Sitafal (custard apple):** Sitafal is available in this division, the produce is sold by public auction. The revenue collected out of the sale of sitafal is given below.

Sitafal trees auctioned and revenue collected

Sr. no.	Year of Auction	No. of trees	Revenue collected in Rs
1	2001-02	1500	10,000
2	2002-03	1500	18,000
3	2003-04	1500	27,800
4	2004-05	1500	6,100
5	2005-06	1500	42,500
6	2006-07	1500	66,100
7	2007-08	1500	89,000
8	2008-09	1500	15,500
9	2009-10	1500	6,500

- (5) **Medicinal plants :** Rich variety of medicinal plants are found in Yavatmal Forest Division which yield 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 biodiversity 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.

Method of treatment: In Yavatmal 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 142 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.

- (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, Yavatmal 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.

(6) Myrabalon: hirda, behda, awala are commonly called as Triphala. These minor forest produce are used in many ways in Yavatmal Forest Division. Hirda species is very rare and 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 dis-order. 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.

Yield : There are no specific studies regarding the yield of fruits from such species so far. The compartment-wise distribution of these species is given in Appendix XXXVb 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 assigned to them should enumerate the trees of these species and yield should be recorded yearly and the collected data should be recorded and 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 beat, round, range and division level.
- (3) These species should be excluded from felling.

(7) Fodder: There is heavy demand for fodder in this area. For stall feeding of cattle local people need palatable grass like sheda (*Sehima nervosum*) paunya (*Sehima Sulcatum*) marvel (*Andropogon annulatus*). However grass like bhurbhushi (*Eragrostis tenella*) kusal (*Heteropogon contortus*) kunda (*Ischaemum angustifolium*) are found in fairly large quantity which are not palatable grasses. The regulations as given in Fodder WC shall be followed.

CHAPTER 16

Joint Forest Management (overlapping) Working Circle

Section 16.1 Background:

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 regarding framework for creating massive people's movement through involvement of village communities in the protection and management of degraded forest lands. 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. Later, GOM issued revised guidelines and framework for implementation of JFM programme vide G.R. dated 25-4-2003.



JFM Committee meeting, Arni

The Yavatmal Forest Division is having 802 villages; and 325 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.



JFM Committee meeting, Arni

Section 16.2 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 16.3 Socio-economic conditions

The total human population of entire division is 10,70,267 as per 2001 census. Population density is 250 per sq. km ST population constitutes 12.6% and SC population 7.73 % of total population.

Section 16. 4 Status of JFM:

16.4.1 In Yavatmal forest division the JFM was started in 1998-99 under Maharashtra Forestry Project. The details of JFM implementation are given in the table below.

Details of villages under JFM in Yavatmal Forest Division

Number of JFM committees in division	Number of Registered committees	Area allotted for protection	Plantation area (ha)
		(ha)	
270	270	48,993.70	1,740.00

Some patches of forests of Yavatmal Forest Division are remote especially in Arni and Ghatanji ranges. 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 population 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 shall be followed. At present there are 270 committees constituted in the division is having forest area of 48,993.70 ha out of this area 1740 ha area was allotted for taking up plantation. Any deviation shall be required sanctioned from the competent authority.

16.4.2 The details of grading of JFM Committees are given below (2001-02 to 2010-11)

No. of villages Good : 199; Better : 40; Fit for cancellation: 31; Total : 270

16.4.3 The following villages received Sant Tukaram Award

(1) 2006-07 Malkhed - Third	(2) 2007-08 Malkhed Third
(3) 2007-08 Kolura Second	(4) 2008-09 Bhisni Second
(5) 2009-10 Uchegaon First	(6) 2010-11 Rampur First

16.4.4 The participation of woman in JFM is good. There are 494 women in Executive Committees in this division. 97 Microplans were approved. The details of plantation taken up and survival percent are given in table below.

Sr. no.	WC	Year	Coupe no.	Area planted ha	Seedlings survival %
1	SCI	2005-06	-	-	-
		2006-07	-	-	-
		2007-08	IX	30	52%
			II	30	49.03%
			IV	40	--
		2008-09	V	40	66.42%
			V	25	32.20%
			V	40	69.20%
			V	40	60.10%
		2009-10	-	-	-
2	IWC	2005-06	-	-	-
		2006-07	-	-	-
		2007-08	IV	25	20.34%
			V	25	73.76%
			III	25	63.86%
			V	25	92.83%
		2008-09	V	40	56.71%
			V	25	70.84%
			V	25	36.25%
			V	25	76.12%
			V	20	74.47%
			V	20	78.27%
3	AWC	2005-06	-	-	-
		2006-07	-	-	-
		2007-08	-	-	-
		2008-09	V	40	80.87%
			V	40	37.88%
			V	20	-
		2009-10	VI	35	-
			VI	35	85.08%

Section 16.5 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.
- (2) To rehabilitate and regenerate degraded forests and to check soil erosion.
- (3) To seek the cooperation and active participation of local people in forest protection, management and development activities.

Section 16.6 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 16.7 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 16.8 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 Yavatmal 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 16.9 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 16.10 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 16.11 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 available.
- (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.

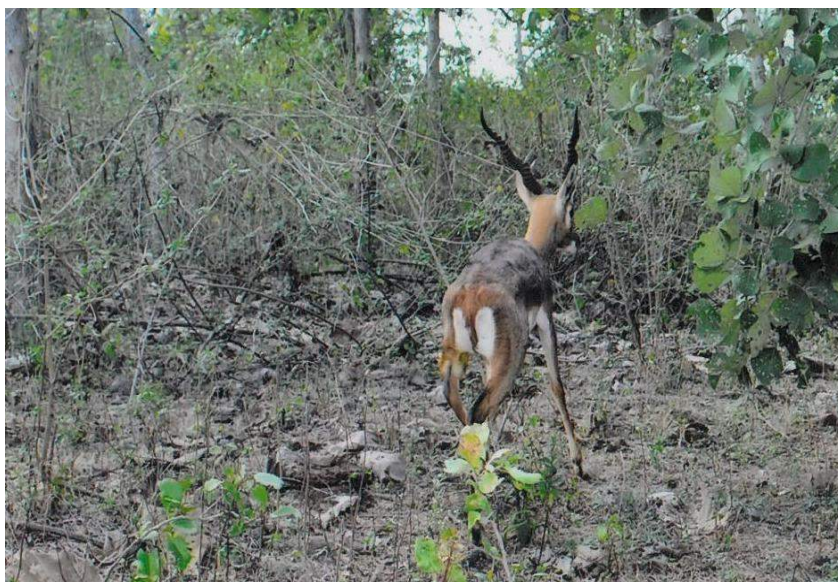
JFM requires strong institutional capacity to make collaborative efforts for forest protection and make it successful in getting the economic returns and regeneration of the forests. Therefore the forest officials have to take adequate measures and precautions in formalising participatory management. Various Government Resolutions, Orders and guidelines in relation to JFM are given in Appendix LXVII of Volume II.

CHAPTER 17

Wildlife Management (Overlapping) Working Circle

Section 17.1 General Constitution:

This WC comprises total forests of Yavatmal Forest Division having an area 84,604.22 ha. This area used to house many wild animals before 3- 4 decades. However in the past few decades these has 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.



Black buck Compt. no. 472, Beat- Umarda(S) Range- Yavatmal

17.1.1 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 Yavatmal as per the estimation of wildlife population in 2005.

Wild animals found in Yavatmal Division (2005)

Sambar	Barking deer	Nilgai	Chowsinga	Wild dog	Wolf	Jackal	Wild boar	Hyae na
29	362	1271	9	48	95	71	764	3
Jungle Cat	Langur	Hare	Mongoose	Peacock	Porcupine	Spotted owl	Bat	Civet
14	1441	184	32	421	5	21	46	3
Spotted deer	Black buck	Chinkara	Sloth bear	--	--	--	--	--
44	6	17	--	--	--	--	--	--

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 however recently one panther was rescued from Kita Kapra of Yavatmal range. Panthers are confined to limited pockets and are noticed in Kita Kapra of Yavatmal Range and Malegaon of Arni Range.

(2) Barking deer (*Muntiacus muntjak*): Barking deers are commonly found in Lonbehel, Bhansara, Malegaon of Arni range, Ramwakdi of Jodmoha Range and Ghatanji, Hiwari, Sonkhas of Ner Range.

(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 Ner & Darwha Ranges, part of Arni, part of Jodmoha 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 Arni, Ghatanji and Jodmoha ranges.

(7) Indian Wolf (*Canis lupus pallipes*): The number of wolves in the division are fairly good. These animals have been noticed at Pathratdevi, Lonbehel, Koli, Chapdoh, Malegaon forest area. 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. During 2005 census wildlife census 6 black bucks were reported.

(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. Sloth bears are found in Pathrotdevi in Darwha Range, Lonbehel, Sawli and Malegaon in Arni Range and Sakhara in Ghatanji Range.

(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. Chinkaras are noticed in few pockets of Arni and Ghatanji Ranges.

(13) Hyena (*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. Hyena is noticed in Bhansara of Arni Range, Kita Kapra of Yavatmal Range.

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*)

Reptiles : Snakes and many species of other reptiles are found all over the tract.

Section 17.2 Special objectives of management:

It is necessary to take up protection and conservation measures throughout forests in the interest of wildlife protection and management, keeping this aspect in view the special objectives of management are as follows.

- (1) To protect and conserve wildlife and ensure viable population of wildlife.
- (2) To increase the population of wildlife by providing proper habitat management including shelter, water, food etc and to develop infrastructure facilities for the betterment of wildlife.
- (3) To preserve area of biological importance as natural heritage for the benefit of education, research and enjoyment of the people.
- (4) To involve local people in wildlife conservation and educate and motivate local people for protection and conservation of wild animals there by providing an environment of security to wild animals.
- (5) To enhance the scope of employment potential and additional income generation by promoting eco-tourism.
- (6) To control illegal trade and poaching in wildlife and their products.
- (7) To reduce biotic interference affecting the growth of wildlife and regulate cattle grazing in wildlife rich area.

Section 17.3 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 IV 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 17.4 Injuries to wildlife:

The wild life in this area dwindled over a period of time due to various reasons like poaching, fire, grazing etc.

17.4.1 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.

17.4.2 Fire: The tract of Yavatmal Division is subjected to repeated fires every year which cause extensive damage to the wild life and its habitat. Repeated fire may compel wild animals towards 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.

17.4.3 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 17.5 Measures 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.

17.5.1 Protection measures: Special protection measures should be undertaken by the territorial staff are 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 1st 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 1st 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.

17.5.2 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.

17.5.3 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.

17.5.4 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.

17.5.5 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.

17.5.6 Considering gradual decrease in the wildlife population DCF, Yavatmal 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.

17.5.7 Other Measures:

(1) Keeping tract of wild animals 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 Yavatmal 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 posses shall verified regularly.
- (f) The cattle kill and human kill cases are required to decided promptly and the compensation shall be paid as per the Government policy.

Section 17.6 Integrated development of wildlife habitat:

17.6.1: DCF Yavatmal made a proposal for the protection of wildlife outside the protected areas in Yavatmal 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 Ner, Darwha, part of Jodmoha, part of Arni where these patches are surrounded by zones of intensive anthropogenic activities mount much pressure on biodiversity which disturbs the prime objectives of bio-diversity 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 Yavatmal 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

17.6.2 Rehabilitation centre: DCF Yavatmal 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.

17.6.3 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, Yavatmal at Ghatanji 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.

17.6.4 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.

17.6.5 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.

* * * *

CHAPTER 18

Eco-Tourism in Yavatmal Forest Division

18.1 Need of eco-tourism:

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 Yavatmal Forest Division is covered under Eco-tourism. The forests of Yavatmal 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. Forests have always beckoned the human being with enchanting realms of natural treasures as mankind originated and thrived in the wilderness. Now, even though man has stepped out in the modern urbanite world, the once thought inexhaustible woods still fascinate him, not only due to its eternal antic beauty but also the tremendous conservation significance. Recreation of wilderness has an important role to play in support of management which directly benefits the cause of conservation as tourism exposes different categories of tourists to the process of conservation and education. 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 Yavatmal division forms a distinct vegetation cover with important rivers like the Penganga, the Wardha, Waghadi, Bembla, Adan, Arunavati, Nirguda etc.

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.

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.

18.2 Ecotourism sites:

One major irrigation project, 6 medium and 5 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, Arunavati, Adan, Bembla, Waghadi, Wardha 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. The following spots can be developed into ecotourism sites.



Shri Mandev mandir Manpur, Beat- Arjuna, Range– Yavatmal

(1) **Shri Mandev Mandir, Manpur:** This is situated in compartment no. 496 which is 14 Km. away from Yavatmal. It is a historical temple situated in the midst of the Jungle having natural scenic beauty. Adjacent to this temple small children park has been developed and a Dharmshala is also constructed in the area of Mandev Mandir. In this area rich forests can be witnessed in which Teak and its associates like Ain, Dhawada, Salai, Char, Anjan, etc. are distributed along with lot of herbs and shrubs. In this area lot of wild animal population can

be seen. Nilgai, jungle fowl, peacock and herds of black buck will definitely attracts visitors. During the time of Shivratri a big jatra take place in this area and lot of visitors reach this area during Shivratri and during the month of Shravan, apart from regular visit on holidays.

(2) Jambwadi minor irrigation project: This project is situated 14 km away from Yavatmal on the way from Yavatmal to Darwha. Adjoining this tank the forest compartment 473 is situated. The forest is situated on undulating and hilly area which gives natural scenic beauty and it definitely attracts visitors. The Irrigation Department has already taken up some activities like boating and arrangement of benches and small children park were developed by Irrigation Department. People from Yavatmal visit this park especially on holidays. As this tank is adjacent to forest wild animals like nilgai, chital, wild boar, panther birds like peacock, jungle fowl and a variety of water birds attract visitors to this area.



Jambwadi Dam, Beat- Umarda(S), Range-Yavatmal

(3) Nature tourism centre Umarda Nursery: It is situated in compartment no. 473 of South Umarda Beat of Yavatmal range. This park is located 19 km away from the Yavatmal - Darwha road. This park is partially developed as nature tourism park with amenities of benches, tract for walking in nursery and small park. Cement bandhara has been constructed across nala to store water for wildlife in that area. Sandal trees were also there in the jungle, wild animals like chital, nilgai, wild boar, peacock, jungle fowl can be seen in this area.



Nature Tourism Centre, Umarda, Range-Yavatmal

(4) Maroti Devsthan Dhumnapur :- This temple is located in compartment no. 465 which is 7 km away from Yavatmal. This is a famous Hanuman Temple situated near Yavatmal. Visitors frequently visit this area especially on holidays. It is a very good picnic spot which could be developed ecotourism site with well developed garden and Children Park. The Jungle is dense and wild animals like Panther, nilgai, wild boar, black buck, wild birds like peacock, jungle fowl definitely attract visitors to this area.



Shri Maroti Mandir, Dhumnapur, Beat- Lohara (F.D.C.M.)

(5) Vasant Smruti Forest Park Yavatmal: This park is situated in compartment no. 513 on Godhni road. This has been taken up by the DCF Yavatmal to develop as ecotourism spot. In this area a small tank and a nala are situated. Lot of flower plants, small children park has been developed to attract visitors, this area is having a rich flora and a rehabilitation centre for wildlife is also arranged here.



Van Udyan Umarsara, Beat- Bothgavan, Range-Yavatmal



Van Udyan Umarsara, Beat- Bothgavan, Range-Yavatmal

(6) Chousaleshwar Mahadeo Mandir: Shri Chousaleshwar Mandir is situated on a small hill in compartment no. 468. The location is 7 km away from Yavatmal on Yavatmal to Kita-Kapra road. It is a famous temple and Lord Shiva is worshiped here. This temple is surrounded by beautiful forest which gives natural scenic beauty, visitors from Yavatmal and nearby villages generally visit on Monday and also on holidays to worship Lord Shiva. During Shivratri, Jatra takes place here and people from Yavatmal and nearby villages enjoy Jatra and worship Lord Shiva. During this season special buses are run from Yavatmal to Chousala. This area is rich in forest species of Teak, Salai, Dudhi, Dhawada, Ain, with lots of herbs and shrubs. The spiraling climbers curling trees are definitely memorises visitors. The jungle fowl, peacock and nilgai, wild boar, panther definitely attract visitors to this natural scenic area.

(7) Shri Shketra Jagdamba Lakhumai Mandir Pathrot: It is a famous and very old Laxmi Mandir situated in compt.no.75, 76 and 77 of Darwha range. The spot is located 10 km from Boriarab and approximately 40 km from Yavatmal. Adjoining mandir a big water tank was constructed from which water is supplied to MIDC in Yavatmal town. Adjacent to this

area Gokhi Nadi passes on which medium irrigation project was constructed in the name of Gokhi nadi project meant for providing irrigation facilities to adjoining area and drinking water to Yavatmal. The total area of this project is 291.40 Sq.km. The water storage capacity of the project is 500.22 lack cubic meters. All three sides are surrounded by forests and wild animals frequently visit this project for drinking water. This is having a beautiful natural scenic which will definitely attract visitors to picnic spot. Wild animals like panther, nilgai, wild boar, hyaena and many water birds are also noticed in this project area.



