



सत्यमेव जयते

GOVERNMENT OF MAHARASHTRA

**WORKING PLAN
FOR
PANDHARKAWADA FOREST DIVISION
YAVATMAL CIRCLE**

**PERIOD : 2023-24 to 2032-33
(PART - I & II)**

VOLUME - I

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WORKING PLAN, YAVATMAL**

PREFACE

॥ अरण्यः ते पृथ्वी स्योनमस्तु ॥

Forests are the Jewel of Earth

I am delighted to present the Pandharkawada Working Plan, a comprehensive document outlining the strategies and measures for the sustainable management of Pandharkawada Forest Division. This Plan replaces the previous working plan of Dr. R. N. Rai, IFS covering the period from 2013-14 to 2022-23. The PWPR for this Plan was presented by Shri V.T.Ghule, IFS, Conservator of Forests (T), Yavatmal Circle before the Standing Consultative Committee on October 10, 2022 and was approved by the committee as per the letter No.Desk-14/WP/SCC/Meeting/62/2022-23/Dt.02.11.2022. On the basis of approved PWPR, the Draft Working Plan was prepared according to the 'National Working Plan Code 2014' and presented before the Standing Consultative Committee on 10.07.2024 and was approved by the committee as per the letter No. Desk-14/WP/ACF/205/24-25/Dt. 22.7.2024. Approval of Working Plan of Pandharkawada Forest Division for the period 2023-24 to 2032-33 by MoEFCC, Regional Office Nagpur Govt. of India vid letter No.F.No.WP-85 / RON / 2023-NGP/13860/Dt.24.12.2024

Prescriptions are provided for sustainable management of forests, scientific harvesting of timber, grassland management, wildlife management, conservation of biodiversity, sustainable harvesting of NTFPs, joint forest management, protection of forests etc. among others.

An initiation was made in this plan to ascertain the carbon stocks, valuation of ecosystem services, estimation of NTFP potential, understanding environmental pollution, documentation of wetlands and implementation of Sustainable Development Goals.

I sincerely hope that this working plan serves as a blueprint for effective management, conservation, and sustainable utilization of the forest resources in the Pandharkawada Division. May our shared commitment to the cause of preserving our natural heritage inspire us to work together towards a greener, healthier, and more sustainable future.

Place: Yavatmal

Date : April 04, 2024



(Anand Reddy Yellu, IFS)

**Deputy Conservator of Forests
Working Plan, Yavatmal**

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I acknowledge and appreciate the guidance and support of Shri Kiran Jagtap, IFS, Deputy Conservator of Forests (T), Pandharkawada, and extend my sincere appreciation to the officials and staff of the Pandharkawada Forest Division. Their tireless efforts in gathering data and providing essential insights have been crucial for the preparation of this plan. I am also thankful to Shri U.M. Phad, DFO, Tipeshwar Wildlife Sanctuary, for his insights into wildlife management.

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Furthermore, I extend my thanks to the local communities residing in and around the Pandharkawada Forest Division. Their invaluable knowledge of the region, traditional practices, and sustainable resource management techniques have greatly contributed to the formulation of this working plan. Their active participation and cooperation are vital for the successful implementation of the proposed strategies.

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WORKING PLAN OF PANDHARKAWADA FOREST DIVISION

EXECUTIVE SUMMARY

1. THE TRACT DEALT WITH

Pandharkawada Forest Division is one of the four forest divisions in Yavatmal circle. Area of the Division lies in Kelapur, Ralegaon, Maregaon, Ghatanji, Zari-Jamni, and Wani talukas of Yavatmal district. The division headquarters is located at Pandharkawada town. Most of the land of the division is high level plateau and gently sloping towards the eastern portion. The area is situated on 'Deccan Trap' with greatly varying basalts. As a result of disintegration of basalt different types of soil are formed with considerable variation in depth and physical properties. The entire area of the Pandharkawada Forest Division is drained by the river Painganga and the river Wardha, along with their tributaries. The river Painganga flows from west to east, serving as the southern boundary of the division. The Wardha River flows from the North West to the South East, meeting Painganga at Junad. The forest type belongs to the Sub group 5A - Southern Tropical Dry Deciduous Forest. The area of the Division spans from 19° 47" to 20° 30" north latitude and 78° 05" to 79° 08" east longitude. The boundaries of the division are as follows:

North	:	Wardha River and Wardha District
East	:	Wardha River and Chandrapur District
South	:	Painganga River & Adilabad District of Telangana State
West	:	Arni taluka of Yavatmal district.

The total geographical area of Pandharkawada Forest Division is 4,97,030.76 ha and the gross forest area is 95,957.66ha which is about 19%. While 14,341.50 ha is under FDCM's control and 14,730.96 ha is part of Tipeswar Wildlife Sanctuary. The forest area of Pandharkawa Division is 67,057.46ha, out of which 63,302.17 ha is reserved forest and 3755.29 ha is unclassified forests. A total of 67,057.46ha shall be dealt in this working plan. This Plan replaces the working plan written by Dr. R. N. Rai, IFS.

2. MAINTENANCE/INCREASE IN THE EXTENT OF FOREST AND TREE COVER

The area details are summarized in the table given below.

RANGEWISE DISTRIBUTION OF THE FOREST AREA (HA)

S. No.	Range	No. of Compartments	Reserve Forest (ha)	Protected Forest (ha)	Unclassed Forest (ha)	Total Area(ha.) (4+5+6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Pandharkawada	97	10508.00	0.00	1101.42	11609.42
2	Parwa	62	7901.25	0.00	1558.18	9459.43
3	Maregaon	61	10895.57	0.00	0.00	10895.57
4	Mukutban	42	7545.53	0.00	66.37	7611.90
5	Wani	89	9996.90	0.00	419.84	10416.74
6	Jamani	56	9421.82	0.00	84.95	9506.77
7	Ghatanji	38	7033.10	0.00	524.53	7557.63
	Total	445	63302.17	0.00	3755.29	67057.46

For administrative convenience, Pandharkawada Forest Division has been divided into 7 ranges, 24 rounds and 90 beats.

Land use, land use change and forestry (LULUCF):

As per the forest cover assessments between 2017 and 2021, there has been a marginal improvement in the quality of forest cover in Pandharkawada Division. The details are as follow:

FOREST COVER CHANGE

Forest Density Class	Area in Ha.			% Change (4/2*100)
	2017	2021	Change w.r.t. to 2017 (3 -2)	
(1)	(2)	(3)	(4)	(5)
Very Dense	28.62	27.87	-0.75	-2.63 %
Moderate Dense	16587.62	16749.36	161.74	0.98 %
Open Forests	21479.85	21529.92	50.07	0.23 %
Scrub	661.47	730.01	68.54	10.36 %
No Vegetation	28144.18	27878.99	-265.19	-0.94 %
Water	155.44	141.20	-14.24	-9.16 %
Total	67057.46	67057.46	0.00	0 %

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

Biodiversity Assessment:

Importance Value Index is assessed for all the trees enumerated. A snapshot of top 10 species of the division is given below:

Species	Relative Frequency			Relative Density			Relative Basal Area		IVI	IVI %
	Plots	Frequency	Relative Frequency (%)	Species	Density	Relative Density (%)	Basal Area (Sum)	Relative Basal Area (%)	(Importance Value Index)	
	(Count)			(Count)						
Teak	424	0.750442	19.18	6889	121.93	56.45	234.74	55.40	131.02	43.67 %
Palas	412	0.729204	18.63	2139	37.86	17.53	52.53	12.40	48.56	16.19 %
Tendu	174	0.307965	7.87	476	8.42	3.90	11.84	2.79	14.56	4.85 %
Ain	145	0.256637	6.56	396	7.01	3.24	18.47	4.36	14.16	4.72 %
Dhawada	122	0.215929	5.52	389	6.88	3.19	19.66	4.64	13.35	4.45 %
Lendia	99	0.175221	4.48	318	5.63	2.61	7.28	1.72	8.80	2.93 %
Mowai	70	0.123894	3.17	148	2.62	1.21	12.51	2.95	7.33	2.44 %
Salai	59	0.104425	2.67	118	2.09	0.97	12.35	2.92	6.55	2.18 %
Moha	58	0.102655	2.62	96	1.70	0.79	11.21	2.65	6.05	2.02 %
Bhera	60	0.106195	2.71	205	3.63	1.68	6.98	1.65	6.04	2.01 %

Conservation of Genetic Resources:

A total of 429 Biodiversity Management Committees have been established at the gram panchayat level in the talukas of Pandharkawada Division. The details are as follows:

LIST OF TALUKA-WISE BIODIVERSITY MANAGEMENT COMMITTEES ESTABLISHED IN PANDHARKAWADA DIVISION

Sr.No.	Taluka	BMCs established
(1)	(2)	(3)
1	Ghatanji	71
2	Kelapur	74
3	Ralegaon	73
4	Maregaon	56
5	Zari-Jamani	54
6	Wani	101
	Total	429

3. MAINTENANCE OF FOREST HEALTH AND VITALITY

Status of Regeneration: Data on regeneration status was collected by SOFR unit Amravati during collection of enumeration data. The status of natural regeneration is fair. Heavy grazing, fire incidences, trampling due to cattle movement, human population pressure to meet their demands like firewood and small timber, poor site quality and erratic rainfall are major factors that influence the establishment of regeneration in this forest area. The details of regeneration are given below:

REGENERATION STATUS AS PER 2023 ENUMERATION

Sr. No.	Range	No. of Sample Plots	No of Seedlings/ha			Total (4+5+6)
			R1	R2	R3	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Ghatanji	59	8.02	1.98	0.64	10.64
2	Jamni	88	37.34	1.17	5.20	43.72
3	Maregaon	71	4.18	0.04	0.00	4.23
4	Mukutban	72	29.56	1.76	1.39	32.71
5	Pandharkawada	94	21.89	6.64	2.54	40.65
6	Parwa	85	9.79	1.35	0.15	11.29
7	Wani	69	18.80	0.10	0.06	18.96
	Weighted Average		19.28	2.04	1.58	24.57

4. CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

In Pandharkawada Forest Division over the past ten years various soil and moisture conservation measures have been undertaken under different schemes. A total of 1530 loose boulder structures, 22 nala bands, 269 forest ponds and 162 contour trench works have been created. Similarly, during the past 10 years, 6533 hectares of tree species plantation and 220 hectares of fodder species plantation has been taken up as part of eco-restoration and it can be presumed that this area is treated for soil conservation.

5. MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

The enumeration data demonstrates that the growing stock has increased in comparison to the previous enumeration. One possible reason is that Ghatanji

taluka, which possesses medium-dense canopy cover forests, has been transferred from Yavatmal Forest Division during the Rao's Plan. The details of comparison are given below:

WORKING CIRCLE WISE TREE DENSITY COMPARISON

Sr. No.	Working Circle	No. of Trees per Ha.		Change in % [(4-3/3)*100]
		Previous Enumeration (2009)	Current Enumeration (2023)	
(1)	(2)	(3)	(4)	(5)
1	Selection-cum Improvement	250.78	285.32	13.77 %
2	Improvement	165.80	-	-
3	Afforestation	74.44	114.39	53.66 %
4	Fodder Improvement	123.55	66.05	- 46.54 %

Incremental Volume of Identified Timber Species: A comparative assessment of Mean Annual Increment of Teak in site quality III and IV for coppice and seed origin has been provided.

Carbon Stock: Carbon Stocks in different pools in various forest density classes in Pandharkawada Division is estimated as per FSI ISFR 2021 Report. The details are as follows:

Carbon Pool	Carbon Stock in Forests of (in Million Tonnes)			% to India's Carbon Stock (4/2*100)	% to Maharashtra's Carbon Stock (4/3*100)
	India (ISFR 2021)	Maharashtra (ISFR 2021)	Pandhar-kawada Division		
(1)	(2)	(3)	(4)	(5)	(6)
AGB	2320	137	0.75	0.032 %	0.547 %
BGB	719	42	0.31	0.043 %	0.738 %
Dead Wood	48	2	0.01	0.021 %	0.500 %
Litter	107	8	0.04	0.037 %	0.500 %
SOC	4010	261	1.71	0.043 %	0.655 %
Total	7204	452	2.82	0.039 %	0.624 %

6. OPTIMISATION OF FOREST RESOURCE UTILISATION

Recorded Removal of Timber: Timber is mainly in demand for the purpose of construction, furniture making and preparation of agriculture implements by the local people. The main preferred species is Teak. Local demand of timber is met from the timber removed from the forest division. The timber depot at Umari in Pandharkawada Range caters to the needs of the local population.

TIMBER AUCTIONED AND REVENUE REALIZED

Sr.No.	Year	Timber (m ³)	Revenue (Rs. Thousands)	Value (Rs Thousands/m ³)
(1)	(2)	(3)	(4)	(5)
1	2013-2014	17.23	220.60	12.81
2	2014-2015	1002.37	27,494.14	27.43
3	2015-2016	1707.10	43,552.53	25.51
4	2016-2017	1653.36	45,984.47	27.81
5	2017-2018	1561.37	48,108.42	30.81
6	2018-2019	2604.89	82,335.53	31.61
7	2019-2020	1753.22	62,254.80	35.51
8	2020-2021	1581.59	58,902.76	37.24
9	2021-2022	1476.25	46,860.60	31.74
10	2022-2023	1526.58	61,951.35	40.58
	Total-	14883.95	4,77,665.19	32.09

Recorded Removal of Fuel Wood

With the introduction of modern cooking fuels like LPG gas and electric implements, dependence on fuelwood has decreased. Nevertheless, firewood is the main cooking fuel for most of the villagers. Dhawda as fuel wood is the most sought-after species for fuel wood. The other hard wood species like Khair, Ain, Babul, etc. are also preferred over some of the soft wood species like Salai, Moyen, Beheda, etc. As the demand exceeds supply, illicit lopping of the trees and carrying of head loads of lopped branches mostly by the women is frequently noticed in this area.

FIREWOOD AUCTIONED AND REVENUE REALIZED

Sr. No.	Year	Quantity (m ³)	Revenue (Rs. In Thousands)	Value (Rs Thousands/m ³)
(1)	(2)	(3)	(4)	(5)
1	2013-2014	0	0.00	-
2	2014-2015	208.8	168.10	0.81
3	2015-2016	448.8	205.80	0.46
4	2016-2017	331.2	238.45	0.72
5	2017-2018	220.8	139.73	0.63
6	2018-2019	102	75.30	0.74
7	2019-2020	177.6	264.40	1.49
8	2020-2021	74.4	81.50	1.10
9	2021-2022	19.2	4.40	0.23
10	2022-2023	7.2	12.05	1.67
	Total	1590	1189.73	0.75

7. MAINTENANCE AND ENHANCEMENT OF SOCIAL, ECONOMIC, CULTURAL AND SPIRITUAL BENEFITS

Status of Empowerment of JFMCs: In Maharashtra JFM committees in the forest division are guided by Government of Maharashtra Resolution dated March 16, 1992, October 5, 2011 and July 10, 2012. In Pandharkawada Forest Division, 257 JFM committees have been established till March, 2023.

Maharashtra forest department has issued guidelines for grading of JFM committees into A, B and C categories based on various criteria. Based on this, of the 257 committees, 22 committees, 42 committees and 193 committees have been graded into A, B and C category committees respectively. 3 JFMCs have been awarded Sant Tukaram Vangram Yojana Award during the plan period. General body meetings and executive committee meetings of JFM committees are conducted periodically.

LabourWelfare: Members from the JFM villages are given priority in all the activities for semi-skilled and unskilled labour. Works of plantations, protection, boundary pillar repairs, fire line tracing and all other works are done primarily through JFM Committee members. In Pandharkawada Division there are Forest Labour Cooperative Societies which perform tree felling activity in their allotted coupes after due approval.

Use of Indigenous Knowledge: The availability of medicinal plants within the forests are collected and used for various ailments. Though the exact quantum, methodology and usage is not recorded but local medical practitioners or vaidhyas have many indigenous and traditional knowledge. They use forest based resources to create various formulations which are still used by local villagers. Apart from this, presence of other indigenous knowledge cannot be ruled out. Indigenous and traditional knowledge related to forest and environment needs to be documented.

Extent of Cultural/Sacred Groves: Dapora Sacred Grave is located in compartment no. 610. It is protected by the tribals belonging to Kolam and Pradhan communities of Dapora in the name of Lord Persapen Devrai. People refrain from felling trees and cutting branches in the vicinity of the grove. Other than Dapora, there are sites of cultural significance in the division. Pandavdevi temple in compartment number 73 of Pandharkawada range draws huge crowds during Shivratri and Navratri festivals. Similarly, Deodhari Dattatreya temple located in compartment no. 163. An annual yatra is held here in December during Datta Jayanthi.

Ecotourism Areas and Activities: Various important ecotourism sites have been identified in the division. Some of the sites have been developed while there is a need to develop other sites.

8. ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The management of forest is done according to the existing policies, acts and regulations of Government of India and Government of Maharashtra. The manpower required for the execution of the plan is adequate.

Forest Resource Accounting: An estimation of ecosystem services provided by the forests of Pandharkawada Forest Division was carried out using IIFM Report “Revision of Rates of NPV applicable for Different Class/Category of Forests”.

At the current rates for various forest canopy classes, the Net Present Value (NPV) for the Pandharkawada Forest Division is approximately 42 billion rupees. Nevertheless, with the proposed revised rates by the Indian Institute of Forest Management (IIFM) to estimate the maximum potential number of ecosystem services, the value increases to 57 billion rupees. The valuation of different ecosystem services in various forest classes of dry deciduous forests, as per the IIFM Report, and its application to the forests of the Pandharkawada division is given below.

VALUATION OF ECOSYSTEM SERVICES IN PANDHARKAWADA FOREST DIVISION

Sr.No.	Ecosystem Service	Value (in Rs crores/ year) of Pandharkawada Forest Division
1	Timber production	102.16
2	Bamboo production	9.17
3	Fodder production	49.02
4	NTFP	45.28
5	Fuel wood production	20.80
6	Carbon sequestration	6.60
7	Gene pool conservation*	265.34
8	Pollination and seed dispersal	39.76
9	Soil conservation	24.02
10	Water recharge	3.27
11	Carbon storage*	664.91
12	Water purification	11.54
Total		1241.86

Excluding the economic value of gene pool conservation and carbon storage which are one-time values, the annual value of ecosystem services provided by the forests of Pandharkawada Division is Rs. 311.62 crores.

9. FIVE YEAR PLANS

Various working plan were in operations during the five year plans. 12th five year plan concluded in the year 2016-17. The budget allocations in the five years plans have increased considerably. Fund sources have increased with the introduction of various new schemes.

10. PAST SYSTEMS OF MANAGEMENT

The regular Working Plan to manage forests was started in 1915 based on the requirement of treatment to the forest, needs of the local population and policies, rules laid down by the Government from time to time. The working plans that followed are listed below.

1. Malcolm's Working Plan (1915-16 to 1937-38)
2. Robinson's Working Plan (1938-39 to 1955-56)
3. Thosre's Working Plan (1955-56 to 1970-71)
4. Kanekar's Working Plan (1982-83 to 1997-98)
5. Yadav's Working Plan (2002-03 to 2011-2012)
6. Rai's Working Plan (2013-14 to 2022-23)

In Dr. R. N. Rai's working plan, the following working circles were constituted:

1. Selection-cum-Improvement Working Circle.
2. Afforestation Working Circle.
3. Fodder Improvement Working Circle.
4. Non Wood Forest Produce (Overlapping) Working Circle.
5. Joint Forest Management (Overlapping) Working Circle.
6. Wildlife Management (Overlapping) Working Circle.
7. Forest Protection (Overlapping) Working Circle.

11. STATISTICS OF GROWTH AND YIELD

Tree Enumeration: SOFR unit, Gadchiroli, has completed the enumeration of forest resources in Pandharkawada Forest Division during 2023-24.

**WORKING CIRCLE WISE NUMBER OF SOUND TREES PER HA AS PER 2023
ENUMERATION**

Girth Class (cm)	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	Above 150	Total (Σ2to 10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SCI	83.97	68.19	55.13	36.52	21.19	11.33	4.33	2.80	1.87	285.32
AWC	55.80	23.91	14.54	7.59	5.00	3.45	1.49	1.44	1.15	114.39
FIWC	26.58	15.79	10.53	5.53	2.37	1.05	1.05	1.32	1.84	66.05

Stem Analysis: During the revision of this working plan, stem analysis was carried out by Working Plan Office, Yavatmal during 2023-2024. The stem analysis of teak was carried out by selecting four representative teak trees of seed origin and coppice origin from Site Quality III and IV. The results obtained have been computed and age/diameter, height/age, age/volume curves were drawn. Yield calculation was carried out.

FUTURE MANAGEMENT

1. BASIS OF PROPOSALS

This working plan is prepared for the scientific management of Pandharkawada Forest Division. The primary objective is to treat the forests as per the site requirements so as to optimize the growing stock. Various aspects of wildlife management, protection, NTFP, JFM have been taken into consideration for the preparation of this plan. The existing policy framework of Central and State Government, various legislations governing forests and wildlife, orders of Hon'ble Supreme Court and High Courts, Government resolutions, Circulars, Notifications have formed the basis of the prescriptions of this working plan.

Distribution of Area to Various Working Circles

The area under the different working circles in the division is given below.

AREA ALLOCATION TO DIFFERENT WORKING CIRCLES

Sr. No.	Working Circle	No. of Compartments	Area in (ha)	Percentage
(1)	(2)	(3)	(4)	(5)
1	SCI WC	134	35604.95	53 %
2	AWC	285	26996.44	40 %
3	FIWC	26	4456.07	7 %
Total		445	67057.46	100 %

2. SELECTION CUM IMPROVEMENT WORKING CIRCLE

Area Allocation: The total forest area included in this working circle is 35604.95 ha. It constitutes 53 % of the total forest area of the division. Forest areas with density of 0.4 and above, which can produce medium to large size timber and poles are included in this working circle. Most of the crop is of site quality IV with a few patches of site quality III.

Special Objectives of Management:

1. To gradually replace coppice teak crop with high forest of seed origin by encouraging establishment of natural regeneration.
2. To increase the stocking of the miscellaneous species.
3. To obtain medium to large sized timber by utilizing the full potential of the site.
4. Encouraging natural regeneration assisted by artificial regeneration by introducing selected germ plasm.

Silvicultural System: The Selection cum Improvement system is aimed at harvesting matured trees and carrying out improvement felling for removal of malformed trees. The percentage of teak improved over the years which constitute approximately 62% of the growing stock. However, miscellaneous species have not shown substantial increase in composition of the crop. Teak trees of coppice origin would be felled on

priority to replace age old coppice trees with teak trees of seed origin. There would be no felling of non-teak species. Silvicultural operations like CBO, thinning, cleaning are included in this system. Thinning would also be carried out to decongest natural regeneration pole crop. Natural regeneration will be given suitable treatments to regenerate the area. Areas which are poor in natural regeneration will be supplemented by artificial regeneration to increase productivity and density of the crop. Soil and moisture conservation works would also be taken up on watershed basis to protect and improve soil and water regime.

Harvestable Diameters: As felling is restricted to only teak trees, harvestable girth is prescribed for teak alone. Harvestable girth has been determined at maximum volume production as per the CAI and MAI curves in stem analysis exercises for site quality IV forests. The harvestable girth for site quality III is fixed at 120 cm for seed origin and 75 cms for coppice origin, while the harvestable girth for site quality IV is prescribed as 105 cm for seed origin and 75 cm for coppice origin.

Calculation of the Yield: Annual yield shall be regulated by area, and the efforts are made, for making annual coupes as equi-productive as possible. For yield calculation in Selection Cum Improvement Working Circle, Sagreiya's modification of Brandis' formula is used. As per these calculations, 16 trees of coppice origin from site quality III & IV, 0.5 trees (i.e. 1 tree in two hectares) of seed origin from site quality III & 2 trees of seed origin from site quality IV are available for selection felling in well stocked area. Yield forecast based on above estimations is given below:

Unit	Estimated Yield in m ³			
	Coppice trees		Seed origin Trees	
	SQ III	SQ IV	SQ III	SQ IV
(1)	(2)	(3)	(4)	(5)
Per Ha.	3.23	2.59	0.32	0.78
Annual average (Assuming 10 % SQ III and 20% D Area)	115.00	829.95	11.39	249.95

Coupe Demarcation and Treatment Map

1. Demarcation and Marking: One year in advance
2. Treatment Map to be prepared as prescribed
3. A type: Protection area
4. B type: Understocked and Blank areas (density <0.4)
 - a. B1-Area with rootstock and natural regeneration
 - b. B2-Area without natural regeneration
5. C type: Pole crop and plantations
6. D type: Well stocked areas (density >0.4)

Marking

1. A type: No marking
2. B type: Dead and diseased trees, live high stumps
3. C type: Marking for thinning
4. D type: Enumeration of trees in approach girth class and above is prescribed.
Trees above selection girth, dead and malformed trees, live high stumps are to be marked.

Silvicultural System

1. Trees above selection girth are prescribed for felling as per principle of safeguarding future yield.
2. Openings created by felled trees would promote natural regeneration of light demander species
3. Hygienic operations (removal of dead, malformed, live high stumps) will improve the existing crop.

Regeneration:

1. Natural Regeneration of seed origin of valuable species to be preferred and managed through cultural operations in D areas and B1 areas.
2. Artificial Regeneration in B2 type area if site is suitable.
3. Strict protection from fire and grazing
4. Tending of natural regeneration of valuable species in B type area.

SMC Works: To be taken up on watershed basis

1. SMC works as prescribed in the Chapter on 'Miscellaneous Regulations' shall be carried out.
2. SMC works will be along with marking operation and completed before onset of monsoon.
3. SMC Works are to be based on the requirement of site.

Subsidiary Operations

1. CBO works: Subsequent year of main felling
2. CBO works include cutting left over marked trees, removal of damaged trees, singling of multiple coppices shoots, etc
3. NR or ANR should compulsorily be carried out immediately after CBO in the same year in D areas. This is necessary to regenerate the area felled.
4. Cleaning operations: 6th Year

Associated Regulations and Measures

Fire Protection: The main felling coupes shall be fire traced and rigidly protected from fire for a period of 5 yrs. The fire tracing activities shall be completed by 15th of February to avoid fire hazards to standing crop as well as to the natural regeneration. Effective protection against fire shall be under taken for a period between February 15 to June 15 to ensure survival and establishment of natural regeneration of all species for developing it into the future growing stock.

Grazing: The coupe of main felling will be closed to grazing till cleaning operations in the 6th year.

3. AFFORESTATION WORKING CIRCLE

Area Allocation: Forest areas with density of less than 0.4 are included in this working circle. A total of 26996.44 ha is included in this working circle which constitutes 40% of the division area.

Special Objectives of Management:

1. To increase vegetative cover, improve quality and composition of the area by tending to natural regeneration and supplementing with plantations.

2. To improve soil condition by taking up suitable soil and moisture conservation measures.
3. To meet the local demand for fuel wood, fodder and NTFP requirements along with better employment opportunities.

Silvicultural System: The main limiting factors for the establishment of seedlings in this area are insufficient sub soil moisture, highly compact soil structure and heavy biotic pressure. Therefore, intensive soil and moisture conservation measures shall be undertaken in these areas. Tending of existing rootstock, saplings, coppice shoots, supplemented by plantations are the main activities in this working circle.

Treatments: Various treatments proposed for deferent categories of the areas are as under:

1. A Type: No felling is prescribed. The soil and moisture conservation works shall be carried out on watershed basis as given in the Chapter on 'Miscellaneous Regulations'.

2. B Type: Soil and moisture conservation works shall be carried out in order to increase the productivity of the soil and to check soil erosion. Teak and other species shall be planted in the under stocked areas, where the area exiting 5 hectare and above in extent at one place as per requirements of site. No standing tree shall be marked for felling except dead trees retaining at least 2 trees/ha.

3. C Type: No plantations shall be carried out in this area. Marking for thinning shall be done in the young pole crop as well as in old plantations to create appropriate spacing as per the stand table.

4. D Type: No planting will be done in these areas. All dead trees (retaining 2 per hectare), malformed, diseased, high stumps and multiple coppice shoots (retaining one) shall be removed.

Associated Regulations and Measures: All annual coupes and plantation sites shall be provided fire protection. Effective protection against fire must be ensured during the fire seasons so that the survival and establishment of the seedlings for development into future growing stock can be achieved. Fire protection can be

achieved through Joint Forest Management Committees. A comprehensive fire management plan shall be prepared out every year. The coupe shall remain closed to grazing for a period of 5 years after main felling.

4. FODDER IMPROVEMENT WORKING CIRCLE

Area Allocation: Areas are mostly open and blank with sparse tree growth. The density ranges from 0.1 to 0.4. The extent of area allotted to this working circle is 4456.07ha which constitutes 7 % of the division area.

Special Objectives of Management:

1. To improve the quality and quantity of fodder grasses by introducing better varieties of fodder grass species and fodder tree species.
2. To meet the local demand for fodder and to reduce the heavy grazing pressure on the forests.
3. To improve the site and conserve soil and moisture through extensive soil and moisture conservation works.

Silvicultural System: Based on the grass and forest resources of the site, the silvicultural systems to be followed are regulated and rotational grazing in pasture areas. Regulating seeding, grass cutting and complete closure to grazing in identified grasslands is prescribed.

METHOD OF TREATMENT:

- a) As the area is highly degraded, extensive soil and moisture conservation measure works such as gully plugging, nalabunding at suitable places and contour trenches depending upon the site quality are prescribed.
- b) Tussocks of grass species shall be raised in the nursery after collecting seeds from the field.
- c) Tussock planting of palatable grass species like Sheda (*Sehima nervosum*), Paunya (*Schima salcutum*), Marvel (*Dicanthum annulatum*), Ned Gavati (*Panicum antidotale*), etc. shall be taken up. The fodder tree species prescribed are Babul (*Acacia nilotica*), Anjan (*Harwickia binata*), Siris

(*Albizia lebbek*), Apta (*Bauhina species*), Tiwas (*Ougenia daldergioides*), etc. However, the selection of fodder species shall be as per the site requirement.

- d) The area shall be effectively fire traced and protected from fire every year.
- e) Plantation of tree species like Anjan, Babul, Subabhul, Kusum, Sirus, Tiwas etc. of fodder value shall be taken up by poly pot planting during the monsoon.
- f) The cutting of grasses for stall feeding of cattle shall be allowed in these areas for 1st three years after planting. The grazing shall be regulated as per Government policy on rotation basis.

5. IMPLEMENTATION OF THE SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNITION OF FOREST RIGHTS) ACT, 2006

The status of implementation of Forest Rights Act, 2006 (up to March 2023) in Pandharkawada Forest Division is summarized in the table below:

STATUS OF IMPLEMENTATION OF FRA, 2006 TILL MARCH 2023

Sr. No.	Type of FRA benefit	No. of claims submitted at Gram Sabha	No. of claims accepted by DLC	Percentage of acceptance	Total Area of accepted claims (ha.)	Percentage of gross forest area
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Individual Forest Rights	2528	694	27.45 %	1076.77	1.27 %
2	Community Forest Rights	316	315	99.68 %	74766.22	88.26 %
3	Benefits u/s 3(2)	26	26	100 %	10.69	0.01 %
	Total	2870	1035	36.06 %	-	-

Prescriptions for Future Management:

- a) The forest areas on which the individual forest rights are recognised by District Level Committee are to be properly demarcated on ground with suitable boundary pillars in order to prevent any further encroachment. In case of Community Forest Rights (CFRs), the area shall be properly demarcated.
- b) The Divisional Area Register (Form No. 1) shall contain the area vested with rights under FRA in the 'remarks' column against each Compartment/Survey No./Gat No.
- c) Efforts need to be made to identify areas of livelihood support such as NTFP collection, processing and marketing, need based skill development programmes for self-employment of FRA beneficiaries.
- d) If the claims under the Act are finally rejected by the competent authority, such encroachments shall be removed immediately by following the due process of law.
- e) As per Rule 4(e), the Gram Sabha is duty bound to constitute Committees for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the Act. Awareness generation shall be brought among FRA beneficiaries about the responsibilities of forest and wildlife conservation.
- f) Similarly, as per Rule 4(t), such Committee shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest resources and integrate such plan with the working plans or management plans of the forest department. Therefore, the DCF and ACFs of Pandharkawada Forest Division shall examine such Conservation Plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of this working plan.
- g) The grazing rights permitted under the CFR shall be as per the prevailing grazing policy of the Maharashtra Forest Department as enlisted in 1968 and 1973.

Accordingly, no goat or sheep grazing shall be allowed in forest areas. And cattle grazing shall be allowed as per the carrying capacity of the grazing units and regeneration restrictions.

6. WILDLIFE MANAGEMENT

Special Objectives of Management: The special objects of management are:

1. To ensure protection and conservation of wildlife in this division.
2. To ensure scientific management of wildlife by undertaking measures like habitat management and regular monitoring of the population of wild animals.
3. To ensure protection of ecologically sensitive and special habitat sites for wildlife conservation.
4. To reduce dependency of fringe villages on forests and to reduce human wildlife interactions.
5. To involve local people in wildlife conservation and reduce human wildlife interactions.

Threats and Challenges to Wildlife:

Wildlife in this division face threats in the form of habitat fragmentation, habitat loss, poaching, fire, grazing, diseases and human-wildlife conflict

Future Management:

1. **Creation of Data Base:** The Division shall carry out survey, annual population estimation of the wildlife, including the migratory and other rare birds, in addition to Phase IV monitoring of All India Tiger Estimation exercise.
2. **Delineation and Mapping of Special Habitat Areas:** Delineation of the special wildlife habitat sites including natural water seepage sites (mesic sites), water holes, natural wallows and saltlicks used by the wildlife, breeding sites, dens or nesting sites of animals and birds shall be carried out and marked on the Divisional/Range maps.

3. **Habitat Development Works:** Development of habitat for provision of water, food, safe places for resting, breeding, and nesting.
4. **Marking Reservations, other Restrictions:** The following prescriptions have been made for implementation along with coupe operations and other treatment prescriptions in the wildlife area specific coupes.
 - a. No felling of trees or harvesting of any sort shall be allowed in riparian zone.
 - b. While marking of dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.
 - c. While harvesting at least 2 down hollow logs, of low commercial value, per hectare shall be reserved for shelter of wildlife.
 - d. Tendu collection centres or labour camps shall not be allowed near water holes frequented by the large mammals or other important wildlife species. The labour camps shall be established away from areas of high wildlife density.
5. **Water Management:** Water management includes maintenance, strengthening of all existing waterholes and creation of new artificial waterholes.
6. **Prey Base Augmentation:** To improve the prey base, care should be taken to improve fodder availability in the forest, especially during the summer season. The open areas in wildlife rich zones should be developed into meadows for the herbivores.
7. **Development of Nesting Sites:** To provide suitable nesting places to these birds, seed sowing of species like Babul and stake planting of species such as Banyan and other *Ficus spp.* should be done near water-bodies and in the riparian areas.
8. **Eco-Development, Awareness Generation and Eco-Tourism:** To seek their willing support and goodwill it is proposed to undertake eco-development works by the division in villages around these sites. It is also proposed to

promote and encourage eco-tourism in the Division by extending and developing camping and nature interpretation facilities at sites/spots, rich and unique in natural and cultural beauty and diversity.

9. **Eco-Sensitive Zone of Tipeswar Wildlife Sanctuary:** A zonal master plan shall be prepared within a period of two years from the date of publication of this Working plan.

7. NTFP MANAGEMENT

General Constitution of the Working Circle: The species of NTFP are available throughout the tract with varying degree. These contribute to a large extent to meet the non wood forest produce demand of local forest dwellers directly or indirectly. They play an important role in generating employment to the local people. The important non wood forest produce Moha flower, Moha seed, Tendu, Myrobalon (Hirda, Behada, Awla), Charoli, Kulu, Dhawda and Honey. The people living in forest mostly supplement their food with Leaves, tubers, flowers and fruits all year around. The medicinal plants play a key role in the health support systems in remote villages. Estimations of major NTFP produce for Pandharkawada Division is provided below:

Sr. No.	NTFP	No. of Trees	Approx Production per Tree(kg)	Estimated Production (kg) Potential (3*4)	MSP/KG In Rupees (TRIFED)	Total Economic Value (Rs Lakhs)(5*6/100000)	50% of Total Economic Value (Rs Lakhs) (7*0.5)	Individual Per Day collection (kgs)	Man-days Generation Potential (5/9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Moha Flowers	113938	25	2848458	30	854.54	427.27	10	284846
2	Moha Seeds	113938	10	1139383	29	330.42	165.21	25	45575
3	Karanj Seeds	2374	2	4747	19	0.90	0.45	5	949
4	Charoli	42727	0.05	2136	126	2.69	1.35	1	2136
5	Beheda	108004	5	540020	17	91.80	45.90	2	270010
6	Awala fruit	4747	1	4747	30	1.42	0.71	1	4747
7	Palas gum	2538689	0.2	507738	195	990.09	495.04	0.5	1015475

Sr. No.	NTFP	No. of Trees	Approx Production per Tree(kg)	Estimated Production (kg) Potential (3*4)	MSP/KG In Rupees (TRIFED)	Total Economic Value (Rs Lakhs)(5*6/100000)	50% of Total Economic Value (Rs Lakhs) (7*0.5)	Individual Per Day collection (kgs)	Man-days Generation Potential (5/9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
8	Palas Seeds	2538689	1	2538689	20	507.74	253.87	5	507738
9	Khair gum	70025	0.25	17506	195	34.14	17.07	0.25	70025
10	Dhawada gum	461688	0.3	138506	195	270.09	135.04	1	138506
11	Salai gum	140049	0.3	42015	195	81.93	40.96	1	42015
Total						3165.76	1582.88		2382023

Special Objects of Management:

1. To protect and manage NTFP species and to utilize the existing potential optimally and to enhance the productivity.
2. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques.
3. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the Division.
4. To generate employment and improve the economy of the local people and thereby improving their socio-economic conditions.

Treatment:

1. Documentation of NTFP Collection
2. Management of Tendu collection
3. Management of gum collection
4. Management of Hirda, Beheda, Aonla, Char and Other NTFPs
5. Resource Augmentation
6. Detailed inventory and prioritization
7. Forward and backward linkages
8. Capacity building
9. Income generation

10. Research and Development

11. Fire Protection Measures

8. JOINT FOREST MANAGEMENT

General Constitution : Pandharkawada Forest Division has a total of 257 JFM committees in the forest fringe villages. The total area allotted for these committees is 49,152.49 hectares. This covers around 73 % of the total area of the division.

Special Objects of Management:

1. To strengthen and empower local institutions for protection and conservation of forests and wildlife resources through peoples' participation.
2. To increase the vegetation cover and to carry out soil and moisture conservation works with the active co-operation of local people.
3. To involve local people in forest protection to generate sustainable employment.

General Prescriptions:

1. For those JFMCs whose micro-plans have expired, new micro-plans will be prepared through the process of participatory rural approach. Micro-plans are to be dovetailed with the prescriptions of this Working Plan.
2. Silvicultural management, maintenance of forest boundary, removal of forest encroachment and control over illicit cutting, illicit grazing and fire should receive high priority.
3. Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
4. Dedicated NGOs/Civil society groups can aid the village communities in strengthening JFM institution. Their services can be utilized by the FD in areas of capacity building of JFMCs in micro planning, community

motivation, eco-tourism initiatives, evolving models for enhancing livelihoods etc.

5. Periodic evaluation of JFMCs should be done to identify 'Performers' and 'Non-Performers'. While Performing JFMCs should be rewarded, the Non-Performers should be given opportunity for improvement.
6. The JFM villages should also be covered with other source of efficient fuel management like improved chul has with help from the Maharashtra Biodiversity Board.
7. The Division should make all efforts to ensure that all JFM Committees have Public Biodiversity Registers as part of the many records to be kept.

9. MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

General Constitution: The forest of this division has 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.

Special Objects of Management:

1. To protect the forest from illicit felling, encroachment, fire and grazing.
2. To sensitize local people about forest protection and involve them in preventing forest offences with their cooperation.
3. To raise the morale of field staff and strengthen their capabilities to deal with forest offences.

Protection Strategy: The strategy to be adopted to protect forest is of integrated approach 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 especially members of Joint Forest Management committee.

Protection Measures: A protection plan is to be prepared at division level in January of every year for taking strict protection measures as per GR dated August 13, 2014.

Fire Protection: Prevention of fires and effective control of fires as prescribed in the plan is essential for sustainable forest management.

Grazing Control: To control grazing, grazing units are formed in the division. The number of cattle heads is fixed as per the carrying capacity of the area. Goat and sheep grazing is prohibited in the forest area.

Encroachment: Survey and demarcation works shall be taken up 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 phase manner. The existing cairns shall be repaired and maintained under 1/5th boundary demarcation scheme.

10. MANAGEMENT OF SPIRITUAL, CULTURAL ASPECTS OF FORESTS AND ECOTOURISM

Forests have long been revered as sacred spaces, places of worship, and sources of inspiration. They are believed to be inhabited by spirits, deities, and ancestral beings, and are often associated with rituals, ceremonies, and traditional practices. Indigenous communities, in particular, have deep spiritual connections with forests, viewing them as integral parts of their identity, heritage, and worldview. Forests serve as providers of resources, healers of ailments, and symbols of wisdom, strength, and resilience.

Recognizing and respecting these values is essential to ensure that ecotourism activities do not undermine or erode the cultural heritage and spiritual connection people have with forests. It involves engaging and consulting with local communities, indigenous peoples, and cultural experts to understand and incorporate their perspectives and knowledge. This includes integrating cultural practices and rituals into ecotourism experiences, promoting cultural exchange between visitors and local communities, and fostering a sense of respect and appreciation for the spiritual significance of forests. By managing the spiritual and cultural aspects of forests within the realm of ecotourism, we can create meaningful and respectful experiences for visitors while safeguarding the cultural heritage and spiritual values that are intertwined with these natural environments.

General objectives that guide ecotourism activities include:

1. The Eco-tourism activity should be concise and small for operationalization.
2. It should be proper in view of environmental, social and cultural aspects.
3. It should be proven and worthy of adoption.
4. Participation of local community should be ensured.
5. It should neither be degrading nor destructive.
6. It should be as per tourist requirements but definitely with some restrictions.

11. ENCROACHMENT REMOVAL

A total of 1500.76 ha of forest area of Pandharkawada Forest Division is under encroachment. This encroachment shall be removed in a phased manner within 3 years from the implementation of this plan.

And a total area of 2082.70 ha was handed over to other departments over the years before the enactment of Forest (Conservation) Act, 1980, but not de-notified as reserved/protected forests. A proposal shall be made by the DCF, Pandharkawada to de-notify these areas and necessary entries should be made in Form No. 1 after denotification.

12. MISCELLANEOUS REGULATIONS

Boundary Demarcation: A well-defined forest boundary is a prerequisite for effective forest protection and its sustainable management. Forest areas vulnerable to boundary obliteration need to be identified for survey and demarcation so that forest encroachment on the forest fringes could be detected promptly. Areas which are un-demarcated and forest boundaries adjoining private land shall receive the highest priority to ensure protection of these areas. In order to keep the integrity of forests areas intact, strict vigilance over the forest boundary and periodic verification of the demarcation on the ground for the entire forest area has been prescribed.

Coupe Working: Various prescriptions regarding demarcation, treatment map, marking, felling, subsidiary silvicultural operations, thinning, irregular harvesting, natural regeneration, artificial regeneration, nursery operations are provided.

Soil Moisture Conservation Works: All soil moisture conservation works shall be carried out on watershed basis.

Watershed Treatment Methodology: Watershed development in forest areas tries to reduce the volume and the velocity of runoff through a series of interventions. The aim is to lower the water velocity, to make the water flow vertically downwards rather than horizontally across the village. Interventions are considered at diverse points in the village in a location-specific manner utilizing locally available materials and the vast knowledge of the local people regarding water flows and resource availability. Interventions are generally planned according to the “ridge-to-valley principle.”

13. FINANCIAL FORECAST

Abstract of year-wise Requirement of Funds for Implementation of Working Plan (In Rs. Lakh) is given below:

Work	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total	Annual Average	Total Mandays to be generated
SCI	1043	1278	1603	1743	1872	2058	2161	2269	2383	2502	18912	2042	470275
IWC	429	554	666	729	795	857	899	944	992	1041	7906	791	153315
AWC	543	713	848	948	1056	1152	1209	1270	1333	1400	10472	1047	206245
FIWC	493	720	756	794	833	875	919	965	1013	1064	8432	843	156391
Total	2508	3265	3873	4214	4556	4942	5188	5448	5721	6007	45722	4723	986226

Abstract of Year-wise Revenue Forecast:

Sr. No.	Working Circle	Approximate Annual Revenue (In Rs. Lakh)						Grand Total
		Timber		Fire Wood		Poles		
		Teak	Non Teak	Teak	Non Teak	Teak	Non Teak	
1	SCI	603.00	3.25	12.96	0.26	4.46	0.06	623.99
2	AWC	67.50	0.34	2.01	0.04	2.70	0.03	72.62
	Total	670.50	3.59	14.97	0.30	7.16	0.09	696.61

14. SCIENCE AND RESEARCH

During the process of writing of this Plan various papers, articles, reports and documents were referred from these sources and used for the writing of the Plan. There is overall lack of research works/paper related to Pandharkawada Forest Division. The research gap is in almost every aspect of the Working Plan as previous plans have not looked into the new aspects. Various aspects such as carbon stock, carbon sequestration, sacred grooves, biodiversity, Climate change, NTFP research, indigenous knowledge, TOF, Social and cultural aspects of forests, ecosystem services etc were found to be wanting in information.

Sample Plots: For forest resource assessment in the working plan, sample plots are systematically laid out in the forest area which is indicated on the Survey of India toposheet on the scale of 1:50000. The statistical sampling method namely “Systematic plot sampling with random start” was used. The plot size of 50”x50” (50 seconds x 50 seconds) representing approximately 225 ha on the ground was laid.

15. CONTROL AND RECORDS

Records on coupe controls, compartment histories, deviation proposals, divisional notebooks, nursery registers, plantation registers, boundary registers, etc. shall be maintained at the Division Office in appropriate formats.

16. TREES OUTSIDE FORESTS

Trees Outside Forests (TOF), these are in the form of small woodlots and block plantations, trees along linear features, such as roads, canals bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas. The total geographical area of the division is 4,22,506 ha and the gross forest area is 84,712.08ha. which is about 20% of the total geographical area of the division. This is way below the targeted 33% forest cover as per the National Forest Policy. Hence it is important to focus on improving the tree cover outside forest area.

From 2023-14 to 2022-23, Yavatmal Social Forestry Division has taken up 261.87 hectares of block plantation and 785.70 kms of roadside plantations. Prescriptions are provided to further enhance such plantations and also make local people more involved in taking up plantations on their private land.

17. SUSTAINABLE DEVELOPMENT

A blueprint is provided to apply the 17 Sustainable Development Goals (SDGs) enlisted by the United Nations within the context of Pandharkawada Forest Division. The targets include specific metrics and timelines, offering a comprehensive framework for evaluating the progress of initiatives. By incorporating these SDGs into the forestry sector, the Pandharkawada Division aims to contribute significantly to global efforts for sustainable development and environmental stewardship.

INTRODUCTION

VISION STATEMENT: To be a pioneer in environmental conservation and sustainable forest and wildlife management by preserving and restoring the ecological balance that has been disrupted by degradation of forest ecosystems, thereby ensuring long-term environmental stability.

GOALS OF MANAGEMENT:

1. Increase the forest and tree cover of the area.
2. Enhancing stability of the ecosystem, while maintaining the productivity of resources.
3. Ensuring equity of the local stake holders in use of the forest resources especially the bonafide needs of the local people and forest dwelling community.
4. Make forestry an important sector in the states' economy.
5. Conservation of biodiversity through people's participation.
6. Mitigation of human-wildlife conflict.
7. Implement forest-based climate change mitigation strategies.

OBJECTIVES:

1. To maintain data on forest resources and undertake periodic resource monitoring.
2. To scientifically manage the forest resources in the area.
3. To prevent soil degradation and improve quality of land through various soil and moisture conservation measures.
4. To regulate activities of various stakeholders in forestry sector
5. To identify, augment and conserve biodiversity within the region.
6. To document, sustainably harvest and cause value addition of NTFP.
7. To develop skilled manpower for protection and management of forests.
8. To utilize modern technology in forest management.
9. To involve local and forest dependent communities in forest protection and management.

10. To scientifically monitor wildlife and devise mechanisms to ensure peaceful coexistence of humans and wildlife.

“SWOT” ANALYSIS FOR PRESCRIPTION OF STRATEGIES FOR ACHIEVING THE GOALS AND OBJECTIVES

SWOT stands for Strengths, Weaknesses, Opportunities and Threats. Strengths and Weaknesses are internal factors and Opportunities and Threats are external factors. Internal attributes are controllable to some extent. Strengths are to be pursued and weakness strategically eliminated or reduced. Considering the vastness of the factors influencing the forestry/biodiversity goals, a few factors are mentioned below in SWOT analysis:

STRENGTHS	WEAKNESSES
1. Long history of conservation and scientific management of forests. 2. Strong legislation and policy. 3. Trained and disciplined staff. 4. Scientific background of staff. 5. Rich flora and fauna. 6. Rich traditional knowledge among locals. 7. Most forest land notified as Reserve Forests. 8. Development of infrastructure in rural and remote areas, encompassing offices, residential spaces, depots, nurseries, etc. 9. Organized budget release and monitoring system. 10. Increase in funds to forestry sector over the years. 11. Well established training institutes in the department. 12. Improved staff mobility achieved by enhanced connectivity and upgraded vehicles. 13. Provision of weapons for safety.	1. Forest land scattered and adjacent to private lands. 2. Predominance of teak forests. 3. Lack of legal awareness. 4. Lack of proper maintenance of records and files, especially at range level. 5. Lack of specific research on flora and fauna. 6. Lack of data and research on NTFP species. 7. Lack of proper demarcation of forest boundaries. 8. Maintenance of infrastructure lacking at times. 9. Long gestation period of forestry activities. 10. Lack of public involvement in forest protection. 11. Deficiency in rapport and communication among stake holders. 12. Lack of viable alternatives for forest dependent communities. 13. Systemic corruption. 14. Uncertainty in budget release.

OPPORTUNITIES	THREATS
1. Many new schemes and fund sources. 2. Use of modern technology in reporting and monitoring. 3. Better coordination among various departments. 4. Documentation and biodiversity studies involving educational and research institutions. 5. Training in different facets of wildlife management. 6. Creation of assets and infrastructure through CAMPA funds. 7. Various training opportunities for all cadres of staff. 8. Better awareness among people regarding nature conservation. 9. Impetus to conservation by Government.	1. Huge gap between demand and supply of forest produce. 2. Increase in illicit felling, poaching, encroachment and grazing. 3. Added impetus to encroachment of forest lands due to Forest Rights Act, 2006. 4. Fragmentation of forests due to linear projects. 5. Increasing man- animal conflict. 6. Increase in invasive alien species. 7. Erratic rainfall and drought conditions. 8. Staff overburdened with unproductive non forestry work. 9. Lack of sustainability in community attitudes, participation and motivation. 10. Undue political interference.

EXPECTED OUTCOMES

During the implementation of the plan, the following notable outcomes are anticipated:

1. Preservation of the nation's natural heritage by safeguarding natural forests, encompassing a diverse array of life forms and genetic resources.
2. Improvement in forest cover coupled with increased productivity to cater to the demands of local communities.
3. Maintenance of forests at an optimum growing stock to maximize timber production while simultaneously sequestering and storing a significant amount of carbon dioxide.
4. Encouragement of healthy regeneration of desired species within the forest ecosystem.

5. Consolidation of forest boundaries for enhanced protection and improved management.
6. Implementation of various soil conservation measures on a watershed basis to curb soil erosion and degradation, leading to reduced silt deposition. This, in turn, extends the lifespan of water bodies and enhances water quality.
7. Enhancement of wildlife habitats, providing increased availability of fodder, water, and shelter. This contributes to mitigating human-wildlife conflicts, reducing damage to agricultural crops, and preventing injury or death to people and domestic livestock.
8. Identification and monitoring of critical wetlands for wildlife conservation purposes.
9. Safeguarding the rights and concessions of tribal and rural communities living within and near forests. Addressing their domestic needs for fuelwood, fodder, and non-timber forest produce (NTFP).
10. Heightened public awareness about the value of trees, wildlife, and nature in general through targeted awareness campaigns, education, and extension activities.
11. Strengthening biodiversity conservation efforts with empowered Biodiversity Management Committees at the village level. Regular upgrading of biodiversity registers and active participation in biodiversity conservation through documentation and studies.
12. Strengthening of local Gram Sabhas and active support from Joint Forest Management (JFM) committees in protecting forests from illicit activities such as felling, illegal grazing, unauthorized NTFP collection, and forest fires.
13. Generation of employment opportunities for locals through various working plan activities, contributing to the enhancement of the rural economy and generating revenue for the state exchequer.

ABBREVIATIONS USED

ACF	:	Assistant Conservator of Forests
AGB	:	Above Ground Biomass
AR	:	Artificial Regeneration
BA	:	Basal Area
BGB	:	Below Ground Biomass
BMC	:	Biodiversity Management Committee
CA	:	Compensatory Afforestation
CAI	:	Current Annual Increment
CAMPA	:	Compensatory Afforestation Fund Management and Planning Authority
C.B.O	:	Cut Back Operation
CCA	:	Cultivable Command Area
CCF	:	Chief Conservator of Forests
CCT	:	Continuous Contour Trench
CCTV	:	Closed-Circuit Television
CF	:	Conservator of Forests
CGWB	:	Central Ground Water Board
cm	:	Centimeter
CO ₂	:	Carbon dioxide
Compt.	:	Compartment
COVID-19	:	Coronavirus Disease
CrPC	:	Code of Criminal Procedure
CSS	:	Centrally sponsored Scheme

cum	:	Cubic Meter
CWR	:	Coppice with Reserves
CWS	:	Coppice with Standards
°C	:	Degree Celsius
DCF	:	Deputy Conservator of Forests
DFO	:	Divisional Forest Officer
DOM	:	Dead Organic Matter
DPDC	:	District Planning and Development Council
Dt.	:	Dated
EDC	:	Eco-Development Committee
EGS	:	Employment Guarantee Scheme
FCA	:	Forest Conservation Act, 1980
FDA	:	Forest Development Agency
FMD	:	Foot-and-Mouth Disease
FRA	:	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
FDCM	:	Forest Development Corporation of Maharashtra
FG	:	Forest Guard
FIR	:	First Information Report
FIWC	:	Fodder Improvement Working Circle
FLCS	:	Forest Labourer's Co-operative Society
FS	:	Felling Series
FSI	:	Forest Survey of India
FYO	:	First Year Operation
GBH	:	Girth at Breast Height

GDP	:	Gross Domestic Product
GIS	:	Geographic Information System
GIM	:	Green India Mission
GMO	:	Genetically Modified Organism
Govt.	:	Government
Gol	:	Government of India
GoM	:	Government of Maharashtra
GPS	:	Global Positioning System
GSDA	:	Groundwater Surveys and Development Agency
ha	:	Hectare
ham	:	Hectare-meter
hrs	:	Hours
ICT	:	Information and Communication Technology
i.e.	:	That is
IFS	:	Indian Forest Service
IIFM	:	Indian Institute of Forest Management
ISFR	:	India State of Forests Report
IT	:	Information Technology
IVI	:	Importance Value Index
IV th Y.O.	:	Fourth Year Operation
IUCN	:	International Union for Conservation of Nature
IWC	:	Improvement Working Circle
JFMC	:	Joint Forest Management Committee
Km.	:	Kilometer

Kg	:	Kilogram
LAN	:	Local Area Network
LPG	:	Liquefied Petroleum Gas
LPM	:	Litres Per Minute
m	:	Meter
m ³	:	Cubic meter
MD	:	Man Day
ml	:	Milliliter
mm	:	Millimeter
Max	:	Maximum
Min	:	Minimum
MAI	:	Mean Annual Increment
MAP	:	Medicinal and Aromatic Plants
MDF	:	Moderate Dense Forests
MIS	:	Management Information System
Misc	:	Miscellaneous
MFP	:	Minor Forest Produce
MoEF	:	Ministry of Environment and Forest
MoU	:	Memorandum of Understanding
MRSAC	:	Maharashtra Remote Sensing Application Centre
MSL	:	Mean Sea Level
M.T.	:	Metric Tonne
NITI Aayog	:	National Institution for Transforming India
NR	:	Natural Regeneration

No.	:	Number
NPV	:	Net Present Value
NT	:	Nomadic Tribe
NTFP	:	Non Timber Forest Produce
NWFP	:	Non Wood Forest Produce
OF	:	Open Forests
PB	:	Periodic Block
PBR	:	People's Biodiversity Register
PCCF	:	Principal Chief Conservator of Forests
PDA	:	Personal Digital Assistant
PF	:	Protected Forest
POR	:	Preliminary Offence Report
PPO	:	Pre Planting Operation
%	:	Percentage
RCC	:	Reinforced Concrete Cement
RET	:	Rare Endangered and Threatened
RF	:	Reserved Forest
RFO	:	Range Forest Officer
Rs	:	Rupees
RTGS	:	Real Time Gross Settlement
SC	:	Scheduled Caste
SCI	:	Selection-cum-Improvement
S & M	:	Soil and Moisture
Sec.	:	Section

SHG	:	Self Help Group
SOC	:	Soil Organic Carbon
SOFR	:	Survey of Forest Resources
SOM	:	Soil Organic Matter
Sq	:	Square
SQ	:	Site Quality
Sr	:	Serial
ST	:	Schedule Tribe
SYO	:	Second Year Operation
TCM	:	Trench cum Mound
Temp	:	Temperature
TYO	:	Third Year Operation
TOF	:	Trees Outside Forests
UF	:	Un-classed Forests
U/S	:	Under section
UN WTO	:	United Nation World Trade Organization
VDF	:	Very Dense Forests
VJNT	:	Vimukta Jati and Nomadic Tribes
Vol	:	Volume
w.r.t	:	with respect to
W.C.	:	Working Circle
WP	:	Working Plan
WS	:	Working Series
Yr	:	Year

GLOSSARY OF LOCAL NAMES

Charaibandi	:	Ban on illegal grazing
Geru	:	Red Ochre or Red earth
Gairan	:	A place for herding cattle
Gaothan	:	A site kept reserved for housing
Gully	:	Channel
Jungle	:	Forest
Kacha road	:	Temporary road
Kharif	:	Monsoon crop
Kurhadbandhi	:	Ban on illegal felling
Murum	:	A reddish hard soil
Naka	:	Barrier on road for checking forest produce In transit
Nala	:	A water course
Nistar	:	Forest produce required for bonafide agriculture or domestic purposes
Parwana	:	License
Phadi	:	A temporary Tendu leaves collection centre
Puda	:	A bundle of 70 Tendu leaves
Ramna	:	A grass reserved close to grazing
Regur	:	Black cotton soil
Shikar	:	Hunting
Taluka	:	A revenue administrative block.

LIST OF FLORA
LOCAL AND BOTANICAL NAMES OF PLANTS IDENTIFIED IN
YAVATMAL FOREST DIVISION

A. TREES

<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>
Achar/Char	<i>Buchanania lanzan</i>	Anacardiaceae
Ain	<i>Terminalia alata</i>	Combretaceae
Ali/Aal/Bartondi	<i>Morinda tinctoria</i>	Rubiaceae
Amaltas/Bahawa	<i>Cassia fistula</i>	Caesalpiniaceae
Amba/Mango	<i>Mangifera indica</i>	Anacardiaceae
Amta	<i>Bauhinia malabarica</i>	Caesalpiniaceae
Anjan	<i>Hardiwickia binata</i>	Caesalpiniaceae
Apta/Kachnar	<i>Bauhinia racemosa</i>	Caesalpiniaceae
Arjuna/Kahu	<i>Terminalia arjuna</i>	Combretaceae
Arni	<i>Clerodendrum multiflorum</i>	Lamiaceae
Australian Babul	<i>Acacia auriculiformis</i>	Fabaceae
Awala	<i>Phyllanthus emblica</i>	Phyllanthaceae
Babul	<i>Acacia nilotica</i>	Mimoseae
Badam	<i>Prunus dulcis</i>	Rosaceae
Bakain / Baka neem	<i>Melia azedarach</i>	Meliaceae
Bakul	<i>Mimusops elengi</i>	Sapotaceae
Beheda	<i>Terminalia bellerica</i>	Combretaceae
Bel	<i>Aegle marmelos</i>	Rutaceae
Bhirra	<i>Chloroxylon swietenia</i>	Rutaceae
Bhokar	<i>Cordia dichotoma</i>	Cordiacea
Biba/Bhilawa	<i>Semecarpus anacardium</i>	Anacardiaceae
Bija	<i>Pterocarpus marsupium</i>	Fabaceae

Bistendu	<i>Diospyros montana</i>	Ebenaceae
Bor/Ber	<i>Zizyphus mauritiana</i>	Rhamnaceae
Chandan	<i>Santalum album</i>	Santalaceae
Chichwa	<i>Albizzia odoratissima</i>	Mimoseae
Chinch	<i>Tamarindus indica</i>	Caesalpiniaceae
Dahibaras	<i>Cordia macleodii</i>	Boraginaceae
Dhaman	<i>Grewia tilifolia</i>	Tiliaceae
Dhaora/Dhawda	<i>Anogeissus latifolia</i>	Combretaceae
Dhoban/Phansi/Satpudi	<i>Dalbergia paniculata</i>	Fabaceae
Dudhkuda/Kuda	<i>Wrightia arborea</i>	Apocynaceae
Garadi	<i>Cleistanthus collinus</i>	Phyllanthaceae
Ghingan	<i>Lannea coromandelica</i>	Amranghaceae
Ghoti/Ghot	<i>Zizyphus glaberrima</i>	Rhamnaceae
Gliricidia	<i>Gliricidia sepium</i>	Fabaceae
Haldu	<i>Adina cordifolia</i>	Rubiaceae
Hiwar	<i>Acacia leucophloea</i>	Mimoseae
Hirda/Harra	<i>Terminalia chebula</i>	Combretaceae
Jambhul/Jamun	<i>Syzygium cuminii</i>	Myrtaceae
Jarul	<i>Lagerstroemia Speciosa</i>	Lythraceae
Kadamb	<i>Neolamarckia cadomba</i>	Rubiaceae
Kadai	<i>Sterculia urens</i>	Malvaceae
Kanchan	<i>Bauhinia Variegata</i>	Fabaceae
Karam Mundi/ Kalamb	<i>Mitragyna parviflora</i>	Rubiaceae
Karanj	<i>Pongamia pinnata</i>	Fabaceae
Karu (Cassia)	<i>Cassia siamea</i>	Caesalpiniaceae
Kevada	<i>Pandanus odoratissimus</i>	Pandanaceae
Khair	<i>Acacia catechu</i>	Mimoseae

Khirni	<i>Manilkara hexandra</i>	Sapotaceae
Kusum	<i>Schleichera oleosa</i>	Sapindaceae
Kadhineem	<i>Murraya Koenigii</i>	Rutaceae
Kawat	<i>Limonia acidissima</i>	Rutaceae
Kulu	<i>Sterculia urens</i>	Sterculiaceae
Lendia/Lenda/schena/Asah	<i>Lagerstroemia parviflora</i>	Lythraceae
Lokhandi	<i>Ixora arborea</i>	Rubiaceae
Medsing	<i>Dolichandrone falcate</i>	Bignoniaceae
Moha/Mahuwa	<i>Madhuca longifolia</i>	Sapotaceae
Mahogany	<i>Swietenia macrophylla</i>	Meliaceae
Maharukh	<i>Ailanthus excelsa</i>	Simaroubaceae
Mokha	<i>Schrebera swietenoides</i>	Oleaceae
Moyen/Mowai	<i>Lannea coromandelica</i>	Anacardiaceae
Neem	<i>Azadirachta indica</i>	Meliaceae
Palas	<i>Butea monosperma</i>	Fabaceae
Phanas	<i>Artocarpus heterophyllus</i>	Moraceae
Pipal	<i>Ficus religiosa</i>	Moraceae
Putranjiva	<i>Putranjiva roxburghii</i>	Putranjivaceae
Raktachandan	<i>Pterocarpus marsupium</i>	Fabaceae
Rakta-rohida	<i>Tecomella undulate</i>	Bignoniaceae
Ramphal	<i>Annona reticulate</i>	Fabaceae
Ratan gunj	<i>Adenanthera pavonina</i>	Fabaceae
Ratanjot	<i>Jatropha curcas</i>	Euphorbiaceae
Ritha	<i>Sapindus trifoliatus</i>	Sapindaceae
Rohan	<i>Soymida febrifuga</i>	Meliaceae
Rohini	<i>Mallotus philippensis</i>	Euphorbiaceae
Sag/Sagwan/Teak	<i>Tectona grandis</i>	Verbenaceae
Saja/Ain	<i>Terminalia alata</i>	Combretaceae

Salai	<i>Boswellia serrata</i>	Burseraceae
Samudraphal	<i>Barringtonia acutangula</i>	Lecythidaceae
Saptaparni	<i>Alstonia scholaris</i>	Apocynaceae
Sawar/Shalmali/Semal	<i>Bombax ceiba</i>	Malvaceae
Sehna/Sina	<i>Senna siamea</i>	Fabaceae
Shevga	<i>Moringa oleifera</i>	Moringaceae
Shiwan/Siwan	<i>Gmelina arborea</i>	Verbenaceae
Sirus(Black)	<i>Albizzia lebbek</i>	Mimoseae
Sirus(White)	<i>Albizzia procera</i>	Mimoseae
Sissoo	<i>Dalbergia sissoo</i>	Fabaceae
Sitaphal	<i>Annona squamosa</i>	Annonaceae
Tendu/Karai	<i>Diospyros melanoxylon</i>	Ebenaceae
Tiwas/Tinsa	<i>Ougeinia oojeinensis</i>	Fabaceae
Umbar	<i>Ficus racemose</i>	Moraceae
Wad	<i>Ficus benghalensis</i>	Moraceae

B. SHRUBS

<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>
Adulsa	<i>Adhatoda vasica</i>	Acanthaceae
Anantmool	<i>Hemidesmus indicus</i>	Apocynaceae
Asvagandha	<i>Withania somnifera</i>	Solanaceae
Atibala	<i>Abutilon indicum</i>	Malvaceae
Bala	<i>Sida cordifolia</i>	Malvaceae
Bharati	<i>Gymnosporia spinosa</i>	Celasteraceae
Champa	<i>Plumeria rubra</i>	Apocynaceae
Chillari	<i>Mimosa rubicaulis</i>	Mimoseae
Chillati	<i>Caesalpinia sepiaria</i>	Caesalpinaceae
Datura	<i>Datura metel</i>	Solanaceae
Dudhi/Kalakuda	<i>Wrightia tinctoria</i>	Apocynaceae
Dhayati	<i>Woodfordia floribunda</i>	Lythraceae

Gajkarni/Snake jasmine	<i>Rhinacanthus nasutus</i>	Acanthaceae
Ghotbor	<i>Ziziphus xylopyrus</i>	Rhamnaceae
Gokarna	<i>Barleria cristata</i>	Acanthaceae
Jamalgota	<i>Baliospermum montanum</i>	Euphorbiaceae
Jangli-methi	<i>Sida rhombifolia</i>	Malvaceae
Jasvant	<i>Hibiscus rosa-sinensis</i>	Malvaceae
Kaner	<i>Nerium oleander</i>	Apocynaceae
Kari Korando	<i>Carissa spinarium</i>	Apocynaceae
Karat	<i>Barleria prionitis</i>	Acanthaceae
Karwand	<i>Carissa carandas</i>	Apocynaceae
Kuda, Indrajav	<i>Holarrhena antidysenterica</i>	Apocynaceae
Lajkuli	<i>Mimosa pudica</i>	Fabaceae
Madang	<i>Dendrophthoe falcata</i>	Loranthaceae
Mogali yerand	<i>Jatropha curcus</i>	Euphorbiaceae
Mothi-ringani	<i>Solanum ferox</i>	Solanaceae
Muradsheng/Marorphal	<i>Helicteres isora</i>	Sterculiaceae
Nirgudi	<i>Vitex negundo</i>	Verbenaceae
Parijat	<i>Nyctanthes arbortristis</i>	Oleaceae
Raymunia	<i>Lantana camara</i>	Verbenaceae
Rui	<i>Calotropis gigantea</i>	Apocynaceae
Sagargota	<i>Caesalpinia bonducella</i>	Fabaceae
Salaparni	<i>Desmodium gangeticum</i>	Fabaceae
Sindhi/Chhindi	<i>Phoenix sylvestris</i>	Arecaceae
Tarwar	<i>Cassia auriculata</i>	Caesalpiniaceae
Waghoti	<i>Capparis horrida</i>	Capparidaceae
Vidanga	<i>Embelia ribes</i>	Moringaceae
Zingrool/Pharsa	<i>Grewia orbiculata</i>	Tiliaceae
Zizurti	<i>Sida spinosa</i>	Malvaceae

C. HERBS

<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>
Agadha	<i>Achyrocline aspera</i>	Amaranthaceae
Akkalkara	<i>Anacyclus pyrethrum</i>	Asteraceae
Aparajita	<i>Clitoria ternatea</i>	Fabaceae
Bajradanti	<i>Tephrosia purpurea</i>	Fabaceae
Bhuiawalki	<i>Phyllanthus fraternus</i>	Eupobiaceae
Bhuriningani	<i>Solanum surattense</i>	Solanaceae
Brahmi	<i>Centella asiatica</i>	Apiaceae
Divali	<i>Tephrosia hamiltonii</i>	Fabaceae
Gajargawat	<i>Parthenium hysterophorus</i>	Asteraceae
Gokhru	<i>Tribulus terrestris</i>	Zygophyllaceae
Gorakhmundi	<i>Sphaeranthus indicus</i>	Asteraceae
Gulvel	<i>Tinospora cordifolia</i>	Menispermaceae
Hamata	<i>Stylosanthes hamata</i>	Caesalpinaceae
Kali musali	<i>Curculigo orchoides</i>	Hypoxidaceae
Kalmegh	<i>Andrographis paniculata</i>	Acanthaceae
Kangni	<i>Solanum nigrum</i>	Solanaceae
Kurmudi	<i>Tridax procumbens</i>	Asteraceae
Maka	<i>Eclipta alba</i>	Asteraceae
Patharchur	<i>Coleus aromaticus</i>	Lamiaceae
Pivla Dhotra	<i>Argemone mexicana</i>	Papaveraceae
Pivili tilwan	<i>Cleome viscosa</i>	Cleomaceae
Ran halad	<i>Curcuma zedoaria</i>	Zingiberaceae
Ran-kanda	<i>Drimys indica</i>	Asparagaceae
Rantulsi/Bantulsi	<i>Hyptis suaveolens</i>	Lamiaceae
Rantur	<i>Atylosia scarabaeoides</i>	Fabaceae
Sadafully	<i>Catharanthus roseus</i>	Apocynaceae

Safed musali	<i>Chlorophytum tuberosum</i>	Asparagaceae
Sarpagandha	<i>Rauvolfia serpentina</i>	Apocynaceae
Scabra	<i>Stylosanthes scabra</i>	Caesalpiniaceae
Suran	<i>Amorphophallus paeoniifolius</i>	Araceae
Surankanda	<i>Tacca leontopetaloides</i>	Dioscoreaceae
Tarota	<i>Cassia tora</i>	Caesalpiniaceae
Vacha	<i>Acorus calamus</i>	Acoraceae
Van tulsi	<i>Ocimum basilicum</i>	Lamiaceae

D. GRASSES AND BAMBOOS

<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>
Bans/Bamboo	<i>Dendrocalamus strictus</i>	Poaceae
Bhurbhusi	<i>Eragrostis tenella</i>	Poaceae
Duswa/Haryalli/Doob	<i>Cynodon dactylon</i>	Poaceae
Dongri gavat	<i>Chrysopogon montana</i>	Poaceae
Guhar, marwel	<i>Andropogon annulatus</i>	Poaceae
Kans	<i>Saccharum spontaneum</i>	Poaceae
Khas	<i>Vetiveria zizanioides</i>	Poaceae
Kodmor	<i>Apluda varia</i>	Poaceae
Kunda	<i>Ischaemum pilosum</i>	Poaceae
Kusal	<i>Heteropogon contortus</i>	Poaceae
Lemon grass	<i>Cymbopogon citratus</i>	Poaceae
Mushan	<i>Iseilema laxum</i>	Poaceae
Musta	<i>Cyperus rotundus</i>	Cyperaceae
Paonia	<i>Schima sulcatum</i>	Poaceae
Sabai or sum	<i>Ischaemum angustifolium</i>	Poaceae
Sheda	<i>Schima nervosum</i>	Poaceae
Tikhadi/Rusa/Rosha	<i>Cymbopogon martini</i>	Poaceae

E. CLIMBERS

<u>Local Name</u>	<u>Botanical Name</u>	<u>Family</u>
Amarbel	<i>Cuscuta reflexa</i>	Convolvulaceae
Bhuikand/Baichend	<i>Dioscorea daemona</i>	Dioscoreaceae
Chilahar/Cat's claw	<i>Caesalpinia sepiaria</i>	Fabaceae
Chilati	<i>Acacia pennata</i>	Mimoseae
Chirati	<i>Mukia maderaspatana</i>	Cucurbitaceae
Dudhavel	<i>Lettsomia setosa</i>	Convolvulaceae
Dukkerkand/Rankand	<i>Dioscorea bulbifera</i>	Dioscoreaceae
Eruni	<i>Zizyphus oenoplia</i>	Rhamnaceae
Gunchi/Gunj	<i>Abrus precatorius</i>	Papilionaceae
Hadjod	<i>Cissus quadrangularis</i>	Vitaceae
Kallawai	<i>Gloriosa superba</i>	Colchicaceae
Kawavel, Dudhi(Nagvel)	<i>Cryptolepis buchanani</i>	Asclepiadaceae
Khajkuri	<i>Mucuna pruriens</i>	Fabaceae
Mahulbel/Mahul	<i>Bauhinia vahlli</i>	Caesalpiniaceae
Palasvel	<i>Butea superba</i>	Fabaceae
Pan	<i>Piper betle</i>	Piperaceae
Piwarvel	<i>Combretum ovalifolium</i>	Combretaceae
Ranjai	<i>Clematis triloba</i>	Ranunculaceae
Shatova/Satawari	<i>Asparagus racemosus</i>	Liliaceae
Vasan vel	<i>Cocculus hirsutus</i>	Menispermaceae

LIST OF FAUNA

COMMON AND ZOOLOGICAL NAMES OF WILD ANIMALS AND BIRDS

A. CHECK LIST OF CARNIVORES

Sr.No.	Common Name	Scientific Name
1	Indian jackal	<i>Canis aureus indicus</i>
2	Indian fox	<i>Vulpes bengalensis</i>
3	Indian grey mongoose	<i>Urva edwardsii</i>
4	Indian wolf	<i>Canis lupus pallipes</i>
5	Jungle cat	<i>Felis chaus</i>
6	Leopard/Panther	<i>Panthera pardus</i>
7	Striped hyaena	<i>Hyaena hyaena</i>
8	Tiger	<i>Panthera tigris</i>
9	Wild dog /Dhole	<i>Cuon alpinus</i>

B. CHECK LIST OF HERBIVORES

Sr.No.	Common Name	Scientific Name
1	Barking deer	<i>Muntiacus muntjac</i>
2	Black buck	<i>Antilope cervicapra</i>
3	Blue bull	<i>Boselapus traqocamelus</i>
4	Chausingha	<i>Tetracerus quadricornis</i>
5	Chinkara	<i>Gazella bennettii</i>
6	Common langur	<i>Presbytis pileatus</i>
7	Gray langur	<i>Presbystis entellus</i>
8	Indian hare	<i>Lupus nigricollis</i>
9	Indian pangolin	<i>Manis crassicaudata</i>
10	Porcupine	<i>Hystrix indica</i>
11	Sambar deer	<i>Rusa unicolor</i>
12	Sloth bear	<i>Melursus ursinus</i>
13	Small Indian civet	<i>Viverricula indica</i>
14	Spotted deer	<i>Axis axis</i>
15	Wild pig	<i>Sus scrofa</i>

C. CHECK LIST OF AVIFAUNA

Sr.No.	Common Name	Scientific Name
1	Alexandrine parakeet	<i>Psittacula eupatria</i>
2	Alpine swift	<i>Tachymarptis melba</i>
3	Ashy Prinia	<i>Prinia inornata</i>
4	Ashy-crowned sparrow-lark	<i>Eremopterix grisea</i>
5	Asian koel	<i>Eudynamys scolopacea</i>
6	Asian open bill-stork	<i>Anastomus oscitans</i>
7	Asian palm swift	<i>Cypsiurus balasiensis</i>
8	Asian paradise-flycatcher	<i>Terpsiphone paradisi</i>
9	Asian pied starling	<i>Sturnus contra</i>
10	Baillon's crane	<i>Porzana pusilla</i>
11	Bar – headed goose	<i>Anser indicus</i>
12	Barn owl	<i>Tyto alba</i>
13	Barred buttonquail	<i>Tumix suscitator</i>
14	Baya weaver	<i>Ploceus philippinus</i>
15	Bay-backed shrike	<i>Lanius vattatus</i>
16	Black – rumped flameback	<i>Dinopium benghalense</i>
17	Black bittern	<i>Dupetor flavicollis</i>
18	Black drongo	<i>Dicrurus macrocercus</i>
19	Black ibis	<i>Pseudibis papillosa</i>
20	Black kite	<i>Milvus migrans</i>
21	Black redstart	<i>Phoenicurus ochruros</i>
22	Black tailed godwit	<i>Limosa limosa</i>
23	Black-breasted weaver	<i>Ploceus benghalensis</i>
24	Black-crowned night-heron	<i>Nycticorax nycticorax</i>

Sr.No.	Common Name	Scientific Name
25	Black-headed bunting	<i>Emberiza melanocephala</i>
26	Black-headed cuckoo- shrike	<i>Coracina melanoptera</i>
27	Black-headed oriole	<i>Oriolus xanthornus</i>
28	Black-lored yellow tit	<i>Parus xanthogenys</i>
29	Black-necked stork	<i>Ephippiorhynchus asiaticus</i>
30	Black-shouldered woodpecker	<i>Chrysocolaptes festivus</i>
31	Blue – tailed bee-eater	<i>Merops philippinus</i>
32	Blue cheek bee-eater	<i>Merops persicus</i>
33	Blue Rock-thrush	<i>Monticola solitarius</i>
34	Blue throat	<i>Luscinia svecica</i>
35	Blue-headed rock-thrush	<i>Monticola cinclorhynchus</i>
36	Brahminy kite	<i>Haliastur Indus</i>
37	Brahminy starling	<i>Sturnus pagodarun</i>
38	Brain fever birds	<i>Hierococcyx varius</i>
39	Brown crane	<i>Amaurornis akool</i>
40	Brown fish owl	<i>Ketupa zeylonensis</i>
41	Brown hawk owl	<i>Ninox scutulata</i>
42	Brown rock pipit	<i>Anthus similes</i>
43	Brown-capped pygmy woodpecker	<i>Dendrocopos nanus</i>
44	Cattle Egret	<i>Bubulcus ibis</i>
45	Chestnut-bellied sandgrouse	<i>Pterocles exustus</i>
46	Citrine wagtail	<i>Motacilla citreola</i>
47	Comb duck	<i>Sarkidiornis melanotos</i>
48	Common babbler	<i>Turdoides caudatus</i>
49	Common barn owl	<i>Tyto alba</i>

Sr.No.	Common Name	Scientific Name
50	Common chiffchaff	<i>Phylloscopus collybita</i>
51	Common coot	<i>Fulica atra</i>
52	Common crested lark	<i>Galerida cristata</i>
53	Common greenshank	<i>Tringa nebularia</i>
54	Common hawk cuckoo	<i>Hierococcyx varius</i>
55	Common hoopoe	<i>Upupa epops</i>
56	Common kestrel	<i>Falco tinnunculus</i>
57	Common kingfisher	<i>Alcedo atthis</i>
58	Common lora	<i>Aegithina tiphia</i>
59	Common moorhen	<i>Gallinule chloropus</i>
60	Common myna	<i>Acridotheres tristis</i>
61	Common pochard	<i>Aythya farina</i>
62	Common quail	<i>Cotumix cotumix</i>
63	Common redshank	<i>Tringa totaus</i>
64	Common rosefinch	<i>Carpodacus erythrinus</i>
65	Common sandpiper	<i>Actitis hypoleucos</i>
66	Common shelduck	<i>Tadorna tadorna</i>
67	Common snipe	<i>Limnocyrtus minimus</i>
68	Common stonechat	<i>Saxicola torquata</i>
69	Common swallow	<i>Hirundo rustica</i>
70	Common tailorbird	<i>Orthotomus sutorius</i>
71	Common teal	<i>Anas crecca</i>
72	Common tern	<i>Sterna hirundo</i>
73	Coppersmith barbet	<i>Megalaima huemacephala</i>
74	Cotton pygmy – goose	<i>Nettapus coromandelianus</i>

Sr.No.	Common Name	Scientific Name
75	Crested bunting	<i>Melophus lathamii</i>
76	Crested serpent-eagle	<i>Spilornis cheela</i>
77	Crested tree swift	<i>Hemiprocne coronate</i>
78	Crow pheasant	<i>Centropus sinensis</i>
79	Curlew sandpiper	<i>Calidris ferruginea</i>
80	Darter	<i>Anhinga melanogaster</i>
81	Dunlin	<i>Calidris alpina</i>
82	Dusky eagle-owl	<i>Bubo coromandus</i>
83	Eastern skylark	<i>Alauda gulgula</i>
84	Eurasian collared dove	<i>Streptopelia decaocto</i>
85	Eurasian cuckoo	<i>Cuculus canorus</i>
86	Eurasian curlew	<i>Numenius orauata</i>
87	Eurasian golden oriole	<i>Oriolus oriolus</i>
88	Eurasian spoonbill	<i>Platalea leucorodia</i>
89	Eurasian whimbrel	<i>Numenius phaeotus</i>
90	Eurasian wigeon	<i>Anas Penelope</i>
91	Eurasian wryneck	<i>Jynx torquilla</i>
92	European roller	<i>Coracias garrulous</i>
93	Ferruginous pochard	<i>Aythya nyroca</i>
94	Gadwall	<i>Anas strepera</i>
95	Garganey	<i>Anas querquedula</i>
96	Glossy ibis	<i>Plegadis falcinellus</i>
97	Gold-fronted chloropsis	<i>Chloropsis aurifrons</i>
98	Great grey shrike	<i>Lanius excubitor</i>
99	Great tit	<i>Parus major</i>

Sr.No.	Common Name	Scientific Name
100	Greater coucal	<i>Centropus sinensis</i>
101	Greater painted snipe	<i>Rostratula benghalensis</i>
102	Greater Racket-tiled drongo	<i>Dicrurus paradiseu</i>
103	Green bee eater	<i>Merops orientalis</i>
104	Green sandpiper	<i>Tringa ochropus</i>
105	Grey – bellied cuckoo	<i>Cacomantis passerines</i>
106	Grey francolin	<i>Francolinus pondicerianus</i>
107	Grey heron	<i>Ardea cinerea</i>
108	Grey jungle fowl	<i>Gallus sonneratti</i>
109	Grey nightjar	<i>Caprimulgus indicus</i>
110	Grey wagtail	<i>Motacilla cinerea</i>
111	Grey-headed flycatcher	<i>Culicicapa ceylonensis</i>
112	Grey-lag goose	<i>Anser anser</i>
113	House crow	<i>Corvus splendens</i>
114	House sparrow	<i>Passer domesticus</i>
115	House swallow	<i>Hirundo tahitica</i>
116	House swift	<i>Apus affinis</i>
117	Indian chat	<i>Cercomela fusca</i>
118	Indian cuckoo	<i>Cuculus micropterus</i>
119	Indian great reed-warbler	<i>Acrocephalus stentoreus</i>
120	Indian grey hornbill	<i>Ocyeros birostris</i>
121	Indian jungle nightjar	<i>Caprimulgus indicus</i>
122	Indian nightjar	<i>Caprimulgus asiaticus</i>
123	Indian peafowl	<i>Pavo criststus</i>
124	Indian pitta	<i>Pitta branchyura</i>

Sr.No.	Common Name	Scientific Name
125	Indian plaintive cuckoo	<i>Cacomantis passerinus</i>
126	Indian pond-heron	<i>Ardeola grayii</i>
127	Indian robin	<i>Saxicoloides fulicata</i>
128	Indian roller	<i>Coracias benghalensis</i>
129	Indian scops owl	<i>Otus bakkamoena</i>
130	Indian short-toed lark	<i>Calndrella raytal</i>
131	Indian treeple	<i>Dendrocitta vagabunda</i>
132	Jack snipe	<i>Gallinago gallinago</i>
133	Jerdon's chloropsis	<i>Chloropsis cochinchinensis</i>
134	Jungle babbler	<i>Turdoides striatus</i>
135	Jungle bush quail	<i>Perdica asiatica</i>
136	Jungle crow	<i>Corvus macrorhynchos</i>
137	Jungle owlet	<i>Glaucidium radiatum</i>
138	Jungle prinia	<i>Prinia sylvatica</i>
139	Large egret	<i>Casmerodius albus</i>
140	Large pied wagtail	<i>Motacilla maderaspatensis</i>
141	Laughing dove	<i>Streptopelia senegalensis</i>
142	Lesser golden-backed woodpecker	<i>Dinopium benghalense</i>
143	Lesser whistling duck	<i>Dendrocygna javanica</i>
144	Little bittern	<i>Lxobrychus minutus</i>
145	Little brown dove	<i>Streptopelia Senegalensis</i>
146	Little cormorant	<i>Phalacrocorax niger</i>
147	Little egret	<i>Egretta garzetta</i>
148	Little grebe	<i>Tachybaptus ruficollis</i>
149	Little green heron	<i>Butorides striatus</i>

Sr.No.	Common Name	Scientific Name
150	Little ringed plover	<i>Charadrius dubius</i>
151	Little stint	<i>Calidris minuta</i>
152	Little swift	<i>Apus affinis</i>
153	Little Tern	<i>Sterna albifrons</i>
154	Mallard	<i>Anas platyrhynchos</i>
155	Marsh sandpiper	<i>Tringa stagnatilis</i>
156	Median egret	<i>Mesophoyx intermedia</i>
157	Mottled wood owl	<i>Strix leptooogrammica</i>
158	Northern pintail	<i>Anas acuta</i>
159	Northern shoveler	<i>Anas clypeata</i>
160	Orange breasted pigeon	<i>Treron bicinctus</i>
161	Orange-headed thrush	<i>Zoothera citrina citrina</i>
162	Oriental magpie-robin	<i>Copsychus saularis</i>
163	Oriental turtle dove	<i>Streptopelia orientalis</i>
164	Oriental white ibis	<i>Threskiornis melanocephalus</i>
165	Oriental white-eyes	<i>Zosterops palpebrosus</i>
166	Paddy field warbler	<i>Acrocephalus agricola</i>
167	Paddyfield pipit	<i>Anthus rufulus</i>
168	Painted francolin	<i>Francolinus pictus</i>
169	Painted partridge	<i>Francolinus pictus</i>
170	Painted sandgrouse	<i>Pterocles indicus</i>
171	Pheasant tailed jacana	<i>Hydrophasianus chirurgus</i>
172	Pied avocet	<i>Recurvisrostra avosetta</i>
173	Pied bushchat	<i>Saxicola caprata</i>
174	Pied cuckoo	<i>Clamator jacobinus</i>

Sr.No.	Common Name	Scientific Name
175	Pied kingfisher	<i>Ceryle rudis</i>
176	Pin tailed snipe	<i>Gallinago stenura</i>
177	Plain Prinia	<i>Prinia inornata</i>
178	Plum – headed parakeet	<i>Psittacula cyanocephala</i>
179	Purple heron	<i>Ardea purpurea</i>
180	Purple moorhen	<i>Porphyrio Porphyrio</i>
181	Purple sunbird	<i>Nectarinia asiatica</i>
182	Purple swampphen	<i>Porphyrio porphyria</i>
183	Purple-rumped sunbird	<i>Nectarinia zeylonica</i>
184	Rain quail	<i>Cotumix coromandelica</i>
185	Red – crested pochard	<i>Rhodonessa rufina</i>
186	Red collared dove	<i>Streptopelia tranquebarica</i>
187	Red jungle fowl	<i>Gallus gallus</i>
188	Red munia	<i>Amandava amandava</i>
189	Red necked phalarope	<i>Phalaropes lobatus</i>
190	Red-headed bunting	<i>Emberiza bruniceps</i>
191	Red-rumped swallow	<i>Hirundo daurica</i>
192	Red-vented bulbul	<i>Pycnonotus cafer</i>
193	Red-wattled lapwing	<i>Vanellus indicus</i>
194	Red-whiskered bulbul	<i>Pycnonotus jocosus</i>
195	Red-winged bush-lark	<i>Miraфра erythroptera</i>
196	River tern	<i>Sterna aurantia</i>
197	Rock bush quail	<i>Perdica argoondah</i>
198	Rock eagle owl	<i>Bo bengalensis</i>
199	Rock pigeon	<i>Columba livia</i>

Sr.No.	Common Name	Scientific Name
200	Rose ringed parakeet	<i>Psittacula krameri</i>
201	Rosy starling	<i>Sturnus roseus</i>
202	Ruddy shelduck	<i>Tadorna ferruginea</i>
203	Ruff	<i>Philomachus pugnax</i>
204	Rufous-backed shrike	<i>Lanius schach</i>
205	Rufous-tailed finch-lark	<i>Ammomanes phoenicurus</i>
206	Savannah nightjar	<i>Caprimulgus affinis</i>
207	Shikra	<i>Accipiter badius</i>
208	Short eared owl	<i>Asio flammeus</i>
209	Singing bush-lark	<i>Mirafrca cantillans</i>
210	Sirkeer malkoha	<i>Taccocua</i>
211	Small bee-eater	<i>Merops orientalis</i>
212	Small blue kingfisher	<i>Alcedo atthis</i>
213	Small buttonquail	<i>Turnix Sylvatica</i>
214	Small minivet	<i>Pericrocotus cinnamomeus</i>
215	Southern coucal	<i>Centropus coucal</i>
216	Spot – billed duck	<i>Anas poecilorhyncha</i>
217	Spotted dove	<i>Streptopelia chinensis</i>
218	Spotted munia	<i>Lonchura</i>
219	Spotted owlet	<i>Athene brama</i>
220	Spotted redshank	<i>Tringa erythropus</i>
221	Stork billed kingfisher	<i>Halcyon capensis</i>
222	Temminck's stint	<i>Calidris temminckii</i>
223	Terek sandpiper	<i>Xenus cineris</i>
224	Thick-billed flowerpecker	<i>Dicaeum agile</i>

Sr.No.	Common Name	Scientific Name
225	Tickell's blue-flycatcher	<i>Cyornis tickelliae</i>
226	Tickell's flowerpecker	<i>Dicaeum erythrorhynchos</i>
227	Tufted duck	<i>Aythya fuligula</i>
228	Verditer flycatcher	<i>Eumyias thalassina</i>
229	Watercock	<i>Gallicrex cinerea</i>
230	White – naped woodpecker	<i>Chrysocolaptes festivus</i>
231	White breasted waterhen	<i>Amaurornis phoenicurus</i>
232	White throated kingfisher	<i>Halcyon smyrnensis</i>
233	White wagtail	<i>Motacilla alba</i>
234	White-bellied drongo	<i>Dicrurus paradiseus</i>
235	White-bellied minivet	<i>Pericrocotus erythropygius</i>
236	White-breasted waterhen	<i>Amaurornis Phoenicurus</i>
237	White-browed bulbul	<i>Pycnonotus luteolus</i>
238	White-browed fantail-flycatcher	<i>Rhipidura aureola</i>
239	White-necked stork	<i>Ciconia episcopus</i>
240	White-throated fantail-flycatcher	<i>Rhipidura albicollis</i>
241	White-throated ground thrush	<i>Zoothera citrina cyanotus</i>
242	White-throated munia	<i>Lonchura malabarica</i>
243	Wire-tiled swallow	<i>Hirundo smithii</i>
244	Wood sandpiper	<i>Tringa glareola</i>
245	Yellow bittern	<i>Lxobrychus sinensis</i>
246	Yellow legged button quail	<i>Turnix tanki</i>
247	Yellow wagtail	<i>Motacilla flava</i>
248	Yellow-crowned woodpecker	<i>Dendrocopos mahrattensis</i>
249	Yellow-footed green pigeon	<i>Treron phoenicoptera</i>
250	Yellow-throated sparrow	<i>Petronia xanthocollis</i>
251	Yellow-wattled lapwing	<i>Vanellus malabaricus</i>