Shri Jagdamba Temple, Pathrat (Devi)

(8) Shri Khateshwar Sansthan Samadhi Mandir Khateshwar Jodmoha: This mandir is located in compartment 368 of approximately 23 km. from Yavatmal and 1 km away from Jodmoha. This is very famous spot where the Samadhi of Khateshwar Maharaj is situated.



Shri Khateshwar Temple, Beat- Jodmoha, Range-Jodmoha

The visitors from adjoining villages and Yavatmal town frequently visit this area. A big tank situated near mandir with full of lotus flowers gives a natural scenic beauty. Lot of water birds are also noticed in this area which fascinates the visitors. A Jatra is held during “Kartik Pournima” of every year for 15 days and many visitors go to this area and special bus service is also organized by State Road Transport Corporation. In this area Dharmshala is constructed for devotees and a Sanskrutik Bhavan is constructed adjoining this mandir. The wild animals visit to this area for drinking water.

18.3 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 the following cardinal principles shall be adopted:

- (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.

- (a) Development of eco-tourism without disturbing socio-cultural and ecological environment of the area or with low impact on it.
- (b) Involvement of local people and over all socio-economic development by maintaining ecological balance.
- (c) Exposure to ethnic groups to the main stream of social, cultural life and involve them in harnessing potential of eco tourism for their development.

- (d) Involvement of government and non-government organizations to create awareness for environment.

18.4 Role of Forest Department:

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. 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. 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 ecotourism.

18.5 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.

18.6 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.
- (2) The role of NGO will be creation of awareness in all aspects of ecotourism, motivation of local community for sustainable eco-tourism activity.
- (3) Conducting trainings in guiding eco-tourism, catering, transportation, affordable housing etc.
- (4) Motivate local community to increase their involvement in sustainable ecotourism.

18.7 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 balance.
- (2) The role of local community is to develop eco-tourism as means of eco-development, improvement of living standards and to make them aware about local ecological and biological diversity.
- (3) Realise and react to potential threat of investors, who see the opportunities in development but lack of sensitivity to local values.
- (4) JFM committee members shall act as efficient caterers and guides to eco-tourists.
- (5) To be friendly with visitors and help them in eco-tourism.
- (6) Practice conservation of nature and culture as a way of life.
- (7) Respect the values of environment, flora and fauna, the monuments and their cultural heritage.

(8) Become effective nature guides and conservationists by enhancing the practical and ancestral knowledge of the natural features of the area.

18.8 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.

18.9 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.

CHAPTER 19

Forest Protection (Overlapping) Working Circle

Section 19.1 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 Yavatmal division have 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 Arni, Hiwari, Ghatanji, Jodmoha and Yavatmal ranges. Yavatmal range is highly sensitive from the point of illicit felling. The local people move in groups, indulge in illicit felling and there have been many cases of assault on staff by illicit cutters especially in sandal wood area of Umarda of Yavatmal Range. Out of 108 beats, 64 beats are considered hyper sensitive and 14 are sensitive beats and 30 beats are normal. There are 22 saw mills at Yavatmal, 2 saw mills at Arni, 5 saw mills at Darwha, 2 saw mills at Babhulgaon, 4 saw mills at Ner and 2 saw mills at Sadoba Sawli and one saw mill each at Ghatanji, Kalamb, Bodegaon, Boriarab and Lohara.

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 Yavatmal town and other towns like Arni, Ghatanji, Kalamb, Babhulgaon, Ner, Darwha 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, 8 Territorial RFOs, 26 Round Officers, 108 Forest Guards for protection of forests. They have been provided with 7 vehicles. There are 9 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.

19.2 Illicit felling of sandal trees: Sandal plantation was taken up in 1963-64 in compartment no. 470,471,472,473,474 and 492 on an area of 1121 ha by Shri Kenkare, Divisional Forest Officer. The plantations were successfully established. In 1978 sandal wood trees were enumerated and subsequently enumerations were also carried out in 1995, 1998, 2002, 2005, January, October, March of 2005 and July 2006. The well grown sandal trees are subjected to illicit felling by organized gangs in spite of special protection measures. It has been observed that almost all the sandal trees were illicitly cut roots and stumps were also uprooted and taken away by thieves. The details of enumeration data of various periods are given in the following table.

Details of enumeration of sandal wood trees

Girth Class (cm)	1978	1989	1995	2002	January-2005	October-2005	March -2006	July-2006
0-30	3830	2396	1778	922	475	277	101	60
31-45	767	954	1572	1208	478	196	112	29
46-60	61	1500	540	499	153	60	37	0
61-75	10	416	107	107	27	16	20	0
76-90	0	66	16	29	7	6	2	0
91-105	0	9	3	4	3	3	1	0
106-120	0	0	1	0	1	0	1	0
121-135	0	0	0	0	1	0	0	0
Total	4668	5341	4017	2769	1145	558	274	89

Later on 25th November 2007 once again enumeration of sandal trees was carried out the details about enumeration is given in the table below.

0-15	16-30	31-45	Total
98	22	2	122

While taking up special protection measures 461 offences were booked against culprits and 222 culprits were nabbed. 67,892 kg of sandal wood and 37 vehicles were seized. Cases were filed in court of law, some culprits were awarded punishment. Out of seized wood 55,660 kg sandal wood was transported to Karnataka Soaps & Detergent Ltd and 12,885 kg of sandal wood is pending regarding 100 offences in the court of law. It has been observed during the inspection that the young seedlings of sandal wood are noticed in the compartment no. 471 and 472 etc. These seedlings should be well protected and tending operations be taken up to improve sandal crop in this area.

Timber volume :

The average volume per ha as per the enumeration data is about 28.79 m³ per ha., therefore the total volume comes around 15,52,272 m³ considering the total forest area as 53917.05 ha (area of density 0.1 to 0.4 + 0.4 to 0.6+ above 0.6). Timber and fuel wood has the market worth of about 27,940 crores at the conservative rate of Rs18,000/per m³. This is a huge forest wealth of the State as well as national economy, providing both tangible and intangible benefits, shall be protected by all means.

Forest fire: The cause of fire is mainly due to ignorance of local people and wrong practices of collection of NWFP. The nature of fire is creeping fire and the regeneration of teak and other species in general suffer due to such fires. Repeated fire causes desiccation in teak as well as other species and even production of good fodder and grass suffer to a large extent.

Section 19.3 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 19.4 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 802 whereas 108 Forest Guards are placed at various places to protect forests. Therefore there is a need to seek the co-operation of local people in forest protection. The main components of strategy 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 employment generation to local people during lean period.

- (4) Fulfilling the demands of local people for forest produce.
- (5) Effective utilization of existing infrastructure, strengthen and updating infra-structural facilities, improvement in communication facility and mobility of the forest staff.
- (6) Installation of new Check Nakas at hyper sensitive and sensitive points.
- (7) Patrolling sensitive forest areas along with the local people/ JFM Committee members.
- (8) Introducing Rewards, Awards and informer system and making forest offences high risk low gain process.

Section 19.5 Protection measures:

19.5.1 Inspection in transit: There are 9 check nakas in Yavatmal 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 by railway should be checked by concerned staff as well as RFO Mobile Squad. The RFO Mobile Squad shall organize surprise checks at railway station at Yavatmal, Lasina, Ladkhed, Bori, Darwha and Sangvi at least once in a fortnight, if he finds any illegal transportation by railways it must be informed to concerned railway authority and a fortnightly report shall be submitted to DCF.

19.5.2 The DCF shall organize “Nakabandi” at places like Yavatmal, Ghatanji, Kalamb, Arni, Sadoba Sawali 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.

19.5.3 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 proformae 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

19.5.4 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 last 15-20 years on large scale. These cases should be disposed off by taking special drive.

19.5.5 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.

19.5.6 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 Yavatmal with supporting staff.

19.5.7 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.

19.5.8 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.

19.5.9 Check Nakas: Presently 9 Check Nakas are established at various strategic points to control the transportation of illicit forest produce and one new check Naka is proposed to be established. 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 (T: Temporary)

Sr. no.	Range	Existing naka
1	2	3
1	Yavatmal	Lohara (T)
2	Yavatmal	Arni road Naka (T)
3	Darwha	Golibar Chowk Darwha (T)
4	Jodmoha	Kalamb (T)
5	Arni	Near bypass Arni (T)
6	Arni	Lonbehel
7	Arni	Ranidhanora
8	Ghatanji	Inzala

These Check Nakas are manned by Forest Guards and Van major 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.

19.5.10 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.



Vehicles seized in forest offences in Yavatmal Range



Vehicles seized in forest offences in Yavatmal Range

19.5.11 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 Yavatmal looks after forest protection under the control of the DCF, Yavatmal Forest Division. The DCF should closely monitor the work of mobile squad and should obtain weekly reports to monitor the protection activities.



Vehicle seized in forest offence in Yavatmal Range.



Saw mill seized in forest offence in Yavatmal Range

19.5.12 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.



Illicit felling: Comptt. No.7, Beat- Malegaon (W), Range– Arni



Illicit felling: Compt. No.7, Beat- Malegaon (W), Range– Arni

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

19.5.13 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.

19.5.14 Wireless network : Presently there is no wireless network in this division. In the present day society offenders possess modern communication systems like mobile phones while committing forest offences and transporting forest produce. Cellular phones were provided to 8 RFOs, 8 Round Officers and DCF. However the cellular phones may be provided to the entire staff for effective protection of the forests.

19.5.15 Mobility of staff: In Yavatmal Forest Division Government vehicles i.e 2 Tata sumo, 2 jeep, 1 Tata Grande and 1 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 grand-1
2	RFO, Mobile Squad, Yavatmal	Gypsy - 1
3	ACF (EGS)	Tata - Sumo - 1
4	ACF (FLCS)	Tata sumo - 1
5	ACF (ECA)	Mahindra bolero -1
6	Sub-DFO, Darwha	Mahindra max -1

Two seized vehicles are given to 3 RFOs for protection and field works.

19.4.16 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 tackle 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) The details of pistols, bullets provided to the staff is given below :-

- (1) ACF (FLCS):1 pistol, 20 bullets
- (2) RFO, Arni:1 pistol, 20 bullets
- (3) RFO, Jodmoha:1 pistol, 20 bullets
- (4) RFO, Ghatanji :1 pistol, 20 bullets
- (5) RFO, Hiwari :1 pistol, 20 bullets

The forest officers are trained in handling weapons.

B) The rifles are given for forest protection to trained Forest Guards (FG) and distribution of rifles is as under.

- (1) FG, Sonkhas beat, Ner range: 1rifle, 13bullets
- (2) FG, Jambhulani beat, Ner range: 1rifle, 13bullets
- (3) FG, Mobile Squad, Yavatmal : 1rifle, 13bullets
- (4) FG, Mobile Squad, Yavatmal : 1rifle, 13bullets
- (5) Round Officer, Pathrat, Darwha range: 1rifle, 13bullets
- (6) FG, Anjankhed beat, Arni range: 1rifle, 13bullets

19.5.17 Territorial Inspections :

Beat checking : It is necessary that the staff is required to carry out patrolling in their respective jurisdictions and the officers concerned will exercise effective supervision and control at all levels. It is necessary to report every forest offence promptly as per directions given in the standing order 37 chapter 9.

19.5.18 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.

Section 19.6 Fire protection :

19.6.1 The areas of Yavatmal 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.

19.6.2 Class I : Forest completely protected this area includes.

- i. All main felling coupes, thinning coupes, all the forest area under Protection WC, Teak plantation WC and 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.

19.6.3 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.

19.6.4 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.

19.6.5 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.

19.6.6 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.

19.6.7 Fire reports:

If any fire incidence takes place the concerned RFO must inform DCF, Yavatmal at once. RFO must keep a proper communication and co-ordination with the DCF, Yavatmal. After fire is extinguished, RFO shall submit a detailed report to DCF, Yavatmal on extent of area damaged, value of damage with detailed map within 15 days. DCF, Yavatmal 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, Yavatmal 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 19.7 Grazing Control:

Grazing causes lot of damage to regeneration due to trampling. To control grazing, 39 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.	Year	Fire	Grazing	Illicit felling	Others	Total
1	2000-2001	45	36	1534	131	1746
2	2001-2002	29	53	1839	118	2039
3	2002-2003	20	44	1619	203	1886
4	2003-2004	42	27	1597	49	1715
5	2004-2005	3	13	1269	125	1410
6	2005-2006	5	14	1256	73	1348
7	2006-2007	25	15	1065	103	1208
8	2007-2008	67	8	950	353	1378

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 39 grazing units in the division and the carrying capacity is 19826 cattle units. The forest area allotted to these grazing units is 19,822.12 ha. 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. The grazing incidence in SCI WC area comes to 1.2 ha and for Improvement and Afforestation WC comes about 0.6 to 0.8 cattle per ha. The instructions contained in Miscellaneous Regulations shall be followed regarding control of grazing.

Section 19.8 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 utilised. 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.

Section 19.9 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. Visit of JFM Committee members to successful areas in the state may be undertaken.

Section 19.10 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 19.11 Control of unauthorised collection of NWFP:

In this division a number of NWFP is available, out of these Tendu, Moha, Gums and Sitafal 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.

CHAPTER 20

Miscellaneous Regulations

Section 20.1 Demarcation and marking:

20.1.1 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 WC. After demarcation a treatment map shall be prepared by the RFO and it should be verified by the ACF. After the coupe is demarcated coupe demarcation certificate shall be furnished by concerned RFO in the following format.

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 Yavatmal Forest Division.

The area of the coupe is ----- ha.

Place -----

Date-----

Signature

(-----)

(Range Forest Officer-----

-----Range)

Place

Verified

Date-----

(-----)

Assistant Conservator of Forests,-----)

After demarcation having been certified by the RFO, stock map and treatment map shall be prepared by the RFO concerned as per the prescriptions. 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 number 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

Table

Sr. No.	Species	Girth at Bh(ob) in cm	Remarks
1	2	3	4
1/1	--		Not to be felled
11/1	Teak		Not to be felled
111/1	Moyen		Not to be felled

No tree will be marked for felling.

20.1.2 Demarcation of Sections: For the effective management of coupes each coupe shall be divided into 4 sections approximately having equal area. The sectional 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. 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.

20.1.3 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

20.1.4 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 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 MDs 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 area type area. Some times B areas are further classified into B1, B2 and areas into D1, D2 depending on whether adequate root stock/natural regeneration is available or not. These details shall be shown in treatment map.

20.1.5 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, sisham, 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) All remaining trees marked 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) 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			

(5) 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

Section 20.2 Harvesting and disposal of forest produce:

20.2.1 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.

20.2.2: Tendu leaves: Prescriptions for pruning coppicing, regeneration given in NWFP WC shall be followed.

20.2.3 Grass: The instructions contained in G.R.No.MFP-1169/118931- (6) - F-2, Dt. 29/10/1976 will facilitate the disposal of grass 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 coupes, it may be auctioned or be sold may sale by rated passes. To encourage stall feeding the villagers may be allowed to cut and take grass free of cost without damaging forests.

20.2.4 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 20.3 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 compartment wise availability of dead, fallen fire wood and wind fallen timber and report to concerned RFO. The RFO shall then prepare compartment wise estimates for such material by marking these trees for extraction. While marking 2 dead trees shall be left for the benefit of wild life. The material is extracted 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 Yavatmal Circle or disposed off as per the instructions of Government. The details of material extracted and the manner in which it is disposed of 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. 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.

(5) 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.

(6) Irregular harvesting shall not be carried out for the purpose of undertaking plantations/ afforestation works under various schemes and outside the scope of the WP.

(7) **Removal of dead trees:** 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 Tropical Forest Research Institute, Jabalpur or other Government agency.

(8) 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.

(9) Sometimes the leaning trees may become dangerous to public as well as private property, these shall be removed as under regular harvesting.

Section 20.4 Maintenance of boundaries:

20.4.1 The present state of boundary maintenance in Yavatmal 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 Yavatmal 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 XLVII the boundaries of the forests shall be maintained as per details given below.

20.4.2 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.

20.4.3 Boundary mark specifications:

The boundary mark specifications shall be as approved by PCCF, Maharashtra State. 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.

- (1) Whether the boundary pillars are correctly located as per the map and demarcation register.
- (2) The boundary width is to the extent of required measurement or not.
- (3) Regular maintenance of cairns and wooden post is replaced wherever necessary.
- (4) That the boundary post bears the correct number and same is engraved and written in coal tar or paint.
- (5) If any encroachments are there, the matter should be pursued and removed.

20.4.4 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 or 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 inspection of the boundary demarcation works, shall check up the periodic returns.

20.4.5 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.

20.4.6 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 20.5 Artificial Regeneration

20.5.1 Planting of teak and miscellaneous species: Plantation of teak and suitable miscellaneous species will be taken up in the following year of main felling as per the suitability of site. In case of teak, stump planting or root trainer planting will be carried out, where as in case of miscellaneous species root trainer or poly pot plants will be planted. Grids shall be laid down in the plantation area and treatment map shall be prepared as specified in this chapter. The planting works will be carried out as given below.

Pre-monsoon works: These operations will be done in the next 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 30 cm X 30 cm for misc. plantation and 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. Generally the number of plants or Teak stumps per ha is 2500 and the number of plants may be decided on the basis of site and model of scheme. 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.

20.5.2 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) Miscellaneous plants: These plants 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. 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.

20.5.3 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 spacing 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.

20.5.4 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.

20.5.5 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 20.6 Subsidiary silvicultural operations:

All these operations shall be carried out departmentally. These operations shall include –

20.6.1 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. Cutting back of malformed advance growth.
- (4) The unwanted under growth interfering with the Teak and other valuable miscellaneous species shall be removed.
- (5) The multiple coppice shoots or poles shall be reduced to one per stool. 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.

20.6.2 Cleaning: This operation will be carried out departmentally in the 6th year after main felling.

- (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) Cleaning shall be carried out before 1st thinning.

20.6.3 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 8th year, second thinning at the age of 15th year of plantation and subsequent thinning shall be carried out at the 25th year and 35th year of plantation.

(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, Yavatmal. 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 young plantations lot of unwanted bushes and weeds come up which will be removed for healthy growth of plantations.

(4) Thinning procedure for old plantations: 1st thinning shall be carried out at the age of 8th 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%. 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/D/ S/M	
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: Codominant, 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 and the teak trees of coppice origin will be marked first for felling. After that the malformed, suppressed, intermediate, codominant 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 LX of Volume II can be used as reference to carryout thinning.

Section 20.7 Fire Protection:

Repeated fire causes intensive damage to forests damaging flora and fauna, young crop, regeneration and fertility of soil. The forests of Yavatmal division shall be protected from fire by taking up effective protection measures. For the purpose of fire protection the forest area is classified into following categories.

20.7.1 Class I Forests completely protected. This area includes

- (1) All main felling coupes, thinning coupes, all the forests of protection WC, Teak Plantation WC and Improvement WC.
- (2) All regenerated coupes of all working circle till the young crop has attained the age of 10 years.
- (3) All plantations.
- (4) All forest nurseries.
- (5) All Government timber depots both permanent and temporary.
- (6) Special habitat area of any special importance as specified by the CCF (T), Yavatmal circle.
- (7) These areas are cleared with appropriate width of fire line as per the guidelines, are patrolled by fire watchers. If any fire incident takes place in this area, it shall be put off and it should be reported to the DCF Yavatmal.

20.7.2 Class II General fire protection area

- (1) The remaining areas of SCI WC.
- (2) All other areas as specially directed by CCF (T), Yavatmal Circle on special grounds.
- (3) These areas are separated from surrounding areas by means of external fire lines and will be divided into suitable blocks of interior fire lines. Fire watchers may be engaged as sanctioned by CCF (T), Yavatmal.

20.7.3 Class III Protection 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 and kept clean of under growth combustible material.

- (1) All external boundaries of reserved forests to the extent of width of 12 m.
- (2) 6th m width around all the plantations up to 10th year from planting.
- (3) 3 m wide coupe lines up to 10 years after main felling.
- (4) 6 m wide line on both sides all along roads and cart tracts that are passing through forests.
- (5) 40 m wide around timber and fuel wood depots. To control and reduce fire the following operations shall be undertaken.

The cutting and cleaning of fire lines shall be completed by end of December and controlled burning shall be completed by end of February. Leaf litter on fire lines shall be collected from time to time and burn before the fire season starts. No fire line shall be burnt after February unless there is a special order from DCF, Yavatmal.

20.7.4 Fire control measures:

- (1) A consolidated fire protection scheme shall be prepared as per prescriptions given in the WP, with the provisions of watch point, strategic location, fire watchers deployment of vehicles and the supervisory staff etc.
- (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 watcher 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 the tower observe location of fire.
- (5) After receiving information fire watchers move in group to extinguish fire.
- (6) The division office will maintain a register of fire lines showing length and width of fire lines and the period of cutting and burning and a consolidated map will be prepared based on the actual position of the 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 committee shall be involved in the fire protection and their participation and cooperation shall be obtained for effective fire protection.
- (8) Available vehicles will be deployed at strategic location where the fire protection gangs can reach easily.

Section 20.8 Grazing control:

20.8.1 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 802 and there are 231 villages situated adjoining forest. There are 39 grazing units in Yavatmal Forest Division. The carrying capacity of all these 39 units is 19,822.12 ha. 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 LXVIII (a and b) of volume II. In the area where grazing settlement has been effected will be governed by the new grazing policy where as in un-settled areas the old grazing rules of Central Provinces and Berar Forest Manual volume II shall apply.

20.8.2 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. Shri G.K. Pawar, ACF submitted proposal for grazing settlement in Yavatmal Forest Division. The observations and recommendations made by the Shri Pawar, Grazing Settlement Officer in grazing settlement proposal are given below.

(1) In 2004-05 the permission for grazing was given was for 54,888 cattle units and in 2005-06 the permission for grazing given was for 38,595 cattle units. The area available for grazing in the division is 19,822.12 ha and carrying capacity of this area is 19,826 cattle units. The grazing passes were given in excess of 18,769 cattle units resulted in excessive grazing pressure on forests. Therefore, he recommended that the grazing passes should be limited to the extent of carrying capacity of the area.

(2) Grazing is not allowed in Kuran and Ramna areas. The coupes which were worked are closed for grazing for 5 years.

(3) In Yavatmal Forest Division the available area for grazing is not sufficient to meet the grazing demand of cattle in the division. Out of 810 villages in 579 villages the grazing demand for available cattle units cannot be met with. But in the remaining 231 villages the

grazing demand for 1,58,405 cattle units, the required area to meet the grazing demand in these villages is 188989.02 ha. The total area of the Yavatmal Forest Division is 1,00,418.80 ha, out of which 19,822.12 ha area is available for grazing. This situation clearly indicates that there is a huge gap between grazing demand and area available for grazing. Shri Pawar recommended that in future as per the carrying capacity of available 19822.12 ha grazing passes should be given to 19,826 cattle units. 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. Shri G. K. Pawar, ACF carried out analysis on the basis of the parameters such as the grazing area available, carrying capacity, number of animals, demand for cattle units for grazing and the demand is excess or less and number of villages unit wise are given in the following table.

List of grazing units

Grazing unit	Grazing Unit name	Villages included in unit.	area available for grazing	carrying capacity of units	Total cattle in G.U.	Requirement of grazing units
1	2	3	4	5	6	7
26	Kharoni (W)	Kinhi, Mandawa, Yerangaon, Wasari Chincholi, Sakhara, Mukti, Enzhala, Pimpri,	316.96	317	6590	6935
36	Lavan	Belura, Lavhana,	27.37	27	499	517
37	Movada	Mowada, Chorkund.	468.74	469	1789	1806
38	Choramba	Choranba, Khadaki, Yewati, kapari, Wasari, Hiwardhara,	147.63	148	3093	3115
44	Aita	Ayata, kavatha, Palodhi, Ratnpur, Kapeswar, umari, Jalandhri,	316.72	317	4873	4751
45	Datodi	Datodi, Zhaparwadi, Warud, umari, Gudha, Malegaon,	858.90	859	4021	3856
46	Nidha (S)	Malegaon, Shiur, Dhaheli, Belora (Phu), Kelzhara (Komathi), Savali, Warud, Echora, Kelazhara(Dhoki),	277.17	277	8328	8310

		Yermal.				
47	Nidha (N)	Borgaon, Pardi, Karegaon, Pinpri, Bhanbora, Shendhri, Anji,	1181.75	1182	5227	5062
48	Kapsi	Koli, Kinhi, Kurha, Chincholi, Talani, Kapsi,	1284.54	1285	4753	4540
49	Undarni	Bodhad, Koli(bu), Sheeroli, Undharni, Ghothi, Kinhi, Rampur, Kopari	201.78	202	5453	5371
50	Gondwakdi (E)	Kopara, Pardi nakathi, Saykhed, Rohkhed, Yelabara, Vathbori, Belora, Sonkhas, Waki, Ramgaon, Pahur, Saykhed(Phu).	738.87	739	7860	7903
51	Gondwakdi (W)	Jodmoha, Yelabara, Ramwakadi, Dhanora, Akupuri, Dhaheli, Wakdhari, Sukali, MurZhadi,	141.35	141	5438	5347
52	Anjani	Dewanalah, Rudha,	38.42	38	1843	1838
53	Dongarkharda	Pothagawhan, Khorad, Dongarkharda,	966.82	967	2285	2196
54	Rajur	Rajura, Dhotra, Khadaki, Kelzhara, Lohara.	626.74	627	3881	4046
55	Durga	Pimpakhuta, Shiwani, Dhurg, Ghosa.	473.63	474	1573	1655
56	Dattapur	Dattapur, kalamb, Pardinakathi, Ghothi, Kawatha, Kairi.	359.71	360	3658	3501
57	Madkoana	Madkona, Karli, Belora, Ashtha, Murzhadi, Mendhala, Chaparda, Bhari, Shankarpur	980.53	981	8333	8323
58	Moha	Dorli, Moha, Pimpalgaon, Karadgaon, Zola,	460.96	461	3871	4191
59	Chausala	Kopara, Yavatmal, Kapara,	335.63	336	1595	1545
60	Chichbardi	Kitha, Chichbardi, Bhoyar, Ashti, Jamb, Kinhi,	410.54	411	2062	2097
61	Jambhulani	Uttarwadhona, Asola, Jambhudani,	960.67	961	2868	2688
62	Sonkhas	Sonkhas, Themburni,	494.67	495	851	817
63	LonWadi	Kolura, lonadi, Pimpalgaon,	206.58	207	1415	1523
64	Ghui	Ghui, Waraj, Kamandev, Borgaon	452.78	453	1940	1934
65	Jamb	Jamb, Kinhi,	90.29	90	1776	1903
66	Rajurwadi	Gondkinhi, Chapdoh, Kolambi, Karegaon, Pimpri,	1101.27	1101	3271	3205
67	Khorad (E0)	Pardi, Zola, Ghathana, Mhasola, Watkhed, Loni, Kharad(Phu)	191.61	192	3636	3585
68	Khorad (W)	Hiwari, Konzari, Kharola,	313.48	313	8139	8001

		Mozar, Bhamb, Chandabni (Naraku), Manpur, Chandapur, Chikani, Warud, Arjuna,				
69	Umri	Bechkheda, Salod, Saykheda, Barad, Jawada, Rui, Bori,	455.41	455	7528	7304
70	Pachwad	Pachwad, Jawadgaon, Aurangapur, Pimpalagaon,	227.99	228	1438	1505
71	Pathrod	Pathrot, Khalasa, Patrod (fu), Wadul, Banayat, Ujona, Nimba, Lingbori, Bhodhagwhan, Daryapur, Pimpri, Pandhurna, Sawada, Karmana, Sawangi, Wadgaon, Wogholi, Nimbala,	558.05	558	6639	6636
72	Bori (G)	Taroda, Sakur,	467.22	467	1395	1360
73	Satara	Jamb, Satara.	290.59	291	616	615
74	Dabhadi	Bramhanwada, Kinhi, Kakadadhara, Chandani, Umari, Tendholi, Jawala, Kouna, Kalgaon, Mhasola, Pangri, Dhabhadi,	224.27	224	11903	11888
75	Anjankhed (N)	Anjankheda, Kurha, Bhansara, Arni.	354.69	365	2586	2446
76	Anjankhed (S)	Anjankheda, Kawata, Shelu, Dhanora, Dhonwada.	416.58	417	2751	2676
77	Ghonsara	Kosdani, Bhosa, Manora, Ghonsara, Anboda, Tiwarang, Sakur, Hiwaleshwar (Phu) Malkapur.	1728.18	1728	7530	7231
78	Dehni (E)	Dehani, Dolamba, Chikhali, Shendursani, Pandhurna.	663.03	663	5098	5177

(5) As per the directions contained in Land Revenue Department Ex-Madhya Pradesh memorandum no.1290-1227-XXVIII dated 4th September 1953 sheep and goats were not allowed to graze in forests which was set aside for the production of timber or in the forest area, where villagers generally exercised their Nistar rights. As per the Govt. Resolution of Revenue and Forest Department dated, 6th December 1968, separate areas are to be assigned for sheep grazing and the subsequent Govt. Resolution no.MFP/1365/13211-Z/ dated 22nd Dec. 1971 clearly fixed the sheep grazing as equal to one unit and its grazing rate was reduced to Rs. 0.50 vide letter No. MFP/1372/134577-Z/ dated 16th Sept. 1972. Subsequently grazing fee for sheep grazing was waived off as per the G.R.No.MFP-2195/C.N.102/F-1/Dt.11.9.1995. Later on as per the Govt. Resolution dt. 23rd December 2003 Grazing Settlement Officer shall assign area for sheep grazing as per the provisions of grazing of

Bombay Forest Manual-III. In general the problem of sheep grazing arises during grazing season in this area. The traditional sheep rearers in this division demand for grazing of their sheep which is admissible as per the procedure. The area available in Yavatmal Forest Division for grazing is not sufficient to meet the grazing demand of cattle of this division. If these areas are assigned for sheep grazing, other cattle are not to be permitted to graze, which results in non-availability of grazing areas to milch and other cattle. Shri Pawar mentioned in his grazing settlement report that because of above reasons no area can be assigned to sheep grazing specially. In view of this he also studied about the possibility of availability of area of Revenue Department to earmark for sheep grazing. However the revenue area available is 7,836.47 ha only in 7 tehsils of this division and this area also has excessive cattle pressure for grazing. Therefore Shri Pawar has come to the conclusion that separate area cannot be assigned for sheep grazing.

(6) In the Govt. Resolution of 2nd August 1971, the permissible cattle units are fixed for each farmer, non-farmer and others on the same lines permissible cattle units for sheep should also be fixed by the Govt. as per the observations made by Shri Pawar. Shri Pawar observed that sheep from villages with no forests, also go to forests of adjoining villages and also far off villages. As the area for grazing is not sufficient for admissible cattle for grazing it is not possible to earmark separate area for sheep grazing.

(7) It is also observed that in Yavatmal Forest Division in the villages of Borgaon, Madhani, karalgaon etc. the Kathewadi people migrate to these areas along with their cattle and settled in those villages, further mounting the pressure for grazing in those areas and also asked for permission to graze their cattle in those areas. Considering availability of grazing area it is not possible to give grazing passes to such Kathewadi people and their cattle were also not recorded for issuing passes.

(8) As per the G.R. 3rd Nov. 1973 free passes or passes on concessional rates were to be given to admissible cattle to villagers. In this context Shri Pawar recommended that free passes should not be allowed to graze cattle and concessional rate based on present situation should be fixed for issuing grazing passes to villagers, as it is mentioned in National Forest Policy 1988.

20.8.3 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 Yavatmal 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 10 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 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, sheda, marvel shall be introduced in fodder improvement area as well as grazing units earmarked for grazing.

Section 20.9 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 are 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 CCF (Working Plan), Nagpur and one set will be sent to DCF, Yavatmal.

(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. Out of 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 Yavatmal Forest Division. Any alteration will be shown on the maps by DCF Yavatmal and furnish it to WPO.

(c) One uncut and un-mounted set of copy will be submitted to CCF (Working Plan), Nagpur. The master copy will be kept in the Working Plan Office, Yavatmal. 20 copies (cut and mounted) will be sent to Territorial Circle, division, sub-division, and all the range officers of Yavatmal Forest Division. Additional copies have to be prepared by the Territorial Divisional

surveyor for the use of field staff. DCF Yavatmal 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 CCF (Working Plan), Nagpur and one set will be sent to DCF Yavatmal.

(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 Yavatmal and another copy will be retained in the office of the working plan.

Section 20.10 Soil and moisture conservation measures:

To rejuvenate the soil conditions of the area of Yavatmal 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.

20.10.1 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 length, 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.

20.10.2 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. NOCCT shall be dug in area with slope of 25°. The total length of the trenches shall not be



Check dam - Comptt. no.10, Beat- Kosdani, Range– Ami

more than 1200 m length per ha. The trenches will be of 30 cm deep and 60 cm wide. 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.

Some of the designs of nala bunding are given in Appendix L(a) of volume II. The check dams may be cement bandhara. Wherever suitable 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.

Section 20.11 Forestry Extension:

The ever growing human and cattle population mount lot of biotic pressure on the forests of Yavatmal 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 alongwith 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 villages 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 20.12 Deviation of WP prescriptions:

20.12.1 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.