D. CHECK LIST OF AMPHIBIANS AND REPTILES

Sr.No.	Common Name	Scientific Name
1	Asian common toad	<i>Duttaphrynus melanostictus</i>
2	Asian grass frog	<i>Fejervarya limnocharis</i>
3	Asian house gecko	<i>Hemidactylus frenatus</i>
4	Asian ornate frog	<i>Microhyla fissipes</i>
5	Asian painted frog	<i>Kaloula pulchra</i>
6	Banded kukri snake	<i>Oligodon arnensis</i>
7	Banded racer	<i>Argyrogena fasciolata</i>
8	Banded racer	<i>Argyrogena fasciolata</i>
9	Blanford's rock agama	<i>Psammophilus blanfordanus</i>
10	Brahminy worm snake	<i>Indotyphlops braminus</i>
11	Bronze grass skink	<i>Eutropis macularia</i>
12	Bronzeback tree snake	<i>Dendrelaphis tristis</i>
13	Brook's house gecko	<i>Hemidactylus brookii</i>
14	Buff striped keelback	<i>Amphiesma stolatum</i>
15	Buffstriped keel-back	<i>Natrix stolata</i>
16	Cat snake	<i>Boiga trigonta</i>
17	Checkered keel-back	<i>Xenochrophis piscator</i>
18	Common Indian krait	<i>Bungarus caeruleus</i>
19	Common Indian trinket snake	<i>Elaphe Helena</i>
20	Common rat snake	<i>Ptyas mucosus</i>
21	Common sand boa	<i>Gongylophis conicus</i>
22	Common wolf snake	<i>Lycodon aulicus</i>
23	Coral snake	<i>Calliophis melanurus</i>
24	Forest spotted gecko	<i>Cyrtodactylus speciosus</i>
25	Fungoid frog	<i>Hylarana malabarica</i>
26	Green keel-back	<i>Macropisthodon plumbicolor</i>

Sr.No.	Common Name	Scientific Name
27	Indian bullfrog	<i>Hoplobatrachus tigerinus</i>
28	Indian burrowing frog	<i>Sphaerotheca breviceps</i>
29	Indian cobra	<i>Naja naja</i>
30	Indian egg eater	<i>Elachistodon westermanni</i>
31	Indian egg-eater snake	<i>Elachistodon westernmann</i>
32	Indian forest lizard	<i>Calotes nemoricola</i>
33	Indian green frog	<i>Euphlyctis hexadactylus</i>
34	Indian marbled toad	<i>Duttaphrynus stomaticus</i>
35	Indian rock python	<i>Python molurus</i>
36	Indian smooth snake	<i>Coronella brachyura</i>
37	Indian tree frog	<i>Polypedates maculatus</i>
38	Red sand boa	<i>Eryx johini</i>
39	Russell's viper	<i>Vipera russelli</i>
40	Saw-scaled viper	<i>Echis carinatus</i>
41	Stout Sand Snake	<i>Psammophis longifrons</i>
42	Variegated or Russell's kukri snake	<i>Oligodon Taeniolatus</i>
43	Worm or Blind snake	<i>Ramphotyphlops braminus</i>
44	Yellow spotted wolf snake	<i>Lycodon flavomaculatus</i>

E. CHECK LIST OF FISH DIVERSITY

Sr.No.	Common Name	Scientific Name
1	Asian stinging catfish	<i>Heteropneusters fossilis</i>
2	Bata	<i>Labeo bata</i>
3	Bogabata	<i>Labeo boga</i>
4	Bronze featherback	<i>Notopterus kapirot</i>
5	Bronze featherback	<i>Notopterus notopterus</i>
6	Butter catfish	<i>Ompak bimaculatus</i>

Sr.No.	Common Name	Scientific Name
7	Catloa	<i>Catla catla</i>
8	Climbing perch	<i>Anabas testudineus</i>
9	Common carp	<i>Cyprinus carpio</i>
10	Dwarf snakehead	<i>Ophiocephalus gachua</i>
11	Elongate glassy perchlet	<i>Channa nama</i>
12	Freshwater garfish	<i>Xenentodon cancila</i>
13	Gangetic mystus	<i>Mystus cavasius</i>
14	Giant murrel	<i>Ophiocephalus marulius</i>
15	Giant murrel	<i>Channa marulius</i>
16	Giant river catfish	<i>Mystus seenghala</i>
17	Helicopter catfish	<i>Wallago attu</i>
18	Indian spiny eel	<i>Macrognathus pancalus</i>
19	Korang	<i>Barilius bendelisis</i>
20	Long-souted barb	<i>Puntitus dorsalis</i>
21	Migral carp	<i>Cirrinus mrigala</i>
22	Mottled eel	<i>Anguilla bengalensis</i>
23	Mozambique tilapia	<i>Tilapia mossambica</i>
24	Rohu	<i>Labeo rohita</i>
25	Spotted snakehead	<i>Channa punctatus</i>
26	Swamp barb	<i>Puntitus chola</i>
27	Tank goby	<i>Glossogobius giuris</i>
28	Ticto barb	<i>Barbacus ticto</i>
29	Walking catfish	<i>Clarius batrachus</i>
30	Zig-zag eel	<i>Mastocembelus armatus</i>

F. CHECK LIST OF BUTTERFLY DIVERSITY

Sr.No.	Common Name	Scientific Name
	Family: Papilionidae	
1	Common jay	<i>Graphium doson</i> (Felder and Felder, 1864)
2	Common mormon	<i>Papilio polytes</i> (Linnaeus, 1758)
3	Common rose	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)
4	Crimson rose	<i>Pachliopta hector</i> (Linnaeus, 1758)
5	Lime butterfly	<i>Papilio demoleus</i> (Linnaeus, 1758)
6	Spot swordtail	<i>Graphium nomius</i> (Esper, 1793)
7	Tailed jay	<i>Graphium agamemnon</i> (Linnaeus, 1758)
	Family: Pieridae	
1	Common Albatross	<i>Appias albino</i> (Fabricius, 1775)
2	Common Emigrant	<i>Catopsilia pomona</i> (Fabricius, 1775)
3	Common Grass Yellow	<i>Eurema hecabe</i> (Linnaeus, 1758)
4	Common Gull	<i>Cepora nerissa</i> (Fabricius, 1775)
5	Common Jezebel	<i>Delias eucharis</i> (Drury, 1773)
6	Common Wanderer	<i>Pareronia valeria</i> (Cramer, 1776)
7	Crimson Tip	<i>Colotis danae</i> (Fabricius, 1775)
8	Indian Pioneer	<i>Belenois aurota</i> (Fabricius, 1793)
9	Large Salmon Arab	<i>Colotis fausta</i> (Olivier, 1804)
10	Mottled Emigrant	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)
11	One Spot Grass Yellow	<i>Eurema andersoni</i> (Moore, 1865)
12	Psyche	<i>Leptosia nina</i> (Fabricius, 1793)
13	Small Grass Yellow	<i>Eurema brigitta</i> (Stoll, 1780)
14	Small Orange Tip	<i>Colotis etrida</i> (Boisduval, 1836)
15	Small salmon Arab	<i>Colotis amata</i> (Butler, 1870)

Sr.No.	Common Name	Scientific Name
16	Spotless Grass Yellow	<i>Eurema laeta</i> (Boisduval, 1836)
17	Three Spot Grass Yellow	<i>Eurema blanda</i> (Boisduval, 1836)
18	White Orange Tip	<i>Ixias Marianne</i> (Cramer, 1775)
19	Yellow Orange Tip	<i>Ixias pyrene</i> (Linnaeus, 1764)
	Family: Nymphalidae	
1	Angled Castor	<i>Ariadne ariadne</i> (Linnaeus, 1763)
2	Anomalous Nawab	<i>Polyura agrarian</i> (Linnaeus, 1764)
3	Baronet	<i>Euthalia nais</i> (Cramer, 1779)
4	Black Rajah	<i>Charaxes solon</i> (Fabricius, 1793)
5	Blue Pansy	<i>Junonia orithya</i> (Linnaeus, 1764)
6	Blue Tiger	<i>Tirumala limniace</i> (Cramer, 1775)
7	Chocolate Pansy	<i>Junonia iphita</i> (Cramer, 1779)
8	Commander	<i>Moduza procris</i> (Cramer, 1777)
9	Common Baron	<i>Euthalia aconthea</i> (Cramer, 1777)
10	Common Bush Brown	<i>Mycalesis perseus</i> (Fabricius, 1775)
11	Common Castor	<i>Ariadne merione</i> (Cramer, 1779)
12	Common Crow	<i>Euploea core</i> (Cramer, 1780)
13	Common Evening Brown	<i>Melanitis leda</i> (Linnaeus, 1758)
14	Common Five Ring	<i>Ypthima baldus</i> (Fabricius, 1793)
15	Common Four Ring	<i>Ypthima huebneri</i> (Kirby, 1871)
16	Common Leopard	<i>Phalanta phalantha</i> (Drury, 1773)
17	Common Nawab	<i>Polyura athamas</i> (Drury, 1773)
18	Common Sailer	<i>Neptis hylas</i> (Linnaeus, 1764)
19	Common Sergeant	<i>Athyma perius</i> (Linnaeus, 1763)
20	Common Three Ring	<i>Ypthima asterope</i> (Klug, 1832)

Sr.No.	Common Name	Scientific Name
21	Danaid Eggfly	<i>Hypolimnas misippus</i> (Linnaeus, 1764)
22	Dark Brand Bush Brown	<i>Mycalesis mineus</i> (Linnaeus, 1758)
23	Dark Evening Brown	<i>Melanitis phedima</i> (Cramer, 1780)
24	Double Branded crow	<i>Euploea Sylvester</i> (Fabricius, 1793)
25	Great Eggfly	<i>Hypolimnas bolina</i> (Linnaeus, 1758)
26	Grey Pansy	<i>Junonia atlites</i> (Linnaeus, 1763)
27	Joker	<i>Byblia ilithyia</i> (Drury, 1773)
28	Large Three Ring	<i>Ypthima nareda</i> (Kirby, 1871)
29	Lemon Pansy	<i>Junonia lemonias</i> (Linnaeus, 1758)
30	Painted Lady	<i>Synthia cardui</i> (Linnaeus, 1764)
31	Peacock Pansy	<i>Junonia almana</i> (Linnaeus, 1758)
32	Plain Tiger	<i>Danaus chrysippus</i> (Linnaeus, 1758)
33	Striped Tiger	<i>Danaus genutia</i> (Cramer, 1779)
34	Tawny Castor	<i>Acraea violae</i> (Fabricius, 1775)
35	Towny Rajah	<i>Charaxes bernardus</i> (Fabricius, 1793)
36	Yellow Pansy	<i>Junonia hierta</i> (Fabricius, 1775)
	Family: Lycaenidae	
1	Bright Babool Blue	<i>Azanus ubaldus</i> (Stoll, 1782)
2	Common Cerulean	<i>Jamides celeno</i> (Cramer, 1775)
3	Common Line Blue	<i>Prosotas nora</i> (Felder, 1860)
4	Common Pierrot	<i>Castalius rosimon</i> (Fabricius, 1775)
5	Common Shot Silverline	<i>Spindasis ictis</i> (Hewitson, 1865)
6	Common Silverline	<i>Spindasis vulcanus</i> (Fabricius, 1775)
7	Dark Grass Blue	<i>Zizeeria karsandra</i> (Moore, 1865)
8	Dingy Line Blue	<i>Petrelaea dana</i> (de Niceville, 1884)

Sr.No.	Common Name	Scientific Name
9	Dull Babool Blue	<i>Azanus uranus (Butler, 1886)</i>
10	Forget-Me-Not	<i>Catochrysops strabo (Fabricius, 1793)</i>
11	Gram Blue	<i>Euchrysops cnejus (Fabricius, 1798)</i>
12	Grass Jewel	<i>Freyeria trochylus (Freyer, 1845)</i>
13	Guava Blue	<i>Virachola isocrates (fabricius, 1793)</i>
14	Indian cupid	<i>Cupido lacturnus (Godart, 1824)</i>
15	Indian Red Flash	<i>Rapala airbus (Fabricius, 1787)</i>
16	Large Oak Blue	<i>Arphopala amantes (Hewitson, 1862)</i>
17	Lesser Grass Blue	<i>Zizina otis (Fabricius, 1787)</i>
18	Lime Blue	<i>Chilades lajus (Stoll, 1780)</i>
19	Pea Blue	<i>Lampides boeticus (Linnaeus, 1767)</i>
20	Peacock Royal	<i>Tajuria cippus (Fabricius, 1775)</i>
21	Plains Cupid	<i>Luthrodes pandava (Horsfield, 1829)</i>
22	Plum Judy	<i>Abisara echerius (Moore, 1901)</i>
23	Pointed Ciliate Blue	<i>Anthene lycaenina (C. Felder, 1868)</i>
24	Rounded Pierrot	<i>Tarucus extricates (Kollar, 1848)</i>
25	Slate Flash	<i>Rapala manea (Hewitson, 1863)</i>
26	Tailless Line Blue	<i>Prosotas dubiosa (Semper, 1879)</i>
27	Tiny Grass Blue	<i>Zizula hylax (Fabricius, 1775)</i>
28	Zebra Blue	<i>Leptotes plinius (Fabricius, 1793)</i>
	Family: Hesperidae	
1	Bevan's Swift	<i>Borbo bevani (Moore, 1878)</i>
2	Blank Swift	<i>Caltoris kumara (Moore, 1878)</i>
3	Brown awl	<i>Badamia exclamationis (Fabricius, 1775)</i>
4	Common Straight Swift	<i>Parnara guttatus (Bremer and Gray, 1853)</i>

Sr.No.	Common Name	Scientific Name
5	Conjoined Swift	<i>Pelopidas conjuncta (Moore, 1878)</i>
6	Dark Palm-Dart	<i>Telicota ancilla (Moore, 1878)</i>
7	Grass Demon	<i>Udaspes folus (Cramer, 1775)</i>
8	Indian Palm bob	<i>Suastus gremius (Fabricius, 1798)</i>
9	Indian skipper	<i>Spialia galba (Fabricius, 1793)</i>
10	Paintbrush Swift	<i>Baoris farri (Moore, 1878)</i>
11	Plain Banded Awl	<i>Hasora vita (Cramer, 1780)</i>
12	Rice swift	<i>Borbo cinnara (Wallace, 1866)</i>
13	Small branded swift	<i>Pelopidas mathias (Fabricius, 1798)</i>

PART - I

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

CHAPTER – 1

THE TRACT DEALT WITH

1.1 NAME AND SITUATION

Pandharkawada Forest Division is one of the four forest divisions in Yavatmal Circle. It is situated on the eastern side of Yavatmal District of Maharashtra.

EVOLUTION OF THE DISTRICT: The evolution of Yavatmal District traces its roots to the amalgamation of portions from the East Berar and Basim (now Akola district) districts. In 1864, the tahsils of Yeotmal, Darwha, Kelapur, and Wun (later renamed Wani) from the East Berar district were separated and amalgamated to form a new district initially known as South-East Berar and later as Wun district. In 1905, the tahsil of Pusad was transferred from the Washim district to the Wun district, leading to the renaming of the district as Yeotmal. As part of the state reorganization in 1956, the district transitioned from Madhya Pradesh to the then Bombay State. Since May 1, 1960, Yavatmal District has been an integral part of Maharashtra.

EVOLUTION OF THE FOREST DIVISION: In 1964, the original Yavatmal Forest Division underwent a reorganization, resulting in the establishment of two separate forest divisions—East Yavatmal and West Yavatmal Forest Divisions. Subsequently, the Forest Department underwent further reorganization in 1983, leading to the creation of three forest divisions: Yavatmal Forest Division, Pusad Forest Division, and Wani Forest Division, which emerged from the former East Yavatmal and West Yavatmal Forest Divisions. Later, in 1987, Wani Forest Division was renamed as Pandharkawada Forest Division, and its headquarters were relocated from Wani to Pandharkawada. The division encompasses the areas of Kelapur, Ralegaon, Maregaon, Ghatanji, Zari-Jamni, and Wani talukas within the Yavatmal District.

The total geographical area of the Pandharkawada Division is 4,97,030.76 hectares, with a gross forest area covering 95,957.77 hectares, accounting for 19.31% of the total area. The division's total forest area is 67,057.46 hectares,

comprising 63,302.17 hectares of reserved forest and 3,755.29 hectares of unclassed forests. This working plan will address a total of 67,057.46 hectares, with compartment-wise details provided in Appendix No. I. The Pandharkawada Forest Division spans from 19° 47" to 20° 30" north latitude and 78° 05" to 79° 08" east longitude.

BOUNDARIES: The boundaries of the division are outlined as follows

North	: Wardha River and Wardha District
North -East	: Wardha River and Wardha District
East	: Wardha River and Chandrapur District
South-East	: Painganga River and Chandrapur District
South	: Painganga River and Adilabad District of Telangana State
South-West	: Painganga River and Nanded District
West	: Arni taluka of Yavatmal district.
North -West	: Yavatmal taluka of Yavatmal district.

1.1.1 DEMOGRAPHIC DETAILS

Highlights from the 2011 Census for Yavatmal district are as follows:

- The district had a population of 27,72,348 with a population density of 204 inhabitants per square kilometer.
- The population growth rate over the decade 2001-2011 was 12.9%.
- The sex ratio of the district is 952.
- 21.58% of the population resided in urban areas. Scheduled Castes and Scheduled Tribes constituted 11.8% and 18.54% of the population, respectively.
- 79.2% of the main and marginal workers were engaged in the agriculture sector. Industrially, Yavatmal is one of the underdeveloped districts in the Amaravati region.
- The literacy rate of the district is 82.9%, with male and female literacy rates at 89.4% and 75.9%, respectively.

- 71% of households in the district use firewood as cooking fuel, while 21% use LPG, and the remaining 8% use other sources.

Demographic details of six talukas within the Pandharkawada Division are tabulated below.

TABLE NO. 1.1: POPULATION, LITERACY AND SEX RATIO OF TALUKAS IN PANDHARKAWADA FOREST DIVISION

Sr. No.	Taluka	No. of villages	Population	Population density (per sq. km)	Rural Population (%)	SC Population (%)	ST Population (%)	Literacy rate (%)	Sex ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Ghatanji	120	138587	145	84.6	8.2	28.9	81.65	948
2	Kelapur	140	156783	188	80.2	6.2	36.1	80.67	977
3	Ralegaon	133	112203	147	100	7.9	29	83.31	955
4	Maregaon	115	78713	130	100	5.1	33.4	82.28	963
5	Zari-Jamani	128	80147	114	100	5.8	38.6	77.70	986
6	Wani	160	213668	231	67.5	9.6	13.4	87.61	938
Weighted Average				173	84.4	7.6	27.6	82.98	958

1.2 CONFIGURATION OF THE GROUND

The Pandharkawada Forest Division is positioned on the southern uplands of Payanghat in Berar and the eastern section of the Ajanta hills. The terrain is characterized by hills and undulating landscapes broken by broad valleys and interspersed with gently sloping plains. The majority of the division's land constitutes a high-level plateau with an average elevation ranging from 350 meters to 400 meters, gently sloping towards the eastern portion. In certain areas, the plateau ascends through steep slopes to higher elevations, forming ridges that carry flat masses at the top, eventually developing into sharp crested peaks.

The headquarters of the Pandharkawada division is situated at an altitude of 263 meters above Mean Sea Level (MSL). The highest point in the area is found in the Bhimkund forest, specifically in compartment no. 183 near Majara village, with an altitude of 442 meters above MSL.

1.2.1 DRAINAGE

The entire area of the Pandharkawada Forest Division is drained by the river Painganga and the river Wardha, along with their tributaries. The river Painganga flows from west to east, serving as the southern boundary of the division. The Vaidarbha River, a tributary of Painganga, flows from the North East to the South West, converging with Painganga at Deurwada. Additionally, the Wardha River flows from the North West to the South East, meeting Painganga at Junad.

The headquarters of the Pandharkawada division is located on the banks of the river Khuni, a tributary of Painganga. While the Painganga and Wardha are perennial rivers, their tributaries tend to dry up during the summer months.

TABLE NO. 1.2: TALUKA WISE IRRIGATION PROJECTS IN PANDHARKAWADA FOREST DIVISION

Sr. No	Taluka	Project Size	Project Name	Storage Capacity (Million Cubic Meters)
(1)	(2)	(3)	(4)	(5)
1	Ghatanji	Medium	Waghadi	35.36
2		Minor	Kinhi	1.40
3			Chorkund	1.42
4			Kochi	7.04
5	Kelapur	Medium	Saikheda	27.18
6		Minor	Shivani	1.91
7			Muchi	1.34
8			Karanji	2.79
9			Karanwadi	3.92
10			Chopan	1.89
11			Wai	8.9
12	Maregaon	Medium	Navargaon	12.48
13		Minor	Khandani	3.07
14			Hatvanjari	2.35
15	Ralegaon	Minor	Pimpalkhuti	2.24
16			Bhulgad	1.90
17			Vihirgaon	3.03
18			Munjala	1.98
19			Digdoh	2.46
20			Khemkund	3.55
21			Warud	8.23
22			Yedashi	1.62
23			Dahegaon	3.12

Sr. No	Taluka	Project Size	Project Name	Storage Capacity (Million Cubic Meters)
(1)	(2)	(3)	(4)	(5)
24	Wani	Minor	Rasa	1.26
25			Khadakdoh	2.47
26			Borda	2.00
27	Zari Jamni	Minor	Pavnar	1.12
28			Mulgavhan	2.33
29			Satpalli	2.68
30			Chilai	1.7
31			Hivara	1.93
32			Pachapor	6.8

1.3 GEOLOGY, ROCK AND SOIL

The forests are located on the Deccan trap, characterized by significantly diverse basalts. The Archaean rocks are entirely concealed by Puranic rocks. Basalt is the predominant rock, exhibiting variations from homogeneous hard belts to soft and earthy belts. Soft belts are prevalent, and areas with patches of black sheet rocks are commonly observed. The disintegration of basalt results in the formation of different types of soil, exhibiting considerable variations in depth and physical properties.

Soil derived from common variety basalt ranges from sandy and clay loams to hard reddish murum, often intermixed with boulders of varying sizes. The soils resulting from these processes frequently blend with each other in varying proportions, containing sand, lime, and gravel in addition to the soil itself. Two broad categories of soil are commonly found in this division: medium black soil and mixed black soil.

1.4 CLIMATIC PARAMETERS

The division's climate is characterized by hot summers and overall aridity throughout the year, except during the south-west monsoon season, spanning from June to September. The temperature experiences a rapid rise from February to May, with May being the hottest month, reaching an average daily maximum temperature of 42.09°C. In contrast, December records an average daily minimum temperature of 13.86°C.

The annual average rainfall ranges from 948 mm to 1031 mm, with approximately 90% of the total annual rainfall occurring during the monsoon months (June to September).

Rainfall in the region is collected in dams, tanks, and wells, serving as a vital resource for agriculture, drinking water, and various other purposes. A network of canals connects the dams, facilitating the transfer of water to areas of utilization. Electric and diesel pumps are employed to lift water from tanks and wells, ensuring effective distribution.

TABLE NO. 1.3: AVERAGE MINIMUM AND MAXIMUM TEMPERATURE (°C)

Year	Station	January		February		March		April		May		June	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2013	Yavatmal	28.90	12.00	31.00	14.30	36.00	17.30	39.20	21.20	42.60	25.70	31.90	20.00
2014		28.40	14.50	30.60	15.20	22.90	18.30	39.30	23.40	40.60	26.10	38.50	26.00
2015		27.00	12.40	31.90	15.90	32.50	18.20	37.30	22.70	41.90	26.50	35.20	24.10
2016		30.70	14.60	34.40	19.30	37.40	21.60	41.80	25.60	41.20	27.20	36.40	25.00
2017		29.80	13.90	33.60	17.20	36.60	21.40	41.40	25.00	42.50	28.90	36.00	24.30
2018		30.70	13.90	32.40	17.80	37.20	21.50	41.20	25.70	43.60	29.40	35.20	23.10
2019		29.00	12.30	32.70	17.20	37.50	21.20	41.70	25.20	43.20	28.90	39.80	26.00
2020		27.10	14.90	30.30	17.50	37.50	21.20	39.10	25.10	42.80	27.20	34.40	24.10
2021		32.20	15.50	33.10	20.60	37.70	20.10	41.20	0.00	40.70	0.00	33.70	23.80
2022		28.10	13.70	31.80	15.40	38.10	21.30	42.30	25.60	42.30	26.60	38.00	25.10
2023		30.30	15.00	33.80	14.60	35.10	18.80	37.60	21.70	39.30	24.30	38.30	24.90
Average		29.29	13.88	32.33	16.82	35.32	20.08	40.19	21.93	41.88	24.62	36.13	24.22

Year	Station	July		August		September		October		November		December	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2013	Yavatmal	27.50	20.40	27.10	20.90	30.60	22.40	30.20	21.10	29.10	15.10	28.50	12.80
2014		31.30	22.70	37.80	27.70	29.70	20.70	32.30	19.50	31.40	16.30	27.70	11.70
2015		32.20	23.00	29.20	21.60	31.40	22.00	33.50	21.20	32.40	18.30	30.80	15.50
2016		29.10	22.50	29.50	22.50	29.70	21.70	31.10	18.20	30.90	12.90	29.50	12.80
2017		30.50	22.60	30.20	22.50	32.50	22.50	33.30	19.80	32.00	15.10	30.70	14.60
2018		28.30	22.00	28.10	21.20	32.20	21.10	46.20	19.10	33.60	15.90	28.50	12.80
2019		31.50	23.20	28.80	22.20	30.00	21.60	30.20	20.30	30.00	21.60	27.60	16.20
2020		32.20	23.10	29.70	22.50	31.80	22.10	32.20	20.10	31.80	15.20	31.30	13.90
2021		31.60	22.30	25.80	25.20	29.20	21.40	31.60	19.60	30.90	17.70	29.20	14.10
2022		29.30	22.50	31.50	22.30	31.80	21.80	32.10	18.70	31.40	13.20	30.90	15.80
2023		30.40	23.70	30.60	22.50	31.60	22.20	34.50	18.60	32.30	16.20	29.60	14.60
Average		30.35	22.55	29.85	22.83	30.95	21.77	33.38	19.65	31.44	16.14	29.48	14.07

**TABLE NO. 1.4 : ANNUAL RAINFALL DATA OF VARIOUS TALUKAS OF
PANDHARKAWADA FOREST DIVISION (2014 – 2023) (MM)**

Year	Ghatanji	Kelapur	Maregaon	Ralegaon	Wani	Zari Jamni
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2014	508	521	492	372	486	553
2015	540	622	396	468	570	441
2016	812	750	763	647	1092	761
2017	535	549	487	441	494	503
2018	1160	916	904	838	1065	1275
2019	805	805	947	868	981	942
2020	920	897	840	774	909	920
2021	1241	1202	1237	1120	1309	1372
2022	1354	1436	1379	1401	1482	1334
2023	1168	1256	1271	1171	1058	1044
Annual Average Rainfall	1031	1002	984	1031	948	984

CHAPTER 2

MAINTENANCE / INCREASE IN THE EXTENT OF FOREST AND TREE COVER

2.1 AREA OF FOREST UNDER DIFFERENT LEGAL CLASSES (RF, PF, UF AND OTHERS)

The Reserve Forests have been declared from time to time out of the changes of Government land by notifications or occasionally through acquisition under Land Acquisition Act. For the first time in 1871 the State forests were promulgated by the Forest Rules of 1871 which effected demarcation of Reserved Forests at that time. In 1892 under Berar Forest Law, State forests have been notified from time to time. Forest was notified again in detail in 1911, when Indian Forest Act was applied to Berar State and also the constitution of State forest under the Berar Forests Law was confirmed by issuing a general notification. Since then the changes in area or classification are notified under the Indian Forest Act.

There are basically two kinds of forests in the division namely Reserved Forests as declared under Indian Forest Act and Ex-private forests. The Reserved Forests are divided into 'A' and 'C' class according to the principles of forest management. In 'A' class Reserve Forest, the rules of fire protection are strict, closed for grazing and felling was regulated. However, in 'C' class Reserve Forests, rules for fire protection, grazing are not enforced but regulated with few restrictions on felling. However, this differentiation has blurred over time. The Ex-private forests were taken by Forest department for management but not declared either as Protected Forests or Reserved Forests and the Indian Forest Act was not applicable to these areas. The private forests were completely vested with the Government with the effect of abolition of Corporate Act, 1951 and were taken over by the Revenue Department. The Revenue Department utilized the excess areas for various purposes of villages under the recommendations of nistar officer Yavatmal and they have been subsequently taken over by Forest department. Later these areas were declared as Reserve Forest under Indian Forest Act, 1927.

2.1.1 AREA STATEMENT

The Area Statement during the Rai's Plan is as follows

The total geographical area of the Division	: 4,22,506 ha
Gross forest area in Pandharkawada Forest Division	: 84,712.08 ha
Forest area transferred to FDCM Ltd.	: 11,993.93ha
Forest area under Tipeswar Wildlife Sanctuary	: 13,917.13 ha
Forest area remaining with Pandharkawada Territorial Dn.	: 58,801.02 ha

As per Revenue & Forest GR No. TRS-06/2001/P.K.209/F-6 Dated 08/05/2003 & PCCF (HoFF) Maharashtra office letter No./ desk-7/ Estd-1/R. SR-139/ Reorg. Ytl/ (05-06)/140 (2013-14) dated 09/05/2013, reorganization of Pandharkawada Forest Division was carried out, where forest land was exchanged with Yavatmal Forest Division.

Current Detailed Area Statement is as follows

1. Total geographical area (after re-organization in 2013)	: 4,97,030.76 ha.
2. Gross Forest Area	: 95,957.66ha.
3. Area currently under FDCM's control	: 14,341.50ha.
4. Area currently under wildlife wing	: 14,730.96 ha.
5. Area dealt in Dr. R. N. Rai's Plan	: 58,801.02 ha.
6. Area received during Rai's Plan (2013-2023):	
a. From Yavatmal Division	: 8,669.65 ha
b. From FDCM	: 0.00 ha
c. From Revenue Department	: 1,751.32 ha
7. Area handed over during Rai's Plan (2013-2023):	
a. To Yavatmal Division	: 301.12 ha.
b. To FDCM	: 2,035.56 ha
8. Total Area dealt in this working plan	: 67,057.46 ha

The total forest area of Pandharkawada Division as on date is 67,057.46ha., out of which 63,302.17ha. are reserved forests and 3,755.29ha. are unclassified forests. A total of 67,057.46ha shall be dealt in this working plan. The details of the notification are mentioned in **AppendixNo.III**. The land acquired for compensatory afforestation and E-class land transferred from Revenue Department remained as Unclassed Forests, which needs to be proposed for declaration as Reserved Forests at the earliest. The area details are summarized in the table given below.

TABLE NO. 2.1: RANGEWISE DISTRIBUTION OF THE FOREST AREA (HA)

S. No.	Range	No. of Compartments	Reserve Forest (ha)	Protected Forest (ha)	Unclassed Forest (ha)	Total Area(ha.) (4+5+6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Pandharkawada	97	10508.00	0.00	1101.42	11609.42
2	Parwa	62	7901.25	0.00	1558.18	9459.43
3	Maregaon	61	10895.57	0.00	0.00	10895.57
4	Mukutban	42	7545.53	0.00	66.37	7611.90
5	Wani	89	9996.90	0.00	419.84	10416.74
6	Jamani	56	9421.82	0.00	84.95	9506.77
7	Ghatanji	38	7033.10	0.00	524.53	7557.63
	Total	445	63302.17	0.00	3755.29	67057.46

Details of 14,341.50 ha area under Yavatmal FDCM's jurisdiction are provided in **Appendix I (A)**.

2.1.2 ADMINISTRATIVE UNITS

For administrative convenience, Pandharkawada Forest Division has been divided into 7 ranges, 24 rounds and 90 beats. Details are given below:

TABLE NO. 2.2: ADMINISTRATIVE-UNIT WISE DISTRIBUTION OF FOREST AREA(HA)

Sr. No.	Range	Head Quarters	No. of Rounds	No. of Beats	Average Forest Area		
					Range	Round	Beat
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Pandhar-kawada	Pandhar-kawada	4	15	11609.42	2902.36	773.96
2	Parwa	Parwa	3	14	9459.43	3153.14	675.67
3	Maregaon	Maregaon	5	16	10895.57	2179.11	680.97
4	Mukutban	Mukutban	3	8	7611.90	2537.30	951.49
5	Wani	Wani	3	10	10416.74	3472.25	1041.67
6	Jamani	Patanbori	3	12	9506.77	3168.92	792.23
7	Ghatanji	Ghatanji	3	15	7557.63	2519.21	503.84
Average			3.4	12.9	9579.64	2794.06	745.08

2.2 FOREST AREA UNDER DIFFERENT WORKING CIRCLES

The area under different working circles during implementation of Dr. R. N. Rai's working plan for the period 2013-14 to 2022-23 is given in the following table:

TABLE NO. 2.3: AREA ALLOCATION TO DIFFERENT WORKING CIRCLES UNDER RAI'S PLAN

Sr. No.	Working Circle	No. of Comp.	Area Allotted in (ha)	Percentage Area Allotted	No. of Felling Series
(1)	(2)	(3)	(4)	(5)	(6)
1	Selection cum Improvement WC	110	30734.78	52 %	30
2	Afforestation WC	205	25552.50	44 %	22
3	Fodder Improvement WC	18	2513.74	04 %	2
	Total	333	58801.02	100 %	54

The area proposed under the different working circles in Pandharkawada Division during implementation of this working plan is given in the following table:

TABLE NO. 2.4: AREA ALLOCATION TO DIFFERENT WORKING CIRCLES

Sr. No.	Working Circle	No. of Compartments	Area Allotted (ha)	Percentage Area Allotted	No. of Working Series
(1)	(2)	(3)	(4)	(5)	(6)
1	Selection cum Improvement WC	134	35604.95	53 %	32
2	Afforestation WC	285	26996.44	40 %	21
3	Grassland & Fodder Improvement WC	26	4456.07	7 %	4
	Total	445	67057.46	100 %	57

Similarly, range-wise allocation of area proposed under different working circles is shown in the table below:

TABLE NO.2.5: RANGE-WISE AREA ALLOCATION TO DIFFERENT WORKING CIRCLES

Sr. No.	Range	SCI WC	AWC	FIWC	TOTAL (3+4+5)
(1)	(2)	(3)	(4)	(5)	(6)
1	Ghatanji	5475.58	1321.99	760.06	7557.63
2	Jamani	6321.06	3185.71	0.00	9506.77
3	Maregaon	6291.12	2920.67	1683.78	10895.57
4	Mukutban	4244.67	3268.90	98.33	7611.90
5	Pandharkawada	6961.93	4647.49	0.00	11609.42
6	Parwa	6310.59	3148.84	0.00	9459.43
7	Wani	0.00	8502.84	1913.90	10416.74
	Total	35604.95	26996.44	4456.07	67057.46

2.3 PERCENTAGE OF FOREST WITH SECURED BOUNDARIES

The boundaries are maintained under the 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. The

remaining forest area and private land boundaries need to be demarcated on the ground.

The entire forest and private lands need to be demarcated thoroughly and pre-cast pillars shall be erected expeditiously and maintain regularly. Appropriate demarcation, maintenance and regular vigilance have become inevitable in the recent times because of the increasing encroachment and hike in land value

A statement showing the extent of natural and artificial boundaries is given in **Appendix No. XXXI.**

2.4 LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

The condition of the forests and the changes in forest cover from 2017 to 2021 is shown below:

TABLE NO. 2.6: FOREST COVER CHANGE

Forest Density Class	Area in Ha.			% Change (4/2*100)
	2017	2021	Change w.r.t. to 2017 (3 -2)	
(1)	(2)	(3)	(4)	(5)
Very Dense	28.62	27.87	-0.75	-2.63 %
Moderate Dense	16587.62	16749.36	161.74	0.98 %
Open Forests	21479.85	21529.92	50.07	0.23 %
Scrub	661.47	730.01	68.54	10.36 %
No Vegetation	28144.18	27878.99	-265.19	-0.94 %
Water	155.44	141.20	-14.24	-9.16 %
Total	67057.46	67057.46	0.00	0 %

During the previous plan period, considering the forest cover assessments after the reorganization of the Division, the spread of Moderate Dense and Open forests increased marginally, while Very Dense forests decreased to a minor extent. A decrease in the water coverage is observed during the same period, while the extent of scrub increased to a similar extent.

2.4.1 DISFORESTATION

No disforestation is done in the division during the previous plan period.

2.4.2 AREA DIVERTED FOR NON- FORESTRY PURPOSES UNDER FOREST CONSERVATION ACT, 1980

A total area of 897.44 ha. forest land has been diverted for non-forestry purposes during the last plan period in the division. And, an area of 100 ha. is received for compensatory afforestation during the same period. The prescription for compensatory afforestation land is allotted to concerned working circles adjoining to the area. For example, if the CA land is adjoining to a compartment of Afforestation working circle, then CA land is allotted to AWC. Details of projects are as follows:

TABLE NO. 2.7: AREA DIVERTED FOR NON- FORESTRY PURPOSES UNDER FOREST CONSERVATION ACT, 1980

Sr. No.	Project	Diverted Area		CA Land			
		Area diverted in Ha.	Compartments	Village	Survey No.	Area in Ha.	Status of land (RF/PF)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	RCCPL Mukutban Cement Project	467.45	c-27, c26, c33	An area of 467.45 ha has been provided as Compensatory Afforestation land in Chiplun Tehsil, Ratnagiri District.			
2	765 K.V D/C Warora to Parali Transmission line	17.42	531, 154 and 211	-			
3	220 K.V D/C Wani to Pandharkawada Transmission line	3.57	10 and 613	-			
4	Ghonsa open cast coal mine (WCL)	24.00	C-48A	-			
5	Lower Paiganga Project	385.00	666, 667, 668, 176, 177, 191, 54, 55, c-88, c-90, c-91, v-92, c-93, 47, c-30, c-31, c-26, c-27, 20B, c-121, 148, 120,121, 123, 60, 61 58, 59, c-104, 101, 102, 106, 103, 104, 124, 126 and133	Shiwani, Ghatanji Taluka	523p	100	-

The details of forest area diverted for non-forestry purposes under FCA, 1980 is given in **Appendix No. V** of Volume II. The total forest area received for compensatory afforestation against FCA, 1980 is 100 ha and details are provided in **Appendix No.XLIX** of Volume II. The details of “identified forests” as per Supreme Court order is given in **Appendix No. I (B)** of Volume II.

2.4.3 AREA DIVERTED FOR NON- FORESTRY PURPOSES UNDER FOREST RIGHT ACT, 2006

A total of 694 individual rights claims and 315 community rights claims pertaining to gross forest area of Pandharkawada Forest Division (including FDCMand Wildlife area) were accepted by the DLC. An abstract is given below:

TABLE NO. 2.8: THE STATUS OF IMPLEMENTATION OF FRA 2006 IN PANDHARKAWADA FOREST DIVISION (INCLUDING WILDLIFE AND FDCM AREA)

Sr. No.	Type of FRA benefit	No. of claims submitted at Gram Sabha	No. of claims accepted by DLC	Percentage of acceptance	Total Area of accepted claims (ha.)	Percentage of gross forest area
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Individual Forest Rights	2528	694	27.45 %	1076.77	1.27 %
2	Community Forest Rights	316	315	99.68 %	74766.22	88.26 %
3	Benefits u/s 3(2)	26	26	100 %	10.69	0.01 %
	Total	2870	1035	36.06 %	-	-

The details are given in **Appendix No.VI**.

2.5 THREATS TO THE FOREST

The forests of Pandharkawada forest division suffer from unregulated grazing, illicit felling, encroachments and repeated forest fires. They disrupt the flow of goods and services from forests by affecting tree growth and survival, water quality and biodiversity. The other agencies which caused injury to the forests such as droughts, frost, floods, plants and insects are negligible.

ILLCIT FELLING: Illicit felling happens for commercial and domestic purposes. As this forest is adjoining to the border district of Nanded, people within the district and from adjoining areas indulge in illicit felling in areas where the good quality teak forests are available. Sometimes people from the adjoining State of Telangana come in groups, cut teak timber and transport it illegally where they get higher prices. Local people in and around the forest area of the division may indulge in illicit felling for meeting their domestic needs such as requirement of fuel, small timber, firewood as there is a huge gap between demand and supply of forest produce. People generally indulge in illicit felling due to unemployment, higher prices of some of the forest products in the market like teak. Lopping of trees and shrubs for rab burning is also observed. In general, illicit felling, lopping and pollarding of forest species has further deteriorated the forest crop in terms of quality and quantity.

FIRE : Forest fires are most destructive in the dry season from February and continue up to June. During this period the forests are vulnerable to fires and the fires that take place by the end of winter and at the beginning of summer are not very damaging. Most of the fires that take place in these forests are man-made and hamper the establishment of natural regeneration. The damage is very severe when freshly felled material is lying in the coupe and fire takes place in the plantation. Young regeneration suffers a lot as they get damaged or killed due to die back. In this area fires are ignited by grazers, intentionally or unintentionally or by villagers who go for Mahua (*Madhuca longifolia*) collection and by people indulged in Tendu (*Diospyros melanoxylon*) leaf collection. Repeated fires in the forest areas during the dry season

cause extensive damage to the tree growth and reproduction. Late fires in the grassy areas or in closed coupes result in fire calamity. In this area fires are generally ground fires and creeping fires which may not reach to crown level as in case of conical forests. Fires cause a lot of damage not only to regeneration but also to wildlife. It also destroys various microbes in the soil which convert leaf litter into humus. The total area of forests affected during the previous plan period due to forest fires is 1490.05 ha.

GRAZING: Grazing is another damaging agency of forests which destroys young regeneration, plantation due to trampling of the areas and excessive movement of cattle population leads to compaction of soil resulting in less porosity of the soil. This makes the soil less conducive for the establishment of young regeneration. Uncontrolled cattle movement is very much common in the forests around the villages. Continuous, unrestricted grazing is very much harmful for the tree growth and also for the establishment of regeneration. The forests establish well in the areas where there is regulated grazing or no grazing. On the contrary, considerable damage has been noticed in the areas where there is uncontrolled excessive grazing more than the carrying capacity of the forests. Grazing in the forests is not uniform as cattle population is restricted to village areas. The grazing pressure is very much serious in the forests especially in summer season i.e. February to June. During this period the forests go dry and, in some areas, the grazers indulge in lopping of trees to feed their cattle. Sheep and goats are not allowed to graze in the forests which are meant for production of timber. However, the forests are still suffering from grazing of sheep and goats in this region.

ENCROACHMENTS: The encroachments though may not be serious in this area but forest areas adjoining agricultural fields of farmers are being encroached especially during the month of monsoon. Some of the forest areas have been cleared, denuded and utilized for agricultural purposes.

TABLE NO.2.9: RANGE WISE ENCROACHMENT ON FOREST AREA

Sr.No.	Name of Range	Compartment No.	Area (ha.) under Encroachment
(1)	(2)	(3)	(4)
1	Parawa	C- 108, 810, CA 110, 663, 820, C 121	117.31
2	Mukutban	C 31A, C32 A, C30, C 45, C44	221.73
3	Pandharkawada	642, 647, 65, C71, C81, CA 78, C- Class Sukali Sur. No. 30, CA 106, 120, C76 B, C97, 61, 638, C 104 B, 637, C 100, 636, 639, 640, C101, 643 B, C 80 A, C 99, C100, C 83	383.80
4	Wani	C 37B, C 16, 807, 808, C 15, 4, C7F, C 50, C35A, C36B, C35B, C42A, C15 D, C15 E, C15 F, C18, C 37A, C 14A, C38, C 42 B, C 42 C, C 40, C 15 B, C 39 B, C 48 A, C 48 B, C 49	485.64
5	Jamani	632 A, 66, C-89, C-93, C-95, C-91, 53, 54, C-105, 632 A, C-94, 48, C-90 B	152.21
6	Maregaon	C69,C68,C47,C62,C77,C65,650,C66,C1AC1B	98.93
7	Ghatanji	909, 915	41.14
Total			1500.76

DAMAGE BY WILD ANIMALS : In Pandharkawada Division, wild animals responsible for damaging young regeneration through grazing and browsing are predominantly black buck, nilgai, and to some extent, chital. Furthermore, wild pigs, hares, and porcupines contribute to the damage occurring within the plantation. Notably, wild pigs are observed causing harm to bamboo plantations during their early growth stages. Porcupines, on the other hand, tend to consume the rhizome and bark of trees such as Haldu, Moha, and Amaltas near the tree's base, which negatively impacts the tree's establishment.

Monkeys are known to cause significant damage to flowers and fruits on the trees. Chital, specifically, pose a threat by damaging the bark of Shivan trees at their base, resulting in the tree's girdling and subsequent death. However, it is worth mentioning that the damage inflicted by wild animals is relatively less severe when compared to the harm caused by domestic animals.

INSECTS AND FUNGI: In this area teak skeletonizer (*Eutectona machaeralis*) and teak defoliator (*Hyblaea puera*) are common. The insect attack is noticed mostly during rainy season.

INVASIVE ALIEN SPECIES: Among the major threats faced by native plants and animal species (and their habitats), the one posed by the invasive alien species is alarming since it is considered second only to that of habitat loss. Damage by Lantana (*Lantana camara*) and Ran-tulas (*Hyptis suaveolens*) is noticed affecting both regeneration and growth by covering forest growth and competing for space. Although other invasive species such as Gliricidia (*Gliricidia sepium*), Subabul (*Leucaena leucocephala*), Prosopis (*Prosopis juliflora*) etc. are noticed in this tract, their presence is not that substantial to impact the local flora and fauna. Damage by climbers mostly confines to the forests along the river bank and along the nala banks in this area. Chilati (*Acacia pinnata*) and Iruni (*Zizyphus oenoplia*) are the main climbers which cause harm to the forest in this area.

DROUGHT: Drought affects the growth of plantation, establishment of regeneration and also growth of forest crops as the soil moisture and water are vital ingredients of growth and regeneration.

FROST: Injury due to frost is not seen in this area.

WIND STORMS: No considerable damage is noticed due to wind storms in this area.

SOIL EROSION: Soil erosion is noticed in this area especially along the river and streams. Sheet erosion is very common in the entire area. Gully formation takes place due to erosion along the river banks. In some of the areas, roots of trees are exposed due to excessive erosion of the soil leading to the windfall of the trees.

2.6 DISTRIBUTION OF DIFFERENT FOREST TYPES

As per Champion and Seth's classification, forests of Pandharkawada Forest Division fall in Group 5 "Tropical Dry Deciduous Forests" and belongs to sub- group 5 A- "Southern Tropical Dry Deciduous". Climax types observed include 5A/C_{1b}-Dry Teak Forest, 5A/C₃ – Southern Dry Mixed Deciduous Forest and 5/DS₁ – Dry Deciduous

Scrub. The major area of division is covered by teak forests, generally of coppice origin. The crop is stunted in areas near human habitation and straight-boled in remote areas.

The forests are categorized on the basis of various local factors like soil texture, depth, soil moisture, topography and also environmental conditions. Most of these forests suffer from biotic factors like heavy grazing, illicit felling and repeated fire incidences and also to some extent encroachments. The forests of the division are situated under soils derived from underlying trap characterized by presence of teak of different qualities depending upon the configuration of ground, soil depth, structure and moisture contents of the soil. These forests are characterized by the presence of quite a high proportion of teak (upto 70 %). Majority of the forest area represents site quality IV.

2.7 TREE COVER OUTSIDE FOREST AREA

Accurate evaluation of a country's forest and tree resources is crucial for developing effective strategies in the forestry sector. Precise data and up-to-date information on forest cover, volume of growing stock, and changes in trends are fundamental for policy formulation and planning purposes. In most countries, there is a significant amount of tree wealth existing outside continuous forested areas, known as "Trees Outside Forests" (TOF). These trees can be found in small woodlots, block plantations, along linear features such as roads and canals, and scattered on farmlands, homesteads, community lands, and urban areas. Traditionally, TOF were not thoroughly surveyed, and limited quantitative information was available. However, there has been increasing global interest in TOF due to their contribution to the rural economy and as a source of valuable forest produce.

The establishment of tree populations along avenues has been a widespread practice since the 1950s, primarily along roads, railway tracks, bunds, canals, riverbanks, parks, blocks, and other vacant areas. Subsequently, farm forestry, agroforestry, and wasteland afforestation activities have further enhanced the abundance of trees in the state. The Forest Survey of India (FSI), has been conducting

assessments of TOF. However, such an assessment has not been conducted specifically for Yavatmal district.

From 2011 to 2022, Social forestry division of Yavatmal has carried out roadside linear plantations of 785.70 kms with 3,92,850 sapling sand block plantations of 261.87 hectares with 2,90,937 saplings. Detailed information can be found in **Appendix No. VII (A)** and **Appendix No. VII (B)**.

2.8 SHIFTING CULTIVATION (JHUMMING)

Shifting cultivation is not practiced in this forest division.

CHAPTER 3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

3.1 FOREST COMPOSITION AND DISTRIBUTION

The Forests of Pandharkawada Forest Division belong to the following types as per the revised classification of forest types of India by H.G.Champion & S.K.Seth :

Group	: 5 Tropical dry deciduous Forests
Sub group	: 5A Southern Tropical dry deciduous forests
Climax types	: a) 5A/C ₃ – Southern Dry Mixed Deciduous Forest b) 5A/C _{1a} – Very Dry Teak Forests c) 5/DS ₁ – Dry Deciduous Scrub

The forests are categorized 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 certain 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. In certain areas adjoining human habitations there is no understorey or understorey has sparse vegetation. The crop density varies from 0.2 to 0.7 and blank patches also occur frequently. The soil is compact, dry and full of boulders at places. The natural regeneration of both teak and miscellaneous species is inadequate. The proportion of teak in growing stock is high.

3.1.1 FLORISTIC COMPOSITION

3.1.1.1 5A/C₃ – SOUTHERN DRY MIXED DECIDUOUS FOREST

This type of forests is distributed where soil is formed from trap rock and gneiss and it is characterized by deep soil accumulated due to siltation. In

Pandharkawada Forest Division, are mostly found in patches in Mukutban, Jamni, Parwa range and southern part of Maregaon ranges. Density of crop varies from 0.2 to 0.7 and the 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:

TABLE NO. 3.1: FLORISTIC COMPOSITION

Sr. No.	Upper Storey	
	Local Name	Botanical Name
(1)	(2)	(3)
1	Teak	<i>Tectona grandis</i>
2	Ain	<i>Terminalia alata</i>
3	Dhawada	<i>Anogeissus latifolia</i>
4	Tiwas	<i>Ougenia oojeinesis</i>
5	Lendia	<i>Lagerstroemia parviflora</i>
6	Tendu	<i>Diospyros melanoxylon</i>).
7	Satpudi	<i>Dalbergia paniculata</i>
8	Bhirra	<i>Chloroxylon swietenia</i>
9	Kalam	<i>Mitragyna parviflora</i>
10	Rohan	<i>Soymida febrifuga</i>
11	Salai	<i>Boswellia serrata</i>
12	Semal	<i>Bombax ceiba</i>
13	Beheda	<i>Terminalia bellirica</i>
14	Sisham	<i>Dalbergia latifolia</i>
15	Bija	<i>Pterocarpus marsupium</i>
16	Bel	<i>Aegle marmelos</i>
Under Storey: The understory consists of trees, shrubs, grass and climbers. The major species are:		

Sr. No.	Upper Storey	
	Local Name	Botanical Name
(1)	(2)	(3)
	Trees	
17	Amaltas	<i>Cassia fistula</i>
18	Awala	<i>Emblica officinalis</i>
19	Char	<i>Buchanania lanzan</i>
20	Dudhi	<i>Wrightia tinctoria</i>
21	Ghoti	<i>Zizyphus xylocarpa</i>
22	Palas	<i>Butea monosperma</i>
23	Dhaman	<i>Grewia tiliaefolia</i>
24	Moyen	<i>Lannea grandis</i>
25	Bartondi	<i>Morinda tinctoria</i>
26	Lokhandi	<i>Ixora parviflora</i>
	Shrubs	
27	Bharati	<i>Gymnosporia montana</i>
28	Parijatak	<i>Nyctanthes arbortristis</i>
29	Moroghphali	<i>Helicteres isora</i>
30	Dhayati	<i>Woodfordia fruticosa</i>
31	Raymuniya	<i>Lantana camara</i>
32	Tendu	<i>Diospyros melanoxylon</i>
	Grasses	
33	Bhurbhusi	<i>Eragrostis tenella</i>
34	Kodmor	<i>Apluda varia</i>
35	Marvel	<i>Andropogon annulatus</i>
36	Dub	<i>Cynodon dactylon</i>
37	Paonya	<i>Schima sulcatum</i>

Sr. No.	Upper Storey	
	Local Name	Botanical Name
(1)	(2)	(3)
	Climbers	
38	Palasvel	<i>Butea superba</i>
39	Mahul	<i>Bauhinia vahlii</i>
40	Pivervel	<i>Combretum ovalifolium</i>
41	Chilati	<i>Acacia pinnata</i>
42	Iruni	<i>Zizyphus oenoplia</i>
43	Gunj	<i>Abrus precatorius</i>
44	Rankand	<i>Dioscorea bulbifera</i>
45	Ran draksh	<i>Vitex tenuifolia</i>

3.1.1.2 5A/C_{1a}– VERY DRY TEAK FORESTS

These forests are the most widespread and situated in all ranges of the Division. These forests are subjected to illicit felling, encroachments, uncontrolled grazing, frequent fires etc. The crop is dominated by teak. Under storey of the crop is lacking or inadequate because of excessive biotic pressure. The majority of forest area of Pandharkawada Forest Division is covered by poor quality teak forests which are mainly of coppice origin. The site quality in these areas is mostly IV also III at very few places. The area of these forests is mostly undulating and hilly. The density of the crop vary from 0.2 to 0.6. The status of natural regeneration is very poor. The soil is compact, murumy with lot of boulders and without humus. The floristic composition is almost similar to that of 5A/C3 type, except that the proportion of teak is higher.

3.1.1.3 5/DS₁ – DRY DECIDUOUS SCRUB

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. They are found mostly in Wani and Maregaon ranges, and to some extent in Ghatanji range, of the Division. 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. Presence of trees is very less and contains scrubs and grasses. The soil is generally murumy, highly compact and without any humus. The following species are found in this type of forest:

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 xylopura*), Nirgudi (*Vitex negundo*), etc.

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

3.2 PLANT SPECIES DIVERSITY

The Importance Value Index (IVI) is a quantitative measure used in ecological studies to assess the relative significance of different species within a given ecosystem. It takes into account the abundance, frequency, and dominance of each species to determine its overall importance in the community. By considering both the presence and abundance of species, the IVI provides a more comprehensive understanding of the ecological role and impact of each species. IVI helps in identifying key species that contribute significantly to the structure and dynamics of an ecosystem, helping prioritize conservation efforts and better comprehend the overall biodiversity and ecological health of a particular habitat.

The Importance Value Index (IVI) of each species was estimated as $IVI = RA + RD + RF$, where RA is relative abundance calculated as the number of individuals *per species per hectare*, RD is relative dominance defined as the basal area *per species per hectare* and RF is relative frequency (*per ha*) estimated as the proportion of plots where the species occurred at least once. IVI is prepared for

Pandharkawada Division as per the enumeration data gathered by SOFR Gadchiroli team in 565 enumeration sample plots.

TABLE NO. 3.2: IMPORTANCE VALUE INDEX (IVI) TABLE FOR TREES

OFPANDHARKAWADA FOREST DIVISION

Sr. No	Species	Relative Frequency			Relative Density			Relative Basal Area		IVI	IVI %
		Plots (Count)	Frequency	Relative Frequency (%)	Species (Count)	Density	Relative Density (%)	Basal Area (Sum)	Relative Basal Area (%)	(Importance Value Index)	
1	2	3	4	5	6	7	8	9	10	11	12
1	Alai	15	0.026549	0.678426	27	0.477876	0.2212	0.497915	0.1175	1.0172	0.34
2	Anjan	10	0.017699	0.452284	15	0.265487	0.1229	2.234419	0.5273	1.1025	0.37
3	Apta	6	0.010619	0.27137	8	0.141593	0.0656	0.152922	0.0361	0.3730	0.12
4	Aaran	1	0.00177	0.045228	1	0.017699	0.0082	0.008138	0.0019	0.0553	0.02
5	Ain	145	0.256637	6.558119	396	7.00885	3.2448	18.46991	4.3589	14.1619	4.72
6	Amaltas	61	0.107965	2.758933	84	1.486726	0.6883	1.229132	0.2901	3.7373	1.25
7	Anduli	2	0.00354	0.090457	2	0.035398	0.0164	0.06005	0.0142	0.1210	0.04
8	Awala	2	0.00354	0.090457	4	0.070796	0.0328	0.040794	0.0096	0.1329	0.04
9	Babhul	4	0.00708	0.180914	6	0.106195	0.0492	0.278148	0.0656	0.2957	0.10
10	Behada	45	0.079646	2.035278	91	1.610619	0.7457	3.720773	0.8781	3.6590	1.22
11	Bel	7	0.012389	0.316599	9	0.159292	0.0737	0.346805	0.0818	0.4722	0.16
12	Bhera	60	0.106195	2.713704	205	3.628319	1.6798	6.978091	1.6468	6.0403	2.01
13	Biba	3	0.00531	0.135685	6	0.106195	0.0492	0.121618	0.0287	0.2136	0.07
14	Bibala	2	0.00354	0.090457	3	0.053097	0.0246	0.131496	0.0310	0.1461	0.05
15	Bharati	3	0.00531	0.135685	3	0.053097	0.0246	0.024414	0.0058	0.1660	0.06
16	Bor	1	0.00177	0.045228	1	0.017699	0.0082	0.008655	0.0020	0.0555	0.02
17	Charoli	22	0.038938	0.995025	36	0.637168	0.2950	1.086271	0.2564	1.5464	0.52
18	Chinch	16	0.028319	0.723655	18	0.318584	0.1475	1.752685	0.4136	1.2848	0.43
19	Dhaman	1	0.00177	0.045228	1	0.017699	0.0082	0.017556	0.0041	0.0576	0.02
20	Dhawada	122	0.215929	5.517866	389	6.884956	3.1875	19.66111	4.6400	13.3454	4.45
21	Dudhkuda	64	0.113274	2.894618	177	3.132743	1.4503	3.829819	0.9038	5.2488	1.75
22	Garadi	3	0.00531	0.135685	7	0.123894	0.0574	0.086705	0.0205	0.2135	0.07
23	Ghoti	2	0.00354	0.090457	10	0.176991	0.0819	0.219394	0.0518	0.2242	0.07
24	Girikunj	1	0.00177	0.045228	1	0.017699	0.0082	0.024923	0.0059	0.0593	0.02
25	Haldu	2	0.00354	0.090457	4	0.070796	0.0328	0.524523	0.1238	0.2470	0.08
26	Haldbera	1	0.00177	0.045228	1	0.017699	0.0082	0.015386	0.0036	0.0571	0.02
27	Hiwar	44	0.077876	1.99005	77	1.362832	0.6309	1.769493	0.4176	3.0386	1.01
28	Kadamb	4	0.00708	0.180914	4	0.070796	0.0328	0.29955	0.0707	0.2844	0.09
29	Neem	77	0.136283	3.482587	120	2.123894	0.9833	3.798109	0.8964	5.3622	1.79
30	Kalamb	22	0.038938	0.995025	24	0.424779	0.1967	2.304793	0.5439	1.7356	0.58
31	Karai	3	0.00531	0.135685	5	0.088496	0.0410	0.462931	0.1093	0.2859	0.10
32	Kalmi	1	0.00177	0.045228	1	0.017699	0.0082	0.014019	0.0033	0.0567	0.02
33	katsavar	2	0.00354	0.090457	2	0.035398	0.0164	0.247988	0.0585	0.1654	0.06

Sr. No	Species	Relative Frequency			Relative Density			Relative Basal Area		IVI	IVI %
		Plots (Count)	Frequency	Relative Frequency (%)	Species (Count)	Density	Relative Density (%)	Basal Area (Sum)	Relative Basal Area (%)	(Importance Value Index)	
1	2	3	4	5	6	7	8	9	10	11	12
34	Khair	34	0.060177	1.537766	59	1.044248	0.4834	2.259588	0.5333	2.5545	0.85
35	Koti	1	0.00177	0.045228	1	0.017699	0.0082	0.060153	0.0142	0.0676	0.02
36	Kuda	7	0.012389	0.316599	13	0.230088	0.1065	0.599712	0.1415	0.5647	0.19
37	Kumbhi	1	0.00177	0.045228	1	0.017699	0.0082	0.011476	0.0027	0.0561	0.02
38	Karanj	1	0.00177	0.045228	2	0.035398	0.0164	0.031511	0.0074	0.0691	0.02
39	Katbor	1	0.00177	0.045228	1	0.017699	0.0082	0.0103	0.0024	0.0559	0.02
40	Kawath	4	0.00708	0.180914	5	0.088496	0.0410	0.153296	0.0362	0.2581	0.09
41	Kavi	1	0.00177	0.045228	1	0.017699	0.0082	0.035675	0.0084	0.0618	0.02
42	kinhi	1	0.00177	0.045228	1	0.017699	0.0082	0.019868	0.0047	0.0581	0.02
43	kukadi	4	0.00708	0.180914	7	0.123894	0.0574	0.081174	0.0192	0.2574	0.09
44	Kula	2	0.00354	0.090457	7	0.123894	0.0574	0.063332	0.0149	0.1628	0.05
45	Lendia	99	0.175221	4.477612	318	5.628319	2.6057	7.275965	1.7171	8.8005	2.93
46	Lokhandi	13	0.023009	0.587969	18	0.318584	0.1475	0.503526	0.1188	0.8543	0.28
47	maharukh	1	0.00177	0.045228	1	0.017699	0.0082	0.019868	0.0047	0.0581	0.02
48	Medshing	5	0.00885	0.226142	7	0.123894	0.0574	0.667288	0.1575	0.4410	0.15
49	Moha	58	0.102655	2.623248	96	1.699115	0.7866	11.20759	2.6450	6.0549	2.02
50	Mowai	70	0.123894	3.165989	148	2.619469	1.2127	12.51068	2.9525	7.3312	2.44
51	Pakali	4	0.00708	0.180914	6	0.106195	0.0492	0.38763	0.0915	0.3216	0.11
52	Pimpal	1	0.00177	0.045228	1	0.017699	0.0082	0.235113	0.0555	0.1089	0.04
53	Palas	412	0.729204	18.6341	2139	37.85841	17.5270	52.52964	12.3971	48.5582	16.19
54	Roda	1	0.00177	0.045228	1	0.017699	0.0082	0.012716	0.0030	0.0564	0.02
55	Rohan	24	0.042478	1.085482	42	0.743363	0.3441	2.64458	0.6241	2.0538	0.68
56	Salai	59	0.104425	2.668476	118	2.088496	0.9669	12.35467	2.9157	6.5511	2.18
57	Satpuda	1	0.00177	0.045228	1	0.017699	0.0082	0.067266	0.0159	0.0693	0.02
58	Seena	38	0.067257	1.718679	82	1.451327	0.6719	1.571709	0.3709	2.7615	0.92
59	Shelzari	1	0.00177	0.045228	1	0.017699	0.0082	0.018311	0.0043	0.0577	0.02
60	Shembadi	1	0.00177	0.045228	1	0.017699	0.0082	0.094422	0.0223	0.0757	0.03
61	Shevdor	4	0.00708	0.180914	8	0.141593	0.0656	0.888414	0.2097	0.4561	0.15
62	Shivan	2	0.00354	0.090457	2	0.035398	0.0164	0.070135	0.0166	0.1234	0.04
63	Siju	1	0.00177	0.045228	1	0.017699	0.0082	0.099691	0.0235	0.0769	0.03
64	Surya	1	0.00177	0.045228	1	0.017699	0.0082	0.009187	0.0022	0.0556	0.02
65	Shiras	2	0.00354	0.090457	2	0.035398	0.0164	0.051658	0.0122	0.1190	0.04
66	Subabhul	1	0.00177	0.045228	1	0.017699	0.0082	0.012716	0.0030	0.0564	0.02
67	Teak	424	0.750442	19.17684	6889	121.9292	56.4487	234.7382	55.3985	131.0240	43.67
68	Tendu	174	0.307965	7.869743	476	8.424779	3.9004	11.84169	2.7947	14.5648	4.85
69	Umber	1	0.00177	0.045228	2	0.035398	0.0164	0.095566	0.0226	0.0842	0.03
70	Yadukolasa	1	0.00177	0.045228	5	0.088496	0.0410	0.064087	0.0151	0.1013	0.03
71	Yerani	1	0.00177	0.045228	1	0.017699	0.0082	0.009735	0.0023	0.0557	0.02
	Total			100			100		100	300	100

As per the above table, in Pandharkawada Forest Division, Teak has the maximum IVI with 131.02, followed by Palas (48.56), Tendu (14.56), Ain (14.16) and Dhawada (13.35).

3.3 STATUS OF BIODIVERSITY CONSERVATION IN FORESTS

The Biological Diversity Act, 2002 provides for establishment of Local level Biodiversity Management Committees to deal with any matter concerning conservation of biological diversity, its sustainable use and fair and equitable sharing of benefits arising out of the use of biological resources and associated knowledge.

A total of 429 Biodiversity Management Committees have been established at the gram panchayat level in the talukas of Pandharkawada Division. The details are as follows:

TABLE NO. 3.3: LIST OF TALUKAWISE BIODIVERSITY MANAGEMENT COMMITTEES

Sr.No.	Taluka	Number of Gram Panchayats	BMCs established
(1)	(2)	(3)	(4)
1	Ghatanji	71	71
2	Kelapur	74	74
3	Ralegaon	73	73
4	Maregaon	56	56
5	Zari-Jamani	54	54
6	Wani	101	101
	Total :-	429	429

The forests of Pandharkawada are rich in biodiversity. However, in view of the presence of large areas under teak, the repeated fires over the years, preferential treatment to commercial species, enhancement of biodiversity in the forests as a whole need to be addressed.

Assessment of status of plant and faunal species and their periodic monitoring can be helpful in formulating strategies for conservation, maintenance and enhancement of overall biodiversity through sustainable management and use practices. Assessment of biodiversity especially the lower forms of life (algae, fungi,

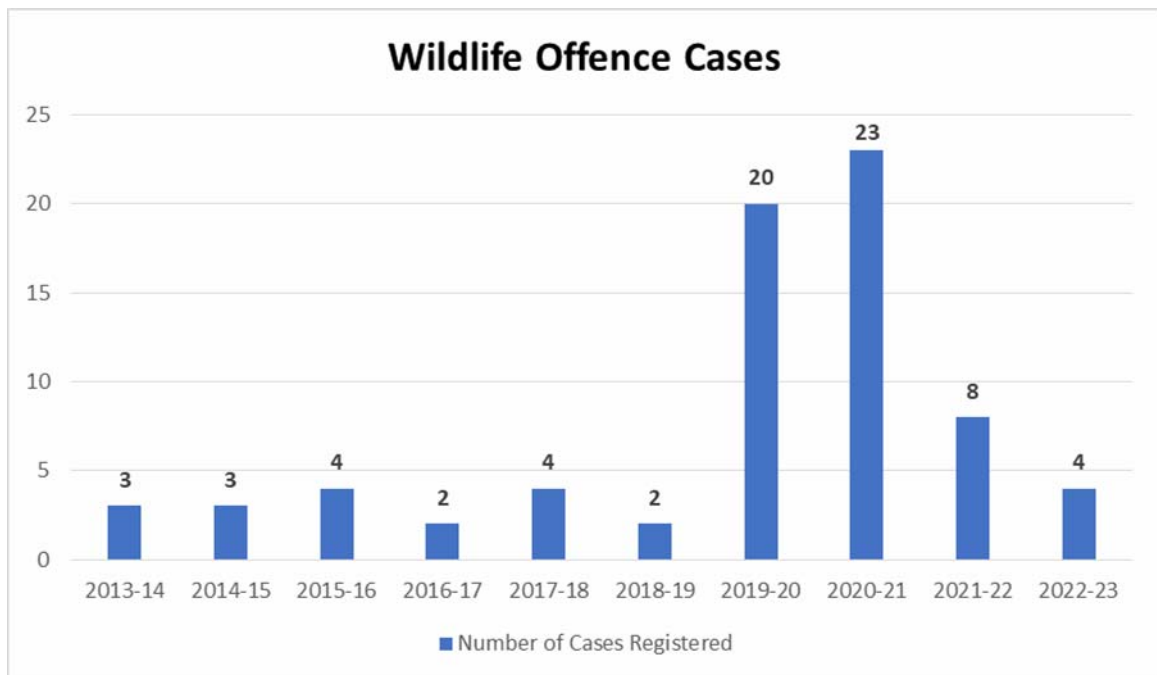
lichen, epiphytes, parasites, etc.) of a forest division must be made an on-going programme with the support from State Biodiversity Board. All these assessments will help in updating and enriching the Peoples Biodiversity Register (PBR) as provided in the Biodiversity Act, 2002.

Preparation of People's Biodiversity Register (PBR) is completed in the Division. Efforts should be made to consistently update the registers periodically. Efforts are also needed to ensure that a part of profits generated from any commercial exploitation of biodiversity in the Division should be distributed among the local people. Mechanisms and models may be developed in future to achieve this.

3.4 STATUS OF SPECIES PRONE TO OVER EXPLOITATION

The status of species prone to over exploitation in the division needs further research with the help of the conservation and subject experts. No cases of exploitation were registered in this division under Biodiversity Act, 2002 in the past 10 years. However, a total of 82 cases were registered under Wildlife Protection Act, 1972. The year wise distribution is shown below:

OFFENCES WITH RESPECT TO WILDLIFE REGISTERED DURING LAST TEN YEARS



The above chart of wildlife offenses reflects the increasing pressure on wildlife. It is also a matter of concern that not all cases of illicit exploitation are actually detected, considering the covert nature of the crimes. Extra efforts are required to protect species prone to exploitation. The in-situ and ex-situ conservation efforts should be undertaken for sensitive/RET/IUCN Red List species and their habitats in the Division. Among the important Schedule I species found in the area of the division are Tiger, Leopard, Sloth bear and Pangolin.

3.5 CONSERVATION OF GENETIC RESOURCES

The genetic resource of the forests is an invaluable asset that needs to be studied in detail. The documentation of the flora and the fauna of the division should be taken at the earliest with the help of experts in the field. The research wing of the department needs to identify areas of high biodiversity in collaboration with the territorial wing and carry out research and documentation of the species available.

1. There is no identified Fodder resource Plot in Pandharkawada Forest Division.
2. There are no identified Preservation Plots in the Pandharkawada Forest Division.
3. There is no identified Medicinal Plant Conservation Area in Pandharkawada Forest Division.

3.6 FAUNA AND THEIR HABITATS

Pandharkawada Forest Division lies in the Central Plateau biotic province of Deccan Peninsula biogeographic zone of Indo-malayan sub-kingdom of Paleotropical kingdom. Consequently, there is a wide variety of fauna noticed in this division. However, its distribution is uneven. Wildlife population density varies with the habitat depending upon availability of food, water and shelter.

3.6.1 DISTRIBUTION OF THE WILDLIFE

The Pandharkawada Forest Division, in the past, served as a natural habitat for a diverse range of wildlife. Historical records, such as the Berar gazetteer, mentioned

the abundance of tigers and panthers in the region, making nighttime travel on foot in the Division perilous. Prior to the enactment of the Wildlife (Protection) Act, 1972, hunting of wild animals was permitted officially in this area. In addition to carnivores, various herbivore species like nilgai, wild pig, black buck, chinkara, cheetal, sambar, and porcupine can be found in this area. Some less common wild animals include wild dogs, jackals, wolves, hyenas, etc. As a result of the increasing human and cattle population, the area has faced immense biotic pressure, leading to habitat destruction, fragmentation of wildlife corridors, and the consequent decline in the population of wild animals. Details of Wildlife population estimation of Pandharkawada Forest Division is given below:

TABLE NO. 3.4: WILDLIFE POPULATION ESTIMATION

Sr. No.	Species	Enumeration year		
		2017	2018	2019
(1)	(2)	(3)	(4)	(5)
1	Leopard	1	0	0
2	Hyena	0	0	0
3	Wild dog	1	0	1
4	Jackal	0	0	0
5	Wolf	2	2	0
6	Sloth bear	0	0	0
7	Spotted deer	52	70	115
8	Blackbuck	3	0	1
9	Barking deer	3	11	4
10	Nilgai	0	0	0
11	Junglefowl	0	8	0
12	Jungle cat	4	12	10
13	Palm civet	0	0	0
14	Mongoose	0	0	1
15	Wild Pig	0	0	0
16	Hare	0	0	0
17	Common langur	231	50	83
18	Wild boar	345	371	250
19	Deer	31	11	129

Sr. No.	Species	Enumeration year		
		2017	2018	2019
(1)	(2)	(3)	(4)	(5)
20	Fox	29	34	14
21	Hare	14	48	15
22	Peacock	144	217	124
23	Blue bull	463	696	181
24	Crane	2	0	6
25	Indian porcupine	7	8	6
26	Black kite	1	0	2
27	Egret	3	12	0
28	Owls	1	2	0
29	Duck	0	11	0
	Total	1337	1563	942

3.6.1.1 PHASE IV MONITORING OF ALL INDIA TIGER ESTIMATION

This monitoring exercise is conducted as a part of the project “Long-term Monitoring of Tigers, Co-predators, and Prey in Tiger Reserves and other Tiger bearing areas of Vidarbha, Maharashtra” in Pandharkawada Forest Division and Tipeshwar Wildlife Sanctuary. It provides more authentic information on the species distribution and abundance in a region.

3.6.1.1.1 POPULATION ESTIMATION OF HERBIVORES

As part of this exercise, a total of 99 transects of 2 km in length were marked and monitored in the 99 beats of Tipeshwar Sanctuary & Pandharkawada Forest Division. Each line transect was walked 3 times during March 2022 to record prey species across the whole area of Tipeshwar Sanctuary & Pandharkawada Division. A total walking effort of 710 km was invested in line transect surveys which generated a total of 186 observations of 9 major prey species were recorded. Nilgai was the most frequently recorded species with 77 sightings. An abstract of the data gathered for 2022 exercise is provided below:

TABLE NO. 3.5: DETAILS OF HERBIVORE SPECIES RECORDED IN THE TIPESHWAR WLS & PANDHARKAWADA FOREST DIVISION DURING THE YEAR 2022

S.No	Species Recorded	Tipeshwar Wildlife Sanctuary		Pandharkawada Forest Division	
		Number of Sightings	Individuals Recorded	Number of Sightings	Individuals Recorded
(1)	(2)	(3)	(4)	(5)	(6)
1	Spotted Deer	22	190	6	18
2	Nilgai	19	114	58	264
3	Wild Boar	16	132	11	69
4	Four Horned antelope	3	6	13	34
5	Langur	8	49	10	104
6	Indian Hare	3	4	3	3
7	Peafowl	2	10	7	12
8	Blackbuck	1	3	2	7
9	Porcupine	-	-	1	1

3.6.1.1.2 POPULATION ESTIMATION FOR TIGERS AND LEOPARDS

During 90 days of camera trapping for tigers in 2022 as part of Phase IV monitoring, a total sampling effort of 5505 trap nights, 19 adult individual tigers were photographed within Tipeshwar WLS & Pandharkawada FD. Similarly, 17 adult leopards were identified based on the rosette pattern of the right flank. An abstract for 2021 and 2022 is provided below:

TABLE NO. 3.6: POPULATION ESTIMATIONS OF THE TIGERS IN TIPESHWAR WLS & PANDHARKAWADA FOREST DIVISION DURING FOR THE YEARS 2021 AND 2022

Sr. No	Tipeshwar Wildlife Sanctuary			Pandharkawada Forest Division		
	Effective Trapping Area (sq. km)	Number of Individuals Captures	Estimate	Effective Trapping Area (sq. km)	Number of Individuals Captures	Estimate
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2021	148	11	11 (± 0.72)	220	11	11 (± 0.87)
2022	148	09	13 (± 1.49)	220	12	13 (± 1.09)

Of the 12 individual adult tigers recorded from Pandharkawada Forest Division in 2022, 4 are males and 8 are females.

TABLE NO. 3.7: POPULATION ESTIMATIONS OF THE LEOPARDS IN TIPESHWAR WLS & PANDHARKAWADA FOREST DIVISION DURING FOR THE YEARS 2021 AND 2022

Sr. No	Tipeshwar Wildlife Sanctuary			Pandharkawada Forest Division		
	Effective Trapping Area (sq. km)	Number of Individuals Captures	Estimate	Effective Trapping Area (sq. km)	Number of Individuals Captures	Estimate
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2021	148	05	06 ($\pm$ 0.72)	220	10	16 ($\pm$ 3.73)
2022	148	09	11 ($\pm$ 2.15)	220	08	9 ($\pm$ 1.16)

Of the 08 individual adult leopards recorded from Pandharkawada Forest Division in 2022, 3 are males, 4 are females and the sex of one leopard couldn't be determined.

3.6.1.1.3 AREA OVERLAP OF CARNIVORE POPULATION

Minimum convex polygons are drawn based on the trap camera captures of an individual tiger/leopard to ascertain its movement in a region over time. Based on these polygons the following conclusions are drawn fore tiger and leopard populations of Tipeshwar Sanctuary and Pandharkawada Forest Division:

Comparison of number of leopards utilizing Tipeshwar WLS & Pandharkawada FD, Maharashtra, India for the years 2020, 2021 and 2022

TABLE NO. 3.8: COMPARISON OF NUMBER OF TIGERS AND LEOPARDS UTILIZING TIPESHWAR WLS & PANDHARKAWADA FOR THE YEARS 2021 AND 2022

S.No.	Details	2021	2022
(1)	(2)	(3)	(4)
1	Tigers (Exclusively Tipeshwar)	08	07
2	Tigers (Exclusively Pandharkawada)	11	10
3	Tigers (Tipeshwar & Pandharkawada)	03	02
4	Leopards (Exclusively Tipeshwar)	07	09
5	Leopards (Exclusively Pandharkawada)	06	08
6	Leopards (Tipeshwar & Pandharkawada)	01	00

3.6.2 DESCRIPTION OF THE WILDLIFE

Charismatic fauna such as tigers, leopards, wild dogs, Indian wolves, hyenas etc. occur in this area. Brief descriptions regarding a few species are given below:

- i) **BENGAL TIGER:** Tigers are crucial in forests as apex predators, regulating prey populations, maintaining ecological balance, and promoting biodiversity. All ranges of Pandharkawada Division have presence of tigers. However, the forest patches adjacent to Tipeshwar Sanctuary in Pandharkawada, Jamni and Parwa ranges have high density. Tigers play a crucial role in population control of nilgai and wild pig, whose growing numbers pose a threat to agricultural farms adjacent to forests. By regulating their population, tigers help mitigate the destructive impact on agricultural lands, safeguarding the livelihoods of farmers and maintaining the delicate balance between wildlife and human activities.
- ii) **INDIAN LEOPARD:** Because of considerable tiger population in Pandharkawada Forest Division, leopard population is relatively less. They are recorded in Pandharkawada, Parwa, Maregaon and Ghantaji ranges. Leopards engage in feeding behavior with wild pigs, effectively controlling their population and mitigating agricultural crop damage.
- iii) **INDIAN WOLF:** Wolves play a vital role in controlling populations of blackbucks and chinkaras, among others, making their protection essential for maintaining ecosystem balance. The species faces threat due to its unique genetic lineage and reliance on human use landscapes. Conservation efforts are crucial to ensure their persistence. They are recorded from Ghantaji and Parwa ranges
- iv) **DHOLE (WILD DOGS):** Dholes are highly social carnivores. They possess a unique and intricate social structure, living in tight-knit packs that work together in pursuit of prey. These intelligent predators exhibit remarkable teamwork and communication, making them efficient hunters. Dholes primarily feed on small to medium-sized ungulates, such as deers and wild pigs, but they are also known to target larger prey when hunting in larger packs. Despite their remarkable adaptations and ecological importance, dholes

face threats from habitat loss, fragmentation, and human-wildlife conflict. Dholes are recorded in forest areas of Pandharkawada and Parwa ranges.

- v) **HYENA:** The semi-arid region of northern Pandharkawada Division, especially in Maregaon range, has hyena presence, with observations indicating their use of shrubs and burrows for denning. Hyenas have been detected in areas with denser vegetation as well as in agricultural plains that are less hilly and contain shrub-lands. It is possible that hyenas, being scavengers in the ecosystem, can adapt to varying environments to some extent, allowing them to reside even in human-use landscapes.

AVIFAUNA: A total of 126 bird species have been identified in Pandharkawada division. Details are provided in the 'List of Fauna'.

3.7 THREATS AND CHALLENGES TO WILDLIFE

3.7.1 POACHING

Poaching remains a major threat to wildlife in the division, despite the strict provisions of the Wildlife (Protection) Act, 1972. The primary motive behind poaching is the illegal trade of animal skins, bones, and flesh. During the summer, when the availability of water holes decreases and water levels recede, animals become more vulnerable to poaching. Among the commonly targeted wildlife in this division are nilgai, wild pig, and hares.

Poachers have devised a dangerous method of poisoning drinking water by adding high concentrations of urea. Animals that consume this poisoned water suffer from intense gas formation in the stomach and blockage of their respiratory organs, leading to death within hours. The poachers then exploit the carcass by extracting the skin or bones for illegal trafficking.

The use of nets and traps to capture birds, hares, and occasionally small deer is an ongoing practice. Another concerning method involves laying electric wires along animal tracks, taking advantage of the high-tension lines passing through the forests. This not only poses a significant threat to wildlife but also endangers local people and domestic cattle.

Wild animals are targeted for their skins, bones, and meat, while some are trapped for the purpose of keeping them as pets. Water holes are particularly vulnerable to poaching activities, and nets and traps are commonly employed to capture birds, deer, and small mammals.

TABLE NO. 3.9: STATEMENT OF POACHING/ NATURAL/ ACCIDENTAL DEATHS OF WILD ANIMALS (FROM 2013-14 TO 2022-23)

Year	Poaching Deaths			Natural Deaths			Accidental Deaths		
	Tiger	Leopard	Other	Tiger	Leopard	Other	Tiger	Leopard	Other
1	2	3	4	5	6	7	8	9	10
2013-14	0	0	2	0	0	22	0	0	1
2014-15	0	0	1	0	0	5	0	0	4
2015-16	0	0	0	0	0	2	0	0	0
2016-17	0	0	0	0	1	5	0	1	2
2017-18	0	0	0	0	0	16	0	0	2
2018-19	0	0	1	0	1	0	0	0	0
2019-20	0	1	5	0	0	1	0	0	4
2020-21	1	0	1	0	1	0	0	0	3
2021-22	1	0	2	0	1	1	0	0	3
2022-23	0	0	0	2	1	1	0	0	2
Total	2	1	12	2	5	53	0	1	21

3.7.2 DISEASE

Livestock from nearby villages frequently enter the forests, coexisting with wild animals and utilizing shared space and resources. There is a risk of water-borne contagious diseases spreading from livestock to wild animals, with foot-and-mouth disease (FMD) being the most common. Other diseases that can occur include anthrax, rabies, haemorrhagic septicaemia (HS), and canine distemper. FMD poses a significant threat as it has the potential to cause widespread devastation, while diseases like rinderpest, anthrax, and rabies are highly infectious and often result in certain death.

The presence of disease-affected domestic animals in forest areas compromises the health of the herbivore population. Outbreaks of contagious diseases, particularly FMD, have a severe impact on herbivores, leading to a significant

decline in their population. Monitoring of wildlife health is virtually nonexistent. It is crucial considering the recent outbreaks of Covid-19, lumpy skin disease and bird flu.

3.7.3 FIRE AND HABITAT DAMAGE

Forest fires have a significant impact on wildlife, causing both immediate and long-term consequences. The intense heat and flames of a fire can directly result in the death of animals caught in its path. The loss of vegetation and shelter leaves wildlife vulnerable to predators and reduces their access to food sources. They may suffer injuries, burns, or smoke inhalation, further endangering their survival. Additionally, the destruction of habitats disrupts ecosystems and displaces wildlife, forcing them to seek alternative territories or compete for limited resources. The long-term effects include changes in biodiversity, as certain species may struggle to recover or adapt to the altered landscape. Forest fires, therefore, have a profound and often devastating impact on the wildlife that depends on these habitats for their survival.

3.7.4 GRAZING

During the last ten years there has been a rise in cattle population. As per 20th Livestock Census, 2019 the total livestock population in this division is about 3.4 lakhs. Grazing pressure on forests has increased manifold in the past few years. Grazing also leads to spread of diseases to wild animals besides affecting the habitat severely. The details of the livestock population are given in the table below:

TABLE NO. 3.10: LIVESTOCK POPULATION AS PER 20th LIVESTOCK CENSUS, 2019

Sr. No.	Taluka	Livestock					Total (3+4+5+6+7)
		Cattle	Buffalo	Sheep	Goat	Pig	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Ralegaon	31527	2361	3232	20021	104	57245
2	Ghatanji	45392	4047	764	19712	209	70124
3	Pandharkawda	40694	4275	987	17396	377	63729
4	Jamni	28627	1684	681	9734	139	40865
5	Maregaon	30550	1462	8	12331	0	44351
6	Wani	36402	4892	529	19610	0	61433
Total		213192	18721	6201	98804	829	337747

3.8 PROTECTION AND MANAGEMENT OF FAUNA

3.8.1 GENERAL HISTORY OF MANAGEMENT

It was stated in Berar gazette of 1870 that tigers and panthers were numerous in the area and it was dangerous to travel in Yavatmal District. Prior to reorganization of state wildlife conservation was ensured under the provisions of Indian Forest Act 1927. Shooting rules were framed by the Government and detailed in the appendix of Central Provinces and Berar Manual Vol. 2, combined with Wild Birds and Animal Protection Act 1912. The Conservator of Forests in consultation with Divisional Forest Officer used to declare certain blocks of Reserve Forest as open for shooting. Then shooting permits were issued by the Divisional Forest Officer.

In 1952 the Indian Board for wildlife was constituted with an object of devising methods and means for conservation of wildlife through coordinated legislative and practical method. Subsequently the Bombay Wild Animals and Wild Birds Protection Act 1951 was enacted and it was considered as the most comprehensive legislation which was made applicable to Vidarbha region in 1961. This act did not propose any significant changes in the management of the game, however it was important as its provisions allowed to operate even in the areas outside the Reserve Forests. As per the provisions laid down in this act, arms license holders had to register themselves with wildlife preservation officer. Hunting license was categorized into four kinds namely small game, big game, special big game and pet animals. The provisions of this act did not allow carrying out any trade in wildlife trophies without a separate trophy dealer license. For the purpose of hunting the forest division was divided into 20 shooting blocks.

3.8.2 LEGAL POSITION

The forest area of this division was a part and parcel of Central Provinces and Berar State. The provisions in Berar Forest Law in 1886 were passed on October 22, 1886. There was no separate act regarding protection of Wildlife in vogue at that time. It was, under Sec. 3, Sub rule (7), the definition of the forest produce included “skins, tusks, bones and horns”. Under Sec. 8 of the said act “any person who acts in

contravention of the said act in the state forests was punishable with the fine which may go up to Rs.50/- when the damage resulting from his offence amounts to more than Rs.25/- , to double the amount of such damage”. Under Sec.10, Sub Sec. (4) of the said act “the residency by orders may regulate any part of the state forest for the hunting, shooting, fishing, poisoning of water or setting trap or snares”. The Berar Law of 1886 was amended by the Berar Forest Law of 1891. Under this amendment Sec.7 (b) states that, forest produce includes the following found in, brought from a forest i.e. to say wild animals, skins, tusks, horns, bones, cocoons, honey, wax and all other parts or produce of animals or forest produce. Sec. 7(2) (B) states offence was punishable with the fine which may extend upto Rs.50/- or when the damages resulting from the offence amounts to more than Rs.25/- , to double the amount of such damage.

In the year 1911 vide Notification No/GIFD/2197-1-B the definition of wildlife as forest produce was included under Sec. 2 (B) (III). Under Sec. 25 (1) of the said act, that any person in contravention of any rules made under this act, which local Government may from time to time prescribe, kills or catches elephants, hunts or shoots fishes, poisons water or sets traps shall be punishable with imprisonment for a term which may extend to 6 months or with the fine not exceeding Rs.500/- or in both in addition to compensation for the damage done to the forests.

After the enactment of Indian Forest Act, 1927, rules related to wildlife regulations were framed under Sec. 26 (1), 76 (d) which was essential to regulate hunting of wild animals and were given in the appendix No. VIII of Madhya Pradesh Forest Manual Volume 2.

Wild Birds and Animal Protection Act, 1912 as amended in 1935 also ensured protection to certain animals and a check of hunting of animals. Shooting block system was initiated in the year of 1947 under the provisions of these two acts. The Conservator of Forests in consultation with the Divisional Forest Officer concerned used to declare the areas having abundant game as open to hunting and the Divisional Forest Officer accordingly issued shooting permits were in the type of game and the number allowed to be hunted together with, the other relevant conditions.

The Bombay Wild Animals and Wild Bird Protection Act, 1951 was extended to Vidarbha region, which has enhanced the scope of management of game outside Reserve and Protected Forest also. Under the provisions of this act regulations were made for registration of armed license holders, categorization of game into small game, big game, special big game and pet animals and also regulated transaction in trophies and other wildlife products. Under this act the statutory wildlife advisory board was constituted in order to advice the Government on various important matters regarding wild animals. In 1952 the Indian Board of wildlife was constituted with the main object of devising ways and means for conservation wildlife through coordinated approach of legislative and political measures and sponsoring the measures to reconstitute National Parks and Wildlife Sanctuary. The comprehensive and unified National and State Park Act of 1971 was passed to provide for appointment of any advisory committee to advise in continuation and declaration of National Parks and Sanctuary and formulation of administrative policy.

In 1972 Parliament enacted Wild Life (Protection) Act, 1972 which came into force in the state since June 1, 1973 and superseded all other acts related to wildlife protection and management in the State. The subsequent rules made under the act are as follows.

1. The Wild Life (Stock declaration) Rules 1973 (came into force in the State since June 1, 1973).
2. The Wild Life (Transactions and Taxidermy) Rules 1973 (came into existence since June 1, 1973).
3. The Wild Life (Protection) Rules 1975 (came into force since March 6, 1975).
4. The Wild Life (Protection), Licensing (additional matter consideration) Rules 1983 became effective since April 14, 1983.

The Wild Life (Protection) Act is a comprehensive legislation that facilitates for effective protection and preservation of Wildlife, moreover it enabled restrictions on hunting and regulation of trade in wild animals as well as the articles made out of wild animals.

Hunting of wild animals is strictly prohibited unless specially permitted as per laid down procedure. Under this act, wild animals have been categorized into V schedules and those animals which are included in schedule I, II and III received the privilege of stringent protection.

The wild animals included in the schedule are permitted to be eliminated if they become threat to or cause damage to life or property. Whereas, only vermin included in scheduled V were excluded from strict protection.

Hunting of young and female of any wild animal other than vermin is strictly prohibited unless permitted (Sec.15). The persons who possess any wild animal trophies are required to declare in a specified proforma under the provisions of this act. The Government of India specified vide letter Dt. 18th Sept 1975 that, the management authorities are vested with the control over the tanks and rivers in National Parks and Sanctuaries.

The delegation of powers and duties of the Chief Wild Life Warden to the Police Sub Inspector for the purpose of Sec. 41 (1) and Sec. 55 of the Wild Life (Protection) Act 1972 was granted by G.R. No. WLP-1973/197578 –F-1, Dt. April 5, 1976. The schedules are revised by the Government from time to time as it was required under Sec. 61 of the Wild Life (Protection) Act 1972. The Government of Maharashtra framed rules under Sec. 64 of Wild Life (Protection) Act 1972 vide its letter No. WLP- 1679/95507 / F-5.

The Wild Life (Protection) Act was again amended hereinafter called as “Wild Life (Protection) Amendment Act 1986” and became effective since November 25, 1986. Under Sec. 44 of the Wild Life (Protection) Act 1972 the Government vide letter No/WLP/1682/100208/CR-43(1)/F-5 permitted the trapping of Cobra and Russell’s viper by a licensed dealer for the purpose of extracting venom. Under the power conferred under sub Sec. (1) and sub Section (2) of the Section 64, the Government of India vide letter No. WLP/1682/10020 (iii)/F-5 framed the new rules called “Wild Life (Frog Leg Industry) Rules 1987” and it came into force from November 25, 1987. The Government of India vide letter No. F. no. 1-2/91/WL/I, Dt. October 21, 1991 further amended the Wild Life (Protection) Act, 1972. Subsequently Wild Plants have been

brought under the provisions of this act. The zoo and circus have been defined and included in this act whereas the game reserves have been completely dropped. A total ban has been imposed on hunting of wild animals specified in schedule II, III, IV and I except as provided under Section 11 and 12 by amending Section 9 of Wild Life (Protection) Act, 1972.

In 2003 compressive amendment was made to impose heavy penalty and stringent punishment in case of wildlife offences. Under the provisions of Section 17 of Wild Life (Protection) Act, the following acts are prohibited

1. Hunting of wild animals from or by means of wheeled or mechanically propelled vehicles in water or on land or by air craft.
2. Use of mechanically propelled vehicles for the purpose of stampeding any wild animals.
3. Use of chemicals, explosives, pit falls, poisons, poisoned weapons, snares or traps except related to capture of wild animals under wild animal trapping license.
4. Hunting of special game or big game other than with a rifle unless specially authorized by the licensee.
5. Setting fire to vegetation for the purpose of hunting, using artificial light for the purpose of hunting except when specially authorized to do so under license in the case of carnivore over a kill. Hunting during night time except when specially authorized.
6. Hunting of any animals on water hole or a salt-lick or other drinking places or on path or approaches to the path except water birds or sand goose.
7. Hunting of any wild animals on any land not owned by the Government without the consent of the owner or his agent.

The Act was further amended in 2022 to increase the number of species protected under the law, rationalize the schedules, and to implement the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), among others.

3.8.3 MEASURES ADOPTED FOR PROTECTION OF WILDLIFE

Apart from regular patrolling of poaching sensitive beats, awareness generation, soil and moisture conservation works which include construction of nalla bund, check dams to augment the water source, no felling of trees along the nalla and water sources, identification of sites of seasonal water sources, development of new water holes have been taken up in the division.

3.8.4 OTHER METHODS ADOPTED FOR PROTECTING WILDLIFE

Apart from legal methods under the Wild Life (Protection) Act, 1972 the following measures have been introduced to protect wildlife from time to time.

3.8.4.1 COMPENSATION FOR THE INJURY TO AND LOSS OF HUMAN LIFE

Introduced through GR dated 27.1.1986, the scheme covers death as well as injury including minor injury caused to any individual in an attack by a wild animal. Any such attack by tiger, leopard, bear, bison, wild pig, jackal, hyena, fox, crocodile, elephant, wild dog, deer, nilgai, monkey or langur is covered under the scheme. Present rates of compensation have been fixed through Govt. Resolution No. WLP-02.23/CR-52(Part-III)/F-1, dt.30/01/2024. Details are provided below:

TABLE NO. 3.11: COMPENSATION FOR THE INJURY AND LOSS OF HUMAN LIFE

Sr. No.	Type of injury	Rate of Compensation
(1)	(2)	(3)
1	Loss of Human Life	Rs.25 lakhs
2	Permanent disability	Rs.7.5 lakhs
3	Major injury	Rs.5 Lakhs
4	Minor injury	In case treatment is done in private hospital the cost of treatment or rupees fifty thousand only, whichever is less.

The compensation to injury & loss human life has to be given as per the terms and condition mentioned in the Govt. Resolution No.WLP-1008/C.No.270/F-I, dated

02/07/2010 and Govt. Resolution No.WLP-2012/C.No.337 /F-I, dated 30/03/2013 and 16/1/2015. Some of the conditions for claiming and deciding above compensation are as under.

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

3.4.8.2 COMPENSATION FOR LOSS/INJURY OF LIVESTOCK

The government compensates the loss due to attack on livestock by wild animals such as tiger, leopard, bear, bison, wild pig, jackal, hyena, fox, crocodile, elephant or wild dogs. Present rates of compensation have been fixed through Govt. Resolution No. WLP-02.23/CR-52(Part-III)/F-1, dt.30/01/2024. Details are provided below:

TABLE NO. 3.12: COMPENSATION FOR THE DAMAGE TO LIVESTOCK

Sr. No	Type of Livestock	Rate of compensation
1	Loss of cow, buffalo or bullock.	75% of market price of cattle or Rs.70,000/- , whichever is less.
2	Loss of sheep, goats and other livestock defined in clause (18A) of section 2 of the Wild Life (Protection) Act, 1972 (53 of 1972).	75% of market price of cattle or Rs.15,000/- , whichever is less.

Sr. No	Type of Livestock	Rate of compensation
3	Permanent disability to cow, buffalo or bullock.	15% of market price of cattle or Rs.15,000/- , whichever is less.
4	Injury to cow, buffalo, bullock, sheep, goat or other livestock.	Medical expenses incurred for treatment of injured cattle shall be paid. Treatment of injured cattle shall be taken in Government or Zilla Parishad veterinary hospital. Amount payable shall be limited to 25% of the market price of cattle or Rs.5000/- , whichever is less.

The compensation to livestock damage has to be given as per the terms and condition mentioned in the GR No.WLP-1008/C.No.270/F-1 of 02/07/2010. Some of the conditions to be fulfilled are as under:

- i. Death to be reported within 48 hours.
- ii. Carcass is not to be removed before case is made.
- iii. No death of any wild animal within 10 km radius area in the next 6 days.
- iv. Immediate investigation by forest officers as to the wild animal, which killed the cattle as well as likely amount of compensation.
- v. Compensation to be sanctioned by an officer not below ACF.
- vi. No compensation in case the livestock was grazing illegally.

3.4.8.3 COMPENSATION FOR CROP DAMAGE

Introduced vide GR No. WLP/1008/C.No.-270/F-1 dated July 2, 2010, it provides for compensating losses to the agricultural crops due to wild animals. A compensation of minimum Rs.2000/- per hectare is paid to the farmers subject to maximum of Rs.50000/-. Currently, as per GR No.WLP-02.23/CR-52(Part-III)/F-1, dt.30/01/2024 damage to agricultural crops by wild pig, deer, bison, nilgai, monkey, langur or elephantis covered. The details are given below.

TABLE NO.3.13: RATES OF COMPENSATION FOR AGRICULTURAL CROPS

Sr.No.	Details of damage	Rate of compensation
(1)	(2)	(3)
1	Crop damage upto Rs.20000/-	Whole amount but minimum Rs. 2000/-
2	Crop damage above Rs.20000/-	Rs.20000/- plus 80% of above amount, but maximum Rs.50000/-
3	Damage to sugarcane crop in eachcase	Rs.1600/- per metric tone, maximum Rs.50000/-

The details of year wise compensation paid due to attacks by wild animals is given in **Appendix No.VIII**. An abstract of the same is provided below.

TABLE NO. 3.14: DAMAGE DUE TO WILDLIFE AND COMPENSATION PAID

Financial Year	Humans				Livestock		Crop			Total Compensation Sanctioned (In Rs Lakhs) (3+5+7+10)
	No. of Deaths	Compensation (In Rs Lakhs)	No. of Injured Persons	Compensation (In Rs Lakhs)	No. of Cases	Compensation (In Rs Lakhs)	No. of Cases	Hectare	Compensation (In Rs Lakhs)	
1	2	3	4	5	6	7	8	9	10	11
2013-14	2	7.00	10	4.74	118	10.62	328	40.98	16.04	38.4
2014-15	0	0.00	0	0	124	11.34	1023	286.4	32.37	43.71
2015-16	3	24.00	37	11.53	22	2.25	1183	846.5	32.19	69.97
2016-17	0	0.00	54	8.96	130	14.19	3953	870.42	69.71	92.86
2017-18	3	24.00	31	9.39	105	12.39	4524	1373.58	106.5	152.28
2018-19	3	28.00	89	25.7	237	35.65	6168	1015.13	192.85	282.2
2019-20	3	45.00	45	12.84	223	34.72	6079	2962.55	196.09	288.65
2020-21	1	15.00	61	30.68	142	20.19	7091	3076.43	228.27	294.14
2021-22	2	30.00	48	26.15	488	94.12	14484	4348.2	546.47	696.74
2022-23	4	70.00	79	49.22	388	82.17	15772	0	620.58	821.97
Total	21	243.00	454	179.21	1977	317.64	60605	14820.19	2041.07	2780.92

3.8.5 RIGHTS AND CONCESSIONS

No specific rights have been provided over wildlife in this Division. The Chief Wild Life Warden can grant the permits for special purposes of education, scientific research and collection of specimens for recognized zoos, museums and scientific institutions.

CHAPTER - 4

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

4.1 STATUS OF REGENERATION

Regeneration in the context of forests refers to the natural or intentional process of renewal and regrowth of trees and vegetation in a forest ecosystem. Ensuring successful forest regeneration is crucial for the long-term conservation and resilience of our forest ecosystems, promoting a sustainable future for both nature and society.

Data on regeneration status was collected by SOFR unit Gadchiroli along with staff of Pandharkawada territorial division during collection of enumeration data between January 2023 and October 2023. The seedlings were enumerated in the following three categories as R1 upto 1 m height, R2 with 1 to 2 m height and R3 above 3 m height. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The natural regeneration of teak and its associates is overall poor and restricted to a few patches of selected sites. Whatever regeneration occurs in the rainy season, fails to establish owing to climatic as well as biotic factors. Heavy grazing, fire incidences, trampling due to cattle movement, human population pressure to meet their demands like firewood and small timber, poor site quality and erratic rainfall are major factors that influence the establishment of regeneration in this forest area. The regeneration data shows that there are 19.28 seedlings of upto 1 m height, 2.04 seedlings between 1 to 2 m height and 1.58 seedlings above 3 m height in a hectare in these forests. The weighted average of the total number of seedlings in the division is 24.57/ha. Range-wise details of regeneration are given below:

TABLE NO.4.1: REGENERATION STATUS

Sr. No.	Range	No. of Sample Plots	No of Seedlings/ha			Total (4+5+6)
			R1	R2	R3	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Ghatanji	59	8.02	1.98	0.64	10.64
2	Jamni	88	37.34	1.17	5.20	43.72
3	Maregaon	71	4.18	0.04	0.00	4.23
4	Mukutban	72	29.56	1.76	1.39	32.71
5	Pandharkawada	94	21.89	6.64	2.54	40.65
6	Parwa	85	9.79	1.35	0.15	11.29
7	Wani	69	18.80	0.10	0.06	18.96
	Weighted Average		19.28	2.04	1.58	24.57

4.2 AREA AFFECTED BY FOREST FIRE

Forest fires are a significant concern for ecosystems worldwide. They can have both short-term and long-term impacts on forests and their inhabitants. Immediate effects include the destruction of vegetation, including trees, shrubs, and ground cover, which disrupts the ecological balance and reduces habitat for wildlife. The loss of vegetation also leads to soil erosion and degradation. Forest fires can also release large amounts of carbon dioxide into the atmosphere, contributing to greenhouse gas emissions and exacerbating climate change. Additionally, fires can cause the loss of valuable timber resources and disrupt local economies that rely on forestry.

Pandharkawada Forest Division is susceptible to fires due to its deciduous nature and dry climate. Forest fires occur primarily during the dry season, which lasts from February to June. **Appendix No. IX** provides further details on forest fires in the area. During this period, the forests are highly vulnerable to fires, although those occurring at the end of winter and the beginning of summer are less destructive. Most of the fires in these forests are man-made, negatively impacting natural regeneration. The combustible leaf litter and undergrowth quickly catch fire and spread. Damage is severe when recently felled material is present, particularly in plantations. Young

regeneration, including teak and other species, often suffer damage or die due to fire. Fires in the area can be started by grazers, intentionally or unintentionally, as well as by villagers engaging in farm bund burning during the cultivation season. Late fires in grassy areas or closed coupes can result in catastrophic fire events. Generally, the fires in this region are ground fires that spread slowly. Repeated fires during the dry season in this arid zone cause significant harm to tree growth and reproduction. Forest fires cause extensive damage to forests, including forest growth, regeneration, ground flora, soil micro-organisms, and soil productivity. The affected area by forest fires is provided in the table below.

TABLE NO. 4.2: INCIDENCE OF FIRE

Sr. No.	Year	No. of Incidents	Area (Ha)	Area Impacted (Ha) per Fire Incident(4/3)
(1)	(2)	(3)	(4)	(5)
1	2013-14	23	147.64	6.42
2	2014-15	21	306.00	14.57
3	2015-16	48	210.67	4.39
4	2016-17	41	196.20	4.79
5	2017-18	70	318.90	4.56
6	2018-19	32	100.00	3.13
7	2019-20	9	5.42	0.60
8	2020-21	69	92.59	1.34
9	2021-22	38	47.45	1.25
10	2022-23	38	65.18	1.72
	Total	389	1490.05	3.83

4.3 AREA DAMAGED BY NATURAL CALAMITIES

DROUGHT: Drought has detrimental effects on forests, including reduced growth and productivity, increased tree mortality, altered forest composition, heightened susceptibility to pests and wildfires, soil degradation, and impacts on wildlife. Though no direct impact was observed, reduced and erratic rainfall often impacts the young saplings.

FROST: Injury due to frost is not observed in this Division.

WIND STORMS: No considerable damage is noticed due to wind storms in this Division.

SOIL EROSION: Soil erosion is noticed in this area especially along the streams. Steep slopes in undulating areas enhance soil erosion. Sheet erosion is common in the entire area. Gully formation takes place due to erosion along the river banks. In some of the areas the roots of trees are exposed due to excessive erosion of soil leading to windfall of trees.

4.4 AREA PROTECTED FROM GRAZING

Unregulated grazing by domestic animals has detrimental effects on forests, including the destruction of young regeneration and plantations due to trampling and excessive movement of cattle. This results in soil compaction and reduced soil porosity, making it less favorable for the establishment of new growth. Grazing is particularly prevalent in forest areas near villages, and continuous, uncontrolled grazing negatively impacts tree growth and regeneration. Forests can thrive in areas with regulated or no grazing, but excessive grazing beyond the carrying capacity of the forests causes significant damage. Grazing patterns vary, with higher pressure during the dry season from February to June, when the forests become dry. Some grazers even resort to lopping trees for cattle feed. Although sheep and goats are not allowed to graze in timber production forests, grazing by these animals still occurs in the region, further impacting the forests.

4.5 LOPPING PRACTICES

The practice of lopping, which involves cutting branches or foliage from trees, can have negative impacts on forest health. Lopping can lead to tree stress, making them more vulnerable to diseases and pests. It can also disrupt the natural growth pattern of trees and hinder their ability to regenerate. Additionally, excessive lopping can reduce the overall canopy cover, affecting the microclimate and biodiversity within the forest. Lopping is seen mostly in forest areas adjacent to the villages. Grazers also lop while grazing their cattle.

4.6 AREA INFESTED BY INVASIVE WEED SPECIES IN FORESTS

Invasive weed species pose significant damage to forest health of Pandharkawada. Their rapid spread often outcompetes native plants, reducing biodiversity and altering ecosystem dynamics. Lantana (*Lantana camara*) is a commonly observed invasive weed throughout the forest area in this division. It forms thick mats that prevent the growth of understory plants, affecting the natural regeneration of tree species. It also inhibits the recruitment of native seedlings and disrupts nutrient cycling processes. It increases fuel load and its dense thickets enhances the probability of chance encounters with wild animals. Moreover, lantana's foliage contains toxins that deter herbivores, further impacting the food chain.

Similarly, Raantulas (*Mesosphaerum suaveolens*), Gaajar Gavat (*Parthenium hysterophorus*) and Tarota (*Senna tora*) are seen infesting the forest floor in this Division to a great extent. Damage by climbers mostly confined to the forests along the water streams bank and along the nala banks is noticed in this area. Chilati (*Acacia pinnata*) and Iruni (*Zizyphus oenoplia*) are the main climbers which cause harm to the forest in this area.

Although Gliricidia (*Gliricidia sepium*), Subabul (*Leucaena leucocephala*) and Prosopis (*Prosopis juliflora*) are recorded in the forests of the Division, they are found scattered and have not established into dense patches to influence the micro-environment of the locality.

4.7 INCIDENCES OF PEST AND DISEASES

In this area teak skeletonizer (*Eutectona machaeralis*) and teak defoliator (*Hyblaea puera*) are common. The insect attack is noticed mostly during the rainy season.

4.8 FOREST DEGRADATION AND ITS DRIVERS

The forests of Pandharkawada forest division mostly suffer from unregulated grazing, illicit felling, encroachments and repeated fires significant damage caused by

these agencies coupled with erratic rainfall. The other agencies which caused injury to the forests such as droughts, frost, floods, plants and insects are negligible.

ILLCIT FELLING: Illicit felling undermines the resilience and long-term sustainability of forests, posing a significant threat to their health and the multitude of benefits they provide to both humans and the environment. It leads to the loss of valuable tree species, disrupting the natural balance and composition of the forest. The removal of trees also results in the destruction of habitats for countless plant and animal species, leading to a decline in biodiversity. Additionally, illegal logging contributes to deforestation, which reduces the forest's ability to sequester carbon dioxide and mitigates climate change. It also degrades soil quality, increases the risk of erosion and negatively affects water resources.

In Pandharkawada Forest Division, illicit felling is a common occurrence. People within the district and from adjoining areas indulge in illicit felling in areas where the good quality teak forests are available. Incidences of people coming in groups for cutting teak timber are also noticed. Local people in and around the forest area of the division may indulge in illicit felling for meeting their domestic needs such as requirement of fuel, small timber, firewood as there is a huge gap between demand and supply of forest produce. People generally indulge in illicit felling due to unemployment, higher prices of some of the forest products in the market like Teak. These social causes make people indulge in illicit felling. Lopping of trees and shrubs for rab burning of fields has further deteriorated the situation. In general, illicit felling, lopping and pollarding of forest species have further deteriorated the forest crop in terms of quality and quantity of the forests.

However, over the past decade the cases of illicit felling have steadily declined, probably owing to the increasing per capita income in the rural areas.

TABLE NO. 4.3: LIST OF OFFENCE CASES

Year	Fire	Grazing	Illicit felling	Others	Total (2+3+4+5)
(1)	(2)	(3)	(4)	(5)	(6)
2013-14	23	0	818	32	873
2014-15	21	1	651	22	695
2015-16	48	3	561	19	631
2016-17	41	6	420	18	485
2017-18	70	6	526	33	635
2018-19	32	4	348	17	401
2019-20	9	2	350	36	397
2020-21	69	3	417	41	530
2021-22	38	6	338	25	407
2022-23	38	2	331	28	399
Total	389	33	4760	271	5453

ENCROACHMENTS:As of March 2023, the total extent of encroached land in the division amounts to 1500.76 hectares. Neighboring forest areas that border agricultural fields are increasingly under the pressure of encroachment, particularly during the monsoon season. Certain forested areas have been cleared, stripped of vegetation and converted for agricultural use. More specific information on the encroached areas can be found in **Appendix No. XLVII (A)** and **Appendix No. XLVII (B)**.

DAMAGE BY WILD ANIMALS: The young regeneration in this area is significantly affected by grazing from Nilgai, Black buck, and Chital. Additionally, wild pigs, hares, and porcupines cause damage in plantations. Wild pigs primarily damage bamboo plantations in their early stages, while porcupines feed on rhizomes and bark near the base of trees, hindering their proper establishment. Monkeys are responsible for considerable damage to flowers and fruits of trees. Chital, on the other hand, damage the bark of Shiwan trees at the base, leading to girdling and eventual tree death.

Although the damage caused by wild animals is not as severe as that caused by domestic animals, their presence plays a compensatory role by promoting regeneration and maintaining forest health through selective tree removal and biodiversity preservation.

MINING: Mining is prohibited in the forest area. There is no report of illegal mining/quarrying in the forest area. However, illegal river sand mining is often reported from the major rivers in the Division.

4.9 POLLUTION CONTROL AND PROTECTION OF ENVIRONMENT

Environmental pollution has significant impacts on forests, jeopardizing their health and sustainability. Air pollution, primarily caused by industrial emissions and vehicle exhaust, can lead to the deposition of harmful substances onto tree leaves and soil, hindering photosynthesis and nutrient uptake. This weakens the overall vitality of trees and makes them more susceptible to diseases, pests, and premature death. Water pollution, resulting from the discharge of pollutants into water bodies, can contaminate forest ecosystems and disrupt aquatic life. Soil pollution, often caused by improper waste disposal or the use of chemical fertilizers and pesticides, can alter soil composition, reduce nutrient availability, and harm soil organisms essential for nutrient cycling. Additionally, pollution contributes to climate change, causing shifts in temperature and precipitation patterns that can negatively affect forest growth and alter species distribution.

There is no recorded evidence of severe pollution in forest areas of Pandharkawada division. However, incidences of water pollution due to heavy usage of fertilizers for agricultural crops in fields adjacent to forest areas are noticed. Air pollution occurs mainly due to mining activities, transportation of mined material, cement industries, vehicular traffic on roads and brick kilns operating in the areas adjacent to forest areas.

CHAPTER – 5

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

5.1 AREA TREATED UNDER SOIL AND WATER CONSERVATION MEASURES

5.1.1 SOIL CONSERVATION

Soil conservation refers to the measures and practices which protect the soil against loss and help in maintaining its fertility. It is based on the following broad principles:

- Protection of soil from the impact of rain drops.
- To slow down the water from concentrating and moving down the slope in a narrow path.
- To slow down the water movement when it flows along the slope.
- To grow the strips of stubble or other vegetation cover to hold the moving particles of soil.
- To increase the size of soil particles.

5.1.2 WATER CONSERVATION

Considering how little water is actually available for use, conservation of water and efficient management of water sources are more critical than ever before. Sustainable water conservation is carried out by the following methods.

- Construction of dams and water reservoirs to control floods
- Developing small catchment dams and protecting wetlands.
- Regular dredging and desiltation of rivers, streams and other water bodies.
- Construction of contour trenches, loose-boulder structures, nala bands etc. to reduce surface runoff and increase ground percolation.

Soil and moisture conservation works need to be carried out on watershed basis as forests are customarily at the top of a watershed. Good forest management secures water at its source. Appropriate forest management strategies produce clean and abundant water for the watersheds, as well as healthy forests.

Trees and forests perform an incredible role in reducing storm water in several ways and removing or filtering pollutants that would otherwise wind up in our waterways. Forests filter and regulate the flow of water, in large part due to their leafy canopy that intercepts rainfall, slowing its fall to the ground and the forest floor, which acts like an enormous sponge, before gradually releasing it to natural channels and recharging ground water.

5.1.3 WATERSHED

A watershed comprises an area of land that conveys all the water running under it and drains it into a body of water. It combines with other watersheds to form a network of rivers and streams that progressively drain into larger water areas.

The topography of any region may be subdivided into several ecological units, each of which drains to a common point. Each such ecological unit is referred to as watershed. Strictly speaking, the higher land that separates each such unit is called a watershed and the unit itself being termed as the catchment area. The size of a watershed may vary from a few hectares to thousands of square kilometres.

Watershed management is the rational utilization of land and water resources for gaining optimum production and with minimum hazards to natural resources. It essentially relates to the practice of soil and water conservation in the watershed, which means proper land use, protecting land against all forms of deterioration, building and maintaining soil fertility, conserving water for farm use, proper management of local water for drainage, flood protection and sediment reduction and

increasing productivity from all prevailing land uses. The principal factors influencing watershed operations are -

A) PHYSIOGRAPHY: It includes the following aspects:

- a. **SIZE:** Both runoff volume and runoff rate increases with the watershed size. however, both the rate and the volume per unit of watershed decrease with an increase in its area. the size of the watershed is thus an important parameter in determining the peak rate of runoff.
- b. **SHAPE:** Elongated and narrow watersheds are likely to have more extended time of concentration resulting in the lower runoff rates as compared to the square shaped watersheds of the identical size. the time of concentration equally affects the amount of water that will eventually infiltrate into the soil in the watershed.
- c. **LAND SLOPE:** Slope in addition provides a significant implication for the land use. the speed and extent of runoff depend on the slope of the land. the greater the slope, greater will be the velocity of flow of the runoff water.
- d. **DRAINAGE DENSITY AND PATTERN:** the drainage density equally affects the runoff pattern and intensity. high drainage density drains runoff water rapidly, decreases the lag time and also increases the peak of hydrograph. $\text{drainage density} = \frac{\text{total length of all stream (km)}}{\text{catchment area (km}^2\text{)}}$.
- e. **SOILS AND GEOLOGY:** The soil and the geology of the watershed determine the amount of percolating water and also governed by the corrective measures, which may be taken for improvement.

B) VEGETATIVE COVER: The type and quality of vegetative cover on watershed land have a substantial influence on runoff, infiltration rate, erosion and sediment production and also on the rate of evaporation. A dense cover of vegetation is a most powerful tool for reducing erosion.

C) PEAK RUNOFF: The runoff generates from rainfall excess drains through the channels of different order and finally reaches the watershed outlet. The flow at outlet starts with minimum flow called base flow (sometimes its value is zero) and

attains the maximum flow after some times and then recedes to base flow again. This time variation of flow is called hydrograph. The maximum flow at outlet thus attained is called peak flow of runoff.

D) PRECIPITATION: The amount and nature of precipitation are the most important factors, which determine what will happen in a watershed. Rainfall evenly distributed throughout the year has a different impact as compared to sudden, sharp showers or seasonal rainfall.

Watershed management approach viz. the ridge-to-valley approach for carrying out soil and moisture conservation works is adopted. In Pandharkawada Forest Division over the past ten years various soil and moisture conservation measures have been undertaken under various schemes. The details are provided in **Appendix No. XI.**

5.1.4 SOIL EROSION: Soil erosion adversely affects the fertility status and land use. National Bureau of Soil Science and Land-Use Planning has grouped the soils of Yavatmal district into different erosion classes. The soils of the total geographical area of Pandharkawada Forest Division have been grouped into different erosion classes, their areal extent and expected soil loss is given below:

TABLE NO. 5.1: DIFFERENT SOIL EROSION CLASSES

Erosion class	Area		Expected soil loss (tonnes/ha/year)
	Ha	(%) TGA	
(1)	(2)	(3)	(4)
Slight	29,312.27	30 %	5-10
Moderate	57,227.67	60 %	10-15
Severe	8,829.96	9 %	15-20
Water bodies	587.75	1 %	-

Sheet erosion is noticed all over the forest areas of the division. The top layers of soil which store organic matter and nutrients, on which plants feed, are lost in this process. It decreases soil fertility, lowers sub-soil water level and water holding capacity of the soil.

The exact area treated under soil conservation cannot be assessed as no special work for soil conservation alone is carried out but SMC works form part of the plantations works. In Pandharkawada Division, during the past 10 years, 6533 hectares of tree species plantation and 220 hectares of fodder species plantation has been taken up for plantation and can safely be presumed that this area is treated for soil conservation.

TABLE NO. 5.2: SOIL AND MOISTURE CONSERVATION WORKS

Name of Work		Year							Total
		2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	
Loose Boulder Structure	Number	48	19	1463	0	0	0	0	1530
	Expenditure	165.2	44.6	16.61	0	0	0	0	226.42
Nala Bands	Number	0	15	2	3	0	2	0	22
	Expenditure	0	82.12	5.14	6.95	0	5.96	0	100.17
Forest Ponds	Number	63	46	105	40	0	7	8	269
	Expenditure	153.1	99.15	138.3	45.5	0	20.58	28.25	484.87
CCT/Deep CCT	Number	43	39	47	19	0	0	14	162
	Expenditure	730.8	915	800.6	355	0	0	0	2801.3
	Number	276.4	170.8	117.2	46.35	0	0	41.63	652.35
WAT	Expenditure	0	10	0	0	0	0	0	10
	Number	0	32.04	0	0	0	0	0	32.04
	Expenditure	0	17.93	0	0	0	0	0	17.93
GSB	Number	166	97	46	22	0	10	0	341
	Expenditure	81.28	53.05	12.78	6.03	0	5.1	0	158.24

(Expenditure in Rs. Lakhs)

5.2 DURATION OF WATER FLOW IN THE SELECTED SEASONAL STREAMS

River Painganga and river Wardha along with their tributaries drain the entire area. Painganga and Wardha are perennial sources of water. There are other small rivers and nalas from forests that have water in their streams till the month of December. There are three medium and 29 minor irrigation projects which form the major source of irrigation in Pandharkawada Division. Many areas feel the shortage of water during summer. Erratic rainfall further worsens the situation.

5.3 WETLANDS IN FOREST AREAS

Wetlands are unique and valuable ecosystems that are characterized by the presence of water, either permanently or seasonally. They serve as a transitional zone between terrestrial and aquatic environments, supporting a rich array of plant and animal species. Wetlands play a crucial role in maintaining the health of the environment and providing various ecosystem services. They act as natural filters, purifying water by trapping sediments and removing pollutants. Wetlands also serve as vital habitats for a wide range of organisms, including migratory birds, fish, amphibians, and invertebrates. They provide breeding grounds, nesting sites, and food sources, contributing to the overall biodiversity of the surrounding areas. Additionally, wetlands help in flood control by absorbing and storing excess water during heavy rains or storms, reducing the risk of downstream flooding. Despite their importance, wetlands face significant threats from human activities, such as drainage for agriculture, urban development, and pollution.

As per National Wetland Atlas, Yavatmal district has a total of 797 wetlands are mapped including 212 small wetlands (< 2.25 ha) with 34,192 ha area. The district is dominated by manmade wetland types. Reservoir/barrage is the major wetland type. There are 7 Reservoir/barrage mapped with 13,250 ha area (38.75%). There are 440 Tank/pond mapped with 33.10% area. Rivers/streams occupy 27.53 % area. Aquatic vegetation is slightly more during pre-monsoon (2936 ha) than during post monsoon (812ha). Open water spread of the wetlands is significantly higher in post monsoon (32303 ha) than during pre-monsoon (13786 ha), indicating the rainfall dependence of the wetlands in the state, particularly the dryness of rivers is very prominent.

5.3.1 SAIKHEDA WETLAND

Saikheda Wetland is the result of the Saikheda earth dam built in 1972 across the Khuni River in Kelapur Taluka of Pandharkawada Division to augment local irrigation. The wetland harbors rich biodiversity, especially avifauna. More than 100 bird species are recorded at Saikheda Wetland, including Purple Swampphen, Coot,

Munias, Warblers, Babblers, Bitterns, Snipes, Sandpipers, Grey Heron, Purple Heron, Woolly-necked Stork, Painted Stork, Eurasian Spoonbill, Plovers, Ibis, Swifts, Swallows, Wagtails, Kingfishers, Cormorants, Bitterns, Egrets, Terns, Jacanas, and more. Additionally, it serves as a habitat for migratory birds such as Eurasian Wigeon, Red-crested Pochard, Common Pochard, Northern Pintail, Ruddy-shelduck, Bar-headed Goose, Gadwall, etc.

However, the biodiversity of the wetland faces threats from open defecation and littering by fishermen camped on the margins, the use of fertilizers and pesticides in lean period agriculture, oil spillage from mechanical water pumps, the menace of stray dogs, and destructive harvesting of Nut grass (*Cyperus rotunda*).

5.3.2 PANDHARKAWADA WETLAND MANAGEMENT PLAN

Within the first two years of implementing this plan, documentation of biodiversity, threats faced, and mitigation measures in all major wetlands of the division will be completed. The DCF, Pandharkawada will then use this data to prepare a comprehensive Wetland Management Plan for the division by 2027. To enhance the quality of the research, partnerships with reputable institutions such as WII and BNHS may be sought. Additionally, recruiting research associates on a temporary basis, preferably from local institutes, will be pursued. Subsequently, potential wetlands identified through this process may be recommended for designation as Wetlands of National Importance and Ramsar Sites.

5.4 WATER LEVEL IN THE WELLS IN THE VICINITY (UP TO 5 Km) OF FOREST AREA

Ground water level is one of the basic data-element which reflects the ground water regime in an area. Central Ground Water Board (CGWB) monitors, ground water levels four times a year during January, April/May, August and November through a network of observation wells spread throughout the country. The primary objective of monitoring the ground water level is to record the response of ground water regime to the natural and anthropogenic stresses of recharge and discharge parameters with reference to geology, climate, physiography, land use pattern and hydrologic

characteristics. Natural conditions affecting the regime include climatic parameters like rainfall, evapotranspiration etc., whereas anthropogenic influences include pumpage from the aquifer, recharge due to irrigation systems and other practices like waste disposal etc. the details of water level data of six talukas in Pandharkawada Forest Division is given in the table below.

Table No. 5.3: WATER LEVEL DATA (2022) WITH LONG TERM DATA TREND (2011-2022)

Sr. No.	Taluka	Annual Ground water Recharge (ham)	Annual Extrac-table Ground water Resource (ham)	Ground Water Extraction for all uses (ham)				Stage of Ground Water Extraction (%)	Categori-zation on of Assess-ment Unit	Allocation of Ground Water Resource for Domestic Utilisation for projected year 2025 (ham)	Net Annual Ground Water Availa-bility for Future Use (ham)	Total Ground Water Availa-bility in the area (ham)
				Dom-estic	Indu-strial	Irrig-ation	Total					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Ghatanji	8104	7699	408	0	1256	1664	22	Safe	408	6035	1609
2	Maregaon	4235	4020	205	0	1116	1320	33	Safe	205	2699	745
3	Pandharkawda	7593	7213	365	0	1424	1788	25	Safe	365	5425	1978
4	Ralegaon	7100	6637	518	0	1966	2484	37	Safe	518	4153	1094
5	Wani	8296	7881	407	0	2068	2475	31	Safe	407	5406	445
6	Zari Jamni	6041	5736	470	0	937	1407	25	Safe	470	4329	155

5.5 STATUS OF AQUIFERS

Various rock formations with different hydrogeological characteristics act as distinct aquifer systems of varying dimensions.

Regarding the status of aquifers GSDA, Pune and CGWB, Central Region Nagpur have reported in 2011. The details of nature and yield potential of aquifers of six talukas in Pandharkawada forest division are given in the table below:

TABLE NO. 5.4: NATURE AND YIELD POTENTIAL OF AQUIFERS

Sr. No	Taluka	Main Aquifer	Yield Potential	Type of Wells Suitable
(1)	(2)	(3)	(4)	(5)
1	Ghatanji	Weathered Basalt	50-100 LPM	Dugwell, Borewell
2	Kelapur	Weathered Basalt	50-100 LPM	Dugwell, Borewell
3	Maregaon	Weathered Basalt Loose sediment	50-100 LPM	Dugwell, Tubewell, Borewell
4	Ralegaon	Weathered Basalt	50-100 LPM	Dugwell, Borewell
5	Wani	Loose sediment, Sandstone	50-100 LPM	Tubewell
6	Zari Jamni	Weathered Basalt, Loose sediment, Sandstone	50-100 LPM	Dugwell, Borewell, Tubewell

CHAPTER – 6

MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

6.1 GROWING STOCK OF WOOD

The enumeration of Pandharkawada Division was carried out by SOFR unit of Gadchiroli Working plan Division during 2023-24. The details are provided below.

TABLE NO. 6.1: WORKING CIRCLE WISE TREE DENSITY COMPARISON

Sr. No.	Working Circle	No. of Trees per Ha.		Change in % [(4-3/3)*100]
		Previous Enumeration (2009)	Current Enumeration (2023)	
(1)	(2)	(3)	(4)	(5)
1	Selection-cum Improvement	250.78	285.32	13.77 %
2	Improvement	165.80	-	-
3	Afforestation	74.44	114.39	53.66 %
4	Grassland & Fodder Improvement	123.55	66.05	- 46.54 %

TABLE NO. 6.2: TREE DENSITY (TREES/HA) OF SCI WC OVER THE PAST THREE ENUMERATIONS

Girth Class (cm)	Yadav's Plan (2000)			Rai's Plan (2009)			Current Plan (2023)		
	Teak	Non-Teak	Total (2+3)	Teak	Non-Teak	Total (5+6)	Teak	Non-Teak	Total (8+9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
30-45	57.20	30.27	87.47	53.17	30.27	85.14	45.13	38.84	83.97
45-60	42.83	18.86	61.69	46.06	18.86	64.97	42.75	25.44	68.19
60-75	27.65	12.56	40.21	33.39	12.56	44.30	40.11	15.01	55.12
75-90	15.23	7.46	22.69	21.76	7.46	28.75	25.72	10.79	36.51
90-105	7.23	7.46	14.69	9.07	7.46	13.44	13.23	7.96	21.19
105-120	2.84	3.33	6.17	4.37	3.33	7.78	6.12	5.21	11.33
>120	1.44	4.66	6.10	1.91	4.66	6.40	3.31	5.69	9.00
Total	154.42	84.60	239.02	169.73	84.60	250.78	176.37	108.95	285.32

TABLE NO. 6.3: TREE DENSITY (TREES/HA) COMPARISON OF SCI WC OVER THE PAST TWO ENUMERATIONS

Girth Class (cm)	Rai's Plan (2009)			Current Plan (2023)			Difference		
	Teak	Non-Teak	Total (2+3)	Teak	Non-Teak	Total (5+6)	Teak (5-2)	Non-Teak (6-3)	Total (8+9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
30-45	53.17	30.27	85.14	45.13	38.84	83.97	-8.04	8.57	-1.17
45-60	46.06	18.86	64.97	42.75	25.44	68.19	-3.31	6.58	3.22
60-75	33.39	12.56	44.30	40.11	15.01	55.12	6.72	2.45	10.82
75-90	21.76	7.46	28.75	25.72	10.79	36.51	3.96	3.33	7.76
90-105	9.07	7.46	13.44	13.23	7.96	21.19	4.16	0.5	7.75
105-120	4.37	3.33	7.78	6.12	5.21	11.33	1.75	1.88	3.55
>120	1.91	4.66	6.40	3.31	5.69	9.00	1.40	1.03	2.60
Total	169.73	84.60	250.78	176.37	108.95	285.32	6.64	24.35	34.54

6.2 GROWING STOCK OF BAMBOO

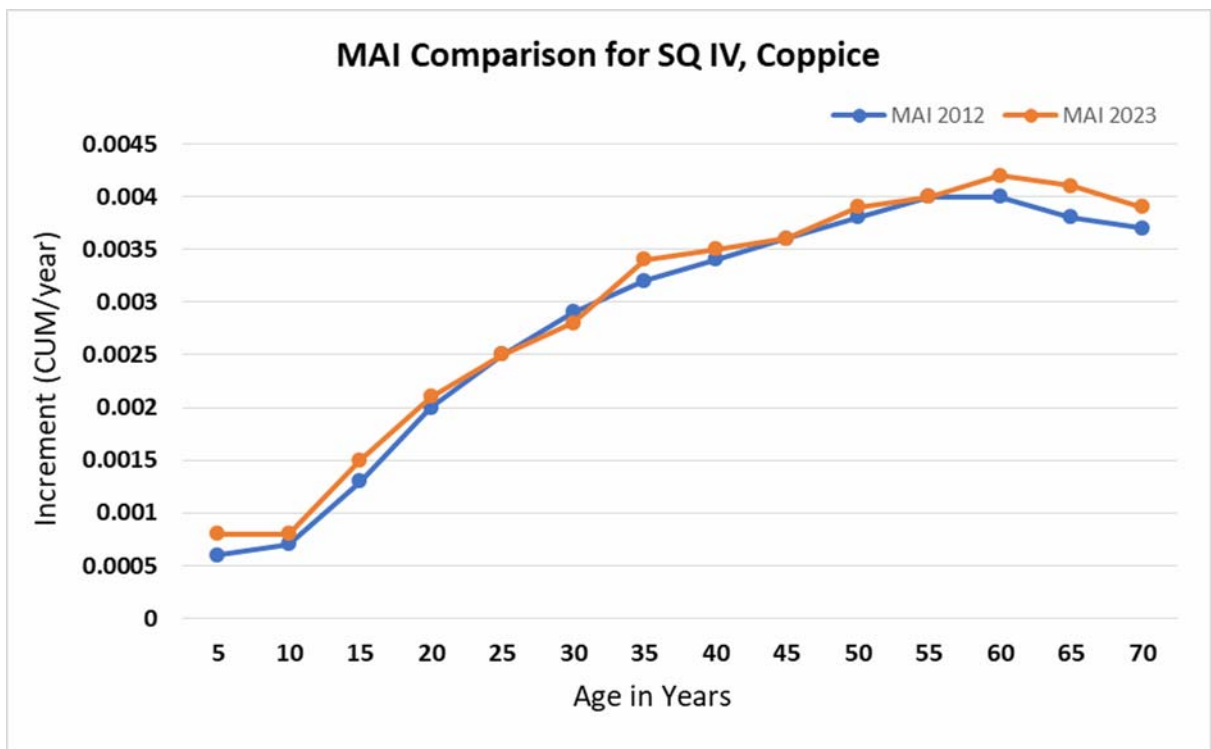
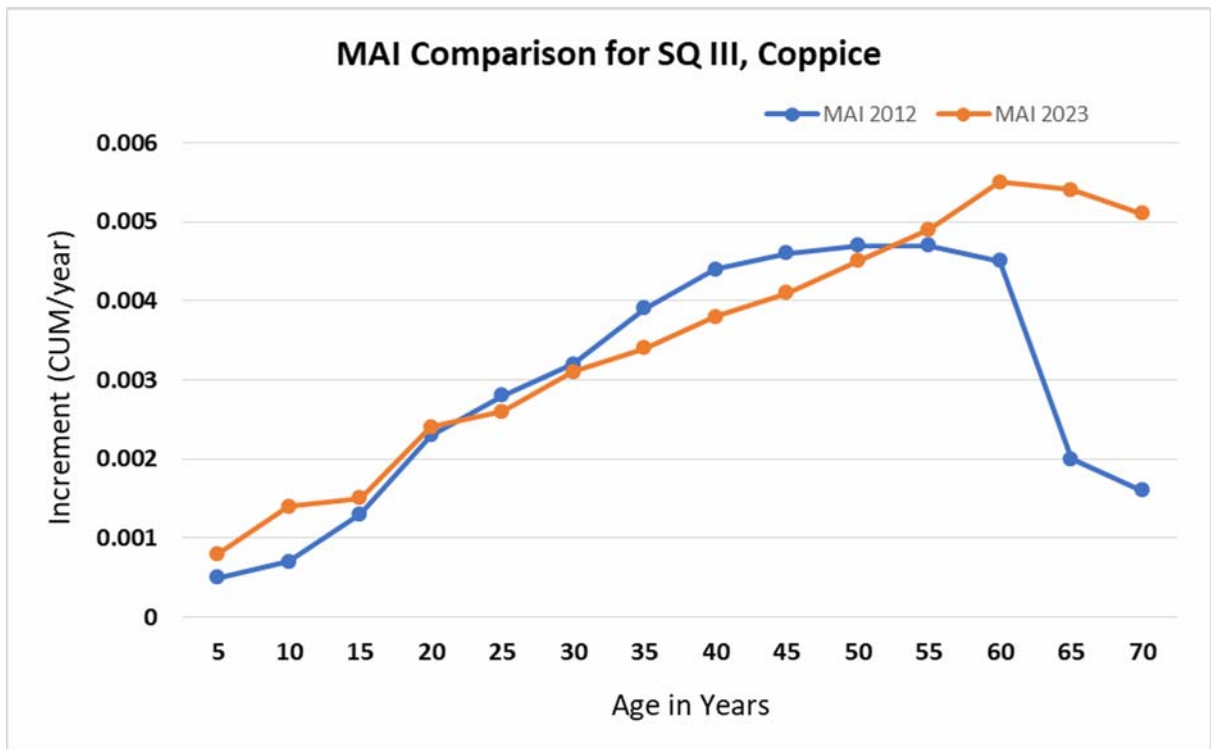
Bamboo presence is very scarce in the Pandharkawada Forest Division. Hence growing stock of bamboo was not assessed.

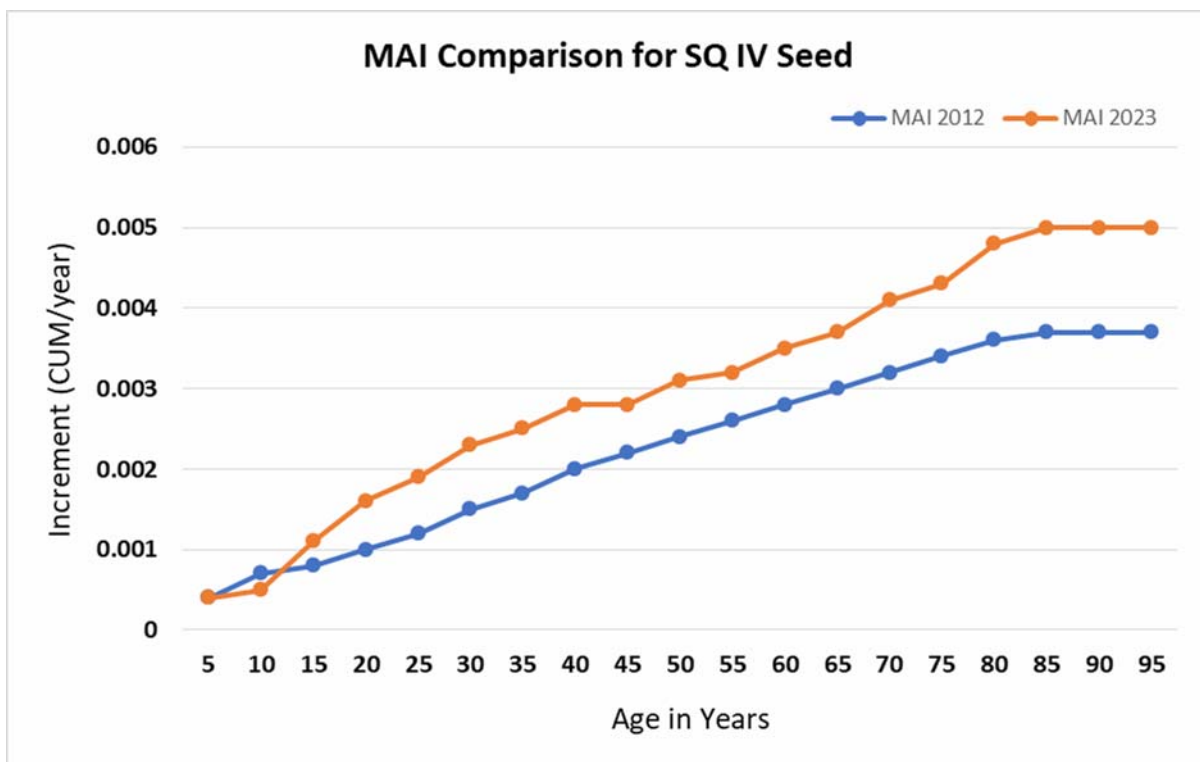
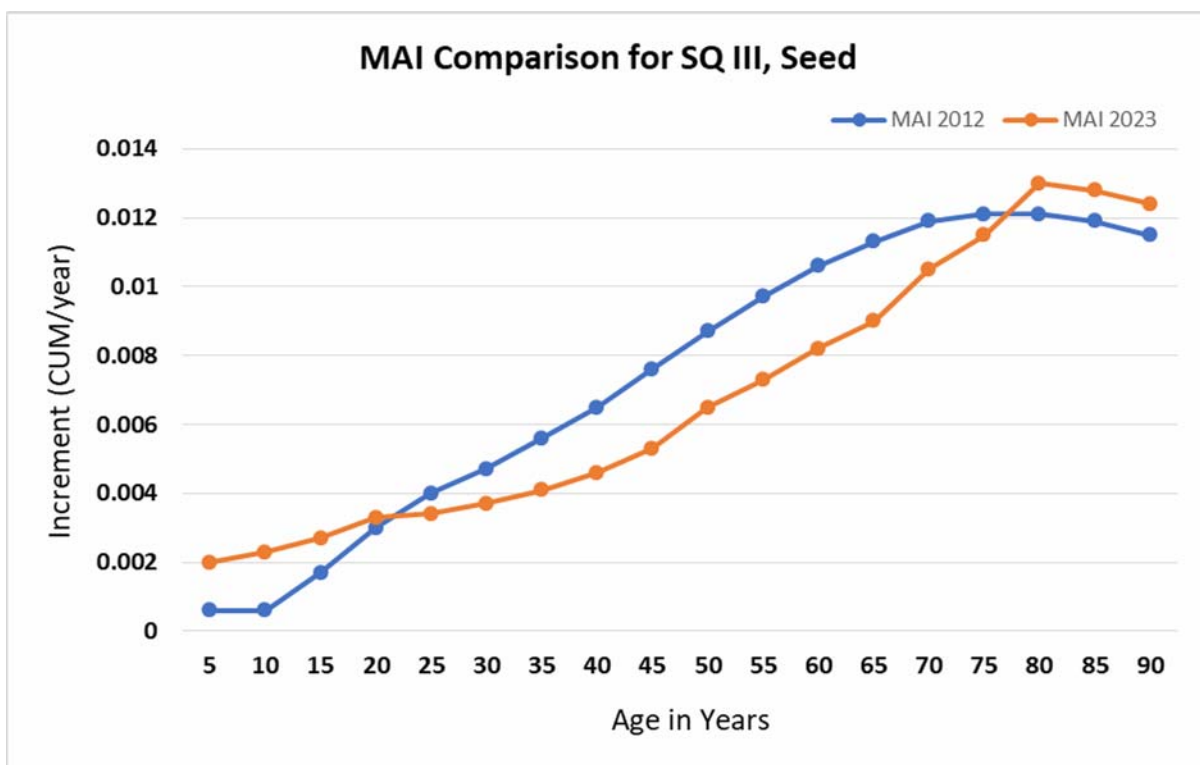
6.3 INCREMENT IN VOLUME OF IDENTIFIED TIMBER SPECIES

During revision of this plan, stem analysis for teak was carried out by selecting four representative teak trees each of seedling origin and coppice origin. The result of stem analysis is given in **AppendixNo.XII (A)** and **AppendixNo.XII (B)**. A comparison chart of MAI estimated from stem analysis of the current plan and the previous plan is provided below:

TABLE NO. 6.4: MEAN ANNUAL INCREMENT COMPARISON CHART

Sr. No.	Age	MAI (m ³ /year)							
		Coppice				Seed Origin			
		SQIII		SQ IV		SQIII		SQ IV	
		2012	2023	2012	2023	2012	2023	2012	2023
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	5	0.0005	0.0008	0.0006	0.0008	0.0006	0.0020	0.0004	0.0004
2	10	0.0007	0.0014	0.0007	0.0008	0.0006	0.0023	0.0007	0.0005
3	15	0.0013	0.0015	0.0013	0.0015	0.0017	0.0027	0.0008	0.0011
4	20	0.0023	0.0024	0.0020	0.0021	0.0030	0.0033	0.0010	0.0016
5	25	0.0028	0.0026	0.0025	0.0025	0.0040	0.0034	0.0012	0.0019
6	30	0.0032	0.0031	0.0029	0.0028	0.0047	0.0037	0.0015	0.0023
7	35	0.0039	0.0034	0.0032	0.0034	0.0056	0.0041	0.0017	0.0025
8	40	0.0044	0.0038	0.0034	0.0035	0.0065	0.0046	0.0020	0.0028
9	45	0.0046	0.0041	0.0036	0.0036	0.0076	0.0053	0.0022	0.0028
10	50	0.0047	0.0045	0.0038	0.0039	0.0087	0.0065	0.0024	0.0031
11	55	0.0047	0.0049	0.0040	0.0040	0.0097	0.0073	0.0026	0.0032
12	60	0.0045	0.0055	0.0040	0.0042	0.0106	0.0082	0.0028	0.0035
13	65	0.0020	0.0054	0.0038	0.0041	0.0113	0.0090	0.0030	0.0037
14	70	0.0016	0.0051	0.0037	0.0039	0.0119	0.0105	0.0032	0.0041
15	75	-	-	-	-	0.0121	0.0115	0.0034	0.0043
16	80	-	-	-	-	0.0121	0.0130	0.0036	0.0048
17	85	-	-	-	-	0.0119	0.0128	0.0037	0.0050
18	90	-	-	-	-	0.0115	0.0124	0.0037	0.0050
19	95		-		-		-	0.0037	0.0050





6.4 EFFORTS TOWARDS ENHANCEMENT OF FOREST PRODUCTIVITY THROUGH QUALITY PLANTATION ACTIVITIES

A total of 6533 hectares of tree species plantation has been done during the plan period. Plantations include teak and miscellaneous species. In the Pandharkawada Forest Division, the details of plantation activities that have been carried out in the past ten years are given in **Appendix No. XIII**. The summary of plantations is given in the table below.

TABLE NO.6.5: PLANTATION CARRIED OUT BY PANDHARKAWADA DIVISION

S.No.	Year	Area (ha)	No. of Saplings Planted
(1)	(2)	(3)	(4)
1	2013-14	427	552850
2	2014-15	852	1144850
3	2015-16	752	492381
4	2016-17	1360	1022050
5	2017-18	814	571975
6	2018-19	805	873500
7	2019-20	1028	1032359
8	2020-21	0	0
9	2021-22	110	94700
10	2022-23	384	389350
Total		6533	61,74,015

6.5 CARBON STOCK

Carbon stocks in forests refer to the amount of carbon stored in the trees, vegetation, and soil within forest ecosystems. Forests act as crucial carbon sinks, absorbing and storing significant amounts of carbon dioxide through photosynthesis. Trees capture carbon and store it in their trunks, branches, and leaves, while the forest soil holds carbon through decomposed organic matter. Protecting and properly managing forests is essential for maintaining and increasing carbon stocks, as deforestation and degradation release stored carbon back into the atmosphere.

Forest conservation and reforestation efforts are crucial for mitigating climate change and preserving carbon stocks in these valuable ecosystems.

In the forest ecosystem, carbon stored is classified in to five pools. The living portion of biomass carbon is classified in two pools; the 'above ground biomass' (AGB) and 'below ground biomass' which are stores of significant amounts of carbon. The 'dead organic matter' (DOM) is also classified into two pools; 'dead wood' and 'litter'. The fifth pool is 'Soil organic matter' (SOM) which contains substantial amount of organic carbon.

Table No. 6.6 : CARBON STOCKS IN DIFFERENT POOLS IN VARIOUS FOREST DENSITY CLASSES AS PER FSI ISFR 2021

Forest Type	Density	Carbon Stock per ha (in tonnes)					
		AGB	BGB	Dead wood	Litter	SOC	Total (Σ3to7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tropical Dry deciduous	VDF	35.34	14.84	0.49	2.01	51.90	104.58
	MDF	28.33	11.90	0.34	1.02	48.59	90.18
	OF	12.75	5.35	0.28	0.88	41.38	60.64

Using the above table and as per the area of forest in the corresponding forest cover density class, estimations of carbon stock in various pools are drawn for Pandharkawada division.

TABLE NO. 6.7 : CARBON STOCK OF PANDHARKAWADA FOREST DIVISION

Density class	Area (ha)	Carbon Stock in Pandharkawada Division (in '000 tonnes)					
		AGB	BGB	Dead wood	Litter	SOC	Total (Σ3to7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VDF	26.53	0.94	0.39	0.01	0.05	1.38	2.77
MDF	16638.55	471.37	198.00	5.66	16.97	808.47	1500.46
OF	21719.83	276.93	116.20	6.08	19.11	898.77	1317.09
Total	38384.90	749.24	314.59	11.75	36.14	1708.61	2820.33

Because carbon stock is provided only for wooded type of forests, the carbon stock estimation is available only for 38,384.90 ha in the division. Remaining area in scrub forests and no vegetation land although contribute to carbon stocks especially through soil carbon are not accounted for.

**TABLE NO. 6.8 : RANGE WISE ESTIMATIONS OF CARBON STOCK IN
PANDHARKAWADA FOREST DIVISION**

Range	Carbon Stock (in '000 tonnes)					
	AGB	BGB	Dead Wood	Litter	SOC	Total (Σ2to6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ghatanji	98.49	41.35	1.53	4.70	222.60	368.67
Jamni	120.84	50.74	1.94	5.98	282.04	461.53
Maregaon	142.07	59.66	2.05	6.25	295.85	505.87
Mukutban	84.99	35.69	1.27	3.88	183.71	309.54
Pandharkawada	127.21	53.41	2.01	6.20	293.06	481.90
Parwa	103.39	43.41	1.79	5.56	262.42	416.57
Wani	72.25	30.34	1.16	3.57	168.93	276.25
Total	749.24	314.59	11.75	36.14	1708.61	2820.33

Range-wise Share of Division's Carbon Stock

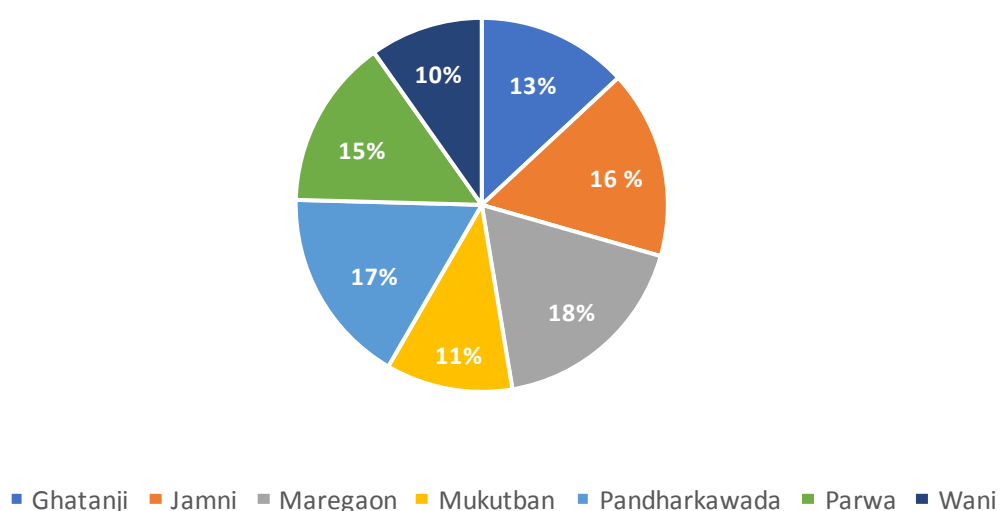


TABLE NO. 6.9: CARBON STOCK COMPARISON FOR PANDHARKAWADA DIVISION

Carbon Pool	Carbon Stock in Forests of (in Million Tonnes)			% to India's Carbon Stock (4/2*100)	% to Maharashtra's Carbon Stock (4/3*100)
	India (ISFR 2021)	Maharashtra (ISFR 2021)	Pandhar-kawada Division		
(1)	(2)	(3)	(4)	(5)	(6)
AGB	2320	137	0.75	0.032 %	0.547 %
BGB	719	42	0.31	0.043 %	0.738 %
Dead Wood	48	2	0.01	0.021 %	0.500 %
Litter	107	8	0.04	0.037 %	0.500 %
SOC	4010	261	1.71	0.043 %	0.655 %
Total	7204	452	2.82	0.039 %	0.624 %

6.6 CARBON SEQUESTRATION AND MITIGATION

Carbon sequestration refers to the process of capturing and storing carbon dioxide (CO₂) from the atmosphere, thus mitigating the effects of greenhouse gas emissions and climate change. It plays a crucial role in reducing the concentration of CO₂ in the atmosphere by removing it and storing it in various reservoirs, such as forests, oceans, and soil. Natural processes like photosynthesis in plants and the absorption of CO₂ by the oceans contribute to carbon sequestration. Additionally, human activities such as reforestation, afforestation, and sustainable land management practices can enhance carbon sequestration. Forests, in particular, are valuable carbon sinks, as trees absorb CO₂ during photosynthesis and store it in their biomass and soil. Maximizing carbon sequestration efforts is essential for achieving global climate goals and creating a more sustainable and resilient future for our planet.

Under Rai's plan, tree plantations covering a total area of 6533 hectares and fodder plantations spanning 220 hectares were taken up across the division. Most of these plantations were carried out with fencing, which has proven effective in

enhancing the survival rate of the planted trees and contributing to ecosystem restoration.

The current plan proposes the allocation of 26,996.44 hectares for Afforestation Working Circle and 4,456.07 hectares for Fodder Improvement Working Circle, to be implemented within the specified plan period. These efforts will expand the forest cover within the division and contribute to the carbon sequestration capacity of the forest. Additionally, the plan promotes natural regeneration, which will augment the biomass and carbon content through increased vegetation.

6.6.1 SOIL ANALYSIS

Soil samples were collected from different compartments of Pandharkawada forest division. These samples were analyzed for various physical and chemical properties. The details are given in **AppendixNo.XIV.**

CHAPTER 7

OPTIMIZATION OF FOREST RESOURCE UTILIZATION

7.1 RECORDED REMOVAL OF TIMBER

Timber is in demand for the purpose of construction, furniture making and preparation of agriculture implements by the local people. The main preferred species is Teak, which is followed by Ain, Dhawda, Kalam, Tiwas, Bija, Behada and Khair. Most of these species are also in demand locally for various construction purposes. Local demand for timber is met from the timber harvested from the forest and private areas. The timber depot at Umari in Pandharkawada Range caters to the needs of the local population.

TABLE NO.7.1: TIMBER AUCTIONED AND REVENUE REALIZED

Sr.No.	Year	Timber (m ³)	Revenue (Rs. Thousands)	Value (Rs Thousands/m ³)
(1)	(2)	(3)	(4)	(5)
1	2013-2014	17.23	220.60	12.81
2	2014-2015	1002.37	27,494.14	27.43
3	2015-2016	1707.10	43,552.53	25.51
4	2016-2017	1653.36	45,984.47	27.81
5	2017-2018	1561.37	48,108.42	30.81
6	2018-2019	2604.89	82,335.53	31.61
7	2019-2020	1753.22	62,254.80	35.51
8	2020-2021	1581.59	58,902.76	37.24
9	2021-2022	1476.25	46,860.60	31.74
10	2022-2023	1526.58	61,951.35	40.58
	Total-	14883.95	4,77,665.19	32.09

During the previous plan period, a total of 13,114.42 cubic meters of timber was harvested in the Selection Cum Improvement Working Circle (SCI), with an average production of 1.24 cubic meters per hectare. And in the Afforestation Working Circle (AWC), a volume of 470.9 cubic meters was extracted during the same period, resulting in an average production of 0.83 cubic meters per hectare.

7.2 RECORDED REMOVAL OF FUEL WOOD

Forest dwellers heavily rely on firewood for cooking, lighting, and warmth in their homes, particularly during winters. Firewood is essential for cooking purposes, and in some villages, fires are kept burning in and around huts throughout the night to provide warmth and deter wild animals. Among different species, Dhawada, Anjan, Babul, Ain, and Khair are preferred for fuelwood, while wood from all species that are not suitable for timber sale is used as fuelwood.

Although the introduction of modern cooking fuels like LPG gas and electric appliances has reduced dependence on fuelwood, it still remains the primary cooking fuel for most villagers and rural people in the Pandharkawada Division. Dhawda is the most sought-after species for fuelwood, followed by other hardwood species like Khair, Ain, and Babul, which are preferred over some softwood species like Salai, Moyen, and Behada. Due to the high demand surpassing supply, illegal tree lopping and the transportation of lopped branches, often carried out by women, are frequently observed to meet the various needs, including commercial consumption. Currently, no fuelwood supply is provided to local villagers under the Nistar system.

Illegal fuelwood consumption involves the unlawful removal of branches from trees in the forests, with transportation carried out on foot, bicycles, and bullock-carts, resulting in significant damage to the forest. Most ginning mills and processing factories in the area have shifted to alternatives such as coal and oil, reducing their reliance on firewood.

TABLE NO.7.2: FIREWOOD AUCTIONED AND REVENUE REALIZED

Sr. No.	Year	Quantity (m ³)	Revenue (Rs. In Thousands)	Value (Rs Thousands/m ³)
(1)	(2)	(3)	(4)	(5)
1	2013-2014	0	0.00	-
2	2014-2015	208.8	168.10	0.81
3	2015-2016	448.8	205.80	0.46
4	2016-2017	331.2	238.45	0.72
5	2017-2018	220.8	139.73	0.63
6	2018-2019	102	75.30	0.74
7	2019-2020	177.6	264.40	1.49
8	2020-2021	74.4	81.50	1.10
9	2021-2022	19.2	4.40	0.23
10	2022-2023	7.2	12.05	1.67
	Total	1590	1189.73	0.75

7.3 RECORDED REMOVAL OF BAMBOO/RATTANS

Availability of bamboo is very scarce, hence there is no documentation of recorded removal of bamboo or rattans. In this area, bamboo production is almost nil except on private farms. Local people when they need bamboo, purchase it from local markets or some local farmers who grow bamboo on their agricultural land.

7.4 RECORDED REMOVAL OF LOCALLY IMPORTANT NTFPs INCLUDING MAPs**7.4.1 TENDU LEAVES**

Tendu is one of the major revenue-earning forest produces. Collection of tendu leaves generally commences from the last week of April and continues up to the first week of June each year. Tendu leaves are collected by engaging labourers who deliver the leaves at various collection centers called "Phadi". After drying, bagging of leaves is done at collection centers and then bags are transported to the approved

godowns. The quantity of tendu leaves is measured in standard bag. One standard bag contains 1000 bundles/pudas. Each bundle/puda contains 70 tradable leaves.

There are 15 Tendu units in Pandharkawada Forest Division. Out of 15 units, 9 are PESA units and the remaining 6 are non-PESA units. The scattered distribution of tendu leaves, lesser areas available for collection and quality of tendu leaves determine the price of the tendu leaves. The details of sale of tendu leaves are given in the table below.

TABLE NO.7.3: TENDU UNITS AUCTIONED, YIELD AND REVENUE REALIZED

Sr No	Year	Type	Total Units	Units Auctioned	Estimated Yield (Standard Bags)	Actual Yield (Standard Bags)	Revenue Realised (Rs Lakhs)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	2014	Non-PESA	13	13	22400	17343	184.29
2	2015	Non-PESA	23	21	19250	12091	173.61
3	2016	PESA	6	6	6645	4536	215.54
		Non-PESA	9	9	11170	7291	116.67
4	2017	PESA	6	4	552	479	30.35
		Non-PESA	9	9	8110	7084	348.98
5	2018	PESA	6	3	807	742	9.68
		Non-PESA	9	2	2050	879	25.99
6	2019	PESA	6	3	1439	1604	21.67
		Non-PESA	9	2	1530	1312	13.41
7	2020	PESA	6	4	755	708	8.76
		Non-PESA	9	2	1350	1325	9.58
8	2021	PESA	6	2	575	503	16.78
		Non-PESA	9	3	2200	1839	27.08
9	2022	PESA	6	3	1615	1609	56.30
		Non-PESA	9	7	4400	3404	47.55
10	2023	PESA	6	4	1435	1272	12.77
		Non-PESA	9	5	3800	2248	28.87
TOTAL			156	102	90083	66267	1347.87

7.4.2: GUM: Gum producing units are less and sparsely distributed, therefore not feasible for auction.

7.4.3: FRUITS AND FLOWERS: Moha flowers and seeds, charoli, biba, hirda and beheda 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 and the local people harvest them. In the remote forest areas, the villagers collect flowers of Moha, fruits of Tendu, Char, for their bonafide use or for their religious and customary functions or for sale to earn their livelihood.

7.4.4: OTHER PRODUCTS: Apart from above mentioned products, local people depend upon forest for gums (Dhawda, Babul etc.), flowers of Palas, fruits of Tendu, Bel, flowers and flowers and seeds of Moha etc. to meet their livelihood demand and bonafide sale even for their livelihood.

An estimation of important NTFPs was carried out. Details are given below:

TABLE NO. 7.4: NTFP ESTIMATION FOR PANDHARKAWADA DIVISION (2023)

Sr. No.	NTFP	No. of Trees	Approx Production per Tree(kg)	Estimated Production (kg) Potential (3*4)	MSP/KG In Rupees (TRIFED)	Total Economic Value (Rs Lakhs) (5*6/100000)	50% of Total Economic Value (Rs Lakhs) (7*0.5)	Individual Per Day collection (kgs)	Man-days Generation Potential (5/9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Moha Flowers	113938	25	2848458	30	854.54	427.27	10	284846
2	Moha Seeds	113938	10	1139383	29	330.42	165.21	25	45575
3	Karanj Seeds	2374	2	4747	19	0.90	0.45	5	949
4	Charoli	42727	0.05	2136	126	2.69	1.35	1	2136
5	Beheda	108004	5	540020	17	91.80	45.90	2	270010
6	Awala fruit	4747	1	4747	30	1.42	0.71	1	4747
7	Palas gum	2538689	0.2	507738	195	990.09	495.04	0.5	1015475
8	Palas Seeds	2538689	1	2538689	20	507.74	253.87	5	507738
9	Khair gum	70025	0.25	17506	195	34.14	17.07	0.25	70025
10	Dhawada gum	461688	0.3	138506	195	270.09	135.04	1	138506
11	Salai gum	140049	0.3	42015	195	81.93	40.96	1	42015
Total						3165.76	1582.88		2382023

7.5 DEMAND AND SUPPLY OF TIMBER AND IMPORTANT NON-TIMBER FOREST PRODUCE

7.5.1 DEMAND AND SUPPLY OF FOREST PRODUCE AND PRESSURE ON THE FOREST

The consumption of timber is crucial for both rural and urban populations, serving various purposes. To assess the demand per family, an estimation has been conducted for the six talukas of the Pandharkawada Forest Division. The Forest Survey of India (FSI) has provided estimates of timber requirements for housing, furniture, agricultural implements, and other purposes in their State of the Forest Report (2019). FSI conducted a nationwide study to quantify the dependence of people living in villages near forests on fuelwood, fodder, small timber, and bamboo in each state and union territory of the country. For Maharashtra, FSI has provided estimated quantities of these four resources in the India State of Forest Report (2019).

Based on the population of Maharashtra in 2011 (11.24 crores), the per capita requirement is calculated as follows: 0.225 tonnes for fuelwood, 5.905 tonnes for fodder, 0.003 tonnes for bamboo and 0.020 cubic meters for small timber. These estimations provide insights into the dependence of people in forest fringe villages near forests in Maharashtra. Using these parameters, the dependency of local people on forests is estimated as shown below:

TABLE NO.7.5: ESTIMATION OF DEPENDANCE OF PEOPLE ON FOREST

Sr. No.	Taluka	Population	Fuelwood (Tonnes /person/ year)	Fodder (Tonnes /person/ year)	Bamboo (Tonnes/ /person/ year)	Small Timber (Tonnes/ person/year)	Total (Tonnes person/year) (Σ4to7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Ghatanji	138587	31182	818356	416	1386	851340
2	Kelapur	156783	35276	925804	470	1568	963118
3	Ralegaon	112203	25246	662559	337	1122	689263
4	Maregaon	78713	17710	464800	236	787	483534
5	Zari-Jamani	80147	18033	473268	240	801	492343
6	Wani	213668	48075	1261710	641	2137	1312563
Total		780101	175523	4606496	2340	7801	4792160

* Assuming density of small timber to be 0.5 Tonnes/CUM

7.6 IMPORT AND EXPORT OF WOOD AND WOOD PRODUCTS

Local people utilize most of the harvested wood to meet their domestic needs. Yavatmal is a good timber market. Harvested timber from forest areas is transported to the local depot at Umari, where the timber is auctioned periodically. Teak timber is mainly transported to Nagpur, Hyderabad and other places.

7.7 IMPORT AND EXPORT OF NTFPs

There is no record of import or export of NTFPs.

7.8 REMOVAL OF FODDER

Grass from closed coupes and plantations should be made available on cutting basis. As per the existing Government orders, annual lease of grass birs for removal of grass on cutting basis, is first offered to Gram Panchayats, Co-operative Milk Societies and other Public Bodies at a price fixed by the Forest Department, considering current market trend and availability of grass. The lease of those areas which could not be disposed in this manner is sold by auction. The grass from the areas which remain unsold by any of the above methods is sold on rated passes. Traditionally during the drought years, grass from grass birs is kept reserved under the orders of the Collector and is cut and supplied to the drought affected areas. However, such practices have become defunct in the current scenario. Further details on the

7.9 VALUATION OF THE PRODUCTS

The details of the quantity revenue realized from sale of timber, firewood and tendu are provided in tables 7.1, 7.2 and 7.3.

CHAPTER -8

MAINTENANCE AND ENHANCEMENT OF SOCIAL, ECONOMIC, CULTURAL AND SPIRITUAL BENEFITS

8.1 NUMBER OF JFM COMMITTEES AND AREAS PROTECTED BY THEM

Pandharkawada Division along with the state has come to embrace the Joint Forest Management as one of the tools of forest management as early as the mid – nineties. Ever since, the people's/ community's participation in conservation and management of forest and wildlife resources has been an integral part. In Pandharkawada Forest Division a total of 257 JFMCs have been established and these committees cover an area of 49,152.49 ha. All the areas adjoining villages have been covered under JFM, which take up 73% of forest area of division currently. JFM Committees have taken up plantation over an area of 297 ha. during the period of the last working plan.

8.2 STATUS OF EMPOWERMENT OF JFMCs

State's JFM is guided by the Govt. of Maharashtra resolution dated March 16, 1992, October 5, 2011 and July 10, 2012. In Pandharkawada division, 257 JFMCs are established in the villages adjacent to the forests. The total numbers of members in the committee are minimum 12 and a maximum of 24 and 1/3rd of the members are to be from the Gram Panchayat. 50 % of the members should be women and 2 members should be from SC/ST and OBC. The performance of committee in the Division has been adequate.

8.3 LABOUR WELFARE

The JFM villagers have priority over others in all the activities of the Department for semi-skilled and unskilled labour. Works of plantations, natural regenerations, boundary pillars repairs, fire line cuttings and all other works of the Department are involved through the JFM members wherever the committee exists.

Maharashtra also has the unique distinction of having Forest Labour Cooperative Societies in every division. All skilled works related to felling of trees in the forests are auctioned to these societies.

8.4 USE OF INDIGENOUS KNOWLEDGE

The Department has made its effort in documenting the indigenous traditional knowledge of the people in the Division. It is incorporated in the micro plan and people's biodiversity registers and implemented through JFMC and BMC. Meetings are held from time to time. It is the responsibility of the field officers to tap all kinds of traditional knowledge from the locals, particularly those associated with forest and environment, and to document them for posterity.

8.5 EXTENT OF CULTURAL/SACRED GROVES

There are no recorded sacred groves in the Division.

8.6 ECOTOURISM AREAS AND ACTIVITIES

Eco- tourism is defined as "tourism that involves traveling to relatively undisturbed natural areas with the specified objects of studying, admiring and enjoying the scenery and its wild plants and animal as well as any existing cultural aspects (both of the past and the present) found in these areas."

Following sites are eco-tourism locations in Pandharkawada Forest Division:

TABLE NO. 8.1: ECO-TOURISM LOCATIONS IN PANDHARKAWADA FOREST DIVISION

Sr.No.	Range	Name	Comp.No.
(1)	(2)	(3)	(4)
1	Wani	Mandar Eco-Park	613
2	Pandharkawada	Krishna Tekadi	C.A.74
3	Maregaon	Pandhardevi	71

8.7 SOCIAL CUSTOMS

Social customs relevant to the forest or its conservation are not noticed.

8.8 STATUS OF COMPLIANCE OF FOREST RIGHT ACT (FRA)

The status of implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 in Pandharkawada Forest Division is summarized in the table below.

TABLE NO. 8.2: STATUS OF IMPLEMENTATION OF FRA, 2006 (as on March 31, 2023)

Sr. No.	Type of FRA benefit	No. of claims submitted at Gram Sabha	No. of claims accepted by DLC	Percentage of acceptance	Total Area of accepted claims (ha.)	Percentage of gross forest area
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Individual Forest Rights	2528	694	27.45 %	1076.77	1.27 %
2	Community Forest Rights	316	315	99.68 %	74766.22	88.26 %
3	Benefits u/s 3(2)	26	26	100 %	10.69	0.01 %
	Total	2870	1035	36.06 %	-	-

8.9 OTHER RIGHTS AND CONCESSIONS

8.9.1 RIGHTS AND CONCESSIONS

There are no rights in the reserved forests except certain rights associated with right of way and access to water. There is no communication of nistar in Pandharkawada forest division. Various concessions have been granted from time to time the agricultur list and other by the Govt. of Maharashtra. The following concessions have been permitted:

1. The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of the reserved forests in accordance with the grazing rules in force.
2. Grazing in R.F. is covered by the Grazing settlement. The grazing concessions are allowed as per grazing policy of Maharashtra State depending upon the cattle unit and carrying capacity of forest.

3. State Government has fixed the grazing units on the functional basis of forest (Protected forest, tree forest, minor forest and pasture forest) vide Government resolution No. MFP-1365 / 13211 Y, Dated 6.12.1968.
4. State Government has fixed the grazing unit for sheep / goat vide resolution NO. MFP-2103 / F-1 / Dated 6.5.2008 and area of 23993.10 ha is fixed for grazing of local cattle.
5. As per current Working plan, 27 grazing units are established where grazing is permitted as per the carrying capacity. However, more often than not, the number of cattle in the tract exceeds the carrying capacity of the grazing unit. The excess cattle may be managed through fodder development activities on common community land. The villagers shall be educated and made aware of ill effects of excessive grazing on forest regeneration and growth. The villagers shall be persuaded to go for stall feeding. The list of grazing units in Pandharkawada Forest Division is given in **Appendix No.XVIII**.
6. Farmers of villages in the vicinity of the reserved forest are given a certain quantity of Bamboo and firewood for their bonafide domestic use at concessional rates, none of these concessions is a legal right.

8.10 DEPENDENCY OF LOCAL PEOPLE OF NTFPS

The species of NTFP are available throughout the tract with varying degree. They meet the NTFP demand of local forest dwellers directly or indirectly. They not only play an important role in economy but also generate employment to the local people. The important NTFP are Tendu, Moha flower, Moha seed, Hirda, Behada, Aoala, Charoli, Kulu, Dhawda, honey etc.

A rich variety of medicinal plants are found in the forest tract of the Pandharkawada Forest Division which yield medicines that are used for curing of different ailments by the local people. The medicinal plants play an important role in socio-economic cultural, spiritual and medicinal values of local villagers. Their conservation, sustainable management and harvesting can conserve biodiversity retaining human, environmental health and generate employment.

8.11 MEASURES TAKEN FOR REDUCING HUMAN WILDLIFE CONFLICT BY INVOLVING JFMC

Efforts to mitigate human-wildlife conflicts in the Pandharkawada Division involve the implementation of an informal Primary Response Team Model. In this model, conflict-prone villages are organized into clusters, each forming a response team comprised of local residents. These teams play a vital role in monitoring daily tiger movements, raising awareness about appropriate behavior in tiger-prone areas, and acting as a buffer in case of tiger attacks. The team members, employed on a daily wage basis, report their findings to the respective Range Forest Officers (RFOs).

Furthermore, members of Joint Forest Management Committees (JFMCs) have undergone training on rescuing and releasing wild animals within their habitats. Specialized training has been provided to equip them with the skills to safely rescue snakes that venture into human settlements. This training includes identifying venomous and non-venomous snakes, contributing significantly to the conservation of snake species that were previously killed out of fear. JFMCs and local youth have actively participated in the creation of waterholes, contributing to the reduction of wildlife movement in search of water.

Distribution of LPG cylinders to families residing on the forest fringe and those dependent on forests for their livelihood has played a pivotal role in decreasing human movement within forests, subsequently reducing illicit tree felling. This has resulted in a decline in human-wildlife interactions associated with fuelwood collection. Ongoing awareness campaigns, facilitated by JFMCs, aim to educate local communities about wild animal habitats and behavior, further reducing instances of conflicts.

CHAPTER 9

ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

9.1 EXISTING POLICY AND LEGAL FRAMEWORK AND THEIR COMPLIANCE

The existing policy and laws in the country and the State are invoked for the management of the forests in the Division. The National Forest Policy of 1988 serves as the basic guide for the management strategy of this plan. The Indian Forest Act, 1927, and its amendments are the principal laws governing the administration of the forest in the Division. The plan has also drawn inspiration from the following:

1. National Forestry Action Plan
2. National Wildlife Action Plan (2017-31)
3. Orders of the Hon'ble Supreme Court of India
4. Forest Right Act, 2006
5. The Biological Diversity Act, 2002
6. Wildlife (Protection) Act, 1972
7. GoI Orders/GoM Resolutions, Circulars, etc.

9.2 STATUS OF APPROVED WORKING PLAN AND COMPLIANCE

The previous working plan for the division covered the period from 2013-14 to 2022-23. Before implementing the current plan, a Working Scheme was sanctioned for 2023-24 to work coupe number XI of Rai's Plan. As per the sanctioned given by MoEFCC Nagpur the plan period 2023-24 to 2032-33 due to this coupe No.XI is considered as Coupe No.I in this Plan. The current plan is now prepared for the period 2023-24 to 2032-33.

9.3 NUMBER OF FOREST OFFENCES

The number of forest offences registered in the last ten years is given below:

TABLE NO.9.1: OFFENCE CASES REGISTERED

Sr. No.	Year	Fire	Illegal Transport	Illicit felling	Encroachment	Wildlife	Others	Total (Σ3to8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	2013-14	23	4	818	6	3	19	873
2	2014-15	21	5	651	4	3	11	695
3	2015-16	48	3	561	7	4	8	631
4	2016-17	43	5	420	3	2	12	485
5	2017-18	70	13	526	4	4	18	635
6	2018-19	32	7	348	0	2	12	401
7	2019-20	9	2	350	1	20	15	397
8	2020-21	69	16	417	1	23	4	530
9	2021-22	38	7	338	7	8	9	407
10	2022-23	38	8	331	2	4	16	399
	Total	391	70	4760	35	73	124	5453

9.4 STATUS OF RESEARCH AND DEVELOPMENT

No research or development work is currently being carried out in this division. However, due to high cases of crop depredation and human-tiger conflict, research and pilot studies should be undertaken in partnership with recognized institutions.

9.5 HUMAN RESOURCE CAPACITY BUILDING EFFORTS

The department heavily relies on its field staff, considering them as its backbone. Ensuring their proficiency is crucial, and thus, regular training and exposure at all levels in the field are essential. Recently, the Forest Department has made significant strides in Information Technology. As a result, it is imperative for all officers and field staff to become adept in using modern technology.

To enhance the capacities of officers at the Deputy Conservator of Forests (DCF), Assistant Conservator of Forests (ACF), and Range Forest Officer (RFO) levels, the department is implementing various training programs. Renowned institutions such as the Forest Research Institute, Forest Survey of India, and Wildlife Institute of India provide training on forestry and wildlife-related advancements. Furthermore,

other institutions across India are engaged to offer training and exposure in diverse areas related to forestry and climate change.

For the training of Foresters and Forest Guards, the department utilizes state training institutes and the Rangers' College. In addition to regular training, field and technical staff members receive instruction on remote sensing, Geographic Information System (GIS), and other IT-related fields. Technical staff members, including Ranger Surveyors and Surveyors, undergo regular training to update their skills in various land management software, such as GeoMedia Professional.

The field staff has been equipped with Personal Digital Assistants (PDAs) for various activities, including plantation, offense cases, fire incidents, encroachment, grazing, and boundary demarcation. The forest department's IT cell has developed several applications that frontline staff members utilize.

9.6 FOREST RESOURCE ACCOUNTING

In this plan, every effort has been made to meticulously document all tangible benefits derived from the forest. The value of timber and firewood has been comprehensively accounted for in the previous plan.

To capture the accounting of intangible benefits, the Net Present Value of the forests as calculated for the calculation of NPV by the Kanchan Chopra Committee and accepted by the Hon. Supreme Court order dated 28.03.2008, is adopted. This method is employed to calculate both tangible and intangible benefits, providing a comprehensive assessment of forest values in the Division. The factors considered for accounting the forest area include:

- i. Value of timber and fuel wood
- ii. Value of Non timber Forest Products (NTFPs)
- iii. Value of fodder
- iv. Value of Eco-tourism
- v. Value of bioprospecting
- vi. Value of Ecological services of forest

- vii. Value of Flagship Species
- viii. Value of Sequestration Value.

For the purpose of the valuation of the forest, the following Eco- classes of forests have been identified for the purpose of calculation and 16 major groups of forest types of India as classified by the Champion and Seth have been reduced into the following Eco- classes.

TABLE NO.9.2: ECO-CLASSES OF FORESTS

Eco class - I	Tropical Wet Evergreen Forest, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forests
Eco class - II	Littoral and Swamp Forests
Eco class - III	Tropical Dry Deciduous Forests
Eco class - IV	Tropical Thorn Forests, Tropical Dry Evergreen Forests
Eco class - V	Subtropical Dry Evergreen Forests, Subtropical Pine Forests, Subtropical Pine Forests
Eco class - VI	Montane Temperate Forests, Moist Temperate Forests, Sub Alpine Temperate Forest, Dry Temperate Forests, Moist Alpine Scrub, Dry Alpine Scrub

The forests within the Pandharkawada Division fall under Eco-Class III. The value of these forests, categorized by their type and associated attributes, has undergone a revision by the Indian Institute of Forest Management, Bhopal. It is important to note that this revised value is still pending approval.

The study conducted by the Indian Institute of Forest Management (IIFM) is notably more comprehensive, encompassing all aspects of the intangible benefits provided by the forest ecosystem. The value of the Pandharkawada forests, considering both tangible and selected components of intangible benefits, is presented below based on the current and proposed Net Present Value (NPV) values.

TABLE NO.9.3: CALCULATION OF FOREST WORTH BASED ON NPV

Sr. No.	Forest Class Category	Area (ha.)	Current Rate of NPV (Rs lakh/ha)	Value of Forest as Current Rate (Rs Crores) (3*4)	Proposed Rate of NPV as per IIFM (Rs lakh/ha)	Value of Forest as per Proposed Rate (Rs Crores) (3*6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	VDF	26.53	13.57	3.60	25.5	6.76
2	MDF	16638.55	12.29	2044.88	19	3161.32
3	OF	21719.83	9.58	2080.76	11.4	2476.06
4	Scrub	720.6	9.58	69.03	7.9	56.93
Total				4198.27		5701.08

At the current rates for various forest canopy classes, the Net Present Value (NPV) for the Pandharkawada Forest Division is approximately 42 billion rupees. Nevertheless, with the proposed revised rates by the Indian Institute of Forest Management (IIFM) to estimate the maximum potential number of ecosystem services, the value increases to 57 billion rupees. The valuation of different ecosystem services in various forest classes of dry deciduous forests, as per the IIFM Report, and its application to the forests of the Pandharkawada division is given below.

TABLE NO.9.4: VALUATION OF ECOSYSTEM SERVICES IN PANDHARKAWADA FOREST DIVISION

Sr. No.	Ecosystem Service	Value in Rs./ha/year				Pandharkawada Division (in Rs crores/ year)
		Very Dense	Dense	Open	Scrub	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Timber production	60,058	41,198	15,346	1,707	102.16

Sr. No.	Ecosystem Service	Value in Rs./ha/year				Pandharkawada Division (in Rs crores/ year)
		Very Dense	Dense	Open	Scrub	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2	Bamboo production	23,376	4,274	909	275	9.17
3	Fodder production	12,535	12,535	12,535	12,535	49.02
4	NTFP	17,074	17,026	7,754	930	45.28
5	Fuel wood production	5,320	5,320	5,320	5,320	20.80
6	Carbon Sequestration	3,361	2,442	1,150	488	6.60
7	Gene pool conservation*	67,852	67,852	67,852	67,852	265.34
8	Pollination and seed dispersal	10,167	10,167	10,167	10,167	39.76
9	Soil conservation	13,947	9,024	4,101	823	24.02
10	Water recharge	1,951	1,269	527	103	3.27
11	Carbon storage*	300,064	2,70,040	95,721	95,721	664.91
12	Water purification	2,950	2,950	2,950	2,950	11.54
Total						1241.86

Excluding the one-time values associated with genepool conservation and carbon storage, the annual value of ecosystem services provided by the forests of Pandharkawada Division is Rs. 311.62 crores.

9.7: BUDGETARY ALLOCATIONS TO THE FORESTRY SECTOR

TABLE NO.9.5: STATEMENT SHOWING THE REVENUE, EXPENDITURE AND SURPLUS

Year	Revenue (in Rs. Lakhs)	Expenditure (in Rs. Lakhs)			
		Conservancy & Work	Establishment	Plan	Total Expenditure (3+4+5)
(1)	(2)	(3)	(4)	(5)	(6)
2013-14	193.19	86.72	164.60	2431.21	2875.72
2014-15	370.16	196.35	204.65	2104.87	2876.03
2015-16	817.63	754.35	218.76	1309.43	3100.17
2016-17	589.06	139.77	223.51	1717.24	2669.58
2017-18	702.17	120.15	229.34	1452.67	2504.33
2018-19	793.05	359.21	230.02	1721.52	3103.80
2019-20	754.36	4.50	277.02	872.68	1908.56
2020-21	74.28	39.43	227.11	1500.44	1841.26
2021-22	148.52	191.56	293.96	1243.09	1877.13
2022-23	816.80	96.54	297.97	2749.14	3960.45
Total	5259.22	1988.58	2366.94	17102.29	26717.03

The table above illustrates that, in the Pandharkawada Division, over the past 10 years, expenditure has exceeded revenue in the ratio of 5:1. Additionally, establishment costs constitute about 9% of the total expenditure.

The department operates an independent Evaluation Cell led by an officer holding the rank of CCF in Nagpur, with a regional office in Yavatmal headed by a DFO. Annual evaluation reports on various plantation activities are submitted to the Division for improvement and course corrections. These assessments follow the guidelines outlined in the Evaluation Code of the Maharashtra Forest Department, published in 1969.

9.8 EXISTENCE OF MONITORING, ASSESSMENT AND REPORTING MECHANISM

Monitoring and assessment will be conducted at the RFO, ACF, and DCF levels. CF(T), Yavatmal, and DCF (WP) are responsible for ensuring the proper implementation of this Working Plan as per GR No. Sankirna – 2011/F.No. 289/F-7, Dt. 29/09/2011, and GR No. FDM-11/2017/F.No.323/F-6 dated 14/12/2017. DCF, Pandharkawada, is tasked with ensuring the timely submission of felling proposals, coupe control forms, compartment history forms, and deviation proposals in the prescribed format to the DCF (WP).

9.9 PUBLIC AWARENESS AND EDUCATION

Public awareness initiatives are conducted by the Division in collaboration with the Social Forestry Wing of the department in the district. According to the Deputy Director of the SFD, 250 schools in Yavatmal District have Eco-clubs under the National Green Army Scheme of the Government of India. Each club has a minimum of 50 members. These schools host regular year-round programs, celebrate important environmental and forest-related days, conduct field visits, and initiate projects. Additionally, seed banks are established in these schools.

The Division actively celebrates Van Mahotsav and Wildlife Week, organizing various events such as essay writing, painting competitions, extempore, and speech competitions.

9.10 ADEQUATE MANPOWER IN FOREST DIVISION

9.10.1 STAFF

In the Pandharkawada Forest Division, the Deputy Conservator of Forests is supported by three Assistant Conservators of Forests, who are Class-I officers, and 13 Range Forest Officers belonging to the Class II (Gazetted) category. Details of the current staff and manpower in the Division are provided in the table below.