20.12.2 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.

20.12.3 Procedure for obtaining sanction for deviation as per the National Working Plan Code 2004:

The DCF Yavatmal 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 CCF (Working Plan), 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

20.13 Inspection of WP implementation:

The CCF (T), Yavatmal circle shall ensure all the prescriptions of working plan are scrupulously implemented by the DCF, Yavatmal. The work shall be inspected as under.

Chief Conservator of Forests (T), Yavatmal: 2%

Deputy Conservator of Forests, Yavatmal division: 5%

Asstt. Conservator of Forests: 20%

RFO/Forester/Forest Guard: 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 20.14 Saw mills:

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 80 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.
- (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, notwithstanding 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 who shall decide the appeal after giving opportunity for personal hearing. The decision of CCF shall be final. 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. 28.8.1991	Transfer and shifting of Sawmill license – 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.

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 20.15 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 one kilometer boundary from forests.

Section 20.16 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 20.17 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 20.18 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 within 2 km of radius from their habitation.

Section 20.19 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 20.20 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. The meteorological observations are necessary to calculate number of plants to be planted in a particular site as per the site requirement, temperature variation, rain fall etc.

Section 20.21 Buildings :

Yavatmal Forest Division was created in 1983 vide Government of Maharashtra No.FDM/1Bbo-F2/Dt.29th August 1983. Presently the office of DCF is accommodated in P.W.D. building situated in the campus of office of the Collector, Yavatmal. 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 20.22 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 20.23 Establishment and labourers:

The total area of the division is 84,604.22 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 20.24 Re-organisation:

The reorganization of East Yavatmal and West Yavatmal Division was effected in the year 1983 forming three divisions i.e. Yavatmal, Pusad and Pandharkawda. The Yavatmal Forest Division was carved out of East and West Yavatmal divisions having head quarters at Yavatmal with 7 ranges, 26 rounds and 108 beats. The average area of beat is 783 ha which may be beyond the control of the Forest Guard due to increasing population whose demands are for small timber, firewood and other forest produce. Such a situation leads to illicit felling, encroachment, illegal grazing etc. which may be beyond the capacity of the Forest Guard to control. Due to increase of population there has been a perpetual problem of protection of the forests, resulted in degradation of forest in and around thickly populated areas. There are 45 sawmills located in different parts of the division and many carpenter houses throughout the division consume teak timber either legally or illegally. There is huge gap between demand and supply of forest produce especially timber poles and fuel wood due to increasing population in the division and it resulted in protection related problems. In the light of above it is necessary to reorganise ranges, rounds and beats in the interest of forest protection, management and development. Hon'ble Bombay High Court, Nagpur Bench, gave directions to the Forest Department while delivering judgment in connection with writ petition no.1275/2002, to reorganise beats, round, ranges in the interest of forest protection. Accordingly the Govt. of Maharashtra issued a letter 15th November 2002 a committee was formed under the chairmanship of Shri Sarvesh Kumar to revise the norms of beats, rounds, ranges. Shri Sarvesh Kumar committee submitted its report on 8th May 2003, indicating the norms of beats, rounds, ranges depending upon the sensitivity from the point of forest protection. As per these norms, the extent of normal beat is 1000 ha area, sensitive beat is to the extent of 750 ha and the area of hyper sensitive beat is to the extent of 500 ha.

A) Before reorganization the number of ranges, rounds and beats is as follows.

Total number of Ranges : 7, these are (1) Yavatmal (2) Arni (3) Hiwari
(4) Ghatanji (5) Jodmoha (6) Ner (7) Darwha.

2. Total number of rounds: 26; Total number of beats: 108

Average area of Range: 12086.60 ha; Average area of Round: 3254.08 ha.

Average area of Beat: 783.39 ha.

B) After reorganisation the number of ranges, rounds, beats may be as given below.

Total number of Ranges: 9, these are (1) Yavatmal (2) Wadgaon (3) Hiwari

(4) Ghatanji (5) Jodmoha (6) Ner (7) Darwaha (8) North Arni (9) South Arni

Total number of rounds: 35; Total number of beats: 160

Average area of Range: 9400.69 ha; Average area of Round: 2417.32 ha.

Average area of Beat: 528.78 ha.

As per sensitivity the normal beat area is 450.94 ha, sensitive beat area is 556.84 ha and the hyper sensitive beat area is 573.49 ha. While proposing reorganisation the boundaries of the Division are changed at some places i.e. transfer of few areas of Pusad division to Yavatmal Division which requires the sanction of the Government. Therefore the proposal of reorganisation of Yavatmal Division has been submitted to Government and the sanction is awaited. The details regarding reorganisation of Yavatmal Forest division is given in table below.

Taluka-wise area before and after reorganization					
Before reorganization			After reorganization		
Range	Taluka	Area(Ha)	Range	Taluka	Area(Ha)
1	2	3	4	5	6
Yavatmal	Yavatmal	82,55.43	Yavatmal	Yavatmal	8,398.22
Jodmoha	Jodmoha	12,746.79	Wadgaon (Dhanora)	Kalamb/Yavatmal/Ghatanji	6,668.51
Hiwari	Yavatmal	14,659.27	Hiwari	Yavatmal/Hiwari	11,544.56
Ghatanji	Ghatanji	11,425.91	Ghatanji	Ghatanji	7974.77
Darwaha	Darwaha	10,795.43	Darwaha	Darwaha	12,833.23
Ner	Ner	10,823.24	Ner	Ner	6,485.83
Arni	Arni	15,900.15	North Arni	Arni/Darwaha	5,833.27
			South Arni	Arni/Darwaha	13,528.29
			Jodmoha	Jodmoha	11,197.22
Total		84,606.22			84,463.90

Section 20.25 Maintenance of land records :

The DCF Yavatmal 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.

Section 20.26 Encroachment:

Encroachment is a constant problem for forest protection. The Government of Maharashtra had taken decision in 1978 and 1979 to regularise 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 regularised. However some of the encroachments of that period remain without regularisation due to various reasons of non-availability of record, encroachments not pertaining to that period etc.

Section 20.27 Working Plan Note:

CCF (T), Yavatmal in consultation with DCF Yavatmal 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 CCF (Working Plan), Nagpur for revision and preparation of working plan of Yavatmal Forest Division.

Section 20.28 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.

20.28.1 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 proformae of the following forms is given in the Volume II of the plan.

(2) DCF Yavatmal 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.

20.28.2 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 LXIII of Volume II of Working Plan.

1. Form no.1: Compartment description written by Conservator of forests Working Plan, 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 in the necessary information and will send to the DCF, Yavatmal 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.

20.28.3 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 LXIV. Nursery registers will be maintained in Form no. 1 to 10 as given in the Volume II Appendix LXV Working Plan.

20.28.4 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 is given in the Volume - II Appendix LXVI .

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CHAPTER 21

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	61	67	108.14	33.00	6596.54	2211.00
2	31-45	65	50	726.20	214.50	47203.00	10725.00
3	46-60	57	33	1584.74	474.00	90330.18	15642.00
4	61-75	41	19	3248.46	975.00	133186.86	18525.00
5	76-90	27	14	5717.66	1716.00	154376.82	24024.00
6	91-105	11	8	9894.38	2667.30	108838.18	21338.40
7	106-120	5	6	14194.16	4256.70	70970.80	25540.20
8	121-135	2	3	16318.02	4886.18	32636.04	14658.54
9	136 & above	1	4	17818.02	5346.00	17818.02	21384.00
	Sub-total	270	204			661956.44	154048.14
	Grand Total (total value per ha)					816004.58	

The value per hectare = Rs 8,16,004

Total Value (Area x Value per hectare) = 44825.32 ha X 8,16,004

= Rs 3,65,776 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	30	66	108.14	33.00	3244.20	2178.00
2	31-45	19	19	726.20	214.50	13797.80	4075.50
3	46-60	13	6	1584.74	474.00	20601.62	2844.00
4	61-75	7	2	3248.46	975.00	22739.22	1950.00
5	76-90	5	1	5717.66	1716.00	28588.30	1716.00
6	91-105	2	0	9894.38	2667.30	19788.76	-
7	106-120	1	0	14194.16	4256.70	14194.16	-
8	121-135	1	0	16318.02	4886.18	16318.02	-
9	136 & above	0	0	17818.02	5346.00	-	-
	Sub-total	78	94			139272.08	12763.50
	Grand Total (value per ha.)					152035.58	

The value per hectare = Rs 1,52,035 area = 22326.05 ha.

Total value = 22,326.05 ha X 1,52,035

= Rs 33,943 lakhs

Capital value of forests under 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	69	100	108.14	33.00	7461.66	3300.00
2	31-45	55	62	726.20	214.50	39941.00	13299.00
3	46-60	40	29	1584.74	474.00	63389.60	13746.00
4	61-75	25	17	3248.46	975.00	81211.50	16575.00
5	76-90	13	11	5717.66	1716.00	74329.58	18876.00
6	91-105	5	7	9894.38	2667.30	49471.90	18671.10
7	106-120	2	4	14194.16	4256.70	28388.32	17026.80
8	121-135	1	3	16318.02	4886.18	16318.02	14658.54
9	136 & above	0	5	17818.02	5346.00	-	26730.00
	Sub-total	210	238			360511.58	142882.44
	Grand Total (value per ha.)					503394.02	

The value per hectare = Rs 5,03,394 Total area = 10,102.61 ha

Total Value = 10,102.61 ha X 5,03,394

= Rs 50,856 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	25	67	108.14	33.00	2703.50	2211.00
2	31-45	25	38	726.20	214.50	18155.00	8151.00
3	46-60	19	20	1584.74	474.00	30110.06	9480.00
4	61-75	13	11	3248.46	975.00	42229.98	10725.00
5	76-90	8	6	5717.66	1716.00	45741.28	10296.00
6	91-105	4	4	9894.38	2667.30	39577.52	10669.20
7	106-120	2	3	14194.16	4256.70	28388.32	12770.10
8	121-135	1	1	16318.02	4886.18	16318.02	4886.18
9	136 & above	-	2	17818.02	5346.00	-	10692.00
	Sub-total	97	152			223223.68	79880.48
	Grand Total (value per ha.)					303104.16	

The value per hectare = Rs 3,03,104, Area under FIWC : 22,326.05 ha

Total value = 22,326.05 ha X 3,03,104

= Rs 67,671.5 lakhs

Total capital value of the forest of Yavatmal Forest Division

Working Circle	Area ha.	Value of forests in Lac
SCI WC		3657.76
AWC		339.43
IWC		508.55
FIWC		676.71
Total		5182.46

The total forest area of Yavatmal Forest Division is 84,604.22 ha. The capital value of the forest estimated is Rs.5182.46 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 Yavatmal Forest Division. The extent of area density wise is given in the following table

Density wise area of Yavatmal Forest Division.

Density	Area in ha.
0.6 and above	3390.75
0.4 to 0.6	28790.94
0.1 to 0.4	21735.36
0.1 and below (blank)	30687.17
Total	84604.22

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	3083.80	9.20	28370.96
	0.4 to 0.6	23249.03	9.00	209241.27
Other WC (AWC, IWC, FIWC, MISC.)	0.6 & above	306.95	7.70	2363.51
	0.4 to 0.6	5541.91	7.13	39513.81
	0.1 to 0.4	21735.36	6.56	142583.96
	o.1 & below (blank)	30687.17	5.80	177985.58
	Total	84604.22		600059.09

The net present value (NPV) of forest of Yavatmal is Rs 6,00,059.09 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.

$$\text{Capital out-turn} = r/0.0p = \frac{42173988}{0.07} = 602485543$$

The total area covered under this plan is 84604.22 ha.

$$\text{Hence capital value per ha is : } \frac{602485543}{84604.22} = \text{Rs. 7121.22}$$

CHAPTER 22

Financial Forecast

Working plan for the Yavatmal 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.

22.1 : Expenditure

22.1.1 Expenditure on establishment :

To run the proper administration, an efficient administrative set up is required. It is recurring expenditure on the set up of organisation i.e. on salary and other benefits to officials and staff, maintenance of offices, vehicles, roads, buildings, machines, communications.

22.1.2 Expenditure on harvesting forest produces and other activities:

During the implementation of prescriptions of the draft report forest produce has 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. The expenditure would also be incurred on regeneration activities, fire protection, grazing control, soil & moisture conservation, wildlife protection & conservation, habitat improvement, subsidiary silvicultural operations etc.

22.1.3 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

Area in ha.	Area per year in ha.	Yield per year		Expenditure in rupees lakhs per year	
		Timber	Fire wood	Timber, Firewood	Total
26,332.8	1,316.64	4,325	1,300	80.19	80.19

(B) Regeneration

(i) Natural Regeneration:

Natural regeneration will be carried out in SCI WC, Afforestation WC, Improvement WC and Fodder Improvement WC.

Projection of Expenditure in Various WC

Sr. no.	Working Circles	Area in ha.	Area per year in ha.	Expenditure (rupees in lakhs (Rate @ 5 man days/ ha and @ 100.34/- per daily wage)	no. of man-days to be generated.
1	2	3	4	5	6
1	SCIWC	44,825.32	2,241.26	11.24	11,206
2	AWC	22,326.05	1,116.30	5.6	5,581
3	IWC	10,102.61	505.13	2.53	2,525
4	FIWC	7,350.24	367.51	1.84	1,837
	Total	84,604.22	4,230.20	21.21	21,149

(ii) Artificial Regeneration:

Artificial regeneration works are required in old teak plantations. The expenditure will be incurred as per the rate sanctioned by PCCF, MS.

S & MC Works & Plantation Under A.R. in SCI & IWC

Plantation work	Total area in ha.	Area available per year in ha.	Operation	Expenditure in rupees lakhs (daily wage rate 100.34/-)	no. of man-days to be generated.
1	2	3	4	5	6
Teak Plantation and others	20000	1000	PPO/PYO	83	82718
			FYO	127	126260
			SYO	61	61120
			TYO	28	27640
			4 th YO	15	15140
			5 th YO	30	30140
			Total	344	343018

(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

Plantation work	Total area in ha.	Area available per year in ha.	Operation	Expenditure in rupees lakhs. (daily wage rate 100.34/-)	No. of man-days to be generated.
1	2	3	4	5	6
Teak Plantation and other	24000	1200	PPO/PYO	161	16,0454
			FYO	131	13,0556
			SYO	73	72,753
			TYO	37	36,875
			4 TH YO	8	7,973
			5 TH YO	18	17,939
			Total	428	42,6,550

Year wise details of expenditure: Expenditure to be incurred during Plan period is summarized in following table.

Artificial Regeneration expenditure in SCI & IWC

Year	Artificial Regeneration expenditure in Rs lakhs						Total	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
2011-12	83	63	24	10	8	9	197	196332
2012-13	83	127	31	11	5	15	272	271078
2013-14	83	127	61	14	6	11	302	300976
2014-15	83	127	61	28	8	12	319	317919
2015-16	83	127	61	28	15	15	329	327885
2016-17	83	127	61	28	15	30	344	342834
2017-18	83	127	61	28	15	30	344	342834
2018-19	83	127	61	28	15	30	344	342834
2019-20	83	127	61	28	15	30	344	342834
2020-21	83	127	61	28	15	30	344	342834

SMC Works with artificial regeneration expenditure (AWC & FIWC)

Year	Artificial Regeneration expenditure in Rs. lakhs						Total	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
2011-12	161	22	12	1	1	3	200	199322
2012-13	161	131	12	6	0.5	1.5	312	310942
2013-14	161	131	73	6	1	1	373	371736
2014-15	161	131	73	37	1	3	406	404624
2015-16	161	131	73	37	8	3	413	411600
2016-17	161	131	73	37	8	18	428	426550
2017-18	161	131	73	37	8	18	428	426550
2018-19	161	131	73	37	8	18	428	426550
2019-20	161	131	73	37	8	18	428	426550
2020-21	161	131	73	37	8	18	428	426550

Total Expenditure in Rs lakhs

Year	Establishment	Boundary, fire, grazing	Timber	S & m work with A .R	N.R	artificial regeneration expenditure Rs lakhs	Total	No. of man-days to be generated
1	2	3	4	5	6	7	8	9
2011-12	800	40	80	200	21	197	1338	536176
2012-13	800	40	80	312	21	272	1525	722543
2013-14	800	40	80	373	21	302	1616	813234
2014-15	800	40	80	406	21	319	1666	863064
2015-16	800	40	80	413	21	329	1683	880006
2016-17	800	40	80	428	21	344	1713	909906
2017-18	800	40	80	428	21	344	1713	909906
2018-19	800	40	80	428	21	344	1713	909906
2019-20	800	40	80	428	21	344	1713	909906
2020-21	800	40	80	428	21	344	1713	909906

22.3 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	4325Cum	45000/Cmt	1946
2	Fuel Beats	1300 Beats	2500/beat	32
3	Poles	6000 Nos	250/pole	15
4	Tendu	20000 Std. bags	700 Rs /std. bag	140
5	Miscellaneous	--	Lump-Sum	12
	Total			2145

Section 22.4 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	2011-12	1946	32	15	140	12	2145	1338	536176
2	2012-13	2102	35	16	151	13	2317	1647	722543
3	2013-14	2270	37	17	163	14	2501	1885	813234
4	2014-15	2451	40	19	176	15	2701	2099	863064
5	2015-16	2647	44	20	190	16	2917	2289	880006
6	2016-17	2859	47	22	206	18	3152	2516	909906
7	2017-18	3088	51	24	222	19	3404	2718	909906
8	2018-19	3335	55	26	240	21	3677	2936	909906
9	2019-20	3602	59	28	259	22	3970	3171	909906
10	2020-21	3890	64	30	280	24	4288	3424	909906

Section 22.5 Expenditure on plan preparation:

Expenditure on Plan of Yavatmal 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 Yavatmal Forest Division was taken up in 2008-09 and simultaneously, revision of Akola Forest Division had been carried out since then. Office of the CCF (Working Plan), 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. 1,10,33,717/-
Working Plan Area.	-	84604.22 ha.
Per Unit Area Cost.	-	Rs. 130.41 / ha.