TABLE NO.9.6: PRESENT STAFF POSITION IN THE PANDHARKAWADA DIVISION

Sr.No.	Name of the Post	Number of Posts				
		Sanctioned	Permanent	Temporary	Filled	Vacant
Class – I						
1	Deputy Conservator	1	0	1	1	0
2	Asst. Conservator	3	3	0	2	1
	Total – I	4	3	1	3	1
Class – II						
1	Range Forest Officer	13	10	3	13	0
2	Office Superintendent	1	0	1	0	1
3	Ranger surveyor	1	1	0	1	0
	Total – II	15	11	4	14	1
Class – III						
1	Forester	41	30	11	35	6
2	Forest Guard	142	104	38	117	25
3	Chief Accountant	1	1	0	1	0
4	Accountant	11	10	1	8	3
5	Clerk	18	17	1	15	3
6	Surveyor	1	1	0	1	0
7	Jeep Driver	4	4	0	2	2
8	Hatyari Police	2	2	0	0	2
9	Truck Driver	0	0	0	0	0
10	Tractor Driver	0	0	0	0	0
	Total – III	220	169	51	179	41
Class – IV						
1	Naik	1	1	0	1	0
2	Daftari	0	0	0	0	0
3	Peon	0	0	0	0	0
4	Mali	0	0	0	0	0
5	Watchman	0	0	0	0	0
6	Choukidar	2	1	1	2	0
7	Tractor Cleaner	3	1	2	3	0
8	Truck Cleaner					
9	Vanmajur	46	0	0	46	0
	Total – IV	52	3	3	52	0
	Grand Total	291	186	59	248	43

The following table outlines the jurisdictions of ACF and RFO posts in the Pandharkawada Division.

TABLE NO.9.7: JURISDICTION OF ACF & RFO POSTS IN THE PANDHARKAWADA DIVISION

S. No.	RFO/ACF Post	Headquarters	Jurisdiction
1	ACF (Territorial & Wildlife)	Pandharkawada	Ghatanji and Parva Ranges
2	ACF (Logging Officer)	Pandharkawada	Jamni Range, Pandharkawada Range and Umari Timber depot
3	ACF (FLCS & CAMPA)	Wani	Wani, Maregaon and Mukutban Ranges
4	RFO (Mobile Squad -1)	Pandharkawada	Ghatanji, Jamni, Parva and Pandharkawada Ranges
5	RFO (Mobile Squad -2)	Wani	Wani, Maregaon and Mukutban Ranges
6	RFO (Territorial), Pandharkawada	Pandharkawada	Pandharkawada Range
7	RFO (Territorial), Ghatanji	Ghatanji	Ghatanji Range
8	RFO (Territorial), Parva	Parva	Parva Range
9	RFO (Territorial), Jamni	Patanbori	Jamni Range
10	RFO (Territorial), Wani	Wani	Wani Range
11	RFO (Territorial), Mukutban	Mukutban	Mukutban Range
12	RFO (Territorial), Maregaon	Maregaon	Maregaon Range
13	RFO (Depot Officer)	Umari	Umari Timber Depot
14	RFO (Logging)	Umari	Umari Timber Depot
15	RFO (EGS), Parva	Parva	Parva Range
16	RFO (EGS), Wani	Wani	Wani Range

9.10.2 LABOUR SUPPLY

The labor supply in this division is generally satisfactory throughout the year, except during the rainy season when agricultural operations coincide with plantation works. The required labor force for various forestry operations is sourced from nearby villages. Departmental tasks such as cutback operations and road repairs are accomplished by engaging local residents. Some villages have skilled laborers proficient in forestry operations, as they have been involved in these activities for an extended period.

CHAPTER 10

FIVE YEAR PLANS

10.1 Forest was a subject of state list till 42nd amendment to the Constitution of India in 1976. State used to look after the protection, development and management of all the forest resources and generate revenue to its exchequer. Forest was managed even before independence on scientific lines in consonance with the prepared Working Plans. The emphasis before independence was on improvement of forest and exploitation of matured and valuable timber species. The ex-proprietary forest was also brought under the purview of the management after independence. Wildlife was treated as a source of recreation. Till late 70's of last century, no plan funds were allocated to the forest sector. In this area, forest was very dense and was utilized for meeting the demands of the local people for forest produce. In this area, silvicultural operations were given priority and protection and fire protection was very much emphasized. With the introduction of plan, lot of developmental activities have been taken up. Forestry sector remained as revenue generating sector and very little amount through non plan expenditure was incurred on forestry sector.

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

10.1.1 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.

10.1.2 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.

10.1.3 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 as well. 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.

10.1.4 THIRD FIVE YEAR PLAN (1966 TO 1969)

Thosre's Plan was under implementation during this period. There was severe drought condition and the local people were reeling under poverty as agricultural crops completely failed, resulting 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.

10.1.5 FOURTH 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.

10.1.6 FIFTH FIVE YEAR PLAN (1974 - 1979)

Thosre's plan continued up to middle of this plan period. The forestry sector in this five year plan aimed at large scale plantations, social forestry and forest conservation. Social Forestry wing was established during this period to involve people, to raise 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.

10.1.7 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 up 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. Kanekar's Working Plan was under implementation during this period. Successful teak plantations were 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 re-organisation of forest divisions was effected and Pandharkawada Forest Division was carved out from East Yavatmal Division.

10.1.8 SEVENTH FIVE YEAR PLAN (1985-1990)

During this period, Kanekar's Working Plan was 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. Plan funds were allocated for the developmental activities under district plan scheme.

10.1.9 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, funds were made available for plantations, soil and moisture conservation works. Kanekar's Plan continued to be in operation during this plan period.

10.1.10 NINTH FIVE YEAR PLAN (1997-2002)

The aims of eighth five year plan were carried forward to ninth 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 miscellaneous species were taken up under various schemes. Funds from the district plan were made available. During this period Yadav's Plan was in force.

10.1.11 TENTH FIVE YEAR PLAN (2002-2007)

Yadav's Plan was under implementation during this Plan. This five year plan gave thrust on JFM through the Forest Development Agency. In Yadav's Plan numerous 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. Wildlife (Protection) Act, 1972 was amended in 2006 to strengthen the conservation of tigers and other endangered species by combating crimes against them and National Tiger Conservation Authority (NTCA) was created. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act was enacted in 2006 to recognize the rights of the forest dwelling tribal communities and other traditional forest dwellers to forest resources on which these communities were dependent.

10.1.12 ELEVENTH FIVE YEAR PLAN (2007-2012)

The monitorable target of the 11th five year plan was to increase the forest cover by 5% of the total geographical area. This would require an additional cover of about 16 million ha. Out of this, 5 million ha could be brought under the tree cover within the recorded forest area while the rest would be added through agro forestry and social forestry. However, the policy target is to have 33% forest and tree cover which will require an additional coverage of about 10–11 million ha. This will have to be done mainly outside the recorded forest area. The target of 33% forest and tree cover reflects the tree component without accounting for other vibrant non-tree natural biomes like grasslands. The amendment of the target of the 1952 policy, of one-third area under forests, to forest/tree cover resulted in a shift of focus from ecological habitat to tree cover. Further, recognition of biodiversity characteristics and ecological services rendered by habitats like grasslands, natural desert ecosystems, alpine, and riparian habitat suggests that several biomes, even if devoid of tree component, can be recognized as 'green cover' and accounted. Recognizing these facts, the following strategic principles were adopted for dealing with the green cover:

1. The policy objective of 33% tree/forest cover should be revisited for its definition on ecological considerations.

2. The green cover should include the existing natural ecosystems within which the tree cover constitutes a sub-set.
3. Enabling environment for social and participatory regimes should be the aim of Central efforts, as is being done through JFM mode under the National Afforestation Programme.
4. Implementation of the Central programmes has met with difficulties on fund flow management at the State level. It is advisable to undertake activities in project mode with earmarked funding, as is done in the externally aided projects.

Impetus was given to implementation of Biodiversity Act, 2002 by constitution of State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) for conservation, documentation and sustainable utilization of biodiversity. National agro biodiversity hotspot mapping and identification of important agro biodiversity landscapes were planned to be undertaken for conservation with the participation of farmers and pastoralist groups. Regions with high concentration of genetic diversity on major and important crops may be declared as 'gene sanctuaries' for conservation and enrichment of diversity, involving communities through diversity based income generation and incentives.

10.1.13 TWELTH FIVE YEAR PLAN (2012-2017)

The 12th Plan has the basic theme of "Faster, Sustainable, and more Inclusive Growth", and lays out major targets, key challenges to meet them, and the broad strategy that may be followed to achieve the stated objectives. Ministry of Environment and Forests has allocated an outlay of Rs. 17,874.00 crores, which works out to 0.41% of the plan allocation across various Ministries/Departments as against a share of 0.42% or Rs. 9231.00 crores in the 11th plan. At current prices, the enhancement in this Ministry's 12th plan outlay over the 11th plan outlay, however, works out to 109%.

12th plan has identified 13 Monitorable Socio-Economic targets for this Ministry, which has been taken up for regular monitoring of progress made by the Ministry. These targets are as follows:

ENVIRONMENT AND CLIMATE CHANGE

1. Assess and remediate 12 identified contaminated sites (hazardous chemicals and wastes) with potential for ground water contamination by 2017.
2. Clean 80 per cent of critically polluted stretches in rivers by 2017 and 100 per cent by 2020.
3. States to meet National Ambient Air Quality Standards (NAAQS) in urban areas by 2017.
4. To reduce emission intensity of Gross Domestic Product (GDP) in line with the target of 20 to 25 per cent reduction over 2005 levels by 2020.

FORESTS AND LIVELIHOOD

1. Greening 5 million ha under GIM including 1.5 million ha of degraded lands, afforestation and eco-restoration of 0.9 million ha of ecologically sensitive areas.
2. Technology-based monitoring of forest cover, biodiversity and growing stock including change-monitoring on periodical basis through dedicated satellite by 2017 and establishment of open web-based National Forestry and Environmental Information system for research and public accessibility by 2015.
3. Engagement of Village Green Guards/Community Foresters for every Joint Forest Management (JFM) village by 2016.
4. Establish forestry seed bank in forest circles and Model Nursery in every district with information on public portal by 2014.

WILDLIFE, ECOTOURISM AND ANIMAL WELFARE

1. Twenty per cent of veterinary professionals in the country will be trained in treating wildlife.
2. Integrated Ecotourism District Plans covering 10 per cent of all potential Protected Areas (PAs) by 2017.
3. Promoting participation of private sector, civil societies, NGOs and philanthropists in animal welfare.

ECOSYSTEM AND BIODIVERSITY

1. Restore 0.1 mha. of wetlands/inland lakes/water bodies by 2017.
2. Mapping and preparation of biodiversity management plans for deserts (both cold and arid), coastal areas, important coral zones, wetlands, mangroves and so on to be completed by 2017.

Rai's Plan was under implementation during this period. The progress made under the various schemes implemented by Pandharkawada Forest Division under the 12th Plan is given below:

TABLE NO. 10.1: Progress under various schemes in 12th Five Year Plan

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
(2406 Forestry and wildlife) (State)						
1	Strengthening of check nakas	0.00	0.00	6.24	9.41	6.30
2	Strengthening of existing wireless network	0.00	0.00	0.00	0.00	0.00
3	Supply of cooking gas	28.31	22.86	23.64	75.92	47.89
4	Joint Forest management	12.72	13.69	31.09	44.23	65.78
	Total	41.03	36.55	60.97	129.56	119.97

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
Centrally sponsored scheme						
1	Modern Forest fire control and management (IFPC)	18.24	8.67	8.82	9.25	0.00
2	National Afforestation programme (FDA)	48.44	46.66	73.19	59.93	12.88
	Total	66.68	55.33	82.01	69.18	12.88

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
(2406 Forestry and wildlife) (State)						
1	Supply of cooking gas	0.00	0.00	0.00	0.00	0.00
2	Vidarbh vikas	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
(2406/3451 Forestry and wildlife) (DPDC)						
1	Soil and moisture conservation on forests areas	48.00	86.72	26.92	0.00	20.00
2	Establishment of central nursery	0.00	0.00	0.00	7.02	10.59
3	Forest protection from fire	0.00	0.00	0.00	0.00	0.00
4	Reforestation of degraded forest (RDF)	72.82	241.88	246.87	147.74	174.38
5	Development of Forest Tourism	0.00	0.00	7.03	81.14	0.00
6	Compensation to the formers for losses caused by wildlife	0.00	0.00	10.50	5.00	0.00
7	Forest Building	0.00	0.00	0.00	0.00	7.53
8	Forest roads & bridges	39.92	0.00	9.45	26.61	21.29
9	Wildlife & nature conservation	52.43	79.30	0.00	34.40	35.35
	Total	213.17	407.90	300.77	301.91	269.14

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
(2406 Forestry and wildlife) (DPDC)						
1	Joint forest management	0.00	0.00	0.00	5.00	9.00
2	Plantation of general use	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	5.00	9.00

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
(4406/2406 Forestry and wildlife) (State)						
1	Construction of Van Talao	0.00	0.00	0.00	38.48	30.50
2	Massive Afforestation programme	26.24	15.87	99.97	171.56	162.01
3	Afforestation for soil conservation	9.49	3.05	53.04	92.23	144.77
	Total	35.73	18.92	153.01	302.27	337.28

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	2	3	4	5	6	7
4406 Forestry and wildlife (State)						
1	Forest Building (Repairs)	0.00	0.00	0.00	0.00	766.10
2	Soil and water conservation on forests areas	0.00	0.00	0.00	0.00	0.00
3	Forest roads & bridges	0.00	0.00	0.00	0.00	0.00
4	Forest Protection from fire	0.00	0.00	0.00	0.00	0.00
5	Wildlife & nature conservation	0.00	0.00	0.00	0.00	0.00
6	Development of Forest Tourism	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	766.1

10.2 THREE YEAR ACTION AGENDA BY NITI AAYOG

India's developmental planning, which started in 1951, came to a conclusion in March 2017 with the end of the Twelfth Five Year Plan. After the dissolution of the Planning Commission, the government decided to set its development priorities and instrumentalise those priorities through the NITI Aayog. One of the major mandates of the NITI Aayog is "to design strategic and long-term policy and programme frameworks and initiatives." In this direction, the NITI Aayog was advised to prepare a 15-year vision document, a seven-year strategy, and a three-year action agenda.

Towards achieving this end, the NITI Aayog formulated a “Three Year Action Agenda, 2017–18 to 2019–20” in August 2017. The document proposes a set of action points for policy and institutional reforms in various sectors of the economy.

It envisages the following aspects:

1. No clear measurements of afforestation programmes about their impacts and effectiveness are seen because there are no acceptable standards for making the information and impacts, transparent and easily measurable. To achieve this, it is proposed to develop an open-source digital database/app for documentation by local forest managers. This includes demarcation of forest boundaries using GPS, entering photographs and other data which would be open to the public.

This can enhance adoption by community and private forest managers who can get financial support from investors by documenting their achievements. After tests the app can be adopted to manage forests and also afforestation programmes.

2. The existing laws put restrictions on felling, transport and sale of trees, thus discouraging plantations by farmers and also prevents long term investment in community managed forests. These should be removed for private lands. These may be restricting conversion of indigenous ecosystems to exotic monoculture but at high economic cost. Furthermore, by restricting entry of private timber and pulp plantations, they impose pressure on native forests.

3. A better strategy to prevent such conversion to monoculture would be to develop incentives to maintain native forests. This would encourage farmers and communities to document their ecological wealth.

4. Linear projects that cut through forests should be required to incorporate mitigation measures at all stages thus allowing projects to go ahead without cutting off migration corridors.

5. Unified policy about invasive alien species that cause enormous damage to crops and ecosystems cutting across all related sectors.

CHAPTER – 11

PAST SYSTEMS OF MANAGEMENT

11.1 GENERAL HISTORY OF THE FORESTS

Berar was assigned to the 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.

Class-I

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 free grazing areas of Class-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. Class-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.

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 1/3rd 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.

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, which were subsequently taken over by the Forest Department.

11.2 PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS

11.2.1 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.

11.2.2 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 and rules laid down by the Government.

11.2.3 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 provide 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 most of the better quality area was young to middle aged.

11.2.4 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 (PB) of 20 years each. PB – I included roughly $\frac{1}{3}^{\text{rd}}$ 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. 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.

11.2.5 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 and 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 and 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 soil conditions and 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 failures.

(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 and 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.

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

For East Yavatmal Division Shri. V.R. Kanekar wrote the Working Plan, which was under implementation from 1982-83 to 1997-98. In Yavatmal Forest Division, eastern part of the forests was carved out from East Yavatmal Division and Western part was carved from West Yavatmal Division and by amalgamating these two parts, Yavatmal Forest Division had been created in 1983 vide Government Resolution No. FDM/1Bb-F-2/ dated August 29, 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 tress 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 stool 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 October 31. 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 pig 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.

11.2.7 SHRI.R.S.YADAV'S WORKING PLAN (2002-03 TO 2011-12)

Shri Kanekar's WP was revised by Shri. R.S.Yadav. The details of prescriptions of WP written by Shri R.S.Yadav for Pandharkawada forest Division and results of implementation are described below.

(1) Selection-Cum-Improvement WC: It included the areas which bear coppice crop, largely of teak trees. The area included in this WC was previously managed

under Coppice With Reserves system, Teak Plantation WC and SCI WC. The crop in general is young to middle aged and the crop density is 0.4 to 0.7, the site quality is IV and few patches of site quality III. Teak is dominant species along with its common associate ain, dhawada, salai, lendia, bhirra, tendu, char etc. salai dominates in dry locations. Matured teak trees are in the process of hollowing. Teak constitutes a high proportion of the total stock. The natural regeneration is inadequate. The basic aim was to replace the stunted coppice growth with high forests by encouraging seedling regeneration tending. Natural regeneration of seedling origin, supplemented with artificial regeneration was prescribed. The selection girth was fixed at 75 cm girth at breast height for site quality IV and 90 cm girth at breast height for site quality III and III/IV. The felling cycle was fixed at 10 years. Total area allotted to this working circle was 26,384.02 ha; the area was divided into 25 felling series and 10 coupes in each felling series. For treating the coupes the areas were divided into type A- protection areas, type B- under stocked area, type C- pole crop and old plantation area and type D- well stocked area. In the blank area planting of 50% miscellaneous species was prescribed. In subsidiary silvicultural operations CBO, cleaning operations were prescribed. Tending of seedling regeneration, soil and moisture conservation measures like nala bunding, gully plugging, trenches, nala bunding etc were prescribed. It has to be supplemented by AR with suitable species.

Result:

1. Annually estimated yield was 4200 cmt. per year & estimated yield is above 3 cmt./ha. to the bottom level
2. Normally actual yield obtained is less than estimated yield.
3. Comparatively yield varies due to harvest in old teak plantation comparing to the other non-plantation teak area.
4. Tending operation and regeneration activity (NR & AR) has not been carried out as per the norms. Only 9% area have been covered. (NR 875/9670 & AR 1189/12496 ha)
5. Plantations raised under Artificial regeneration till 2006 are not successful. Desirable growth seen, is not satisfactory though 5 to 20% plants established. The

current plantations which are under maintenance as per scheme are better in survival (40 to 90 %) but growth is undesirable (0.30 to 1.00 mtr.)

6. 50% teak has not been planted in the mixed plantation
7. Main reason for the shortfall is paucity of funds.
8. The coupe no.-I was not worked for want of due felling permission.

(2) Improvement WC: The area previously managed under Coppice with Reserves WC. The total area allotted to this WC was 8410.46 hectare, site quality IV with scattered patches of site quality III and density was 0.4 to 0.6 or even more at places. The crop is young to middle aged. The dominant species is teak along with its associates ain, hirda, dhawada, tendu, kalamb, mowai etc. The primary objects of management were to improve the crop, to check the soil erosion, conserve soil and moisture and to improve the forest crop. The 37 compartments have been included in this WC and divided into 9 working series, having 10 coupes in each working series. The treatment prescribed was improvement felling of malformed trees and thinning. For treating the coupes the areas were divided into type A- protection areas, type B- under stocked area, type C- pole crop and old plantation area and type D- well stocked area. No yield regulation was prescribed. Soil and moisture conservation measures like gully plugging, nala bunding and WAT (Water Absorption Trenches) were prescribed and greater emphasis was given to soil and moisture conservation works. Tending of natural regeneration, supplemented with artificial regeneration was prescribed. In the plantations 50% teak and 50% of miscellaneous species were prescribed. In subsidiary silvicultural operations CBO, cleaning operations were prescribed.

Results:

1. Annual estimated yield as per plan was 219cmt.
2. Improvement marking has not been done in most of the coupes therefore left as unworked coupe.
3. Though improvement marking was prescribed, trees of selection harvestable girth has been felled in worked coupes (e.g. Compt. No.176,60,66,622,626a,626b,626c)

4. Regeneration activity (NR & AR) has not been carried out as per the norms. Only 20% area has been covered (NR 945/3873 & AR 595/3682 ha.)
5. Plantations raised under Artificial regeneration till 2006 are not successful. Desirable growth seen is not satisfactory though 5 to 20% plants established. The plantations which are under maintenance as per scheme are better in survival (40 to 90%) but growth is undesirable (0.30 to 1.00 m.)
6. 50% teak has not been planted in the mixed plantation
7. Main reason for the shortfall is paucity of funds.
8. The coupe no.I was not worked.

(3) Afforestation WC: Under stocked and open forest area having site quality IV have been included in this WC. The tree crop is young to middle aged. The principal species is Teak with its natural associates like ain, dhawada, char, tendu etc. These areas were subjected to heavy grazing which resulted in compaction of soil. The total area allotted to this WC was 16,785.06 ha. The special objects were to check soil erosion by adopting suitable soil and moisture conservation measures, to improve vegetal cover, to control biotic interference and to increase the productivity of forests. The status of natural regeneration of teak and its associates was poor. The total area was divided into 17 Working Series and each series was divided into 10 coupes. Plantations have to be carried out in 2 phases.

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

Results:

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

(4) Fodder Reserve WC: The area included in this WC was previously managed under Fodder Reserve WC and Pasture WC. The site quality of the area is IVb, mostly open or sparsely wooded. In most of the Ramnas grass of less fodder value like Kushal (*Andropogon contortus*) and Bhurbhshi (*Eragrostis tennela*) are available and good fodder grass like sheda, Paunya marvel etc. sparsely occur. Total area included in this working circle was 5,451.15 ha. Compartments allotted for rotational grazing were divided into 4 sections and each section should be under treatment, closed for grazing for 3 consecutive years; from 4th year onwards controlled grazing was to be permitted during October to May. Intensive soil and moisture conservation works, removal of weeds, thorny shrubs, bushes, eradication of unpalatable grass like kusai, 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. Moreover the response of people was very poor towards cutting and purchasing of fodder to stall feed their cattle, due to the availability of adjoining

forests for grazing. Many plantations taken up under various schemes did not succeed. It is evident that the fodder improvement area had been neglected.

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

(5) Joint Forest Management (Overlapping) WC: Area included in this WC is 30,646.67 ha in 207 compartments. The main objects were to seek people's participation especially the members of JFM committees in protection of forests, to increase vegetal cover and to check soil erosion. The areas were to be treated as per microplan to be prepared in consultation with villagers as per the instructions of the Government.

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

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

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

11.2.8Dr R. N. RAI'S WORKING PLAN (2013-14 TO 2022-23)

Yadav's Working Plan was replaced by the plan written by Dr.R.N.Rai. It essentially continued the major working circles of the previous plan, apart from adding three overlapping working circles related to wildlife management, NTFP and forest protection.

TABLE NO. 11.1: AREA ALLOCATION TO DIFFERENT WORKING CIRCLES UNDER RAI'S WORKING PLAN

Sr. No.	Working Circle	Compt. No.	Area Allotted(ha)	Percentage Area Allotted	No. of Felling Series
(1)	(2)	(3)	(4)	(5)	(6)
1	Selection cum Improvement WC	127	30734.78	52 %	30
2	Afforestation WC	205	25552.50	44 %	22
3	Fodder Improvement WC	18	2513.74	04 %	02
	Total:	350	58801.02	100 %	54

Analysis of each working circle is given in the following paragraphs.

11.2.9.1 SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

The area included in this WC was previously managed under the Coppice-with-Reserves system which has resulted in poor teak forests. The basic aim was to replace the stunted coppice growth with high forests by encouraging seedling regeneration. The other objectives included improving the forest density and composition by harvesting mature Teak trees, improvement felling, supplemented by natural and artificial regeneration, CBO and soil moisture conservation measures. The harvestable

girth for site quality III is fixed as 120 cm for seed origin & 75 cm for coppice origin, the harvestable girth for site quality IV for Seed origin is fixed as 105 cm and for coppice origin - 75 cm. The trees above selection girth were to be enumerated and 12 trees of coppice origin from site quality III & IV, 0.5 trees of seed origin from site quality III & 1.24 trees of seed origin from site quality IV are available for selection felling in well stocked area. Selection annual yield estimated is 864 M³ and yield from improvement felling is 631 M³.

This working circle included 30734.78 ha. of 127 compartments, 30 working series & 20 coupes in each working series. In the blank areas planting of 50% teak and 50% miscellaneous species was prescribed. Tending of seedling regeneration, soil and moisture conservation measures such as nala bunding, gully plugging, contour trenches, check dams etc were prescribed.

RESULTS:

- It was observed that the prescriptions were exhaustive and conservation oriented. Though there is less quantity of seed origin crop, the working plan differentiates between seed origin and coppice origin teak, prescribing different harvestable girth for seed origin and coppice origin teak trees.
- Of the 326 designated coupes during the plan period, felling operations were carried out in 252 coupes. The remaining 74 coupes weren't worked due to reasons such as high proportion of 'A type' area, canopy cover density being less than 0.4, high proportion of non-teak species, farmers taking possession of the land through FRA claims, among others, resulting in less area available for coupe working.
- The coupes labelled as 'unworkable' were completely left off, without carrying out the improvement felling works, which was contrary to the plan prescriptions.

- Total annual yield expected from SCI WC as per the working plan was 1495 m³, while the actual average annual yield realized during the previous plan period was 1311 m³. Coupe-wise details are provided below:

**TABLE NO. 11.2: COUPEWISE DETAILS OF SCI WORKING CIRCLE DURING RAI'S
WORKING PLAN**

Sr. No.	Year	Coupe No.	Number of due coupes	Area (ha.)	No. of coupes worked & Area (ha.) of coupes			Estimated Yield of the coupes worked (m ³)	Actual Yield (m3)
					No. of coupes	Total Area (ha.)	Workable area (D area)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	2013-14	I	33	1874.90	23	1124.40	1124.40	0	0
2	2014-15	II	33	1584.70	26	800.20	800.20	860.50	859.49
3	2015-16	III	33	1575.20	26	980.40	980.40	1300.95	1224.47
4	2016-17	IV	33	1562.00	20	1371.80	1371.80	1400.52	1371.63
5	2017-18	V	33	1546.00	22	982.10	982.10	1350.20	1335.52
6	2018-19	VI	33	1518.30	26	1136.00	1136.00	2600.30	2597.57
7	2019-20	VII	33	1587.10	29	1053.00	1053.00	1765.27	1659.33
8	2020-21	VIII	33	1474.00	28	1180.90	1180.90	1561.34	1434.01
9	2021-22	IX	33	2010.10	30	1071.00	1071.00	1467.20	1351.16
10	2022-23	X	29	1457.00	22	1108.00	865.95	1333.49	1281.24
	Total :		326	16189.30	252	10807.80	10565.75	13639.77	13114.42

- On an average 1.24 m³/ ha is realized from the D Area.
- Subsidiary Silvicultural Operations works were carried out in an inadequate manner. The quality of CBO works is subpar, mainly owing to lack of adequate funds and poor monitoring, resulting in poor regeneration.

11.2.9.2 AFFORESTATION WORKING CIRCLE

Under stocked and open forest area having site quality IVb have been included in this Working Circle. Area under this WC was previously managed under Coppice

with Reserves WC, Miscellaneous WC, Plantation WC etc. Total area included in this WC was 25552.50 ha. And the area was divided into 22 Working Series and each series was divided into 20 coupes. The principal species is Teak with its natural associates such as Ain, Dhawada, Char, Tendu etc. These areas were subjected to heavy grazing which resulted in compaction of soil. The status of natural regeneration of teak and its associates was poor. The special objects were to check soil erosion by adopting suitable soil and moisture conservation measures, to improve vegetation cover, to control biotic interference and to increase the productivity of forests. 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, FYO, 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 for 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. Also, an indicative yield of 0.4 m³ per hectare was provided from improvement fellings to be carried out in the well stocked regions of the coupe.

RESULTS:

- A total area of 6533 ha was taken up for plantations during the plan period.
- The details of year wise plantations and number of saplings planted are given in the table below:

**TABLE NO. 11.3: YEARWISE AREA OF PLANTATIONS AND NO. OF SAPLINGS PLANTED
DURING RAI'S WORKING PLAN**

S.No.	Year	Area (ha)	No. of Saplings Planted
(1)	(2)	(3)	(4)
1	2013-14	427	552850
2	2014-15	852	1144850
3	2015-16	752	492381
4	2016-17	1360	1022050
5	2017-18	814	571975
6	2018-19	805	873500
7	2019-20	1028	1032359
8	2020-21	0	0
9	2021-22	110	94700
10	2022-23	384	389350
Total		6533	61,74,015

- Teak, Khair, Bamboo, Neem, Sitafal, Awala, Beheda, Karanj and other native species were planted in plantations. However, teak is preferred over other species due to its high survival percentage.
- Most of the plantations undertaken during this plan period were fenced using either chainlink fencing or barbed wire fencing. Though it has escalated the costs of plantations, these fencings have been effective in preventing the straying of cattle and wild animals, ensuring survival and establishment of saplings.
- In areas of low rainfall and poor soil quality sites such as in Wani and Maregaon, the plantations that have been taken up have resulted in stunted growth and poor development. Such areas are better suited for FIWC.

- Plan prescriptions of reproductive and productive phases were seldom adhered to.
- Improvement fellings were carried out regularly with 47 m³ yield realized over the duration of plan period.
- Subsidiary Silvicultural Operations works were carried out in an inadequate manner. The quality of CBO works is subpar, mainly owing to lack of adequate funds and poor monitoring, resulting in poor regeneration.
- The impetus of 50 crore plantation drive by Maharashtra Government and steady flow of funds for plantation activities over the years ensured fair implementation of plan prescriptions.

11.2.9.3 FODDER IMPROVEMENT WORKING CIRCLE

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 (*Andropogan contortus*) and Bhurbhshi (*Eragristus tennela*) are available and good fodder grass such as Sheda, Paunya, Marvel etc. sparsely occur. Total area included in this working circle was 2513.74 ha.

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 etc. were prescribed. Other treatments such as intensive fire protection and closing of area permanently to grazing in Ramnas were also prescribed.

RESULTS:

- Fodder grass plantations of 220 ha were taken up under CAMPA. Year wise plantation details are furnished below:

TABLE NO. 11.4: FODDER GRASS PLANTATIONS DURING RAI'S WORKING PLAN

Sr. No.	Year	Range	Round	Beat	Compt. No.	Area (Ha)
1	2	3	4	5	6	7
1	2019-20	Maregaon	Wadki	Vihirgaon	651	10
		Pandharkawda	Pandharkawda	Kondi	68	5
2	2020-21	Maregaon	Wadki	Anji	655	5
		Maregaon	Botoni	Botoni	C65	10
		Maregaon	Khandani	Wadhoni	35	10
		Pandharkawda	Pandharkawda	Tiwasala	73	10
		Pandharkawda	Umari	Ghodadara	80	10
		Pandharkawda	Umari	Runza	C-81	10
		Jamani	Jamani	Patan	50	10
		Jamani	Matharjun	Mandavi	60	10
		Parwa	Patapangara	Patapangara-2	178	10
		Parwa	Patapangara	Jhatala	176	10
		Mukutban	Mukutban	Bhendala	C32A	10
		Mukutban	Pawnar	Pawnar	21	10
		Mukutban	Mukutban	Bhendala	C32A	10
		Wani	Suknegaon	Suknegaon	7	10
		Wani	Wani	Wani	C7F	10
		Wani	Wani	Shirpur	C39A	7
		Wani	Suknegaon	Borda	C49	8
		Wani	Kurli	Kurli	C15C	5
		Ghatanji	Ghatanji	Sakhara	226	10
		Ghatanji	Ghatanji	Kapshi	220	10
3	2022-23	Ghatanji	Koli	Rampur	250	10
		Ghatanji	Koli	Rampur	251	10
TOTAL						220

- These plantations have come up well owing to good quality tussocks raised in the nurseries specially established for this purpose, chain-link fencing of plantations and effective fire prevention. Owing to these plantations, the proportion of quality fodder material has increased in these areas.

- In order to maintain grassland ecosystems, it was envisaged that plantation of tree species shall be avoided. However, due to massive afforestation programmes such as 50 Crore plantation scheme, tree species plantation has been taken up in these areas.
- Prescriptions regarding soil and water conservation, fire prevention and grazing prevention have been partially implemented.

11.2.9.4 NON WOOD FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

This working circle includes the total forests of the Pandharkawada Division. The Non-Wood Forest Produce (NWFP) also includes medicinal plants available in forests. Objective was to increase the stocking of NWFP yielding and medicinal plant species, ensure sustainable harvesting, and generate employment and alternative source of livelihood. Various treatments were prescribed for NWFPs like Tendu leaves, Mahua, Gum, Custard Apple, Medicinal Plants and Myrabalon.

RESULTS:

Organized collection of Tendu (*Diospyros melanoxylon*) leaves was undertaken. A total revenue of Rs. 976.02lakhs and Rs. 371.85 lakhs was generated from Non-PESA and PESA units respectively, from 2014 to 2023 from collection of Tendu leaves. Collection of tendu leaves not only helps in generating employment but also improves their livelihood by providing incentives through bonuses. Rest of the NWFPs are collected and disposed of at local level. Special emphasis was laid on increasing the percentage of NWFP and medicinal species in the plantations undertaken.

11.2.9.5 JOINT FOREST MANAGEMENT (OVERLAPPING) WC

The objectives of this Working Circle included protection of forest and utilizing degraded forest areas for productive purposes in order to meet the demand for fuel, fodder and timber requirements, and to seek cooperation and active participation and local peoples in forest protection.

RESULT:

Pandharkawada Forest Division has a total of 257 JFM committees established in the forest fringe villages. The total area allotted for these committees is 49,152.49 hectares. This covers around 73 % of the total area of the division.

Areas generally degraded with density less than 0.4, open forest with eroded soils are included for JFM activities. JFM committees have taken up plantation activities to the extent of 297 hectares during the previous plan period. A total of 11,413 families have been distributed with LPG connections to reduce their dependence on forests for fuelwood.

Maharashtra forest department has issued guidelines for grading of JFM committees into A, B and C categories based on various criteria. Based on this, of the 257 committees, 22 committees, 42 committees and 193 committees have been graded into A, B and C category committees respectively. 3 JFMCs have been awarded Sant Tukaram Vangram Yojana Award during the plan period.

11.2.9.6 WILD LIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

Entire Forest area of the division is included in this working circle. The wildlife is unevenly distributed throughout the tract. Objectives of management include protection and conservation of wildlife, habitat improvement, involving locals in protection measures, and awareness generation. Prescriptions were given for protection, habitat management, water management, monitoring of wildlife population and wildlife health.

RESULTS:

All major prescriptions were adhered to, but only partially. A network of waterholes is established and maintenance of these is generally lacking. Meadow development is mainly restricted to the Fodder Improvement working circle, whereas the requirement is in all the working circles.

Monitoring of wildlife in the Division is being carried out through the AITE Phase -IV exercise where in every year the occupancy and spatio-temporal presence of

wildlife is being monitored by the WII. It is more credible and scientific way of monitoring the wildlife in comparison to the previous method of Buddha Poornima census, which lacks scientific basis and credibility.

Monitoring of wildlife health is virtually nonexistent. It is crucial considering the recent outbreaks of Covid-19, Lumpy Skin disease and bird flu.

Wildlife rescue operations mainly pertaining to tigers, bears, snakes, nilgai, black buck, langurs, monkeys etc straying into human habitations are carried out throughout the year. Snake rescues peak during the monsoon seasons. However, documentation of rescue operations is poor. Prescriptions related to establishment of rehabilitation center and forest custody are not adhered to.

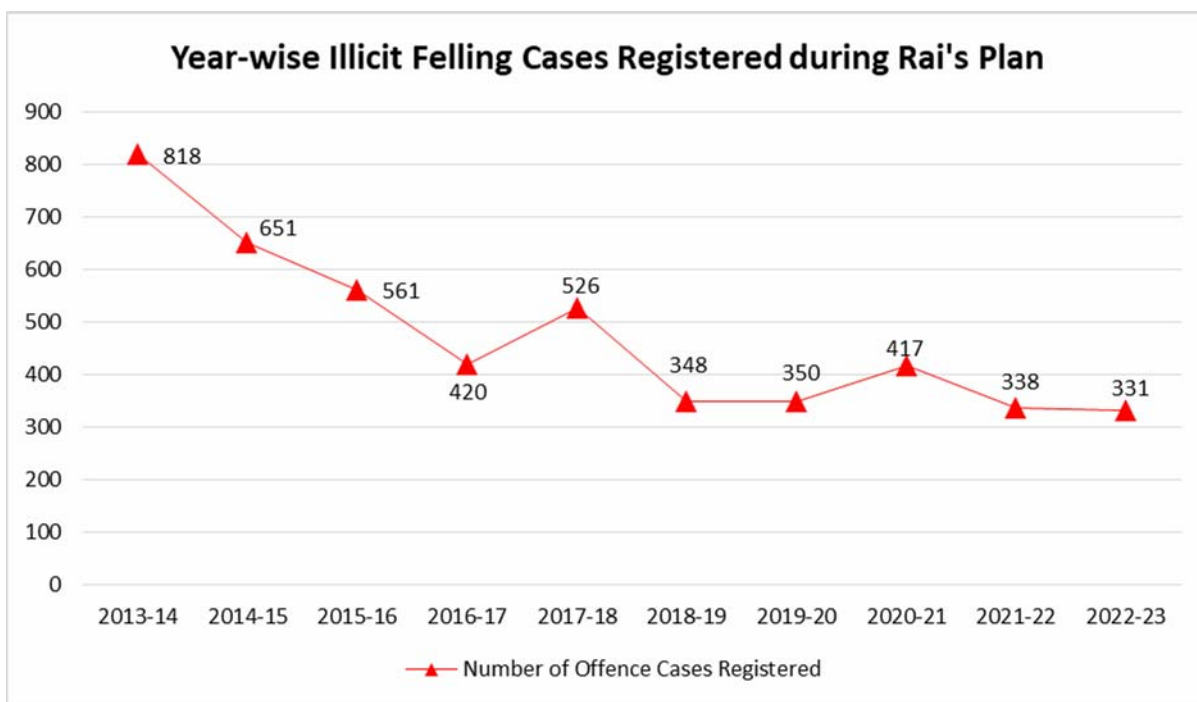
Human-wildlife conflict is partly addressed through swift disbursement of compensations for crop damage, livestock injury/death and human injury/death. Nevertheless, there is resentment among farmers on the fringe villages of forests that the compensation for crop damage is insufficient.

11.2.9.7FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

Entire forest area of the division is included in this working circle. The main object was to protect the forest from illicit felling, encroachment, fire and grazing by sensitizing local people about forest protection and involving them in preventing forest offences with their cooperation.

RESULTS:

Illicit Felling:As teak tree constitutes majority of the forest crop and being valuable timber, it is more vulnerable to illicit felling. Over years, there has been a decreasing trend of cases registered under illicit felling mainly owing to increase in per capita income of locals and enhanced protection measures. The trend is depicted in the chart below:



And, the recovery of timber lost due to illicit felling stands at 94.79 %. The details are given in the table below:

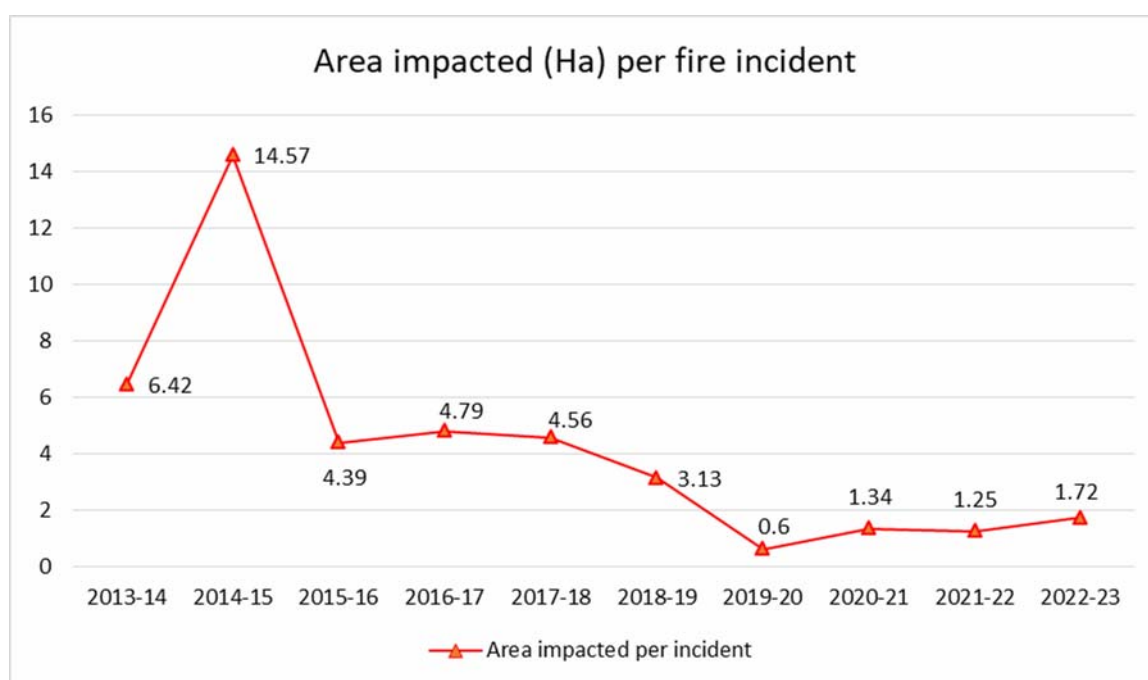
TABLE NO. 11.5: TIMBER RECOVERED FROM ILLICITLY FELLED TREES

Year	No. of illicitly felled trees	Value of timber lost (in Lakhs)	Value of timber recovered (in Lakhs)	Recovery percentage
1	2	3	4	5
2013-14	3298	23.99	20.86	87 %
2014-15	3260	33.77	33.71	100 %
2015-16	2527	24.65	27.13	110 %
2016-17	1790	16.36	15.63	96 %
2017-18	1352	9.90	9.60	97 %
2018-19	1429	8.60	6.99	81 %
2019-20	829	5.48	5.03	92 %
2020-21	1096	7.52	7.03	93 %
2021-22	882	4.99	3.41	68 %
2022-23	870	4.97	3.54	71 %
Total	17333	140.23	132.93	95 %
Average	1733	14.02	13.29	95 %

Fire: Over the plan period, there have been 389 offence cases associated with forest fire and a total area of 1490.05 ha. has been impacted. However, there has been a declining trend observed in the area impacted per fire incident

TABLE NO. 11.6: INCIDENCES OF FIRE

Sr. No.	Year	No. of Incidents	Area (Ha)	Area Impacted (Ha) per Fire Incident (4/3)
(1)	(2)	(3)	(4)	(5)
1	2013-14	23	147.64	6.42
2	2014-15	21	306.00	14.57
3	2015-16	48	210.67	4.39
4	2016-17	41	196.20	4.79
5	2017-18	70	318.90	4.56
6	2018-19	32	100.00	3.13
7	2019-20	9	5.42	0.60
8	2020-21	69	92.59	1.34
9	2021-22	38	47.45	1.25
10	2022-23	38	65.18	1.72
	Total	389	1490.05	3.83



The declining trend observed above is majorly due to quick dissemination of fire alerts, modern fire extinguishing equipment such as fire blowers and increased mobility of staff. The prescriptions regarding removal of encroachment and grazing control are partially followed.

11.2.9.8 GENERAL ASSESSMENT OF PAST WORKING PLAN DURING RAI'S WORKING PLAN:

1. Compartments that were earlier in Improvement Working Circle were merged with SCI working circle in Rai's Plan as the prescriptions are similar, except for the selection felling over harvestable girth. Though this initiative has streamlined coupe working, the improvement felling aspect is often seen neglected in coupes where trees with harvestable girth are not available.
2. Taking into account guidelines issued by Govt.of Maharashtra in general high yielding Coupes are worked through FLCs, and low yielding coupes of all working circles were worked departmentally to promote sustainable regeneration.
3. Grazing and fire were better controlled in plantations with chainlink/ barbed wire fencing.
4. The treatment proposed in SCI, AWC and FIWC like nalabunding, gully plugging, contour trenches, etc. could not be taken up in all coupes due to paucity of funds.
5. The operations prescribed in restorative & productive phases have not been carried out fully in any of the coupes so far in AWC due to paucity and irregular flow of funds.
6. The coppicing vigor of teak and miscellaneous species is reduced over the period due to repeated working under coppice system, resulting in malformed and stunted coppice crop. Teak comprises majority of the total stocking. Natural regeneration normally does not get established due to uncontrolled grazing & fire incidence.

7. Misinterpretation of the provisions of the Scheduled Tribes and other traditional forest dwellers (Recognition of forest rights) Act 2006 resulted in increase in encroachment and over-grazing.
8. Plantations under were taken up through JFMC and LPG connections were distributed to the members of active JFMC. However, the LPG distribution in the Division is yet to be saturated.

Position of sanctioned grants against the requirement as per WP prescription is given in the following table:

TABLE NO. 11.7: FUNDS DISPERSED FOR WOKRING PLAN ACTIVITIES DURING RAI'S PLAN

Year	Natural regeneration		Artificial regeneration		Survey & demarcation		Fire & Forest protection	
	Require ment	Funds Provided (Amount in Lakh)	Require ment	Funds Provided (Amount in Lakh)	Require ment	Funds Provided (Amount in Lakh)	Require ment	Funds Provided (Amount in Lakh)
1	2	3	4	5	6	7	8	9
2013-14	10.11	10.11	471.47	471.47	21.14	21.14	34.53	34.53
2014-15	4.08	4.08	672.48	672.48	24.96	24.96	137.26	137.26
2015-16	111.42	111.42	936.13	936.13	44.37	44.37	43.90	43.90
2016-17	45.95	45.95	845.98	845.98	66.31	66.31	63.23	63.23
2017-18	5.26	5.26	1055.76	1055.76	51.91	51.91	33.81	33.81
2018-19	2.69	2.69	1141.84	1135.59	16.70	16.70	50.43	50.43
2019-20	15.06	15.06	875.63	875.63	46.16	46.16	36.47	36.47
2020-21	5.84	5.84	681.98	681.98	11.75	11.75	75.84	75.84
2021-22	3.01	3.01	671.35	671.35	0.00	0.00	124.72	124.72
2022-23	30.00	30.00	912.84	912.84	268.25	268.25	116.69	116.69
Total	233.42	233.42	8265.46	8259.21	551.55	551.55	716.88	716.88

11.3 SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN

11.3.1 INFORMATION TECHNOLOGY

Maharashtra Forest Department has been deploying information and communication technologies for better forestry management. The main objective is to systematically organize planning, implementation and monitoring of forestry and other related operations by systematic collection, storage and retrieval of MIS and geospatial data through a computer based communication network. This will not only bring transparency, responsibility and accountability but will also enhance efficiency. These initiatives plan to achieve its objective by using ICT to set up e-Governance framework for information availability and tracking of forestry related activities across the supply chain while involving citizens, villagers and other stakeholders in the entire process. Maharashtra Government has taken decision of computerisation of state's Forest department vide Resolution dated October 5, 2011. Accordingly, infrastructure was developed to connect all offices from beat guard to headquarters of Maharashtra Forest department, Nagpur and Mantralaya, Mumbai by LAN and internet connectivity. IT cell has been developed at headquarters in Nagpur equipped with computers and independent server farms. A consultant has been appointed to bridge the technical component and IT savvy personnel have been appointed to develop various applications required for forestry activity and services.

11.3.2 PDA (PERSONAL DIGITAL ASSISTANT)

PDAs were distributed to the field staff of the division. These devices were pre-loaded with applications on offence reporting, fire incidences, beat checking, etc. in which incidences of fire and other illicit activities can be tracked more accurately with geo-tagged photos and Latitude-Longitude details. This helps in capturing real time data and monitoring forestry activities. The application enables registration of offence, taking photograph of seized material and also of offender, if any.

11.3.3 PLANTATION USING PMIS/NMIS

Plantation Management Information System (PMIS) captures district-wise, taluka-wise and village-wise data for registration of plantation sites. Most of these

sites are geo-tagged. These sites are tagged with the department's existing Nursery Management Information System (NMIS) to support adequate seedling stock. The application has also been integrated with the department's existing PMIS to enhance future monitoring of plantation activity.

11.3.4 GREENING OF MAHARASHTRA (50 CRORE PLANTATION PROGRAMME)

Maharashtra Government has implemented the 50 crore plantation programme from 2015-16 to 2019-20. During the implementation of this programme, emphasis was laid on involving the public across all walks of life and other line departments have been involved apart from Forest department. This programme has created a mark movement for Greening of Maharashtra.

11.3.5 GREEN ARMY MAHARASHTRA

To supplement the insufficient manpower with the Forest department, the initiative of Green Army was conceptualised. This initiative has a vision to raise 10 million volunteers to help achieve the nationally mandated forest cover of 33%. To facilitate this vision, green army website (www.greenarmy.mahaforest.gov.in) was launched where interested citizens could get themselves registered to volunteer for this mission.

11.3.6 CENTRALISED CALL CENTRE "HELLO FOREST-1926"

Maharashtra Forest department has started call centre "Hello Forest" with a toll-free number 1926 which will handle citizen grievances, suggestions and complaints. This involves participation of public to reduce forest fires, encroachment, poaching and illicit felling as well as to make enquiries regarding citizen services, ecotourism and matters related to forestry.

11.3.7 JALYUKTA SHIVAR ABHIYAN

Maharashtra Government also started the Jalyukta Shivar Abhiyan for taking up intensive soil and moisture conservation works. Under this programme, certain SMC works have been taken up in this Forest Division. These works will definitely help in improving the soil-moisture regime of the area in long run.

11.3.8 ATAL GHAN VAN YOJANA - MIYAWAKI PLANTATIONS

Miyawaki plantation, also known as the Miyawaki method or Miyawaki technique, is a unique approach to forest restoration and ecological regeneration. Developed by Japanese botanist Akira Miyawaki, this method involves densely planting a variety of native tree species in a small area to create a self-sustaining, biodiverse forest ecosystem. Unlike traditional reforestation methods, which often rely on a single tree species and take years to mature, Miyawaki plantations accelerate the growth process by mimicking natural forests and maximizing vertical layering. These plantations have several benefits, including enhanced biodiversity, improved soil fertility, carbon sequestration, and the creation of microclimates. Miyawaki plantations have gained popularity worldwide as a sustainable and efficient means of restoring degraded land and combating climate change.

Three sites have been planted using Miyawaki Plantation technique under Atal Anand Ghan Van Yojana during the previous plan period. The details of the plantations are as follows:

TABLE NO. 11.8: MIYAWAKI PLANTATIONS UNDERTAKEN DURING RAI'S PLAN

S. No	Range	Place of work	Year of Plantation	Compartment No.	Area in (ha.)	No. of Seedlings planted	Expenditure incurred (In Rs. Lakhs)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
1	Maregaon	Awalgaon		72	0.096	2700	4.72 (until 2 nd year)
2	Wani	Mandar (Nilgiri ban)		613	0.096	2700	5.73 (until 2 nd year)
3	Pandharkawada	Pandharkawada (Krishna Tekadi)		CA74	1.00	30000	45.93 (until 1 st year)

11.4 PAST YIELD, REVENUE AND EXPENDITURE

The details of yield and revenue realized during the Rai's Plan are given in the table below.

TABLE NO.11.9: YIELD AND REVENUE REALIZED DURING RAI'S PLAN

Sr. No.	Year	Timber			Firewood		
		Quantity (m ³)	Revenue (Rs. Lakhs)	Rate (Rs. Thousands/m ³)	Quantity (m ³)	Revenue (Rs. Lakhs)	Rate (Rs. Thousands/m ³)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	2013-14	17.23	2.206	12.81	0	0.00	-
2	2014-15	1002.37	274.94	27.43	208.80	1.68	0.81
3	2015-16	1707.10	435.53	25.51	448.80	2.06	0.46
4	2016-17	1653.36	459.84	27.81	331.20	2.38	0.72
5	2017-18	1561.37	481.08	30.81	220.80	1.40	0.63
6	2018-19	2604.89	823.36	31.61	102.00	0.75	0.74
7	2019-20	1753.22	622.55	35.51	177.60	2.64	1.49
8	2020-21	1581.59	589.03	37.24	74.40	0.82	1.1
9	2021-22	1476.25	468.61	31.74	19.20	0.04	0.23
10	2022-23	1526.58	619.51	40.58	7.20	0.12	1.67
Total		14883.96	4776.65	32.09	1590.00	11.90	0.75

CHAPTER – 12

STATISTICS OF GROWTH AND YIELD

“What gets measured gets managed”

-Peter Drucker

12.1 INTRODUCTION: Statistics play a crucial role in the effective management of forests, particularly when it comes to assessing and optimizing growth and yield. Statistical analysis helps in identifying trends, patterns, and variations in growth and yield, allowing informed decisions about sustainable harvesting, silvicultural treatments, and long-term planning. By using statistical tools, responsible and efficient use of forest resources can be ensured while maintaining the health and biodiversity of these valuable ecosystems. Growth and yield estimates of Pandharkawada Division are carried out through enumeration exercise and stem analysis.

12.2 TREE ENUMERATION

SOFR unit, Gadchiroli has carried out the sample plot enumeration of forest resources in Pandharkawada Division during 2023-24. The entire area of forest division was considered for sampling enumeration. The trees are enumerated in girth classes from 30 cm and above. The girth was scientifically measured at breast height (gbh). This data was correlated with stock maps prepared by field units and also compared with satellite imagery before the compartments were allotted to various working circles.

The statistical sampling method namely “Systematic Line Plot Sampling with Random Start” was used for tree enumeration. The plot size is of 50”x50” (50 seconds x 50 seconds) i.e. 225 ha. In each plot, 0.1 ha plot was enumerated. A total of 565 plots were laid out covering the entire division. The complete enumeration of trees, natural regeneration, grass and medicinal species were carried out in these plots. In the same way, qualitative measurements were also carried out. The enumeration data was analysed by Forest statistician in the O/o PCCF (ITP).

The total growing stock (trees/ha) as per analysis of enumeration data is 219.51 out of which 122.87 is teak and 96.64 is of miscellaneous species. The results of enumeration data are given in the following table:

TABLE NO. 12.1: WORKING CIRCLE WISE NUMBER OF SOUND TREES PER HA AS PER 2023 ENUMERATION

Sr. No	Working Circle	Number of Sound Trees per Ha.				
		General Utility Species	Special Utility Species	NTFP Species	Other Species	Total (Σ3to 6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	SCI	191.95	19.91	61.36	12.09	285.32
2	% of stock to total stock in SCI	67 %	7 %	22 %	4 %	100 %
3	AWC	46.38	16.10	44.72	7.19	114.39
4	% of stock to total stock in AWC	41 %	14 %	39 %	6 %	100 %
5	FIWC	9.74	12.11	32.63	11.58	66.05
6	% of stock to total stock in FIWC	15 %	18 %	49 %	18 %	100 %

TABLE NO. 12.2: GIRTH CLASSWISE NUMBER OF SOUND TREES PER HA AS PER 2023 ENUMERATION

Girth Class(cm)	31- 45	46- 60	61- 75	76- 90	91- 105	106- 120	121- 135	136- 150	Above 150	Total (Σ2to 10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SCI	83.97	68.19	55.13	36.52	21.19	11.33	4.33	2.80	1.87	285.32
AWC	55.80	23.91	14.54	7.59	5.00	3.45	1.49	1.44	1.15	114.39
FIWC	26.58	15.79	10.53	5.53	2.37	1.05	1.05	1.32	1.84	66.05

12.2.1 VOLUME EQUATIONS: These are mathematical formulae to estimate total wood volume based on tree measurements like DBH and Height

The volume equations of the predominant tree species in this Division, as prescribed by FSI in its ISFR 2017 report, are provided in the table below:

TABLE NO. 12.3: VOLUME EQUATIONS OF VARIOUS SPECIES

Sr. No	Species		Volume equation
	Local Name	Scientific Name	
(1)	(2)	(3)	(4)
1	Saag	<i>Tectona grandis</i>	$V = 0.032011 - 0.995474xD + 9.91129xD^2$
2	Dhawda	<i>Anogeissus latifolia</i>	$V = 0.061856 + 7.952136 \times D^2$
3	Tendu	<i>Diospyros melanoxylon</i>	$V = 0.033867 - 0.975148xD + 8.255412 + D^2$
4	Palas	<i>Butea monosperma</i>	$V = 0.18573 - 2.85418xD + 15.03576xD^2$
5	Moha	<i>Madhuca indica</i>	$V = 0.074069 - 1.23002xD + 7.726902xD^2$
6	Ain	<i>Terminalia tomentosa</i>	$V = 0.060344 - 1.569539xD + 12.090296xD^2$
7	Mowai	<i>Lanneacoromandilica</i>	$V = 0.093318 - 1.531417xD + 9.01159xD^2$
8	Lenda	<i>Symplocosracemosa</i>	$V = 0.06466 - 1.371984xD + 9.629971xD^2$
9	Salai	<i>Boswellia serrata</i>	$V = 0.050452 - 1.228748xD + 9.123381xD^2$

V: Volume of the tree

D: Diameter at breast height

12.3 STEM ANALYSIS

During the revision of working plan, stem analysis was carried out by Working Plan Office, Yavatmal in 2023. The stem analysis was carried out by selecting four representative teak trees of seed origin and coppice origin from site quality III and IV.

The results obtained have been computed and the following curves were drawn.

1. Age/diameter curve
2. Height/age curve and
3. Age/volume curve

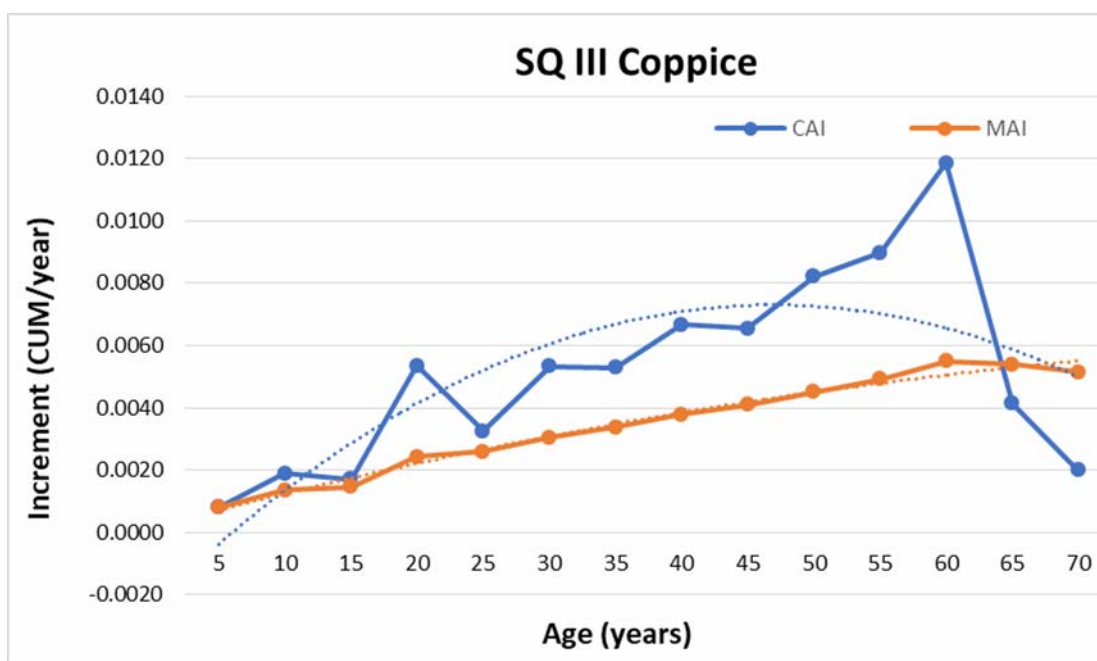
TABLE NO. 12.4: DETAILS OF TREES FELLED FOR STEM ANALYSIS

Sr. No.	Site Quality	Range	Round	Beat	Compartment Number	No. of Trees Selected	
						Seed Origin	Coppice Origin
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	III	Pandharkawada	Pandharkawada	Tiwsala	73	1	-
2		Pandharkawada	Pandharkawada	Tiwsala	73	1	-
3		Pandharkawada	Arli	Arli	122	-	1
4		Pandharkawada	Arli	Arli	122	-	1
5	IV	Mukutban	Dabhadi	Dabhadi	34	1	-
6		Mukutban	Dabhadi	Dabhadi	34	1	-
7		Jamni	Shibla	Ambezari	63	-	1
8		Jamni	Shibla	Ambezari	63	-	1

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

Table No. 12.5: STEM ANALYSIS FOR COPPICE ORIGIN TEAK (SITE QUALITY III)

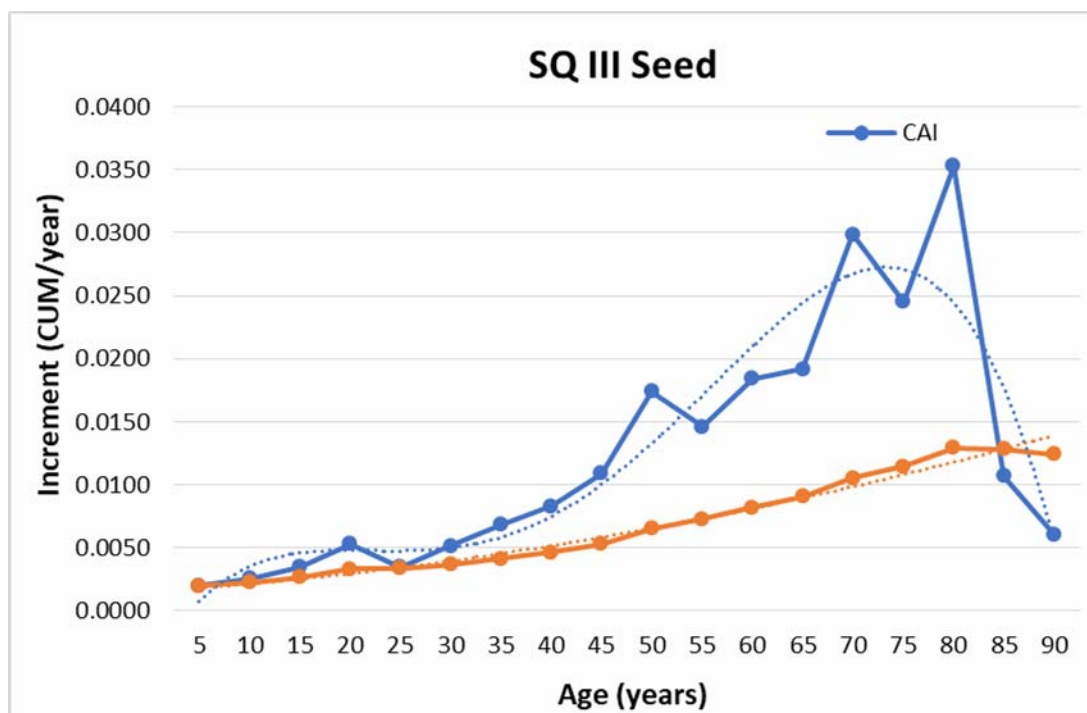
Sr. No.	Age (Years)	Height (m)	DBH ob (cm)	GBH ob (cm)	Volume (m ³)	CAI (m ³ / year)	MAI(m ³ / year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	5	5.5	4.24	13.31	0.0040	0.0008	0.0008
2	10	8.0	7.80	24.49	0.0135	0.0019	0.0014
3	15	9.1	11.04	34.67	0.0220	0.0017	0.0015
4	20	10.1	13.29	41.72	0.0487	0.0053	0.0024
5	25	11.0	15.44	48.48	0.0650	0.0033	0.0026
6	30	11.8	17.33	54.41	0.0916	0.0053	0.0031
7	35	12.6	19.12	60.04	0.1180	0.0053	0.0034
8	40	13.2	21.10	66.27	0.1513	0.0067	0.0038
9	45	13.8	22.16	69.58	0.1840	0.0065	0.0041
10	50	14.3	23.57	74.00	0.2251	0.0082	0.0045
11	55	14.7	24.64	77.37	0.2700	0.0090	0.0049
12	60	15.1	25.78	80.96	0.3293	0.0119	0.0055
13	65	15.4	26.72	83.90	0.3500	0.0041	0.0054
14	70	15.7	27.52	86.41	0.3600	0.0020	0.0051



The periodic CAI and MAI curves intersect at 53rd year. The girth (OB) corresponding to this exploitable age is 83.40cms. The exploitable girth is hence fixed at 75cms for coppice origin Teak trees of Site Quality III.

Table No. 12.6: STEM ANALYSIS FOR SEED ORIGIN TEAK (SITE QUALITY III)

Sr. No.	Age (Years)	Height (m)	DBH ob (cm)	GBH ob (cm)	Volume (m ³)	CAI(m ³ /year)	MAI(m ³ /year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	5	5.5	8.00	25.12	0.010	0.0020	0.0020
2	10	8.0	11.78	36.99	0.023	0.0025	0.0023
3	15	10.3	15.50	48.67	0.040	0.0035	0.0027
4	20	11.8	18.46	57.96	0.067	0.0053	0.0033
5	25	13.0	20.50	64.37	0.084	0.0035	0.0034
6	30	14.0	22.75	71.44	0.110	0.0052	0.0037
7	35	14.6	25.20	79.13	0.144	0.0068	0.0041
8	40	15.2	27.63	86.76	0.186	0.0083	0.0046
9	45	15.8	30.50	95.77	0.240	0.0109	0.0053
10	50	16.3	33.73	105.91	0.327	0.0174	0.0065
11	55	16.8	35.20	110.53	0.400	0.0146	0.0073
12	60	17.2	36.40	114.30	0.492	0.0184	0.0082
13	65	17.6	37.40	117.44	0.588	0.0192	0.0090
14	70	18.0	38.40	120.58	0.737	0.0299	0.0105
15	75	18.3	39.30	123.40	0.860	0.0245	0.0115
16	80	18.6	40.20	126.23	1.037	0.0353	0.0130
17	85	18.8	41.00	128.74	1.090	0.0107	0.0128
18	90	19.0	41.60	130.62	1.120	0.0060	0.0124

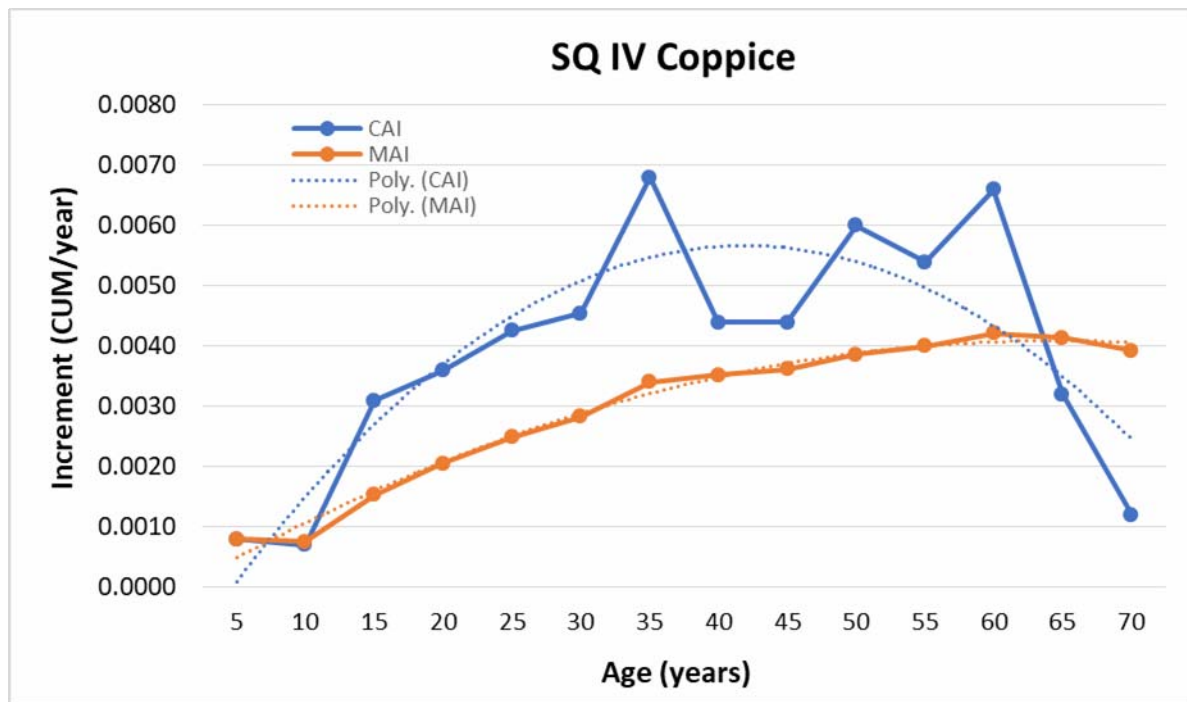


The periodic CAI and MAI curves intersect at 84th year. The GBH (OB) corresponding to this exploitable age is 128.11cms. The exploitable girth is hence fixed at 120cms for seed origin Teak trees of Site Quality III.

Table No. 12.7: STEM ANALYSIS FOR COPPICE ORIGIN TEAK (SITE QUALITY IV)

Sr. No.	Age (Years)	Height (m)	DBH ob (cm)	GBH ob (cm)	Volume (m ³)	CAI(m ³ /year)	MAI(m ³ /year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	5	3.0	5.60	17.58	0.0040	0.0008	0.0008
2	10	6.6	8.05	25.28	0.0075	0.0007	0.0008
3	15	9.3	11.90	37.37	0.0230	0.0031	0.0015
4	20	10.7	14.60	45.85	0.0410	0.0036	0.0021
5	25	11.7	16.17	50.77	0.0623	0.0043	0.0025
6	30	12.7	17.68	55.52	0.0850	0.0045	0.0028
7	35	13.4	18.90	59.35	0.1190	0.0068	0.0034

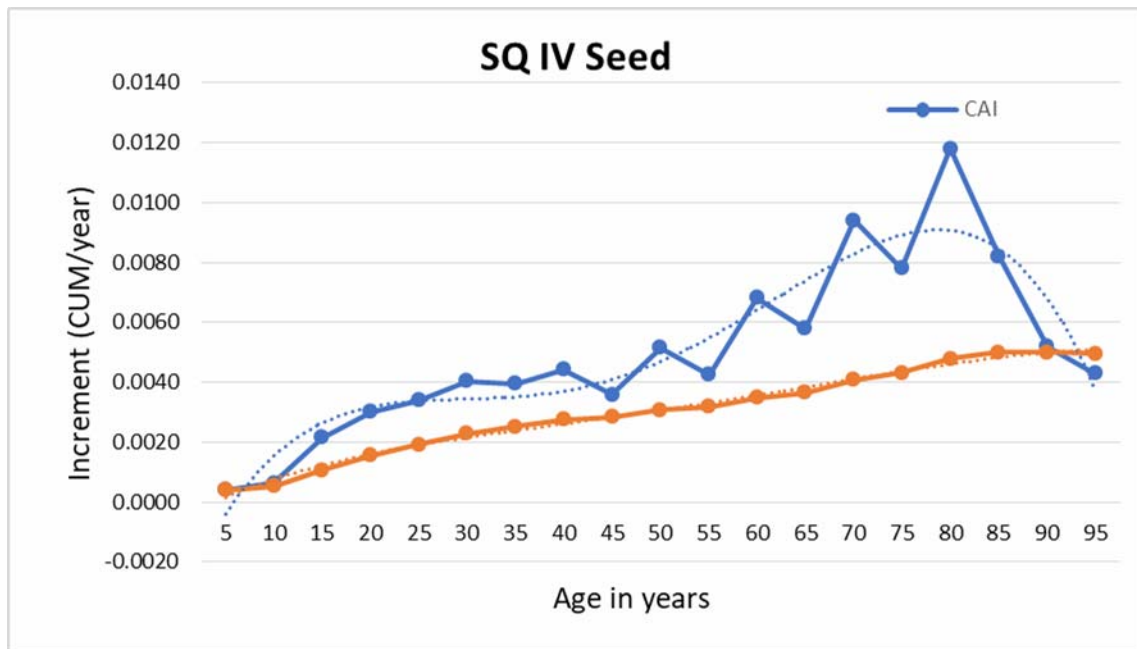
Sr. No.	Age (Years)	Height (m)	DBH ob (cm)	GBH ob (cm)	Volume (m ³)	CAI(m ³ /year)	MAI(m ³ /year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8	40	14.2	20.13	63.21	0.1410	0.0044	0.0035
9	45	15.3	22.05	69.24	0.1630	0.0044	0.0036
10	50	16.1	23.42	73.55	0.1930	0.0060	0.0039
11	55	17.0	24.36	76.49	0.2200	0.0054	0.0040
12	60	17.9	25.97	81.55	0.2530	0.0066	0.0042
13	65	18.5	26.81	84.18	0.2690	0.0032	0.0041
14	70	19.0	28.78	90.38	0.2750	0.0012	0.0039



The periodic CAI and MAI curves intersect at 64th year. The girth (OB) corresponding to this exploitable age is 83.74cms. The exploitable girth is hence fixed at 75 cms for coppice origin Teak trees of SQ IV.

Table No. 12.8: STEM ANALYSIS FOR SEED ORIGIN TEAK (SITE QUALITY IV)

Sr. No.	Age (Years)	Height (m)	DBH ob (cm)	GBH ob (cm)	Volume (m³)	CAI(m³/year)	MAI(m³/year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	5	5.0	3.15	9.89	0.0020	0.0004	0.0004
2	10	7.1	5.54	17.38	0.0052	0.0006	0.0005
3	15	9.7	9.00	28.26	0.0160	0.0022	0.0011
4	20	10.8	11.80	37.05	0.0310	0.0030	0.0016
5	25	11.5	14.40	45.22	0.0480	0.0034	0.0019
6	30	12.0	16.77	52.65	0.0682	0.0040	0.0023
7	35	12.5	18.99	59.63	0.0880	0.0040	0.0025
8	40	12.9	21.13	66.35	0.1101	0.0044	0.0028
9	45	13.2	22.59	70.93	0.1280	0.0036	0.0028
10	50	13.5	24.01	75.40	0.1537	0.0051	0.0031
11	55	13.7	25.29	79.41	0.1750	0.0043	0.0032
12	60	13.9	26.69	83.79	0.2091	0.0068	0.0035
13	65	14.1	28.17	88.45	0.2380	0.0058	0.0037
14	70	14.2	29.95	94.05	0.2850	0.0094	0.0041
15	75	14.2	31.32	98.34	0.3240	0.0078	0.0043
16	80	14.2	32.83	103.09	0.3830	0.0118	0.0048
17	85	14.3	34.11	107.11	0.4240	0.0082	0.0050
18	90	14.3	35.31	110.86	0.4500	0.0052	0.0050
19	95	14.4	36.00	113.04	0.4715	0.0043	0.0050



The CAI and MAI curves intersect at 91st year. The girth (OB) corresponding to this exploitable age is 111.34cms. The exploitable girth is hence fixed at 105cms for seed origin Teak trees of Site Quality IV.



PART - II

FUTURE MANAGEMENT

CHAPTER – 1

BASIS OF PROPOSALS

1.1 OBJECTIVES OF MANAGEMENT

This Working Plan is prepared for the scientific management of the forests and wildlife of Pandharkawada Forest Division. The primary management objective for the forests of this tract is to treat forests as per the requirement of site so as to optimize growing stock in a manner as mentioned in the preface.

1.1.1 FACTORS INFLUENCING THE GENERAL OBJECTIVES OF MANAGEMENT

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

1.1.1.1 NATIONAL FOREST POLICY

National forest policy for India was first enacted in 1894. This policy considered public benefit as the main objective of public forest management. It suggested the maintenance of forests in hilly areas for preservation of climatic conditions and protection of agriculture from hill torrents. The main objectives of the forest policy 1894 were-

1. To preserve climatic and physical conditions of the country.
2. To preserve minimum amount of forest necessary for general well being of the country.

3. Priority to cultivation over forestry.
4. To meet the public demands for forest produce at concessional rates on priority in comparison to revenue consideration.
5. Realization of maximum revenue after meeting the demands of local people.

1.1.1.2 NATIONAL FOREST POLICY, 1952

The Indian Republic formulated its first National Forest Policy in 1952. The factors that influenced the policy makers were deteriorating environmental conditions, world wars, dependency of defence on forest produce and reconstruction schemes on forestry.

The following needs were identified while making forest policy:

1. The need for evolving a system of balanced and complimentary land use.
2. Need for checking of denudation of mountainous regions, erosion along the tree less banks of great rivers and on vast undulating waste lands.
3. Need for establishing tree lands, to ameliorate physical and climatic conditions for general well being of the people.
4. The need for progressively increasing demands for grazing, fire wood, and small timber for agriculture implements.
5. The need for realization of revenue in continuity.

The National Forest Policy, 1952 stated that the State Government can regulate, frame the policies for forest administration and legislation for conservation and utilization of forest resources, provided those policies do not adversely affect the general economy and physical balance of adjoining States and in general the Forest Policy of the Central Government.

1.1.1.3 NATIONAL FOREST POLICY, 1988

The forests have been brought to the concurrent list from the state list with the effect of the 42nd amendment to the Constitution of India which enables the Central Government to exercise more authority in forestry matters. This was clearly reflected in the National Forest Policy, 1988. The reasons for such changes were,

inadequacy of protection measures, diversion of forest lands to non forestry uses, tendency to maximize revenue realization, growing demands for timber, wood and fodder. The Forest Policy of 1988 clearly states that the forests are to be managed mainly for preservation, maintenance, sustainable utilization, restoration and enhancement of natural environments. The governing objects of National Forest Policy are as follows:

1. Maintenance of environmental equilibrium through preservation and restoration of ecological balance.
2. Conserving national heritage by preserving the remaining natural forests with the great variety of flora and fauna which represents commendable biodiversity and genetic resources of the country.
3. Checking soil erosion and desiltation in the catchment areas of rivers, lakes, reservoirs through soil and water conservation measures in order to mitigate floods, droughts and siltation of reservoirs.
4. Substantial improvement in the forests and tree cover in the country through massive afforestation, social forestry programmes specially on denuded, degraded and unproductive lands.
5. Meeting the demands for fuel wood, minor forest produce, fodder and small timber of the rural and tribal populations.
6. Increase the productivity of forest to meet essential needs of the nation.
7. Efficient utilization of forest produce by introducing modern techniques and maximum substitution of wood.
8. Ensuring massive peoples movement by creating awareness and involvement of women for achieving these objects and to minimize the dependency on existing forests.
9. The basic emphasis of the policy is on the management of existing forests and forest lands by protecting and increasing their productivity and conservation of total biological diversity by strengthening and improving the network of national parks, sanctuaries, biosphere reserves and other protected areas.

The Objectives of Forest Policy, 1988 are as follows

1. Restrictions on schemes and projects which interfere with the forest that cover steep slopes, catchment of rivers, lakes and reservoirs.
2. No working of forests without approval of management plans by the Central Government.
3. Exotic species are not to be introduced without long term scientific trials.
4. The rights and concessions including grazing be regulated by carrying capacity of the forests.
5. The rights and concessions for forest produce of the tribal should be protected and their domestic needs for fuel, fodder, non wood forest produce and small timber for construction should be provided on priority.
6. Forest management plans to take special care about wildlife conservation.
7. Effective action to prevent encroachment on forest land the existing encroachments should not be regularised.
8. Forest based industries should raise their raw material needed by them, making arrangement from private cultivators without depending on forests.
9. Survey of forest resources shall be completed on scientific lines for updating information.

1.1.1.4: NATIONAL FORESTRY ACTION PROGRAMME:

The Government of India has formulated the National Forestry Action Programme in order to reverse the process of degradation of forests and for sustainable development of forests. It is a compressive strategic plan to address major problems of the forestry sector. The major thrust of the National Forestry Action Programme is to enhance the contribution of forestry and tree resources for ecological stability and people centered development through qualitative and quantitative improvement in forest resources.

The Issues Identified in Forestry Sector

The aim of the National Forestry Action Programme is to evolve issue-based programme on the lines of provisions of National Forestry Policy, 1988. It is to

integrate forestry development programme in the country within the frame work of National five years plans. Under National Forestry Action Programme five interrelated basic issues have been identified and these are the basis of the following programme structure.

The programme targets the rehabilitation and increase in productivity of the degraded forests and enhance in the areas of forest and tree cover to the extent of 33% of the total area of the country within 20 years. The five inter related issues identified and to be addressed in the programme are -

1. Protect existing forest resources.
2. Improve forest productivity.
3. Reduce total demand.
4. Strengthen policy and institutional framework.
5. Expand the forest area.

Programme

i. Protect existing forest resources: It has three mains of sub programmes.

1. Forest Protection
2. Soil and water conservation
3. Protected areas and biodiversity conservation.

These sub programmes include the works of forest survey, demarcation mapping, inventory, bio-diversity conservation, protected area management, stringent protection against boundary defacing, encroachment, fires, poaching, etc.

ii. Improve forest productivity: The main sub programmes identified are -

1. Rehabilitation of degraded forests.
2. Research and technology development.
3. Development of NWFP.
4. Assisting private individuals with community participation.

These sub programmes involve main aspects of research and enrichment of planting stock, soil and water conservation, technology improvement, regeneration, rehabilitation and afforestation mainly in existing forests.

iii. Reduce total demand: The main sub programmes for the efficient usage of fuel wood, fodder, timber and NWFP.

The main aspects in this programme are technology improvement in preservation, seasoning, substitutions and other measures or efficient utilization of forest products, reduction in wastage of forest produce and also through extensive bio mass plantations.

iv. Strengthen policy and institutional frame work: The sub programmes are-

1. Central forests administration
2. Central forestry institutions
3. State forestry administration and institutions

These sub programmes include development of infrastructure facilities like buildings, communication etc. and strengthen of skills of staff including Human Resources Development. These issues cover all the aspects of capacity building forest policy and litigation, public forest administration and organizational structure, research, planning and budgeting etc.

v. Expand the forest area: The two sub programmes are

1. Tree plantation on forest and outside forest lands
2. Peoples' participation in plantation and its protection.

The aspects of extensive forestry programme in all kinds of waste lands and marginal farm lands through creation of plantation forest by taking up waste land reclamation, afforestation, promotion of agro forestry.

The Objectives of National Forest Action Programme are as follows

1. To achieve sustainability of the forest, productivity of forest plantations to be enhanced at least 3 to 5 cubic meter per ha, per annum, by regeneration and enrichment plantations.
2. Improvement of hygiene of the forest through perpetual silviculture practices.
3. Efforts are to be made to bring 1/3rd geographical area of the country under forests and tree cover by plantations on all category of waste lands on farm lands (Agro-forestry).
4. Expansion of protected area network and maintenance of biodiversity conservation.
5. Non forest waste lands to be planted with mostly fuel wood species as 70% of wood produced from the forest is used as fuel wood. The species of industrial wood and pulp wood may be increased in farm forestry.
6. Peoples' participation in protection and development of degraded forests and fringe forests to be strengthened.
7. Non-wood forest species to be developed and value addition may be promoted at village level.
8. Regulation of grazing in forest as per the carrying capacity and silvicultural needs.
9. Infrastructure for forest inventory, research and development to be strengthened. Human resource development should also be improved.
10. Investment for sustainable development of forest should be rational and in proportionate to the total production.
11. Supreme Court rulings and other rules of the land should scrupulously be followed.

1.1.1.5 NATIONAL WILDLIFE ACTION PLAN (2017 - 2031)

1. The Plan is based on the premise that essential ecological processes that are governed or strongly moderated by ecosystems are essential for food production, health and other aspects of human survival and sustainable development.

2. It underlines the fact that despite being one of 17 mega biodiversity countries of the world, national planning has not taken serious note of adverse ecological consequences of reduction and degradation of wilderness areas from the pressures of population, commercialization and development projects.
3. Accordingly, the plan has brought to focus the alarming erosion of our natural heritage comprising rivers, forests, grasslands, mountains, wetlands, coastal and marine habitats, arid lands and deserts.
4. It also keeps in focus the intrinsic value of nature and its manifold components. The maintenance of these ecosystems, which can be termed as 'Life Support Systems' is considered vital for all societies regardless of their stage of development.
5. It emphasizes two other aspects of nature conservation viz. preservation of genetic diversity and sustainable utilization of species and ecosystems, which have a direct bearing on our scientific advancements and support to millions of rural communities.
6. The Plan adopts a landscape approach in conservation of all wildlife i.e. uncultivated flora and undomesticated fauna that have an ecological value to the ecosystem and mankind irrespective of where they occur.
7. It accords special emphasis to recovery of threatened species of wildlife while conserving their habitats which include terrestrial, inland aquatic, coastal and marine ecosystems.
8. It takes note of concerns relating to climate change on wildlife, by integrating actions to be taken for its mitigation and adaptation into wildlife management planning.
9. The plan underscores the increasing need for people's support for conservation of wildlife and to this effect recommends strengthening the 'core –buffer- multiple use surround' structure with higher inputs for eco-development, education, innovation, training, extension, conservation awareness and outreach programs. Wildlife health and disaster management have received due attention in this Plan.

10. Management of tourism in wildlife areas with related plough back mechanism, development of human resource and staff welfare has undergone a reorientation in the Plan.
11. The plan is alive to communities, inhabiting forest lands and other wilderness areas, to be treated appropriately in the light of the Forest Rights Act, 2006 keeping in mind their inadequacy of resources and strong dependence on natural biomass resources.

1.1.1.6 SUSTAINABLE DEVELOPMENT GOALS (SDGS)

The Sustainable Development Goals (SDGs) are a set of 17 global goals established by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals aim to address social, economic, and environmental challenges to achieve a more sustainable and equitable future.

1.1.1.7 UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION

The United Nations Decade on Ecosystem Restoration, which runs from 2021 to 2030, aims to promote and support the restoration of ecosystems worldwide. While the exact principles of the Decade are not explicitly defined, there are several key principles that underpin its objectives and actions. These principles include:

- 1. Collaboration and Partnership:** The Decade emphasizes the need for collaboration and partnerships at various levels, including governments, non-governmental organizations, local communities, indigenous peoples, and the private sector. It recognizes that ecosystem restoration requires collective efforts and expertise from multiple stakeholders.
- 2. Inclusive and Participatory Approach:** The Decade promotes an inclusive and participatory approach that involves the engagement of local communities, indigenous peoples, and other stakeholders in decision-making processes related to ecosystem restoration. It recognizes the importance of integrating traditional knowledge and practices.

3. **Science-Based and Evidence-Informed:** Ecosystem restoration efforts under the Decade are guided by scientific research, best practices, and evidence-based approaches. This ensures that restoration actions are effective, sustainable, and based on a sound understanding of ecosystems.
4. **Landscape and Ecosystem-Level Restoration:** The Decade recognizes the importance of restoring entire landscapes and ecosystems, rather than focusing on individual species or isolated areas. It encourages an integrated approach that considers the interconnectedness of different ecosystem components.
5. **Sustainable Land and Water Management:** The Decade highlights the need for sustainable land and water management practices as a crucial component of ecosystem restoration. It promotes the adoption of approaches that enhance soil health, water conservation, and biodiversity conservation.
6. **Climate Change Mitigation and Adaptation:** Ecosystem restoration plays a vital role in climate change mitigation and adaptation. The Decade emphasizes the importance of restoring ecosystems to enhance their capacity to sequester carbon, reduce greenhouse gas emissions, and build resilience to climate change impacts.
7. **Financial and Technical Support:** The Decade recognizes the need for adequate financial and technical support to enable and scale up ecosystem restoration efforts globally. It calls for increased investment and the mobilization of resources to support restoration initiatives.
8. **Monitoring, Evaluation, and Learning:** The Decade emphasizes the importance of monitoring, evaluating, and learning from restoration activities. This enables the assessment of progress, identification of effective strategies, and sharing of lessons learned to improve future restoration efforts.

1.1.1.8 OTHER FACTORS INFLUENCING THE GENERAL OBJECTS OF MANAGEMENT

The major factors influencing the objects of management are given below:

1. Pandharkawada Forest Division has forests with a canopy cover density ranging from 0.1 to 0.7, including scrub, open forest, and medium dense forests. These forests have been managed using coppice with standard system and coppice with reserve system in previous working plans, resulting in their degradation.
2. Due to low site quality, excessive biotic pressure, and frequent fire incidents, natural regeneration is inadequate. The plan should include provisions for improving natural regeneration and root stock management. Artificial regeneration will be used to supplement natural regeneration in areas lacking or having insufficient natural regeneration.
3. Teak occupies majority of the forest composition, highlighting the need to enhance the presence of miscellaneous species in the forests.
4. The forest tracts experience soil erosion, requiring intensive soil and moisture conservation efforts.
5. Forests are capable of producing medium to large-sized timber.
6. There is demand for small timber, firewood, poles, fodder, and non-timber forest products (NTFP) among local communities.
7. Certain forest patches are rich in wildlife, including tigers, wolves and leopards, necessitating habitat improvement measures and effective protection for wildlife conservation throughout the division.
8. Spillover of tigers from Tipeswar Wildlife Sanctuary and increase in population of resident tigers has compounded the human-tiger conflict in the area.
9. NTFP species constitute a significant portion of the forest crop and contribute to the livelihoods of local communities. There is great potential for sustainable economic development of these communities through the conservation of forest resources.

10. Encroachment of forest land received impetus due to enactment of Forest Rights Act, 2006.

1.1.1.9 GENERAL OBJECTS OF MANAGEMENT

1. To preserve and enrich the growing stock in natural forests and to restore all under stocked and degraded areas of the forest with better stocking by taking up soil and moisture conservation measures, and afforestation.
2. To preserve forest cover on hill slopes, along streams, water courses and water bodies to prevent soil erosion, check siltation and preserve catchment areas through treatment of catchment and drainage areas.
3. Suitable tending and rootstock management to stimulate growth of naturally regenerated seedlings and rootstock.
4. Preservation and improvement of forests by harvesting silviculturally available medium to large sized timber on sustainable basis and to meet the demands of local people.
5. Habitat management and protection activities for wildlife in these forests.
6. To effectively protect forests from illicit felling, uncontrolled grazing, fire, poaching and encroachment with the help of local people.
7. To document, increase the availability, production and harvest of NTFP species especially medicinal plants through sustainable means.
8. To meet the biodiversity conservation values and maintain gene pool in natural forests while providing ecological services with the active involvement of people.
9. Site specific eco-development initiatives based on participatory village level microplans to improve ecological status of the area and livelihood of the local communities.

10. To ensure active participation of local communities in forest management, and with Joint Forest Management (JFM) committees receiving priority.
11. To document and protect the diversity and abundance of medicinal plants in the division.
12. Reducing biotic pressure on forests, particularly illicit felling, grazing, fire, and encroachment should be given the highest priority.
13. Boundary demarcation of forest areas, including forest land under the Forest Rights Act, 2006, should be carried out within a specified timeframe.

1.1.1.10 ANALYSIS AND VALUATION OF THE CROP

During the 2023-24 period, the SOFR unit of Gadchiroli Working Plan Division has carried out the enumeration of forest resources in the Pandharkawada Forest Division. The entire forest division area was considered for the sampling enumeration plan. Trees were enumerated based on girth classes starting from 30 cm and above, with girth measurements taken at breast height (GBH). The data obtained was correlated with stock maps prepared by field units and cross-referenced with satellite imagery to assign compartments to different working circles.

For tree enumeration, a statistical sampling method called "Systematic Line Plot Sampling with Random Start" was employed. The plot size measured 50" x 50" (50 seconds x 50 seconds), which equals 225 hectares. A total of 565 plots were laid covering the entire division. Within each plot, a 0.1-hectare area was surveyed, covering the complete enumeration of trees, natural regeneration, grass, and medicinal species. Additionally, qualitative measurements were conducted in the same manner. The collected enumeration data was then analyzed.

The working circle wise results of enumeration data is given in the table below.

TABLE NO.1.1: WORKING CIRCLE WISE RESULTS OF ENUMERATION DATA

S.No	Working Circle	Total Tree Density Per Ha	Teak per Ha	% Stock of Teak Tress to the Total Stock
(1)	(2)	(3)	(4)	(5)
1	SCI	285.32	176.37	62 %
3	AWC	114.39	35.92	31 %
4	FIWC	66.05	4.74	7 %
Weighted Average		219.51	122.87	56 %

Forest canopy density cover data has been procured from the GIS cell, Nagpur.
The details for the year 2021 are provided in the table below.

TABLE NO.1.2 FOREST COVER DENSITY (2021)

Forest Cover Type	Area in Ha.	Percentage of Total Area
(1)	(2)	(3)
VDF	26.53	0.04 %
MDF	16638.55	24.81 %
OF	21719.83	32.39 %
Scrub	720.60	1.07 %
No Vegetation	27808.82	41.47 %
Water	143.00	0.21 %
Total	67057.46	100 %

Details of classes of forests in different compartments are given in **Appendix No. XX** of Volume-II.

1.1.1.9 FUNCTIONAL CLASSIFICATION OF FOREST

The Government of Maharashtra vide G.R. No. MEP-1365/132211-Y, Dt. December 6, 1968 classified the state forest into the following categories:

1. Protection Forests

This category consists of forest on very steep slopes, 25° and above and the forest situated along river banks, the forest that have depleted on account of maltreatment and heavy biotic pressure and further harvesting will accelerate soil erosion and affect the agriculture productivity in the lower plains adversely.

The management will aim at improvement of the forest both in quality and quantity and soil and moisture conservation measures.

2. Tree Forests

This includes the forest situated in remote areas where the biotic pressure is negligible and this forest shall be capable of producing large size and commercially valuable timber and other products of economic value.

3. Minor Forests

These forests are situated adjoining cultivated lands and are subjected to heavy biotic pressure. These forests are capable of producing minor timber, fuel wood, fodder and other forest produce to fulfill the needs of the local population.

4. Pasture Lands

The nature of this forest is generally, highly degraded, open sparsely stocked or mostly scrub lands. These lands are unable to produce small timber but provide grazing land to the local cattle.

5. Miscellaneous Forests

This category includes grass reserves and remaining areas. The grass reserves are small patches of forest situated adjoining cultivated lands or habitats. These forests have scrub vegetation capable of producing good quality fodder. The remaining areas in this category are needed for other works, with regard to wildlife

habitat; most of the forest tract in this division is potential habitat for many kinds of wildlife. Some of the areas are rich in wild flora, especially medicinal plants.

1.2 METHOD OF TREATMENT TO BE ADOPTED

The method of treatment to be adopted is influenced by the situation and condition of forest, status of regeneration of the crop, needs of local people, availability of labour force, staff and resources. Encouragement of natural regeneration wherever present, shall be properly tended for planting operations native tree species shall be preferred and participation of local villagers in forestry operations like afforestation, protection shall be encouraged. Extensive soil and moisture conservation measures shall be taken up. These forests will be effectively protected from illicit felling, encroachment, unregulated grazing and repeated forest fires.

1. Tree Forests

This type of forests includes the good quality forests, especially of decent site quality, capable of producing medium to large sized timber. These areas shall also be treated under Selection cum Improvement Working Circle. Tending of natural regeneration, wherever it is adequate and areas having inadequate natural regeneration will be planted with suitable valuable species. Steep slopes will be excluded from harvesting operations but soil and moisture conservation will be taken up.

2. Minor Forests

These forests represent mostly site quality 'IVB' and to a limited extent site quality 'IVA' dominated by teak. These types of forest are the most prevalent in the tract and cover all the ranges. The well stocked forest of this category is proposed to be treated under Selection cum Improvement Working Circle, with emphasis on improvement felling. These forests are capable of producing small timber and fuel wood. In this area, extensive soil and moisture conservation works along with gap plantation is prescribed.

Areas having sparse tree crops, open areas without tree growth and isolated small forest patches are included in the Afforestation Working Circle (AWC). In such areas, the focus would be upon tending of existing natural regeneration and rootstock; in natural regeneration management, the seedlings of seed origin of desirable species will be given preference over the coppice. If natural regeneration is insufficient then it will be supplemented by seedling plantations, wherever necessary. Involvement of the local community is considered focal for management of such areas as well as afforestation of open areas and isolated patches.

3. Pasture Forests

These forests include areas close to the habitations which are unsuitable for raising timber crops due to their refractory nature and heavy biotic pressure. They are treated under Fodder Improvement Working Circle. Fodder plantations and extensive soil and moisture conservation works have been proposed.

1.3 CONSTITUTION OF WORKING CIRCLES

The following working circles have been proposed based on the objects of management and methods of treatment.

1. Selection-cum-Improvement working Circle
2. Afforestation Working Circle
3. Fodder Improvement Working Circle
4. Miscellaneous Working Circle

A separate chapter for each of the following has been included in the plan.

1. Wildlife Management
2. Non-Timber Forest Produce
3. Joint Forest Management
4. Maintenance and enhancement of forest health and vitality
5. Management of spiritual, cultural aspects of forests and eco-tourism
6. Encroachment removal
7. Forest Rights Act, 2006
8. Sustainable Development

1.3.1 DISTRIBUTION OF AREAS TO VARIOUS WORKING CIRCLES

The allocation of forest areas under various working circles of the current working plan has been given in the table below.

TABLE NO.1.3: WORKING CIRCLES AND AREA ASSIGNED

Sr. No.	Working Circle	No. of Compartments	Area in (ha)	Percentage
(1)	(2)	(3)	(4)	(5)
1	SCI	134	35604.95	53 %
2	AWC	285	26996.44	40 %
3	FIWC	26	4456.07	7 %
Total		445	67057.46	100 %

1.4 PERIOD OF THE PLAN

The period of plan is for 10 years from 2023-24 to 2032-33. The gap year 2023-24 was worked through a Working Scheme sanctioned by Nagpur Regional Office, MoEFCC, Government of India vide letter no. F.No.WP-85/RON/2023-NGP/12486 dt. November 9, 2023. Approval of Working Plan of Pandharkawada forest Division for the period 2023-24 to 2032-33 by MoEFCC, Nagpur Regional Office, Govt. of India vide letter No.F.No.WP-85/RON/2023-NGP/13860/ Dt. December 24, 2024. The midterm review can be undertaken after 5 years if the situation demands and the proposal shall be moved by the Conservator of Forests (Territorial), Yavatmal.

CHAPTER-2

SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

2.1 SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

The area of this working circle has been marked on a GIS based map of 1:150000 which is appended in the plan and a copy of the same is given in A4 size here.

2.2 GENERAL CONSTITUTION OF THE WORKING CIRCLE

This working circle consists of areas which were earlier assigned to Coppice with Standards, Coppice with Reserves, Selection-cum-Improvement and Miscellaneous Working Circles. The crop is unevenly aged. These forests were treated under the Coppice with Reserves system prior to Yadav's plan. In Yadav's and Rai's plan, this area was treated under Selection-cum-Improvement Working Circle. The forests are predominantly teak forests.

2.2.1 AREA ALLOCATION

The information from enumeration data, stock mapping, forest density classes from FSI and compartment wise density classes in digital format were utilized for allotment of this working circle. Forest areas with density of 0.4 and above, which can produce medium to large size timber and poles are included in this working circle. Most of the crop is of site quality IV with a few patches of site quality III.

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

The total forest area included in this working circle is 35604.95 ha. It constitutes 53 % of the total forest area of the division.

2.2.2 AREA STATEMENT

Range-wise allocation of compartments and area is shown in the table below.

TABLE NO. 2.1: DISTRIBUTION OF AREA IN SCI WORKING CIRCLE

Sr. No.	Range	Total Area (ha) of Range	No. of Compt. Allotted to SCI WC	Area Allotted (ha)				% to the Area of Range (8/3*100)	% to the Area of WC
				RF	PF	UF	Total Area		
1	2	3	4	5	6	7	8	9	10
1	Ghatanji	7557.63	16	5475.58	0	0	5475.58	72 %	15 %
2	Jamani	9506.77	27	6321.06	0	0	6321.06	66 %	18 %
3	Maregaon	10895.57	23	6291.12	0	0	6291.12	58 %	18 %
4	Mukutban	7611.9	16	4244.67	0	0	4244.67	56 %	12 %
5	Pandhar kawada	11609.42	26	6851.93	0	110.00	6961.93	60 %	20 %
6	Parwa	9459.43	26	6278.34	0	32.25	6310.59	67 %	18 %
7	Wani	10416.74	0	0	0	0	0	0 %	0 %
	Total	67057.46	134	35462.70	0	142.25	35604.95	-	100%

2.3 GENERAL CHARACTERISTICS OF VEGETATION

The principal species of the crop is teak with its natural associates like Dhawda, Moha, Ain, Lendia, Salai, Bhirra, Kalamb, Char, etc. The crop is young to middle aged and open at some places. Teak constitutes around 62% with 176 trees/ha while miscellaneous species constitute 38% with 109 trees/ha. Teak is mostly of coppice origin and the growth is stunted and malformed. The established regeneration is meager in number though young recruits are seen in some places. The density of the crop is between 0.4 and 0.7. As per the SOFR 2023 enumeration data, 27 % of teak trees fall in the girth class above 75 cms.

2.4 FELLING SERIES, CUTTING SECTIONS AND JFM AREAS

Felling Series and Annual Coupes: The entire area of this working circle has been divided into 32 felling Series with an average area of 1613 ha and each felling series is further divided into 20 coupes with an average area of 56 ha. Felling cycle is fixed at 20 years. The details of annual coupes are given in **Appendix No. XXII (A) and XXII (B)**.

2.5 BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAPS)

A total of 134 compartments are allotted to this working circle. The details of compartment wise area distribution are given in the table below.

TABLE NO.2.2: COMPARTMENTS ALLOTTED TO SCI WORKING CIRCLE

Sr. No.	Felling Series	Range	Compartments Allotted	Range-wise Allotment of Felling Series Area (ha)	Total Area of the Felling Series
(1)	(2)	(3)	(4)	(5)	(6)
1	Chinchoni	Maregaon	69, 71, 72 70A, 70B	1207.10	1207.10
2	Karanji	Pandharkawda	73, 74	554.42	973.23
		Maregaon	C64, CA63	418.81	
3	Ghordara	Pandharkawda	78, 79, 80, 81	828.87	828.87
4	Kinhala	Pandharkawda	76, 77	689.2	1057.34
		Maregaon	CA61	368.14	
5	Matharjun	Mukutban	29, 30, 31	1018.2	1102.43
		Jamani	633A	84.23	
6	Mudhati	Jamani	47, 621, 49	1048.94	1048.94
7	Mukutban	Jamani	51, 56, 631, 634	806.59	806.59
8	Pawanar	Mukutban	21, 26, 28, 831, 832	890.11	1183.10
		Jamani	48	292.99	
9	Ambezari	Maregaon	40, 625	526.90	1006.86
		Jamani	620, 622	479.96	
10	Botoni	Pandharkawda	68, 645	815.85	999.24
		Jamani	626A 626B 626C	183.39	
11	Chilai	Mukutban	36, 37	616.74	874.93
		Jamani	619	258.19	
12	Dabhadi	Mukutban	32, 33, 618	815.05	919.57
		Jamani	632B	104.52	
13	Durgada	Mukutban	44, 45	791.56	1083.74
		Pandharkawda	46	292.18	
14	Jununi	Jamani	628, 629, 630	674.2	1001.22
		Maregaon	C 70A, C70C	327.02	
15	Khandani	Maregaon	41, 42, 43	952.23	952.23
16	Mahadoli	Jamani	62, 63, 64	839.72	1001.60
		Pandharkawda	65	161.88	
17	Mangurda	Jamani	67	209.22	981.77
		Pandharkawda	644, 646	772.55	
18	Pachpor	Mukutban	34, 35	856.72	1139.60
		Jamani	627	282.88	

Sr. No.	Felling Series	Range	Compartments Allotted	Range-wise Allotment of Felling Series Area (ha)	Total Area of the Felling Series
(1)	(2)	(3)	(4)	(5)	(6)
19	Wadhona	Maregaon	623, 624, 38, C59	893.24	1002.49
		Pandharkawda	CA78	109.25	
20	Pahapl	Parwa	84	402.66	1175.61
		Pandharkawda	647, 648	772.95	
21	Kharoni	Parwa	86, 87, 88	1104.79	1104.79
22	Bori	Jamani	57, 58, 59	1056.23	1181.61
		Parwa	165B	54.07	
		Pandharkawada	643A	71.31	
23	Kegaon	Pandharkawada	61, 121, 122, 123, 640	1138.4	1138.40
24	Arli	Parwa	181, 669, 649A, 649B	831.23	831.23
25	Kurli	Mukutban	C43	208.10	1164.32
		Maregaon	3	328.60	
		Pandharkawda	75	303.11	
		Parwa	CA111, 671	324.51	
26	Manusdhari	Parwa	180, CA110, 666, 667, 668, 821	1127.96	1127.96
27	Patapangra	Parwa	176, 178, 179, 165A	954	1035.77
		Ghatanji	908	81.77	
28	Sayatkharda	Parwa	903, 641, 163, 177	1117.21	1117.21
29	Machindra	Parwa	82, 663	736.12	1327.29
		Maregaon	2	317.27	
		Pandharkawada	858	110	
		Ghatanji	220	163.9	
30	Sakhara	Ghatanji	224, 229, 556, 223	1583.2	1583.20
31	Kopra	Ghatanji	231, 210, 211, 230, 226	1723.96	1723.96
32	Undarni	Ghatanji	238, 241, 237, 221, 236	1922.75	1922.75
Total				35604.95	35604.95

2.6 SPECIAL OBJECTIVES OF MANAGEMENT

The special objects of management include:

1. To gradually replace coppice teak crop with high forest of seed origin by encouraging establishment of natural regeneration.

2. To increase the stocking of the miscellaneous species.
3. To obtain medium to large sized timber by utilizing the full potential of the site.
4. Encouraging natural regeneration assisted by artificial regeneration by introducing selected germ plasm.
5. To maintain and improve adequate soil cover in the forest areas by taking up intensive soil and moisture conservation measures on watershed basis.

2.6.1 ANALYSIS OF THE CROP

Analysis of enumeration data is provided in the following tables:

TABLE NO.2.3: TREE DENSITY OF TEAK AND NON-TEAK SPECIES IN SCI WORKING CIRCLE

Sr. No.	Girth Class (cm)	Teak			Non-teak			Total	
		No. of trees per Ha.	% w.r.t. Total Teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Non-Teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Stock
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	31-45	45.13	26 %	16 %	38.84	36 %	14 %	83.97	29
2	46-60	42.75	24 %	15 %	25.44	23 %	9 %	68.19	24
3	61-75	40.11	23 %	14 %	15.01	14 %	5 %	55.13	19
4	76-90	25.72	15 %	9 %	10.79	10 %	4 %	36.52	13
5	91-105	13.23	8 %	5 %	7.96	7 %	3 %	21.19	7
6	106-120	6.12	3 %	2 %	5.21	5 %	2 %	11.33	4
7	121-135	2.10	1 %	1 %	2.24	2 %	1 %	4.33	2
8	136-150	0.79	0 %	0 %	2.01	2 %	1 %	2.80	1
9	>151	0.42	0 %	0 %	1.44	1 %	1 %	1.87	1
Total		176.37	100 %	62 %	108.95	100 %	38 %	285.33	100

TABLE NO 2.4: SPECIES-WISE TREE DENSITY (NO. OF TREES/HA.) IN SCI WORKING CIRCLE

Species	Girth-class wise classification in cms									
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	Total
Group A: Species of General Utility										
Teak	45.13	42.75	40.11	25.72	13.23	6.12	2.10	0.79	0.42	176.37
Ain	1.16	1.10	1.27	1.33	1.36	0.93	0.34	0.28	0.14	7.93
Lendia	3.65	2.24	1.05	0.23	0.23	0.06	0.03	0.03	0.00	7.51
Bibla	0.03	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.06	0.14
Total	49.97	46.09	42.46	27.28	14.84	7.11	2.46	1.10	0.62	191.95
Group B: Species of Special Utility										
Salai	0.14	0.11	0.37	0.23	0.28	0.65	0.31	0.34	0.34	2.78
Hiwar	0.48	0.17	0.11	0.06	0.06	0.00	0.03	0.00	0.03	0.93
Moin	0.08	0.20	0.40	0.57	0.45	0.23	0.34	0.20	0.11	2.58
Bherra	1.42	0.82	0.68	0.59	0.51	0.20	0.03	0.03	0.00	4.28
Dhawada	0.59	0.96	0.88	1.87	1.44	0.88	0.20	0.31	0.06	7.20
Garadi	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
Haldu	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.03	0.11
Kalamb	0.08	0.06	0.03	0.03	0.17	0.03	0.06	0.14	0.00	0.59
Karai	0.00	0.03	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.08
Khair	0.37	0.31	0.20	0.14	0.08	0.06	0.03	0.00	0.00	1.19
Kudai	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Sawar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Shiwan	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Total	3.26	2.72	2.66	3.51	3.03	2.10	0.99	1.05	0.59	19.92
Group C: Species of Minor Forest Produce										
Apta	0.08	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.20
Behada	0.62	0.42	0.11	0.23	0.23	0.08	0.06	0.06	0.00	1.81
Bel	0.06	0.11	0.08	0.03	0.03	0.03	0.00	0.00	0.00	0.34
Biba	0.14	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.20
Char	0.37	0.20	0.14	0.06	0.03	0.03	0.00	0.00	0.00	0.82
Chinch	0.03	0.00	0.00	0.00	0.08	0.06	0.03	0.06	0.06	0.31
Moha	0.17	0.23	0.06	0.14	0.28	0.59	0.20	0.11	0.40	2.18
Neem	0.34	0.28	0.08	0.00	0.08	0.06	0.00	0.06	0.03	0.93
Palas	19.21	13.23	7.45	4.28	1.64	0.54	0.17	0.03	0.06	46.60
Shiras	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Tendu	4.31	1.93	0.93	0.42	0.23	0.06	0.00	0.06	0.00	7.93
Total	25.33	16.52	8.92	5.18	2.61	1.44	0.45	0.37	0.54	61.36

Species	Girth-class wise classification in cms									
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	Total
Group D: Other Species										
Aal	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Ajan	0.00	0.00	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.08
Alai	0.31	0.14	0.03	0.00	0.03	0.03	0.03	0.00	0.00	0.57
Amti	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.06
Anjan	0.00	0.03	0.00	0.03	0.06	0.20	0.08	0.00	0.03	0.42
Babhul	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Bahawa	0.76	0.40	0.25	0.00	0.00	0.00	0.00	0.00	0.00	1.42
Bharati	0.28	0.20	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.51
Chandu Kowara	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Chichwa	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.06
Dhaman	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Dudhakula	2.49	1.08	0.23	0.14	0.06	0.08	0.00	0.00	0.00	4.08
Ghoti	0.17	0.08	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.31
Girikunj	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Haladbhera	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Kalmi	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Koti	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03
Kuda	0.08	0.08	0.03	0.00	0.06	0.06	0.03	0.00	0.00	0.34
Lokhandi	0.06	0.03	0.11	0.03	0.03	0.00	0.00	0.00	0.00	0.25
Medsing	0.06	0.00	0.00	0.00	0.06	0.03	0.00	0.06	0.00	0.20
Movai	0.03	0.00	0.11	0.11	0.17	0.17	0.08	0.11	0.00	0.79
Pakali	0.03	0.06	0.00	0.00	0.06	0.00	0.00	0.00	0.03	0.17
Pimpal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Rohan	0.40	0.28	0.06	0.14	0.06	0.06	0.11	0.06	0.00	1.16
Satpuda	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03
Sehna	0.62	0.37	0.14	0.03	0.03	0.00	0.06	0.00	0.00	1.25
Sewdor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.06
Sisoo	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03
Surya	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Total	5.41	2.86	1.08	0.54	0.71	0.68	0.42	0.28	0.11	12.10
Grand Total	83.97	68.19	55.13	36.52	21.19	11.33	4.33	2.80	1.87	285.33

Regeneration:

Data on regeneration status was collected along with enumeration of the crop. The seedlings were enumerated in the following three categories as R1 upto 1 m height, R2 with 1 to 3 m height and R3 above 3 m height. The data is analyzed and used to devise prescriptions for natural and artificial regeneration of forest areas. The status of natural regeneration in SCI areas is poor. The total number of seedlings is 26.30/ha. The table of regeneration is given below:

TABLE NO.2.5: REGENERATION STATUS IN SCI WORKING CIRCLE

Sr. No.	Range	No. of sample plots	No of seedlings/ha			Total
			R1	R2	R3	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Ghatanji	51	6.88	2.29	0.75	9.92
2	Jamni	61	39.02	1.66	4.28	44.95
3	Maregaon	42	3.33	0.00	0.00	3.33
4	Mukutban	40	32.95	2.83	2.18	37.95
5	Pandharkawada	66	22.58	7.36	2.82	46.39
6	Parwa	71	9.39	1.62	0.18	11.20
7	Wani	13	21.92	0.00	0.00	21.92
Weighted Average			19.28	2.71	1.70	26.30

2.6.2 SILVICULTURAL SYSTEM

The silvicultural system is aimed at harvesting matured trees and carrying out improvement felling for removal of malformed trees. The teak species constitutes 62% of the total tree density. However, miscellaneous species have not shown substantial increase in composition of the crop. Teak trees of coppice origin would be felled on priority to replace age old coppice trees with teak trees of seed origin. There would be no felling of non-teak species. Silvicultural operations like CBO, thinning and cleaning are included in this system. Thinning would also be carried out to decongest natural regeneration pole crop. Natural regeneration will be given suitable treatments to regenerate the area. Areas which are poor in natural regeneration will be

supplemented by artificial regeneration to increase productivity and density of the crop. Soil and moisture conservation works would also be taken up on watershed basis to protect and improve soil and water regime.

The SCI being a conservative system has been applied to preserve and improve the ecological status of the forest in general. So, the silvicultural system adopted is aimed at protecting and tending the seedling regeneration while creating desirable gaps to increase natural regeneration by harvesting mature trees as per silvicultural principles.

2.6.3 ROTATION PERIOD: As per the silvicultural system adapted.

2.6.4 HARVESTABLE GIRTH

As felling is restricted to only teak trees, harvestable girth is prescribed for teak alone. In Rai's Plan, the harvestable girth for site quality III is fixed at 120 cm for seed origin and 75 cms for coppice origin, while the harvestable girth for site quality IV is prescribed as 105 cm for seed origin and 75 cm for coppice origin.

During preparation of this plan, stem analysis was carried out to ascertain harvestable selection girth for teak seed origin and coppice origin respectively, which shown different trends in intersection of CAI and MAI. In case of coppice origin, stem analysis reveals that CAI and MAI intersects at 53 years having girth of 83 cm at breast height in site quality III, where as in site quality IV CAI and MAI intersects at 64 years represents 84 cm Girth at breast height. Therefore, it is convenient to prescribe selection harvestable girth 75 cm at breast height in site quality III and IV for coppice origin. In case of teak seed origin CAI intersects at 84 years represents 128 cm girth breast height in site quality III and at 91 years represents 111 cm girth breast height in site quality IV. Hence selection exploitable girth for seed origin teak should be 120 cm girth at breast height in site quality III and would be 105 cm girth at breast height for site quality IV.

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

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

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

2.6.5: REDUCING FACTORS AND REDUCED AREAS: Not Applicable.

2.6.6: FELLING CYCLE: Felling cycle has been fixed at 20 years.

2.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB): Not applicable.

2.6.8 CALCULATION OF THE YIELD

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

- (i) The number of trees in Class I (Exploitablegirth 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 $Y_2, Y_3, \dots$ year_s 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.,

$$(S_2 + S_3 + \dots) / (Y_2 + Y_3 + \dots) = S / Y \text{ is say } R.$$

- (vi) The felling cycle adopted is f years and
- (vii) The accruing average annual recruitment during the 1st, 2nd, Cycles is R' , R'' , ... , so that the recruitments, accruing in successive cycles, i.e. $f R'$, $f R''$, ... 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} , ... 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.

2.6.8.1: REGULATION OF YIELD OF TEAK COPPICE TREES IN SQ III

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

Table No. 2.6: Details of no. of trees per ha in forests under SCI WC

Girth class	Total teak trees	Non-Teak trees	No. of trees of coppice origin (60%)	No. of trees of seed origin (40%)
1	2	3	4	5
31-45	45.13	38.84	27.08	18.05
46-60	42.75	25.44	25.65	17.10
61-75	40.11	15.01	24.07	16.05
76-90	25.72	10.79	15.43	10.29
91-105	13.23	7.96	7.94	5.29
106-120	6.12	5.21	3.67	2.45
121&up	3.31	5.69	1.99	1.33
Total	176.37	108.95	105.83	70.55

In table above, details of teak and non-teak trees per hectare are given based on enumeration data 2023. As the forests were repeatedly worked under CWR system previously, the crop has considerable stock of coppice origin.

Table No. 2.7: Details of period required by teak trees of coppice origin to shift to next higher girth class (Site quality III)

Class	Girth class (cm)	Period required by teak trees to switchover to next higher girth class (years)	Corresponding symbol representing period to switchover to next higher girth class (years)
A	B	C	D
	> 91	--	--
I	76-90	--	--
II	61-75	11	Y ₂
III	46-60	9	Y ₃
IV	31-45	6	Y ₄
Total period:		26	Y

The period required by teak trees of coppice origin to switchover to next higher girth class is worked out based on stem analysis data. For example, teak trees of 31 cm girth at bh (diameter 9.6 cm) will take 10 years to attain that diameter. Teak trees of 46 cm girth (diameter 14.6 cm) will take 16 years for attaining that diameter. Therefore, the number of years teak trees remain in 31-45 girth is 6 years (16 - 10 = 6).

The same principle can be applied to all girth classes to know the period (years) taken by teak trees to switchover to next higher girth class. In the above table in column A, class I symbol is given for the teak trees in girth class of harvestable girth and above, based on enumeration data. Next lower girth is named as class – II and next girth class – III and so on.

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

Table No. 2.8: Details of Trees Available in different girth classes for Harvesting per Ha.

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	13.60	--	--	--	--
I	76-90	15.43	--	--	--	--
II	61-75	24.07	64 %	x_2	15.43	S_2
III	46-60	25.65	60 %	x_3	15.43	S_3
IV	31-45	27.08	57 %	x_4	15.43	S_4
	Total	105.83			46.29	S

In the table above, in column C the number of trees present in a girth class is given based on enumeration data. The trees in class I of 76-90 and above girth class are not considered here because the trees in this girth class are above harvestable girth and it is the stock in hand for harvesting. In column D percentage of trees available as a class-I in future are given based on the number of trees to be available in Column C. As the total number of class-II trees above harvestable girth are 15.43 (75-90 girth class) which means that out of 24.07 trees in class II, 15.43 trees will switch over to above harvestable girth and the percentage is 64 %. 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 (26 years) the total recruitment is S, the mean yearly recruitment R is S/Y ,

$$R = 46.29 / 26$$

$$= 1.78 \text{ per ha.}$$

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.

Table No. 2.9: Details of Teak Trees – Annual Recruitment to next girth class per ha.

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	13.60	--			
I	76-90	15.43	--			
II	61-75	24.07	11	Y_2	1.40	R_2
III	46-60	25.65	9	Y_3	1.71	R_3
IV	31-45	27.08	6	Y_4	2.57	R_4
	Total	105.83	26	Y	--	R

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

There is stock in hand of 29.03 trees/ha (class-I) and there will be recruitment of 46.29 trees/ha in 26 years and thus theoretically annual yield is : $(46.29 + 29.03) \div 26 = 2.90$ 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.

Table No.2.10: 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	29.03	$\frac{1}{2}R_2 = 0.70$	$19R_2 + \frac{1}{2}R_3 = 27.46$
2	II	1	2	29.03	$R_2 + \frac{1}{2} R_2 = 2.10$	$18R_2 + \frac{1}{2}R_2 = 25.90$
3	III	1	3	29.03	$2R_2 + \frac{1}{2} R_2 = 3.50$	$17R_2 + \frac{1}{2}R_2 = 24.50$
4	IV	1	4	29.03	$3R_2 + \frac{1}{2} R_2 = 4.90$	$16R_2 + \frac{1}{2}R_2 = 23.10$
5	V	1	5	29.03	$4R_2 + \frac{1}{2} R_2 = 6.30$	$15R_2 + \frac{1}{2}R_2 = 21.70$
6	VI	1	6	29.03	$5R_2 + \frac{1}{2} R_2 = 7.70$	$14R_2 + \frac{1}{2}R_2 = 20.30$
7	VII	1	7	29.03	$6R_2 + \frac{1}{2} R_2 = 9.10$	$13R_2 + \frac{1}{2}R_2 = 18.90$
8	VIII	1	8	29.03	$7R_2 + \frac{1}{2} R_2 = 10.50$	$12R_2 + \frac{1}{2}R_2 = 17.50$
9	IX	1	9	29.03	$8R_2 + \frac{1}{2} R_2 = 11.90$	$11R_2 + \frac{1}{2}R_2 = 16.10$
10	X	1	10	29.03	$9R_2 + \frac{1}{2} R_2 = 13.30$	$10R_2 + \frac{1}{2} R_2 = 14.70$
11	XI	1	11	29.03	$10R_2 + \frac{1}{2} R_2 = 14.70$	$9R_2 + \frac{1}{2} R_2 = 13.30$
12	XII	1	12	29.03	$11R_2 + \frac{1}{2}R_2 = 16.10$	$8R_2 + \frac{1}{2} R_2 = 11.90$
13	XIII	1	13	29.03	$12R_2 + \frac{1}{2}R_2 = 17.50$	$7R_2 + \frac{1}{2} R_2 = 10.50$
14	XIV	1	14	29.03	$13R_2 + \frac{1}{2}R_2 = 18.90$	$6R_2 + \frac{1}{2} R_2 = 9.10$
15	XV	1	15	29.03	$14R_2 + \frac{1}{2}R_2 = 20.30$	$5R_2 + \frac{1}{2} R_2 = 7.70$
16	XVI	1	16	29.03	$15R_2 + \frac{1}{2}R_2 = 21.70$	$4R_2 + \frac{1}{2} R_2 = 6.30$
17	XVII	1	17	29.03	$16R_2 + \frac{1}{2}R_2 = 23.10$	$3R_2 + \frac{1}{2} R_2 = 4.90$
18	XVIII	1	18	29.03	$17R_2 + \frac{1}{2}R_2 = 24.50$	$2R_2 + \frac{1}{2} R_2 = 3.50$
19	XIX	1	19	29.03	$18R_2 + \frac{1}{2}R_2 = 25.90$	$R_2 + \frac{1}{2} R_2 = 2.10$
20	XX	1	20	29.03	$19R_2 + \frac{1}{2}R_3 = 27.46$	$\frac{1}{2}R_2 = 0.70$
	Total	20		580.60	280.16	280.16
			Average	29.03	14.01	14.01

Thus, overall average number of coppice trees per ha above selection girth per year
 $= 29.03 + 14.01 + 14.01$
 $= 57.05$

Out of which available for selection felling per year $= 29.03 + 14.01$
 $= 43.04$

Percentage removal $= 43.04 \div 57.05$
 $= 75.44\%$

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

Accordingly average number of trees to be harvested for felling on average per ha annually (37.72% of 43.04) = 16.23, say 16 trees per ha.

Volume conversion factor of teak trees in girth class 76-90 for timber = 0.202 m^3 (for Pandharkawada Range)

Average annual yield per hectare $(16 \times 0.202) = 3.23 \text{ m}^3$

2.6.8.2: REGULATION OF YIELD OF TEAK COPPICE TREES IN SQ IV

Harvestable girth is fixed at 75 cm (GBH). The numbers of coppice teak trees per hectare are given in the table below.

Table No.2.11: Details of no. of trees per ha in forests under SCI WC

Girth class	Total teak trees	Non-Teak trees	No. of trees of coppice origin (60%)	No. of trees of seed origin (40%)
1	2	3	4	5
31-45	45.13	38.84	27.08	18.05
46-60	42.75	25.44	25.65	17.10
61-75	40.11	15.01	24.07	16.05
76-90	25.72	10.79	15.43	10.29
91-105	13.23	7.96	7.94	5.29
106-120	6.12	5.21	3.67	2.45
121&up	3.31	5.69	1.99	1.33
Total	176.37	108.95	105.83	70.55

In table above, details of teak and non-teak trees per hectare are given based on enumeration data 2023. As the forests were repeatedly worked under CWR system previously, the crop has considerable stock of coppice origin.

Table No.2.12 Details of period required by teak trees of coppice origin to shift to next higher girth class (Site quality IV)

Class	Girth class (cm)	Period required by teak trees to switchover to next higher girth class (years)	Corresponding symbol representing period to switchover to next higher girth class (years)
A	B	C	D
	> 91	--	--
I	76-90	--	--
II	61-75	13	Y ₂
III	46-60	11	Y ₃
IV	31-45	9	Y ₄
Total period		33	Y

The period required by teak trees of coppice origin to switchover to next higher girth class is worked out based on stem analysis data. In the above table in column A, class I symbol is given for the teak trees in girth class of harvestable girth and above, based on enumeration data. Next lower girth is named as class – II and next girth class – III and so on.

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

Table No. 2.13: Details of Trees Available in different girth classes for Harvesting per ha

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	13.60	--	--	--	--
I	76-90	15.43	--	--	--	--
II	61-75	24.07	64 %	x ₂	15.43	S ₂
III	46-60	25.65	60 %	x ₃	15.43	S ₃
IV	31-45	27.08	57 %	x ₄	15.43	S ₄
	Total	105.83			46.29	S

In the table above, in column C the number of trees present in a girth class is given based on enumeration data. The trees in class I of 76-90 and above girth class are not considered here because the trees in this girth class are above harvestable girth and it is the stock in hand for harvesting. In column D percentage of trees available as a class-I in future are given based on the number of trees to be available in Column C. As the total number of class-II trees above harvestable girth are 15.43 (75-90 girth class) which means that out of 24.07 trees in class II, 15.43 trees will switch over to above harvestable girth and the percentage is 64 %. In column E the symbol x_2 , x_3 etc is given for the percentage of trees available as class I in future corresponding to the column D. In column G, symbol S_2 , S_3 etc is given for number of trees available as class-I in future from each girth class (class-III, class-IV, class-V) as given in column F. In column G at the bottom S indicates the total number of trees available as class I in future from all girth classes.

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

$$R = 46.29 / 33$$

$$= 1.40 \text{ per ha.}$$

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.

Table No.2.14: Details of Teak Trees Annual Recruitment to next girth class per ha

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	13.60	--			
I	76-90	15.43	--			
II	61-75	24.07	13	Y_2	1.19	R_2
III	46-60	25.65	11	Y_3	1.40	R_3
IV	31-45	27.08	9	Y_4	1.71	R_4
	Total	105.83	33	Y	--	R

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

There is stock in hand of 29.03 trees/ha (class- I) and there will be recruitment of 46.29 trees/ha in 33 years and thus theoretically annual yield is : $(46.29 + 29.03)/33 = 2.28$ 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.

Table No.2.15: Number of trees available for harvesting per ha, for 20 year felling cycle

Sr. no.	Coupe no.	For coupe area in ha	Nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-1/2) R_2$	Accruing Recruitment=
1	I	1	1	29.03	$\frac{1}{2}R_2 = 0.70$	$19R_2 + \frac{1}{2}R_3 = 27.46$
2	II	1	2	29.03	$R_2 + \frac{1}{2} R_2 = 2.10$	$18R_2 + \frac{1}{2}R_2 = 25.90$
3	III	1	3	29.03	$2R_2 + \frac{1}{2} R_2 = 3.50$	$17R_2 + \frac{1}{2}R_2 = 24.50$
4	IV	1	4	29.03	$3R_2 + \frac{1}{2} R_2 = 4.90$	$16R_2 + \frac{1}{2}R_2 = 23.10$
5	V	1	5	29.03	$4R_2 + \frac{1}{2} R_2 = 6.30$	$15R_2 + \frac{1}{2}R_2 = 21.70$
6	VI	1	6	29.03	$5R_2 + \frac{1}{2} R_2 = 7.70$	$14R_2 + \frac{1}{2}R_2 = 20.30$

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=
7	VII	1	7	29.03	$6R_2 + \frac{1}{2} R_2 = 9.10$	$13R_2 + \frac{1}{2} R_2 = 18.90$
8	VIII	1	8	29.03	$7R_2 + \frac{1}{2} R_2 = 10.50$	$12R_2 + \frac{1}{2} R_2 = 17.50$
9	IX	1	9	29.03	$8R_2 + \frac{1}{2} R_2 = 11.90$	$11R_2 + \frac{1}{2} R_2 = 16.10$
10	X	1	10	29.03	$9R_2 + \frac{1}{2} R_2 = 13.30$	$10R_2 + \frac{1}{2} R_2 = 14.70$
11	XI	1	11	29.03	$10R_2 + \frac{1}{2} R_2 = 14.70$	$9R_2 + \frac{1}{2} R_2 = 13.30$
12	XII	1	12	29.03	$11R_2 + \frac{1}{2} R_2 = 16.10$	$8R_2 + \frac{1}{2} R_2 = 11.90$
13	XIII	1	13	29.03	$12R_2 + \frac{1}{2} R_2 = 17.50$	$7R_2 + \frac{1}{2} R_2 = 10.50$
14	XIV	1	14	29.03	$13R_2 + \frac{1}{2} R_2 = 18.90$	$6R_2 + \frac{1}{2} R_2 = 9.10$
15	XV	1	15	29.03	$14R_2 + \frac{1}{2} R_2 = 20.30$	$5R_2 + \frac{1}{2} R_2 = 7.70$
16	XVI	1	16	29.03	$15R_2 + \frac{1}{2} R_2 = 21.70$	$4R_2 + \frac{1}{2} R_2 = 6.30$
17	XVII	1	17	29.03	$16R_2 + \frac{1}{2} R_2 = 23.10$	$3R_2 + \frac{1}{2} R_2 = 4.90$
18	XVIII	1	18	29.03	$17R_2 + \frac{1}{2} R_2 = 24.50$	$2R_2 + \frac{1}{2} R_2 = 3.50$
19	XIX	1	19	29.03	$18R_2 + \frac{1}{2} R_2 = 25.90$	$R_2 + \frac{1}{2} R_2 = 2.10$
20	XX	1	20	29.03	$19R_2 + \frac{1}{2} R_3 = 27.46$	$\frac{1}{2} R_2 = 0.70$
	Total	20		580.60	238.11	238.11
			Average	29.03	11.91	11.91

Thus overall average number of coppice trees per ha above selection girth per year
 $= 29.03 + 11.91 + 11.91$
 $= 52.84$

Out of which available for selection felling per year $= 29.03 + 11.91$
 $= 40.94$

Percentage removal $= 40.94 \div 52.84$
 $= 77.47 \%$

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

Accordingly average number of trees to be harvested for felling on average per ha annually $(38.73\% \text{ of } 40.94) = 15.86$, say 16 trees per ha.

Volume conversion factor of teak trees in girth class 76-90 for timber = 0.162 m^3 (for Jamni Range)

Average annual yield per hectare (16×0.162) = 2.59 m^3

2.6.8.3: REGULATION OF YIELD OF TEAK SEED TREES IN SQ III

Harvestable girth is fixed at 120 cm (GBH). As stated earlier the stock of teak trees of seed origin is relatively less in view of the fact that the forest area was repeatedly worked under coppice system during previous WP. For the purpose of calculation of yield it is assumed that the seed origin teak stock is about 40% of the total teak crop. The details of teak trees in various girth classes are given below.

Table No.2.16: 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	3.31	1.33	-	
II	106-120	6.12	2.45	14	Y_2
III	91-105	13.23	5.29	12	Y_3
IV	76-90	25.72	10.29	11	Y_4
V	61-75	40.11	16.05	10	Y_5
VI	46-60	42.75	17.1	9	Y_6
VII	31-45	45.13	18.05	6	Y_7
	Total	176.37	70.56	62	y

Table No.2.17: 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	1.33	-	-	-	-
II	106-120	2.45	54 %	X ₂	1.33	S ₂
III	91-105	5.29	25 %	X ₃	1.33	S ₃
IV	76-90	10.29	13 %	X ₄	1.33	S ₄
V	61-75	16.05	8 %	X ₅	1.33	S ₅
VI	46-60	17.1	8 %	X ₆	1.33	S ₆
VII	31-45	18.05	7 %	X ₇	1.33	S ₇
	Total	70.56			7.98	S

Table No.2.18: Details of teak trees - annual recruitment to next girth class per ha is given below

class	girth class in cm	no. of trees per ha.	years in class	symbol for corresponding figures in column D	annual recruitment to next class	symbol for corresponding figures in column F
A	B	C	D	E	F	G
I	121 & above	1.33	-	-	-	-
II	106-120	2.45	14	Y ₂	0.10	R ₂
III	91-105	5.29	12	Y ₃	0.11	R ₃
IV	76-90	10.29	11	Y ₄	0.12	R ₄
V	61-75	16.05	10	Y ₅	0.13	R ₅
VI	46-60	17.1	9	Y ₆	0.15	R ₆
VII	31-45	18.05	6	Y ₇	0.22	R ₇
	Total	70.56	62	Y	--	R

Table No.2.19: Calculation of yield number of trees per ha for 20 years 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	1.33	$\frac{1}{2}R_2 = 0.05$	$19R_2+\frac{1}{2}R_3 = 1.96$
2	II	1	2	1.33	$R_2 + \frac{1}{2} R_2 = 0.15$	$18R_2+\frac{1}{2}R_2 = 1.85$
3	III	1	3	1.33	$2R_2 + \frac{1}{2} R_2 = 0.25$	$17R_2+\frac{1}{2}R_2 = 1.75$
4	IV	1	4	1.33	$3R_2 + \frac{1}{2} R_2 = 0.35$	$16R_2+\frac{1}{2}R_2= 1.65$
5	V	1	5	1.33	$4R_2 + \frac{1}{2} R_2 = 0.45$	$15R_2+\frac{1}{2}R_2 = 1.55$
6	VI	1	6	1.33	$5R_2 + \frac{1}{2} R_2 = 0.55$	$14R_2+\frac{1}{2}R_2 = 1.45$
7	VII	1	7	1.33	$6R_2 + \frac{1}{2} R_2 = 0.65$	$13R_2+\frac{1}{2}R_2 = 1.35$
8	VIII	1	8	1.33	$7R_2 + \frac{1}{2} R_2 = 0.75$	$12R_2+\frac{1}{2}R_2 = 1.25$
9	IX	1	9	1.33	$8R_2 + \frac{1}{2} R_2 = 0.85$	$11R_2+\frac{1}{2}R_2 = 1.15$
10	X	1	10	1.33	$9R_2 + \frac{1}{2} R_2 = 0.95$	$10R_2+\frac{1}{2} R_2 = 1.05$
11	XI	1	11	1.33	$10R_2+\frac{1}{2} R_2 = 1.05$	$9R_2 + \frac{1}{2} R_2 = 0.95$
12	XII	1	12	1.33	$11R_2+\frac{1}{2}R_2 = 1.15$	$8R_2 + \frac{1}{2} R_2 = 0.85$
13	XIII	1	13	1.33	$12R_2+\frac{1}{2}R_2 = 1.25$	$7R_2 + \frac{1}{2} R_2 = 0.75$
14	XIV	1	14	1.33	$13R_2+\frac{1}{2}R_2 = 1.35$	$6R_2 + \frac{1}{2} R_2 = 0.65$
15	XV	1	15	1.33	$14R_2+\frac{1}{2}R_2 = 1.45$	$5R_2 + \frac{1}{2} R_2 = 0.55$
16	XVI	1	16	1.33	$15R_2+\frac{1}{2}R_2 = 1.55$	$4R_2 + \frac{1}{2} R_2 = 0.45$
17	XVII	1	17	1.33	$16R_2+\frac{1}{2}R_2= 1.65$	$3R_2 + \frac{1}{2} R_2 = 0.35$
18	XVIII	1	18	1.33	$17R_2+\frac{1}{2}R_2 = 1.75$	$2R_2 + \frac{1}{2} R_2 = 0.25$
19	XIX	1	19	1.33	$18R_2+\frac{1}{2}R_2 = 1.85$	$R_2 + \frac{1}{2} R_2 = 0.15$
20	XX	1	20	1.33	$19R_2+\frac{1}{2}R_3 = 1.96$	$\frac{1}{2}R_2 = 0.05$
	Total	20		26.60	20.01	20.01
			Average	1.33	1.00	1.00

Average no. of trees per ha above harvestable girth of 120 cm = $1.33+1.00+1.00$
= 3.33

$$\begin{aligned}
 \text{Average no. of trees available for selection felling per ha} &= 1.33 + 1.00 \\
 &= 2.33 \\
 \text{Percentage removal} &= \frac{2.33 \times 100}{3.33} \\
 &= 70 \%
 \end{aligned}$$

Following the guidelines of GOI for removal of 50% of normal yield, the average annual yield (no. of trees) per ha = 35% of 2.33

$$= 0.82 \text{ trees per ha, or say 1 tree per two hectares}$$

Volume conversion factor of teak for girth class 121-135 (Pandharkawada Range):
0.634 m³

$$\text{Average annual yield (volume) per ha} = 0.436 \times 0.5 = 0.32 \text{ m}^3$$

2.6.8.4: REGULATION OF YIELD OF SEED COPPICE TREES IN SQ IV

Harvestable girth is fixed at 105 cm (GBH). As stated earlier the stock of teak trees of seed origin is relatively less in view of the fact that the forest area was repeatedly worked under coppice system during previous WP. For the purpose of calculation of yield it is assumed that the seed origin teak stock is about 40% of the total teak crop. The details of teak trees in various girth class is given below.

Table No.2.20 : Details of teak stock, period required by trees to switchover to next girth class per ha

class	girth class (cm)	total no. of trees per ha as per enumeration data	40% total no. of trees of seed origin per ha. out of trees in col 3	years required to shift to next girth class (seed origin)	Corresponding symbol for figures in col.5
1	2	3	4	5	6
I	120 & Above	3.31	1.33	-	-
II	106-120	6.12	2.45		Y ₁
III	91-105	13.23	5.29	16	Y ₂
IV	76-90	25.72	10.29	14	Y ₃
V	61-75	40.11	16.05	11	Y ₄
VI	46-60	42.75	17.1	09	Y ₅
VII	31-45	45.13	18.05	08	Y ₆
	Total	176.37	70.56	58	Y

Table No.2.21: 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	1.33	-	-	-	-
II	106-120	2.45	-	-	-	-
III	91-105	5.29	71%	X ₂	3.78	S ₂
IV	76-90	10.29	37%	X ₃	3.78	S ₃
V	61-75	16.05	24%	X ₄	3.78	S ₄
VI	46-60	17.1	22%	X ₅	3.78	S ₅
VII	31-45	18.05	21%	X ₆	3.78	S ₆
	Total	70.56			18.90	S

Table No.2.22: 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	1.33	-	-	-	-
II	106-120	2.45	-	Y ₁	-	R ₁
III	91-105	5.29	16	Y ₂	0.24	R ₂
IV	76-90	10.29	14	Y ₃	0.27	R ₃
V	61-75	16.05	11	Y ₄	0.34	R ₄
VI	46-60	17.1	09	Y ₅	0.42	R ₅
VII	31-45	18.05	08	Y ₆	0.47	R ₆
	Total	70.56	58	Y	--	R

Table No.2.23: Calculation of yield number of trees per ha for 20 years 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	3.78	$\frac{1}{2}R_2 = 0.12$	$19R_2+\frac{1}{2}R_3 = 4.70$
2	II	1	2	3.78	$R_2 + \frac{1}{2} R_2 = 0.36$	$18R_2+\frac{1}{2}R_2 = 4.44$
3	III	1	3	3.78	$2R_2 + \frac{1}{2} R_2 = 0.60$	$17R_2+\frac{1}{2}R_2 = 4.20$
4	IV	1	4	3.78	$3R_2 + \frac{1}{2} R_2 = 0.84$	$16R_2+\frac{1}{2}R_2 = 3.96$
5	V	1	5	3.78	$4R_2 + \frac{1}{2} R_2 = 1.08$	$15R_2+\frac{1}{2}R_2 = 3.72$
6	VI	1	6	3.78	$5R_2 + \frac{1}{2} R_2 = 1.32$	$14R_2+\frac{1}{2}R_2 = 3.48$
7	VII	1	7	3.78	$6R_2 + \frac{1}{2} R_2 = 1.56$	$13R_2+\frac{1}{2}R_2 = 3.24$
8	VIII	1	8	3.78	$7R_2 + \frac{1}{2} R_2 = 1.80$	$12R_2+\frac{1}{2}R_2 = 3.00$
9	IX	1	9	3.78	$8R_2 + \frac{1}{2} R_2 = 2.04$	$11R_2+\frac{1}{2}R_2 = 2.76$
10	X	1	10	3.78	$9R_2 + \frac{1}{2} R_2 = 2.28$	$10R_2+\frac{1}{2} R_2 = 2.52$
11	XI	1	11	3.78	$10R_2+\frac{1}{2} R_2 = 2.52$	$9R_2 + \frac{1}{2} R_2 = 2.28$
12	XII	1	12	3.78	$11R_2+\frac{1}{2}R_2 = 2.76$	$8R_2 + \frac{1}{2} R_2 = 2.04$
13	XIII	1	13	3.78	$12R_2+\frac{1}{2}R_2 = 3.00$	$7R_2 + \frac{1}{2} R_2 = 1.80$
14	XIV	1	14	3.78	$13R_2+\frac{1}{2}R_2 = 3.24$	$6R_2 + \frac{1}{2} R_2 = 1.56$
15	XV	1	15	3.78	$14R_2+\frac{1}{2}R_2 = 3.48$	$5R_2 + \frac{1}{2} R_2 = 1.32$
16	XVI	1	16	3.78	$15R_2+\frac{1}{2}R_2 = 3.72$	$4R_2 + \frac{1}{2} R_2 = 1.08$
17	XVII	1	17	3.78	$16R_2+\frac{1}{2}R_2 = 3.96$	$3R_2 + \frac{1}{2} R_2 = 0.84$
18	XVIII	1	18	3.78	$17R_2+\frac{1}{2}R_2 = 4.20$	$2R_2 + \frac{1}{2} R_2 = 0.60$
19	XIX	1	19	3.78	$18R_2+\frac{1}{2}R_2 = 4.44$	$R_2 + \frac{1}{2} R_2 = 0.36$
20	XX	1	20	3.78	$19R_2+\frac{1}{2}R_3 = 4.70$	$\frac{1}{2}R_2 = 0.12$
	Total	20		75.60	48.02	48.02
			Average	3.78	2.40	2.40

Average no. of trees per ha above harvestable girth of 105 cm = $3.78+2.40+2.40$
= 8.58

Average no. of trees available for selection felling per ha = $3.78+2.40$
= 6.18

Percentage removal = $\frac{6.18 \times 100}{8.58}$
= 72 %

Following the guidelines of GOI for removal of 50% of normal yield, the average annual yield (no. of trees) per ha = 36% of 6.18

= 2.23 trees per ha, say 2 trees per hectare

Volume conversion factor of teak for girth class 105-120 (Mukutban Range)= 0.389

Average annual yield (volume) per ha = 2 x 0.389 = 0.78 m³

Abstract of yield calculation is given below.

TABLE NO. 2.24: EXPECTED YIELD

Unit	Expected Yield in m ³			
	Coppice trees		Seed origin Trees	
	SQ III	SQ IV	SQ III	SQ IV
(1)	(2)	(3)	(4)	(5)
Per Ha.	3.23	2.59	0.32	0.78
Annual average (Assuming 10 % SQ III and 20% D Area)	115.00	829.95	11.39	249.95

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

Local volume conversion table for each range shall be prepared at division level to estimate the yield obtained from the coupe.

2.6.9: TABLE OF FELLING : The abstract of the table of felling is shown in **Appendix No.XXI**

2.6.10: METHOD OF EXECUTING THE FELLING

2.6.10.1: AGENCY OF HARVESTING : Demarcation of coupes and marking of trees for felling will be carried out by the department to meet silvicultural and technical requirements. The felling of trees, logging, and haulage of the felled material will be carried out either by the department or by the Forest Labour Co-operative Society

(FLCS), as per existing Government directives. Silvicultural operations such as cut-back operations, cleaning, thinning, etc., and other regeneration activities after the main felling of the coupes will be carried out by the Forest department.

2.6.10.2: DEMARCATION

The main annual coupes due for felling will be demarcated one year in advance (Coupe No.I was worked during 2023-24 which was Coupe No.XI in previous plan. except coupe number II which shall be demarcated along with Coupe number III) due for working in which demarcation and marking will be carried out in the same year of working. Demarcation and marking will be carried out as per the prescriptions in 'Miscellaneous Regulations' Chapter in Part II of this plan. The coupes will be divided into sections for effective control over various operations like felling, extraction and other treatments. Each section shall not exceed more than 20 ha.

2.6.10.3: PREPARATION OF TREATMENT MAP

After demarcation of the coupes, a treatment map shall be prepared by the RFO and it will be verified by the ACF emphasizing the areas of promising natural regeneration, site suitable for plantation and the area which need soil and moisture conservation works. The treatment map shall be approved by the DCF after having detailed discussion with concerned RFO and ACF and field inspection. The treatment map shall be prepared with proper care and all the features must be shown on the treatment map.

The treatment map shall indicate the following sections:

- 1. Type A- Protection Area :** It shall include the following:
 - i. Areas with steep slopes i.e. more than 25%.
 - ii. 20 m wide strip on either side of perennial water courses (water courses in which water remains till month of December).
 - iii. Eroded or liable to erosion areas.
 - iv. The area which directly drain into water reservoirs of the irrigation or drinking water projects.

2. Type B - Under stocked area: This includes area with crop density less than 0.4 or total blank areas and the area shall not be less than 2 ha in extent at one place. Under stocked areas can be categorised into 2 types:

- i. B1-type: Open forests (density < 0.4) with natural regeneration.
- ii. B2-type: Open forests (density < 0.4) without natural regeneration.

3. Type C - Areas of old plantations and pole crop: This category includes the patches of pole crop and natural regeneration suitable for retention as future crop of both teak and miscellaneous patches. It also includes old plantations, the extent of which shall be minimum one ha at one place.

4. Type D - Well stocked areas: The areas having crop density more than 0.4 shall be considered as well stocked areas.

Coupe Area and Enumeration: Treatment maps shall be prepared on graph paper in 1:5000 scale. Laying of grids shall be done after demarcation of A, B, C and D type areas. Grids of one hectare shall be laid down. Grids shall be laid down using GIS software such as q-GIS. Grid wise record of enumeration, marking and felling shall be maintained. In the remarks column of marking register, reasons for marking such as mature, teak trees of coppice origin or seed origin, dead, malformed, live high stump, etc. will be recorded. Enumeration of all trees above 15 cm above GBH shall be carried out in D type areas. With respect to teak trees enumeration, the details of seed origin or coppice origin shall be recorded in D type areas. Grid wise details shall be maintained for enumeration.

Treatment: Different types of treatments are prescribed and adopted for these categories of areas are as under:

1. Type A: No felling is prescribed. Harvesting of standing trees (dead or alive) is prohibited in A type areas. Appropriate soil and moisture conservation measures shall be carried out.

2. Type B: Treatments recommended for B-type areas: Preference shall be given to natural regeneration and proper treatment will be given to the crop considering the existence of seedlings or rootstock in the areas. Identification of important valuable

seedlings of seed and coppice origin shoots is essential. Seed based natural regeneration should be marked with red band and seedlings raised from coppice shoots should be marked with yellow band. ACF and RFO shall ensure proper identification. Model estimate for three years for tending of natural regeneration and coppice shoots shall be prepared and approved by competent authority. Plantation register will be maintained in the lines of AR areas. All such sites selected for tending of natural regeneration including rootstock and coppice management shall be geo-referenced on digital maps in the division by taking GPS readings of each grid. These grids may be compared later with satellite imagery of the division for any change in the vegetation cover. A proper record in the form of natural regeneration register should be maintained at the range level and division level regarding all activities of regeneration. Records such as register, number of seedlings identified, cleaned saplings, maps, GPS readings, operations, photographs etc. shall be maintained on a regular basis. All entries should be made in the relevant coupe control forms and compartment history forms. Tending of natural regeneration of valuable species in the B-type will be carried out as follows:

A. Natural regeneration management in B1-type Areas

Following treatments are prescribed for B1-type areas:

Tending of Natural Regeneration (of Seed Origin):All seedlings and saplings (of seed origin) of valuable species, more than 60 cm. in height, will be nursed as future crop. Spacing operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5 metre spacing. Spacing out operation will be in favour of valuable species and species rarely found in the area. Natural regeneration shall be assisted and encouraged by soil working and mulching around them, in the following manner.

a) First Year Operations:Weeds in one-meter diameter around saplings of valuable species shall be cleared during the first week of July. Uprooted weeds, grasses and leaf-litter shall be mixed in the upper layer of soil as the organic mulch and facilitate loosening and aeration of the soil by worms and insects. One soil working shall be carried out in October.

b) Second Year Operations: The soil working in October shall be repeated in the following year. However, one scrap weeding of one-meter diameter shall be carried out in the first week of August around the shoots of seedling coppice within the rootstock management area.

c) Third Year Operations: Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance shall be repeated as third year operations.

Singling of Coppice Shoots: 1 to 2 healthy and promising coppice shoot shall be retained on the stumps and the rest will be removed. Such coppice shoots should also be close enough to the ground so that it will not topple after gaining volume and weight and would be able to subsequently develop root system of its own. However, coppice shoots interfering with promising saplings of seed origin or coppice of valuable species shall be removed.

Coppice Management of Damaged and Malformed Saplings: The saplings and poles of up to 45 cm GBH having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, causing erosion and leading to soil loss. Poles having at least 2.50 meter of clean bole will not be treated as malformed.

B. Artificial Regeneration in B2-Type Areas: Plantations will not be taken up in SCI areas unless a minimum of 5 hectares of clear open patch fit for plantation is available in an annual coupe. The choice of species will be decided as per the site. Teak and valuable mixed local spp. should be given preference in the plantation. Stump planting of Teak should be taken only in well drained areas with clear open patches.

C. Soil and Moisture Conservation Works: Required soil and moisture conservation works will be carried out as per site requirement. Prescriptions in miscellaneous regulations will be followed.

3. Type C: No plantation will be done in these areas. Thinning shall be done in the young pole crop as per the stand table. Marking rules have been mentioned subsequently.

4. Type D: No Plantation will be done in these areas. Felling will be carried out as prescribed under marking rules.

2.6.10.4 MARKING TECHNIQUES

Marking will be done under close supervision of ACF with guidance of DCF concerned. The DCF will himself inspect as many coupes as possible and impart proper guidance and instruct the staff so as to avoid any deviations of the prescription of the treatment.

Marking will be done along with the work of coupe demarcation, one year in advance of the main felling.

Marking technique and prescriptions described in the chapter of the Miscellaneous Regulations shall be followed, with required modifications described in the following paragraphs.

- i. Marking shall be carried out under the close supervision of the RFO and under guidance of ACF concerned. DCF shall inspect the coupes to ensure proper marking and to guard against excessive marking, if any.
- ii. The following rules shall be observed strictly for marking in different types of areas.

Type A: No tree shall be marked for felling.

Type B:

1. All dead and diseased trees shall be marked, retaining 2 dead trees/ha as snags and dens.
2. All live high stumps shall be marked and cut close to the ground.
3. Malformed seedlings shall be cut back. All multiple coppice shoots, retaining one promising shoot, shall be marked.

Type C:

1. All dead, diseased and malformed trees shall be marked.
2. Multiple shoots shall be reduced to 1 per stool retaining the vigorous one.
3. Young poles will be marked for thinning to remove congestion. The spacing between two adjacent poles shall be approximately equal to $1/3^{\text{rd}}$ of the crop height and/or to bring down stem number as per the yield table.
4. Thinning shall be carried out on the silvicultural principles with the help of stand table. The following prescriptions should also be followed for thinning operations.
 - a. Age and site quality of crop shall be ascertained.
 - b. Wedge Prism of suitable factor (generally for young crop, middle aged crop, prism with factor one is convenient) shall be used and basal area per ha of crop is obtained by averaging 3 or 4 counts at various representative sites.
 - c. The basal area as obtained above shall be compared with basal area given in the stand table and if the basal area is more than that of given in stand table for corresponding age and site quality, the crop is suitable for thinning.
 - d. The additional basal area is required to be removed from those girth classes which are having a greater number of trees as compared to the stand table.
 - e. Care should be taken to remove the poles of coppice origin first while retaining the poles of seedling origin.
5. Unwanted undergrowth interfering or likely to interfere with the seed based natural regeneration of Teak and other valuable species shall be removed.

Type D:

1. The marking for felling shall be carried out as per the marking rules.
2. No miscellaneous species including fruit and NTFP shall be marked.
3. All the climbers except those of NTFP values shall be cut.
4. Multiple coppice shoots or poles shall be marked to reduce them to one per stool retaining the most vigorous one.
5. All dead and malformed trees shall be marked for felling leaving 2 dead trees per ha for wildlife. A tree shall be considered as malformed if it does not have clear standing bole exceeding 2.5 metres from ground level. Malformed trees having clear straight bole exceeding 2.5 metres height from ground shall not be marked for felling.
6. The silviculturally available teak trees of coppice origin with harvestable girth of 75 cm at GBH and above shall be marked for felling.
7. A tree is considered silviculturally available when
 - (a) Removal will not lead to soil erosion;
 - (b) Removal shall create appropriate gap for improvement of young seedlings
 - (c) Alternate trees for seed source are available.
8. The silviculturally available teak trees of seed origin with harvestable girth of 120 cm at GBH and above shall be marked for felling.
9. The felling of teak trees shall be from highest girth class to the next lower girth class.
10. The undesirable undergrowth which is preventing or likely to prevent the establishment and growth of seedling regeneration of the desired species will be removed.

Verification of Marking:

- (i) RFO shall carry out marking and shall also certify the marking abstract.
- (ii) ACF concerned shall verify 20% of the marking work. He shall inspect all the coupes to verify marking and shall record his findings and give corrective written instructions.
- (iii) DCF shall inspect 10% of the coupes to verify marking and take corrective measures.
- (iv) CF (T) shall check 2% coupe marking work randomly.

2.6.10.5 SOIL AND MOISTURE CONSERVATION WORKS

The forests of Pandharkawada Division suffered from frequent fires, heavy biotic pressure and excessive cattle movement resulting in compaction of soil, poor soil aeration and poor drainage. These soil conditions are not conducive to establish regeneration. All soil and moisture conservation works shall be carried out on watershed basis. The soil and moisture conservation works shall be taken up along with marking operation and completed before onset of monsoons. The soil and moisture conservation works are to be based on the requirement of site. These works will be taken up after preparation of a detailed treatment map of the area and model of soil and moisture conservation measures duly sanctioned by the competent authority. To bring about conducive site conditions for establishment of seedlings, the soil and moisture conservation like contour trenches, nala bunding, cement plugs etc. can be taken up.

Prescriptions listed in 'Miscellaneous Regulations' Chapter shall be followed for soil and moisture conservation works.

2.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS

CBO: The cut back operations shall be carried out one year after the main felling of the coupes. The following prescriptions are given to carry out these operations.

1. The badly damaged trees during the main felling shall be felled.
2. Cutting of the climbers except those of known medicinal or NTFP value.

3. All left over established multiple coppice shoots and the poles shall be reduced to one per stool.
4. Newly raising multiple teak coppice shoots will be reduced to two per stool retaining the most promising ones.
5. The trees marked for felling but left out during the main felling shall be felled.

Cleaning: It shall be carried out during the 6th year of the main felling as per the following prescriptions.

1. Climbers cutting shall be undertaken except those known for medicinal and NTFP value.
2. Multiple coppice shoots shall be reduced to one or removed if found interfering with the establishment of natural regeneration.
3. The established natural regeneration of teak shall be thinned for appropriate space.
4. All the inferior species including undesirable undergrowth interfering or likely to interfere with growth and development of seedling of teak and other valuable species (Including medicinal and NTFP) shall be cut back.

2.6.12 REGENERATION

Natural Regeneration: The young regeneration of seed origin are noticed in patches of both teak and miscellaneous species and usually die before getting established due to edaphic conditions resulted due to excess biotic pressure and recurrent fires.

To increase the development and establishment of natural regeneration and to induce the natural regeneration, the prescriptions given below shall be followed.

1. The areas with promising natural regeneration shall be identified inside the coupe.
2. The undesirable undergrowth which is preventing or likely to hinder the establishment and development of regeneration of seed origin of the desired species shall be removed.

3. The identification patches of natural regeneration shall be rigidly protected from fire, grazing and other biotic interference.
4. The coppice shoots of both teak and miscellaneous species interfering with the young seedlings shall be removed.
5. The young seedlings shall be treated with soil working and soil mulching in each year in first three years after main felling. The soil and moisture conservation works shall be taken up in such identified patches if needed.
6. The natural regeneration should be cleared of weeds within the diameter of one meter and these weeds, grasses, leaf litter, leaves, twigs and branches will be spread in a 15 cm. high layer all around the seedlings within the cleared area so that it will act as organic mulch. 2 or 3 spade full of soil to each plant shall be added over it to keep it in place. So that it will keep the soil around the plants free from weeds as well as helping proper aeration of the soil by worms and insects. Apart from this, mulching small stones around the current year seedlings shall be arranged in the areas where stones are available.

Artificial Regeneration and Choice of Species

Supplemented with natural regeneration, artificial regeneration is prescribed as per the site requirement. The choice of species shall be based on site conditions. In this context it is preferred to select the species of indigenous, naturally occurring and of proven fodder, fruit, non-wood forest produce. The species shall be selected in consultation with local people or the members of JFMC. Some of indigenous and preferred species are Arjun, Dhawda, Bel, Behada, Bamboo, Chinch, Jamun, Apta, Anjan, Biba, Hirda, Kulu, Shivan, Tiwas, Ber, Amba etc. In general, in the plantations 50% teak and 50% miscellaneous species shall be raised. Bamboo can be planted along the streams. The seedlings so raised from source of seed origin preferably obtained from known source especially from plus trees of high forests.

Method of Planting: In the areas of plantation the spacing may be 2 x 2 mtr. For planting teak stumps alignment and stocking will be carried out and stumps will be planted. For root trainer teak seedlings, pit size of 30 x 30 x 30 cms will be used for planting. Saplings of miscellaneous species will be planted in pits of size of 45 x 45 x 45cm.

Weeding and Casualty Replacement : Three weedings are prescribed in 1st year, 2 weedings in 2nd year and 1 weeding in 3rd year. Casualty replacement, if necessary, shall be carried out in 1st and 2nd year to the extent of 20%. One soil working shall be undertaken in October in the first and second year.

While digging pits, care should be taken not to dig them in the shadow of standing tree or 2 meter of existing established seedlings. The standing trees are having influence zone of spreading shadow and pits should not dig either in the shadow or in the influence zone of a standing tree. Influence zone for various size trees may be taken as given in the table below:

TABLE NO. 2.25 : TABLE SHOWING THE ZONE OF INFLUENCE

Sr. No.	Girth Class (Cm)	Influence Zone (m)
(1)	(2)	(3)
1	<30	2
2	30-60	3
3	60-90	4
4	90-120	5
5	>120	6

2.6.13: ASSOCIATED REGULATIONS AND MEASURES:

Fire Protection:

The main felling coupes shall be fire traced and rigidly protected from fire for a period of 5 years. The fire tracing activities shall be completed by mid-February to avoid fire hazards to standing crop as well as to the natural regeneration. Effective protection against fire shall be undertaken for a period between mid-February to mid-June to ensure survival and establishment of natural regeneration of all species for developing it into the future growing stock.

Grazing:

The coupe of main felling will be closed to grazing till cleaning operations in the 6th year.

CHAPTER 3

AFFORESTATION WORKING CIRCLE

3.1 AFFORESTATION WORKING CIRCLE

The area of this Working Circle has been marked on the GIS based map of 1:150000 which is appended in the plan and a copy of the same is given on A4 size here.

3.2 GENERAL CONSTITUTION OF THE WORKING CIRCLE

This working circle comprises of open forests having density less than 0.4 with sparse vegetation and shrubby growth. The areas were earlier included in Afforestation Working Circle of R. N. Rai's working plan.

3.2.1 AREA ALLOCATION

Forest areas with density of less than 0.4 with inadequate natural regeneration are included in this working circle. The site quality is poor which represents from IV A to IV B. A total of 26996.44 ha is included in this working circle which constitutes 40 % of the division area. The range-wise allocation of compartments and area is shown in the table below:

TABLE NO. 3.1: DISTRIBUTION OF AREA IN AFFORESTATION WORKING CIRCLE

Sr. No.	Range	Total Area (ha) of Range	No. of Compartments allotted to AWC	Area Allotted (ha) to AWC				% to the Area of Range (8/3*100)	% to the Area of WC
				RF	PF	UF	Total Area		
1	2	3	4	5	6	7	8	9	10
1	Ghatanji	7557.63	20	797.46	0	524.53	1321.99	17 %	05 %
2	Jamani	9506.77	29	3100.76	0	84.95	3185.71	34 %	12 %
3	Maregaon	10895.57	28	2920.67	0	0	2920.67	27 %	11 %
4	Mukutban	7611.9	24	3202.53	0	66.37	3268.9	43 %	12 %

Sr. No.	Range	Total Area (ha) of Range	No. of Compartments allotted to AWC	Area Allotted (ha) to AWC				% to the Area of Range (8/3*100)	% to the Area of WC
				RF	PF	UF	Total Area		
1	2	3	4	5	6	7	8	9	10
5	Pandhar kawada	11609.42	71	3656.07	0	991.42	4647.49	40 %	17 %
6	Parwa	9459.43	36	1622.91	0	1525.93	3148.84	33 %	12 %
7	Wani	10416.74	77	8083	0	419.84	8502.84	82 %	31 %
Total		67057.46	285	23383.4	0	3613.04	26996.44	-	100%

3.3 GENERAL CHARACTERISTICS OF VEGETATION

Teak constitutes as the major species along with its principal associates such as Ain, Dhawada, Char, Tendu, Palash etc. in these forest areas. The soil is compact with little or no soil moisture or sub soil moisture and highly impoverished due to heavy grazing pressure. Natural regeneration is poor. The young recruits of Ain, Teak and Dhawada are observed in many compartments but they die back without getting established. Due to heavy grazing, establishment of natural regeneration is inadequate. Special efforts are required to regenerate these areas.

3.4 FELLING SERIES, CUTTING SECTIONS AND JFM AREAS

Felling Series and Annual Coupes: The entire area of this working circle is divided into 21 working Series with an average area of 1285 ha. and each working series is further divided into 20 coupes with an average area of 64 ha. The details of felling series and annual coupes is given in **Appendix No. XXIV (A)** and **Appendix No. XXIV (B)** of Volume-II.

3.5 BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAPS)

A total of 285 compartments are allotted to this working circle. The details of compartment wise area distribution are given in the table below.

TABLE NO.3.2: COMPARTMENTS ALLOTTED TO AFFORESTATION WORKING CIRCLE

Sr. No.	Working Series	Range	Compartments Allotted	Range wise Allotment of Working Series Area (ha)	Total Area of the Working Series (ha)
(1)	(2)	(3)	(4)	(5)	(6)
1	Ardhawan	Jamani	633B,C89, C90A, C90B, C91, C92A, C92B, C93, C94, C95, CA91	1034.34	1167.07
		Mukutban	20 B	132.73	
2	Chichghat	Maregaon	C51B, 39, C70 B	467.35	1364.53
		Mukutban	17B, C33B, C34A, C34B, C69	364.39	
		Wani	C49	532.79	
3	Hirpur	Mukutban	C28C, C29A, C29B, C30, C31A, C31B, C26, C27, C33A,834	1441.42	1441.42
4	Jamani	Mukutban	C24A, C24B, C25	362.81	1222.24
		Wani	C18, C20, C21, C23A, C23B,881	859.43	
5	Khairi	Pandharkawda	120, 637, 638, 639, 643B, C104A, 642, 804, 822, 846, 848, 849, 850, 851, 852, 865, 847, 864, 870, 871, 845, 857	1595.61	1595.61
6	Kodori	Jamani	839, 873, 874, 875, 876, 877, 837, 838	114.89	1090.20
		Mukutban	833	14.52	
		Pandharkawda	825, 842, 841, 843, 844, 856, 854, 855, 861, 859, C72, C73A, C73B, C75, C76A, C76B, CA74, C71, CA107, CA106	960.79	
7	Mandvi	Jamani	60, 878	398.76	1469.48
		Pandharkawda	636, 853, C103, C100, C101, C102, C99, C104B, C97, C96A, C96B, C98	1070.72	
8	Mendholi	Wani	C37A, C37B, C38, C48A, C50, C48C, C6, C48B, 9, 892	1285.51	1285.51
9	Mukutban	Mukutban	616	112.1	1142.07
		Wani	879, 880, 886, 887, 885, C35A, C35B, C36A, C36B, C42A, C42B, C42C, CA22A, CA22B	1029.97	
10	Palsoni	Wani	613, 893, C10, C11, C12, C13, C14A, C14B, C14C, C8, CA52	1262.88	1262.88

Sr. No.	Working Series	Range	Compartments Allotted	Range wise Allotment of Working Series Area (ha)	Total Area of the Working Series (ha)
(1)	(2)	(3)	(4)	(5)	(6)
11	Parwa	Parwa	823, 820, 816, 148, 819, 899, 898, 818, 817, 900, 895, 896, 897, 904, 894, 905, C122A, C122B, C121, C108A, C108B	1819.84	1819.84
12	Rasa	Mukutban	840	15.27	1125.32
		Wani	6, 7, 8	1110.05	
13	Rudhe	Jamani	52, 53, 54, 55	932.81	932.81
14	Saiphall	Jamani	632A, C105, 50	391.62	1493.14
	Saiphall	Mukutban	615, C44, C45, C47A, C47B	1101.52	
15	Salebhatti	Maregaon	611, C60, C57, C58	642.85	887.39
		Wani	C53, C54, C52, C7A, C7B, C7C, C7D, C7G, C9D	244.54	
16	Sukhanegaon	Maregaon	C55B	414.31	1072.95
		Wani	4, C55A, 891	658.64	
17	Yenake	Wani	16, 806, 807, 808, 809, 835, 836, 882,883, 888,889,884,890,C16 C17 C15D C15E C15F C15G C7F	1519.03	1519.03
18	Jamb	Pandharkawda	826	115.28	1444.28
		Parwa	824, 827, 164, 815, 830, 811, 812, 810, 828, 829, 901, 902, C109, 814, 813	1329	
19	Phulora	Maregaon	1, 610, 801, 802, 803, C4, C5, C2A, C2B, C3A, C3B, C62, C65, 70C, C77, C1A, C1B	1120.3	1213.71
		Pandharkawda	860, 872	93.41	
20	Kinihi	Jamani	66	313.29	1096.63
		Pandharkawda	805, 862, 866, 867, 868, 869, C83, C84, C80A, C80B, C81, C79A, C79B	783.34	
21	Koli Bk.	Pandharkawda	863	28.34	1350.33
		Ghatanji	909, 910, 911, 912, 917, 918, 919, 250, 251, 531, 248, 246, 247, 249, 907, 913, 914, 915, 916, 906	1321.99	
	Grand Total			26996.44	26996.44

3.6 SPECIAL OBJECTS OF MANAGEMENT

These areas have been degraded due to heavy grazing, illicit felling and frequent fires. Considering these factors, the special objects of management for these areas are:

1. To increase vegetative cover, improve quality and composition of the area by tending natural regeneration and supplementing with plantations.
2. To improve soil condition by taking up suitable soil and moisture conservation measures.
3. To meet the local demand for fuelwood, fodder and NTFP requirements along with providing employment opportunities.

3.6.1 ANALYSIS AND VALUATION OF THE CROP

Stock mapping of the area was carried by territorial staff of Pandharkawada forest division and was verified with the extensive enumeration data. The density of the forest in these areas was analysed and used for allotment of compartments to this working circle. The density of the crop is less than 0.4. Enumeration was carried out by SOFR unit, Gadchiroli. The data was analysed and the results are given in the table below.

TABLE NO.3.3: TREE DENSITY OF TEAK AND NON-TEAK SPECIES IN AWC

Sr. No.	Girth Class (cm)	Teak			Non-teak			Total	
		No. of trees per Ha.	% w.r.t. Total Teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Non-teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Stock
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	31-45	11.44	32 %	10 %	44.37	57 %	39 %	55.80	49
2	46-60	9.43	26 %	8 %	14.48	18 %	13 %	23.91	21
3	61-75	6.95	19 %	6 %	7.59	10 %	7 %	14.54	13
4	76-90	3.51	10 %	3 %	4.08	5 %	4 %	7.59	7
5	91-105	1.95	5 %	2 %	3.05	4 %	3 %	5.00	4

Sr. No.	Girth Class (cm)	Teak			Non-teak			Total	
		No. of trees per Ha.	% w.r.t. Total Teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Non-teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Stock
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
6	106-120	1.44	4 %	1 %	2.01	3 %	2 %	3.45	3
7	121-135	0.52	1 %	0 %	0.98	1 %	1 %	1.49	1
8	136-150	0.63	2 %	1 %	0.80	1 %	1 %	1.44	1
9	>151	0.06	0 %	0 %	1.09	1 %	1 %	1.15	1
Total		35.92	100 %	31 %	78.45	100 %	69 %	114.37	100 %

TABLE NO. 3.4: SPECIES-WISE TREE DENSITY (TREES/HA.) IN AWC

Species	Girth-class wise classification in cms									
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	Total
Group A: Species of General Utility										
Ain	3.97	1.09	0.80	0.29	0.69	0.29	0.11	0.00	0.23	7.47
Lendia	2.13	0.52	0.23	0.00	0.00	0.06	0.06	0.00	0.00	2.99
Teak	11.44	9.43	6.95	3.51	1.95	1.44	0.52	0.63	0.06	35.92
Total	17.53	11.03	7.99	3.79	2.64	1.78	0.69	0.63	0.29	46.38
Group B: Species of Special Utility										
Bhera	2.13	0.34	0.40	0.17	0.06	0.11	0.06	0.00	0.00	3.33
Dhawada	3.79	1.15	1.09	0.23	0.29	0.11	0.17	0.00	0.00	6.84
Garadi	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
Hiwar	1.03	0.40	0.11	0.17	0.06	0.06	0.00	0.00	0.00	1.84
Kalamb	0.23	0.06	0.06	0.00	0.00	0.00	0.06	0.00	0.06	0.46
Khair	0.17	0.11	0.17	0.06	0.29	0.06	0.00	0.00	0.00	0.86
Kudai	0.29	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34
Moin	0.00	0.11	0.11	0.11	0.06	0.17	0.00	0.00	0.11	0.69
Salai	0.34	0.11	0.11	0.11	0.06	0.17	0.17	0.23	0.11	1.44
Sawar	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06
Shivan	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06
Total	8.22	2.36	2.07	0.98	0.80	0.69	0.46	0.23	0.29	16.15

Species	Girth-class wise classification in cms									
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	Total
Group C: Species of NTFP										
Behada	0.75	0.23	0.34	0.17	0.00	0.11	0.00	0.00	0.00	1.61
Bor	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Char	0.40	0.11	0.06	0.00	0.06	0.00	0.06	0.00	0.00	0.69
Tendu	5.52	2.24	0.75	0.63	0.29	0.23	0.17	0.11	0.00	10.06
Palas	16.32	5.69	2.24	1.15	0.40	0.23	0.06	0.00	0.06	26.26
Shiras	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Neem	2.36	1.09	0.46	0.17	0.23	0.06	0.00	0.06	0.06	4.60
Chinch	0.06	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.11
Kawath	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.23
Moha	0.06	0.17	0.17	0.17	0.23	0.17	0.06	0.11	0.11	1.26
Total	25.69	9.60	4.14	2.41	1.21	0.80	0.34	0.29	0.23	45.06
Group D:Other Species										
Alai	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
Anduli	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06
Anjan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11
Babhul	0.00	0.00	0.00	0.06	0.06	0.06	0.00	0.00	0.00	0.17
Bahawa	1.72	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84
Bharati	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Chichwa	0.06	0.00	0.00	0.06	0.06	0.06	0.00	0.00	0.00	0.23
Dudhkhuda	0.63	0.40	0.06	0.00	0.00	0.00	0.00	0.00	0.06	1.15
Karanj	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Kavi	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Kinhi	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Kuda	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34
Lokhandi	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.23
Maharukh	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Medsing	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06
Mowai	0.06	0.06	0.06	0.00	0.06	0.00	0.00	0.11	0.11	0.46
Roda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Rohan	0.11	0.00	0.06	0.11	0.17	0.00	0.00	0.06	0.06	0.57
Sewdor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.11

Species	Girth-class wise classification in cms									
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	Total
Shekzari	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Shembli	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.06
Sehana	0.63	0.17	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.92
Subabul	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Yerani	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Total	4.37	0.92	0.34	0.40	0.34	0.17	0.00	0.29	0.34	7.36
Grand Total:	55.80	23.91	14.54	7.59	5.00	3.45	1.49	1.44	1.15	114.37

Regeneration:

Data on regeneration status was collected along with enumeration of the crop. The seedlings were enumerated in the following three categories as R1 upto 1 m height, R2 with 1 to 3 m height and R3 above 3 m height. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The status of natural regeneration in AWC areas is very poor. The total number of seedlings is 23.86/ha. The table of regeneration is given below:

TABLE NO. 3.5: RANGE-WISE REGENERATION STATUS IN AWC

Sr. No.	Range	No. of sample plots	No of Seedlings/ha			Total
			R1	R2	R3	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Ghatanji	3	30.00	0.00	0.00	30.00
2	Jamni	27	33.56	0.07	7.30	40.93
3	Maregaon	15	7.93	0.00	0.00	7.93
4	Mukutban	32	25.31	0.44	0.41	26.16
5	Pandharkawada	27	21.04	5.11	1.81	27.96
6	Parwa	14	11.79	0.00	0.00	11.79
7	Wani	52	18.73	0.13	0.08	18.94
Weighted Average			21.36	0.95	1.55	23.86

3.6.2 SILVICULTURAL SYSTEM

The main limiting factors for the establishment of seedlings in this area are insufficient sub soil moisture, highly compact soil structure and heavy biotic pressure. Topsoil has been washed away in a vast area since there is no significant vegetation. As a result, these areas do not have even adequate soil depth and porosity to support the tree crop, therefore intensive soil and moisture conservation measures shall be undertaken in these areas. Tending of existing rootstock, saplings, coppice shoots, supplemented by plantations are the main activities in this working circle. A two-phase approach has been prescribed for these areas.

Phase I: RestorativePhase

The duration of this phase will be a minimum of one year. Survey and demarcation, soil and moisture conservation works along with complete protection by digging TCM or fencing shall be undertaken in this phase. Nala bunding works and other appropriate soil and moisture conservation works shall be taken up on watershed basis. Contour trenches, deep CCT depending upon the site requirement shall be undertaken as prescribed in the chapter on 'Miscellaneous Regulations'. Singling and cut back operations shall be carried out in order to improve rooted stock in the area.

Phase II: Productive Phase

The duration of this phase shall be of 5 years immediately after the completion of restorative phase. The RFO shall inspect the area and prepare the treatment map in the 2nd year. The RFO shall prepare the treatment map with the features of crop density, soil type, topography and natural regeneration areas of one hectare at one place and above features shall invariably be shown on the treatment map. The treatment map shall indicate about the treatment proposed to be given grid wise. Minor repairs of soil and moisture conservation works shall also be undertaken if necessary. PPO work shall be undertaken from 2nd year onwards.

3.6.3: ROTATION PERIOD:Not applicable.

3.6.4: HARVESTABLE DIAMETERS:Not applicable.

3.6.5: REDUCING FACTORS AND REDUCED AREAS:Not applicable.

3.6.6: FELLING CYCLE: Not applicable.

3.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB):Not applicable.

3.6.8: CALCULATION OF THE YIELD:No yield is prescribed for this working circle.

3.6.9: TABLE OF FELLING:Not applicable.

3.6.10: METHOD OF EXECUTING THE FELLING:Not applicable.

3.6.10.1: DEMARCATION: The annual felling coupe shall be demarcated one year in advance.

Preparation of the Treatment Map: After the demarcation of the coupe a treatment map will be prepared by the Range Forest Officer and it shall be verified by the Assistant Conservator of Forests emphasizing the suitability of sites for plantation, as well as the promising natural regeneration of areas. The treatment map thus prepared will be submitted to the DCF in charge of division, who after sample checking will give sanction to it. The following categories of area shall be shown distinctively in the treatment map:

1. **Type A - Protection Areas:** It shall include areas having steep slopes i.e. more than 25° , eroded areas or areas liable to erosion, 20-meter-wide strip on either side of water courses, riparian zones and sacred groves.
2. **Type B - Understocked Areas:** It shall include the areas having less than 0.4 density, including barren lands and natural banks.
3. **Type C - Groups of Young Poles:** Includes patches of well-grown pole crop of Teak and other species suitable for retention as a future crop. The patch should not be less than 2 ha.
4. **Type D - Well Stocked Areas:** Areas having more than 0.4 crop densities.

Treatments: Treatments proposed for different categories of the areas are as under:

1. Type A: No felling is prescribed. The soil and moisture conservation works shall be carried out on watershed basis as given in the Chapter on 'Miscellaneous Regulations'.

2. Type B: Soil and moisture conservation works shall be carried out in order to increase the productivity of the soil and to check soil erosion. Teak and other species shall be planted in the under stocked areas, where the area existing 5 hectare and above in extent at one place as per requirements of site. No standing tree shall be marked for felling except dead trees retaining at least 2 trees/ha.

3. Type C: No plantations shall be carried out in this area. Marking for thinning shall be done in the young pole crop as well as in old plantations to create appropriate spacing as per the stand table.

4. Type D: No planting shall be done in these areas. Felling will be done as prescribed in marking rules.

3.6.10.2 MARKING RULES

Marking Techniques: Marking techniques for felling of the trees is as discussed in the chapter on 'Miscellaneous Regulations'.

Marking Rules: Marking shall be carried out by the Range Forest Officer under the guidance of Assistant Conservator of Forests concerned. The Deputy Conservator of Forests shall inspect as many coupes as possible to give proper guidance and instructions to the staff and also to have check against excess marking if any. The marking rules of various categories of areas are as under:

1. Type A: No tree shall be marked for felling.

2. Type B:

- No tree shall be marked for felling.
- All live high stumps shall be cut back.
- Multiple coppice shoots and poles shall be reduced to one per stool retaining the vigorous one.

- The unwanted under growth which is preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed.

3. Type C:

- The congested young poles shall be marked for thinning to reduce the congestion by bringing down the number of poles per ha. as per the yield table.
- The dead, dying, disease and malformed poles shall be marked first for thinning. The multiple poles shall also be thinned retaining one most promising pole for stool.
- Appropriate care shall be taken to retain the poles of seedling origin while removing poles of coppice origin.
- Congested crop in the old plantation areas shall also be marked for thinning retaining the number of trees per ha as prescribed in the stand table.

4. Type D:

- Marking shall be done to reduce the number of stems or poles to one per stool retaining the most promising one in the entire multiple coppice teak crop.
- All live high stumps shall be cut back.
- All the dead trees shall be marked for felling retaining 2 per hectare.

3.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS: Not applicable.

3.6.12 REGENERATION

Natural Regeneration

Natural regeneration of teak and other species, though noticed in the same patches at certain places, usually die before getting established due to highly compact

soil structure coupled with bad drainage, aeration, high incidence of cattle grazing and recurrent fires. To help young recruits of teak and other species to establish develop natural regeneration, the following prescriptions shall be adopted:

1. Identification of the areas containing promising natural regeneration shall be done inside the coupe.
2. The undesirable undergrowth which is preventing or likely to prevent the development of natural regeneration of the desired species shall be removed.
3. Patches of natural growth shall be rigidly protected from the fire and grazing and suitable thinning and tending will be carried out. Coppice shoots which interfere with the development of young natural seedlings shall be removed. Opening up of top canopy by felling of marked trees and the ground cover at some places shall boost establishment of natural regeneration of teak and other species by providing better light and aeration.
4. Natural regeneration should be cleared of weeds within the diameter of one meter and these weeds, grasses, leaf litter, twigs, leaves and branches shall be spread in 15 cm. high layer all around the seedlings within the cleared area to provide organic mulch. Two or three spreads full of earth shall be thrown to the mulch in place. It will keep the soil around the plants free from weeds as well as help securing the loosening and aeration of the soil by worms and insects. 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 the very young seedlings which will help in retention of surface moisture as well as avoid accidental trampling by cattle or others.
5. These areas shall be protected from biotic interference as well as from recurring fires. Natural regeneration shall be supplemented with artificial regeneration in the under stocked areas.

Artificial Regeneration

In areas where natural regeneration is not sufficient, open or blank areas, plantation with suitable species shall be taken up under artificial regeneration. The number of seedlings to be planted is to be decided on the basis of soil conditions, rainfall and temperature. The choice of species to be planted will depend on the suitability of site. Plantations prescribed in afforestation working circle shall include at least 10 percent of fodder and fruit species.

Pre-Planting Operations

PPO shall be carried out one year before actual planting work. The planting stock in nurseries should be in good condition. The planting stock must have different species and should be healthy with sufficient height and hardy enough to be planted. The seeds for raising nursery stock shall be from known sources preferably from plus trees of high forests and certified seeds.

While digging pits, care should be taken not to dig them in the shadow of standing tree or 2 m. of existing established seedlings. The standing trees are having influence zone of spreading shadow and pits should not dig either in the shadow or in the influence zone of a standing tree. Influence zone is 2 m. for trees having girth class <30cm, 3m. for trees having girth class between 30 to 60 cm, 4m for trees having girth class 60 to 90 cm., 5 m. for trees having girth class 90 to 120 cm & 6 m. for trees having girth class >120 cm.

Choice of Species

The choice of species must be based on climatic and edaphic conditions and also preference of local community. The native species that occur naturally, and of proven fodder grasses, fruit, NTFP and some of the timber species shall be preferred. Some of the species such as Teak, Neem, Dhawda, Arjun, Babul, Khair, Jamun, Bel, Apta, Anjan, Biba, Bamboo, Behada, Hirda etc. may be planted. Palatable grass species like Sheda, Paunya and Marvel shall be preferred. Bamboo can be planted along the nalas. Better planting stock shall be ensured and the area of plantation is closed either by TCM or fencing. It is advisable that on the mound of TCM a row of suitable fast growing thorny species shall be planted along with Agave species.

First Year Operations

Planting shall be completed within a fortnight from the outbreak of monsoons. The teak seedlings or stumps shall be planted after first monsoon showers. Polybag plantation shall be taken up in case of miscellaneous species.

Weeding and Casualty Replacement

The weeding shall be done in the first year as per following schedule.

- 1stweeding : By the end of July
- 2ndweeding : By the beginning of September
- 3rdweeding : By the mid of October

Casualty replacement shall be carried out along with 1stweeding.

Second Year Operations and Third Year Operations

In the SYO casualty replacement and two weeding shall be carried out as per following schedule.

- 1stweeding : By the end of August
- 2ndweeding : By the end of October

Casualty replacement shall be done by mid July. Mulching and hoeing shall be carried out along with 2ndweeding. In the third year operation only one weeding will be done during the month of September followed by thorough soil working in the month of October.

3.6.13 ASSOCIATED REGULATIONS AND MEASURES

All annual coupes and plantation sites shall be provided fire protection. Effective protection against fire must be ensured during the fire seasons so that the survival and establishment of the seedlings for development into future growing stock can be achieved. Fire protection may be achieved through Joint Forest Management

Committees. A comprehensive fire management plan shall be prepared by RFO every year and the same shall be scrutinized and sanctioned by the DCF.

The coupe shall remain closed to grazing for a period of 5 years after main felling. At the time of planting the under-stocked area in each coupe, the seeds of fodder grass like Paunya, Sheda, Marvel, etc shall be sown to have enough fodder of good quality.

3.6.14 SOIL AND MOISTURE CONSERVATION WORKS

Soil and moisture conservation measures shall be undertaken 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.

Soil and moisture conservation measures shall be undertaken in the restorative phase. These works shall be taken up along with marking and completed before the onset of monsoon of the next year. All soil and moisture conservation works shall be carried out on watershed basis. The soil & moisture conservation works are to be based on the requirement of site. These works will be taken up after preparation of a detailed treatment map of the area and model of soil & moisture conservation measures duly sanctioned by the competent authority. To bring about conducive site conditions for establishment of seedlings, the soil & moisture conservation works like contour trenches, nala bunding, cement plugs bio restoration tanks etc. can be taken up.