* **

CHAPTER 23

List of plants and wild animals occurring in Yavatmal Forest Division

Trees

<u>Local name</u>	<u>Botanical name</u>	<u>family</u>
Achar	Buchanania lanzan	Anacardiaceae
Ain	Terminalia tomentosa	Combretaceae
Ahl/Ahl/Bartondi	Morinda tinctoria	Rubiaceae
Amaltas/Bahawa	Cassia fistula	Caesalpiaceae
Amta	Bauhinia malabarica	Caesalpiaceae
Apta/Kachnar	Bauhinia racemosa	Caesalpiaceae
Anoxia/Aonla	Phyllanthus emblica	Euphorbiaceae
Arjuna/Kahu	Terminalia arjuna	Combretaceae
Babul	Acacia arabica	Mimoseae
Bakain / Baka Neem	Melia azedarach	Meliaceae
Beheda	Terminalia bellerica	Combretaceae
Bel	Aegle marmelos	Rutaceae
Bhirra	Chloroxylon swietenia	Rutaceae
Biba/Bhilawa	Semecarpus anacardium	Anacardiaceae
Bija	Pterocarpus marsupium	Fabaceae
Bistendu	Diospyros montana	Ebenaceae
Bor/Ber	Zizyphus mauritiana	Rhamnaceae
Chandan	Santalum album	Santalaceae
Chichwa	Albizia odoratissima	Mimoseae
Chinch	Tamarindus indica	Caesalpiaceae
Dahipalas	Cordia macleodii	Boraginaceae
Dhaman	Grewia kiliaefolia	Tiliaceae
Dhaora/Dhawada	Anogeissus latifolia	Combretaceae
Dhoban/Phausi	Dalbergia paniculata	Fabaceae
Ghoti/Ghota	Zizyphus xylopyra	Rhamnaceae
Haldu	Adina cordifolia	Rubiaceae
Hiwar	Acacia leucophloea	Mimoseae
Hirda/Harra	Terminalia chebula	Combretaceae
Jambhul/Jamun	Syzygium cumini	Myrtaceae
Kalam.Mundi	Mitragyna parvifolia	Rubiaceae
Karanj	Pongamia pinnata	Fabaceae
Karu(Cassia)	Cassia siamea	Caesalpiaceae
Khair	Acacia catechu	Mimoseae
Kusum	Schleichera oleosa	Sapindaceae
Kawat	Limonia acidissima	Rutaceae
Kulu	Sterculia urens	Sterculiaceae
Lendia/Lenda/Schena/Asah	Lagerstroemia parviflora	Lythraceae
Lokhandi	Ixora parviflora	Rubiaceae
Medsing	Dolichandrone falcata	Bignoniaceae
Mahua/Mahuwa	Madhuca latifolia	Sapotaceae
Mokha	Schrebera swietenoides	Oleaceae
Moyen/Mowai	Lannea grandis	Anacardiaceae
Neem/nim	Azadirachta indica	Meliaceae

Pipal	Ficus religiosa	Moraceae
Rohan	Soymida febrifuga	Meliaceae
Sag/Sagwan/Teak	Tectona grandis	Verbenaceae
Saja/Ain	Terminalia tomentosa	Combretaceae
Salai	Boswellia serrata	Burseraceae
Semal(Borgu)	Bombax malavaricum	Bombacaceae
Shiwan/Siwan	Gmelina arborea	Verbenaceae
Sirus(Black)	Albizzia odoratissima	Mimoseae
Sirus(White)	Albizzia procera	Mimoseae
Sisoo	Dalbergia latifolia	Fabaceae
Sitafal	Anona squamosa	Annonaceae
Tendu	Diospyros melanoxylon	Ebenaceae
Tiwas/Tinsa	Ougeinia oogeinensis	Fabaceae

Shrubs

<u>Local name</u>	<u>Botanical name</u>	<u>family</u>
Bharati	Gymnosporia montana	Celastraceae
Chillari	Mimosa rubicaulis	Leguminosae
Chillati	Caesalpineac spiaria	Leguminosae
Dudhi/Kalakuda	Wrightia tinctoria	Apocynaceae
Dhayati	Woodfordia floribunda	Lythraceae
Kari Korando	Carissa spinarium	Apocynaceae
Karat	Barleria prionitis	Acanthaceae
Kuda, Indrajav	Holarrhena antidysenterica	Apocynaceae
Muradsheng/Marorphal	Helicteres isora	Sterculiaceae
Nirgudi	Vitex negundo	Verbenaceae
Sindhi/Chhindi	Phoenix sylvestris	palmae
Tarwad	Cassia auriculata	Leguminosae
Waghoti	Capparis horrida	Bixaceae
Zingrool/Pharsa	Grewia orbiculata	Tiliaceae

Herbs

<u>Local name</u>	<u>Botanical name</u>	<u>family</u>
Divali	Tephrosia hamiltonii	Fabaceae
Gajargawat	Parthenium hysterophoru	Asteraceae
Gokhru	Tribulus terrestris	putaceae
Hamata	Stylosanthes hamata	Caesalpinaceae
Pivla Dhotra	Argemone mexicana	Papaveraceae
Pivili Tilwan	Cleome viscosa	Cleomaceae
Rantulsi/Bantulsi	Hyptis suaveolens	Lamiaceae
Rantur	Atylosia scarabaeoides	Leguminosae
Scabra	Stylosanthes scabra	Caesalpinaceae
Tarota	Cassia tora	Leguminosae

D. Grass and bamboo

<u>Local name</u>	<u>Botanical name</u>	<u>family</u>
Bans/Bamboo	Dendrocalamus strictus	Poaceae(Gramineae)
Bhurbhusi	Eragrostis tenella	Poaceae
Duswa/Haryalli/Doob	Cynodon dactylon	Poaceae
Dongri Gavat	Chrysopogon montana	Poaceae
Guhar, Marwel	Andropogon annulatus	Poaceae
Kans	Saccharum spontaneum	Poaceae
Khas	Vetiveria zizanioides	Poaceae
Kodmor	Apluda varia	Poaceae
Kunda	Ischaemum pilosum	Poaceae
Kusal	Heteropogon contortus	Poaceae
Mushan	Iseilema laxum	Poaceae
Paonia	Sehima sulcatum	Poaceae
Sabai Or Sum	Ischaemum angustifolium	Poaceae
Sheda	Schima nervosum	Poaceae
Tikhadi/Rusa/Rosha	Cymbopogon martini	Poaceae

E. Climbers

<u>Local name</u>	<u>Botanical name</u>	<u>family</u>
Bhuikand/Baichend	Dioscorea daemona	Dioscoreaceae
Chilati	Acacia pennata	Mimoseae
Eruni	Zizyphus oenoplia	Rhamnaceae
Gunchi/Gunj	Abrus precatorius	Papilionaceae
Khajkuri	Mucuna pruriens	Fabaceae
Mahulbel/Mahul	Bauhinia vahlli	Caesalpiniaceae
Palasvel	Butea superba	Fabaceae
Piwarvel	Combretum ovalifolium	Combretaceae
Shatova/Satawari	Asparagus racemosus	Liliaceae
Kawavel,Dudhi(Nagvel)	Cryptolepis buchanani	Asclepiadaceae

Common and zoological names of wild animals and birds

(1) Wild Animals

<u>Common name</u>	<u>Scientific Name</u>
Panther/Bibta (M) /	Panthera pardus
Striped Hyena/ Taras (M) /	Hyaena hyaena
Jackal	Canis aureus
Indian Fox	Vulpes bengalensis
Wolf	Canis lupus pallipes
Jungle Cat	Felis chaus
Black Buck	Antelope cervicapra
Chital	Axis axis
Nilgai	Boselaphus tragocamelus
Wild Boar	Sus scrofa
Sloth Bear	Melursus ursinus
Common Langur	Presbytis entellus
Porcupine	Hystrix indica
Hare	Lepus nigricollis
Chinkara	Gazella gazella benetti
Barking Deer	Muntiacus muntjak
Sambar	Cervus unicolor
Chousinga	Tetra ceros quadricornis
Wild dog	Cuon Alpinus

(2) Wild Birds

<u>Common name</u>	<u>Scientific Name</u>
Pond Heron Or Paddy Bird	Ardeola grayii
Cattle Egret	Bubulcus ibis
White Breasted Waterhen	Amaurornis phoenicurus
Grey Partridge	Francolinus pondicerianus
Jungle Bush Quail	Perdica asiatica
Yellow Wattled Lapwing	Vanellus malabaricus
Rose Ringed Parakeet	Psittacula krameri
Blosson Headed Parakeet	Psittacula cyanocephala
Alexandrine Parakeet	Psittacula eupatria
Koel	Eudynamis scolopacea
Crow Pheasant (Coucal)	Centropus sinensis
Spotted Owlet	Athene brama
Common Indian Night Jar	Caprimulgus asiaticus
White Breasted Kingfisher	Halcyon smyrnensis
Common Kingfisher	Alcedo atthis
Green Bee Eater	Merops orientalis
Hoopoe	Upupa epops
Indian Roller	Coracias bengalensis
Golden Backed Wood Pecker	Dinopium benghalense
Rufous Backed Shrike	Lanius schack

Golden Oriole
Black Drongo
Brahminy Myna
Common Myna
House Crow
Jungle Crow
Small Minivet
Common Iora
Red Vented Bulbul
Common Babbler
White Throated Fantail
Paradise Flycatcher
Magpie Robin
Indian Robin
Gray Wagtail
Pied Or White Wagtail
Grey Tit
Purple Sunbird
House Sparrow

Oriolus riolus
Dicrurus adsimilis
Sturnus pagodarum
Acridotheres tristis
Corvus splendens
Corvus macorthynchos
Pericrocotus cinnamomeus
Aegithina tiphia
Pycnonotus cafer
Turdoides caudatus
Rhipidura albicollis
Terpsiphone paradisi
Copsychus saularis
Saxicoloides fulicata
Motacilla cinerea
Motacilla alba
Parus mauor
Nectarinia asiatica
Passer domesticu

Endangered Wildlife

Panther
Sloth Bear
Peacock

Panthera pardus
Melursus ursinus
Pavo cristatus

(7)

20th March to 21st April 2008
6 MAY 2008
491
6/5/08

**OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS,
 MAHARASHTRA STATE, NAGPUR.**

Ms.D-14/WP/CR.369(C)/02/08-09.
 Nagpur 440 001, Dated: 28/04/2008

To,
 The Chief Conservator of Forests (T)
 Nagpur / Amravati / Yavatmal / Dhule.

The Conservator of Forests (T)
 Kolhapur

The Conservator of Forests,
 Working Plans Division,
 Nagpur / Amravati / Yavatmal / Kolhapur / Dhule.

Sub:- Minutes of the State Level Committed meeting held on
 27th March, 2008 for approval of Working Plans.

A copy of the minutes of the State Level Committee meeting held on 27th March, 2008 at Vansabhagruha, Nagpur for approval of Draft Working Plan Reports of Jalgaon, Kolhapur and West Melghat and 2nd PWPR of Bhandara and Akola and 1st PWPR of Satara and Yavatmal Forest Divisions, duly approved by the Principal Chief Conservator of Forests, M.S., Nagpur is enclosed here with for information and necessary action.

Incorporating the suggestions / modifications suggested by the Committee, the revised draft plan should be submitted to this office within 15 days for further submission to GOM.

Encl.-As above.

W.S.
 Addl. Principal Chief Conservator of Forests
 (Production and Management),
 Maharashtra State, Nagpur.

Copy alongwith enclosure submitted with compliments to:

1. The Principal Chief Conservator of Forests, M.S., Nagpur
2. The Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur
3. Addl. Principal Chief Conservator of Forests (B.P.&D.), / (H.R.D.), M.S. Nagpur

Copy alongwith enclosure forwarded with compliments to:

1. Chief Conservator of Forests (Central), Regional Office,
 Western Region, Bhopal,
2. Chief Conservator of Forests (Conservation), M.S., Nagpur
3. Chief Conservator of Forests (PT&SP), M.S., Nagpur
4. Chief Conservator of Forests (Protection) M.S., Nagpur
5. Chief Conservator of Forests (Working Plans), Nagpur / Pune
6. Collector, Yavatmal / Jalgaon / Amravati / Nagpur / Bhandara / Kolhapur / Akola

Copy alongwith enclosure forwarded to:

1. Dy. Conservator of Forests, Jalgaon / Kolhapur / West Melghat / Yavatmal / Akola / Bhandara / Satara.

Minutes

**Minutes of the State Level Committee meeting held on
27th March, 2008 at Nagpur.**

Meeting of the State Level Committee on working plans was held at 'Van Sabhagruh' on 27th March, 2008 at 10.00 A.M. under the chairmanship of Shri Jwala Prasad, P. C. C. F. Maharashtra State. Apart from Dr. B. N. Mohanty, C. C. F. (Central), Bhopal (MOEF Representative.), others present in the meeting included the following.

- 1) Shri B. Majumdar, P.C.C.F. (W.L.), M. S. Nagpur.
- 2) Shri A. K. Joshi, A.P.C.C.F. (P. & M.), M. S. Nagpur
- 3) Shri C. S. Joshi, A.P.C.C.F. (HRM), M. S. Nagpur
- 4) Shri Tasneem Ahmad, C.C.F. (Conservation), M. S. Nagpur.
- 5) Shri R.R. Sahay, C.C.F. (PT&SP), M. S. Nagpur.
- 6) Shri Ashok Sharma, C.C.F. (W.P.), Nagpur.
- 7) Dr. A. D. Shejale, C.C.F. (W.P.), Pune.
- 8) Shri A. K. Nigam, C.C.F. (T), Dhule.
- 9) Shri Ramanuj Choudhary, C.C.F. (T), Yavatmal.
- 10) Shri S. D. Sontakke, C.C.F. (T), Amravati.
- 11) Shri S. W. H. Naqvi, C.C.F. (T), Nagpur.
- 12) Shri A. V. Ashtekar, C.F. (T), Kolhapur.
- 13) Shri T. S. K. Reddy, C.F. W.P. Dn. Dhule.
- 14) Shri Sai Prakash, C.F. W.P. Dn. Aurangabad.
- 15) Shri Vikas Gupta, C.F. W.P. Dn. Kolhapur.
- 16) Shri V. R. Tiwari, C.F. W.P. Dn. Amravati.
- 17) Shri F. S. Jafry, C.F. W.P. Dn. Nagpur.
- 18) Shri G. R. K. Rao, C.F. W.P. Dn. Yavatmal.
- 19) Shri P. N. Bhamre, Dy. C.F. Forest Dn. Jalgaon.
- 20) Shri G. T. Chawhan, Dy. C.F. Forest Dn. Kolhapur.
- 21) Ms. Joyoti Benerjee, Dy. C.F. Forest Dn. West Melghat .

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- 22) Shri T. N. Salunke, Dy. C.F. Forest Dn. Akola.
- 23) Shri R. K. Pole, Dy. C.F. Forest Dn. Yavatmal.
- 24) Shri B. S. Thakre, Dy. C.F. Forest Dn. Bhandara.
- 25) Shri G. S. Balki, DFO, (Vigilance), Yavatmal.

At the outset, Shri A. K. Joshi, Addl. P.C.C.F. (P. & M.) extended a hearty welcome to all the officers present and requested Shri Jwala Prasad, P. C. C. F. (M.S.) to chair the meeting. The P.C.C.F. (M. S.), in his opening remarks and, subsequently, during the course of discussions, made the following **general observations**.