3.7 INPUTS FROM EVALUATION UNIT

The Central Evaluation Unit of Maharashtra Forest Department, through their regional cells, conducts assessment of plantation works across the state for improving the implementation efficiency. Their inputs, brought out in the form of various reports, are crucial in understanding the general and specific issues that plague plantation works. DCF, Pandharkawada shall ensure that the observations recorded in these reports shall reach the field staff, until the Beat Officer, in a periodic manner.

CHAPTER-4

FODDER IMPROVEMENT WORKING CIRCLE

4.1 FODDER IMPROVEMENT WORKING CIRCLE (CLEARLY MARKED ON GIS BASED MAPS (1:150000))

The area of this working circle marked on GIS based map of 1:150000 scale is appended and a copy of the same is provided in A4 size here.

4.2 GENERAL CONSTITUTION OF THE WORKING CIRCLE

Forests included in this working circle are the areas managed under Pasture Improvement Working Circle, Coppice with Reserve Working Circle, Plantation Working Circle and Miscellaneous Working Circle in the past. In Rai's Working Plan these areas were managed under Fodder improvement Working Circle. These areas are in the vicinity of villages and under severe biotic pressure. The extent of area allotted to this working circle is 4456.07 ha which constitutes 7 % of the division area. The range-wise allocation of area is shown in the table below.

TABLE NO. 4.1: DISTRIBUTION OF AREA IN FODDER IMPROVEMENT WORKING CIRCLE

Sr. No.	Range	Area (ha) of Range	No. of Compt.	Area Allotted (Ha) to FIWC				% to the Area of Range	% to the Area of WC
				RF	PF	UF	Total Area (5+6+7)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Ghatanji	7557.63	2	760.06	0	0	760.06	10 %	17 %
2	Jamani	9506.77	0	0	0	0	0	0 %	0 %
3	Maregaon	10895.57	10	1683.78	0	0	1683.78	15 %	38 %
4	Mukutban	7611.90	2	98.33	0	0	98.33	1 %	2 %
5	Pandharka wada	11609.42	0	0	0	0	0	0 %	0 %
6	Parwa	9459.43	0	0	0	0	0	0 %	0 %
7	Wani	10416.74	12	1913.9	0	0	1913.9	18 %	43 %
Total		67057.46	26	4456.07	0	0	4456.07	-	100 %

4.3 GENERAL CHARACTERISTICS OF VEGETATION

The area allotted to this working circle contains degraded soils with heavy biotic pressure. The site quality of the area is IV and the area is sparsely wooded with species like Teak, Hiwar, Palas, Bor, Khair, etc. In majority of these areas less fodder value grasses like Kushal grass (*Andropogon contortus*) and Burbushi (*Eragrostistennela*) are seen. The availability of palatable grasses such as Sheda, Pauniya and Marvel are also present but in very less quantity. The sub type of vegetation is degraded scrub forest. The existing stock maps have been updated and the stock is assessed with the help of satellite imageries with appropriate ground truth verification. Mostly the areas are open and degraded.

4.4 FELLING SERIES, CUTTING SECTION AND JFM AREAS

Treatment Series and Annual Coupes: The working circle has been divided into 4 working series and each working series is divided into 20 annual coupes. The details of felling series and annual coupes is given in **Appendix No.XXV (A)** and **Appendix No.XXV (B)**.

4.5 BLOCKS, COMPARTMENTS AND JFM AREAS

There are 26 compartments included in this working circle. These compartments are distributed over 4 ranges. The details are provided below:

TABLE NO.4.2: COMPARTMENTS ALLOTTED TO FODDER IMPROVEMENT WORKING CIRCLE

Sr. No.	Working Series	Range	Compartments Allotted	Range-wise Allotment of Working Series Area (Ha)	Total Area of the Working Series (Ha)
(1)	(2)	(3)	(4)	(5)	(6)
1	Karanji	Maregaon	650, 651, 652, C66, C67, 655	1418.30	1418.30

Sr. No.	Working Series	Range	Compartments Allotted	Range-wise Allotment of Working Series Area (Ha)	Total Area of the Working Series (Ha)
(1)	(2)	(3)	(4)	(5)	(6)
2	Wani	Maregaon	C51A, C56A,C56B	265.48	1107.39
		Mukutban	C32A	41.08	
		Wani	C 41, 15, C15A, C15B, C15C, C39A	800.83	
3	Borda	Mukutban	C28A	57.25	1170.32
		Wani	C 40, C39B, C39C, C19A, C19B, 14	1113.07	
4	Koli Bk.	Ghatanji	222, 243	760.06	760.06
Grand Total				4456.07	4456.07

4.6 SPECIAL OBJECTS OF MANAGEMENT

1. To improve the quantity and quality of fodder resources by introducing improved varieties of fodder grasses.
2. To augment fodder supply to meet the needs of local people.
3. To reduce the grazing pressure on forests.
4. To increase the vegetal cover and to increase the productivity of the land.
5. To conserve soil and moisture in the area by taking appropriate SMC measures.

4.6.1 ANALYSIS OF THE CROP

Stock mapping was done by territorial staff of Pandharkawada forest division and was verified with the enumeration data. Satellite imageries and density maps of FSI were used for verification of stock maps. Areas are mostly open and blank with sparse tree growth. The density ranges from 0.1 to 0.4. Analysis of the enumeration data highlights that the distribution of non-teak trees (85 %) is more in comparison to teak trees(15%) in FIWC. The matured teak trees are very less. The total number of trees (above 30 cm GBH) per ha is 66.05. The details of analysis from sample plot enumeration data are provided in the following tables.

TABLE NO.4.3: TREE DENSITY OF TEAK AND NON-TEAK SPECIES IN FIWC

Sr. No.	Girth Class (cm)	Teak			Non-teak			Total	
		No. of trees per Ha.	% w.r.t. Total Teak Trees	% w.r.t. Total Stock	No. of trees per Ha.	% w.r.t. Total Non-teak Trees	% w.r.t. Total Stock.	No. of trees per Ha.	% w.r.t. Total Stock
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	31-45	3.42	35 %	5 %	23.16	41 %	35 %	26.58	40 %
2	46-60	1.84	19 %	3 %	13.95	25 %	21 %	15.79	24 %
3	61-75	1.58	16 %	2 %	8.95	16 %	14 %	10.53	16 %
4	76-90	1.58	16 %	2 %	3.95	7 %	6 %	5.53	8 %
5	91-105	0.26	3 %	0 %	2.11	4 %	3 %	2.37	4 %
6	106-120	0.26	3 %	0 %	0.79	1 %	1 %	1.05	2 %
7	121-135	0.53	5 %	1 %	0.53	1 %	1 %	1.05	2 %
8	136-150	0.26	3 %	0 %	1.05	2 %	2 %	1.32	2 %
9	>151	0.00	0 %	0 %	1.84	3 %	3 %	1.84	3 %
Total		9.74	100 %	15 %	56.32	100 %	85 %	66.05	100 %

Table No.4.4: Species wise tree Densit (Trees/Ha.) in FIWC

Species	Girth-class wise classification in cms									Total
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	
Group A: Species of General Utility										
Ain	0.53	0.00	0.26	0.26	0.00	0.26	0.00	0.00	0.00	1.32
Lendia	1.58	0.53	0.79	0.79	0.00	0.00	0.00	0.00	0.00	3.68
Teak	1.32	1.32	0.53	0.53	0.26	0.00	0.53	0.26	0.00	4.74
Total	3.42	1.84	1.58	1.58	0.26	0.26	0.53	0.26	0.00	9.74

Species	Girth-class wise classification in cms									Total
	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	150 & above	
Group B:Species of Special Utility										
Bherra	0.53	0.00	0.26	0.00	0.00	0.00	0.00	0.26	0.00	1.05
Dhawada	1.05	1.58	1.32	1.58	1.05	0.26	0.00	0.00	0.00	6.84
Hiwar	2.37	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42
Salai	0.00	0.00	0.00	0.00	0.53	0.00	0.26	0.00	0.00	0.79
Total	3.95	2.63	1.58	1.58	1.58	0.26	0.26	0.26	0.00	12.11
Group C: Species of NTFP										
Apta	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
Awala	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
Behada	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.26
Moha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.79	1.58
Neem	1.05	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.26	1.84
Palas	7.37	6.58	3.95	0.79	0.00	0.00	0.00	0.00	0.00	18.68
Tendu	4.21	1.58	2.37	0.53	0.26	0.53	0.00	0.00	0.26	9.74
Total	12.89	8.42	6.32	1.84	0.53	0.53	0.00	0.79	1.32	32.63
Group D:Other Species										
Anduli	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
Babhul	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53
Bahawa	0.53	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05
Bharati	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
Dudhakula	1.84	1.58	0.26	0.00	0.00	0.00	0.00	0.00	0.00	3.68
Haladbhera	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
Karai	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.26
Lokhandi	0.53	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.79
Movai	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.53
Rohan	0.26	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.53
Sehna	0.26	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.53
Sina	2.11	0.26	0.53	0.00	0.00	0.00	0.00	0.00	0.00	2.89
Total	6.32	2.89	1.05	0.53	0.00	0.00	0.26	0.00	0.53	11.58
Grand Total	26.58	15.79	10.53	5.53	2.37	1.05	1.05	1.32	1.84	66.05

Regeneration of tree species:

Data on regeneration status was collected along with enumeration of the crop. The seedlings were enumerated in the following three categories as R1 upto 1 m height, R2 with 1 to 3 m height and R3 above 3 m height. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The status of natural regeneration in AWC areas is very poor. The total number of seedlings is 4.79/ha. The table of regeneration is given below:

TABLE NO. 4.5: RANGE-WISE REGENERATION STATUS IN AWC

Sr. No.	Range	No. of sample plots	No of Seedlings/ha			Total
			R1	R2	R3	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Ghatanji	5	6.40	0.00	0.00	6.40
2	Jamni	0	0.00	0.00	0.00	0.00
3	Maregaon	14	2.71	0.21	0.00	2.93
4	Mukutban	0	0.00	0.00	0.00	0.00
5	Pandharkawada	1	0.00	0.00	4.00	4.00
6	Parwa	0	0.00	0.00	0.00	0.00
7	Wani	4	9.50	0.00	0.00	9.50
Weighted Average			4.50	0.13	0.17	4.79

During the last plan period, a total of 220 ha of fodder plantation has been developed through CAMPA funds. The details are as follows:

TABLE NO.4.6: FODDER PLANTATIONS IN PANDHARKAWADA DIVISION

Sr. No	Year	Range	Round	Beat	Compartment Number	Area (Ha.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	2019-20	Maregaon	Vadaki	Vihirgaon	651	10.00
		Pandharkawada	Pandharkawada	Kondi	68	5.00

Sr. No	Year	Range	Round	Beat	Compartment Number	Area (Ha.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2	2020-21	Maregaon	Vadaki	Anji	655	5.00
		Maregaon	Botoni	Botoni	C65	10.00
		Maregaon	Khandni	Vadhona	35	10.00
		Pandharkawada	Pandharkawada	Tivsala	73	10.00
		Pandharkawada	Umari	Ghoddhara	80	10.00
		Pandharkawada	Umari	Runza	C-81	10.00
		Jamni	Jamni	Patan	50	10.00
		Jamni	Mathrjun	Mandvi	60	10.00
		Parwa	Patapangara	Patapangra-2	178	10.00
		Parwa	Patapangara	Zhatala	176	10.00
		Mukutban	Mukutban	Bhendala	C32A	10.00
		Mukutban	Pavnar	Pavnar	21	10.00
		Mukutban	Mukutban	Bhendala	C32A	10.00
		Wani	Suknegaon	Suknegaon	7	10.00
		Wani	Wani	Wani	C7F	10.00
		Wani	Wani	Shirpur	C39A	7.00
		Wani	Suknegaon	Borda	C49	8.00
		Wani	Kurli	Kurli	C15C	5.00
		Ghatanji	Ghatanji	Sakhara	226	10.00
		Ghatanji	Ghatanji	Kapshi	220	10.00
3	2022-23	Ghatanji	Koli	Rampur	250	10.00
		Ghatanji	Koli	Rampur	251	10.00

4.6.2 SILVICULTURAL SYSTEM

Based on the grass and forest resources of the site, the silvicultural systems to be followed are as under.

1. Regulated and rotational grazing in pasture areas.
2. Regulating seeding, grass cutting and complete closure to grazing in identified grasslands.

4.6.3 : ROTATION PERIOD: Rotational grazing is practiced.

4.6.4 : HARVESTABLE DIAMETERS: Not applicable.

4.6.5 : REDUCING FACTORS AND REDUCED AREAS: Not applicable.

4.6.6 : FELLING CYCLE:Not applicable.

4.6.7 : DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB): Not applicable.

4.6.8 : CALCULATION OF YIELD: The yield is fixed by area.

4.6.9 : TABLE OF FELLING:Not applicable.

4.6.10: METHOD OF EXECUTING THE FELLING/CUTTING: The grass is to be harvested on “Cut and Carry” basis as regulated by the Department, preferably through JFMCs.

4.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

Demarcation: The coupes due for closure to grazing shall be demarcated one year in advance, by cutting 3 metre wide lines and erecting pillars at suitable intervals.

Treatment: Each year area suitable for fodder development shall be selected from due coupes and shall be developed for fodder either by removal of obnoxious weeds and unwanted grasses or through ploughing and planting of suitable grasses. Depending on the requirement of site, suitable options for fencing can be taken up.

4.6.12 REGENERATION:Not applicable

4.6.13 ASSOCIATED REGULATIONS AND MEASURES

(i) Seeding of Grasses

In order to allow seeding of fodder grasses, the coupe shall be closed to cutting of grass and shall be prohibited from beginning of June to end of November after which the grass may be allowed to be removed by cutting.

(ii) Fire Protection

The areas shall be protected from fire with the involvement of local people or JFM committees.

4.6.14 METHOD OF TREATMENT

1. As these areas are highly degraded, extensive soil and moisture conservation measure works like gully plugging, nala bunding at suitable places and contour trenches depending upon the site quality shall be taken up. Soil and moisture conservation works shall be done as specified in 'Miscellaneous Regulations'.
2. Areas with existing good growth of palatable fodder grasses as well as areas suitable for the growth of fodder grasses shall be identified and closed for grazing.
3. All obnoxious weeds, thorny shrubs and bushes shall be uprooted and the unpalatable grasses shall be removed by ploughing in the area in pre flowering stage.
4. Tussocks of superior grass species such as Sheda (*Sehima nervosum*), Paunya (*Sehima sulcatum*), Marvel (*Dichanthium annulatum*), etc. shall be prepared in the nursery, depending upon the local demand.
5. Plantation of fodder tussocks shall be carried out after ploughing at the onset of monsoon.
6. The fodder tree species prescribed are Babul (*Acacia nilotica*), Anjan (*Harwickia binata*), Sirus (*Albizzia lebbek*), Apta (*Bauhina sp.*), Tiwas (*Ougenia daldergioides*), etc. However, the selection of these species shall be as per the site requirement.
7. The area shall be closed with fencing or cattle proof trenches in order to have a complete protection.
8. The area shall be effectively fire traced and protected from fire every year.
9. The fodder grasses shall be allowed to be cut only from 3rd year onwards after seeding.
10. The cutting of grass along grid lines and fire lines for stall feeding of cattle shall be allowed in these areas for first three years after planting.
11. Cutting of grass shall be carried out preferably in strips and in the direction perpendicular to the prevalent direction of the wind.
12. The grazing shall be regulated as per Government policy on rotation basis.

CHAPTER 5

IMPLEMENTATION OF THE SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNITION OF FOREST RIGHTS) ACT, 2006

5.1 INTRODUCTION

The Scheduled Tribes and other traditional forest dwellers (recognition of forest rights) Act, 2006, commonly known as the Forest Rights Act (FRA), is a landmark legislation in India that aims to recognize and vest the forest rights and occupation of forest-dwelling communities, including tribal communities. The Act is designed to correct historical injustices and empower these communities by granting them legal rights over their traditional lands and resources.

It was enacted on December 12, 2006 & pursuant to this The Govt. of India Ministry of Tribal Welfare brought out Forest Rights Rules on January 1, 2008 and amendment rules on January 6, 2012 and April 30, 2015, to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded. This act provides for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. The effective implementation of the Forest Rights Act is crucial for ensuring social justice, conservation, and sustainable development.

5.2 RIGHTS VESTED UNDER THE ACT

For the purpose of this act, the following rights which secure individual or community tenure or both shall be the forest rights of forest dwelling Scheduled Tribes and other traditional forest dwellers on all forest lands. These include:

- a) Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for their livelihood.
- b) Community rights.

- c) Right to ownership, access to collect, use and dispose of minor forest produce.
- d) Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers.
- e) Not with standing anything contained in the Forest (Conservation) Act, 1980, the Central Government shall provide for diversion of forest land for school, hospital, anganwadi, fair price shop, electric and telecommunication lines, tanks, drinking water supply, minor irrigation projects, canals, roads and community centres etc. provided that the land should be less than one hectare in each case and which do not involve felling of trees exceeding seventy five trees per hectare.
- f) Using powers vested the Fifth Schedule to the Constitution of India, a notification has been issued by the Hon. Governor of Maharashtra to modify the FRA in its Section 3, sub-section (2) after the clause (m), to add the following in Scheduled Areas in Maharashtra:
 - i. Godowns, warehouses, cold storages and haats (Markets) to be operated by the Government of Maharashtra or its subsidiaries
 - ii. Cremation grounds/ burial grounds

5.2.1 CRITERIA FOR RECOGNITION OF RIGHTS

Recognition of rights is subject to fulfilment of certain criteria as enlisted below:

- a) The recognition and vesting of rights under this Act shall be subject to the condition that such Scheduled Tribes or Tribal Communities or other traditional forest dwellers had occupied forest land before the December 13, 2005.
- b) The right conferred shall be heritable but not alienable or transferable.
- c) The forest rights recognized and vested in respect of land which shall be under the occupation of an individual or family or community on the date of commencement of this Act i.e. December 31, 2007 and shall be restricted to the area under actual occupation and shall in no case exceed than an area of four hectares.

- d) The holders of forest rights, Gram Sabha and village level institution in area are duty bound to protect wildlife, forest and biodiversity, adjoining catchment area, water resources and other ecological sensitive areas.

5.3 PROCEDURE FOR RECOGNITION OF RIGHTS

The Act and its associated rules provide a comprehensive framework for the recognition and vesting of forest rights. The involvement of local communities, Gram Sabhas, and various committees at different levels is critical for the successful implementation of the Act.

a) Initiation

- i. Section 3(1) of the Forest Rights Act, 2006, outlines the process for recognition and vesting of forest rights. It empowers the Gram Sabha (village assembly) to initiate the process and recommend the claims for recognition of individual and community forest rights.
- ii. Rule 4 of the Forest Rights Rules, 2008, specifies the procedures and forms for filing claims. It includes Form A for individual claims and Form B for community claims. The Gram Sabha plays a pivotal role in verifying and consolidating these claims.

b) Verification and Recommendation:

- i. Rule 5 of the Forest Rights Rules delineates the responsibilities of the Sub-Divisional Level Committee (SDLC) and District Level Committee (DLC) in verifying and recommending claims. The committees are required to conduct field verification and ensure due diligence in the process.

c) Rights of PVTG communities:

- i. Section 3(1)(m) of the Act recognizes the rights of Particularly Vulnerable Tribal Groups (PVTGs) over their habitat and traditional lands. It is essential to ensure that the rights of these vulnerable communities are protected and upheld.
- ii. Rule 6 of the Forest Rights Rules provides specific procedures for determining and recognizing the rights of PVTGs. It mandates the committees to prioritize the processing of claims from these communities.

d) Appeals and Grievance Redressal:

- i. Section 12 of the Act allows for appeals against the decisions of the SDLC and DLC. The Act emphasizes the establishment of Grievance Redressal Mechanisms at various levels. Subsequently, an additional layer of scrutiny was created at Divisional level to crosscheck the claims rejected by DLC.
- ii. Rule 12 and Rule 13 of the Forest Rights Rules detail the procedures for filing appeals and the constitution of the State Level Monitoring Committee for addressing grievances and ensuring proper implementation.

5.3.1 STATUS OF RIGHTS IN PANDHARKAWADA DIVISION

Status of rights recognised under Forest Rights Act, 2006 from Pandharkawada Forest Division are provided in Appendix No. VI(A), VI(B) & VI(C). A total of 694 individual rights claims and 315 community rights claims pertaining to gross forest area of Pandharkawada Forest Division (including FDCM and Wildlife area) were accepted by the DLC. An abstract is provided below:

TABLE NO. 5.1: THE STATUS OF IMPLEMENTATION OF FRA 2006 IN PANDHARKAWADA FOREST DIVISION (INCLUDING WILDLIFE AND FDCM AREA)

Sr. No.	Type of FRA benefit	No. of claims submitted at Gram Sabha	No. of claims accepted by DLC	Percentage of acceptance	Total Area of accepted claims (ha.)	Percentage of gross forest area
(1)	(2)	(3)	(4)	(5)	(6)	
1	Individual Forest Rights	2528	694	27.45 %	1076.77	
2	Community Forest Rights	316	315	99.68 %	74766.22	
3	Benefits u/s 3(2)	26	26	100 %	10.69	
	Total	2870	1035	36.06 %	75853.7	

5.4 ISSUES ASSOCIATED WITH IMPLEMENTATION OF FOREST RIGHTS ACT, 2006

While the Forest Rights Act (FRA), 2006 has been primarily benefiting indigenous communities, there are some potential negative impacts on forest areas that should be considered:

- a. **Promotion to Encroachments:** In certain cases, the FRA has been misused to legitimize encroachments and illegal activities in forest areas. It might enhance the encroachment in forest land with a belief that the encroachments shall be legalised in future.
- b. **Fragmentation and Degradation:** The process of recognizing individual and community forest rights can lead to the fragmentation of forest areas. When land is allocated to different households or communities, it results in the creation of small and disconnected patches of forests. This fragmentation can disrupt ecological connectivity and lead to habitat degradation. This might further aggravate the human-wildlife conflict situation in Pandharkawada division.
- c. **Inadequate Implementation:** The effective implementation of the Act has been a challenge due to inadequate resources, lack of awareness, and limited capacity at the local and state levels. This can result in delays in the recognition of forest rights, weak enforcement of regulations, and insufficient support for sustainable forest management practices.
- d. **Conflicts with Forest Department:** The process of identifying and recognizing forest rights has sometimes led to conflicts between forest-dwelling communities and field staff.

It is important to note that these negative impacts are not inherent to the FRA itself but are primarily a result of inadequate implementation, governance challenges, and conflicts of interest. The rights granted under FRA should be co-terminus with the duties assigned to the right holders in the same legislation. And the Management Plans for implementation of Community Forest Rights should be prepared adhering to the principles and objectives of this working plan.

5.5 PRESCRIPTIONS FOR MANAGEMENT OF FOREST AREAS ON WHICH THE FOREST RIGHTS ARE RECOGNISED:

- a) **Boundary Demarcation:** The forest areas on which the individual forest rights are recognised by District Level Committee are to be properly demarcated on ground with suitable boundary pillars in order to prevent any further encroachment. In case of Community Forest Rights (CFRs), the area shall be properly demarcated so that the Village level institutions and the Forest Department officials can maintain absolute clarity about the boundaries of CFR. As of now, boundary demarcation work of FRA beneficiaries has not been initiated in the division. Therefore, this exercise needs immediate attention of DCF and shall be completed within 2 years from the date of commencement of this Working Plan. The progress of boundary demarcation works shall be monitored on a monthly basis by the DCF, Pandharkawada and on a Quarterly basis by the CF, Yavatmal. The GPS coordinates of such boundary pillars shall be maintained in the Boundary Pillar Register which shall be specific to FRA implementation. DCF shall ensure checking of pillars from his/her field staff.
- b) **Updating Area Registers:** The Divisional Area Register (Form No. 1) shall contain the area vested with rights under FRA in the Remarks column against each Compartment/Survey No./Gat No.
- c) **Awareness Generation among FRA beneficiaries** about the responsibilities of forest and wildlife conservation will aid in the long run to prevent further encroachments and forest degradation.
- d) In the FRA Rules 2012, there is a provision to help the holders of forest rights through convergence of various government schemes relating to land improvement, land productivity, basic amenities and other Livelihood measures. In this regard, special efforts need to be made to identify areas of livelihood support such as NTFP collection, processing and marketing, need based skill development programmes for self-employment.

- e) If the claims under the Act are finally rejected by the competent authority, such encroachments shall be removed immediately by following the due process of law.
- f) As per Rule 4(e), the Gram Sabha is duty bound to constitute Committees for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the Act.
- g) Similarly, as per Rule 4(t), such Committee shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest resources and integrate such plan with the working plans or management plans of the forest department. Therefore, the DCF and ACFs of Pandharkawada Forest Division shall examine such Conservation Plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of the approved working plan.
- h) The grazing rights permitted under the CFR shall be as per the prevailing grazing policy of the Maharashtra forest department as enlisted in 1968 and 1973. Accordingly, no goat or sheep grazing shall be allowed in forest areas. And cattle grazing shall be allowed as per the carrying capacity of the grazing units and regeneration restrictions.

CHAPTER-6

WILDLIFE MANAGEMENT

Wildlife plays an indispensable role in our lives and the overall health of the planet. Beyond their intrinsic value, animals and plants contribute to various ecological processes, maintaining the delicate web of life that sustains us all. From the pollination of crops by bees and butterflies to the regulation of pest populations by predators, wildlife serves as the bedrock of countless ecosystem services that benefit humans. These services range from clean air and water to nutrient cycling, soil fertility, and climate regulation, all of which are essential for our well-being.

From forests to grasslands and meandering rivers, this region harbors a wealth of flora and fauna, making it a veritable haven for wildlife. Recognizing the significance of wildlife in maintaining ecological equilibrium and fostering sustainable development, this chapter aims to shed light on the critical importance of preserving and conserving the rich biodiversity.

This chapter on wildlife management aims to delve into the multifaceted strategies and initiatives undertaken to protect and manage the region's diverse wildlife. The National Wildlife Action Plan (2017-31) recognizes the need of looking outside Protected Areas for wildlife conservation. Furthermore, this chapter will address the need for scientific research, monitoring, and effective policy frameworks to guide conservation efforts. It will underscore the significance of raising awareness among the public and fostering a sense of stewardship towards wildlife, emphasizing the importance of education and outreach programs. The area covers the whole division and is therefore not specifically marked on GIS based map.

6.1 ANALYSIS OF THE WILDLIFE IN PANDHARKAWDA DIVISION

The fauna of Pandharkawada Division belongs to the following biogeographic zone:

- ➔ Kingdom: Paleotropical
- ➔ Sub-kingdom: Indo-malaysian
- ➔ Biogeographic Zone: 6 – Deccan Peninsula
- ➔ Biotic Province: 6D – Central Plateau

A wide variety of fauna is noticed in this division. However, its distribution is quite uneven. Wildlife population density varies with the habitat depending upon availability of food, water and shelter. Presence of Tipeshwar Wildlife Sanctuary in the Pandharkawada Division impacts the distribution of wildlife in the neighboring tracts. Wildlife commonly found in the division is provided in the Section 3.6 of Chapter 3 in Part I of this Plan. Detailed list is given in the 'List of Fauna' under Introduction.

6.1.1 TIPESHWAR WILDLIFE SANCTUARY

Tipeshwar Wildlife Sanctuary derives its name from the Goddess Tipai located near the Tipeshwar village in the sanctuary area. It was notified as a wildlife sanctuary on January 24, 1997 drawing area from Parwa and Patanbori ranges of Pandharkawada. As per its current management plan, the sanctuary is home to 30 species of mammals such as Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Civet (*Viverricula indica*), Wolf (*Canis lupus pallipes*), Hyena (*Hyaena hyaena*), Cheetal (*Axis axis*), Nilgai (*Boselaphus tragocamelus*), Black Buck (*Antelope cervicapra*), Jackal (*Canis aureus*), Porcupine (*Hystrix indica*), Sloth Bear (*Melursus ursinus*) and four horned antelope (*Tetracerus quadricornis*). The sanctuary also has 160 species of birds and 26 species of reptiles.

As part of management intervention, Maregaon village and Tipeshwar village were relocated from the sanctuary in 2013 and 2016 respectively. Sambar reintroduction in the sanctuary was taken up in the year 2013 to enhance the prey base for tigers. These two interventions have reduced the biotic pressure on tigers, which led to increase in its population as the number of resident tigers increased in the sanctuary.

Eco Sensitive Zone was declared around Tipeshwar sanctuary through a gazette notification dated January 17, 2018. The purpose of declaring it is to create some kind of shock absorber for the sanctuary. It would act as a transition zone from areas of high protection to areas involving lesser protection. The gazette notification of Tipeshwar Eco-sensitive Zone is provided in the **Appendix No. I (A)**

As per the said notification, a Zonal Master Plan for the management of Eco-Sensitive Zone should have been prepared by January, 2020. However, the Plan is yet to be prepared and approved. As member secretary of the Eco-sensitive Zone Monitoring Committee, the DCF, Pandharkawada, shall prepare a plan within a period of two years from the date of publication of this Working plan. Assistance from DFO (wildlife), Tipeshwar Sanctuary may be sought in this regard.

6.2 SPECIAL OBJECTIVES OF MANAGEMENT

1. To ensure protection and conservation of wildlife in this division.
2. To ensure scientific management of wildlife by undertaking measures like habitat management and regular monitoring of the population of wild animals.
3. To ensure protection of ecologically sensitive and special habitat sites for wildlife conservation, such as riparian zones, mesic sites (natural water seepage sites), perennial water holes, natural grasslands, sacred groves, high altitude plateaus, natural resting, breeding and nesting sites (caves, snags, overhangs, groves of old Ficus trees, thick Bamboo groves etc.)
4. To reduce dependency of fringe villages on forests and to reduce human wildlife interactions.
5. To involve local people in wildlife conservation and reduce human wildlife interactions.
6. To promote and encourage ecotourism without disturbing and damaging wildlife.
7. To demarcate the tiger corridors and ensure adequate protection of them.

6.3 THREATS AND CHALLENGES TO WILDLIFE

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

6.3.1 HABITAT FRAGMENTATION AND HABITAT LOSS

Wildlife requires continuous large patches of forests for maintaining a minimum threshold of population to thrive. Anthropogenic interferences in terms of linear projects (roads, railways, irrigation, etc.) fragment the forests. Habitat fragmentation, caused by human activities such as urbanization, agriculture, and infrastructure development, has significant implications for wildlife populations. Firstly, fragmented habitats result in the isolation of wildlife populations, restricting their ability to disperse, find mates, and maintain genetic diversity. This can lead to reduced genetic variation within populations, making them more susceptible to diseases and genetic disorders. Additionally, small and isolated populations are more vulnerable to environmental disturbances, natural disasters, and climate change, as they have limited capacity to adapt and recover.

Secondly, habitat fragmentation disrupts natural ecological processes and alters species interactions. Fragmented habitats often result in the loss of critical resources such as food, water, and shelter, leading to changes in wildlife behavior and distribution. Species that require large territories or specific habitat conditions may suffer the most, as their habitat patches become smaller and more fragmented. This can lead to increased competition for limited resources, conflicts with human activities, and ultimately, population declines. Furthermore, fragmented habitats can disrupt the natural predator-prey dynamics, disrupt pollination and seed dispersal networks, and impact the overall functioning of ecosystems.

Grasslands because of their unique characteristics are also home to a host of endangered wild species that are adapted to the semi-arid conditions. Species like the Indian Wolf, Indian Gazelle, Blackbuck, Indian fox, Stripped Hyena occur in the grasslands most of which occur outside the Protected Area matrix. These areas therefore cannot be viewed or managed in the traditional “Protected Area” method

because of the extensive spread of this ecosystem as well as the presence of dense human populations that have traditionally used these areas posing a challenge to the conservation of grasslands. Treatment of grasslands as wastelands and attempts to perform afforestation activities have negatively impacted these ecosystems.

6.3.2 POACHING: Though there is no organized poaching in the area, incidences predominantly of poaching of wild pigs is noticed. In Pandharkawada and taluka towns' markets, at times, birds such as Parakeets, Partridges, Quails, Water-Birds, Monitor lizards, Tortoise, Turtles etc. are brought for sale.

6.3.3 FIRE: Forest fire is frequent especially during dry seasons. Repeated forest fires occur in this tract. Forest fire damages natural habitat and drives the animals towards human habitations resulting in human wildlife conflict. The fires in the interior of the forests, besides destroying the natural habitat of the forest fauna, drive them to take shelter near the human habitation and make them easy targets of poachers. Due to fire even the young ones may perish. Besides other animals, reptiles and birds, which live on ground and cannot escape the fire and its heat. In case they survive, their food, grasses, herbs and shrubs are destroyed. The whole tract experiences water scarcity in summer. These fires aggravate the already existing water scarcity and expose these animals to above mentioned risks. It in turn increases the man animal conflict.

6.3.4 GRAZING: During the last ten years there is a rise in cattle population. The total livestock population in Pandharkawada Division is 3,37,747 as per 20th livestock census 2019. Grazing pressure has increased manifold in the past few years. Heavy grazing in forest areas takes away available fodder for most wild herbivores. Grazing also leads to spread of diseases to wild animals besides affecting the habitat severely. This along with fire also poses a serious threat to habitat of grassland birds. Illegal grazing is on rise especially during the monsoon season, disturbing the natural regeneration in the division.

6.3.5 DISEASES: The livestock from the villages in the forests regularly frequent the forests and share the waterholes used by wild animals. Therefore, various diseases common in domestic cattle, and which spread through contact and are water borne

(contagious diseases) are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are anthrax, rabies, FMD and canine distemper. FMD has a potential to wipe out large populations, while rinderpest, anthrax and rabies are highly infectious and lead to certain death.

6.3.6 HUMAN-WILDLIFE CONFLICT

Damages to the Crops: Incidences of crop damages by herbivores have been reported predominantly in forest fringe villages. This is leading to economic losses to farmers. Farmers are compensated for the losses as per the Government orders issued from time to time.

Injuries to Cattle & Human: Communities around the forest patches of this landscape are dependent on forest resources for livestock grazing, forest product collection etc. that leads frequent conflict in this landscape matrix. In 2017, a tigress in this block was held accountable for claiming several human lives and later was gunned down by a professional hired by the Govt. of Maharashtra. There are also cases of human injury and even death due to attacks from other wild animals like wild pigs. Statistics of damage to humans is provided in the table no. 3.11 in Chapter 3 of Part I of this Plan. More details are provided in the **Appendix No. VIII**. To minimize the human-tiger conflict, and to avoid any untoward incident, prey supplementation in Tipeswar Wildlife Sanctuary, an early alarm system for the people living around this landscape block should be implemented.

The National Tiger Conservation Authority has developed Standard Operating Procedures (SOPs) to deal with various aspects of tiger such as

- a) Straying of Tiger in human dominated landscape
- b) Tiger mortality
- c) Disposal of carcasses

DCF, Pandharkawada shall ensure that these are implemented scrupulously.

6.4 FUTURE MANAGEMENT

6.4.1 STANDING ORDER (WILDLIFE) NO.001

The standing order (Wildlife) No.001 dated March 07, 2003 issued by the PCCF (WL) MS, Nagpur prescribes duties and lists measures for the protection and conservation of the wildlife outside PAs. Following are the general prescriptions, majority of which are based on the guidelines under this Standing Order, for the protection of wildlife in the areas outside the Protected Areas. The territorial staff of the division shall scrupulously implement these prescriptions.

1. Duties of Forest Guard, Forester, RFO and ACF include:

- Keeping information of waterholes, particularly in summer and special vigilance at all the waterholes in the division is prescribed.
- Keeping a watch on the electric lines passing through forests.
- Ensuring registration of arms licenses as required under Wildlife (Protection) Act 1972
- Cognizance of cases of injury due to wild animals as per Government orders from time to time with speedy and transparent disposal of cases.
- Keeping track of animals like tiger, particularly tigress with cubs and a watch on such vulnerable animals.
- Proper disposal of carcass of wild animals found dead or killed.
- Local staff shall maintain record of sensitive wildlife areas such as areas with heavy wild animal concentration.
- Establishing a network of informers with the aid of the Secret Service Fund.
- There shall be regular short-term training/workshops in anti-poaching activities and legal requirements in dealing with wildlife offence cases.

- Cases of man-animal conflict should be handled swiftly and efficiently. Keeping in view the area of the division, at least one Rapid Response team shall be operationalized 24 x 7. Such team should be given need based training. Every range headquarters should contain equipment necessary to handle conflict situations.
2. Nature education programme in the villages adjoining forests, schools and colleges shall be arranged.
 3. Ecologically sensitive habitats shall be identified and protected.
 4. Antler trade is now banned; hence, no collection of shed antlers is to be allowed.
 5. The involvement of Honorary Wildlife Warden and dedicated NGOs be encouraged for nature education programmes.
 6. It shall be ensured that cattle grazing in forests near the important wildlife habitats are inoculated against contagious diseases.

6.4.2 CREATION OF DATABASE

The division shall carry out survey of riparian zones, mesic sites, perennial waterholes, saltlicks, natural wallows, resting places, breeding and nesting sites, etc. and map them on GIS platform for their protection and management. The range office will also maintain a meticulous record of these sites on a register named “Register of the Special Wildlife Habitat” and update it annually by an officer not below the Range Forest Officer.

The division shall undertake annual population estimation of the wildlife, including the migratory and other rare birds, in addition to All India Tiger and Leopard population Estimation. Special note should be taken if any nesting site of endangered birds such as Vultures is noticed. Concurrent monitoring of top carnivores through camera traps shall be taken up. All cases of compensation (crop, livestock and human)

along with GPS coordinates should be mapped on the GIS platform for better management.

6.4.3 DELINEATION AND MAPPING OF SPECIAL HABITAT AREAS

Delineation of special wildlife habitat sites including natural water seepage sites (mesic sites), waterholes, natural wallows and saltlicks used by the wildlife, breeding sites, dens or nesting sites of animals and birds appearing in the Schedules of the Wildlife (Protection) Act, 1972 shall be carried out and marked on the divisional/range maps. A strip of 50-meter around special habitat sites shall also be delineated and mapped to serve as buffer for the site.

While preparation of treatment map of coupe for working in the area-specific working circles, the special wildlife habitat sites given above shall be identified and marked on the map along with its buffer of 50-meter wide strip around.

6.4.4 HABITAT DEVELOPMENT WORKS

Due to continuous biotic pressure, wildlife habitat has also deteriorated and has reached a critical condition. The most important factors in the habitat are water, food, safe places for resting, breeding, and nesting. Wallows and salt licks are other factors. To meet the minimum requirement of the wild animals the following activities are recommended:

Marking Reservations and Other Restrictions: The following prescriptions have been made for implementation along with coupe operations and other treatment prescriptions, in the wildlife area-specific coupes.

- No felling of trees or harvesting of any sort shall be allowed in riparian zone.
- While marking of dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.

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

Development of Fodder:

- The existing grass areas shall be protected from biotic pressure and restricted near habitations. Due to heavy domestic cattle grazing these grassland patches are invaded with unpalatable grass and weed growth.
- The carrying capacity for grazing is determined after excluding the forest area required to meet fodder requirements of the wild animals and ecologically sensitive sites and special habitat sites for wildlife in the area.
- Habitat improvement is proposed at places having high density of wildlife and the areas frequented by both domestic animals and wildlife. Special efforts are to be initiated to develop meadows.
- Plantations prescribed in various working circles shall include at least 10 percent of fodder and fruit species of wildlife importance. Ficus species (Vad, Umbar etc.), Ber, Sitafal, Anjan, etc. are recommended for this purpose.

Water Management:

Water management includes maintenance, strengthening of all existing waterholes and creation of new artificial waterholes. Water availability, or the scarcity of it, is one of the major factors that decide the health of a habitat. Its non-availability at sufficient places in the forests also increases probability of animals being found on the limited waterholes or near villages and thereby increases their susceptibility to poaching. Water is a major limiting factor during the summers in these forests. The waterhole density shall be commensurate with the density of wild animals found in the area and as per the wildlife management regulations. To meet the requirement the following steps may be taken up:

- All the perennial and ephemeral waterholes shall be identified, recorded and marked on divisional/range maps.
- De-silting, if required, shall be carried out during summer to provide adequate drinking water. Leaf litter which falls in the waterholes and gets decomposed making water unhealthy shall be cleared during April and May.
- Creation of additional waterholes (permanent and temporary) is prescribed so that undisturbed waterholes are available. Waterholes shall not be created at least 2 kms from the nearest village boundary so as to avoid the animals moving towards the human habitation. Approach to waterholes shall be made accessible by providing rough surfaces and smooth slopes.
- Small nala bunds, underground bunds and other technically sound small water harvesting structures may be constructed across the streams to create waterholes and habitat development.
- Small cement concrete saucer shaped waterholes shall be constructed at suitable and safe places and be linked with solar powered pumps fitted to bore wells.

Food/Prey Base:

Whether the prey base is adequate or not shall be ascertained from regular herbivore count. Any downward trend should be looked into seriously and possible reasons for its downslide must be found out and rectifying steps must be taken. To improve the prey base, care of herbivores should be taken by improving the assured fodder availability in the forest, especially during the summer season, when the forest grasslands are burnt. The open areas in wildlife rich zones should be developed into meadows for the herbivores.

Development of Nesting Sites:

To provide suitable nesting places to these birds, seed sowing of species like Babul and stake planting of species such as Banyan and other Ficus spp. should be done near water-bodies and in the riparian areas.

6.4.5 PROTECTION MEASURES FOR WILDLIFE

Considering the presence of wildlife, monitoring of wild animal health is important. Presence of domestic cattle increases the vulnerability of wild animals. Communicable animal diseases of bacterial, viral, protozoan and rickettsial origin may threaten the wildlife population. The total livestock population in six talukas of Pandharkawada Forest Division is 3,37,747 as per 20th livestock census 2019. There are many villages adjoining the forest area. They are dependent on agricultural and forestry works. These villages, with large number of livestock, are a threat to wild animals as they share the same water bodies and grazing grounds. Due to common grazing and drinking water at same places, many contagious diseases may spread in the wild animals. With the help of the veterinary department the following preventive measures in such villages should be undertaken.

a) Vaccination of Village Cattle:

All cattle of adjoining villages within 5 km from the boundary of Protected Areas should be vaccinated every year for important diseases. This activity shall be monitored by the DFO (Wildlife). Tipeshwar Wildlife Sanctuary and also DCF, Pandharkawada.

b) Regular Health Check-up for Cattle:

Forest staff, with the help of veterinary doctor of the area, should organize annual cattle health check-up camps in villages. Required vaccination should be done and if required, proper treatment to sick animal should be given.

Sensitization of Field Staff:

The field staff of the Division should be trained in day-to-day wildlife management and protection works. They should work in close cooperation with the wildlife wing.

Protection from Poaching and Trade:

The forest staff shall develop an intelligence system with the help of local people, especially with the Joint Forest Management Committee, to gather information about any activities related to poachers and traders of wildlife. Special funds are provided by the department for gathering such information.

Regular patrolling by the staff shall be carried out in the areas where the population of wildlife is more, especially during summer when these animals become more vulnerable due to shortage of water in the forest areas. The forest staff shall also be vigilant in the towns' market where at times birds like parakeets, partridges, quails, waterbirds, monitor lizards, tortoise, turtles etc. are brought for sale.

Protection of Forest from Over-Grazing and Fire:

After poaching, uncontrolled grazing and fire are the most important factors which adversely affect wildlife. To restrict illegal grazing, by cattle including goat, sheep etc., and during the fire season, to prevent the forest fires, patrolling parties should carry out regular patrolling in the sensitive areas of the forest.

6.4.6 DR. SHYAMA PRASAD MUKHARJEE JAN VAN VIKAS YOJANA

This is a wholistic scheme operational since 2015. The areas falling within 5 kms of Tiger reserves/National Parks and Wildlife Sanctuaries can be addressed through this scheme. The purview of this scheme has been recently expanded to include villages outside 5 km radius of the Protected Area. This scheme includes following activities:

1. Wildlife protection and conservation.
2. Decreasing human wildlife conflict.
3. Developing alternate livelihood.
4. Improving cleanliness aspects.
5. Enhancing dairy development.

6. Undertaking watershed development.
7. Ushering agricultural development.

The scheme is implemented in 44 villages of Pandharkawada Forest Division. Range-wise details are provided in the table below.

Table 6.1: Implementation of Dr. Shyama Prasad Mukharjee Jan Van Vikas Yojana in Pandharkawada Division

Sr.No.	Range	Village name
(1)	(2)	(3)
1	Maregaon	Sarati
2		Tejani
3		Khairgaon
4		Borati
5		Loni
6		Sakhi
7		Vihirgaon
8		Bandar
9		Savarkheda
10		Vadad
11	Pandharkawada	Zotingdhara
12		Jira
13		Meera
14		Ghodadara
15		Ballarpur
16		Kavatha
17		Sakhara (Bu.)
18		Vanjari
19		Sakhi (Bu.)
20		Ghubadi
21		Hiwari
22		Chanakha
23	Mukutban	Chichghat
24		Khadakdoh
25		Bopapur

Sr.No.	Range	Village name
(1)	(2)	(3)
26		Savali
27		Dongargao
28		Adkoli
29		Nimani
30		Dabhadi
31		Pavnar
32	Jamani	Pivardol
33		Gavara
34		Mandvi
35	Parava	Manusdhari
36		Mejada
37		Jamb
38	Ghatanji	Injala
39	Maregaon	Vedashi
40		Aanji
41		Boragaobandi
42		Wadhonabandi
43	Wani	Sukanegaon
44		Kumbharkhani (Ejasan)

6.4.7 CAPACITY BUILDING

Books related to disease of wild animals, treatment, tranquilization, wildlife management etc. should be supplied to the field staff to improve their management skills. Short duration training for tranquilization of wild animals, to the forest staff and veterinary doctors, shall be imparted. Special care to motivate and orient the field staff should be through regular meetings, guidance and workshops. Some of the RFOs and Foresters shall be sent to short term training in the Chandrapur Forest Academy, Wildlife Institute of India, Dehradun, etc. Visits to Protected Areas should be carried out to expose the field staff to the technical aspects of wildlife management.

6.4.8 AWARENESS GENERATION AND ECO-TOURISM

Active involvement and support of village communities in protecting and managing sensitive ecological and special habitat sites/areas are crucial. To achieve this, it is necessary to consider the genuine needs and concerns of the local communities. Undertaking eco-development works in villages surrounding these sites and promoting eco-tourism through camping and nature interpretation facilities can help garner their support. Collaboration with the Maharashtra Tourism Development Corporation (MTDC)/ FDCM is recommended for site development. Additionally, creating eco-centres at prominent water bodies and specific habitat sites can serve as hubs for awareness generation, nature interpretation, and eco-tourism.

Awareness generation campaigns shall be taken up to involve local villagers in the wildlife conservation programme. Village Panchayats and JFMCs shall be involved actively to further the cause of wildlife protection. Teaching institutions viz. schools, colleges, etc. and NGOs shall be involved through nature camps, wildlife film shows, exhibitions, seminars, competition, etc.

CHAPTER 7

NON-TIMBER FOREST PRODUCE

Traditionally Non-Timber Forest Produce (NTFP) refers to all biological materials other than timber extracted from natural forests for human and animal use and have both consumptive and exchange value. It is estimated that about 50 million people in India are dependent on NTFPs for their livelihood. NTFP sector has untapped potential to create huge employment opportunities. Historically, the NTFP sector was neglected for many decades from mainstream forestry and they were considered as 'minor' (Minor Forest Produce). NTFPs have a tremendous potential to involve local collectors for establishing micro, small and medium enterprises through clear tenured rights, better collection methods, financial support, capacity development, infrastructure and institutional support in near future. With these efforts there is a potential to create large scale employment opportunities thereby, helping in reducing poverty and increasing empowerment of particularly women, tribal and poor people of the poorest and backward districts of the country.

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

7.1 ANALYSIS OF THE CROP

The species of NTFP are available throughout the tract with varying degrees. These contribute to a large extent to meet the non-wood forest produce demand of local forest dwellers directly or indirectly. They play an important role in generating employment to the local people. The important non timber forest produce available in this division are Moha flower, Moha seed, Tendu, Hirda, Behada, Aonla, Charoli, Kulu, Dhawda and Honey.

TABLE NO.7.1 NTFP SPECIES OF PANDHARKAWADA DIVISION
(AS PER ENUMERATION DATA - 2023)

S.No.	NTFP Species	Scientific Name	Trees/ha.	Estimated Number of Treesin Pandharkawada Division
(1)	(2)	(3)	(4)	(5)
1	Apta	<i>Bauhinia racemosa</i>	0.14	9495
2	Awala	<i>Emblica officinalis</i>	0.07	4747
3	Behada	<i>Terminalia bellirica</i>	1.61	108004
4	Bel	<i>Aegle marmelos</i>	0.16	10682
5	Biba	<i>Semecarpus anacardium</i>	0.11	7121
6	Bor	<i>Ziziphus mauritiana</i>	0.02	1187
7	Charoli	<i>Buchananialanzan</i>	0.64	42727
8	Chinch	<i>Tamarindus indica</i>	0.32	21363
9	Dhawada	<i>Anogeissus latifolia</i>	6.88	461688
10	Karanj	<i>Pongamia pinnata</i>	2.12	142423
11	Khair	<i>Acacia catechu</i>	1.04	70025
12	Moha	<i>Madhuca longifolia</i>	0.04	2374
13	Neem	<i>Azadirachta indica</i>	1.70	113938
14	Palas	<i>Butea monosperma</i>	37.86	2538689
15	Shiras	<i>Albizia lebbeck</i>	0.04	2374
16	Tendu	<i>Diospyros melanoxylon</i>	8.42	564944

Medicinal Plants:

A wide range of medicinal plants are found in Pandharkawada Forest Division which yield a variety of medicines that are used by the local people. The medicinal plants play an important role in socio-economic, cultural, spiritual lives of local villagers and in conserving biodiversity.

The distribution of medicinal plants is in the entire tract but the present methods of extraction of medicinal plants are not well studied. At present the knowledge about the use of various products of medicinal plants is meager.

Some of the medicinal plants in the division are not identified which require surveys. Studies at macro level do not give a proper picture about most of the medicinal plants. Many medicinal plants appear during the 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. Moreover, 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. The list of important medicinal plants identified in this division is provided in **Appendix No. XXVII** of Volume-II.

7.2 SPECIAL OBJECTIVES OF MANAGEMENT

As per the National Forest Policy, 1988 and 'The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006', the development of Non-Timber Forest Produce (NTFP) has been one of the most important objectives in forest management. Therefore, consistent with the above policy and law, the special objects of management are enunciated as below:

1. To protect and manage NTFP yielding species and to utilize the existing potential optimally and to enhance the productivity.
2. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques.

3. To ensure enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division.
4. To generate employment and improve the economy of the local people and thereby improve their socio-economic conditions.

7.2.1 OWNERSHIP OF NTFP

The statutory provisions have vested ownership rights over the listed NTFPs species in the village communities in the Scheduled Areas without granting such rights over the trees and the land. Till recently, this list did not include Tendu, the prominent NTFP species in this tract. But after the enactment of 'The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006', even Tendu has been included in the category of NTFP.

The Seventy-third Amendment of the Constitution of India has brought the NTFPs under the management of the Village Panchayat. NTFPs (MFPs) in the state and its sale procedure can be categorised into two parts:

- i. 33 NTFPs (MFPs) in Scheduled Areas.
 - ii. Other NTFPs (MFPs) excluding 33 NTFPs in Scheduled Area and NTFPs in Non-Scheduled Areas.
- i. 33 NTFPs in Scheduled Areas:**
- i. Government of India passed the Provisions of the Panchayat Extension to the Scheduled Areas in 1996. In pursuance to this, Government of Maharashtra passed Maharashtra Act No. XLV of 1997, "Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act 1997."
 - ii. As per 1997 amendment, for 33 Minor Forest Produce found on Government land in Scheduled Areas, ownership lies with Gram Sabha.

ii. Other Non Timber Forest Produce (excluding 33 NTFPs in Scheduled Area) and NTFPs in Non-Scheduled Areas:

1. Revenue & Forest Department, GoM, Government Resolution dated October 5, 2011, confers the rights of NTFP collection, processing and sale to the JFMCs. Therefore, capacity building of JFMCs is crucial for realising the potential of harnessing employment generation to JFMC members and additional income to the committee to further invest in the development of NTFPs.
2. Forest Rights Act, 2006 confers the rights over NTFPs to the community right holders. Therefore, in areas where the CFRs (involving NTFPs) have been vested with village communities, in such areas, the process of NTFP collection, processing and sale has to be initiated by that community.
3. Excluding the above-mentioned areas, DCF can form NTFP units and put them for auction. However, a mechanism has to be evolved to regulate excess harvesting.

7.2.2 NTFP COLLECTION

Though a few species are identified there is huge lacuna in the quantum of availability, collection and sale of the products. There may be many other forest species which yield various products or leaves, flowers, fruits etc. which are of some use for medicinal purposes. However, systematic information in this respect is not currently available. Such NTFPs should also ideally find their due place in the JFM micro-plan. Proper grading, value addition and exploring new markets for the traditional NTFPs (such as gum), shall be included under the JFM programme of the division.

7.2.3 METHODS OF TREATMENT

Documentation of NTFP Collection: The beat guards shall send monthly reports to the Range Forest Officer on the quantity of NTFPs collected in their beats. The Range Forest Officer shall compile and send the detailed report, mentioning the quantity as well as the market price, to the division office. The Division Office thereafter shall compile the figures for each species for Division with a view to monitor the collection and to enhance the productivity of these NTFPs. Involving JFMCs in this exercise would be beneficial as they are the major stakeholders in collecting, processing and selling NTFPs. To capture such information with uniformity, suitable printed registers be supplied to all JFMCs through the division office.

Vandhan Jandhan Outlet : Vandhan Jandhan outlet is established at Yavatmal range in Yavatmal Forest Division and produces of NTFP species are sold through this platform. JFM Committees of Bhoyar, Chicnchbardi and Ichori are actively involved in collection, processing and sale of NTFPs. More such outlets can be established in the Division.

Fire Protection Measures: Collection of NTFPs is often associated with forest fires, because the villagers set fire around the NTFP yielding trees for clearance of leaf litter and undergrowth. Fires are also caused by agents of Tendu contractors under the belief to get better flush of Tendu leaves. If it is left unattended, such fires spread into forests as forest fires. Additionally, the following measures shall be undertaken.

- The Village Panchayats and Forest Protection Committees shall be involved in awareness generation programme to help control forest fires.
- In case of forest fire, legal action shall be taken against the defaulters. Strict vigilance is necessary during the months of February-April to check the spread of fires specially during the Tendu and Mahua flower season.

The treatment to be given will be different for different types of NTFPs. Therefore, each NTFP will have separate treatment as follows.

Management of Tendu:

Collection of Tendu Leaves: Tendu is the prominent revenue generating NTFP of this tract. Tendu leaves are used for manufacturing bidis. Tendu trade has been nationalised by the Government of Maharashtra Act No. LVII of 1969. Tendu leaves were collected by the department through agents till 1990 season. From the 1991 season Tendu units are being sold on lump sum basis. The collection of Tendu leaves commences from the last week of April each year and continues up to first week of June. Quality of leaves is a major criterion for bidi manufacturers. The quality depends on the colour, texture and presence of nodules and veins. The best quality leaves are those ranging from ashy to palest hue; Almond colour is also prized shade. Leaves with leathery texture either too thick or thin are good quality for making Bidi. The leaves are collected at various collection centres called phadies. The leaves (pudas) are dried and then packed in gunny bags. The quantity is measured in standard bags.

- Tendu leaf collection is governed by the policy of the State Government in conjunction with various laws presently in force.
- Tendu leaf collection is an income generating activity for most local and tribal villages in the region. The local village communities shall be engaged in Tendu collection in the Division to support their livelihood.
- Pruning of young Tendu plants does help in increasing leaf yield. Saplings having more than 5 centimetres collar diameter shall not be pruned.

Tendu Regeneration:

In view of importance of Tendu to support the livelihood of forest dwelling communities and its economic value for the region, sustainable management and use of Tendu is prescribed to be given added focus.

- Maintenance and improvement of Tendu in the forest crop composition is prescribed by ensuring regeneration of Tendu and its subsequent protection.
- Singling of shoots and soil working around Tendu seedlings is prescribed in the plantation and rootstock areas to promote growth of Tendu seedlings along with the annual coupes in area-specific working circles.

- Tendu regenerates through root suckers. Hence, young root suckers should be identified and aided for creation of congenial growth conditions such as cleaning of bushes, protection from fire etc.

Year wise production of revenue obtained for the last 10 years is given in **Appendix No. XXVIII**. In order to increase the 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 ignite fire to forest to get good flush of tendu leaves which causes adverse impact on regeneration.

Formation of units:

The entire division is divided into 9 non-PESA tendu units and 6 PESA tendu units. They are constituted for the purpose of regulation of trade of tendu leaves under its Forest Produce (Regulation of Trade) Act 1969 vide its No. MFP 2182/240911/F-1, dt. November 19, 1983 of Government of Maharashtra. The list of tendu units formed in this Division are given below.

TABLE NO.7.2: TENDU UNITS OF PANDHARKAWADA DIVISION

Sr. No.	Range	Non-PESA Unit	PESA Unit
(1)	(2)	(3)	(4)
1	Maregaon	Maregaon	Maregaon
2	Wani	Sukannegaon	Wani
3		Kurli	
4		Wani	
5	Mukutban	Mukutban	Mukutban
6	Jamani	Jamani	Jamani
7	Pandharkawada	Pandharkawada	Pandharkawada
8	Parwa	Parwa	Parwa
9	Ghatanji	Ghatanji	Ghatanji

Management of Gums:

Gum is an important NTFP and is exuded by plants, partly as normal phenomena and partly as the result of disease or injury to the bark. Wood Gum is a substance of more or less sticky nature. Dhawda (*Anogeissus latifolia*) is the main source of gum in the area. These gums are used in medicines, chemicals, cosmetics, food industries and incense. Dhawda gum is used in the food industry for making sweets. It may also be suitable in the manufacture of elastic adhesive, lacquers, oil cloth compositions, ink and perfumery.

Previously gum units were operational in this division, but because of operational difficulties and reduced availability of source trees, they have become dysfunctional over time. Locals in few pockets continue to harvest gum, using traditional methods. Staff, through the means of JFMCs, should ensure that the scientific ways of gum tapping should be adhered to.

Tapping rules:

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

1. The tapping season shall commence from November to end of May each year.
2. Tapping shall be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.
3. Only trees above 90 cm in girth at breast height shall be tapped.
4. Each tree shall be tapped continuously for 3 years and shall be given rest for 3 years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.
5. The initial blaze of 20 cm width and 30 cm in length or height may be made on trees in the month of November. The blaze is made 0.6 cm deep in the bark. Blaze may be made horizontally leaving equal space between two blazes.

6. The gum starts oozing out soon after blaze is made and may be collected after a month, i.e. about December. Subsequent collection and freshening may be done fortnightly up to May. Thus 12 freshening may be required to be made during the year.
7. The lowest row of blaze will be at 1 m 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 NO.7.3: NUMBER OF BLAZES ON TREE FOR GUM

Sr.No.	Girth at Breast Height (in metres)	Maximum no. of Blazes to be made on each Tree
(1)	(2)	(3)
1	0.9 to 1.3	2
2	1.3 to 2	3
3	2 to 3	4
4	Over 3	1 blaze for every 45 cm girth in addition to category 3 above.

No fresh blaze will be made on the partially healed up surface or old wounds. Each blaze will be in a shape of parabola with a 2.5 cm side base. The curved side of parabola will be upwards and of height not more than 7.5 cm and depth of the blaze shall not exceed 0.6 cm in the wood. At the end of the season, the height of the blaze shall not be greater than 12.5 cm. Maximum permissible dimension of each blaze shall be 10X12.5X0.6 cm in width, height and depth respectively.

Since the 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 the width and depth remaining the 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.

The “Drill method” for gum extraction may also be carried out for better gum production. The methodology is as follows.

- The tapping season commences from November and remains until the end of May each year.
- No tree below 90 cm in girth will be tapped.
- Drills of 2 to 3 cm depth (slightly slanting towards base) are made at a spacing of 20 cm at breast height. A tree of 120 cm will have 6 drill holes.
- 1 ml of ethephon (39%) will be injected in each hole.
- Within 4 to 5 hours of ethephon injection, Gum oozing commences.
- Gum can be harvested as clumps every 15 days.

7.2.4 MANAGEMENT OF HIRDA, BEHEDA, AONLA, CHAR AND OTHER NTFPS

Collection of Hirda, Beheda, Aonla, Char and other NTFPs:

Fruits of Hirda, Beheda, Aonla and Char are marketable items. Similarly, fruits, flowers and leaves of certain shrubs and trees are used for variety of purposes. Current level of collection is quite erratic and therefore, poor indicator of their potential in the tract.

Collection of species, which are not covered under the monopoly procurement by government agencies, should be allowed by the Joint Forest Management Committees or Village Panchayats for better protection of Hirda, Beheda, Aonla, Char trees and to increase its stock, few of the above trees be numbered and these trees be

allotted to members of JFM committee. The members of committees who have been assigned should protect and nurture these trees. Range Forest Officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

Removal of NTFPs shall be within the sustainable limits of production. Felling of trees and lopping of branches shall not be permitted for NTFP collection. Destructive removal shall not be permitted, in any case. Digging up of plant roots, branch cutting, debarking on a plant will be considered as destructive removal.

Regeneration of Hirda, Beheda, Aonla and Char:

Required tending is prescribed where saplings of Beheda, Aonla and Char are found in worked coupes, to remove congestion. Soil working and mulching are prescribed along with planted seedlings and to be done during coupe operations of various areas in working circles. At least 10% of species taken up for plantations shall be of NTFP species. Hirda, Beheda, Aonla and Char are prescribed for plantations.

7.2.5 FUTURE INTERVENTIONS

The NTFP management on sustainable basis has remained a complex process for the last several decades but in the present scenario, there is a need to adopt multipronged strategy, as under, to build up an environment to strengthen community based management and trade of NTFPs which in turn would strengthen the livelihood of forest dependant population.

Resource Augmentation:

Due to unrestricted and unscientific collection and over-use, NTFP resources have greatly depleted over years while their regeneration has declined. Special efforts are required for reducing the pressure on forest by cultivating selected species and undertaking intensive conservation of existing forests supported by Natural Regeneration and other conservation activities. One of the important strategies for resource generation is conservation, development and harvesting methods which is an integrated approach from conservation and production to the end use.

Undertaking in situ conservation measures for NTFPs including protection and Assisted Natural Regeneration (ANR) to reduce resource depletion and reviving endangered NTFPs is required. Conservation of all genotypes including RET species, development and sustainable harvesting with locally feasible models of community participation. Additionally, cultivation and plantations of NTFP can be promoted in private lands, lands with gram panchayat to reduce the gap in demand and supply. Special efforts are required for all activities of NR, ANR, nursery raising, plantations and tissue culture etc.

Detailed Inventory and Prioritization:

NTFP sector is majorly unorganized. There is no comprehensive information available on most of the NTFPs. Most of NTFP species are of medicinal value and are in active trade. Only few species are recognized and traded while very little data is available at the division level. Since NTFP collections are seasonal and may vary from year to year it is difficult to provide demand and supply data until a dedicated system prevails. The first priority would be to prepare a base line data. A first-hand knowledge towards the identification of species should be available at a beat level. Hence a compartment wise inventory of the species, quantity, mature trees available, their production potential and quantum collected needs to be documented. Attributes such as species wise availability, season of harvest, economic part, cultivation status, quantity which is self-consumed, value added and traded also needs to be documented. Range wise species prioritization and selection for conservation, development and harvesting of important NTFP species, demand and supply for NTFPs needs to be determined. All such information needs to be developed on GIS platform for better management.

Forward and Backward Linkages:

Traditionally the whole NTFP sector, particularly its collection, trade and local value addition are managed in an unsystematic and unorganized manner. JFM committees, Gram sabhas and Panchayats were given some responsibilities for NTFP management but are still not in a position to independently and successfully handle

the overall management of NTFP. Most NTFPs are biological and seasonal products where several produce are perishable and require immediate disposal. In most places the primary collectors do not have proper storage facilities. Hence, primary collector is vulnerable to sell at a low price.

In this Division a few species can be identified based on the availability. For each prioritized species, value chain analysis and development needs to be carried out followed by need based infrastructure development, processing facilities, standardization, certification, enterprise development, purchase and selling, arrangements for working capital/loans etc. Importance should be given to those species which come under RET (rare, endangered and threatened) categories. There is a need to involve financial institutions to promote community based micro-enterprises with clear benefit sharing mechanisms. Involve financial institutions like public sector banks in NTFP enterprise development. Apart from the above, the following aspects can be considered for NTFPs.

1. Minimum support price (MSP) for NTFPs: Ministry of Tribal Affairs, Government of India has announced MSP for certain NTFPs such as, Karanj Seed, Mahua Seed, Sal Leaf, Sal Seed, Lac (Rangini and Kusumi), Chironjee, Wild Honey, Myrobalan, Tamarind, Gums (Gum Karaya), Kusum Seed, Neem Seed, Puwad Seed, Baheda, Hill Broom Grass, Shikakai, Guggul (exudate), Bael (dried and without crust), Nagarmotha, Palash Kesuda (flower), Shatavari (dried), Madhunashini, Kalmegh, Tamarind (de-seeded).
2. Mechanism for market intelligence and information system.
3. Efficient Certification system for improved trade.
4. Revolving Fund or similar financial support to primary collectors through JFM committees.
5. Better access and benefit sharing mechanism with necessary legal provisions needs to be ensured.

6. Value chain development by aggregation, primary processing, grading, branding and certification. Works initiated by some of the divisions like Gadchiroli may be taken as a reference.

Capacity Building:

Skill development is very important for the foresters, particularly the field staff, to successfully face the emerging challenges of accommodating community rights in forest conservation, ensuring biodiversity conservation and managing climate change. At the same time, complimentary facilitation should be made for forest protecting JFM committees too in the form of NTFP management protocols. The following aspects need to be taken up for capacity building.

1. Formation and strengthening of local institutions-JFM committees, Self Help Groups.
2. Special training of front line staff and members of JFMCs.
3. Strengthen and restructure existing institutions, particularly public sector procurement and marketing agencies.
4. Modular training for NTFP collector, growers, entrepreneurs and traders.
5. Local, state and national level exposure visits of relevant stakeholders.

Income Generation:

For empowerment of community and sustainable forests a symbiotic relationship between forests and forest dwellers must be maintained in order to provide income for the poor population. Women are mostly dependent on NTFPs due to the nature of its production, quantity, collection procedure, processing and local selling. Better income generation leads to poverty alleviation and women empowerment.

Research and Development:

Research and Development activities in the past were more or less timber centric. Except for few NTFPs such as lac, resin, tendu most have been ignored even though they are highly exploited. There is a need of action oriented R & D in areas of developing new/alternate marketability particularly for low value and high volume NTFPs on the basis of a special drive, post harvesting, semi processing, genetics, management, nursery, plantation, collection, storage, chemical analysis for useful contents, etc. Research is required on biological, social, trade and market and economic dimensions.

R & D focus is also necessary to develop NTFP silviculture, sustainable harvesting protocols, low-cost and user-friendly (preferably women-friendly) value addition techniques and processing machines, eco-friendly and safe storage methods. To develop the NTFP sector in a holistic way a co-ordinated effort between various Government sponsored programmes is necessary.

CHAPTER-8

JOINT FOREST MANAGEMENT

Joint Forest Management (JFM) is a collaborative approach that involves the participation of local communities, forest departments, and other stakeholders in the sustainable management and conservation of forest resources. Under JFM, communities are given a significant role in decision-making processes, implementation of forest conservation measures, and sharing the benefits derived from forests. The objective of JFM is to address the issues of deforestation, encroachment, and degradation of forests by promoting community ownership and responsibility. This approach recognizes the traditional knowledge and practices of local communities, empowering them to actively participate in forest protection, regeneration, and sustainable utilization of forest products. JFM has proven to be an effective strategy in several countries, fostering a sense of ownership, enhancing livelihoods, and promoting the conservation of forests and their biodiversity. Through JFM, communities become the custodians of their local forests, leading to a more sustainable and equitable approach to forest management.

8.1 SPECIAL OBJECTS OF MANAGEMENT

1. To strengthen and empower local institutions for protection and conservation of forests and wildlife resources through peoples' participation.
2. To increase the vegetation cover and to carry out soil and moisture conservation works with the active co-operation of local people.
3. To involve local people in forest protection to generate sustainable employment.

8.2 RANGE WISE FORMATION OF JFMCs

In Maharashtra, JFM committees are guided by the Government of Maharashtra Resolutions dated March 16, 1992, October 5, 2011 and July 10, 2012.

In Pandharkawada Forest Division, 257 JFM committees have been established till 2023. The details are provided in the table below.

TABLE NO.8.1
RANGE-WISE DISTRIBUTION OF JFM COMMITTEES

S. No.	Range	No. of JFMCs	Area allotted (Ha.)	No. of MoUs signed	No. of Micro-plans Sanctioned
1	2	3	4	5	6
1	Pandharkawada	46	9009.27	46	17
2	Parwa	23	4895.09	23	7
3	Ghatanji	18	5168.01	18	15
4	Maregaon	43	8267.19	43	14
5	Wani	49	7635.22	49	8
6	Mukutban	30	5220.16	30	7
7	Jamani	48	8957.55	48	18
	Total	257	49152.49	257	86

In the 257 JFM committees there are a total of 3271 members and 257 Memorandums of Understanding (MoU) have been signed. The details of JFM committees are given in **Appendix No. XVI (A), Appendix No. XVI (B)** and **Appendix No. XVI (C)** of Volume-II.

8.3 BACKGROUND OF JOINT FOREST MANAGEMENT

Degradation of forests is a reality owing to various factors such as over exploitation of forest resources due to heavy biotic pressure caused from illegal removals from forest, overgrazing, forest fires, loss of top soil due to excessive erosion etc. Rate and magnitude of degradation is directly linked to the involvement of rural communities in the protection and management of forest resources. In the past, local communities enjoyed free access to the forests. With the bringing of forests under Government control through the process of reservation the access to forest resources

were substantially regulated. Thus, forest reservation policy came in conflict with the interests of local communities dependent on these forests to meet their basic needs of forest produce for bonafide requirements. Forests were managed as Government property in larger national interest as provided for in the National Forest Policy, 1952 which stated that the use of forests by village communities in their neighbourhood should in no event be permitted at the cost of national interest. Such policy of managing forest only in larger national interests, overlooking the basic needs of local communities did not succeed and forests were degraded as a result of over use.

Forests being a common property resource entails participation of communities in protection and management so that, the belongingness of the community acts as a catalyst for long term forest and wildlife conservation. Therefore, the National Forest Policy, 1988 accordingly provided for creating a massive people's movement for the conservation of forest resources.

The National Forest Policy, 1988 emphasized that domestic requirements of the tribal and other poor people living within and near the forest for fuel wood, fodder, NTFP and construction timber should be the first charge on forest produce and the holders of customary rights and concession in forest areas should be motivated to identify themselves with the protection and development of forest from which they derive benefits. In pursuance to the National Forest Policy, the Ministry of Environment and Forests advised the State Governments to adopt the Joint Forest Management (JFM) approach for the protection and rehabilitation of degraded forest. The Government of Maharashtra vide Resolution No.SIF-1091/199/F-11, dt.March 16, 1992 adopted JFM approach for degraded forest areas. Thereafter, the State Government vide Resolution dt. 25/4/2003, expanded the scope of JFM to good quality forests also. On October 5, 2011, the JFMCs were provided legal backing by bringing them under the umbrella of Mumbai Gram Panchayat Act 1959. Similarly, to further strengthen the institution of JFM, special schemes have been introduced to reduce the biotic pressure on forest and to improve the success of plantations viz., distribution of LPG/Biogas, distribution of improved cattle in lieu of low yielding cattle, protection of plantations, etc.

JFM is a concept under which Forest department and village committee jointly protect and manage the forests. The starting point of JFM has to be the realization of the need of JFM both by Forest department and the local people. Generally, the scarcity of forest products such as fuel wood, fodder etc. as a result of degradation of forest on which the local communities depended, forces the people to think of steps for the protection and improvement of degraded forests. People are usually reluctant to participate in JFM where sufficient forest areas are still available to meet their requirements. On the part of Forest Department, the challenge to effectively protect forests with limited resources is enormous. The JFM program succeeds where the initiative comes from the people's side and it usually fails where it is forced from Forest Department side as it would only be a Government driven and target oriented program. Villagers themselves are required voluntarily to participate in the program.

Forest Protection Committee (FPC) is to be formed in each village through the resolution of Gram Sabha. Each Forest Protection Committee constitutes a Managing Committee consisting of members elected from general body and with local Forest Guard/Forester as the member secretary. The managing committee is responsible to implement the decisions of general body with regard to the execution of JFM works in partnership with Forest department. Memorandum of Understanding (MoU) is signed between Forest department and managing committee clearly specifying the duties and responsibilities of both parties. Entitlement of FPC members to the share in forest produce is subject to the fulfilment of conditions of MoU.

The members of the FPC will help in protection and development of forests and in return they shall receive share in the usufructs from the forest areas assigned to such committee. The JFM area shall be managed as per the micro-plan prepared by the JFMC and approved by the DCF. These micro-plans shall contain the details of forest and village development works. This has to be sustainable, should cater to needs of local communities and the same time, the silvicultural requirements of the forest are to be factored properly.

Government of Maharashtra vide Resolution dated October 5, 2011 and July 10, 2012 has issued revised guidelines for implementation of JFM programme. Important provisions of these guidelines are summarized below:

1. JFMC will be constituted by the Gram Sabha through a resolution under the provisions of Section 49 of Mumbai Gram Panchayat Act, 1958. It would consist of 12 to 24 members, of which, at least 50% are women. Representation to SC, ST and VJNT will be as per prevailing Government norms.
2. The ex-officio member secretary of JFMC would be Forest Guard or Forester based on the village population whether it is less than 1000 or more than 1000 respectively.
3. The forest area to be assigned to JFMC would be decided based on parameters such as production potential, available eco-tourist sites etc. through consultative process. In general, forest areas within 3 km of Gaothan would be identified for assignment. Apart from degraded forest areas, even dense forest areas can also be assigned to JFMCs.
4. Memorandum of Understanding (MoU) shall be signed in prescribed format by DCF (T) and JFMC.
5. Micro-plan shall be prepared by the JFMC and should be approved by the DCF. All JFM activities should be taken up as per the approved micro-plan. The micro-plans are to be dovetailed with the broad prescriptions of the approved Working Plan of the division.
6. JFMC is authorized to promote eco-tourism activities in their assigned areas and can levy entry fee and nuisance tax from eco-tourists to preserve these sites sustainably and also generate livelihoods to local people.
7. JFMC is authorized to impose penalties on persons involved in forest and wildlife crimes.

8. RFO and JFMC have to submit an annual performance report jointly to the DCF with respect to the responsibilities assigned and achievements of the committee.
9. The JFMC would be eligible for usufruct sharing from intermediate and final felling as per working plan if the responsibilities thrust on the committee are executed for a period of five years. However, in case of bamboo, yield from dense areas/degraded areas, the same would be available to JFMC soon after execution of MoU and upon protection of bamboo for 3 years respectively. All removals would be as per the provisions of approved Working Plan.
10. In case, the JFMCs do not perform the responsibilities assigned to them, DCF is authorized to dissolve such committees by applying the principles of natural justice.
11. Non forest land available in the village can be included in the JFM programme if the Gram Panchayat agrees to do so.
12. To reduce the biotic pressure on forests for fuelwood, Government of Maharashtra vide Resolution dated July 10, 2012 has launched schemes for distribution of LPG/Biogas connections on 75% subsidy. Similarly, to reduce grazing pressure, distribution of improved breed of cattle in lieu of disposal of low yielding cattle has been introduced on 50% subsidy. To improve the performance of plantations, scheme for plantation protection through financial incentive has been launched.

8.4 CRITICAL ANALYSIS OF JFM

Pandharkawada Forest Division has a total of 257 JFM committees in the forest fringe villages. The total area allotted for these committees is 49,152.49 hectares. This covers around 73 % of the total area of the division.

The area is overburdened with heavy human and cattle population leading to high biotic pressure resulting in degradation of forest areas adjoining habitations. These forests are required to be regenerated through intensive protection and

development of rooted stock and natural regeneration. Natural regeneration should be supplemented with artificial regeneration with the active involvement and cooperation of the members of JFM committees. Areas generally degraded with density less than 0.4, open forest with eroded soils are included for JFM activities. JFM committees have taken up plantation activities to the extent of 297 hectares during the previous plan period.

Maharashtra forest department has issued guidelines for grading of JFM committees into A, B and C categories based on various criteria of performance. Based on this, of the 257 committees, 22 committees, 42 committees and 193 committees have been graded into A, B and C category committees respectively. General Body meetings and executive committee meetings of JFM committees are conducted periodically. The overall attendance in General Body meetings is 80% and that of Executive Committee meetings is 96%. During these meetings various resolutions pertaining to the concerned JFM committee are approved. Various registers are also maintained at the committee level.

Sant Tukaram Vangram Yojana Award is granted to best performing JFMCs at the district and state level. Certain JFMCs from Pandharkawada Forest Division during the previous plan period have won these awards. Details are as follows:

TABLE NO. 8.2: SANT TUKARAM VANGRAM YOJANA AWARD WINNING JFMCs

Sr.No	Year	JFMC	Range	District Level Standing
(1)	(2)	(3)	(4)	(5)
1	2014-15	Dhunki	Wani	Third
2	2015-16	Kawadashi	Wani	First
3	2016-17	Karegaon (Paranba)	Jamni	First

8.5 GAME THEORY IN JOINT FOREST MANAGEMENT

Joint Forest Management Committees (JFMC) play a pivotal role in balancing the interests of the forest department and local communities dependent on forest

resources. Applying game theory to this dynamic relationship unveils a strategic framework for understanding the interactions between these stakeholders. The forest department and forest dependents can be viewed as players engaged in a repeated game, where the decisions of one impact the outcomes for the other over time. To enhance cooperation, it is essential to align incentives, foster open communication, and establish clear, enforceable agreements. By building trust through gradualism, incorporating monitoring mechanisms, and promoting adaptive strategies, the JFMC can navigate the complexities of forest management while addressing the diverse objectives of sustainable forest use, biodiversity conservation, and community livelihoods. This game theory-based approach provides a structured pathway to foster collaboration and address potential conflicts, ultimately contributing to more effective and equitable joint management of forest resources.

In this strategic game, reciprocity and inclusive decision-making are essential elements. The tit-for-tat strategy, rewarding cooperation and responding to non-cooperation with proportionate actions, encourages a sense of fairness and mutual benefit. Inclusive decision-making, involving both the forest department and local communities, fosters a shared sense of ownership and responsibility. Furthermore, external mediation can serve as a valuable tool in resolving conflicts impartially. Capacity building for both the forest department and local communities is crucial, enhancing their ability to navigate challenges and contribute meaningfully to sustainable forest management. By incorporating these principles, the JFMC can transform its interactions into a cooperative endeavor, ensuring the long-term health of forests and the well-being of the communities dependent on them.

8.6 MANAGEMENT OPTIONS FOR FOREST

The concept of Joint Forest Management is to be accepted as important strategy for ushering in an era of sustainable rural development. The present on-going approach needs to be modified in such a way that local villagers develop a sense of “belongingness” to the existing forest and other natural resources. Overall management of the natural resources should be directed towards raising the general standards of the common masses, which would ultimately lead to the sustainable

community development. The following measures need to be incorporated to bring fresh air in JFM and, this kind of timely appropriate remedial measures shall make forest management more effective;

- i. **Entry Point Activity:** The entry point activity shall wholly contain the distribution of plants to be grown in kitchen garden or agricultural fields like *Moringa olifera* (drumstick), *Mangifera indica* (mango), *Emblica officinalis* (amla), *Citrus limon* (lemon), *Psidium guajava* (guava), *Murrayakoenigii* (kadipatta), etc. The main objective of this intervention is to provide nutritional supplements to family members through these plants. Other activities which suits local requirement and meets the need of village and fulfil the spirit of forest management may be permitted. It has been noted that if a village is approached with an entry point activity and an investment package in the name of JFM, people start losing interest in the whole process once that input package is over. This ultimately reflects on the sustainability of the entire programme. If the villagers are themselves not ready for a change then sustainability of any rural development programme or poverty alleviation programme cannot be ensured only by pumping in funds in the name of development projects or schemes, etc. If people are to develop a genuine interest in the whole development process, the initiative should come from within the village itself. The expectations of the villagers should be kept low.
- ii. **Soil and Moisture Conservation Works:** Soil and moisture conservation works shall be taken up as per the 'Ridge to valley' concept. The essential principle will be to conserve maximum rainwater within the village itself to recharge the groundwater table. Villagers must be educated and motivated to participate for conserving soil and moisture with the help of JFM.
- iii. **Afforestation on Forest Lands:** The Afforestation activities on forest lands will include:
 - a) Natural Regeneration
 - b) Assisted Natural Regeneration

- c) Artificial Regeneration
- d) Bamboo plantation
- e) Grass and fodder plantation

These afforestation programmes should be done with the help of JFMC as per prescriptions of Working Plan to maintain ecology and also for gaining economic gains for benefit of village by means of planting NTFP species.

iv. Plantation on Outside Forest Area: JFMC should vibrantly participate to increase vegetation cover not only in forests but also outside the forests. In this activity Social Forestry wing of the Forest department will give necessary assistance for plantation.

- **Block Plantation on Village Common Land:** The preference shall be indicated for raising combination of short and long rotation forestry species of NTFP values like Tamarind (*Tamarindus indica*), Jamun (*Syzygium cumini*), Bamboo, Kadipatta (*Murraya koenigii*), Triphala species (Hirda, Behada, Amla), etc. so that these plantations will provide sustained revenue to the village panchayat.
- **Linear Plantations:** All roads within the village and other connecting roads shall be planted under the roadside plantation program. In conjunction with roadside plantation other linear features like canals, streams, rivers, railway line, etc. plantations shall be carried out with co-ordination of concern department. Involvement of Social Forestry Department along with JFM will prove to be a booster for these plantations.
- **Bamboo Plantation on Agriculture Land:** There are two schemes that are implemented by the Maharashtra Bamboo Development Board. They are Atal Bamboo Samruddhi Yojana (a State Scheme) and Plantations under National Bamboo Mission (a Central Scheme). More

beneficiaries from the selected JFM villages should be included under these two schemes.

- v. **Distribution of LPG:** One of the important reasons for forest degradation is the dependence of local people on firewood from forests. Therefore, to reduce such dependence, GoM vide resolution of July 10, 2012 decided to distribute LPG connections to forest fringe villages. JFMCs have played a key role in implementing this scheme. Efforts should be made to extend this scheme to all JFM villages. The JFM villages should also be covered with other source of efficient fuel management like Improved Chulhas with help from the Maharashtra Biodiversity Board. Detailed planning should be made to include beneficiaries in the JFM village through the convergence of the Government of Maharashtra scheme with the Ujwala Yojana of Government of India. Priority should be given for villages which are remotely located.
- vi. **Monitoring and Evaluation:** One very important dimension of this JFM programme is that suitable mechanism needs to be developed for monitoring and evaluation of the JFM programme at regular interval. This periodic monitoring and feedback mechanism would pave way for corrective/ remedial measure in between, which is very much required for sustainable forest management. The parameters selected should be quite simple so that even local villagers can go on implementing and assessing their impact from time to time. The JFM program will be monitored annually through certain indicators/benchmarks, which are given by Government from time to time. The online monitoring of the JFM program using IT is needed. The use of this application helps in avoiding duplication of work as maximum information is required to be filled merely once and any updates can be made on an annual basis. This will not only help in reducing effort, time and stationery but also improve work efficiency and transparency
- vii. **Conflict Resolution:** In the process of sustainable management of forests and natural resources, one can't deny the role of local and dependent communities upon them for their livelihood. These communities have been managing these

resources in their own traditional and indigenous ways. The collaborative management of natural resources has increased the number of stakeholders in this sector, which is not limited to the foresters and the villagers. There are many other stakeholders. This has increased the possibilities of conflicts. These conflicts can be divided into two major types; Human-Human conflict and human-wildlife conflict. The JFMC level conflict can be resolved by the JFMC executive body. If the conflict happened between two forest committees or between two different panchayats and JFMCs then the concerned Range Forest Officer would be responsible for the resolution of the conflict. If the conflict is between the JFMCs of two varied ranges then the Deputy Conservator of Forests, Pandharkawada should resolve the conflicts. The appeal, for all decisions mentioned, should be made to Conservator of Forests (Territorial), Yavatmal. In regulating the Human-Wildlife conflict, the empowerment of the communities to handle conflict situations and creating awareness about the importance of wildlife and its conservation is necessary. The communities need to be exposed to precautions and safety measures to protect themselves and also the wildlife.

- viii. Maintenance and Corpus Fund:** A majority of forest development activities in the State are undertaken with the support of externally or internally supported projects. After the completion of the Project, necessary arrangements for maintenance of assets created under the Project are unavailable. It is, therefore, necessary to establish a fund that can be used in the post-project period for the maintenance of project assets, and also help in the implementation of the statutory working plans including micro plans.
- ix. Self Help Groups (SHGs):** JFMC can come up with several income generation activities for alternative livelihood especially for low-income groups of the community. They can form SHGs and the front-line staff of the forest department can assist them to establish the groups.
- x. Training on Livelihoods:** Once a JMFC is established, it should be exposed to diverse training programs to enhance the skill and capacity of the members for

the holistic development of the area. The different capacity building training programs which the JFMC members should undertake, would be; Hands-on training on cultivation of NTFPs, medicinal plants, enhancing agriculture productivity through rainwater harvesting, introduction of alternative energy sources, pasture development for fodder, and plantation of fruit trees/orchards, training on animal husbandry and poultry farming, etc. and other government schemes from time to time.

- xi. Convergence:** To make the JFM program successful, a well-planned convergence of various schemes under CSS, State plan, District plan, etc., need to be carried out. These convergence plans need to be implemented in a time-bound manner. Exposure visits enable the JFMC members to interact with and learn from other successful examples of JFMC. It allows them to view practical examples of successful integration of sustainable practices in JFM like their own. They are integral to sensitizing the JFMC members to practices of sustainable forest management.

8.7 VILLAGE FORESTS

“Village forests” or “Gram Van” means such part of reserved forests or protected forests in the village as assigned to the Village Panchayat under the Indian Forest Act, 1927 and the Village Forest Rules 2014 and also under the Maharashtra Village Panchayats Act 1959 for management through Joint Forest Management Committee. The JFMC shall manage its village forests on behalf of the Village Panchayat with due reference to the relevant provisions of the Panchayats (Extension to the Scheduled Area) Act, 1996, the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act, 2006, the Indian Forest Act, 1927, the Wildlife (Protection) Act, 1972, the Biological Diversity Act, 2002, the Maharashtra Village Panchayats Act, 1959, and rules made thereunder and any other law in force as applicable to the State of Maharashtra.

8.8 MAHARASHTRA VILLAGE FOREST RULES, 2014

In exercise of the powers conferred by sections 26, 28, 30, 32, 34 and 76 of the Indian Forests Act, 1927 (Act No. XVI of 1927) and all other powers enabling it in that behalf, the Government of Maharashtra has notified the Village Forest Rules on May 13, 2014. The salient aspect of these rules is mentioned below:

1. JFMCs fulfilling the criteria of zero encroachment, positive rate of natural regeneration, effective control of forest fire (area burnt not more than 5 % in last three years), over 60% survival in plantations raised in the said area at the end of fifth year, effective implementation of “charaibandi” and “kurhadbandi” are eligible for assignment of village forests if at least three criteria are fulfilled.
2. The village forests assigned to the village community or the Village Panchayat shall be managed by a committee called as the “Van Vyavasthapan Samiti” or the Village Forest Management Committee.
3. “Van Vyavasthapan Samiti” has to prepare “Ten-year micro-plan” by dovetailing with the Working Plan of the landscape and an “Annual implementation plan” every year for managing the village forests and place the micro-plan before the Gram Sabha for ratification and its approval by the ACF and revise it periodically.

8.9 GENERAL PRESCRIPTIONS

- For those JFMCs whose micro-plans have expired, new micro-plans shall be prepared through the process of Participatory Rural Appraisal (PRA). Micro-plans are to be dovetailed with the prescriptions of the approved Working Plan.
- Silvicultural management, maintenance of forest boundary, removal of forest encroachment and control over illicit felling, illicit grazing and fire should receive high priority.

- Gradations of JFM Committees into A, B and C categories is being done. Efforts should be taken to improve the JFM Committee and upgrade them from C category to B and B category to A.
- Forest protection cannot be viewed in isolation. The works depicted in the micro-plans should be reflected in the planning process of the Gram Panchayat.
- Wherever required, NGOs should be involved for creating awareness programmes.
- Documentation of successful initiatives under the JFM approach must receive importance at the range and division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
- JFM programme should be implemented with complete transparency. The accounts of JFMCs shall be annually audited as per Government instructions and a copy of such audited statement shall be shared with Gram Panchayat. All payments to JFM members shall be made either through account payee cheques or RTGS transfer or depositing directly into respective bank accounts. Payments through cash shall be strictly discouraged.
- As far as possible, all works are to be executed by JFM members only. Monitoring of JFM activities by supervisory cadres (ACF to CCF) is the key for effective implementation of JFM programme. Periodic reviews at various levels will aid in good implementation.
- Often, there is thinking in the grassroots level functionaries that, JFM has to be implemented only if funds are allotted to a village. This notion is detrimental to the core values of JFM. Therefore, the supervisory officers should strive to bring suitable awareness among the grass root functionaries (FG to RFO) to change attitudes and mindset.

- Dedicated NGOs/Civil society groups can aid the village communities in strengthening JFM institution. Their services can be utilized by the department in areas of capacity building of JFMCs in micro-planning, community motivation, eco-tourism initiatives, evolving models for enhancing livelihoods etc.
- Periodic evaluation of JFMCs should be done to identify performers and non-performers. While performing JFMCs should be rewarded, the non-performers should be given opportunity for improvement.
- One of the important reasons for forest degradation is the dependence of local people for firewood from forests. Therefore, to reduce such dependence, Government of Maharashtra vide resolution of July 10, 2012 decided to distribute LPG connections to forest fringe villages. JFMCs have played a key role in implementing this scheme. In the division, 11,413 families have been distributed with LPG connections. This includes 1,729 SC beneficiaries, 3,645 ST beneficiaries and 6,039 from the open category.
- Measures being taken for reducing human wildlife conflict (described in 8.11 of Vol. I) should be continued with active involvement of JFMCs.

CHAPTER-9

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

Forest health refers to the overall well-being of forests, including the condition of trees, biodiversity, and ecological processes. A healthy forest is characterized by the presence of diverse and robust tree species, thriving understory vegetation, and a balanced ecological community. Forest vitality, on the other hand, refers to the resilience and ability of forests to adapt and withstand various stressors such as climate change, pests, diseases, and human activities. Forest health and vitality are closely intertwined, as a healthy forest is more likely to exhibit vitality and better withstand disturbances.

The maintenance of forest health and vitality is essential for the overall well-being of ecosystems and the numerous benefits they provide. However, forests face various threats that can significantly impact their health and sustainability. Illicit felling, often driven by illegal logging activities, poses a severe threat to forests worldwide. It not only leads to the loss of valuable timber resources but also disrupts the ecological balance, destroys habitats, and contributes to deforestation.

Encroachment, another significant threat, occurs when human settlements or agricultural activities expand into forested areas. This encroachment results in habitat fragmentation, loss of biodiversity, and increased pressure on forest resources. Fire is a natural ecological process in forests, but when uncontrolled, it can have devastating effects. Uncontrolled wildfires, often exacerbated by climate change and human activities, destroy large forest areas, endanger wildlife, release vast amounts of carbon dioxide into the atmosphere, and increase the risk of soil erosion.

Grazing, particularly by livestock, can also pose a threat to forest health. Overgrazing can lead to soil degradation, erosion, and a decline in the regeneration of native plant species. Livestock can trample vegetation, disrupt wildlife habitats, and introduce invasive species, further compromising the vitality of forests.

The forests of this division are under 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.

9.1 SPECIAL OBJECTIVES OF MANAGEMENT

1. To protect the forest from illicit felling, encroachment, fire and grazing.
2. To sensitize local people about forest protection and involve them in preventing forest offences with their cooperation.
3. To raise the morale of field staff and strengthen their capabilities to deal with forest offences using modern technology.