- Even though, the rank of WPO's had been raised to the level of Conservators of Forests, their functions remained essentially the same. Hence they should concentrate on timely completion of working plan revisions rather than keep demanding better amenities like cars, which were hardly useful for travel on forest roads.
- Girth, height and survival percentage of all the existing plantations should be recorded as an integral part of field data collection, while preparing the working plan.
- JFM plans must make a distinction between the degraded and non degraded forests. While implementing the micro plans, there is no harm in advancing the regeneration operations, even though such a measure means deviation from the approved working plan. However, the regeneration should be in conformity with the prescriptions of working plan.
- There is a need to ensure preparation of detailed inventory of NTFFP while conducting field surveys for revision of the working plan as such a measure will help access their economic worth and enable formulation of better conservation strategies. Such inventories should if possible can also be made through JFMCS.

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- There is a need to incorporate measures to preserve biological diversity of natural forests.
- There is a need to ensure that adequate prescriptions for wildlife protection / conservation, are laid down in the Wildlife (O.L.) W.C. for forests close to the Protected Area.
- Compartment nos. should not be changed.
- The regeneration survey should include seedlings / saplings of seed origin only. Coppice growth should be ignored while assessing the status of regeneration. Detailed instructions for identification of coppice growth, should be incorporated in the working plan.
- The decision to reduce the period of revision of working plan to 10 years needs to be reconsidered by the Government of India. The earlier practice of 20 years duration is more appropriate.
- There is also a need for the Government of India to reconsider the decision regarding the ban on "Clear felling". For many forest areas, where natural regeneration by seedlings is inadequate or absent, uniform system based on artificial regeneration is the only way to ensure crop improvement.
- There is a need to organize repeated training sessions to ensure that the prescriptions are well understood by the field staff. The summary of prescriptions should be provided to the field staff in Marathi.
- The Working Plan officers should ensure that only the All India site quality classes are used for preparing the plans.
- The system of maintaining " Divisional Note Book", "Compartment History" and "Control Forms" needs to be revived through awareness, education and training.
- The Territorial C.C.F. / C.F. must furnish his detailed analysis of the

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effects of treatments prescribed in the earlier working plan while preparing PWPR I and based on that suggest whether present prescriptions be continued or modified.

- The Working Plans should ensure that the impact of past working has been analyzed in details and the prescriptions are laid down on the basis of sound reasoning.

The C. C. F. (Central) in his reaction to the above observation made the following remarks.

- Clear felling had been baned by the Government of India since 2002. As of how, the issue of " Critical girth formula" incorporated in the plans prepared by the FDCM was still being debated and hence undecided. Therefore, clear felling followed by artificial generation should not be incorporated in the working plans for now.
- The Government of India has consciously permitted the felling of arrear coupe Nos I, II & VII of Bhandara as the same could not be worked in time due to lack of resources.
- 'Commercial felling' meant silvicultural operations involving felling. Because these can generate revenue, these have been called "Commercial".

The committee discussed the issue of changes made in the Working Circles, approved during PWPR / II PWPR earlier. It was generally agreed that each changes could be done as an exception and must be supported with valid reasons.

The PCCF (M.S.), then directed the Working Plan Officers to start presentation, as per schedule.

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The research for studying the effect of annual harvesting on production and regeneration of bamboo and establishment of Silt Monitoring Stations was approved by the committee.

The Committee approved the Draft Plan of West Melghat Division subject to the incorporation of above mentioned changes.

II Preliminary Working Plan Report of Akola Forest Division

Shri G.R.K. Rao, Conservator of Forest (W.P.), Yavatmal made power point presentation of the II PWPR of Akola Forest Division. At the outset, he informed that the Working Plan for Akola Forest Division would expire in March, 2009. He further informed that the II PWPR had been approved by State Level Committee on 27th March, 2008. After presentation, following comments were made by the committee members.

Shri C.S. Joshi, Addl. Principal Chief Conservator of Forests (HRD) pointed out that in the on going Thengdi's plan, the reasons for not carrying out works as per the prescriptions in the afforestation, Fodder and Babubun Working Circles should be examined and analyzed by the CCF (T) Yavatmal.

Selection Cum Improvement Working Circle

- Shri Jwala Prasad PCCF, M.S. suggested that soil conditions and site suitability studies be conducted before taking up teak and other plantations in view of the need for gradual replacement of coppice crop of teak in Akola Forest Division.
- Shri Tasneem Ahmed, CCF (Conservation) suggested that site quality and suitability for the area to take up plantation should be taken as criterion for raising teak and other plantations.

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- Shri Jwala Prasad, PCCF, M.S., suggested that the proposed Selection cum Improvement system should be continued and some of the areas be identified for research with a view to study the suitability of sites to take up teak and other plantations. He also suggested the constitution of a separate Research Working Circle for such areas.
- Shri Ramanuj Choudhary, CCF (T), Yavatmal suggested that separate stem analyses be carried out for teak of coppice and seed origins.

Afforestation Working Circle

- The PCCF and other committee members opined that the area included in Afforestation Working Circle be verified and sample enumeration be once again carried out in this Working Circle.

Catchment Area Treatment Working Circle

- Shri Jwala Prasad, PCCF, M.S. pointed out that the enumeration data should be checked up. Shri Ashok Sharma, CCF (W.P.), Nagpur stressed on the need for analysis of enumeration data by the Forest Statistician.
- Shri R.R. Sahai, CCF (PT & SP) pointed out that seed dribbling should not be taken up in Catchment Area Treatment Working Circle. Hence it was agreed to exclude the prescription from the PWPR.

Babul Working Circle

- The Committee members opined that the prescription regarding 60 cms. GBH as the harvestable girth, needed to be reconsidered.
- Shri Jwala Prasad, PCCF, M.S. suggested that prescriptions should incorporate provision for the utilization of Babul pods (Food) as NTIP for local people.

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Fodder Working Circle

- Shri C.S. Joshi, APCCF (HRM) suggested that enumeration data should be verified.
- Shri Ramanuj Choudhary, CCF (T.), Yavatmal recommended that broadcasting of seeds should be deleted. The committee agreed with the recommendation.

Non Timber Forest Produce (Over lapping) Working Circle

- Shri Ramanuj Choudhary, CCF (T.), Yavatmal pointed out that the prescriptions "all climbers shall be cut except those NTFP value", should be deleted and suggested that specific names of climbers to be retained be given.
- The PCCF and other committee members pointed out that, in the draft plan, the areas should be re allotted based on suggestions given in the meeting after verifying the enumeration data and site suitability.
- Shri Jwala Prasad, PCCF, M.S. recommended that Research Working Circle be formed and an area of 100 ha. be allotted to the same for felling and plantation purposes in order to study replacement of the existing coppice crop with teak and other plantations.

Wildlife (Overlapping), Working Circle

- Shri Ramanuj Choudhary CCF (T.), Yavatmal pointed out that the status of Wildlife had not been incorporated in the Plan and suggested that the same be provided in the draft plan.
- Dr. B. N. Mohanty, CCF (Central), Bhopal recommended that specific instructions of the PCCF (W.L.) should be incorporated in the Wildlife (Overlapping) W.C. in the draft plan.

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- Shri Ramanuj Choudhary, CCF (T), Yavatmal recommended that prescriptions for habitat improvement should be introduced in the Wildlife (Overlapping) W.C. ✓

Forest Protection (Over Lapping) Working Circle

- The PCCF and other committee members suggested that, based on supporting data the following provisions should be included.
 - Provision for protection squad. ✓
 - Fire protection plan. ✓

The above suggestion were unanimously approved.

- Dr. B. N. Mohanty, CCF (Central), Bhopal suggested that although, the Working Circles of Joint Forest Management (Overlapping) Working Circle, Wildlife Conservation (Overlapping) Working Circle, Forest Protection (Overlapping) Working Circle and Non Wood Forest Produce (Overlapping) Working Circle were mandatory as per the National Working Plan Code 2004, all except the NTFP (Overlapping) Working Circle be incorporated as separate Chapters in the draft Working Plan. ✓

The draft II PWPR of Akola Forest Division was approved by the Committee subject to the above suggestions / recommendations.

II Preliminary Working Plan Report of Bhandara Forest Division

The PWPR-II of Bhandara Forest Division was presented by Dr. F.S. Jafry, Conservator of Forests, Working Plan, Nagpur. The following observations / suggestions / recommendations were made.

Minutes

The P.C.C.F. M. S. also suggested that protection measures such as site specific details of the establishment and strengthening of check nakas, be provided in the draft. The Conservator of Forest, Kolhapur concluded the presentation with assurance to comply with the suggestions made by the Committee members.

Subject to the incorporation of the above modifications / recommendations in II PWPR, the Committee approved the First PWPR of Satara Forest Division.

First PWPR of Yavatmal Forest Division

The First PWPR of Yavatmal Forest Division was presented before the Committee by Shri Ramanuj Choudhary, Chief Conservator of Forests (T), Yavatmal.

The proposals mentioned in the presentation were approved by the Committee with following suggestions / modifications / instructions:

- PCCF, M.S. suggested that the exploitation girth proposed in previous plan should be reduced. The Chief Conservator of Forests (T), Yavatmal suggested that stem analysis of coppice and seed origin crops should be done separately and the exploitable girth may be suggested accordingly.

The suggestion was accepted by the Committee.

- The APCCF (HRD & A), Shri C. S. Joshi suggested that, details of plantations taken up under Afforestation Working Circle / Fodder Working Circle, along with the list of successful plantations should be given in Part-I. It was unanimously agreed.

Minutes

- The APCCF (HRD & A) also opined reasons for not carrying out the works and operations as per provisions of Working Plan should also be clearly mentioned and analyzed.
- Shri C. S. Joshi, APCCF (HRD & Administration) also suggested that percentage wise details of the species felled during coupe working should also be given.
- The PCCF, M.S. as well as APCCF (HRD & Administration) suggested that the Bamboo (Overlapping) W.C. should be either named as Bamboo Plantation Working Circle or merged with Afforestation Working Circle. The Chief Conservator of Forests (T), Yavatmal pleaded that, special areas were needed to be selected as per the target given under Bamboo mission and hence new Working Circle had been suggested. **The suggestion was accepted.**
- APCCF (HRD &Administration) Shri. C. S. Joshi suggested that teak plantations should be only taken up in the suitable sites were suitable. Otherwise, it would be better to take up plantation of non-teak species. He also suggested that details of illicit cutting & plantation taken up should be given at the appropriate place.

The PCCF M.S. asked the Chief Conservator of Forests (T), Yavatmal to clarify his suggestion made in the PWPR I, as to which data was required to be collected by the Conservator of Forests, Working Plan for completing the PWPR-II. The CCF (T) Yavatmal suggested collecting the following data.

- Stem/Stump analysis of adequate no. of trees of Coppice & seed origin crop -should be carried out separately and exploitation girth for different crops be suggested suitably to take care of hollowness and unproductiveness of over standing crop.

Minutes

- Detailed stock mapping of the area should be carried and analysis done to find out the areas suitable for plantations especially for teak, sandalwood and bamboo.
- Protection measures for prevention of illicit cutting of teak / sandalwood should be given and the same be linked appropriately with joint forest management activities. Use of arms by forest staff and provision for development of administrative infrastructure structure like check nakas, protection huts and reorganization of beats / rounds.
- The prescription for marking and felling in Selection Cum Improvement Circle as well as other Working Circles be spelled out clearly so that field staff may easily understand and work on the same without going into the details of theoretical predictions.
- The detailed survey of medicinal plant and forest trees used by the tribals be carried out and results listed in draft plan.
- Habitat development measures like development of water resources, grassland development and shelter tree plantation be given for wild life conservation in the area. The measures to curtail the problem of crop destruction by wild animals should also be suggested as far as possible.
- The area proposed for taking over from Revenue Department also be incorporated in the proposed plan but shown distinctly.
- Sites suitable for ecotourism should also be suggested by working plan officer, and measures suggested for improvement.
- The provision for replacement of the poor coppice origin crop in SCI and IWC of present working plan through canopy removal should be considered carefully and introduction of teak / silviculturally suitable miscellaneous species' plantations in suitable sites should be recommended wherever possible through canopy removal.

3 FEB 2011

**OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS,
(HoFF) MAHARASHTRA STATE, NAGPUR**

No.D-14/WP/CR.10/(10-11)/136/10-11
Nagpur-440 001, Dated 7th February 2011.

To,
Chief Conservator of Forests (T)
Nagpur/Yeotmal/Thane/Amravati/Pune.

To,
Conservator of Forests (T)
Kolhapur/Chandrapur/Gadchiroli

To,
Conservator of Forests,
Working Plans Division,
(All) *yeotmal* ✓

Sub :- Minutes of the State Level Committed meeting held on 28th January 2011 for approval of Second PWPR & First PWPR.

The duly approved minutes of the State Level Committee meeting for approval of Draft Working documents held on 28th January 2011 at Varsabhagruha, Nagpur is enclosed for information and necessary action. The revised DWR & modified PWPR-I after incorporating the suggestions/modifications suggested by the Committee should be submitted within a month for further necessary action.

Encl :- As above

8/2/11

In Word No.	876
Date	8/2/11
Section	2/3

Draft approved by P.C.C.F. (HoFF) M.S., Nagpur

JAC
For, Principal Chief Conservator of Forests, (HoFF)
Maharashtra State, Nagpur.

Copy along with enclosure with compliments to :-

1. Principal Chief Conservator of Forests, (Wildlife) M.S., Nagpur.

Copy along with enclosure forwarded to :-

1. Additional Principal Chief Conservator of Forests (P & M), M.S., Nagpur.
2. Additional Principal Chief Conservator of Forests (BP & D), M.S., Nagpur.

3. Additional Principal Chief Conservator of Forests (HRM & A), M.S., Nagpur.
4. Chief Conservator of Forests (Central), Regional Office, Western Region, Bhopal.
5. Chief conservator of Forests (Conservation), M.S., Nagpur.
6. Chief Conservator of Forests (PT & SP) M.S., Nagpur.
7. Chief Conservator of Forests (Protection), M.S., Nagpur.
8. Chief Conservator of Forests, Working Plan Circle, Nagpur/Pune.
9. Collector, Gondia, Thane, Pune, ~~Sejapur~~, Chandrapur, Gadchiroli, Yeotmal, Sawantwadi.

Copy along with enclosure forwarded to :-

1. Dy. Conservator of Forests, Wadsa, Yeotmal, Amrawati, Roha, Shahpur, Sawantwadi, Gondia, Pandrakawada, Chandrapur.
2. Sub Divisional Forest Officer (Territorial) Bhor.

Draft approved by PCCF (HoFF), M.S., Nagpur

For, Principal Chief Conservator of Forests, (HoFF)
Maharashtra State, Nagpur.

**Minutes of the Meeting of the State Level Committee for the State of
Maharashtra held on 28th January, 2011 for approval First and Second
Preliminary Working Plan Reports.**

Government of Maharashtra vide G.R. NO.MSC 2004/ CR.102 /1-2, Dated 25th June 2004 had constituted a State Level Committee for approval of Second Preliminary Working Plan Reports and First Preliminary Working Plan Reports of various Forest Divisions of Forest Department in Maharashtra before its submission to Government of India for approval. The meeting of the said committee was held at 'Van Sabhagruh', Nagpur on 28th January, 2011 under the chairmanship of Shri A.K.Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur. During the meeting Shri D.C.Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur, Dr. S.K.Khetrapal, APCCF(Production & Management), M.S., Nagpur, Shri P.J.Thosre, APCCF (HRM & A), M.S., Nagpur, Shri A.K. Rana, CCF (Central) Bhopal (Representative of MOEF) & other concerned officers were also present. The list of participants is enclosed.

2.00 Shri T.K.Choubey, Chief Conservator of Forests, Working Plan Circle, Nagpur welcomed all the dignitaries and officials attending the meeting and requested Shri A.K.Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur and Chairman of the Committee to start the proceedings of the meeting.

3.00 Dr. S.K. Khetrapal, APCCF(Production & Management M.S., Nagpur briefly introduced the meeting's agenda & informed that Two Second Preliminary Working Plan Reports and Eight First Preliminary Working Plan Reports will be placed before the committee for approval. Thereafter, he has briefly informed the status of approved working plans in the state & role of SOFR units in working plan division. He also informed that presently three SOFR units are working in Maharashtra & on an average 15 Divisions will become due for enumeration by SOFR units at the beginning of 2011-12. Thereafter during the year 2012-13, 2013-14 & 2014-15, 15 Divisions will be due for enumeration by SOFR units. Looking into the target of enumeration works to be done during the next five years in various Divisions/ Sub-divisions, these three S.O.F.R. units will be insufficient. Therefore three extra units of SOFR have been proposed as per the recommendation of 13th Finance commission. He also informed the committee that it has been observed in the review meeting of the various activities as per approved working plan that there is huge difference in estimated yield given in the approved working plan & yield reported by Dy. Conservator of Forests of some Divisions. He has emphasized on ground truthing of enumeration data by territorial division. He also informed that as per National Working Plan Code 2004, the

period of Working Plan has been reduced to 10 years from 20 years. Besides this, many additional works like socio-economic survey, NTFP survey and detailed information and chapters on NTFP, Wildlife management, JFM, Forest Protection etc. are also prescribed in the NWPC 2004. He urged that GIS & GPS technologies and satellite imagery be used more & more for assessment & management of Forest Resources and preparation of working plan maps. He also emphasized that Coupe Control Forms & Compartment History Forms duly filled in in all respect are essential. Those forms necessary to analyze the response to prescriptions of current working plan. He asked all CCF(T)/ CF(T) to expedite the completion of these forms. These should be kept ready at the time of presentation of First PWPR before the State Level Committee. Thereafter, He requested Shri A.K.Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur and Chairman of the Committee to start the proceedings of the meeting.