9.2 PROTECTION STRATEGY

The strategy to be adopted to protect forest is of integrated approach 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 especially members of Joint Forest Management committee. Some of the strategies proposed are:

- Existing forest needs to be well protected and developmental works such as soil and moisture conservation measures, natural and artificial regeneration works and other cultural operations shall be carried out in order to increase the productivity of the forests.
- Creation of database regarding forest offences at division and range level. This data should be available on GIS platform for better planning, monitoring and implementation of activities regarding forest offences.
- Regulation of grazing and controlling forest fire.
- Seeking cooperation and active participation of local people in all operations of forest management especially JFM committee members.
- Employment generation to local people during lean period.
- Fulfilling the demands of local people for forest produce.

- Effective utilization of existing infrastructure, strengthen and updating infrastructural facilities.
- Installation of new check nakas at hypersensitive and sensitive points apart from existing check nakas.
- Improvement in communication facility and mobility of the forest staff.
- Patrolling sensitive forest areas along with the local people/Joint Forest Management Committee members.
- Introducing reward-based informer system and transforming forest offences into high-risk low-gain activities.

9.3 PROTECTION MEASURES

A protection plan is to be prepared at division level in January of every year for taking strict protection measures as per GR dated August 13, 2014. Protection plan shall cover the following issues.

- All beats of the division are considered as hypersensitive beats.
- The DCF shall prepare an annual program for beat inspection. It must be ensured that all the beats in the division shall be inspected once every 6 months. In a year, RFO shall inspect all the beats under his jurisdiction and in a month, he shall inspect at least one beat in his jurisdiction. If any serious offence has been detected, the concerned ACF shall re-inspect that beat. Apart from this, DFO (Vigilance) shall inspect the coupes randomly within the division.
- During beat inspection apart from forest offences, forest boundaries, pillars, records of beat guard, POR book, beat map, topo sheet, diary, uniform, GPS, mobile, PDA shall also be examined. Proper use of GPS and PDA shall be ensured.

- After every quarter, the DCF shall review and analyse the beat inspection reports, and appropriate measures and instructions shall be given to the field staff accordingly.
- Office inspection must be carried out regularly. RFO should inspect round office once in 3 months, while ACF should inspect round office once in 6 months. Range office shall be inspected by ACF and DCF once in a year.
- Saw mill inspection shall be done by RFO (minimum 8 saw mills per month), ACF (minimum 4 saw mills per month), DCF (minimum 2 saw mills per month) and CF (as and when required).
- DCF, ACF, RFO should ensure that all offence cases registered should be brought to a logical conclusion. All cases in court should be regularly monitored and review should be taken. Help should be taken from the legal advisor in the o/o CF for all required cases.
- The CF/DCF shall also organize meetings with officers of the adjoining divisions regarding forest protection. They should also ensure proper coordination between Police and Revenue officials.
- At the division level, a control room should be operational that shall work 24/7.

9.4 ILLICIT FELLING

Illicit felling is a major problem in this division. The forests areas near the border of Telangana and along border of Nanded district are sensitive from the point of illicit felling. To have effective protection regular patrolling needs to be undertaken.

Patrolling:

Regular patrolling is essential in all sensitive areas to control illicit felling. Separate day and night patrolling around sensitive areas, roads leading from forest to towns shall be carried out. A register should be maintained at range office regarding patrolling team, time and duration. ACF should supervise patrolling and involve in

patrolling once in a month. Patrolling should include inspection and regular checking of waterholes. Joint patrolling with JFM committee members along with staff of adjoining range, round and beat, should be taken up. During patrolling, weekly markets shall be monitored for prevention of illegal trade of NTFP and wildlife parts and products. Analysis of offence cases reveals that the following beats need intense patrolling.

TABLE NO.9.1: BEATS REQUIRING INTENSE PATROLLING

Sr. No.	Range	Name of the Beats	Number of Beats
(1)	(2)	(3)	(4)
1	Pandharkawada	Arli, Ghubadi, Khairi, Bori, Sunna, Both, Pahapal, Akoli, Pandharkawada, Tiwasala, Kinhala, Ghordara and Runza	13
2	Maregaon	Wadhona, Ambezari, Wagdara, Khandani, Durgada, Awalgaon, Chinchoni- Botoni, Khargaon, Wegaon, Maregaon, Machindra, Mardi, Warna, Anji and Vihirgaon	15
3	Jamani	Pachpor, Ambezari, Shibala, Matharjun, Mandavi, Junoni, Mudhati- A, Mudhati- B, Patan and Shekapur	10
4	Mukutban	Chilai, Dhabhadi, Pawanar and Bhandala	4
5	Wani	Kurli, Suknegaon, Babapur, Borda, Shirpur, Mendholi, Mandar and Wani	8
6	Parwa	Manusdhari, Patapangara- 1, Patapangara- 2, Zatala, Saitkharada-1, Saitkharada-2, Bilayata, Kurli, Sawangi, Kinhi, Wadhona, Parwa and Jamb	13
7	Ghatanji	Sakhara, Titawi, Mandawa, Inzala, Kopara, Ghati, Mowada, Choramba, Shivani, Koli Bk., Pardi, Undarni and Rampur	13
Total			76

Check Nakas:

Check nakas are established at various strategic points to control the transportation of illicit forest produce. Presently there are four check nakas in the division. These check nakas are manned by beat guard and vanmajors. The Check nakas must be duly notified by competent authority and published for the benefit of public as well as law enforcing authorities. It is required to strengthen existing check nakas with effective controlling force i.e. manpower and modern communication system. Check nakas need to be installed with CCTV cameras for better monitoring of vehicles. The details of status of check nakas is given in the table below.

TABLE NO.9.2: LIST OF CHECK NAKAS

Sr. No.	Range	Permanent Nakas	Temporary Nakas
(1)	(2)	(3)	(4)
1	Pandharkawada	Pimpalkhuti	-
2	Parwa	Sayfal	-
3	Parwa	khadka	-
4	Jamni	-	Digras
5	Ghatanji	-	Enjala
6	Maregaon	-	Jalka
Total		3	3

Protection Huts:

Protection huts may be established in sensitive locations.

Mobile Squad:

The DCF, Pandharkawada is currently provided with two mobile squads, stationed at Pandharkawada and Wani, for forest protection activities. The DCF shall closely monitor the work of mobile squad and will obtain weekly reports to monitor the protection activities.

Inspection of Area of Illicit Felling:

The Government has issued various directions and circulars from time to time in relation to dealing of forest offences. The Government has issued GR no. TRS-04/2014/F-6/R and FD, Dt. August 14, 2014. The following time schedule has been provided for inspection of illicit felling areas by respective officers.

TABLE NO. 9.3: INSPECTION OF AREA OF ILLICIT FELLING

Sr. No.	In-situ Value of Illicit Cutting at a Place	Inspecting Officer	Period Within Which Inspection Should be Completed
(1)	(2)	(3)	(4)
1	Up to Rs.50,000	RFO	3 days from detection/receipt of intimation of detection
2	Above Rs.50,000 but not exceeding Rs.2,00,000	ACF/ Sub DFO	3 days from the receipt of information
3	Above Rs.2,00,000 but not exceeding Rs.5,00,000	DCF/DFO	3 days from the receipt of information
4	Above Rs.5,00,000	CCF	7 days from the receipt of information

Wireless Network :

There is no wireless network in this Division. In the current scenario, offenders possess modern communication systems such as mobile phones while committing forest offences and transport forest produce with ease. The field staff is provided with mobiles and PDAs for better monitoring. Since mobile network is not available throughout the division wireless network will have an added impact in forest protection. Therefore, it is prescribed that wireless communication system should be provided for effective protection of the forest.

Modern technology such as smart phones, PDA, drones, ect. may be used in detection, prevention and subsequent actions against forest offences. Various applications developed by ITP Cell of Maharashtra Forest Department can be used.

Mobility of the Staff:

In Pandharkawada Forest Division, Government vehicles are provided for DCF, ACF and all RFOs. It has ensured better movement of staff, which enhanced forest protection. Regular maintenance and insurance shall be taken up for all the vehicles in the Division.

Provision of Arms:

Forest offenders are resorting to use modern weapons i.e. fire arms in committing forest offences. Government has provided weapons to the staff for forest protection and for self-protection. As on 01/01/2014, the Division has 4 pistols (20 ammunition) and 8 rifles (80 ammunition). The arms and ammunitions provided to the staff members should be put to use as and when required. Field staff should be regularly trained for the use of fire arms. Firing practice should be taken up annually in coordination with the Police Department.

Transit Rules for Forest Produce:

Illegal transportation of forest produce should be checked by concerned staff as well as staff of mobile squad. Special surprise checking and 'nakabandi' shall be organized on major district roads and known routes from the forests to towns through local staff and mobile squad once in a month.

Collection of Information and Intelligence:

The Range officers, the Round officers and the Beat officers shall frequently interact with the villagers to collect information regarding illicit felling, poaching, encroachment etc. through intelligence network and keep the information in a register under their personal custody. Through this intelligence network, village wise record of habitual offenders must be prepared. Secret service fund provided by the

department may be used to the fullest to gather, raid and apprehend offenders involving in forest offences. This fund may also be used for intelligence gathering regarding forest offences.

Rapid Response Unit:

A rapid response unit is needed to quickly respond and attend conflict situations created as a result of human wildlife interactions. The unit should consist of Round officers, beat guards, vanmajors and be provided with a vehicle which can accommodate a trap cage, equipment, tranquilizing kit, mobile phones, wireless handsets and other necessary equipment. This unit can be stationed at Pandharkawada town. A separate vehicle may be procured for smooth mobility of the unit.

A special task force can be created to deal with organized gangs engaged in illicit felling, encroachment and poaching. This may include staff of forest, police and revenue department.

9.5 FIRE PROTECTION

The areas of Pandharkawada Forest Division are subjected to repeated fires due to heavy biotic pressure and the nature of vegetation and atmosphere due to deciduous nature and the dry climate. Fire caused extensive damage to the forest specially the 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 sustainable forest management. The fall of leaf litter on the ground combined with highly combustible under growth consisting of dense grasses, can trigger a fire in a short time. In summer high speed hot winds aid the fire to spread easily to the rest of area before it can be brought under control. Analysis of fire data for the past 10 years reveals that in the certain beats there is repeated occurrence of forest fires. These beats require specific fire management interventions. The details of the beats are given below.

TABLE NO. 9.4: FOREST FIRE SENSITIVE BEATS

Sr. No.	Range	Name of the Beats
(1)	(2)	(3)
1	Pandharkawada	Pandharkawada, Kinhala, Ghordara, Sunna, Both, Karanji, Pahapal and Tiwasala
2	Maregaon	Durgada, Wadhona, Khandani, Wagdara, Chinchoni- Botoni and Vihirgaon
3	Jamani	Shibala, Pachpor, Patan, Matharjun, Mudhati- A, Mandavi and Ambezari
4	Mukutban	Chilai, Dhabhadi, Mangarul Kh. and Pawanar
5	Wani	Tejapur, Kurli and Borda
6	Parwa	Manusdhari, Patapangara- 1, Patapangara- 2, Zatala, Sawangi, Parwa and Jamb
7	Ghatanji	Kopara, Shivani, Mowada, Undarni and Rampur

The areas needed to be protected from fire are classified into the following categories based on purpose of fire protection.

1. Class I (Completely Protected)

- All main felling coupes and thinning coupes.
- All regenerated coupes of all working circles till the young crop has attained the age of 10 years.
- All plantations.
- All forest nurseries.
- All Government timber depots.

- Special habitat areas or any other special important areas as specified by the concerned CF/CCF.

These areas are cleared with appropriate width of fire line as per the guidelines and patrolled by fire watchers. If any fire incident takes place in this area, it should be reported to the concerned DCF in detail.

2. Class II (General Fire Protection)

- The remaining areas of Selection-cum-Improvement working circle.
- All other areas as specially directed by the CF(T) of Yavatmal Circle on special grounds.
- These areas are separated from surrounding areas by means of external fire lines and will be divided into suitable blocks of interior fire lines and no trees will be cut. Fire watchers may be engaged as sanctioned by the CF(T).

3. Class III (Forests Protected by Law Only)

Those categories which are not included in class I and II are included in this class. 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 the growth and combustible material.

- All external boundaries of reserve forest to the extent of width of 12m.
- 6 m wide around all the plantations upto 10th year from planting.
- 3 m wide coupe lines upto 10 years of main felling.
- 6 m wide line on both sides all along the roads and cart tracks that are passing through forests.
- 40 m wide fire lines around timber and fuel wood depots.

Fire Control Measures:

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 the fire lines shall be collected from time to time and burnt before the fire season begins. No fire line shall be burnt after February unless there is a special order from the DCF, Pandharkawada.
- A consolidated fire protection scheme shall be prepared in consistent with the prescription given in the working plan with the provisions of watch towers, strategic locations, fire watcher at each location, deployment of vehicles and the supervisory forest staff.
- The fire watchers and forest staff are required to be given training in fire protection and handling of firefighting tools.
- Fire watchers shall constantly patrol the areas of class I and class II.
- Fire watch towers shall be erected at strategic points.
- After receiving information, the fire watchers shall move in group to particular location and extinguish fire with the help of firefighting tools.
- The division office will maintain a register of fire lines showing the length and width of fire line 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.
- The members of Joint Forest Management Committee shall be involved in the fire protection and their participation and cooperation shall be obtained to have effective fire protection.

- The vehicles that are available will be deployed at strategic location where the fire protection teams can reach easily whenever they require a vehicle. These vehicles are means for transporting fire protection labour and fire protection equipment.
- **Fire Alerts:** Forest survey of India, Dehradun provides alerts on forest fires on real time basis. These alerts are being sent to the concerned beat guards directly along with information on Latitude & Longitude of the fire spot detected. These alerts should be utilized to the maximum and fires can be brought under control in a quick time. These fires spots should be collected and made available in a GIS platform for better fire management and utilization of available resources. It serves as an important tool for the field officers.

Responsibility:

The RFO is personally responsible for efficient fire protection in his range. If there is a common boundary between two ranges the responsibility of clearing fire line will be decided by the DCF. In case of common boundary between two divisions the fire line preparation and maintenance will be decided by the CCF (T).

The DCF is responsible for carrying out efficiently all protective measures for fire protection. 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/She 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 local enquires and inspections. A constant watch should be kept on Tendu contractors and their agents who engage local labourers to ignite fire to the forest to get good flush of Tendu leaves.

Fire Reports:

If any fire incidence takes place the concerned Range Forest Officer must inform the DCF at once. The Range Forest Officer must keep a proper communication

and co-ordination with the DCF. After the fire is extinguished, a detail report shall be submitted to the division office regarding extent of area, damage, value of damage with the detail map within 15 days. Forest Survey of India provides geo coordinates of fire daily. While preparing fire reports all these points within the division must be verified on the ground.

The division shall submit monthly report in prescribed proforma to the CF showing serial number of fires, date of occurrence, cause, area burnt, extent of damage and the steps taken to extinguish fire. A register of fire record shall be maintained at division office giving details of length fire line Class I, II and III. The fire incidence that takes place in Class I, II&, III areas shall be indicated with different marks on the 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.

9.6 GRAZING CONTROL

Fire and grazing hamper the success of regeneration of forest to a great extent. To control grazing, grazing units are formed in the division. The number of cattle heads is fixed as per the carrying capacity of the area. In Pandharkawada Forest Division heavy cattle population pressure has degraded the forests. 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.

The main felling coupes of all working circles shall remain closed for a period of 10 years from the main felling as felling cycle is fixed at 20 years i.e. 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 the forest. The excess cattle units can be managed through fodder development activity on common community lands and waste lands. 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 to them and local people shall be educated and made aware of ill-effects of excessive grazing on forests growth. Apart from this the forest staff should open a dialogue with the local villagers to discuss regarding grazing policy, carrying capacity of forests and the area available to graze their cattle in the adjoining forests. The DCF should consider all the factors and prepare a consolidated plan based on area, cattle units, carrying capacity, rotational grazing and avenue for excess cattle units.

9.7 ENCROACHMENT

The problem of encroachment is common in almost all the areas specially the forest areas located adjoining to habitations. The problem of encroachment is because of lack of appropriate survey and demarcation on the ground, the greed of the people and the apathy of local people towards Government lands. 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 phase manner. The existing cairns shall be repaired and maintained under 1/5th boundary demarcation scheme. The powers that were entrusted to the officers of Assistant Conservator of Forests and above rank under Sec. 53 and 54 of Land Revenue Code shall effectively be utilized. The encroachment, if any, can be tried summarily and evicted as early as possible. The following instructions shall be followed regarding encroachments.

1. Special care shall be taken to ensure protection of vulnerable patches of forests 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, 1927.
2. All external boundaries shall be demarcated with concrete pillars. All sensitive and important boundaries and wherever disputes exist, 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, and location of encroachment, by the RFO.
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/she 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. Cr. P.C. provisions such as Sections 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. Regularisation of the encroachments made earlier to 1980 be settled as early as possible and necessary proposals be submitted to the Government.
10. After the listing of all encroachments, sample verification shall be carried out by all supervisory officers to detect unregistered encroachments.
11. In the month of May, a drive for encroachment prevention be taken up in all the sensitive areas by taking meetings in the villages, distribution of leaflets and posters.
12. Keep a watch on all the sites meant for debris cleaning, ploughing etc., in the month of May, so that encroachments are removed even before the sowings.

In the recent past the tendency for encroaching forest land for cultivation has increased. 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. The RFO must inspect at least 50% of the boundary demarcation, the ACF at least 10%, and the DCF at least 2%. The RFO Mobile Squad shall check 10% of the boundary demarcation.

9.8 ROLE OF JOINT FOREST MANAGEMENT

JFM Committees will contribute to a large extent in protection of the forest from illicit felling, encroachment fire, grazing control, removal of invasive species, etc. provided if the forest staff have a constant dialogue with the members of the committees and involve them for joint patrolling, management and development of the forest.

The JFM committees shall be entrusted with a specific area ear marked for them for the protection, management and development of the area. The committee members should to be given training in technical matters of protection and at the same time they should be provided with gainful employment by taking up management and developmental activities in the areas entrusted to them.

9.9 CONTROL OF INVASIVE ALIEN SPECIES

Invasive alien species refer to organisms not native to a locality, having arrived from different regions, often assisted by human activities such as horticulture, floriculture, or for various purposes related to food. These species may also inadvertently reach new areas, sticking to transportation vehicles or humans. Many invasive species, once introduced, thrive in their new environments without natural enemies, pathogens, or predators, and can rapidly outcompete native species. This competitive advantage, as seen in the case of *Lantana camara*, can lead to a gradual but silent erosion of biodiversity, ultimately posing a potential catastrophe. Besides displacing native species, invasive species interfere with native regeneration, altering

not only ecosystem structure but also ecosystem functioning, impacting ecosystem services and human wellbeing.

Controlling invasive species involves their removal, but this process must be accompanied by restoration efforts, especially since these species often flourish in open, degraded ecosystems. In some instances, invasive plants have become integral to native ecosystems, with native frugivores and pollinators relying on them. Abrupt removal could negatively affect these dependent species. Additionally, large-scale removal of dominant invasive plants may lead to widespread erosion. Therefore, removal needs to be gradual to prevent unintended damage.

The table below presents commonly encountered invasive species in Pandharkawada Division, along with their respective management strategies.

TABLE NO. 9.5: INVASIVE SPECIES AND THEIR MANAGEMENT

Name	Botanical name	Origin	How it arrived	Impacts	Management
Lantana	<i>Lantana camara</i>	Central & South America	Introduced as an ornamental plant in Kolkata (Calcutta) Botanical Garden in 1809.	➤ Lantana forms dense thickets in the forest understory, suppressing regeneration of native species ➤ Lantana adds to the fuel load, thus causing frequent and intense forest fire, thus reducing forage availability for wild herbivores. ➤ Lantana leaves are toxic to livestock. ➤ Lantana forms	• The “cut-rootstock” method is considered the most effective form of mechanical removal. This involves cutting lantana individuals below the root collar, which prevents resprouting. • Uprooting is less effective and more labour intensive. It brings buried seeds to the soil surface, resulting in increased regeneration from

Name	Botanical name	Origin	How it arrived	Impacts	Management
				dense thickets, which increase the chances of wildlife encounters.	seed. Continued removal and establishment of canopy cover reduces the density and robustness of these shrubs.
Raan Tulas; Bush mint	<i>Mesosphaerum suaveolens</i> (Earlier <i>Hyptis suaveolens</i>)	Tropical and subtropical parts of America	Introduced across the tropics, but the reason and time of introduction to India is not known.	- Dense patches are associated with reduced diversity of native species. - The plant is unpalatable, reducing fodder availability for livestock and leading to disproportionate grazing on native species.	Uprooting the plant by hand before it sets seed.
Tarota; Sickle Senna	<i>Senna Tora</i> (Earlier <i>Cassia tora</i>)	Tropical America	No available information	The plant can grow aggressively and have allelopathic effects.	Weeding is recommended when plants are young.
Gaajar Gavat; Congress grass; Carrot Grass	<i>Parthenium hysterophorus</i>	Central, South America	Thought to have arrived accidentally in the 1950s with wheat imported from America; the plant was recorded from Pune, Maharashtra, in 1955. However,	- Chemicals produced by the plant can affect crop germination and growth. - Contact with the plant can cause skin allergies, and its pollen can cause respiratory problems. - The plant takes	- This is a difficult species to manage since removal by hand causes skin irritation. - Burning is not recommended because the residues are harmful to other plants.

Name	Botanical name	Origin	How it arrived	Impacts	Management
			herbarium records from 1810 suggest it was introduced much earlier.	over grasslands leading to loss in fodder for cattle.	• Other methods such as chemical control using herbicides and biological control using insects have not proved effective.
Bush Morning Glory	<i>Ipomoea carnea</i>	Central and South America	Introduced as an ornamental and hedge plant	➤ Bush morning glory competes with and suppresses other vegetation. ➤ The plant is toxic to livestock and obstructs water courses.	• Manually cutting and uprooting the plant • The herbicide, 2,4-D, has been used effectively.

CHAPTER-10

MANAGEMENT OF SPIRITUAL AND CULTURAL ASPECTS OF FORESTS AND ECOTOURISM

Forests hold sacred significance for diverse cultures, serving as places of worship, inspiration, and spiritual connection. Indigenous communities, especially, deeply value forests as integral to their identity, heritage, and worldview, viewing them as inhabited by spirits and ancestral beings. Beyond indigenous cultures, various societies have developed unique connections with forests, portraying them in art and literature, and incorporating them into cultural practices.

The cultural richness of forests includes a tapestry of stories and oral traditions conveying ecological knowledge, ethical values, and social norms. They function as repositories of traditional wisdom, offering insights into medicinal plants and sustainable practices. Forests also act as outdoor classrooms, facilitating the transmission of knowledge and skills from elders to younger generations.

Acknowledging the spiritual and cultural aspects of forests is crucial for sustainable management and conservation. This requires collaboration with local communities, indigenous peoples, and cultural experts to understand and respect their beliefs and practices. Management strategies should integrate cultural considerations, such as protecting sacred sites and incorporating traditional practices into plans.

Embracing the spiritual and cultural dimensions of forests contributes to the overall well-being of communities and ecosystem resilience. Recognizing forests as more than ecological resources fosters a holistic approach to conservation and sustainable development. In ecotourism, it is vital to engage with local communities and cultural experts to ensure activities align with and respect cultural heritage. This involves integrating cultural practices into ecotourism experiences, promoting exchange between visitors and communities, and upholding the spiritual significance

of forests. Managing the cultural aspects within ecotourism allows for meaningful and respectful experiences, safeguarding the intertwined cultural heritage and spiritual values of these natural environments.

10.1 PRINCIPLES OF ECOTOURISM

Eco-tourism is about uniting conservation, communities and sustainable travel. This means that those who implement, participate in and market eco-tourism activities should adopt the following principles:

- Minimize physical, social, behavioural and psychological impacts.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Generate financial benefits for both local people and private industry.
- Deliver memorable interpretative experiences to visitors that help raise sensitivity to the sites' environmental and social importance.
- Design, construct and operate low-impact facilities.
- Recognize the rights and spiritual beliefs of the local/indigenous people in the community and work in partnership with them to create empowerment.

10.2 ECOTOURISM POLICY

- Ministry of Tourism, in Government of India has declared "Eco-tourism in India Policy and guidelines, 1998". This policy has underlined the activities of tourism ought to be environment-friendly having no adverse impact on ecosystem.
- The UNWTO came into force on September 27, 1970. To make people aware on the role and impact of tourism on society, the UNWTO started celebrating

World Tourism Day on September 27 every year since 1980. Every year a theme is launched on the eve of World Tourism Day by UNWTO. Eco-tourism, environment protection, climate change, biodiversity, community development, etc. became themes of World Tourism Day.

- Government of Maharashtra, in Tourism and Cultural Affairs vide Resolution No. MTC-2005/2/CR-172/Tourism, Mumbai dated -2006, declared Tourism Policy-2006 having tourism vision 2025. This policy has identified “Eco-tourism” sector. Infrastructure development, public-private partnership, capacity building, creating awareness etc. are highlights of this policy.
 - The Eco-tourism activity should be concise and small for operationalization.
 - It should be proper in view of environmental, social and cultural aspects.
 - It should be proven and worthy of adoption.
 - Participation of local community.
 - It should neither be degrading nor destructive.
 - As per tourist demand but definitely with some restrictions.

This policy entrusts Forest Department to prepare management plan of eco-tourism centers in pursuance of Forest Conservation Act, 1980, Wildlife Protection Act, 1972 and guidelines by National Tiger Conservation Authority. The Maharashtra Eco-tourism Board has key role in co-ordination of line departments, granting of permission for infrastructure development, signing of MoU with Forest Department for development of infrastructure and revenue sharing.

- The Government of Maharashtra, in Revenue and Forest Department vide Resolution No.M-2011/C.R. 174/F-5, Mumbai, dated 24.11.2011 has issued guidelines for implementing eco-tourism activities in forest areas. Identification of eco-tourism places, preparation of management plan, involvement of stake holders, stay and food facilities, home-stay facilities, capacity building of local people and staff, identification of various types of tourism etc. are important provisions to be considered.

10.3 ECO-TOURISMS SITES

Following Sites are Eco-tourism locations in Pandharkawada Forest Division:

TABLE NO. 10.1: ECO-TOURISMS SITES IN PANDHARKAWADA FOREST DIVISION

Sr.No.	Range	Name	Comp.No.
(1)	(2)	(3)	(4)
1	Wani	Mandar Eco-Park	613
2	Pandharkawada	Krishna Tekadi	C.A.74
3	Maregaon	Pandhardevi	71 Awalgaon

TABLE NO. 10.2: POTENTIAL ECOTOURISM SITES

Sr.No.	Range	Name	Comp.No.
(1)	(2)	(3)	(4)
1	Pandharkawada	Jangodai Penthana	C.A.74
2	Wani	Kawadashi	809
3	Pandharkawada	Kinhi	C81

10.4 ROLE OF FOREST DEPARTMENT

The Department shall develop the centers of eco-tourism with controlled accessible points at strategic places. Eco-tourism centers include walking trails, self-guided nature drives, interpretation centers, signages, observation towers, butterfly gardens, souvenir shops, recreation zones, lodging and dining facilities, nature friendly garbage disposal facility and other amenities as per the site requirement. Any development of buildings and other infrastructural facilities or activities shall be nature-friendly and eco merging. Primarily, local people should be involved while execution and maintenance of the activities in order to fetch benefits to them and thus building rapport with them which should be aimed at eliciting their support for the conservation of forests of the Division.

Environmental, physical and social carrying capacity should be clearly specified before developing or conceiving any ecotourism activity in order to limit the developmental activities. The division will provide information regarding what to see?,how to see? and how to behave? to the visitors by providing brochures, leaflets and specified guides and visitor information centers.

Division shall prepare and distribute code of conduct to all visitors. Training programmes should be organised for forest personnel and general public and JFM committees to enhance awareness regarding various managerial aspects about eco-tourism.

Similarly, due care should be scrupulously taken even while planning, execution and maintenance phases of site expansion and development to strictly abide by the laid down procedures, legal provisions etc.

10.4.1 CODE OF CONDUCT AND EXCEPTIONS FROM VISITORS

Proper site-specific guidelines shall be prepared and enabling environment shall be created for the visitors to abide by these guidelines. General guidelines are given below:

- The habitats of flora, fauna and any sites of natural or cultural significance shall not be affected by tourism.
- Make no open fires and discourage others from doing so. If water is to be heated with firewood, use as little as possible. Wherever feasible, use fuel efficient wood stove.
- Remove litter, burn or bury paper and carry back non degradable litter.
- 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.
- Plants should be left to flourish in their natural environment and avoid taking away cuttings, seeds and roots.

- Leave the camp sites clean after use.
- Help guides follow conservation measures. Do not allow groups to throw garbage in the streams or rivers.
- Respect the natural and cultural heritage of the area and follow local customs.
- Respect local etiquette. Attire and public behavior should be in accordance with local customs.
- Respect privacy of individuals and ask permission before capturing photographs of local inhabitants.
- Respect holy places. Do not or remove religious objects.
- Strictly follow the guidelines for personal safety and security and always take your own precautions and safety measures.

10.4.2 ROLE OF NON-GOVERNMENT ORGANIZATIONS

Established NGOs will be allowed to take lead in eco-tourism activities and harness the potential of eco-tourism for the development of local people. The role of NGO will be creation of awareness in all aspects of eco-tourism, motivation of local community in participation of sustainable eco-tourism activity. Trainings in hospitality, catering, transportation, etc. shall be conducted using NGOs.

10.4.3 ROLE OF COMMUNITY

- Participation of local people in aspects of eco-tourism development makes the tourists aware about the locality, without disturbing ecological balance.
- JFM members along with Forest Department shall act as efficient caterers and guides to eco-tourists.
- To be friendly with visitors and help them in eco-tourism practice.
- Practice conservation of nature and culture as a way of life.

- Preserve the values of respecting environment, flora and fauna, the monuments and their cultural heritage.

10.4.4 THE ENVIRONMENTAL PLEDGE

While promoting eco-tourism in the tract environment pledge shall be displayed at strategic locations. The environment pledge shall indicate about publicity on recycle paper, disposal of polythene bag, garbage disposal, alternate source of energy for fuel, water catchment and treatment, eco-friendly lodging and resorts, planting of saplings, etc.

As these sites are yet to be developed, there is plenty of scope to develop in a manner that is both eco-friendly and beneficial to the communities. The principles of eco-tourism stated above should be the guide for all such developments.

Apart from keeping in mind the principles of eco-tourism, the Department should ensure that the following are adhered to:

- While developing eco-tourism sites, it should be verified that the proposed activities must not attract nor violate provisions under Forest Conservation Act, 1980.
- The DCF, Pandharkawada shall prepare an **Eco-tourism Development Plan** for the Division incorporating potential sites and get it approved from the Maharashtra Eco-tourism Development Board.
- Local people, especially the JFM Committees wherever in existence, should be fully involved right from the planning stage.
- Adequate training and capacity-building of the staff and locals should form part of the development plan.
- The specialty and uniqueness of each site should be properly documented and should be brought up in attractive brochures keeping in mind the information that tourists would require and the Dos and Don'ts for such tourists.

- Any local traditional product, crafts, food items/local cuisine, cultural display etc. should be encouraged as part of the eco-tourism package.
- The development of the ecotourism sites should go hand in hand with the conservation of the biodiversity, the nurture of environment and the appreciation of nature by the tourists.

While designing the plan conservation of forests and wildlife should be of prime importance. The different actors/stakeholders such as the community, visitors, businesses, NGOs should be taken into consideration. A common phenomenon is that eco-tourism can generate both symbiosis and conflict between the actors. The potential for eco-tourism to result in symbiosis between conservation and development has been widely touted, but the potential for conflict should not be ignored.

CHAPTER-11

ENCROACHMENT REMOVAL

11.1 GENERAL CONSTITUTION

This is concerned with the Reserved Forests of Pandharkawada Division which are under encroachment and areas that were handed over to other departments which are yet to be disforested. Details are provided in the Appendix No. XLII. An abstract is provided below:

TABLE NO. 11.1: RANGE-WISE FOREST AREA UNDER ENCROACHMENT

Sr. No.	Range	Total Area (ha) of the Range	No. of compartments under encroachment (partial/full)	Area (ha) under Encroachment	% to the Area of Range (5/3*100)
(1)	(2)	(3)	(4)	(5)	(6)
1	Ghatanji	7557.63	2	41.14	0.54 %
2	Jamani	9506.77	16	152.21	1.60 %
3	Maregaon	10895.57	12	98.93	0.91 %
4	Mukutban	7611.90	5	221.73	2.91 %
5	Pandharkawada	11609.42	27	383.80	3.31 %
6	Parwa	9459.43	6	117.31	1.24 %
7	Wani	10416.74	31	485.64	4.66 %
Total		67057.46	99	1500.76	2.24 %

TABLE NO. 11.2: AREA HANDED OVER TO OTHER DEPARTMENTS BUT NOT DENOTIFIED

Sr. No.	Range	Comptt. No.	Area handed Over to other Deptt.in ha.	Remarks		
				Purpose of diversion	Total area of the compartment (ha.)	Net area of the compartment (ha.)
1	2	3	5	6	7	8
1	Wani	C35B	3.10		61.62	58.52
2	Wani	C42D	26.20		26.2	0.00
3	Mukutban	C33A	11.59		265.74	254.15
4	Mukutban	C28C	4.50		79.2	74.70
5	Mukutban	C32B	25.60		52.29	26.69

Sr. No.	Range	Comptt. No.	Area handed Over to other Deptt.in ha.	Remarks		
				Purpose of diversion	Total area of the compartment (ha.)	Net area of the compartment (ha.)
1	2	3	5	6	7	8
6	Mukutban	C28B	81.74		81.74	0.00
7	Jamani	C94	13.00		77.85	64.85
8	Mukutban	C43	28.32		208.1	179.78
9	Mukutban	C44	122.32		271.49	149.17
10	Mukutban	C45	4.04		473.25	469.21
11	Pandhar-kawada	C76A	30.35		55.95	25.60
12	Parwa	C121	182.10		339.9	157.80
13	Maregaon	150B	278.86		278.86	0.00
14	Maregaon	149B	201.35		201.35	0.00
15	Pandhar-kawada	C79A	2.02		127.53	125.51
16	Maregaon	C88A	222.52		222.52	0.00
17	Maregaon	C56A	17.56		69.41	51.85
18	Maregaon	C57	0.80		342.52	341.72
19	Maregaon	C60	2.00		220.77	218.77
20	Maregaon	C2A	2.00		45.64	43.64
21	Wani	C7E	118.50		118.5	0.00
22	Wani	C7B	28.79		28.79	0.00
23	Wani	C9B	14.28		14.28	0.00
24	Wani	C9E	31.15		31.15	0.00
25	Wani	C9F	10.81		10.81	0.00
26	Wani	C9A	27.59		27.59	0.00
27	Wani	C9C	42.37		42.37	0.00
28	Wani	C49	9.50		532.79	523.29
29	Wani	C48A	2.66		275.31	272.65
30	Wani	C16	25.09		299.27	274.18
31	Pandhar-kawada	82	210.45		341.96	131.51
32	Maregaon	C64	63.32		234.62	171.30
33	Mukutban	139	12.14		339.94	327.80
34	Ghatanji	221	12.60	Arunawti Dam Project C.G.Ltr.No.8-149/88FC Dated 2.3.94	407.05	394.45
35	Ghatanji	222	6.02	Arunawti Dam Project C.G.Ltr.No.8-149/88FC Dated 2.3.94	444	437.98
36	Ghatanji	223	6.00	Arunawti Dam Project C.G.Ltr.No.8-149/88FC Dated 2.3.94	236.41	230.41

Sr. No.	Range	Comptt. No.	Area handed Over to other Deptt.in ha.	Remarks		
				Purpose of diversion	Total area of the compartment (ha.)	Net area of the compartment (ha.)
1	2	3	5	6	7	8
37	Ghatanji	241	2.28	Arunawti Dam Project C.G.Ltr.No.8-149/88FC Dated 2.3.94	270.07	267.79
38	Ghatanji	249	6.20	Waghadi Project C.G.Ltr.No.8- C/119/93FC Dated 30.10.95	44.22	38.02
39	Ghatanji	250	112.05	Waghadi Project 10.88 ha.& 101.17 ha. Cultivation in 1970 survey	244.83	132.78
40	Ghatanji	251	80.93	Rev.Dept.For Cultivation in 1970 survey	132.5	51.57
	Total		2082.70		7578.39	5495.69

11.2 GENERAL CHARACTERISTICS OF VEGETATION

The nature of vegetation is of scrub or open type. Most of the area under encroachment is primarily under cultivation of agricultural crops.

11.3 METHOD OF TREATMENT

The DCF, Pandharkawada shall ensure removal of encroachment on forest land within 3 years of implementation of this plan. Procedural prescriptions on encroachment removal are provided under section 12.7 of 'Miscellaneous Regulations' Chapter of Part II, Volume I of this plan.

Regarding the area that was handed over to other departments but not de-notified as reserved/protected forests, since these areas which were handed over to other departments, they will have the same legal status until they are de-notified. Therefore, it is prescribed that a proposal shall be made to de-notify these areas and necessary entries should be made in Form No. 1 after denotification.

CHAPTER-12

MISCELLANEOUS REGULATIONS

12.1 BOUNDARY DEMARCATION

A well-defined forest boundary is a prerequisite for effective forest protection and its sustainable management. Forest areas vulnerable to boundary obliteration need to be identified for survey and demarcation so that forest encroachment on the forest fringes could be detected, promptly. Presence of boundary marks also serves as a psychological barrier against forest encroachment. Areas which are un-demarcated and forest boundaries adjoining private land shall receive the highest priority to ensure protection of these areas. In order to keep the integrity of forest areas intact, strict vigilance over the forest boundary and periodic verification of the demarcation on the ground for the entire forest area has been prescribed.

12.1.11/5th BOUNDARY DEMARCATION

It is prescribed to work the entire boundary of Reserve Forest and Protected Forest in a 5 years period. Details of the compartment boundary for this purpose are provided in **Appendix No. XXXI** of Volume-II.

12.1.2 ROUTINE BOUNDARY MAINTENANCE

1. The Beat Guard is principle responsible for protecting and maintaining the boundary pillars every year. All boundary marks shall be inspected by the Beat Guard every month in his/her beat. The boundary marks inspection will be mentioned in his/her diary and shall be sent to RFO.
2. The Round Officer is equally responsible for protection and maintenance of all boundary marks in the forest in his/her round. He/she is required to ensure proper maintenance and colour wash by the beat guard as directed. The 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 shall be mentioned in the monthly diary. Half of his/her inspection should involve

checking of the work done during the previous month by the Beat Guard in his jurisdictions and the other half should involve checking of the compartments not reported by the Beat Guards during the months.

12.1.3 SPECIFICATION OF BOUNDARY PILLARS

The forest boundary marks will be as per the specification prescribed the Principal Chief Conservator of Forests M.S. Nagpur vide his letter no.CF/LR/68/2000-2001 Nagpur Dated May 29,2001. Accordingly, 1.40m long cement concrete pillars at roughly 50 m intervals on the external forest boundaries will be erected. Wherever the external boundary is shared with other government land, the interval should be increased to 100-150m and intermediate pillars may be 0.90m long. Both types of pillars should be embedded to 0.40m depth in the cement-concrete base. The prescribed tapering cross-section of the 1.40m pillar is 0.10 x 0.15m at the top and 0.15 x 0.23m at the base. The 0.90m pillars are parallel pipe with 0.15m width and thickness.

12.1.4 SPECIFICATION OF A BOUNDARY CAIRN

Artificial boundaries should be marked with a series of boundary cairns. A cairn should be made of loose stones upon excavated foundation to a depth of 30cm and shaped like a truncated cone. Interspaces between the large stones should be filled in with small stones, and the outer stones will be wedged with stone chips. A cairn will be 1.20m high and have 1.20m top diameter and 1.80m base diameter, as described in the Central Province and Berar Forest Manual. A slab stone (0.20 x 0.20 x 0.90m) or a timber stake projecting ½ m (half) in the centre will be fixed firmly on the top of the cairn, and marked with cairn serial number. Each boundary mark (cairns) must be visible from its neighbouring ones on both sides. Distance between two consecutive boundary marks should not exceed 250m. The cairn stone or post should be colour washed white for the open forests and red for the closed forests. The cairn tops should have direction of boundary lines shown by the same colour lines radiating from the centre. Such cairns can be made of earthen mass, where stone boulders are not available.

12.1.5 RECORDING LOCATIONS OF THE BOUNDARY PILLARS OR CAIRNS

The location of the boundary pillars and cairns along with their numbers should be shown on the maps. The numbering will follow the convention communicated by the Chief Conservator of Forests in charge of the land matters. The numbers shown on the topo-sheets will be maintained unless warranted by compelling reasons. Such reasons must be reduced in writing and entered as a note on the master set of the maps. This master set shall be made available to the Office of DCF Working Plan, Yavatmal for updating the working maps and the digital database with GPS reading. Also, the register for maintenance of boundary pillars shall be updated at range and division level.

12.1.6 CLEARANCE FOR THE BOUNDARY LINE

Boundary line clearance on the artificial boundaries will follow the standard width as described in the directives on the subject. Trees should not be felled for the boundary line, but shrubby undergrowth should be cleared. Norm for the external boundary line is 12m. The internal compartment boundary lines should be 3m wide.

12.1.7 COMPARTMENT PLATES

Metal plates on the boundary trees at a height of 2.5 to 3.0 m will be fixed on the corners and roughly at half-kilometre intervals on the side away from the compartment. The colour of the plate and lettering should agree with the state-level general guidelines. Till such guidelines are available, red letters on white plates will be used. Size of the plate and letters should not be less than 15 cm and 10 cm, respectively. Strokes should be at least 2 cm wide.

12.1.8 COLOUR WASH ON THE BOUNDARY MARKS

The Beat Guard shall be responsible for annual freshening of the pillar numbers, the compartment plates and the colour-wash of the boundary pillars carried out in September-October. He/she must submit details for work done in each compartment in his/her Annual Colour-Wash Report. The RFO shall carry out sample checking of the report in the manner decided by the RFO. Only material cost should be admissible for the purpose.

12.1.9 REVIEW AND MONITORING OF BOUNDARY DEMARCATION WORKS

Continuous review and monitoring of boundary demarcation works is absolutely necessary to ensure time bound implementation.

12.2 DEMARCATION, PREPARATION OF TREATMENT MAP AND MARKING OF COUPE

12.2.1 DEMARCATION OF COUPE

1. The annual coupes for harvesting will be demarcated one year in advance, and each coupe, if so required, may be subdivided into four sections for effective management and control. The Range Forest Officer will thoroughly inspect the coupe after demarcation and issue 'Coupe Demarcation Certificate' in the prescribed format, given in the following paragraph, which is to be verified by the concerned ACF.

2. Format for the coupe demarcation certificate is prescribed, as follows,

"I _____ R.F.O.
_____ certify that I have personally
inspected the demarcation of the coupe No. _____ in Compartment No.
_____ of F.S. _____ of W.C. _____ on
dated _____ and found that the coupe has been demarcated as
prescribed in the working plan. The area of the coupe is _____ hectares.

Date:

Signature of the RFO

3. **Demarcation of Coupes:** Annual coupes have been prescribed to be demarcated by cutting and clearing bushy undergrowth on 3 m wide line and by erecting pillars or posts up to 2 m height in middle of the cut line at suitable intervals, so as one pillar shall be visible from the other one, except where the coupe boundary runs along streams, fire line or road. The pillars shall bear the coupe number, name of the felling series and the working circle on the side away from the coupe.

4. Selected trees, above 45 cm GBH, at suitable intervals standing on the periphery of the coupe will be given two coal tar bands and a geru band in between after scraping the loose dead bark. The lower coal tar band will be at breast height and the other coal tar band will be 15 cm above it. Just below the lower coal tar band, tree serial number in Arabic will be given on the side away from the area of the coupe. The bands and serial numbers of such trees will be maintained in the marking register as follows.

Sr.No.	Name of species	GBH (OB)	Remarks
1			
2			
3			

5. No tree, bearing the coupe demarcation bands, is proposed to be marked for felling.
6. **Demarcation of Sections:** For effective monitoring and control of the harvesting operations, each coupe marked for felling in will be divided into approximately equal sections (Each section not more than 20 ha). Sections will be demarcated by 1.5 m wide cut lines by clearing brushwood, unless the section line runs along a permanent feature.
7. Trees above 45 cm girth, selected at suitable intervals on the inner edge of the 1.5 m wide cleared section line will be given two coal tar bands 15 cm apart, the lower coal tar band being at breast height. Just below the lower coal tar band section number will be given on the side away from the area they would denote.

8. Demarcation of other areas given in the treatment map: The other categories of areas shown in the treatment map will be marked by giving one geru band at breast height and one coal tar band 5 cm above it.

12.2.2 TREATMENT MAP

1. Immediately, after completion of demarcation of the coupe, Round officer shall prepare the treatment map of the coupe under the close supervision of RFO by clearly showing the various treatment-type areas as prescribed in each working circle. The concerned ACF shall verify the treatment map and make corrections, if necessary, before submitting them to the DCF for approval.
2. Preparation of treatment map shall be done one year in advance of the coupe working. Timely preparation would facilitate necessary checking and corrections, if any, in time.
3. Immediately after seeking approval of the treatment map, site-specific work plan for the entire coupe shall be prepared by RFO, incorporating all the prescribed activities under various treatment-type areas marked on the map, entailing quantum of work involved, estimated amount required and period of operation for each activity. The work plan is proposed to be verified by the ACF concerned and submitted for approval to the competent authority.

12.2.3 MARKING OF TREES FOR HARVESTING

1. After approval of the treatment map, marking of trees for harvesting shall be carried out as per prescriptions given in respective working circles. Marking of trees for harvesting shall be done one year in advance of the coupe working and it shall be done departmentally. Timely marking would facilitate necessary checking and corrections, if any, in time.
2. Marking is prescribed to be done by the Round officer concerned under the close supervision of RFO and constant guidance of ACF concerned. The DCF shall himself inspect majority of coupes to ascertain proper marking as per prescriptions of the working plan as well as to guard against the excessive

marking. To ensure this close supervision, a marking certificate in the following format is prescribed.

I _____ RFO, _____ personally inspected the marking of the coupe No _____ in compartment No _____ of felling series _____ in _____ Working circle _____ on dt _____ and found that marking of trees for felling has been done as prescribed in the working plan.

Date :

Signature of the RFO

3. Trees marked for felling will be given geru bands at breast height and will bear marking hammer impression at breast height as well as at the base on the blazes of sizes 10 cm x 10 cm. The blaze size should be strictly adhered to so as to aid in identification of marked trees at the time of felling. Trees marked for felling will be serially numbered with coal tar.
4. All trees bearing serial numbers will be individually recorded in marking register. Remarks column shall invariably mention about the deformities if any, such as dead, top broken, hollow, severe insect damage etc.
5. Abstract of trees marked for felling shall be made in 15 cm girth classes. Timber, poles and firewood trees shall be shown, separately.
6. Malformed trees alone shall be recorded as fuel trees, except that of teak. A tree will be classified as fuel tree only when it is incapable of yielding any useful sawn timber or pole.

12.3 SUBSIDIARY SILVICULTURAL OPERATIONS

All these operations shall be carried out departmentally. These operations shall include –

1. Cut Back Operations: CBO shall be carried out in the following year of the main felling.

- Climber cutting of the entire area.
- Removal of badly damaged or broken trees desiring main felling.
- Cutting back of malformed advance growth.
- The unwanted undergrowth interfering with the Teak and other valuable miscellaneous species shall be removed.
- The multiple coppice shoots or poles shall be reduced to one per stool.
- In eroded areas or areas liable for erosion soil conservation measures shall be taken up by way of gully plugging, nala bunding, check dams, etc.

2. Cleaning: This operation will be carried out departmentally in the 6th year after main felling.

- Climber cutting of the entire area of the coupe.
- Removal of damaged and malformed saplings in teak plantation area.
- All coppice shoots shall be completely cut except in areas where planted stock has not come up successfully and in such areas multiple coppice shoots shall be reduced to 1 per stool which is most promising and vigorous one.
- The undesirable growth interfering with teak and other valuable miscellaneous species shall be cut.
- In the patches of advance growth of teak and other valuable species proper spacing shall be created by removing inferiors in tree growth.

- Cleaning of weeds at the base of teak plants and intensive soil mulching shall be carried out immediately after the rainy season is over.
- Cleaning shall be carried out before 1st thinning.

3. Thinning:

Thinning in plantations is very essential and one of the silviculture requirements to provide appropriate spacing based on the number of plants required in a site in relation to age of crop. For appropriate utilization of soil many plants have to be removed. In the plantations thinning operation shall be carried out as per standard technique for thinning in teak plantation.

For teak, the 1st thinning will be carried out at the age of 10th year of plantation and subsequent thinnings shall be carried out at the interval of 10 years.

12.4 IRREGULAR HARVESTING

12.4.1 RESTRICTION ON IRREGULAR HARVESTING: Irregular harvesting of timber, firewood and other NTFPs is prohibited, except in the following cases:

1. **Harvesting for the Fire Lines and the Transmission Line:** The DCF may permit felling of trees within the prescribed width of the established fire lines and the approved power transmission line. The prescribed width in the guidelines for the Forest (Conservation) Act, 1980 and rules, there under, will be applicable to the transmission lines. Creation of new fire lines shall require prior permission of the CF(T).
2. **Felling for the Haulage Roads:** The DCF may permit felling of trees for the purpose of haulage roads that are temporary in nature, and should be aligned properly to ensure minimum possible felling of trees.
3. **Harvesting in Forest Areas Diverted for Non-forestry Purposes:** Felling of trees on forest land required by the other departments such as Irrigation, PWD, etc., will only be undertaken after the proposals for the use of forest land for non-forest

purposes are approved by the Government of India under the provisions of the Forest Conservation Act, 1980 and as per latest guidelines issued by GOI from time to time for specific projects. The DCF may permit felling of trees on forest land diverted for the non-forestry purposes as approved under the provisions of the Forest (Conservation) Act, 1980. The material obtained from such harvesting will be brought to the depots and will be disposed off as per departmental procedures.

4. Harvesting of Dead, Fallen and Uprooted Trees in the Storm: Removal of dead, fallen firewood and trees uprooted by wind or storm from all parts of the forests, except the coupes due for working, will be done in the following manner:

- a. Every year in the month of October each Beat Guard shall report the availability of dead fallen firewood and trees uprooted by wind or storm to the concerned RFO.
- b. The RFO shall estimate availability for such material in each compartment and the ACF concerned will verify the same.
- c. If more than 2 such trees per hectare is estimated, proper marking will be carried out. Two dead and fallen trees are required for retention from wildlife conservation.
- d. Wood removal will be carried out from the compartment after approval of the DCF. The details of material obtained from each compartment and revenue realised from it will be entered in the respective Compartment History Form.
- e. Harvesting of dead and fallen firewood is governed by the nistar rights and privileges as admitted in the nistarpatrak or directed by the government from time to time.

No irregular harvesting for the purpose of undertaking plantations/afforestation works under schemes outside the scope of this Working Plan will be taken up in any of the areas under the working plan.

12.5 ARTIFICIAL REGENERATION

12.5.1 PLANTING OF TEAK AND MISCELLANEOUS SPECIES

Plantation of suitable teak and miscellaneous species shall be taken up in the following year of main felling as per the suitability of site. Stump planting shall be carried out in case of stump planting or root trainer planting whereas in case of misc. species root trainer or poly pot planting shall be prescribed. The planting works will be carried out as given below.

Pre-Monsoon Works: These operations will be done in the year of main felling. Fencing or TCM will be prepared for the protection of the plantation. The TCM will be having standard cross section 1.90 X 0.60 X 1.0 m will be dug where the boundary runs along the contour. No TCM will be aligned which runs across the contour and in that case live fencing shall be undertaken. Wherever possible, fencing shall be preferred over TCM.

Pit Digging: The size of pit may be 45 X 45 cm. for miscellaneous plantation and the pit digging shall be completed before March and it should be allowed to weather during summer. The pit refilling shall be completed before the end of May.

12.5.2 NURSERY OPERATIONS

Teak Stumps: These shall be prepared from one year old seedlings raised on the beds as per standard nursery techniques. The seed sources must be from a known place and duly certified by the competent authority. The stumps shall be prepared by following standard techniques.

Miscellaneous Species: These plants shall be raised in polythene bags following standard miscellaneous nursery techniques. Standard size of poly bags for raising miscellaneous species plants should be in accordance with the objective of obtaining optimum size of plants. The nursery operations shall commence 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 the nursery, every 15 days once the plant

attains 10 cm. height. However, care should be taken while shifting that the plants shall not be damaged. The potting mixture shall be managed properly and application of suitable mixture and fertilizer will be carried out at appropriate intervals. Before plantation good quality, healthy and appropriate size plants will be selected and these will be inspected by the officer not below the rank of ACF.

1st Year Operations:

Species of live hedge species shall be taken up in three rows. Planting of Agave on the outer rows of fencing at a spacing of 15cm and planting of shrub cuttings in inner rows will be done. Teak stump plantation will be done in crowbar holes whereas the polythene bag planting will be done in pits after the onset of monsoon.

12.5.3 SUBSEQUENT OPERATIONS

1st weeding along with causality replacement shall be completed within 20 to 25 days after the plantation is over. The 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 vaporization losses. One more soil working will be done in the month of January if there are winter rains, based on the availability of funds. Weeding and soil working to the seedlings and live hedge will also improve the growth and survival of plants on live hedge. In the second year plantation the causality replacement will be carried out after onset of monsoon and weeding shall be done in the month of August and October respectively. Soil mulching shall be carried out along with 2nd weeding. In case of teak, debudding will be done in the month of May. In 3rd year plantation only one weeding along with soil mulching shall be done in the month of September. Debudding in teak plantation shall be taken up in the 2nd year.

12.6 SOIL AND MOISTURE CONSERVATION WORKS

All soil and moisture conservation works shall be carried out on watershed basis.

12.6.1 WATERSHED TREATMENT METHODOLOGY

Watershed development in forest areas tries to reduce the volume and the velocity of runoff through a series of interventions. The aim is to lower the water velocity, to make the water flow vertically downwards rather than horizontally across the area. Interventions are considered at diverse points in a location-specific manner utilizing locally available materials and the vast knowledge of the local people regarding water flows and resource availability. Interventions are generally planned according to the “ridge-to-valley principle.”

A usual mistake is to begin by constructing a water harvesting structure in the lowest part of the watershed without treating the upper part of the catchment. These results in rapid silting up of the storage capacity created because of the soil erosion taking place in the upper part of the catchment. Therefore, ideally it must begin with the treatment of the ridge area followed by the smallest drain, moving on to larger and larger drains in the watershed, arresting the runoff at each point. As a whole, soil moisture conservation works to be undertaken under various schemes including Jalayukt Shivar programmes should be implemented keeping in clear view the technical and scientific specifications and requirements.

Broadly the interventions are categorized into two groups: (1) Ridge area interventions and (2) Drainage line interventions.

12.6.2 Ridge Area Interventions

Ridge area interventions include forest area and lands of marginal farmers located usually on the ridges and upper reaches. These areas are managed initially. This results in reduction in velocity of water, soil conservation and prevention of silt deposition in water harvesting structures on the downstream site. Soil and water conservation measures undertaken in the ridge area will help recharge deeper aquifers in the discharge zone as well as regenerate the degraded forest cover.

While undertaking ridge area treatment, one must remember we are trying to reduce soil erosion and not to increase it, or in another word the aim of watershed

development is to reduce the slope of land and not to increase it. The following points need to remember while selecting the Ridge Area interventions:

- Utmost care should be exercised not to disturb the existing vegetation.
- If boulders are to be used in any structure, they should never be dug out from the soil.
- On slopes greater than 25%
 - Intensive plantation of grasses and shrubs
 - Where boulders are available, contour bunding with boulders
- On slopes greater than 10% and less than 25%, contour trenching is preferred.
- On slopes less than 10%, earthen contour bunding shall be taken up.
- Plantation of trees should be taken up on barren patches and where the crown cover is less than 40%
- Encouraging natural regeneration by grazing control, stump dressing of freely coppicing varieties, micro-water harvesting structures and weeding around saplings, treating bamboo clumps by shoring them up with mud.

12.6.2.1 RIDGE AREA TREATMENTS

Ridge Area Treatment by Forest Regeneration and Plantation:

On slopes steeper than 25% in the ridge area, it is advisable to undertake vegetative interventions only. Where the ridge maintains an existing forest with some vitality, the general thrust should be towards protection and regeneration. In other situations, the plantation may need to be undertaken.

Ridge Area Treatment Contour Trenching:

Contour trenching is a simple and a low-cost method of checking the velocity of runoff in the ridge area of any watershed. A contour trench is a trench dug along a contour line. A contour line is an imaginary line, which joins points together of the

same elevation. Digging a trench along such a line increases the chances of containing runoff for a more extended period of time within the trench. It is equally accurate that if trenches were not to follow a contour, such digging could actually increase the possibility of soil erosion because there would be a rise in the velocity of runoff following an increase in the slope of the land.

Objectives:

- Slowing down the velocity of runoff
- Checking soil erosion, and
- Improving local soil moisture profile

Contour trenches are constructed in the ridge area of a watershed. Rainwater, which falls in this area, flows unchecked carrying with it eroded soil into the flatter portion of the watershed referred to as the "valley." This eroded soil gets deposited as silt in the reservoirs and ponds, thereby reducing their life. Thus, any water harvesting work undertaken in the valley will become meaningless unless appropriate measures like the contour trenching are undertaken to control runoff and soil erosion on the ridge. Contour trenches serve to collect the rainwater that falls in the ridge area. This way the soil moisture profile in the area adjacent to the trench gets improved. Along with the water, the eroded fertile topsoil gets deposited in the trench. It is, therefore, necessary to combine trench construction with the plantation.

Location:

- If the slope of the ridge area is 25% or more, the best form of treatment is the planting of grasses, shrubs and trees. This is because for contour trenches to be effective on such high slopes, they will have to be constructed at very close intervals, which could end up causing more soil erosion due to excessive digging.
- On the other hand, if the slopes are less than 10%, even then contour trenches are not considered to be the best measure. This is because in such a situation,

in comparison to contour trenches, contour bunds are a more effective means of checking runoff and soil erosion. In a contour bund, water not only stops in the excavated portion but also against the bund. Therefore, wherever possible, contour bunds must be constructed in place of contour trenches. However, on very high slopes, it is not possible to make contour bunds since there is a great danger of the bunds breaking.

- Thus, given the above considerations, contour trenches are the most appropriate where the slope of the ridge area lies between 10 to 25%.
- It is an ideal treatment for the non-agricultural land.
- CCT should be avoided in areas with black cotton soil and if the depth of soil is less than 20 cm.

Distance between Trenches:

The distance between the two successive trenches depends on the volume and the velocity of runoff they are expected to handle. This in turn depends on:

- The quantum of rainfall: The greater the rainfall, the lesser the distance
- The permeability of the soil: The more permeable the soil, the greater shall be the distance
- The slope of the land: The greater the slope, the lesser the distance

That is, as the volume and velocity of runoff increase due to any reasons given above, the trenches should become more closely spaced. In several watershed programmes, however, a specific procedure has been adopted for fixing the intervals between trenches: "The vertical interval between contour trenches is fixed at 1m".

Thus, with a constant vertical interval of 1m, the contour trenches would be spaced at a horizontal interval of 20m on a 5% slope and 10m on a 10% slope. However, one must not follow this rule blindly without taking into account the catchment area that each contour trench has to handle. For example, on high slopes

one may end up making too many trenches even though there is very little water, which each trench needs to handle. And on low slopes, very few trenches are made which however are unable to intercept most of the runoff, since each trench is expected to do much more than its fair share of work. In practice, thus, one must fix the maximum and minimum horizontal interval between the two successive contour trenches in a way, which is depicted as follows:

- On high slopes, the trenches should be close to each other but never closer than 10 m.
- On low slopes, the trenches should be far from each other but never farther than 30 m.

Thumb rule for the vertical interval between two rows:

V.I. = Slope (%) / C, where value of C = 12 for the medium rainfall.

It is commonly expressed in term of vertical interval (V.I.), which is defined as the difference in elevation between the two similar points on two consecutive bunds. The basic principle involved in fixing the spacing between the two bunds is to keep the velocity of runoff below the critical value, which creates scour.

Vertical Interval is usually expressed as:

$$V.I. = 0.305 \times [(S/a) + b]$$

Where V.I. = Vertical Interval in meter, S = Slope in percent, a and b = constants specific to particular region. For soil with good infiltration rates values of a and b are respectively taken as 3 and 2; whereas for soils of low infiltration rates the corresponding value are 4 and 2, respectively.

Staggered vs Continuous Trenching:

Over time, experience of watershed programmes has shown that it is better to stagger the digging of contour trenches. This is because it has been found that invariably errors have been made in contouring over long distances.

Therefore, instead of making trenches continuously, they should be made in a staggered and discontinuous manner. Dig a trench 4 m long on a contour line. Give a gap of 4 m and dig another 4 m trench along the contour. The trenches are further dig in the similar fashion along this particular contour. Then, come to the next contour line. Begin digging in a stretch, which covers the gap left in the higher contour line. The gaps in this contour line should fall below the trenches in the higher contour line. In this way, we maximize the amount of harvested runoff by the trenches. In other words, chains of staggered trenches should be made along successive contour lines so that water left by one line of trenches is captured by the immediately lower line and so on.

In areas where there is an abundance of trees and vegetation, gaps in excavation are in any case essential to allow space for the roots of the trees to spread. Also, where there are hard rocks underneath the soil, trenches must be staggered.

12.6.3 DRAINAGE LINE INTERVENTIONS

These interventions are implemented along the existing drainage lines with an objective to enhance the recharge of groundwater and increase the duration of flow in the drainage line. Some general considerations should be borne in mind while selecting the site for locating structures on the drainage line:

- The width of the drainage line at that point should be narrow.
- The width of the drainage line upstream of the point should be more considerable.
- The embankments at that point should be clearly defined, stable and high.
- The upstream bed slope of the drainage line should be low.
- The upstream bed of the drainage line should be made up of impervious material if the principal aim is to harvest water for

irrigation. On the other hand, if the main aim is to increase the rate of groundwater recharge, this material will be relatively pervious.

- Ideally in structures where waste weirs have to be constructed, the substrata of the nala banks should be hard enough; so that the banks of the weir do not easily get eroded.
- In all those structures where overtopping is allowed, it is to be ensured that the height of the structure plus the depth of peak flow in the stream is habitually less than the height of the embankments.
- Always locate a structure at such a point, where the construction material of requisite size and quantity are adequately available.

Some of the Drainage Line Interventions include:

1. Where the local bed slopes are above 20% and where thinning operation yields adequate raw material: brushwood checks
2. Where local bed slopes are between 5-20%
 - a. If boulders are freely available: dry boulder checks
 - b. If boulders are not freely available: boulder cum earthen checks
3. Where local bed slopes are less than 5%
 - a. Nala bunds, which serve as percolation reservoirs in the upper catchment. These are to be located on pervious strata to improve vertical percolation.
 - b. Sand-filled bag structures to check the velocity of stream flow and where sand is locally available
 - c. Gabion structures where velocity and volume of peak run-off are excessively high for loose boulder structures
4. Where the stream embankments have been severely eroded
 - a. Nala draining, including deepening of channels and raising embankments, along sections of streams; especially where during peak floods, the stream flows over its embankments and damages the fields alongside.

- b. Embankment stabilisation through gabions or sand-filled bag structures in stretches where the banks are exceptionally vulnerable and require reinforcement.
- c. Where groundwater harvesting wells are located alongside
- d. Underground dykes in the discharge zone where the impermeable strata are overlaid by a thin layer of permeable deposits.

12.6.3.1 DRAINAGE LINE TREATMENTS

Drainage Line Treatment with Boulder Checks:

Boulder checks are loose rock dams made on small drainage lines, which have a catchment area of around 10 to 20 ha. As per rainfall parameters the permissible catchment area of the drain for the construction of loose boulder gully plug varies.

Objectives:

The main aim of constructing boulder checks is to reduce the velocity of water flowing through the drainage line. By reducing the velocity of runoff, boulder checks help in;

- Reduction in soil erosion.
- Trapping silt, which reduces the rate of siltation in water harvesting structures in the lower reaches of the watershed.
- Creating a hydraulic head locally which enhances infiltration of surface runoff into the groundwater system; and
- Increasing the duration of flow in the drainage line.
- Therefore, the capacity of the water harvesting structures created downstream on the drainage line is utilized more fully as they get many more refills.

Location:

- Boulder checks should be made as a series on a drainage line, with each structure dividing the overall catchments of the drainage line into smaller sections.
- The independent catchment of each boulder check should not be more than 1 to 2 ha.
- Boulder checks should not be made where the bed slope of the drainage line at that point is above 20% because the check will not be able to withstand the high velocity of water flow. However, on a drainage line with an overall high bed slope boulder check can be constructed in sections where the local bed slope is less than 20%.
- Boulder checks should be made where boulders are available in large quantities in the requisite size.
- A boulder check should be made where the embankments are well defined and stable, and high enough to accommodate peak flows even after the check has been made, thereby preventing water from rising over and cutting the banks. The height of the embankment at the location of the structure must at least equal the maximum depth of flow in the stream including the design height of the structure in the central portion of the drainage line. This rule is applicable to all structures in which overtopping is permissible.
- Even though storage is not a primary consideration in the case of boulder checks, enhanced water retention and groundwater recharge is a desirable objective. Hence, locating the structure in those sections in the drainage line, where the upstream slope is flatter may be advantageous. The flatter the upstream slope, the greater would be the storage per unit height of the structure.

Layout:

On each drainage line there will be a series of boulder checks. The minimum vertical interval between two successive checks on a drainage line should be equal to the height of the structure, so that the water temporarily stored in one check will reach the toe of another check upstream. Any interval below this limit would mean under-utilization of the capacity of the downstream boulder check. What interval we keep above this limit would require a balance to be struck between cost considerations and volume of water to be stopped. Once this vertical interval is fixed, the horizontal interval between two successive checks would depend on the bed slope of the drainage line; for instance, with a constant vertical interval of 1m, the boulder checks would be spaced at a horizontal interval of 20 m on a 5% slope and 10 m on a 10% slope. In general, the relationship can be expressed as follows:

$$\text{H.I.} = \text{V.I.} / S$$

Where, H.I. = Horizontal Interval; V.I. = Vertical Interval and S = Slope (%)

However, one must not follow this rule blindly without taking into account the catchment area that each boulder check has to handle. For example, on high slopes one may end up making too many checks even though there is very little water which each checks needs to handle. In practice, one must fix the maximum and minimum horizontal interval between two successive boulder checks.

- On high slopes, boulder checks should be spaced close but not closer than 10 m
- As the slope decreases, boulder checks must be spaced farther, but not farther than 50 m

Planning:

Identify the drainage line to be treated by the checks. Start from the top. Fix the location of the topmost boulder check. Walk 5 m downstream. This gives the downstream bottom edge of the first boulder check. We have decided that the

minimum horizontal distance between 2 boulder checks has to be 10 m. Measure the slope of the nala bed over the 10 m stretch, beginning with the bottom edge of the first boulder check.

If the slope is 10% or more, keep the horizontal distance between two boulder checks as 10 m. In case the slope is less than 10%, then increase the distance between the boulder checks, depending on the flatness of the slope. Thus, for instance, if the slope is 5%, the distance should be 20 m; if slope is 2%, the distance should be 50 m. Even if the slope is less than 2%, do not increase the distance beyond 50 m, which is the maximum distance we have fixed. Thus, along the length of the drain, the location of the checks is marked.

Drainage Line Treatment with Gabion structure:

Gabion structures are rock and wire dams constructed across the drainage lines with a catchment area of 30-150 ha. They are also constructed to reinforce highly erodible stream embankments.

(A) Gabion Structure across Drainage Line:

Objectives: The main aim of constructing gabion structures is to reduce the velocity of water flowing through the drainage line. By reducing the velocity of runoff, gabion structures help in:

- Reduction in soil erosion.
- Trapping silt, which reduces the rate of siltation in water harvesting structures in the lower reaches of the watershed.
- Creating a hydraulic head locally which enhances infiltration of surface runoff into the groundwater system; and
- Increasing the duration of flow in the drainage line. Therefore, the capacity of the water harvesting structures created downstream on the drainage line is utilized more fully as they get many more refills.

Location:

The minimum independent catchment area for a gabion structure is 5 ha. For a catchment area smaller than this even a loose boulder check may suffice. The precise location of a gabion structure depends on the following factors:

- Stability of the embankments is the primary consideration. The less stable and more erodible the material on the embankments is the weaker the structure is likely to be. In such a situation, making the structure stronger would render it too expensive.
- The elevation of side embankments from the bed of the stream at the least must equal the sum of the depth of peak flow in the stream and the designed height of the structure. For example, if the height of the embankments is 6 m and the depth of peak flow is 4 m, then the height of the gabion must not exceed 2 m to prevent the water from jumping over the sides. Hence, observation of the peak flows is imperative before a gabion structure is planned.
- For maximizing storage in the structure, the bed slope of the upstream portion should be low. The flatter the upstream slope, the greater will be the temporary storage per unit height of the structure.
- The material composing the bed of the drainage line upstream of the structure should not be completely impermeable, because what we are looking for is temporary storage followed by groundwater recharge.

(B) Gabion Structure along Embankments:

These structures are built to cushion the impact of water, preventing it from eroding the banks. On very high slopes as in the Himalayas, such structures are built along the contour lines to prevent landslides. These should be located in those stretches where embankments are prone to severe erosion by the stream. Normally this happens where the stream turns sharply and its flows are directed towards the

embankments. The length of the embankment to be strengthened has to be determined. Along this length the rectangular boxes have to be placed as a straight wall with a vertical face. The wall width could be a standard 1m while the length and height both are dependent on the local conditions. The height of this wall should be at least 1 m above the peak flood levels of the stream. The upstream end of the gabion wall should be well embedded into the embankment so that the stream is not able to cut a path behind the structure. Care must be taken that the gap between the structure and the embankment is filled with rammed earth while raising the rectangular structure.

Drainage Line Treatment with Earthen Water Harvesting:

In forest areas the commonly built earthen water harvesting structures are Percolation tanks.

Objectives of Percolation Structures:

Percolation structure is an earthen dam constructed to impound water flowing in a small drain or a medium drain for the primary purpose of increasing the rate of groundwater recharge. A percolation structure augments flows in the groundwater system by controlling the volume and velocity of surface water flow, thereby allowing water a greater time for percolation into the aquifer. This replenishment of groundwater benefits the irrigation wells situated downstream in the catchment. Enhanced groundwater recharge helps lengthen the life of the seasonal streams through regenerative base flows after the end of the rainy season. Depending on the capacity of the structure and duration of water storage, the pond can have secondary benefits (such as pisciculture) that are vital for the livelihood security of local communities.

Location:The location of earthen structures is determined on the basis of the following considerations:

- **Effective Storage:**The site for an earthen structure should be selected at a point where the total runoff is adequate to fill the structure to its full capacity,

i.e., the total runoff should be at least greater than or equal to the 'effective' storage of the structure.

- Effective storage = Storage capacity + Volume of water percolating from it during one season + Evaporation + Water used for protective irrigation.
- Hence, an estimation of runoff from the catchment and the effective storage of the structure are essential to decide its location. On the other hand, it must also be ensured that the total runoff is not too large in relation to the effective storage of the structure, i.e., the structure should be able to hold most of the water flowing into it. A common mistake is to locate earthen structures in such a place where the catchment area of the stream is very large so that the inflow of water is much higher than structure capacity. Such a structure would necessarily have to let most of its inflow out through a waste weir, which literally means that we end up leaving the entire nala. Therefore given the cost constraints no structure should be constructed where its effective storage is less than 50% of total runoff. Thus matching runoff and storage entails a knowledge about the topography of the catchment and the geology of the bed of the structure.

Embankments:At the point of location, the drainage line must have well defined embankments to which the structures can be anchored. Since the structure is embedded into them, these embankments should be strong and not made of loose material like sand.

- Slope of the Upstream Nala Bed: The bed slope should be relatively low (not more than 5%) upstream of the site selected for the earthen structure, in order to maximize storage capacity.
- Width of the Nala: At the site the embankment should be narrow and vertical. But as we move upstream, the nala should ideally widen so as to contain maximum storage within its banks.

Geology: Since the primary objective of structure is water storage, the geology of the structure must be favourable for water storage, i.e., percolation losses must be minimal up to reasonable depths. In cases where percolation losses are high and the storage structure makes sense only as a groundwater recharge structure, it is advisable to dig intake wells on the downstream to collect the percolating water. If the percolation losses are high but the strata, which can be tapped by dug wells, yield very little water, the site should be abandoned since a structure here will neither store surface runoff nor recharge wells. In the case of the percolation structure, however, the primary consideration is groundwater recharge. Therefore, we would ideally like the bed of the structure to be made up of relatively pervious material. In both cases, the geology of the waste weir site should preferably be a hard rock so that it does not erode very easily.

Availability of Materials: Even if all other factors are favourable and if the requisite materials are not easily available, one may be compelled to abandon the site.

Type of earthen structures: Depending on the construction materials used, two types of structures can be constructed:

- **Structure made of Homogenous Material:** In places with an impervious foundation where availability of clay is virtually nil, structures can be made from a relatively more pervious material either by increasing the area of cross section, ramming the material to a greater extent or by providing a narrow clay blanket on the upstream side in order to control seepage.
- **Core Wall Type:** Where both the pervious and the impervious materials are available, the structure wall can be partitioned between these according to their relative abundance. Where the availability of impervious clayey soil is limited, one can choose to economize on clay by puddling. In the core wall type structure, there is a narrow, impermeable wall, extending from

embankment to embankment and made of puddled clay that forms the core of the structure. To support and protect this, the outer flanks of the structure are made of dry or wet rammed coarser soils, which are arranged by grade. The finest particles being placed inside and the coarsest material is placed in graduating way towards the outside. The final shelter is provided by pitching, which involves giving a layer of boulders on the upstream face of the structure.

Forest Pond:

It is a water harvesting structure suitable for the plain area. Main purpose of the structure is to ensure water availability to wildlife.

Site Selection Criteria: Following are the criteria for the site selection of a dugout pond:

- Catchment area of the pond should be within 2 - 20 hectares.
- Soil strata up to 3 m depths should not be in the form of disintegrated rock or hard rock.
- If any well is present in the vicinity, then the pond should be on the upstream side of the well.
- Soil of the dugout should be impermeable so that water can be stored for a longer period.
- One thousand cubic meter (20 m x 20 m x 2.5 m) storage capacity of forest pond required for the protective irrigation of one hectare of the land. Five percent land is required for serving the said requirement. Beneficiaries should be selected as per the requirement of the land for the construction of forest pond.
- At least three to four hectares catchment area is required for storing 1000 cubic meter water in a forest pond.

Types of Forest Ponds:

- **Dugout Type:** Where the slope of the field is relatively low and there are no well-defined drainage channels, the pond will have to be created by excavation. The storage capacity will be confined to this excavated portion. Because of the low slope, there will be little storage above the ground level. Such ponds are best located in the lowermost portion. The runoff has to be directed into the pond through bunds or channels.
- **Trapezium Type Dugout Pond:** Size of the tank depends on the requirement of water to be stored. Depth of dug out pond depends on the soil strata. Side slope of the dug-out pond depends on the angle of repose, generally 1:1 side slope is provided in cutting section.
- **Stepped Dugout Pond:** It is preferred in that location where community may use the pond for their daily work.
- **Dugout cum Embankment Type:** Where there is no well-defined channel and the slope of the land is medium, the pond should be of the dugout cum embankment variety. Here, the mud excavated should be used to form an embankment all around the pond except at the inlet. At the full reservoir level, the water level will be higher than the ground level and the embankment will serve as a retaining wall. Therefore, even while the dugout portion will be a significant part of the total storage volume, there will be some storage above the dugout portion retained by the embankments.

The main difference between the embankment and dugout types of farm ponds is that the dugout variety can be made in virtually any topographic situation without reference to the drainage line. As for the design, the freeboard in a dugout pond refers to the difference between the base of the waste weir and the top of the dugout portion of the structure. The freeboard is given mainly to prevent water from flowing into nearby fields during flash floods. Since the main storage is not through the bund, most of the discussion regarding bund parameters becomes redundant. But

a certain degree of care has to be exercised in order to protect the pond from erosion by the intense rainfall and the sloughing action of the receding water. Here, the same considerations apply as in determining the slope of the dugout area. If the pond face is made of a material, which has a low angle of repose, it should be cut at an appropriate angle to form a series of steps. The resultant reduction in the pond capacity is to be balanced against the considerations of stability. Pitching should also be done where required. Where percolation losses are high, it may be advisable to allow a layer of transported soil to get deposited on the pond bed during the initial year. By acting as a clay blanket, this layer would reduce percolation losses. In subsequent years, a silt trap can be made in the inlet channel. The inlet channel should be lined with boulders to make it safe against erosion. Before the channel reaches the pond, a silt trap should be placed either by digging a trench or through constructing a boulder check.

Precautions:

- Catchment area should be treated for the soil conservation interventions otherwise pond will silt up.
- It should be constructed on small drain or the first order drain.
- If the dugout pond is used for meeting daily water requirements then stepped type dugout should be preferred.
- Select the deep pond instead of a shallow pond. Exit of a dug out pond should be at the ground level and side of the embankment should be protected with stone pitching.
- Dugout soil should be stacked in the form of embankment with a one-meter berm.

Cement Nala Bunds:

This is a permanent structure having long life sustainability. The work of cement nala bunding helps raise ground water level and prevents soil erosion.

Check dams are constructed across small streams having gentle slope and are feasible both in hard rock as well as alluvial formations. The site selected for check dam should have sufficient thickness of permeable bed or weathered formation to facilitate recharge of stored water within short span of time. The water stored in these structures is mostly confined to stream course and the height is normally less than 2 m. These are designed based on stream width and excess water is allowed to flow over the wall. In order to avoid scouring from excess run off, water cushions are provided at downstream side. To harness the maximum run off in the stream, series of such check dams can be constructed to have recharge on regional scale.

A series of small bunds or weirs are made across selected nala sections such that the flow of surface water in the stream channel is impeded and water is retained on pervious soil/ rock surface for longer body. Nala bunds are constructed across bigger streams of second order in areas having gentler slopes. A nala bund acts like a mini percolation tank.

Site Characteristic and Design Guidelines:

For selecting a site for Check Dams/ Nala Bunds the following conditions may be observed:

- The total catchment of the nala should normally be between 40 to 100 hectares though the local situations can be guiding factor in this.
- The rainfall in the catchment should be less than 1000 mm/annum.
- The width of nala bed should be atleast 5m and not exceed 15m and the depth should not be less than 1 metre.
- The soil downstream of the bund should not be prone to water logging and should have pH of 6.5 to 8.
- The nala bunds should be preferably located in area where contour or graded bunding of lands have been carried out.
- The rock strata exposed in the pond area should be adequately permeable to cause ground water recharge through pond water.

- Nala bund is generally a small earthen dam with a cut-off core wall of brick work, though masonry and concrete bunds/ plugs are now prevalent.
- For the foundation for core wall a trench is dug 0.6m wide in hard rock or 1.m in soft rock of impervious nature. A core cement concrete wall is created 0.6 m wide to stand at least 2.5m above nala bed and the remaining portion of trench is back filled on upstream side by impervious clay. The core wall is buttressed on both sides by a bund made up of local clays and on the upstream face, stone pitching is done.
- Normally the final dimensions of the nala bund are: length 10 to 15m, height 2 to 3m and width 1 to 3m, generally constructed in a trapezoidal form. If the bedrock is highly fractured, cement grouting is done to make the foundation leakage free.
- Dams should be built at sites that can produce a relatively high depth to surface area so as to minimise evaporation losses.
- Rocky surfaces should not be fractured or cracked, which may cause the water to leak away to deeper zones or beneath the dam.
- Dam foundation must be of solid impermeable rock with no soil pockets or fracture lines.
- Dams should be located along the edges of depressions or directly across the lower ends of deep gullies into the rock.

12.7 ENCROACHMENT

The problem of encroachment is common in almost all the areas specially the forest areas located adjoining to habitations. The problem of encroachment is because of lack of appropriate survey and demarcation on the ground, the greed of the people and the apathy of local people towards Government lands. There have been large scale clearances of the forests in the past for encroachment with a view to

obtain agricultural crops. The state government has issued orders in 1978 and 1979 to regularize all encroachments on forest lands done during the period from 01.04.1972 to 31.03.1978. This increased the tendency of people to encroach upon the forest land with a hope that in future also such encroached lands will be regularized by the Government. The enactment of the FRA, 2006 has also further fragmented the forest land. Currently, a total of 1500.76 ha forest area is found under encroachment in Pandharkawada Division. Encroachment anywhere irrespective of size, should be removed as per law. In order to mitigate the problem, it is essential to take up survey and clear demarcation works on top priority. Precast pillars of Class-I and Class-II 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 that were entrusted to the officers of Assistant Conservator of Forests and above rank under Sec. 53 and 54 of Land Revenue Code will effectively be utilized. The encroachment, if any, can be tried summarily and evicted as early as possible.

The following instructions shall be followed regarding encroachments.

1. Special care shall be taken to ensure protection of such patches from encroachment. The civil powers of eviction are entrusted to ACF and DCF. The procedure laid out in the Land Revenue Code shall be followed before the execution of eviction. Habitual encroachers shall be prosecuted as per Indian Forest Act. 1927.
2. All external boundaries shall be demarcated with concrete pillars. All sensitive and important boundaries and wherever disputes exists, be surveyed and concrete pillars be laid immediately.
3. All encroachers shall be listed with their names, age, residence, profession, whether belongs to SC, ST, OBC/NT, extent of encroachment, survey no. and location of encroachment, village/block etc.
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 under Land Revenue Code and after giving a reasonable opportunity of being heard to the encroacher, ACF shall pass a summary eviction order if he/she 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 will 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. Regularisation of the encroachments made earlier to 1980 be settled as early as possible and necessary proposals be submitted to Government.
10. After the listing of all encroachments, sample verification shall be carried out by all supervisory officers to detect unregistered encroachments.
11. In the month of May, a drive for encroachment prevention be taken up in all the sensitive areas by taking meetings in the villages, distribution of leaflets and posters.
12. Keep a watch on all the sites meant for debris cleaning, ploughing etc., in the month of May, so that encroachments are removed even before the sowings.

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.

In order to release the forest land from the burden of illegal encroachment, it is imperative to not to lose sight of this important issue. Therefore, to have close

monitoring of various activities to be continuously taken under the drive in the division, information shall be submitted to Conservator of Forests, Yavatmal on monthly basis in proforma as given in **Appendix No.X (B)** of Volume-II.

12.8 GRAZING

Fire and grazing hamper the success of regeneration of forest to a great extent. To control grazing, grazing units are formed in the Division. The number of cattle heads is fixed as per the carrying capacity of the area. In the Pandharkawada Forest Division, heavy cattle population pressure has degraded the forests. 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.

The main felling coupes of all working circles will remain closed for a period of 10 years from the main felling as felling cycle is fixed at 20 years i.e. 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 that the cattle exceeding carrying capacity of an area open for grazing should not be allowed to enter into the forest. The excess cattle units can be managed through fodder development activity on common community lands and waste lands. 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 to them and local people shall be educated and made aware of ill-effects of excessive grazing on forests growth. Apart from this the forest staff should open a dialogue with the local villagers to discuss regarding grazing policy, carrying capacity of forests and the area available to graze their cattle in the adjoining forests. The DCF, Pandharkawada should consider all the factors and prepare a consolidated plan based on area, cattle units, carrying capacity, rotational grazing and avenue for excess cattle units.

The above cannot be achieved without the active participation of the people. The role of JFMCs and the rapport of the field officers/staff is very important for the success of containing grazing. Closing of the area of natural regeneration from grazing should be strictly followed.

12.9 MAINTENANCE OF THE FOREST LAND RECORDS

Maintenance of the Land Records and Forest Maps:

The forestland records and the forest maps will be maintained properly and updated periodically. A certificate to this effect will be recorded annually in the Form No 1- Register during the month of June.

Forest Notification:

Non-forest areas transferred for the compensatory afforestation shall be immediately proposed for notification as Reserved Forests, and the reservation process shall be initiated with the section 4 notification under the provisions of Indian Forest Act, 1927.

Reconciliation of the Revenue Records:

The revenue records will be reconciled on the basis of the forest notifications. The Collector and the Deputy Conservator of Forests shall jointly ensure that the Revenue Records are brought up to date according to the forest notifications. Since the Divisional Commissioner issues the forest notifications, there is no apparent need to issue separate orders for the mutation entries. The Revenue Department will provide a certified copy of the Records of Rights to the Pandharkawada Forest Division to mark completion of the process.

Along with the reconciliation, the details of land grants (patta) issued on the forestland will also be made available to the division office.

CHAPTER 13

FINANCIAL FORECAST

The prescriptions of this working plan confirm to the emphasis laid in the National Forest Policy 1988 which lays emphasis on protection and conservation of forests, catchment treatment of rivers and streams, preservation of natural forests, increase in productivity of forests, increase in forest cover, protection of rights and concessions of people, tribals, meeting the requirements of people for small timber, fuelwood, NTFP etc. Various prescriptions have been given to achieve the objectives. The implementation of prescription of this working plan will incur expenditure on establishment, execution of works and also generate ecological services as indirect benefit and revenue and sale proceeds of different produce.

13.1 EXPENDITURE

Expenditure on establishment: To run proper administration, an efficient administrative set up is needed. It is a recurring expenditure on the salary and other benefits to officials and staff, maintenance of offices, vehicles, roads, buildings, machines, communication facilities etc.

Expenditure on harvesting forest produce and other activities: During the implementation of the prescriptions forest produce is to be harvested. In SCI and other working circles forest produce in the form of timber, firewood, and other produce like tendu leaves, gums etc. will be harvested. The activities incur expenditure on harvesting.

The sources of funds during the last Plan were Plan Schemes, Non-Plan schemes, CAMPA, District Plan (DPDC), MGNREGA, special projects like Jalyukt Shivar, etc. The expenditure and revenue during the implementation of the past working plan period is given in the table below.

**TABLE NO. 13.1: DETAILS OF EXPENDITURE, REVENUE AND SURPLUS OVER THE
PREVIOUS PLAN PERIOD**

Year	Revenue (Rs in lakh)	Expenditure in (Lakh)			Total Expenditure in Rs. Lakhs (3+4+5)	Surplus (+) or Deficit(-) in Rs. Lakhs (2-6)
		Conservancy & Work (in Rs. Lakhs)	Establish- ment (in Rs. Lakhs)	Plan (in Rs. Lakhs)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2013-14	193.19	86.72	164.60	2431.21	2875.72	-2682.53
2014-15	370.16	196.35	204.65	2104.87	2876.03	-2505.87
2015-16	817.63	754.35	218.76	1309.43	3100.17	-2282.54
2016-17	589.06	139.77	223.51	1717.24	2669.58	-2080.52
2017-18	702.17	120.15	229.34	1452.67	2504.33	-1802.16
2018-19	793.05	359.21	230.02	1721.52	3103.80	-2310.75
2019-20	754.36	4.50	277.02	872.68	1908.56	-1154.20
2020-21	74.28	39.43	227.11	1500.44	1841.26	-1766.98
2021-22	148.52	191.56	293.96	1243.09	1877.13	-1728.61
2022-23	816.80	96.54	297.97	2749.14	3960.45	-3143.65
Total	5259.22	1988.58	2366.94	17102.29	26717.03	-21457.81

13.2 FORECAST

Since the expenditure on various items is linked with the wage rate and the prevailing salaries of the staff and officers, it is not possible to work out expenditure on all the specific items. The forecast is based on certain assumptions like quantum of work, areas to be tackled, wage rate etc. Based on assumptions like these, the following calculations are made. These are symbolic and not final figures.

FINANCIAL FORECAST

Estimated Annual Expenditure for the Working plan implementation in SCI Working Circle of Pandharkawada Division

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	-18	-19
1	Coupe marking																	
1a	Demarcation & Treatment map preparation	1780	Ha.	2	895.92	15.95	15.95	16.74	17.58	18.46	19.38	20.35	21.37	22.44	23.56	24.74	20.06	3560
1b	Enumeration & marking	356	Ha.	2.5	1119.90	3.99	3.99	4.19	4.40	4.62	4.85	5.09	5.34	5.61	5.89	6.18	5.01	890
2	Coupe working																	
2a	Timber harvesting	1206	Cum.	8.4	3762.86	45.38	45.38	47.65	50.03	52.53	55.16	57.92	60.81	63.85	67.05	70.40	57.08	10130
2b	Firewood extraction	398	Stacks	1.63	730.17	2.91	2.91	3.05	3.20	3.36	3.53	3.71	3.89	4.09	4.29	4.51	3.66	649
3	Natural Regeneration																	
3a	Pre-planting Operations	445	Ha.	31	13886.76	61.80	61.80	64.89	68.13	71.54	75.11	78.87	82.81	86.95	91.30	95.87	77.73	13795

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	-18	-19
3b	First Year Operations	445	Ha.	20.38	9129.42	40.63	40.63	42.66	44.79	47.03	49.38	51.85	54.44	57.16	60.02	63.02	51.10	9069
4	Soil and Moisture Conservation work																	
	100 cum/ Coupe	3200	Cum.	0.92	412.12	13.19	13.19	13.85	14.54	15.27	16.03	16.83	17.67	18.56	19.48	20.46	16.59	2944
4	Assisted Natural Regeneration																	
4a	Pre-planting Operations	445	Ha.	171.44	76798.26	341.75	341.75	358.84	376.78	395.62	415.40	436.17	457.98	480.88	504.92	530.17	429.85	76291
4b	First Year Operations	445	Ha.	73.06	32727.96	145.64	145.64	152.92	160.57	168.60	177.03	185.88	195.17	204.93	215.18	225.93	183.18	32512
4c	Second Year Operations	445	Ha.	55.41	24821.46	110.46	0	115.98	121.78	127.87	134.26	140.97	148.02	155.42	163.19	171.35	179.92	189
4d	Third Year Operations	445	Ha.	58.88	26375.88	117.37	0	0.00	189.02	198.47	208.39	218.81	229.75	241.24	253.30	265.97	279.27	293
5	Cutback Operation	356	Ha.	5	2239.80	7.97	7.97	8.37	8.79	9.23	9.69	10.18	10.69	11.22	11.78	12.37	10.03	1780
6	Artificial Regeneration																	
6a	Pre-planting Operations	178	Ha.	456.07	204301.12	363.66	363.66	381.84	400.93	420.98	442.03	464.13	487.33	511.70	537.29	564.15	457.40	81180

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	-18	-19
6b	First Year Operations	111	Ha.	127.28	57016.35	63.46	0	66.63	69.96	73.46	77.14	80.99	85.04	89.29	93.76	98.45	73.47	14166
6c	Second Year Operations	111	Ha.	73.22	32799.63	36.51	0	0.00	72.32	75.94	79.73	83.72	87.91	92.30	96.92	101.76	69.06	8149
6d	Third Year Operations	111	Ha.	57.52	25766.66	28.68	0	0.00	0.00	59.66	62.64	65.78	69.06	72.52	76.14	79.95	48.58	6402
6e	Fourth Year Operations	111	Ha.	39	17470.44	19.44	0	0.00	0.00	0.00	42.47	44.59	46.82	49.16	51.62	54.20	28.89	4341
6f	Fifth Year Operations	111	Ha.	39	17470.44	19.44	0	0.00	0.00	0.00	0.00	44.59	46.82	49.16	51.62	54.20	24.64	4341
7	Cleaning	356	Ha.	8	3583.68	12.76	0	0.00	0.00	0.00	0.00	48.02	50.42	52.94	55.59	58.37	26.53	2848
					Total :-		1042.85	1277.60	1602.82	1742.63	1872.23	2058.45	2161.37	2269.44	2382.91	2502.06	2042.04	273529

Note :-

1. 25 % of the coupe area is assumed to be D type area.
2. Man-days for Fire Protection will be sanctioned after preparing "Fire Protection Plan" for the entire division.
3. Wage rate is considered as Rs 447.96 with 5% annual increase. The fund requirement will vary as per prevailing wage rate.
4. NR, ANR and AR shall be carried out as per site conditions requirement and staff capacity.
5. 5A (1111 model) is used for AR.
6. NR Model is based on 13th Finance Commission report.
7. The above works are only indicative and the DCF can change the quantity shown as per site requirements.