4.00 Shri A.K.Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur and Chairman of the Committee had deliberated that it is the necessary to assess the dependence of villagers on the forests for their livelihood needs. This is also important in the context of preparation of the micro-plan for Joint Forest Management. He also deliberated that field works like socio-economic survey, NTFP survey and detailed information and chapters on NTFP, Wildlife management, JFM, Protection etc. are should be included after careful analysis of these aspects in the working plans. Available information on socio-economic status of the people living in and around forests should be collected and analyzed to bring forth the importance of forest product and forestry operation for the people and to formulate suitable management strategies to improve their socio economic status particularly that of tribal and economically backward communities. He has informed that the status report along with their latest survival percentage of all old plantations taken up in the respective forest divisions should be included in the First PWPR & it should be kept ready at the time of presentation of the First PWPR during meeting SLC meeting in future. Data collected in respect of various NTFPs found in the Division should be incorporated in First PWPR. He emphasized to maintain the state of boundaries, kinds of threats, erecting boundary pillars etc. & it should be incorporated in the working plans. Climbers and other species included in Red Data Book of BSI and IUCN Red Data Book should not be sacrificed due to ignorance during forestry operations. General assessment of plantations undertaken during the previous plan periods, survival percent, growth, protection etc. under Afforestation Working Circle should be incorporated in working plans. Analysis of implementation of JFM programme, grading of JFMC, award winning JFMC, women's participation etc. should be incorporated in working plans. Priority should be given to fruit and NTFP species in plantations in JFM areas. He also told that the location of water

holes, suitable habitat for wild animals, measures needed to conserve and improve the same, and anything specific and beneficial to wildlife should be included in the First PWPR. He has informed that the areas of various forest divisions adjacent to national Parks & Sanctuaries shall be managed by concerned Dy. Conservator of Forests, in consonance with objectives & management prescriptions of the Management plan respective PAs in vogue from time to time. Prescriptions in Wild Life Management (OL) Circle should be vetted by CWLW of the State. He deliberated in the meeting that the use of Remote Sensing (RS) has become an important tool in the Forest Resource assessment and management. GIS and GPS have further added to these capabilities.

The Chairman then requested the Conservator of Forest, Working Plan Division, Gadchiroli to present the Second PWPR of Wadsa Forest Division.

WADSA FOREST DIVISION

SECOND PWPR

5.00 Shri S.P. Thakre, Conservator of Forests, Working Plan Division, Gadchiroli made power point presentation of Second PWPR of Wadsa Forest Division before the committee. During deliberations of committee following points were discussed and suggestions were made by the committee members.

1. Shri Tasneem Ahmad, Chief Conservator of Forests (Protection) raised objection on stem analysis & CAI-MAI graph & suggested that it has to be re-examined. Dr. S.K. Khetrapal, APCCF (P & M), M.S., Nagpur informed Conservator of Forest, Working Plan Division, Gadchiroli to modify these data & CAI-MAI curve & it will be verified by Chief Conservator of Forests, Working Plan, Nagpur.
2. Shri Tasneem Ahmad, Chief Conservator of Forests (Protection) asked why areas under IWC are not allotted in SCI working circle. Dr. S.K. Khetrapal, APCCF (P & M) M.S., Nagpur informed that the trees above harvestable girth are not available in IWC & therefore only improvement felling should be prescribed in IWC & therefore it should be kept as separate working circle.
3. Shri Tasneem Ahmad, Chief Conservator of Forests (Protection) suggested to introduce thinning after 5 years instead of 10 years in Old Teak Plantation Working Circle.
4. Principal Chief Conservator of Forests (HoFF), M.S. Nagpur suggested that endangered climbers and other plants should be identified from red data book of BSI book before removal, during silvicultural operations under various working circles.

5. Principal Chief Conservator of Forests (HoFF), M.S. Nagpur & Dr. S.K. Khatripal, APCCF (P & M) M.S. Nagpur suggested that in Joint Forest Management Working Circle Socio-economic survey should be included. It has also been suggested that NTFP policy, latest guidelines for wildlife management should be included PWPR-II.
6. In Bamboo Overlapping Working Circle the record of yield from plantation should be separately maintained.
7. Shri A.K.Joshi, Principal Chief Conservator of Forests (HoFF), M.S. Nagpur suggested to include status of plantation with complete clarity in PWPR-II.
8. Shri P.J.Thosre, Additional Principal Chief Conservator of Forests (HRM & A), M.S. Nagpur suggested that introduction of edible bamboo in bamboo plantations on experimental basis and various other native species of bamboo too should be tried.
9. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur & Shri D.C.Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur suggested that brief note on account on performance of various JFM committees, their participation in forest protection, grading of JFM committees, names of JFM committees which received Sant Tukaram Award etc. should be included. The issue of participation of women in JFM programme should be included. The analysis so done must reflect in prescriptions.
10. In Non-wood Forest Produce Working Circle inclusion of Lac cultivation and inoculation of ethylene product for gum production suggested by Shri P.R.Ramanujam, Dy.C.F. (T) Wadsa
11. Shri A.K.Joshi, Principal Chief Conservator of Forests (HoFF), M.S. Nagpur suggested to include the data of compensation paid for injuries & casualties as well as cattle kill cases to be included.
12. In Wildlife Overlapping Working Circle, Shri D.C. Pant, Principal Chief Conservator of Forests (Wildlife), M.S.Nagpur suggested following.
 - (a) Mentioning of clear cut area details viz. compartment no. etc. for corridor of Tiger.
 - (b) Reasons for disappearance of Tiger to be properly elaborated by showing specific details of men-animal conflict.
 - (c) The satellite imagery showing corridors should be attached.
 - (d) Additional Principal Chief Conservator of Forests (HRM & A), M.S. Nagpur suggested to omit certain reference like indiscriminate killing by Jamindars,
 - (e) Substitute the word 'census' by 'estimation'.
 - (f) Additional Principal Chief Conservator of Forests (HRM & A), M.S. Nagpur suggested for inclusion of good bird sites like Heronry, sites for vulture and bats, good wetlands etc. He

also suggested to elaborate all possible sites for Conservation Reserves and Community Reserves.

(g) Management maps should show good wildlife areas.

13. Shri D.C. Pant, Principal Chief Conservator of Forests (Wildlife), M.S. Nagpur suggested that in Eco-tourism chapter all the provisions of Forest Conservation Act and N.T.C.A. guidelines should be clearly mentioned so that no violations are carried out by the implementing agencies. While implementing eco-tourism, efforts should be made to create awareness among public regarding conservation of forest and wild life. There should be mention of Supreme Court directives against the use of government land for religious purpose.

The committee has unanimously approved the Second PWPR of Wadga Forest Division subject to the modifications & corrections listed above.

YEOTMAL FOREST DIVISION

SECOND PWPR

6.00 Shri A.R. Mande, Conservator of Forests, Working Plan Division, Yeotmal made power point presentation of Second PWPR of Yeotmal Forest Division. After examining and discussing Second PWPR, the committee desired that the following modifications and information should be incorporated in Second PWPR.

1. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur informed to the committee that all the common suggestions discussed during the discussion on second PWPR of Wadga Division should be incorporated in second PWPR of Yeotmal Division.
2. Shri Tasneem Ahmad, Chief Conservator of Forests (Protection) raised some objection in respect of harvestable girth of seed origin & coppice origin of teak trees & CAI-MAI curves. Dr.S.K.Khetrapal, Additional Principal Chief Conservator of Forests (Production & Management), M.S., Nagpur informed the committee that the issue of stem analysis has to be re-examined in consultation with Shri Tasneem Ahmad, Chief Conservator of Forests (Protection) and necessary changes and technically sound details should be incorporated.
3. Dr. S.K. Khetrapal, Additional Principal Chief Conservator of Forests (Production & Management), M.S., Nagpur informed that detail instruction for laying grids, demarcation of coupes & preparation of treatment maps have been issued vide letter dated 2nd July 2010 should be included in Second PWPR.

4. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur suggested that information on assessment of implementation of plantation works, survival percentage, list of plantations etc. should be included in Afforestation Working Circle.
5. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur suggested that it should be verified whether there are any old fenced areas for fodder production under Fodder Improvement Working Circle and steps be taken for grass land development and fodder production. Planting of tree species should be avoided in Fodder Improvement Working Circle areas, so that the grassland ecosystem is maintained and conserved, considering the climate and soil conditions.
6. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur & Shri D.C. Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur suggested that brief note on account on performance of various JFM committees, their participation in forest protection, grading of JFM committees, names of JFM committees which received Sant Tukaram Award etc. should be included. The issue of participation of women in JFM programme should be included.
7. Shri D.C. Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur suggested that the word census should be replaced by estimation of wildlife population.
8. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur suggested that the details of crop damage, killing of cattle by wildlife compensation paid etc. should be included.
9. Shri D.C. Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur suggested that in case of development of eco-tourism, it should be mentioned that wherever necessary approval on case to case basis under Forest (conservation) Act 1980 & as per new NTCA guidelines should be obtained before executing works. While implementing eco-tourism, efforts should be made to create awareness among public regarding conservation of forest and wild life. There should be mention of Supreme Court directives against the use of government land for religious purpose.
10. Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur suggested that it is necessary to exercise caution to avoid cutting of climbers and other species included in Red Data Book of BSI, during silvicultural operations under various working circles.
11. Shri D.C. Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur suggested that as the PWPR II is voluminous, contains superfluous text and repetitions, the entire report should be edited to make it concise and brief. Vague statements should be avoided.

The committee has unanimously approved the second PWPR of Yeotmal Forest Division subject to the suggestions & modifications listed above.

BHOR FOREST SUB-DIVISION

FIRST PWPR

7.00

The First PWPR for the Bhore Forest Sub-Division was presented by the Shri A.S.K. Sinha, CCF (T) Pune Circle, Pune. The CCF (T) explained the salient features of the First PWPR of Bhore Sub-Division with the help of Power point presentation. Following suggestions were made by the members of the committee to be included in the First PWPR.

1. Shri D.C. Pant, PCCF (WL), M.S., Nagpur asked if there was any change in the status of the bio-diversity in the Bhore forests since last many years as majority of the forests were allotted to the Protection working Circle in the previous Plan. He advised that if no survey report is available for bench-marking then some agency may be engaged by the CCF (T) to study and report the status.
2. Dr. Nandkishore, CCF (P&T) suggested not to remove dead/ malformed trees or to resort to CBO, Cleaning operations in the Improvement Working Circle and instead advised full protection for such areas. The committee agreed to merge Improvement Working Circle with the Protection Working Circle.
3. Shri P.J.Thosre, APCCF (IRM & A) M.S., Nagpur and the Shri D.C. Pant, PCCF (WL) M.S., Nagpur suggested that the existing natural blanks on the plateaus in the forest areas are rich in bio diversity and may turn out to be the sites akin to Valley of Flowers and therefore should not be afforested with tree species. There should be specific conservation measures for such identified sites.
4. Shri A.K.Joshi, PCCF(HoFF) M.S., Nagpur asked the Sub DFO to survey and identify such areas and to provide the list to the CF (WT) Pune to be included in the Working Plan. Only under-stocked areas with good soil depth should be afforested with the indigenous species.
5. Similarly it was also suggested not to undertake large scale Glyricidin and Chandrajyoti plantations in the dry-land areas in the eastern side of the sub division since they hamper the growth of the grasses.
6. Shri D.C.Pant, PCCF (WL) M.S., Nagpur suggested to replace word 'Census' with 'Population estimation'. He also suggested to give 'scientific names' along with the 'common names' of the wild animals.

7. Shri A.K.Joshi, PCCF(HoFF) M.S., Nagpur & Shri D.C.Pant, PCCF (WL) M.S., Nagpur suggested that the sub DFO should identify the areas rich in Wild-life and bearing natural water holes and provide such list to the Working Plan Officer.
8. Shri P.J.Thosre, APCCF (HRM) M.S., Nagpur suggested that the old forts are frequented by the wild animals very often and therefore the water bodies therein should be de-silted periodically and a gradual slope should be provided on one side to save the wild animals from drowning.
9. Shri P.J.Thosre, APCCF (HRM) M.S., Nagpur suggested that the field officers in consultation with the CF (WL) Pune should explore the possibility of having Wild-life corridors from Mahad to Bhor and from southern portion of Lavasa to Bhor.
10. Shri P.J.Thosre, APCCF (HRM) M.S., Nagpur suggested that two important species viz. Giant squirrel and Mouse deer have not appeared in the wild life population estimates but should be mentioned in the Working Plan. He has also told that Narkya is also found in such tract and needs to be mentioned so in the Working Plan. Status in respect of these be verified and suitable measures be included in working plan.
11. Shri D.C.Pant, PCCF (WL) M.S., Nagpur suggested that there should only be a chapter on Eco-tourism and not a separate Working Circle. He suggested that this chapter should be integrated with the state Eco-tourism Policy. He has also suggested that in case of development of eco-tourism, It should be mentioned in the working plan that wherever necessary approval on case to case basis under Forest (conservation) Act 1980 should be obtained before executing works. While implementing eco-tourism, efforts should be made to create awareness among public regarding conservation of forest and wild life. There should be mention of Supreme Court directives against the use of government land for religious purpose.
12. Shri A.K.Joshi, PCCF(HoFF) M.S., Nagpur & Shri D.C.Pant, PCCF (WL) M.S., Nagpur suggested suggested that brief note on account on performance of various JFM committees, their participation in forest protection, grading of JFM committees, names of JFM committees which received Sant Tukaram Award etc. should be included. The issue of participation of women in JFM programme should be included. *
13. It was also suggested to add Mandatory Working Circles on 'Old Plantations' and 'NITPP' in the First PWPR as per the National Working Plan Code 2004 with complete details.
14. Shri A.K.Joshi, PCCF (HoFF) M.S., Nagpur asked the CCF (T) Pune to provide a survey report on the successful old plantations to the CF (WP) Pune to be included in the Working

Plan. Dr. Nandkishore, CCF (PT&SP) suggested that the Glyricidia plantations taken on the refractory sites need to be retained while Glyricidia plantations taken on good sites should be thinned to be ultimately replaced by Neem/ indigenous species.

The committee has unanimously approved the First PWPR of Bhor Forest Sub-Division subject to incorporation of above suggestions & modifications.

SHAHPUR FOREST DIVISION.

FIRST PWPR

8.00 The First PWPR of Shahpur Forest Division of Thane Circle was presented by the Shri S.A. Thorat, CCF (T), Thane. Following suggestions & modifications were made by the members of the committee to be included in the First PWPR.

1. Shri A.K.Joshi, PCCF (HoFF) M.S., Nagpur & Dr. S.K.Khetrapal, APCCF (P&M), M.S., Nagpur told that the First PWPR of Shahpur Forest Division prepared by CCF(T) Thane was not in consonance with the National Working Plan Code 2004. Accordingly he directed to revise the First PWPR and submit the same through Chief Conservator of Forest, Working Plan Circle, Pune. It was pointed out that directions contained in code and the factual position about various aspects must be analyzed and considered, while preparing the First PWPR of Shahpur Forest Division.
2. Dr. Nandkishore, CCF (PT & SP) M.S., Nagpur told that the First PWPR is the basis of the WFO's intensive field work and only brief comments are required on Part-I of the Working Plan regarding such sections which are required to be updated. While Part-II requires detailed comments and close analysis of the results of the past management for each working circle separately. He informed that no analysis of success or failures and reasons, thereof had been given in the First PWPR. The impact of the past working and the extent of harvesting done needs to be revised and accordingly incorporated.
3. Shri A.K.Joshi, PCCF(HoFF) M.S., Nagpur enquired about the status of the old plantations taken up in the Division which was not available with the Dy. Conservator of Forest, Shahapur. He told to include the status report of all old plantations taken up in the division alongwith its latest survival percentage report and other attributes & it should be kept ready at the time of presentation of the First PWPR during meeting to be held in future.

4. Shri A.K.Joshi, PCCF(HoFF) M.S., Nagpur enquired about the Tree enumeration data of the various felling series of Shahapur Forest Division, which DCF(T) Shahpur could not provide. Analysis of data must be done.
5. Dr. S.K.Khetrapal, APCCF (P&M) M.S., Nagpur directed that as per instruction given in Para No.18 of the Working Plan Code, 2004, the WPO should be supplied with the updated coupe Control Forms and Compartment Histories by the DCF(T), which should be kept ready at the time of presentation of First PWPR before the State Level Committee.
6. In the Bamboo Plantation (OL) Working Circle list of all old Bamboo Plantation undertaken (successful or failure) have not been enclosed. Similarly, the details of Bamboo areas which have been harvested during the Plan period, have not been incorporated in the First PWPR.
7. Shri A.K.Joshi, PCCF(HoFF) M.S., Nagpur directed to CCF(T) Thane to prepare the First PWPR in consultation with the CCF(WP), Pune. He also directed to CCF (T) Thane that it should be based on the field visits of the forest areas and re-submit the same to APCCF (P&M), M. S., Nagpur after due scrutiny.

In view of the above, the First PWPR of Shahpur Forest Division was not approved. The committee has unanimously taken decision in the meeting that First PWPR of Shahpur Forest Division should be re-submitted by CCF (T) Thane after incorporating of above suggestions & modifications in the First PWPR.

ROHA FOREST DIVISION.

FIRST PWPR

9.00 The First Preliminary Working Plan Report of Roha Forest Division was presented by Shri S.A. Thorat, CCF (T) Thane. Following suggestions & modifications were made by the Chairman & Members of the committee to be included in the First PWPR of Roha Forest Division.

1. Shri A.K.Joshi, PCCF (HoFF) M.S., Nagpur Dr. S.K.Khetrapal, APCCF (P&M), M.S., Nagpur directed CCF(T) Thane to include all the observations & suggestions made by him and the other members of SLC during the course of discussion of First PWPR of Shahapur Forest Division should be followed while redrafting the First PWPR Roha Forest Division.
2. Shri A.K.Joshi, PCCF (HoFF) M.S., Nagpur directed that the status of all old plantations taken up in the division along with its latest survival percentage reports needs to be kept ready at the time of presentation of First PWPR in the next State Level Committee meeting.

3. Dr. S.K. Khatripal, APCCF (P&M), M.S., Nagpur suggested that the First PWPR should be in consonance with the guidelines as given in the National Working Plan Code, 2004 and should be prepared by CCF (T); Thane in consultation with the CCF (WP), Pune & it should be based on the field visits of forests area. He also directed to CCF (T) Thane that it should be based on the field visits of the forest areas and re-submit the same to APCCF (P&M), M. S. Nagpur after due scrutiny.

In view of the above, the First PWPR of Roha Forest Division was not approved. The committee has unanimously taken decision in the meeting that First PWPR of Roha Forest Division should be re-submitted by CCF (T) Thane after incorporating of above suggestions & modifications in the First PWPR.

SAWANTWADI FOREST DIVISION.

FIRST PWPR

10.00 Shri R.K. Pole, CCF(T) Kolhapur presented the First PWPR of Sawantwadi Forest Division before the committee. Following suggestions & modifications were made by the Chairman & other Members of the committee to be included in the First PWPR of Sawantwadi Forest Division.

1. Dr. S.K. Khatripal, APCCF (P&M), M.S., Nagpur & Dr. Nandkishore CCF (PT & SP) have suggested that the Format of the First PWPR should be followed as per the National Working Plan Code 2004 (as given vide Para No. 21).
2. Shri T.K. Choubey CCF (WP) Nagpur told that the results of past system of working in various working under various working circles of current working plan should be included in First PWPR.
3. Dr. S.K. Khatripal, APCCF (P&M), M.S., Nagpur updated Coupe Control Forms & Compartment History Forms should be submitted to the WPO before the final approval of First PWPR & it should be kept ready at the time of SLC meeting.
4. The forest areas shown as decided and undecided should be re-examined and finalized & the same should be incorporated in the First PWPR.
5. It was suggested that the report of the survey of turtles in coastal area in 123 villages of Sawantwadi is available with Shri Katdhare an NGO and these reports should be incorporated in the First PWPR.
6. It was suggested that the prescription on the corridor area for the habitat of Tigers (above Dodanarg Forests) as per the reports of FSI, Dehradun and the Tiger Conservation

International should be procured and be considered for the prescriptions of the Wild life management.

7. Sawantwadi Forest Division being the coastal area, the First PWPR should focus on the Tsunami threat and the related management issues should be incorporated in the First PWPR.

8. Shri P.J.Thosre, APCCF(HRM & A) M.S., Nagpur suggested that the threatened flora and fauna like Olive Ridley Turtle (nesting habitat), Sea Eagle (nesting on the old casuarina trees), White backed vultures (nesting habitat), Malabar Pied Hornbills (4 varieties reported in the area) should be considered while writing the First PWPR.

9. Dr. S.K.Khetrapal, APCCF (P&M), M.S., Nagpur informed in the said SLC meeting that the survey on the flora and fauna of the area has been conducted by the National Institute of Oceanography, Goa. These books are available in the office library of the CCF (WL), Borivili, Mumbai and the data should be incorporated in the First PWPR.

In view of the above, the First PWPR of Sawantwadi Forest Division was not approved. Hence, the committee has unanimously taken decision in the meeting that First PWPR of Sawantwadi Forest Division should be re-submitted by CCF (T) Thane after incorporating of above suggestions & modifications in the First PWPR.

**List of Officers present in the meeting of State Level Committee
held on 28th January 2011.**

1	Shri A.K. Joshi, Principal Chief Conservator of Forests (HoFF), M.S., Nagpur	Chairman
2	Shri D.C.Pant, Principal Chief Conservator of Forests (Wildlife), M.S., Nagpur	Member
3	Dr. S.K.Khetrapal, Additional Principal Chief Conservator of Forests (Production & Management), M.S. Nagpur	Member
4	Dr. S.K.Khetrapal, Additional Principal Chief Conservator of Forests (Budget, Planning & Development) M.S. Nagpur	Member
5	Shri P.J. Thosre, Additional Principal Chief Conservator of Forests (H.R.M. &A.)M.S. Nagpur.	Member
6	Shri A.K. Rana, Chief Conservator of Forests (Central), Regional Office, GOI, Western Region, Bhopal	Member
7	Tasneen Ahmad, Chief Conservator of Forests (Protection) M.S. Nagpur	Member
8	Dr. Nandkishore, Chief Conservator of Forests (Policy, Technology and Strategic Planning) M.S. Nagpur.	Member
9	Shri N.B. Majumdar, Chief Conservator of Forests (Conservation) M.S. Nagpur	Member
10	Shri Shirish Ashtanna, Chief Conservator of Forests, Working Plan Circle, Pune.	Member
11	Shri Krishna Mohan, Chief Conservator of Forests (T), Nagpur	Member
12	Shri Sarjan Bhagat, Chief Conservator of Forests (T), Amrawati	Member
13	Shri A.S.K. Sinha, Chief Conservator of Forests (T), Pune	Member
14	Shri Suresh A.Thorat, Chief Conservator of Forests (T), Thane	Member
15	Shri Devendra Kumar, Chief Conservator of Forests (T), Yeotmal	Member
16	Shri T.K.Choubey, Chief Conservator of Forests, Working Plan Circle, Nagpur.	Member

17	Shri G.R.K. Rao, Conservator of Forests (T), Chandrapur	Member
18	Shri P.R. Yeole, Conservator of Forests (T), Gadchiroli	Member
19	Shri R.K. Pole, Conservator of Forests (T), Kolhapur	Member
20	Shri A.R. Mande, Conservator of Forests, Working Plan Division, Yeotmal	Member
21	Shri Mohan Karnat, Conservator of Forests, Working Plan Division, Kolhapur	Member
22	Shri Vikas Gupta, Conservator of Forests, Working Plan Division, Pune	Member
23	Shri K.P. Singh, Conservator of Forests, Working Plan Division, Dahanu	Member
24	Shri Jeet Singh, Conservator of Forests, Working Plan Division, Nashik	Member
25	Shri S.P. Thakre, Conservator of Forests, Working Plan Division, Gadchiroli.	Member
26	Shri P.R. Ramanujam, Dy. Conservator of Forests, (T) Wadsa.	Member
27	Shri D.B. Srikhande, Dy. Conservator of Forests, (T)	Member
28	Shri B.P. Walimbe, Dy. Conservator of Forests, (T), Sawantwadi	Member
29	Shri S.U. Hiwalekar, Dy. Conservator of Forests, (T), Shahapur	Member
30	Shri Mukesh Gannatra, Dy. Conservator of Forests, (T), Gondia	Member
31	Shri R.S. Kadam, Dy. Conservator of Forests, (T), Amrawati	Member
32	Shri P. Kalyankumar, Dy. Conservator of Forests, (T), Chandrapur	Member
33	Shri T.N. Salunkhe, Dy. Conservator of Forests, (T), Roha	Member
34	Shri V.R. Jagtap, Sub-DFO (T), Bhor Sub-Division.	Member



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

क्षेत्रीय कार्यालय, पश्चिम क्षेत्र,
Regional Office, Western Region
"केंद्रीय पर्यावरण भवन"
"Kendriya Paryavaran Bhavan"
लिंक रोड नं-३/Link Road No. 3
E-5, विवेक नगर/Ravishankar Nagar,
दुबई/Phone: 2466525, 2465496, 2426615
फैक्स/Fax: 0755-2463102
भोपाल (मध्य)/Bhopal-462016 (M.P.)
ईमेल/E-mail: rooffhopal@gmail.com

No.: 12-55/98 (FORV) 3786

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

Dt-26-9-2011,

Sub: Approval of Working Plan proposal of Yavimul Forest Division, written by
Shri G.R.K.RAO, IFS, for the period of 2012-2013 to 2021-2022.

Revenue and Forest Department, Government of Maharashtra letter FDM-2011/CR 71/F-
2, dated 16.05.2011.

Sir,

With reference to the above mentioned subject, I am to inform you that after careful examination of the Working Plan of Yavimul Forest Division, the Central Government hereby conveys its approval to the said working plan in accordance with the powers vested under Forest (Conservation) Act, 1980 subject to following conditions:-

- (1) The currency of the Working Plan shall be for a period of 10 years i.e. from 2012-2013 to 2021-22.
- (2) The orders of Hon'ble Supreme Court of India in the matter of Godaverman Thirumalkpad Vs Union of India in W.P. (Civil) No. 202/93 and related Inter Locutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
- (3) Further, in compliance with orders of Hon'ble Supreme Court's dated 22.09.2000, the State Government of Maharashtra shall ensure that regeneration of forests is commensurate with fellings carried out under this working plan.
- (4) No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with fellings. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.
- (5) Following the directions of the Hon'ble Supreme Court of India in their order dated 22.09.2000, a Care 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

Government in the manner to be listed in Table shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MOEF, New Delhi.

- (5) No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.
- (7) Prescriptions of microplans for JFM (if made) should not deviate the broad framework/guidelines of the working plan and shall be in accordance with various orders of Hon'ble Supreme Court.
- (8) Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/following years to compensate this removal.
- (9) No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval by the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out of late plantations carried out outside the working area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.
- (10) 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 from time to time by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy.

Yours faithfully,

(Pradeep Vasudeva)
(Pradeep Vasudeva)

Conservator of Forests (Central)

Copy to:

1. The Additional Director General of Forests (FC), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003.
2. The Addl. Principal Chief Conservator of Forests, Govt. of Maharashtra, (Production and Management), Secunary Hills, Nagpur.
3. The Chief Conservator of Forests (Working Plan), Government of Maharashtra, Nagpur.

(Pradeep Vasudeva)
(Pradeep Vasudeva)

Conservator of Forests (Central)

GOVERNMENT OF MAHARASHTRA

NO. FDM-2011/CR-71/F-2
Revenue and Forests Department,
Mantralaya, Mumbai-400 032
Dated :- 7.2.2012

**SUBJECT :- APPROVAL OF WORKING PLAN OF YAVATMAL FOREST
DIVISION WRITTEN BY SHRI G.R.K.RAO, IFS FOR THE PERIOD OF
2012-2013 TO 2021 - 2022.**

MEMORANDUM:

The undersigned presents compliments to the Additional Chief Conservator of Forests (Production & Management) and, with reference to his letter no. Desk-14/WP/CR-68/10-11/481/11-12, dated 20.7.2011 on the above subject, is directed to convey the sanction of Government of Maharashtra to the working plan of YAVATMAL FOREST DIVISION, Maharashtra state for the period of 2012-13 to 2021-22 prepared by SHRI G.R.K.RAO, IFS

The Government of India, Ministry of Environment and Forests has already conveyed its approval to the above said working plan vide its letter No.12-55/98(FOR)/3786, dated 26.9.2011 under certain conditions. These conditions should be strictly followed.

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

Ord No. 995
16/2/2012
on 2-2-2012

(N.M. SHILWANT)

Deputy Secretary

Revenue and Forests Department

To,
THE ADDITIONAL CHIEF CONSERVATOR OF FORESTS, (PRODUCTION & MANAGEMENT) MAHARASHTRA STATE, NAGPUR.

Copy to:

- ✓ 1. Chief Conservator of Forests, Working Plan Circle, Yavatmal.
2. Select File-F-2

D:\New Folder format\aparna\F-2 NOTEKARYA AYOJANA PRASTAV

अपर प्रधान मुख्य वनसंरक्षक (कार्य आयोजना-पूर्व), नागपुर यांचे कार्यालय.

वि.बी.के.डी. वन संरक्षण, विभाग, विधिक सर्वेक्षक, नागपुर
दुपचाची डा. (०८१२) २५८५००९ केवळ डा. ०८१२१ २५८५००९ ई-मेल: cchvnm@bhamail.com

विषय:- श्री जी.आर.के.राव, भावसे वदारा लिखित
यवतमाळ वन विभागाच्या कार्य आयोजनेस सन
२०१२-१३ ते २०२१-२२ या कालावधीकरिता
मंजूरी. १४/०३
कमांक, कस्त-१४/काआ/तास/प्र.क.९४/ २०११-१२
नागपुर-४४० ००९ दिनांक ८/३/२०१२

संदर्भ:- वनसंरक्षक (केंद्रीय), भारत सरकार, पर्यावरण व वन मंत्रालय, भोपाल यांचे
पत्र क्र.१२-५५ /९८ (FOR)/३७८६ दि.२६-०९-२०११.

संदर्भित केंद्र शासनाचे पत्रान्वये यवतमाळ वन विभागाच्या कार्य आयोजनेस सन
२०१२-१३ ते २०२१-२२ या कालावधीकरिता मंजूरी प्राप्त झालेली आहे. संदर्भित केंद्र शासनाचे
दि.२६-०९-२०११ च्या पत्राची छायांकीत प्रत माहिती व आवश्यक कार्यवाहीकरिता पाठविण्यात
येत आहे.

सहपत्र:- परीलप्रमाणे

अपर प्रधान मुख्य वनसंरक्षक,
(कार्य आयोजना पूर्व)
नागपुर

प्रति,
मुख्य वनसंरक्षक
(प्र), यवतमाळ

प्रतिलिपी :- प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन) म.रा. नागपुर यांना माहितीकरिता सादर.

प्रतिलिपी :- वनसंरक्षक, कार्य आयोजना विभाग, यवतमाळ यांना संदर्भित पत्राची छायांकीत प्रत माहिती व
आवश्यक कार्यवाहीस अग्रेषित

प्रतिलिपी :- उप वनसंरक्षक(प्र), यवतमाळ यांना संदर्भित पत्राची छायांकीत प्रत माहिती व
आवश्यक कार्यवाहीस अग्रेषित.

In Word No. 986
Date - 14/2/2012
Location - 2/2/2012

General for approval of working plan of yavtma

State Level Committee Meeting held on 28th January 2011

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/CR.10/(10-11)/136/10-11
dated 7-2-2011 (minutes of meeting).

Draft Working Plan (PWPR-2) of Yavatmal 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 28-1-2011.


(S.S. Dole I.F.S.)
Dy. Conservator of Forests
Yavatmal Forest Division, Yavatmal


(T.K. Dholey I.F.S.)
Chief Conservator of Forests
(Working Plan), Nagpur
Member, State Level Committee


(N.B. Mujumdar I.F.S.)
Chief Conservator of Forests (Conservation),
M.S. Nagpur;
Member, State Level Committee


(A.K. Joshi I.F.S.)
Principal Chief Conservator of Forests
(Hof F) M.S., Nagpur
Chairman, State Level Committee


(A.B. Mande I.F.S.)
Conservator of Forests
Working Plan Division, Yavatmal


(Devendra Kumar I.F.S.)
Chief Conservator of Forests (T)
Yavatmal


(Dr. Nand Kishor I.F.S.)
Chief Conservator of Forests
(PT SP), M.S., Nagpur
Member, State Level Committee


(A.K. Rana I.F.S.)
Chief Conservator of Forests (Central)
Regional Office, GOI, Western Region,
Bhopal, Member, State Level Committee