FINANCIAL FORECAST

Estimated Annual Expenditure for the Working Plan implementation in AWC of Pandharkawada Division

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1	Coupe Marking																	
1a	Demarcation and treatment map	1350	Ha.	2	895.92	12.09	12.09	12.70	13.33	14.00	14.70	15.43	16.21	17.02	17.87	18.76	15.21	2700
2	Coupe working (Hygienic Felling)																	
2a	Timber harvesting	135	Cum.	8.4	3762.86	5.08	5.08	5.33	5.60	5.88	6.17	6.48	6.81	7.15	7.50	7.88	6.39	1134
2b	Firewood extraction	67	Stacks	3.5	1567.86	1.06	1.06	1.11	1.17	1.22	1.29	1.35	1.42	1.49	1.56	1.64	1.33	236
3	Natural Regeneration																	
3a	Pre-planting Operations	100	Ha.	31	13886.76	13.89	13.89	14.58	15.31	16.08	16.88	17.72	18.61	19.54	20.52	21.54	17.47	3100
3b	First Year Operations	100	Ha.	20.38	9129.42	9.13	9.13	9.59	10.07	10.57	11.10	11.65	12.23	12.85	13.49	14.16	11.48	2038

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
4	Assisted Natural Regeneration																	
4a	Pre-planting Operations	100	Ha.	171.44	76798.26	76.80	76.80	80.64	84.67	88.90	93.35	98.02	102.92	108.06	113.47	119.14	96.60	17144
4b	First Year Operations	100	Ha.	73.06	32727.96	32.73	32.73	34.36	36.08	37.89	39.78	41.77	43.86	46.05	48.35	50.77	41.16	7306
4c	Second Year Operations	100	Ha.	55.41	24821.46	24.82	0.00	26.06	27.37	28.73	30.17	31.68	33.26	34.93	36.67	38.51	28.74	5541
4d	Third Year Operations	100	Ha.	58.88	26375.88	26.38	0.00	0.00	29.08	30.53	32.06	33.66	35.35	37.11	38.97	40.92	27.77	5888
6	Artificial Regeneration																	
6a	Pre-planting Operations	200	Ha.	456.07	204301.12	408.60	408.60	429.03	450.48	473.01	496.66	521.49	547.57	574.94	603.69	633.88	513.94	91214
6b	First Year Operations	200	Ha.	127.28	57016.35	114.03	0.00	119.73	125.72	132.01	138.61	145.54	152.81	160.46	168.48	176.90	132.03	25456
6c	Second Year Operations	200	Ha.	73.22	32799.63	65.60	0.00	0.00	72.32	75.94	79.73	83.72	87.91	92.30	96.92	101.76	69.06	14644
6d	Third Year Operations	200	Ha.	57.52	25766.66	51.53	0.00	0.00	0.00	59.66	62.64	65.78	69.06	72.52	76.14	79.95	48.58	11504

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
6e	Fourth Year Operations	200	Ha.	39	17470.44	34.94	0.00	0.00	0.00	0.00	42.47	44.59	46.82	49.16	51.62	54.20	28.89	7800
6f	Fifth Year Operations	200	Ha.	39	17470.44	34.94	0.00	0.00	0.00	0.00	0.00	44.59	46.82	49.16	51.62	54.20	24.64	7800
4	Soil and Moisture Conservation works																	
	100 cum/ Coupe	2000	Cum.	0.92	412.12	8.24	2.42	2.54	2.67	2.8	2.94	3.09	3.24	3.41	3.58	3.75	3.04	552
	Total						561.80	735.68	873.87	977.22	1068.55	1166.57	1224.89	1286.15	1350.45	1417.97	1066.31	204057

1. D Area is assumed to be 10%

FINANCIAL FORECAST

Estimated Annual Expenditure (details) for the Working plan implementation in GFI WC of Pandharkawada Division.

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/ unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)	Man-days generated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1	Demarcation and treatment map	222	Ha.	2	895.92	1.99	1.99	2.09	2.19	2.30	2.42	2.54	2.67	2.80	2.94	3.09	2.50	444
2	Fodder Nursery (CAMPA model)																	
2a	Fodder Nursery	600000	Tus-socks	1558.2	11.38	6.83	6.83	7.17	7.53	7.90	8.30	8.71	9.15	9.61	10.09	10.59	8.59	4675
3	Fodder Plantation (CAMPA model)																	
3a	Pre-planting Operations	100	Ha.	134.4	58923.65	58.92	58.92	61.87	64.96	68.21	71.62	75.20	78.96	82.91	87.06	91.41	74.11	13440
3b	First Year Operations	100	Ha.	218.4	95750.93	95.75	95.75	100.54	105.57	110.84	116.39	122.21	128.32	134.73	141.47	148.54	120.43	21840
3c	Second Year Operations	100	Ha.	146.64	64289.91	64.29	0.00	67.50	70.88	74.42	78.14	82.05	86.15	90.46	94.99	99.73	74.43	14664
4	Soil and Moisture Conservation works																	
4a	100 cum/ Coupe	400	Cum.	0.92	403.35	1.61	1.61	1.69	1.78	1.87	1.96	2.06	2.16	2.27	2.38	2.50	2.03	368
	Total						165.10	240.86	252.91	265.55	278.83	292.77	307.41	322.78	338.92	355.86	282.10	55431

Revenue Forecast for Pandharkawada Forest Division

Sr. No.	Working Circle	Approximate Expected yield (Annual)						Avg. Unit Price in Rupees (As per Schedule of Rates)					
		Timber (CUM)		Beat (CUM)		Poles (Number)		Timber (per CUM)		Beat (per CUM)		Poles (per pole)	
		Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	SCI	1206	65	432	22	2230	112	50000	5000	3000	1200	200	50
2	AWC	135	7	67	3	1350	68	50000	5000	3000	1200	200	50
Total		1341	72	499	25	3580	180						

Sr. No.	Working Circle	Approximate Annual Revenue (In Rs. Lakhs)						Total
		Timber		Beat		Poles		
		Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	
(1)	(2)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
1	SCI	603.00	3.25	12.96	0.26	4.46	0.06	623.99
2	AWC	67.50	0.34	2.01	0.04	2.70	0.03	72.62
Total		670.50	3.59	14.97	0.30	7.16	0.09	696.61

Note- The expected Annual Revenue would vary as per the prevailing market prices.

CHAPTER 14

SCIENCE AND RESEARCH

During the process of writing of this Plan various papers, articles, reports and documents were referred from these sources and used for the writing of the Plan. Major sources are mentioned below.

- Census 2011
- Annual administration report of Maharashtra Forest Department, 2021-2022
- Central Ground Water Board (CGWB)
- Geological Survey of India (GSI)
- Ground water survey and Development Agency (GSDA)
- Indian Forester
- Indian Institute of Forest Management, Bhopal (IIFM)
- Maharashtra Remote Sensing Application Centre (MRSAC)
- National Bureau of Soil Survey and Land use Planning (NBSSLUP)
- Social Forestry, Agriculture, Animal Husbandry, Irrigation departments of Yavatmal
- India State of Forest Report 2017, 2019 and 2021
- Supreme Court Orders
- Twelfth Five Year Plan document under Environment, Forestry and Wildlife 2009
- Maharashtra Forest Manual
- WII Report

During the preparation of working plan various research gaps have been noticed. Forests in Yavatmal district and Pandharkawada Division in specific were managed on scientific lines since long. But modern concepts in forest management have changed the way forests are being managed. Working plan requires specific

inputs on various topics. As per the Working Plan Code, 2014 many new chapters have been added for which information was not available with the division. There is a lack of research work related to Pandharkawada Division. The research gap is in almost every aspect of the Working Plan as previous plans have not looked into the new aspects. Various aspects such as carbon stock, carbon sequestration, sacred grooves, biodiversity, climate change, NTFP research, indigenous knowledge, trees outside forests, social and cultural aspects of forests, ecosystem services etc. were found to be wanting in information.

14.1 PRESERVATION PLOTS

Preservation plots, the miniature nature reserves, are demarcated forest areas set aside for the preservation of the forest in perpetuity permitting only such human interference as is necessary for their protection and maintenance. Following the recommendations of the 3rd All India Silvicultural Conference, preservation plots in the representative areas of chief forest types were marked. By 1939, about 112 preservation plots were established throughout the country, when concept of preservation of both climatic and seral types was generated. In 1961, during the 10th All India Silvicultural Conference, emphasis was laid on preservation of fine specimens of forests i.e. groups of out-standing trees, rare types of forests of botanical curiosity and patches of relict vegetation, specimens of managed forests (stable sub-climax stages) and climax forests.

Preservation plots in Maharashtra have been established as early as 1955 and as of 1993, there are 23 preservation plots in Maharashtra covering an area of 517.32 ha. There are no preservation plots in Pandharkawada Forest Division. The following points are recommended for creation of preservation plots.

- The division should be surveyed to identify the area under specific forest types to be made as preservation plot. The plot size shall be of not less than 4.0 ha and to a maximum of 20 ha.
- The plot should be well-demarcated on the ground, geo-referenced and plotted on a GIS-based map. The trees on the border should be demarcated

with such demarcation as were marked in the other preservation plots in the country/state.

- These plots shall be spared from all human interference including harvesting operations, if prescribed in the Plan. Activities shall be limited to those that would ensure protection and maintenance.
- A total enumeration of the plot shall be taken up taking into account all the tree species of the forests (species, age-class distribution, height, etc.)
- The forests shall also be described in a proper manner as to its species composition, condition of the crop, health and vitality, presence of pests etc.
- The shrubs and herbs present in the plot should be well-documented. This shall include the lower life-forms.
- The fauna available in the area should be surveyed and documented.

14.2 SAMPLE PLOTS

For forest resource assessment in the working plan, sample plots are systematically laid out in the forest area which is indicated on the Survey of India toposheet on the scale of 1:50000. The statistical sampling method namely “Systematic line plot sampling” with random start was used. The plot size of 50”x50” (50 seconds x 50 seconds) representing approximately 225 ha on the ground was laid. The complete enumeration of trees, natural regeneration, grass and medicinal species was carried out. Similarly, qualitative measurements were also carried out. These are distributed in different Working Circles under different ranges and are well-distributed throughout the division. A total of 565 sample plots were laid. The details are given in **Appendix No. XXXII**. These plots shall be monitored and data collected on a periodic basis. The normal prescriptions that are prescribed in the Plan area are allowed to be carried out in these plots and the impact of the implementation of such prescriptions should be recorded and monitored.

14.3 REGENERATION PLOTS

Selection of Plots: The sample plots have been surveyed and in 3 x 3 m sub-plots, information was recorded for regeneration. In these plots, regeneration will also be studied during the plan period. This will make the monitoring and data collection easier as well.

Data to be Collected: Regeneration plots are established to study the regeneration status of important species.

- Data should be collected on population dynamics of seedlings, saplings and young trees.
- Each seedling and sapling should be marked individually.
- The marked seedlings should be measured and monitored periodically.
- The status of growth, their health and conditions should be measured in detail.
- The conditions of soil (depth, humus content etc), presence of litter, the canopy opening level, should be recorded properly.
- The incidences of pest should be recorded.
- Any threat and outside interference like fire, grazing etc should be recorded.
- The monitoring should be done periodically, the period of which should be decided in consultation with the SOFR unit and the Research wing.

14.4 NTFP PLOTS

There are no specific NTFP plots in Pandharkawada Forest Division.

14.5 OTHER RESEARCH AND EXPERIMENTAL PLOT

There are no seed orchards, clonal seed orchards established in the division till date.

CHAPTER-15

CONTROL AND RECORDS

15.1 CONTROL AND RECORDS

The following records shall be maintained in the division office.

1. Control forms
2. Compartment History
3. Plantation registers
4. Nursery Registers
5. Divisional Note Book.
6. Boundary registers.

15.2 CONTROL FORMS

Control forms shall be prepared to include each of working plan prescriptions as well as definite suggestions regarding other operations. All activities of harvesting, subsidiary silvicultural operations, cleaning, thinning, regeneration works, boundary demarcation and soil and moisture conservation works carried out shall be recorded in the control forms. The prescribed proforma of the control forms is given in **Appendix No XXXV** of Volume-II.

Three permanent sets of these control forms shall be prepared. One set each shall be made available at the Division office, DCF (Working Plan) office and CF (Territorial) office. DCF Pandharkawada shall make entries in the control forms and send it to the Working Plan Officer by August of every year. All the entries showing the deviation from the prescription of working plan will be underlined in red ink. The Working Plan Officer will scrutinize it and process further.

15.3 COMPARTMENT HISTORIES

Compartment history is the record of various activities and observations made in the past year. They shall be maintained in forms No. 1 to 5 as given in **Appendix No. XXXVI** of Volume-II.

FORM NO. 1 : Compartment description written by Working Plan Officer, Yavatmal as per his/her inspections.

FORM NO. 2 : Record of changes in the growing stock and plantations.

FORM NO. 3 : Record of operations and out turn.

FORM NO. 4 : Record of observations.

FORM NO. 5 : Record of injuries.

Each compartment or sub compartment must have a separate file. Compartment history must be maintained by the division office and range office as 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 shall send them to the DCF who will get them scrutinised by an officer not below the rank of ACF, get them typed and sign them. One copy of the forms will be filled in the divisional compartment history file and another copy will be returned to the RFO. The copies of the compartment history files shall be sent to the Working Plan office, Yavatmal annually by the month of August.

15.4 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 **Appendix No. XXXVII** of Volume-II.

Nursery registers will be maintained in Form No. 1 to 10 as given in **Appendix No. XXXVIII** of Volume-II.

15.5 DIVISIONAL NOTEBOOK

It is desirable for the DCF to maintain certain journals and records for ready reference. These journals are important for controlling and monitoring various activities of expenditure. A brief note on the plantation will also be recorded by the DCF under the appropriate heads. The form of the Divisional Note Book is given in **Appendix No.XXXIX** of Volume-II.

15.6 FIRE RECORDS

They should be maintained as per the latest orders from the State Government from time to time.

15.7 OTHER RECORDS

List of amendments to the working plan and list of area changes will be maintained in prescribed forms.

CHAPTER-16

TREES OUTSIDE FOREST

16.1 INTRODUCTION

An accurate assessment of forest and tree resources in the country is essential for formulating sound strategies for the forestry sector. Precise data and latest information on forest cover and volume of growing stock of forests/trees and trends of changes therein are basic ingredients for policy and planning purposes. Generally, extensive tree wealth exists outside continuous forested areas in every country. Termed as “Trees Outside Forests” (TOF), these are in the form of small woodlots and block plantations, trees along linear features, such as roads, canals bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas. Traditionally, these were not inventoried and little quantitative information existed about TOF. However, lately a lot of interest has been generated worldwide on TOF. Besides providing support to the rural economy, these trees are now a source of substantial forest produce in every country. Tree population along avenues has been taken up extensively since the early 1950s mainly along roads, railway tracks, bunds, canals, riverbanks, in parks, in blocks and other blank areas. Farm forestry, agro-forestry and wasteland afforestation activities have subsequently increased the tree wealth of the state.

Social Forestry Department (SFD) of the State has the mandate for the forestry outside forest area. Since the early 1980s the SFD has carried innumerable plantation and plantation-drives across the state. It has not only conducted such plantations but has backed-up with good awareness and extension efforts which have borne fruits in many ways. The SFD has been carrying out plantations in the private areas since 1982 in which include block plantations, agricultural bund planting and road-side plantations which form a substantial quantity and forest cover in the areas outside forest.

16.2 TO INCREASE FOREST/TREE COVER

In tune with the objectives of our National Forest Policy 1988 we have to achieve a national target of bringing 33% of landmass of our country under forest and tree cover for ensuring ecological security and environmental balance. However, forest cover and tree cover in India has over the years stabilized at around 24 % of geographical area and Yavatmal district has about 19.20% of the total geographical area under forest cover as per the India State of Forest Report, 2021. The area under forest and forest land is difficult to increase.

The only way left for the increase of forest cover and tree cover has to be through afforestation activities in non-forest areas. The areas outside forests comprises mainly of private farm forests, canal bank areas, road side strips, railway line side strip, blank and degraded land, wasteland etc. Apart from increasing the tree cover, extension of forestry in non forest areas especially as agro-forestry and farm forestry has tremendous potential to increase production of timber and other wood products and reduce the pressure on natural forests. The options for increasing Trees outside Forest have been mentioned below.

16.3 AGROFORESTRY

Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components. Agroforestry can also be defined as a dynamic, ecological based, natural resource management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. In particular, agroforestry is crucial to marginal and small farmers and other rural people because of its potential to enhance their food supply, income and health. Agroforestry is a low-input system which combines trees with crops in various combinations or sequences.

Agroforestry also has the potential to reduce risk through diversification of a variety of products, including food, fuel wood and animal fodder. Agroforestry combines agriculture and forestry technologies to create more integrated, diverse, productive, profitable, healthy and sustainable land-use systems. Agroforestry systems are multifunctional systems that can provide a wide range of economic, socio-cultural, and environmental benefits. The three main types of agroforestry systems are -

1. **Agrisilvicultural System:** It is a combination of crops and trees, such as alley cropping or home gardens.
2. **Silvopastoral System:** It combines forestry and grazing of domesticated animals on pastures, rangelands or on-farm.
3. **Agrosilvopastoral System:** It includes an integrated approach of trees, animals and crops.

16.4 ROADSIDE / CANAL-SIDE PLANTATIONS

From 2013-14 to 2022-23, the Yavatmal Social Forestry wing has taken up 785.70 kms of roadside plantations with 3,92,850 saplings. Detailed information is provided in **Appendix No. VII (A)**.

16.5: BLOCK PLANTATIONS

From 2013-14 to 2022-23, Yavatmal Social Forestry wing has carried out 261.87 hectares of block plantations with 2,90,937 saplings. Detailed information is provided in **Appendix No. VII (B)**.

16.6: OTHER MODELS AND PLANTATIONS: The following types of Agroforestry possibilities should also be explored as per the site conditions and the requirement of the people.

- I. Boundary/Bunds Plantation: Trees on boundary + crops
- II. Energy plantation: Trees + crops during initial year
- III. Alley cropping: Shrubs + crops
- IV. Agri-horticulture: Fruit trees + crops

- V. Agri-horti-silviculture: Trees + fruit trees + crops
- VI. Horti-pasture: Fruit trees + pasture/animals
- VII. Shelterbelts: Trees +/- crops
- VIII. Windbreaks: Trees +/- crops
- IX. Homesteads: Multiple combinations of trees, fruit trees etc.

16.7 SUGGESTIVE STEPS FOR INCREASING TREES OUTSIDE FORESTS

- I. Identification of the fallow lands, culturable and unculturable wasteland range/taluka-wise in agricultural land which is available for taking up afforestation.
- II. Drawing up appropriate time specific action plan is essential, which will require the involvement of the Social Forestry Department and the Agriculture Department alongwith the Forest Department.
- III. Farmers must be encouraged and motivated by way providing them incentives, technical assistance and cooperation from Forest Department for taking up planting trees.
- IV. Land laws, if any, should be so modified wherever necessary so as to facilitate and motivate individuals and institutions to undertake tree-farming and grow fodder plants, grasses and legumes on their own land.
- V. Schemes like “Kanya Van Samruddhi” should be undertaken which promotes planting trees on birth of girl child in lands outside forest area.
- VI. Wherever possible, degraded lands should be made available for agroforestry purpose either on lease or on the basis of a tree-patta scheme. Steps necessary to encourage them to do so must be taken. Appropriate regulations governing the felling of trees on private holdings should be appropriately relaxed.

- VII. High quality planting stock including clonal planting stock supported with improved silvicultural management practices can usher in a second green revolution in India with respect to tree crops for timber, fuel-wood and fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality.
- VIII. People's support in forest conservation should be recognized by the state forest department. And appropriate extension programmes should be undertaken to motivate and make them conscious of the value of trees, wildlife and nature in general. This can be achieved through the involvement of educational institutions, Krishi Vigyan Kendras, mass media, audio-visual aids and the extension machinery. Trainers' Training Centres to learn agri-silvicultural and silvicultural techniques should be developed to ensure optimum utilisation of land and water resources.
- IX. The wood based industries have an important role to play in the development of agroforestry. They should consider making appropriate arrangements with farmers and play a facilitative role in arranging quality planting material and enter into buy back arrangements.
- X. Preferred tree under agroforestry by farmers which are not naturally available in neighbouring forests may be exempted from the transit permit and felling regulations.
- XI. The possibility of a Public-Private Partnership in regenerating the culturable wasteland and barren unculturable wastelands should be explored. This can also be explored for raising the improved planting material for supply to the farmers.

CHAPTER-17

SUSTAINABLE DEVELOPMENT

17.1 SUSTAINABLE DEVELOPMENT GOALS

Sustainable development is a holistic and forward-looking approach that seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs. At the forefront of this global initiative are the 17 Sustainable Development Goals (SDGs), established by the United Nations. Covering a range of interconnected issues, these goals address critical challenges such as poverty, hunger, health, education, gender equality, clean water, clean energy, economic growth, and climate action. The significance of the SDGs lies in their comprehensive nature, aiming to create a balanced and equitable world by 2030. The SDGs serve as a roadmap for transformative change, emphasizing the interconnectedness of social, economic, and environmental well-being, and inspiring collective action to build a more inclusive, resilient, and sustainable future.

17.2 APPLICATION OF SUSTAINABLE DEVELOPMENT GOALS TO PANDHARKAWADA FOREST DIVISION

A blueprint is provided to apply the 17 Sustainable Development Goals (SDGs) within the context of Pandharkawada Division's forestry sector. The targets include specific metrics and timelines, offering a comprehensive framework for evaluating the progress of initiatives. By incorporating these SDGs into the forestry sector, the Pandharkawada Division aims to contribute significantly to global efforts for sustainable development and environmental stewardship.

**TABLE NO. 17.1: SUSTAINABLE DEVELOPMENT GOALS (SDGs) FOR
PANDHARKAWADA FOREST DIVISION**

SDG No.	SDG	Relevance to Forestry sector	Monitorable Targets for Pandharkawada Division
1	No Poverty	Implement sustainable livelihood programs for forest-dependent communities, including eco-tourism, sustainable harvesting, and agroforestry initiatives.	1. Monitor the number of person-days employment provided by the Division every year. Increase 5% year-on-year. 2. Monitor the amount of revenue generated from ecotourism activities that is provided for the welfare of local community every year.
2	Zero Hunger	Support sustainable food systems integrating forest resources, promoting sustainable gathering practices, community gardens, and forest-based agriculture, while facilitating access to nutritious forest products.	1. Monitor the number of training sessions conducted on sustainable harvesting of forest produce. 2. Monitor the number of kitchen gardens and nurseries established in schools. 3. Monitor the number of usufruct trees planted in the Division.
3	Good Health and Well-being	Develop programs promoting health benefits of forests, including forest bathing, eco-therapy, and providing access to forested areas for recreation and physical activities.	1. Monitor the number of visitors to eco-tourism sites. 2. Conduct annual sports meet for entire staff. 3. Award medals and certificates to better performing staff on Independence Day and Republic Day every year. 4. Ensure all staff are provided with decent housing. Clusters at Round level may be established for field staff. 5. Conduct annual medical camps for all staff.
4	Quality Education	Develop educational programs and campaigns to promote forest conservation, sustainable management, and biodiversity conservation among local communities, schools, and stakeholders.	1. Monitor the number of outreach programmes on awareness generation conducted every year.
5	Gender Equality	Promote gender equality in forest-related activities by ensuring equal participation	1. Ensure establishment of separate toilets for women staff at all range and round headquarters by 2027.

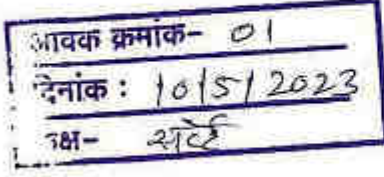
SDG No.	SDG	Relevance to Forestry sector	Monitorable Targets for Pandharkawada Division
		and representation of women in decision-making, training, and employment within the forest department.	2. Establish creche facility at all range headquarters by 2027. 3. Ensure gender sensitisation sessions are conducted for all staff every year. 4. Monitor the percentage of women in employment generated by the department every year.
6	Clean Water and Sanitation	Implement watershed management programs focusing on protecting and restoring forest ecosystems to ensure clean water sources, prevent soil erosion, and preserve water quality.	1. All work places in the Division should have provision of clean water by 2025. 2. Yavatmal evaluation unit shall assess the quality of SMC works undertaken. 3. Quantify the amount of water harvested through SMC works every year. 4. Establish rain water harvesting systems in all official and residential buildings by 2026.
7	Affordable and Clean Energy	Promote sustainable and clean energy sources in forest operations, including solar power for forest offices, energy-efficient equipment, and developing renewable energy projects using forest biomass.	1. Entire division to achieve net zero emissions by 2028 by installing solar rooftops on all official and residential buildings. 2. All nurseries functioning in the Division shall operate on solar power by 2026. 3. Ensure all new electronic appliances have a minimum of 4-star BEE rating.
8	Decent Work and Economic Growth	Create employment opportunities and promote economic growth through forest-related industries such as timber harvesting, non-timber forest product trade, eco-tourism, and forest restoration projects.	1. Clusters for NTFP processing shall be established to generate employment by 2028. 2. Supply chain and Demand assessment studies shall be conducted on major NTFPs by 2027.
9	Industry, Innovation, and Infrastructure	Invest in forest-related research and development for sustainable management practices, innovative technologies, and infrastructure development for effective forest protection and management.	1. Research shall be initiated on biodiversity, ethnobotany, NTFP, medicinal plants, human-wildlife conflict, wetlands etc. by 2026.

SDG No.	SDG	Relevance to Forestry sector	Monitorable Targets for Pandharkawada Division
10	Reduced Inequalities	Ensure equitable access and benefit sharing of forest resources among local communities, indigenous peoples, and stakeholders, addressing land and resource rights issues and promoting inclusive forest governance.	1. Conduct annual training sessions on Access and Benefit Sharing concept enshrined under Biodiversity Act, 2002. 2. Conduct annual training sessions on rights and duties under Forest Rights Act, 2006 for all the right holders.
11	Sustainable Cities and Communities	Incorporate urban forest planning and green infrastructure development into city planning to improve air quality, mitigate climate change, and enhance community well-being through the inclusion of forests and trees in urban areas.	1. Ensure Social Forestry Wing and the Municipal councils in the Division are technically guided on various plantations activities to mitigate pollution and climate change.
12	Responsible Consumption and Production	Promote sustainable forest-based products and practices, including responsible timber harvesting, certification schemes, and responsible sourcing to encourage responsible consumption and reduce the environmental impact of forest products.	1. Establish VanDhan-JanDhan outlet at Pandharkawada town and other taluka headquarters by 2027 and promote usage of forest produce. 2. Make all the work places of the Division 'plastic-free' by 2026. 3. Ensure all the plastic wastes generated by the Division, especially the polythene bags used for raising saplings, are recycled.
13	Climate Action	Implement forest-based climate change mitigation strategies, including conservation, reforestation, afforestation, and sustainable management, contributing to global efforts in reducing greenhouse gas emissions and increasing carbon sequestration.	1. Reduce plantation failures by 50% by 2030. 2. Initiate research projects on plantation models for maximising climate change mitigation by 2026.

SDG No.	SDG	Relevance to Forestry sector	Monitorable Targets for Pandharkawada Division
14	Life below Water	Implement marine and coastal conservation programs recognizing the role of forests in maintaining healthy ecosystems, protecting watershed areas contributing to marine biodiversity, and ensuring sustainable coastal zone management.	1. Develop Pandharkawada Wetland Management Plan by 2026 and ensure its implementation.
15	Life on Land	Promote sustainable forest management practices safeguarding biodiversity, protecting endangered species, restoring degraded lands, combating deforestation, and conserving forest ecosystems to ensure the sustainable use of forest resources.	1. Reduce illicit activities (by cases) in forest areas by 10% year-on-year.
16	Peace, Justice, and Strong Institutions	Strengthen forest governance and law enforcement mechanisms to combat illegal logging, promote transparency, ensure equitable distribution of forest benefits, and foster community participation in decision-making processes.	1. Dispose all cases pending more than a year by 2026. 2. All departmental enquiry cases shall be expedited.
17	Partnerships for the Goals	Foster collaboration and partnerships with local communities, indigenous peoples, NGOs, academia, and other stakeholders to enhance knowledge sharing, capacity building, and resource mobilization for sustainable forest management and conservation efforts.	1. JFMCs shall be made fulcrum of forest management. All C category JFMCs shall be shifted to B and all the current B category committees shall be shifted to A category by 2030. 2. Tri-patriate agreements shall be taken up for plantation activities. 3. CSR funding shall be sought for majority of the works enlisted above.

CHAPTER-18
NECESSARY PERMISSION & DOCUMENTS

18.1 Pandharkawada Forest Division Working Scheme Year 2022-23 (Draft) and its correspondence.



10.05.2023



वनसंरक्षक (प्रादेशिक) यवतमाळ यांचे कार्यालय

वनभवन इमारत, चर्च रोड, सिव्हील लाईन, यवतमाळ -445001

कार्यालयीन दूरध्वनी 07232-242894/242194, फॅक्स- 242194

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क्रमांक - कक्ष 2/सां/ का आ/ 153 /2023-24

यवतमाळ 445001 दिनांक 09/05/2023

प्रति,

अपर प्रधान मुख्य वनसंरक्षक
(उत्पादन व व्यवस्थापन),
म.रा.नागपुर

विषय :- पांढरकवडा वनविभागाची सन 2023-24 करीताची Working Scheme सादर करणेबाबत.

संदर्भ :- 1. आपलेकडील पत्र क्र./कक्ष-14 / अप्रमुवसं (उ.व.व्य.)/ आर. एस/ 143 दिनांक 24/02/2023
2. उपवनसंरक्षक, पांढरकवडा यांचे पत्र क्र./उवसं/व/सर्वे / 120 दि 25/04/2023

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उपरोक्त संदर्भाय पत्राचे अनुषंगाने पांढरकवडा वनविभागाची कार्य आयोजना सन 2022-23 मध्ये संपुष्टात आली असल्याने पांढरकवडा वनविभागा अंतर्गत क्षेत्रातील वानिकी कामे व वनसंवर्धन विषयक कामात खंड पडू नये व कार्य आयोजना ही अखंडीत कार्यन्वीत राहणे हेतु पांढरकवडा वनविभागाच्या कार्य आयोजनेची सन 2023-24 करीताची Working Scheme तयार करून केंद्र शासनाचे मंजूरी करीता वासोबत सादर करण्यात येत आहे.

(व्ही. टी. फुले)
वनसंरक्षक (प्रादेशिक)
यवतमाळ

प्रतिलिपी :- वनसंरक्षक (कार्य आयोजना पूर्व), नागपुर यांना माहिती व योग्य कार्यवाही करीता सादर.

प्रतिलिपी :- उपवनसंरक्षक, कार्य आयोजना विभाग, यवतमाळ यांना माहिती व योग्य कार्यवाही करीता अग्रेषित.

प्रतिलिपी :- उपवनसंरक्षक, पांढरकवडा वनविभाग, पांढरकवडा यांना माहिती करीता अग्रेषित.



Government of Maharashtra

**PANDHARKAWADA
WORKING SCHEME
2023-24(DRAFT)**

Pandharkawada Forest Division
Yavatmal Circle

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PART - I

CHAPTER - 1

AREA DEALT WITH- LOCATION

This WP deals with all the Reserved Forests, Protected Forests and Unclassed Forests of Pandharkawada Forest Division. These forests occupy eastern portion of Yavatmal District. There are 6 Talukas in this division namely Kelapur, Ghatanji, Ralegaon, Maregaon, Wani and Zari-jamani.

The present day Pandharkawada Forest Division was a part of old Yavatmal Forest Division. In the year 1964 the old Yavatmal Forest Division was reorganized into two separate forest divisions i.e., East Yavatmal and West Yavatmal Forest Divisions. Subsequently in the year 1983 reorganization of Forest Department was affected and three Forest Divisions were created namely Yavatmal Forest Division, Pusad Forest Division and Wani Forest Division (later on renamed as Pandharkawada Forest Division) out of East Yavatmal and West Yavatmal Forest Divisions. The entire forest region of Pandharkawada Forest Division lies between $19^{\circ} 47''$ to $20^{\circ} 30''$ north latitude and $78^{\circ} 05''$ to $79^{\circ} 08''$ east longitude.

The Pandharkawada division consists of 7 ranges viz. Pandharkawada, Parawa, Ghatanji, Maregaon, Wani, Jamani and Mukutban. These 7 ranges consist of 24 Rounds, 90 Beats & 370 Compartments. Some compartments within the Pandharkawada (T) division are managed by FDCM.

Boundaries :

The boundaries of the division are given below

North	: Wardha District, Wardha River
East	: Chandrapur District, Wardha and Painganga River
West	: Yavatmal Forest Division
South	: Painganga River, Telangana (Adilabad District), Chandrapur District

CHAPTER – 2

DETAILS OF FOREST LAND

Pandharkawada Forest Division comprises of Pandharkawada, Parawa, Ghatanji, Maregaon, Wani, Jamani and Mukutban Ranges.

The total forest area of Pandharkawada (T) Division as of today is 66885.31 ha, out of which 63327.82 ha is Reserved Forest, 90.72ha is Protected Forest and 3466.77 ha is Unclassed Forest.

- | | |
|--|---------------|
| 1. The total geographical area of the Division | : 497030.76ha |
| 2. Gross forest area in Pandharkawada Forest Division | : 95957.66 ha |
| 3. Forest area transferred to FDCM Ltd. | : 14341.39ha |
| 4. Forest area with wildlife wing | : 14730.96ha |
| 5. Forest area with Pandharkawada Territorial Division | : 66885.31ha |
| 6. Area currently under work | : 64632.09 ha |
| 7. Area dealt with for Working Scheme | : 64632.09 ha |

Present Area of Pandharkawada Forest Division

Sr. No.	Range	No. of Compts.	Reserved forest area in Ha.	Protected forest area in Ha.	Unclassed forest area in Ha.	Total area in Ha.
1	Pandharkawada	69	10500.12	0.00	970.83	11470.95
2	Jamni	50	9415.35	0	91.42	9506.77
3	Mukutban	42	7545.53	0	66.37	7611.90
4	Maregaon	61	10895.57	0	0	10895.57
5	Parwa	50	7900.39	0	1524.50	9424.89
6	Ghatanji	24	7073.10	90.72	393.81	7557.63
7	Wani	74	9997.76	0	419.84	10417.60
	Total:	370	63327.82	90.72	3466.77	66885.31

CHAPTER – 3

DESCRIPTION OF THE FOREST CROP

The forests of Pandharkawada 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/C(ia) Dry Teak bearing forests and Teak Forests.

(2) 5A/C(ib) Dry Teak forests degraded scrub forests.

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

Teak and its associates form a top canopy up to 22-23 m in height. In some areas adjoining human habitations, there is no understorey or the understorey has sparse vegetation. The crop density varies from 0.2 to 0.6 and blank patches also frequently occur.

Upper Storey:

Teak (*Tectona grandis*) is a dominant species and principal associates are:

Ain (<i>Terminalia alata</i>),	Dhawada (<i>Anogeissus latifolia</i>),
Tiwas (<i>Ougeinia oojeinensis</i>),	Lendi (<i>Lagerstroemia parviflora</i>),
Tendu (<i>Diospyros melanoxylon</i>),	Kalam (<i>Mitragyna parvifolia</i>),
Bhirra (<i>Chloroxylon swietenia</i>),	Rohan (<i>Soymida febrifuga</i>),
Semal (<i>Bombax ceiba</i>),	Beheda (<i>Terminalia bellirica</i>),
Sisham (<i>Dalbergia latifolia</i>),	Bel (<i>Aegle marmelos</i>).

Under Story:

1. Trees: Amaltas (*Cassia fistula*),

Char (*Buchanania lanzan*),

Ghoti (*Ziziphus xylopyrus*), Palas (*Butea monosperma*),

Dhaman (*Grewia tiliaefolia*), Moyen (*Lannea grandis*),

Bartondi (*Morinda tinctoria*), Lokhandi (*Ixora parviflora*)

2. Shrubs:

Bharati (*Gymnosporia montana*), Nirgudi (*Vitex nigundo*),

Morogphali (*Helicteres isora*), Dhayati (*Woodfordia fruticosa*),

Chillari (*Mimosa rubicaules*), Dudhi (*Wrightia tinctoria*),

3. Grass:

Bhurbhusi (*Eragrostis amabilis*), Kodmor (*Apluda varia*),

Marvel (*Andropogon annulatus*), Doob (*Cynodon dactylon*),

Paonya (*Sehima sulcatum*)

4. Climbers:

Palasvel (*Butea superba*), Mahul (*Phanera vahlii*),

Pivervel (*Combretum ovalifolium*), Chilati (*Acacia pennata*),

Eruni (*Ziziphus oenoplia*), Gunj (*Abrus precatorius*),

Distribution of the wild life:

Heavy biotic pressure and consequent deterioration of forests have adversely affected the wildlife in this tract. During summer, water is scarce in forests and is confined to only a few places. The wild animals noticed in the tracts are: -

- 1) **Carnivores:** Tiger (*Panthera tigris*), Panther (*Panthera pardus*), Hyaena (*Hyaena hyaena*), Wild dog (*Cuonal pinus*), jackal (*Canis aureus*), Indian fox (*Vulpes bengalensis*), Wolf (*Canis lupus pallipes*), Jungle cat (*Felis chaus*), Mongoose (*Genus herpestes*).
- 2) **Herbivores:** Spotted deer (*Axis axis*), Blue bull (*Boselaphus stragocamelus*), Sambar (*Cervus unicolor*), Sloth bear (*Melursus ursinus*), Wild boar (*Sus scrofa*), Hare (*Lapus nigricollis*), Barking deer (*Muntiacus muntjak*), Porcupine (*Hystrix indica*), Langur (*Presbytis entellus*).

- 3) **Avifauna:** Apart from common birds, following avifauna are observed -Peafowl (*Pavocristatus*), Jungle fowl (*Gallus sonneratii*), Common quail (*Coturnix coturnix*), Spotted owlet (*Athemebroma*), Civet (*Viveridae*).
- 4) **Reptiles:** Indian cobra (*Najanaja*), Python (*Python molurus*), and Dhaman (Rat snake)

CHAPTER – 4

PAST MANAGEMENT PRACTICES

The first regular working plan authored by Malcom for the A class forest was introduced in 1915-16.

Details of previous working plans implemented in the past are given below-

- 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 1970-71 extended up to 1975-76
- d. Kanekar's WP for East Yavatmal Division 1982-83 to 1997-98
- e. Yadav's WP 2002-03 to 2011-12
- f. Dr R N Rai's WP 2013-14 to 2022-23

PART -II

CHAPTER – 5

BASIS OF PROPOSALS

5.1 Introduction - The duration of Pandharkawada Working Plan (2013-14 to 2022-23) written by DrRN Rai IFS concluded on 31/03/2023. The PWPR for the upcoming Working Plan (2023-24 to 2032-33) has been submitted vide letter no.Desk-1/Survey398/2022-23 dated 20/06/2022. This PWPR was approved by the Standing Consultative Committee in its meeting dated 10/10/2022 the preparation of DWPR requires considerable amount of time and any discontinuity in coupe working results in imbalance in silvicultural management, loss of employment to the locals, loss of revenue to the government etc. an annual Working Scheme is proposed for the gap-year (2023-24).

The architects of Dr. RN Rai's Working Plan have listed coupes for 20 years i.e., 10 years beyond the regular duration of plan period. In the absence of an approved working plan for the financial year 2023-24, this Working Scheme is being prepared to ensure continuation of scientific management of forests through working in Coupe XI areas.

The Scheme also reconciles the compartments after the 2014 reorganization of Forest Divisions in Yavatmal District. Being a supplement to the 2023-24 Working Plan, the Scheme limits itself to present areas in coupe XI of working circles requiring felling of trees. All the observations, calculations and management prescriptions pertaining to each working circle are expected to be derived from the previous working plan.

National Forest policy, Wildlife (Protection) Act 1972, other relevant Acts and Rules, growing stock, availability of harvestable trees, wildlife management, protection related issues, silviculture, improving productivity & vegetation, conservation of endangered flora & fauna etc were considered and prescriptions under various WC were formulated. The details of WC prescribed are given below-

Sr. No.	Working Circle	Area (ha)
1.	Selection cum Improvement Working circle	1760.00
2.	Improvement Working Circle	50.00
3.	Afforestation Working Circle	1289.85
4.	Fodder Improvement Working Circle	123.22
	Total	3223.07

5.2 Salient features of each WC

5.2.1 Selection cum Improvement Working Circle:

- Number of Felling series as per sanctioned plan: 30
- Number of Felling series available after 2014 reorganization of Pandharkawada Division: 33
(As per Revenue & Forest Department, Mantralaya, Mumbai GR No. FDC-2014/P.K.112 /F-5 dt. 19/06/2014)
- Number of coupes in each felling series: 20
- Average coupe area is 50 ha.
- Total area of Coupe no XI: 1760.00 ha (58% area is >0.4 density, 42% below 0.4 density & blank)
- Average no. of trees per ha: 350 (teak: 104 trees)
- Average no. of trees above 61 cm girth: 71 trees.

Prescriptions:

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

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

Category B Under stocked area: Multiple coppice shoot shall be cut retaining one per shoot and malformed teak and other timber species seedlings shall be cut. Unwanted undergrowth which is hindering or likely to hinder the growth of seedlings of desirable species shall be removed. Certain blank areas can be utilised as meadows for wildlife conservation. Plantation shall be carried out with suitable species as per site conditions. 50% Teak and 50% miscellaneous species shall be planted.

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

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

Marking Rules:

Felling of silviculturally available teak trees above the harvestable girth as given below

- Harvestable girth at breast height for teak – coppice origin: 75 cm & seed origin: 120 cm
- Harvesting of teak (coppice origin) for site quality III and IV -12 trees/ha, harvesting of teak (seed origin) for SQ III – 0.45 trees/ha; for SQ IV- 1.24 trees/ha;

Improvement felling of all malformed trees

Felling of all dead trees except 2 trees retaining per ha for conservation of wildlife will act as snag & dens for wildlife.

CBO, cleaning operations;

No felling of non-teak species.

5.2.2 Improvement Working Circle:

- Total Felling series as per sanctioned plan: 1
- Number of coupes in each Felling series: 20
- Average coupe area is 50 ha.
- Total area of Coupe no XI: 50.00ha (52% area is >0.4 density, 48% below 0.4 density & blank)

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

5.2.3 Afforestation Working Circle:

- Total Working series as per sanctioned plan: 23
- Number of coupes in each Felling series: 20
- Total area of Coupe no XI: 1289.85 ha

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

Restorative phase: This phase will be for two years, 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, Pre-planting Operations, PYO works in 2nd year, followed by planting have to be done. Treatment of coupe shall be given as 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.

5.2.4 Fodder Improvement Working Circle:

- Total Working series as per sanctioned plan: 3
- Number of coupes in each working series: 20
- Total area of Coupe no XI: 123.22 ha

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.

CHAPTER – 6

WORKING CIRCLE WISE DESCRIPTION

The WC are prescribed based on the objectives of management and method of treatment. While assigning areas to various WC, the enumeration data, stock mapping and the data of NDVI maps have been taken into consideration. The following WCs are prescribed.

1. Selection Cum Improvement Working Circle.
2. Improvement Working Circle.
3. Afforestation Working Circle.
4. Fodder Improvement Working Circle.

(1) **Selection-Cum-Improvement WC:** These areas basically constitute both good and degraded forests mixed together in almost all the compartments and are capable of producing medium size timber and poles. 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 of coupe no. XI included in this working circle is 1760.00 ha.

(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 of coupe no. XI, included in this working circle is 50.00ha.

(3) **Afforestation 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 of coupe no. XI assigned to this WC is 1289.85ha.

(4) **Fodder Improvement WC:** 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. The total area of coupe no. XI assigned to this WC is 123.22ha.

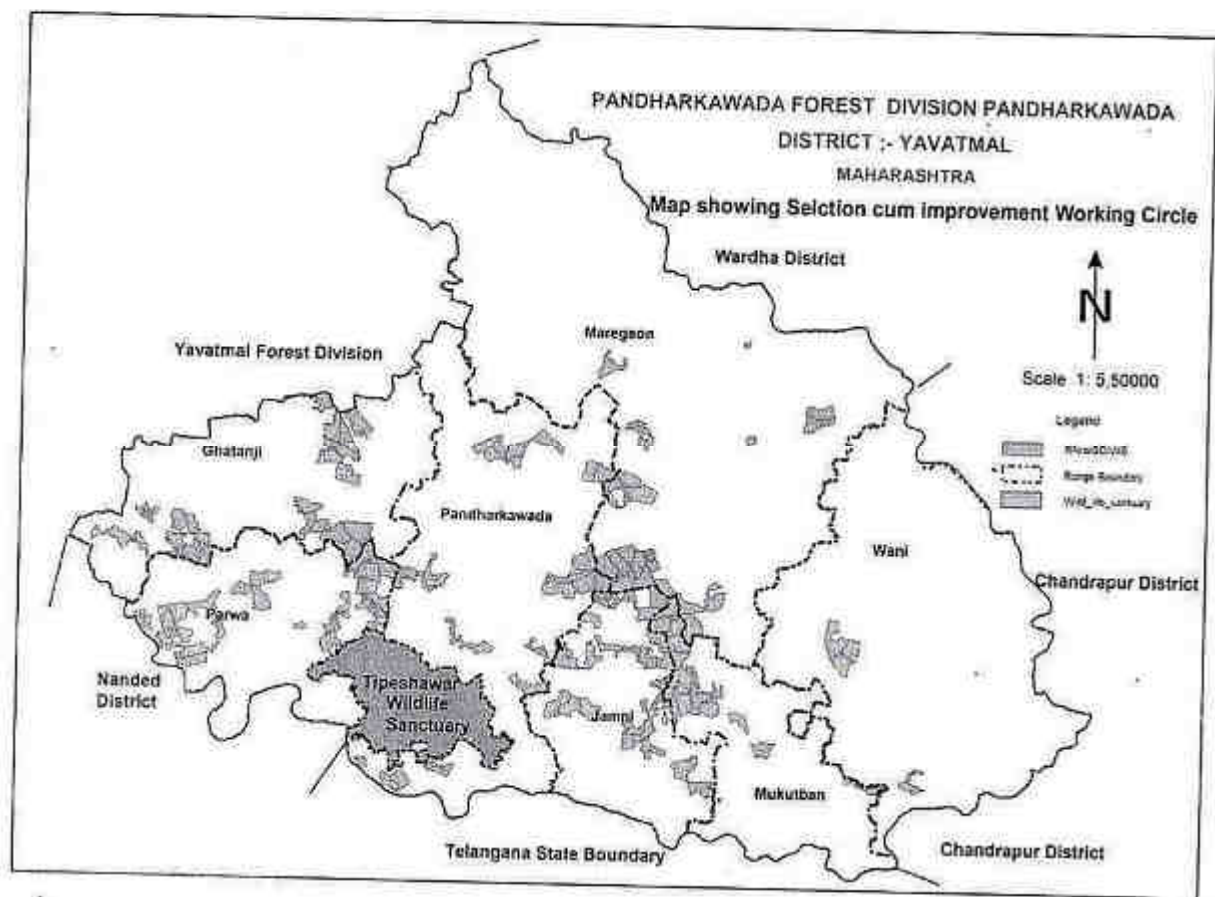
SELECTION CUM IMPROVEMENT WORKING CIRCLE

Table showing the coupes formed under various working series in Selection-cum-Improvement Working Circle Coupe XI (Year 2023-24)

Sr No	Range	Felling Series	Coupe No.	Compt No.	Area (ha)
1	Maregaon	Chinchoni	XI	72	57.00
2	Pandharkawada	Karanji	XI	73	51.00
3	Pandharkawada	Kinhala	XI	77	56.00
4	Jamani	Ambezari	XI	620	51.00
5	Maregaon	Durgada	XI	45	54.00
6	Maregaon	Khandani	XI	41	44.00
7	Mukutban	Pachpor	XI	34	58.00
8	Mukutban	Wadhona	XI	38	50.00
9	Maregaon	Machindra	XI	1	35.00
10	Pandharkawada	Ghordara	XI	79	37.00
11	Pandharkawada	Botoni	XI	645	51.00
12	Pandharkawada	Mangurda	XI	644	48.00
13	Parawa	Pahapal	XI	84	57.00
14	Pandharkawada	Kegaon	XI	61	60.00
15	Mukutban	Matharjun	XI	29	56.00
16	Jamani	Mudhati	XI	47	60.00
17	Mukutban	Chilai	XI	36	43.00
18	Mukutban	Dabhadi	XI	618	30.00
19	Jamani	Mukutban	XI	51	40.00
20	Mukutban	Pawanar	XI	28	48.00
21	Jamani	Junoni	XI	630	60.00
22	Jamani	Mahadoli	XI	63	46.00
23	Jamani	Bori	XI	59	56.00
24	Parawa	Kharoni	XI	86	51.00
25	Parawa	Kurli	XI	641	59.00
26	Parawa	Sayatkharda	XI	177	54.00

27	Parawa	Patapangara	XI	178	54.00
28	Parawa	Manusdhari	XI	180	58.00
29	Parawa	Arli	XI	181	41.00
30	Wani	Rasa	XI	6	55.00
31	Ghatanji	Sakhara	XI	224	80.00
32	Ghatanji	Kopara	XI	210	80.00
33	Ghatanji	Undarni	XI	241	80.00
Total number of coupes 33					1760.00

A total of 33 coupes are planned under SCI WC for the year 2023-24, with a cumulative area of 1760.00 ha. Estimated timber yield is 1628.925 CUM.

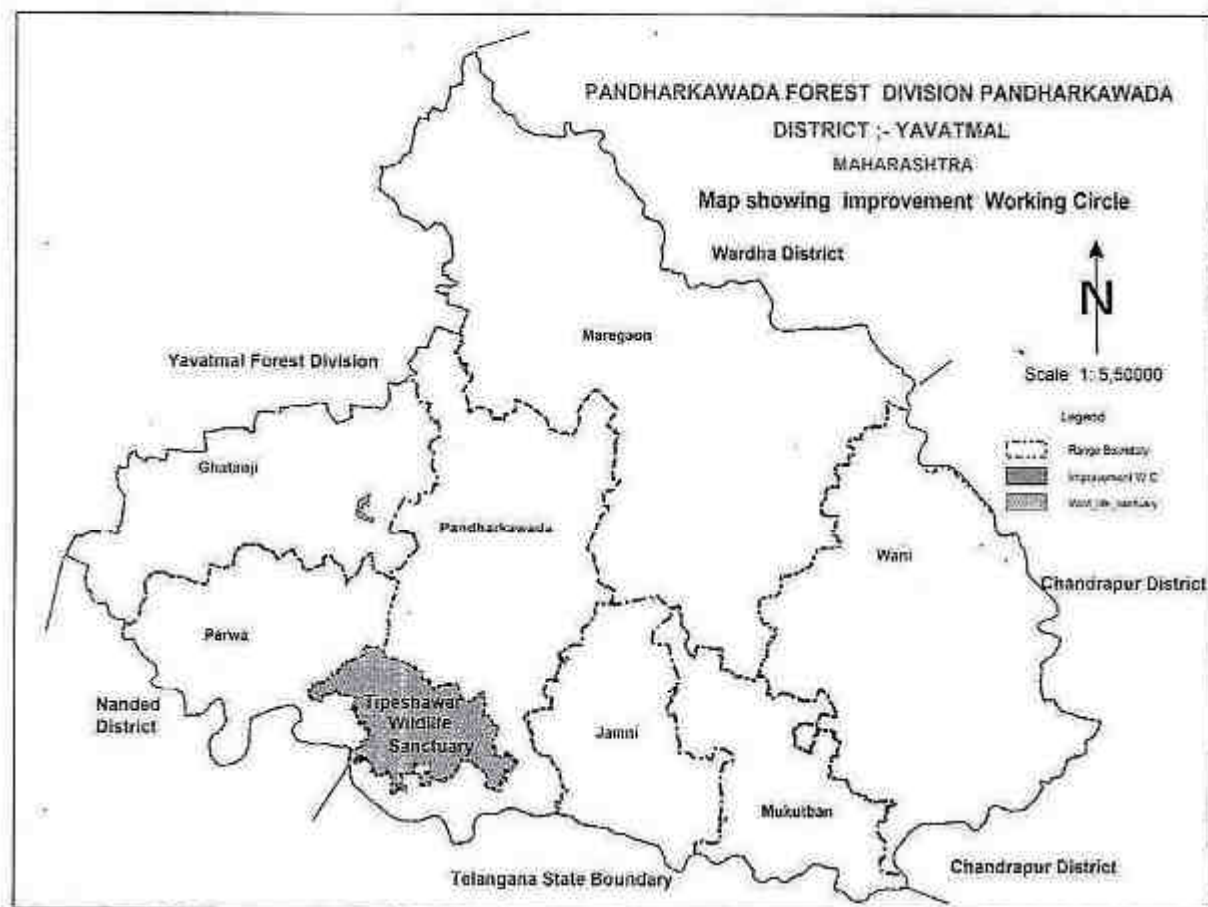


IMPROVEMENT WORKING CIRCLE

Table showing the coupes formed under various working series in Improvement Working Circle Coupe XI (Year 2023-24)

Srno	Range	Felling Series	Coupe No.	ComptNo	Area (Ha)
I	Ghatanji	Masola	XI	531	50.00
		Total coupes	1		50.00

One coupe is planned under IWC WC for the year 2023-24, with a cumulative area of 50.00 ha. Estimated timber yield is 30.456 CUM.

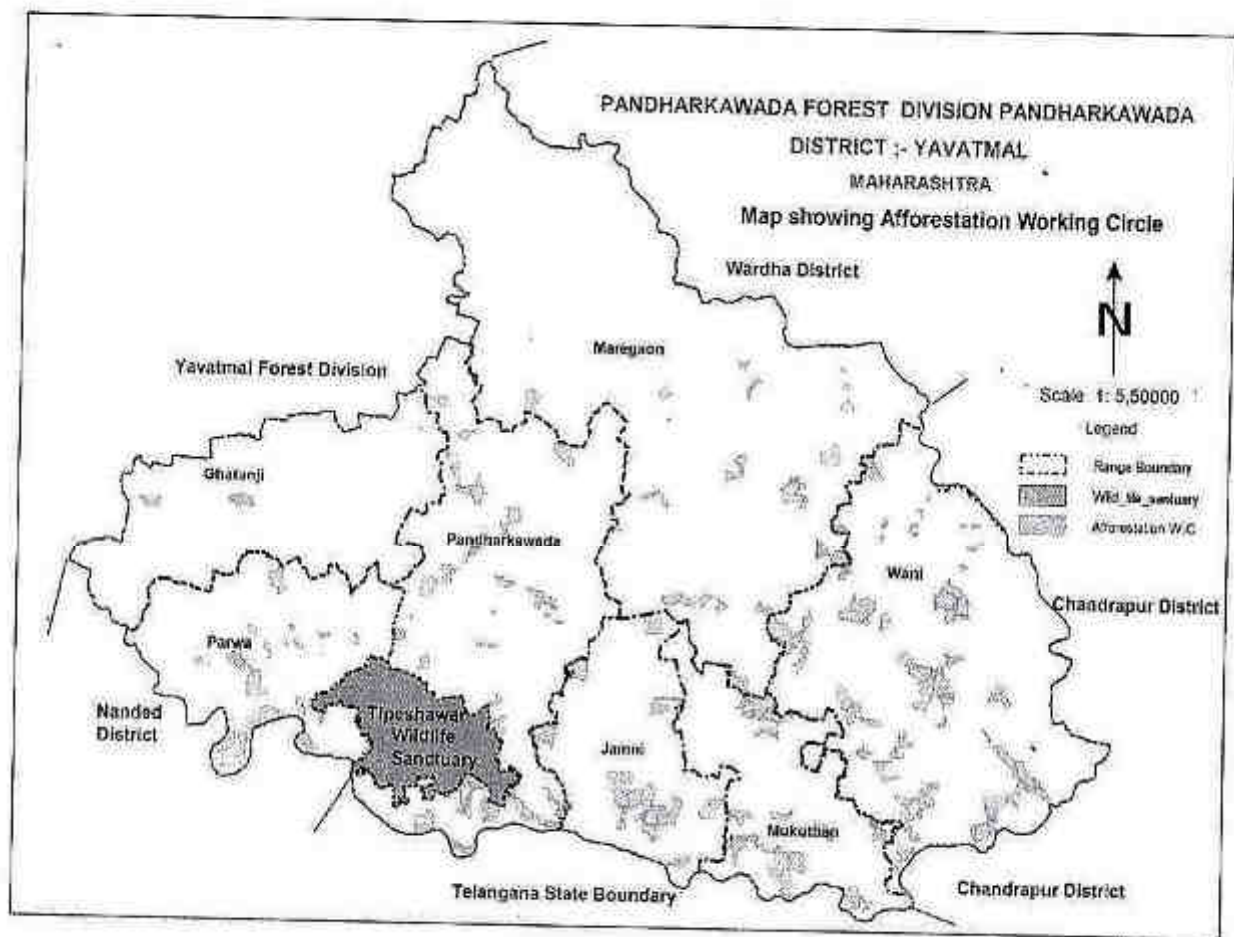


AFFORESTATION WORKING CIRCLE

Table showing the coupes formed under various working series in Afforestation Working Circle Coupe XI (Year 2023-24)

Srno	Range	Felling Series	Coupe No.	ComptNo	Area (Ha)
1	Wani	Jamani	XI	C-18	64.00
2	Mukutban	Hirapur	XI	C30	76.38
3	Maregaon	Phulora	XI	3	47.00
4	Mukutban	Mukutban	XI	616	56.10
5	Wani	Palsoni	XI	CA52	61.35
6	Wani	Mendholi	XI	C37A	35.47
7	Wani	Borda	XI	C49	75.00
8	Wani	Yenak	XI	807	75.00
9	Jamani	Rudhe	XI	52	53.00
10	Mukutban	Ardhavan	XI	20B	46.00
11	Jamani	Mahadoli	XI	66	44.00
12	Pandharkawada	Jamb	XI	82	85.00
13	Parawa	Parawa	XI	C122B	85.00
14	Jamani	Mandavi	XI	60	75.00
15	Pandharkawada	Khairi	XI	638	75.00
16	Maregaon	Kinhi	XI	70C	61.27
17	Jamani	Saiphai	XI	C-105	51.26
18	Pandharkawada	Kodori	XI	C73B	28.67
19	Maregaon	Salebhatti	XI	C57	48.00
20	Wani	Sukhanegaon	XI	4	59.00
21	Ghatanji	Titavi	XI	250	42.78
				251	51.57
		Total coupes	21		1289.85

A total of 21 coupes are planned under AWC WC for the year 2023-24, with a cumulative area of 1289.85 ha. Estimated timber yield is 190.868 CUM.

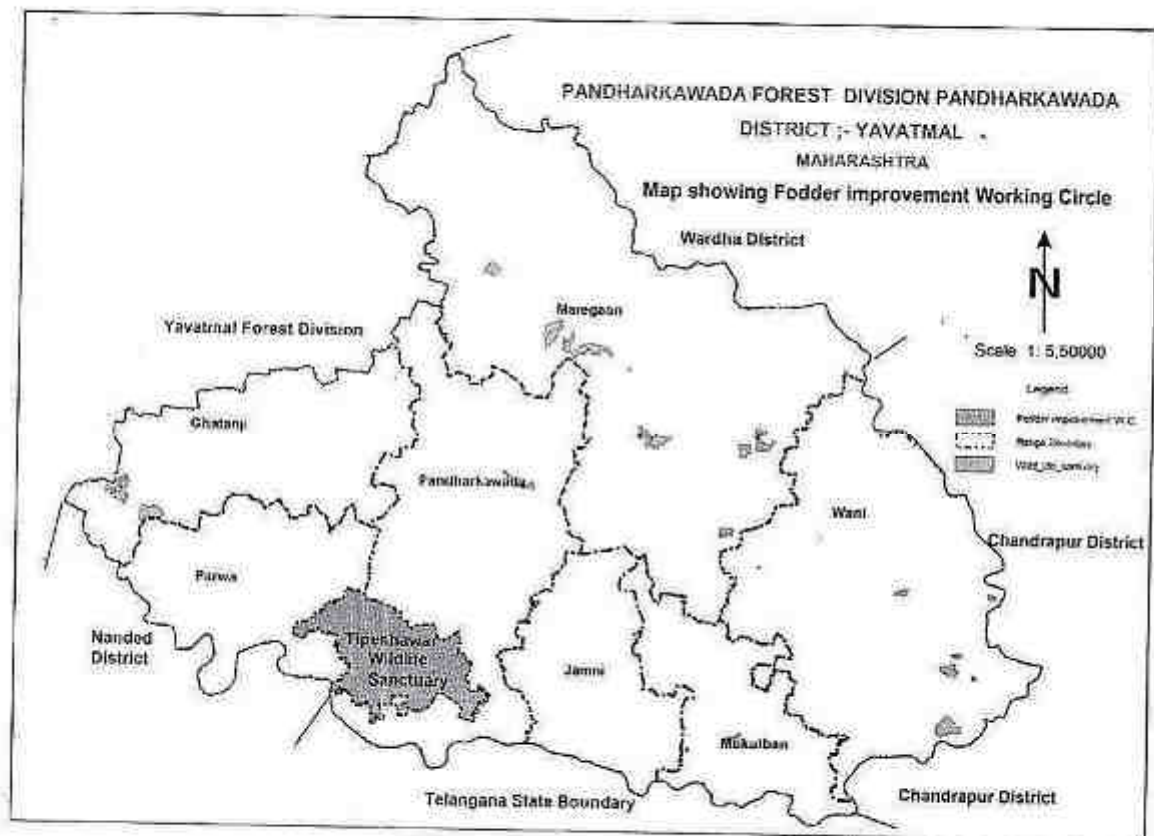


FODDER IMPROVEMENT WORKING CIRCLE

Table showing the coupes formed under various working series in Fodder Improvement Working Circle Coupe XI (Year 2023-24)

Srno	Range	Felling Series	Coupe No.	ComptNo	Area (Ha)
1	Pandharkawada	Karanji	XI	CA78	55.25
2	Maregaon	Wani	XI	5	67.97
		Total coupes	2		123.22

A total of 2 coupes are planned under FIWC WC for the year 2023-24, with a cumulative area of 123.22 ha



CHAPTER – 7

ESTIMATED REVENUE AND EXPENDITURE

Sr. No.	Working Circle	No. of Coupes	Coupe Area (Ha)	Area to be worked	Expected yield (cu.m.)	Financial Requirement (In lakhs)	Remark
1.	SCI	33	1760.00	651.57	1628.925	104.79	Requirment amount for demarcation, marking, felling & transport Works
2.	IWC	1	50.00	27.00	30.456	2.49	
3.	AWC	21	1289.85	477.17	190.868	32.07	
4.	FIWC	2	123.22	---	--	1.07	
	Total	57	3223.07			140.42	

CHAPTER – 8

CONTROL AND RECORDS

The following records will be maintained in the division office.

- 1. Control forms** –Control forms will be prepared to include each of working plan prescriptions as well as definite suggestions regarding other operations. All activities of harvesting, subsidiary silvicultural operations, cleaning, thinning, regeneration works, boundary demarcation and soil and moisture conservation works carried out shall be recorded in the control forms. Three permanent sets of these control forms will be prepared. One set each in division office, DCF (Working plan) office and CCF (Territorial) office.
- 2. Compartment History-** Compartment history is the record of various activities and observations made in the past year. Compartment history must be maintained by the division office and range office as they keep the record of past management practices and their effects on the growing stock. One copy of the forms will be filled in the divisional compartment history file and another copy will be returned to the RFO. The copies of the compartment history files will be sent to the Working Plan office, Yavatmal annually by the month of August.
- 3. Plantation & Nursery registers-** Plantation register will be maintained for all the areas regenerated artificially in the form No. 1 to 9.
- 4. Divisional Note Book-**It is desirable for the DCF to maintain certain journals and records for ready reference. These journals are important for controlling and monitoring of various activities of expenditure. A brief note on the plantation will also be recorded by the DCF under the appropriate heads.
- 5. Boundary registers** – Register of boundary pillars with GPS reading shall be maintained.
- 6. Fire Records-**They should be maintained as per the latest orders from State Government from time to time.
- 7. Other records-** List of amendments to the working plan and list of area changes will be maintained in prescribed forms



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

Regional Office
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
apccfcentral-nag-mef@gov.in

E.No. WP-85/RO/2023-NGP/12127

प्र.सु.व.न.म.स.स.स.
नागपुर-440001 Date: 05.09.2023

To,

The Addl. Principal Chief Conservator of Forests
Production and Management
Van Bhavan, Ramgiri Road
Civil Lines, Nagpur-440001.



Sub: Approval of Working Scheme of Pandharkawada Forest Division for the Period 2023-2024 - regarding

Sir,

The undersigned is directed to invite your kind attention to your office letter no. Desk-14/WP/ACF/22/23-24 dated 08.06.2023 on the above mentioned subject and to say that after examination of Working Scheme at the Regional Office, MoEF&CC revealed following:

1. In covering letter details of only two Working Circles i.e. SCI and IWC has been submitted; however in Chapter- 6 i.e. Working Circle wise description, details of four Working Circles has been submitted. Clarification in this regard needs to be submitted.
2. In the covering letter the details of only two Working Circles are submitted viz. SCI and IWC, which indicates the expected yield of 1628.92 CuM & 30.45 CuM respectively. But on page 19, an estimated yield of 190.868 CuM has been proposed in Afforestation Working Circle, but not mentioned in the covering letter. Clarification in this regard needs to be submitted.
3. The Working Scheme is not duly countersigned by concerned CCF/ CF. Revised Working Scheme countersigned by concerned CCF/ CF needs to be submitted.

In view of the above, I am further directed to request that necessary corrections as indicated above shall be made and revised Working Scheme shall be submitted to this office for further necessary action in the matter.

This issues with the approval of DDGI (Central), Regional Office, MoEF&CC, Nagpur.

Yours faithfully,

Sd.
(Karthik M.L.)
Technical Officer (Gr. II)

Copy to:

- i. The PCCF (HoFI), Government of Maharashtra, Nagpur.
- ii. User agency.
- iii. Guard file.

2-14

Karthik M.L.
(Karthik M.L.)
Technical Officer (Gr. II)

PCCF (HoFI)
26/9/23



Government of Maharashtra

Office of the Principal Chief Conservator of Forests (Head of Forest Force)
Maharashtra State, 'Van Bhavan', Rangiri Marg, Civil Lines, Nagpur 440 001.
Ph.No. 0712-2556788 Web site : mahaforest.nic.in
E-mail : pccfpmngp@mahaforest.gov.in

No.Desk-14/WP/ACT/83/23-24

Nagpur-440 001, dated : 09/10/2023

12

To

Deputy Director General of Forests (Central),
Ministry of Environment, Forests and Climate Change,
Government of India, New Secretariate Building, Ground Floor,
East Wing, Opposite VCA Stadium, Civil Lines, Nagpur 440 001.

Sub :- Approval of Working Scheme of Pandharkawada Forest Division for the period 2023-24 -regarding

Ref :- 1. This office letter No. Desk -14/ WP/ACT/22/ 23-24 Dated 08/06/2023
2. Your office letter No. WP-85/ROH/2023/12127 Dated 05/09/2023.
3. The Conservator of Forest (T) Yavatmul letter No. Desk-4/ WP/ACT/159/ 23-24 Dated 05/10/2023

Vide reference at 1, the Working Scheme of Pandharkawada Forest Division for the period 2023-24 has been submitted for approval to your office.

The explanation for queries raised vide reference No 2 are as follows.

- The Working Plan of Pandharkawada Forest Division consists of Selection cum Improvement Working Circle (SCI), Improvement Working Circle (IWC), Afforestation Working Circle (AWC), Fadder Improvement Working Circle (FIWC). So, four Working Circles are included in Chapter-6.
- In Working Plan of Pandharkawada Forest Division, felling operations are prescribed in SCI, IWC and AWC as per silvicultural norms.
- Revised copy of Working Scheme counter signed by concerned CC/CT is being submitted herewith.

Accordingly, the revised details of area to be felled in SCI, IWC and AWC Working Circles along with the estimated yield are as follows:

Sr.No.	Working Circle	Coupe Area (Ha.)	Expected yield (Cu M)	Financial requirement (Crout)
1	SCI	1760.00	1628.92	1.04
2	IWC	50.00	30.45	0.03
3	AWC	1289.85	190.86	0.32
	Total :-	3099.85	1850.23	1.38

G.O. Indus-35

Therefore, it is requested to kindly approve the Working Scheme of Pandharkawada Forest Division for the period 2023-24.

Encl : Copy of Working Scheme of Pandharkawada Division.

✓
(B.S.Hooda)
Principal Chief Conservator of Forests
(Production and Management)
Maharashtra State
o/c
11/10/2023

Copy to -

1. Conservator of Forest (T), Yavatmal for information.
2. Conservator of Forest, Working Plan (East) Nagpur for information.
3. Dy. Conservator of Forest (T), Pandharkawada for information.
4. Dy. Conservator of Forest, Working Plan, Yavatmal for information.

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

Regional Office
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
apccfcentral-ngp-mef@gov.in

F.No. WP-42/RON/2017-NGP / 12355

Date: 20.10.2023

To,

The Principal Secretary (Forests),
Revenue and Forest Department,
Hutatma Rajguru Chowk,
Madam Cama Marg
Mazurkaya, Mumbai - 400032.

20.10.2023
2.32.08
14

Sub: Proposal for Implementation of Working Plan prescriptions - felling permission for the year 2023-24 in the State of Maharashtra- regarding.

Sir,

The undersigned is directed to refer to APCCF (Production and Management), Government of Maharashtra letter No Desk-14/WP/ACF/53/23-24 dated 29.08.2023 on the above subject seeking prior approval of the Central Government and to say that the said proposal has been examined and recommended by the Regional Empowered Committee constituted under Section - 4 of the Forest (Conservation) Act, 1980 in its meeting dated 26.09.2023.

After detailed examination and discussion on the proposal of APCCF (Production and Management), State Government, Maharashtra, the Committee decided to recommend to approve the proposal for felling/ regeneration activities to be undertaken during the year 2023-24 in 18 Divisions as per following details:

Sr. No.	Working circle	Physical		Financial Target (Rs. In Cr.)
		Area (ha.)	Yield (Cu. M.)	
1.	SCI	26065.50	37770.51	19.16
2.	IWC	14235.00	7356.53	7.02
3.	IPWC	706.41	32602.69	7.30
4.	AWC	124.45	7.15	0.02
5.	OTPL	163.97	266.12	0.19
6.	PL cum AWC	783.12	799.80	3.46
7.	Coastal Management WC	8.23	93.37	0.14
	Total	42086.68	78896.17	37.29

प्रमुख (वन) 18 NOV 2023

16/10/2023

26-14

Proposal for Fire Protection:

Divisions where Working Plans are in operation		Divisions where Working Plans are not in operation	
Length to be covered (in Km)	Total amount required (in Crores)	Length to be covered (in Km)	Total amount required (in Crores)
92287.06	40.62	28352.10	8.81

Proposal for Boundary Maintenance:

	No. of Old Pillars	No. of New Pillars	Total amount required (in Crores)
Divisions where Working Plans are in operation	45414	59174	46.34

18-98

28

28/10/2023

Divisions where Working Plans are not in operation	10941	17014	12.98
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The approval is subject to following conditions:

- i. The budget of Rs. 146.04 Crores as made available by the State Govt. for this purpose in the current financial year for carrying out different operations shall be ensured for full achievements of targets especially regeneration. No CAMPA funds shall be utilized for any such regeneration.
- ii. The deficient PHO work in Nanded Division has to be completed within one month from the date of sanction of the approval and details of the same has to be submitted to Regional Office, Nagpur.
- iii. The Committee suggested that the proposals should be submitted well in advance in order to enable the Regional Office for proper scrutiny.
- iv. Supplementary proposal for felling shall have to be sent to the Ministry for undertaking additional felling in the Divisions where Working Plan shall be approved during the year and also where felling permission has been not approved.
- v. Fund allotment for regeneration work should be enhanced to the extent estimated by Working Plan Officers. In case no estimate is available in the Working Plan, the fund should be allotted on the basis of the site specific plan for regeneration.
- vi. Efforts shall be made to involve people's participation through JFMC's in all forestry works.
- vii. If no regeneration can be carried out in an area, due to law and order or any other reason, then no felling should be carried out in an equivalent area.
- viii. There shall be no clear felling and plantations be taken up in areas with crown density 0.4 and above.
- ix. Appropriate and effective measures should be undertaken for the conservation of biodiversity by protecting local RET species of area and wildlife management by protecting and maintaining all meadows and fruit bearing trees.
- x. The orders of Hon'ble Supreme Court in the matter of Godavarman Thirumulkpad Vs Union of India in W.P. (Civil) No. 202/95 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
- xi. Further, in compliance with the order of the Hon'ble Supreme Court dated 22.09.2000, the Government of Maharashtra shall ensure that regeneration of forest is commensurate with the felling carried out.
- xii. The State Government shall follow the principle of sustainable management and precautionary principle as propounded by the Hon'ble Supreme Court and the Hon'ble NCIT in various pronouncements.
- xiii. A comprehensive analysis of estimated yield and actual yield should be undertaken. The reasons for shortfall/excess yield should be analysed and measures taken to minimize the difference.
- xiv. The State Government should carryout exercise for preparation of the latest local volume tables of all major species to be felled in all regions to get realistic estimation of the yield.

- xv. Reconstruction of boundary pillars may be done so as to complete the works in selected coupes taken up in a year rather than scattering it in the whole State;
- xvi. No commercial felling shall be carried out along the 2 km strip of all perennial Rivers of State; further, no commercial felling shall be carried out along the strip of 500 meters of all seasonal Rivers; only eco-restoration work shall be carried out;
- xvii. No commercial felling shall be carried out in the Divisions where working plan is not in operation;
- xviii. No deviations shall be made from the prescriptions of Working Plan without prior approval of the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. voluntary 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 from time to time;
- xix. Fruit bearing naturally grown trees shall not be cleared felled;
- xx. Silvicultural operations including thinning shall be done under direct supervision of an officer not below the rank of Assistant Conservator of Forests;
- xxi. Efforts should be made to undertake artificial regeneration of local species as well as RET species in such a way that it serves the purpose of biodiversity conservation as well as meeting the demand of fuel wood, fodder and the timber. Planting of exotic species should be avoided;
- xxii. All kinds of felling including dead, dying, diseased trees, for granting of right and concession, illicit felling and felling mandated under FCA approval shall be accounted for against the prescribed felling yield of the relevant year;
- xxiii. Demarcation and consolidation of forests shall be done adequately in time bound manner;
- xxiv. The Central Government reserves the right to review/modify/withdraw, this approval at any time if any condition of this approval is not implemented. Relevant modifications in the annual plan are required to be carried out so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy from time to time.

This is issued with the approval of competent authority.

Yours faithfully,


(C.B. Tashildar)
AIGF (Central)

Copy to:

- i. The IGF (RoHQ), Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jorbagh Road, Aliganj, New Delhi- 110003.
- ii. The Addl. Principal Chief Conservator of Forests, Production and Management, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur, Maharashtra- 440001.
- ✓ iii. O/o Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
- iv. Guard file.

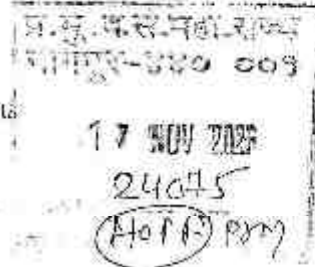

(C.B. Tashildar)
AIGF (Central)



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

Regional Office
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
apcc@central-ngp-mef@gov.in

F.No. WP-85/ROH/2023-NGP/12486



Date: 09.11.2023

To:

The Principal Chief Conservator of Forests
Production and Management
Maharashtra State
Var. Bhawan, Rangin Road, Civil Lines
Nagpur-440001.

Sub: Approval of Working Scheme of Pandharkawada Forest Division for the Period 2023-2024 - Regarding.

Sir,

With reference to the above mentioned subject, the undersigned is directed to inform that after examination of Working scheme for Pandharkawada Forest Division, the Central Government hereby conveys its approval to the said Working Scheme in accordance with the powers vested under Sub Section (IV) of Section-2 of Forests (Conservation) Act, 1980 and para 96 of National Working Plan Code 2014 subject to the following conditions:

1. The Period of Working Plan was up to 2022-23. The currency of the Working Scheme shall be for a period of 1 year i.e. for 2023-24.
2. The orders of Hon'ble Supreme Court in the matter of T.N. Godavarman Thirumulpad Vs Union of India in W.P. (Civil) No. 20295 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
3. Further, in compliance with order to Hon'ble Supreme Court's Order dated 22.09.2009, the Government of Maharashtra shall ensure that regeneration of forests is commensurate with felling carried out under this Working Plan.
4. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurable with felling. In the events of failure of 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 issued by MoEF&CC vide letter dated 23.02.2018, Regional Offices of MoEF&CC under the chairmanship of Deputy Director General of Forests (Central) of the Regional Office of this Ministry will be competent authority for deciding the extent of harvesting that could be permitted under approved Working Plans, for ensuring regeneration to be commensurable with felling. Instruction/ directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling is to be done by State Government only after seeking permission from R/O, MoEF&CC, Nagpur.

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6. Fruit bearing naturally grown trees shall not be clear felled for any purpose whatsoever.
7. Standard thinning and silvicultural operations under the strict supervision of Assistant Conservator of Forests and above will be allowed as per norms to improve the health of growing stock while executing the prescriptions of the Working Scheme.
8. Prescriptions of micro plans for IFM (if made) should not deviate from the broad framework/guidelines of the Working Plan and shall be in accordance with various orders of Hon'ble Supreme Court.
9. Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/future years to compensate this removal.
10. No deviations shall be made from the prescriptions of Working Scheme without prior approval of the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. voluntary 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 from time to time.
11. The exploitable girth of tree species and period of felling cycle shall not be lower than the approved in previous Working Plan.
12. In the vicinity of Nalas and water bodies felling shall not be undertaken. Further, felling shall not be undertaken near the known resting/nesting places of wild animals and birds.
13. No commercial felling shall be carried out along the 2 km strip of all perennial Rivers of Maharashtra State as recommended by RLC in its meeting dated 24.02.2020 viz: Bluma, Godavari, Kanhan, Koyna, Krishna, Manjara, Mula, Nira, Panchganga, Pench, Penganga, Pranhita, Purna, Tapi, Vaitarna and Wanganga; further, no commercial felling shall be carried out along the strip of 300 meters of all seasonal Rivers; only eco-restoration shall be carried out.
14. Removal of dead and diseased trees will be undertaken under the supervision of an officer not below the rank of Assistant Conservator of forests.
15. Volume details of all kinds of fellings viz: dead and diseased trees, grants of right and concession and all illicit felling should be compiled along with the estimation of their stand volumes as per the same volume table use for the assessment of growing stock. This report shall be prepared annually working circle and compartment wise by the territorial Sub- DFO and shall be submitted to the CF, Working Plan for this purpose within 02 months of the end of control year. Such removal shall be accounted vis-à-vis prescribed felling yield of the relevant year.
16. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the prescription of Working Scheme. Proper mechanism has to be in place for the collection of NTFPs in sustainable manner.
17. Status of rare, endangered and near extinct species shall be monitored closely and adequate measures will be taken for their protection and conservation.
18. Execution of Working Scheme shall be in conformity with the National Forest Policies, 1988.

19. No regularization of existing encroachment should be done without following due procedure. An appendix may be added giving details of the encroachment of the forest area in the division. A definite plan has to be made to remove encroachment and vacated area shall be planted with suitable local species as per Government of India and Hon'ble Supreme Court Orders/Guidelines in the matter.
20. Eco-tourism shall may be undertaken on sustainable basis. No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed to public. Such sites will be declared Plastic-free zones. These eco-tourism sites will be managed by the forest department as per the prescriptions of the Working Plan and after taking prior approval of Central Government under Section-2 of Forest (Conservation) Act, 1980.
21. Demarcation and consolidation of Forest Boundaries will be done adequately. Identification of Land Bank in the form of degraded forest areas in the Division to be explored for CA plantations.
22. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.
23. Proper mechanism has to be put in place to control illegal felling, grazing and fire. Proper fire management plan shall be prepared and executed meticulously.
24. Only 50% of natural yield, if silviculturally available, will be allowed for removal in case of Teak, Dhawala, Balsa, Lardia, Chichawa, Mowai, Rohan, Shiwan, Shistam, Surya, Karai, Mokha, Patas, Dhanan, Bhilawa, etc. in case of Haldu, Ain, Bija, Tiwas, Raham, Salai, Garadi, Khair it shall be 20% if silviculturally available.
25. Efforts should be made to undertake artificial regeneration of local species along with 10-15% RFL species in such a way that it serves the purpose of biodiversity conservation as well as meeting the demand of fuel wood, fodder and the timber. Planting of exotic species should be avoided.
26. Lac cultivation, if any, will be practiced as per the provisions of Forest (Conservation) Act, 1980.
27. Documents and appendices mandated in National Working Plan Code, 2014 will be incorporated in the Working Scheme.
28. Attempts shall be made to grow trees outside forest areas to meet the local demand of small timber, fuel wood and fodder as well as to achieve the 33% forest cover as envisaged in National Forest Policy, 1988.
29. Cutback operation shall be undertaken as per standard norms and grassland will not be expanded at the expense of natural tree cover.
30. While managing forests, provisions of the Biological Diversity Act, 2002 and Wildlife Protection Act, 1972 shall be fully complied.
31. Prescriptions on Wildlife Management should be vetted by the CWLUW and a certificate of the same be attached to the scheme.
32. Grazing to be properly regulated and grazing fee should be levied.
33. Annual Plan of Operations under Compensatory Afforestation Fund Act, 2016 and Compensatory Afforestation Fund Rules, 2018 shall be in conformity with Working Scheme prescriptions.



34. All the Unclassed Forest, acquired CA areas and acquired Private Forests should be notified as RF/ PF in time-bound manner at the earliest.
35. The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented. Relevant modification in the Working Scheme are required to be carried out so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy from time to time.

This issues with the approval of DDGF (Central), Regional Office, MoEF&CC, Nagpur

Yours faithfully,


(C.B. Tashildar)
AIGF (Central)

Copy to:-

1. The IGF (RoHQ), Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jorbagh Road, Aliganj, New Delhi- 110003.
- ✓ 2. The Principal Chief Conservator of Forests (HoPF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
3. The Principal Chief Conservator of Forests (P&M), Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
4. Guard File.


(C.B. Tashildar)
AIGF (Central)



प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख) महाराष्ट्र राज्य, नागपूर यांचे कार्यालय.
(अपर प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन) महाराष्ट्र राज्य, नागपूर)
"वनभवन" रामगिरी रोड, पोलिस जमखाना जवळ, सिव्हिल लाईन्स, नागपूर-440 001
दूरध्वनी क्र. (0712) 2556788 ई-मेल occpmnp@mahaforest.gov.in

क्रमांक- कक्ष-14/अप्रमुवसं(उ.व व्य.)/आर/एस. 112/23-24,

दिनांक -17/11/2023.

प्रति,
श्री वनसंरक्षक (प्रादेशिक), यवतमाळ.

विषय:- पांढरकवडा वनविभागाची सन २०२३-२४ या वर्षाची Working Scheme मंजूरीबाबत.

संदर्भ:- १. केंद्रशासनाचे पर्यावरण, वन व जलवायु परिवर्तन मंत्रालय, क्षेत्रीय कार्यालय, नागपूर यांचेकडील पत्र क्रमांक F.No. WP-85/RO/2023-NGP/12486, दिनांक 09/11/2023. चे पत्र प्राप्त दि. १७/११/२०२३
२. या कार्यालयाचे पत्र क्रमांक कक्ष-१४/अप्रमुवसं (उ.व व्य.)/आर.एस./१० दिनांक २५/१०/२०२३.

वनसंरक्षक (प्रादेशिक) यवतमाळ यांचे लक्ष संदर्भात पत्राकडे वैधण्यांत येत आहे. त्यांना कळविण्यांत येते की, केंद्रशासनाचे पर्यावरण, वन व जलवायु परिवर्तन मंत्रालय, क्षेत्रीय कार्यालय, नागपूर यांनी संदर्भात पत्रांनुषंगे सन २०२३-२४ करिता पांढरकवडा वनविभागाची Working Scheme. नमुद अट क्र. १ ते ३५ नुसार अधिन राहून मान्यता दिलेली आहे. त्या अनुषंगाने अटीचे तंतोतंत पालन करण्यांत यावे.

केंद्र शासनाचे पत्र दि. २०/१०/२०२३ अन्वये वृक्षतोडीस परवानगी दिल्यानुसार वृक्षतोडीची कामे करण्यांत यावी. सुलभ संदर्भाकरिता प्रत ई-मेल द्वारे माहिती व उचित कार्यवाहीसाठी पाठविण्यांत येत आहे.
सहपत्र- वरिलप्रमाणे

(उमेश वामी)

उप वनसंरक्षक

(उत्पादन उपयोग), नागपूर

प्रतिलिपी :- प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख), महाराष्ट्र राज्य यांना सहपत्रासह माहितीस सादर.

प्रतिलिपी :- प्रधान मुख्य वनसंरक्षक (अ.व वि.नि.), महाराष्ट्र राज्य यांना सहपत्रासह माहितीस सादर.

प्रतिलिपी :- वनसंरक्षक कार्यआयोजना (पूर्व) नागपूर यांना सहपत्रासह माहिती व उचित कार्यवाहीस.

प्रतिलिपी :- उपवनसंरक्षक (कार्य आयोजना) विभाग यवतमाळ यांना सहपत्रासह माहिती व उचित कार्यवाहीस.

प्रतिलिपी :- उपवनसंरक्षक (प्रा.) पांढरकवडा यांना सहपत्रासह माहिती व उचित कार्यवाहीस. त्यांनी अटीचे काटेकोरपणे पालन करूनच वृक्षतोडीची व इतर कामे करावीत.



तत्पुनर संदर्भीय पत्र क्रमांक ०५ अन्वये पांढरकवडा वनविभागच्या (working scheme) वर्ष २०२३-२४ करिता एक वर्षासाठी मंजुरता प्राप्त झाली होती. त्यानुसार संदर्भीय पत्र क्रमांक ०६ अन्वये पांढरकवडा वनविभागाच्या वृक्षतोड प्रस्तावातील Annexure-IV उपवनसंरक्षक, कार्यआयोजना यातमाळ यांचेकडे पाठविण्यात आला आहे. सदर वृक्षतोड प्रस्तावामध्ये SCI व AWC याव Working Circle मधील क्षेत्र समाविष्ट करण्यात आले होते. परंतु आपले कार्यालयाकडील पत्र क्र. ५ अन्वये पांढरकवडा वनविभागातील (working scheme) नुसार वृक्षतोड परवानगी मध्ये पांढरकवडा वनविभागातील SCI व IWC कुपातील वृक्षतोड करण्याबाबत निर्देशित केले आहे.

त्यास अनुसरून पांढरकवडा वनविभागातील मंजूर WORKING SCHEME नुसार या कार्यालयाकडून संदर्भीय पत्र क्र.०६ अन्वये सादर केलेल्या वृक्षतोड प्रस्तावामध्ये SCI व AWC या कुपांमध्ये काम प्रस्तावित करण्यात आले आहे. सदर वृक्षतोड प्रस्ताव तसेच वृक्षतोड परवानगी मध्ये SCI कुपांमधील एकूण अपेक्षित उत्पादनामध्ये असलेली तफावत सुधारित करून देण्यास तसेच AWC कुपांच्या क्षेत्राचा समावेश करून सदर वृक्षतोड प्रस्तावास परवानगी असणे गरजेचे आहे. जेणेकरून मंजूर वृक्षतोड प्रस्तावातील अटी व शर्तीचे पालन होणार नाही.

वृक्षतोड प्रस्ताव तसेच वृक्षतोड परवानगी मधील तफावत खालीलप्रमाणे.

१) या कार्यालयाचे पत्र क्र.२३४९ दि.२९/११/२०२३ अन्वये सादर करण्यात आलेल्या पांढरकवडा वनविभागाच्या वृक्षतोड प्रस्तावामध्ये दर्शविण्यात आलेले क्षेत्र व अपेक्षित उत्पादन.

अ.क्र	Working Circle	No. of coups	Area(He.)	Yeild(Cum.m)
1	SCI	33	1760.00	2494.434
2	AWC	21	1289.85	65.934

२) केंद्र शासनाचे पत्र क्र.१२३५५ दि.२०/१०/२०२३ अन्वये दिलेल्या वृक्षतोड परवानगी मध्ये दर्शविण्यात आलेले क्षेत्र व अपेक्षित उत्पादन.

अ.क्र	Working Circle	No. of coups	Area(He.)	Yeild(Cum.m)
1	SCI	--	1760.00	1628.92
2	IWC	--	50.00	30.45

करिता जरिले नमुद अनुक्रमे ०१ मधील तपशिलाप्रमाणे वृक्षतोड प्रस्तावास परवानगी देण्यास विनंती आहे.

86-2m
(दि.दि.धुले)
वनसंरक्षक (प्रा.)
यवतमाळ

प्रतिलिपी :- उपवनसंरक्षक(प्रादे.) पांढरकवडा यांना माहितीस आणित





प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख) महाराष्ट्र राज्य, नागपूर यांचे कार्यालय,

(प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन) महाराष्ट्र राज्य, नागपूर)

"वनभवन" रामगिरी रोड, पोलिस जमखाना जवळ, सिव्हिल लाईस, नागपूर-440-001

दूरध्वनी क्र. (0712) 2556788 ई-मेल ncs@maharashtra.gov.in

क्रमांक- कक्ष-14/प्रमुवस(उ.व.व्य.)/आर/एस.163/23-24,

दिनांक-21/03/2024

प्रति,

वनसंरक्षक (प्रादेशिक), यवतमाळ.

विषय:- पांढरकवडा वनविभागाची सन २०२३-२४ या वर्षाची Working Scheme मंजुरीबाबत.

संदर्भ:-१. केंद्रशासनाचे पर्यावरण, वन व जलवायु परिवर्तन मंत्रालय, क्षेत्रीय कार्यालय, नागपूर यांचेकडील पत्र क्रमांक F.No. WP-85/ROD/2023-NGP/12486, दिनांक 09/11/2023, चे पत्र प्राप्त दि. १७/११/२०२३

२. या कार्यालयाचे पत्र क्रमांक कक्ष-१४/अप्रमुवस (उ.व.व्य.)/आर.एस./११ दिनांक २५/१०/२०२३.

३. या कार्यालयाचे पत्र क्रमांक कक्ष-१४/अप्रमुवस (उ.व.व्य.)/आर.एस./१२ दिनांक १७/११/२०२३.

वनसंरक्षक (प्रादेशिक) यवतमाळ यांचे लक्ष संदर्भात पत्राकडे वेधण्यात येत आहे. त्यांना कळविण्यात येते की, केंद्रशासनाचे पर्यावरण, वन व जलवायु परिवर्तन मंत्रालय, क्षेत्रीय कार्यालय, नागपूर यांनी संदर्भात पत्रान्वये सन २०२३-२४ करिता पांढरकवडा वनविभागाची Working Scheme नमुद अट क्र. १ ते ३५ नुसार अधिन राहून मान्यता दिलेली आहेत.

तथापी केंद्र शासनाचे पत्र दि. २०/१०/२०२३ अन्वये वृक्षतोडीस परवानगी दिल्यानुसार वृक्षतोडीची कामे खालील मंजूर झालेल्या क्षेत्रात सुरु करण्यात आलेली असेल, अशी या कार्यालयाची धारणा आहे.

केंद्रशासनाने वृक्षतोडीस मंजूर केलेले क्षेत्र

अनु क्रमांक	वनविभाग	कार्यवृत्त	क्षेत्र (हेक्टर)	अपेक्षित उत्पादन (घन मिटर)
१	पांढरकवडा	SCI	१७६०.००	१६२८.९२
२		IWC	५०.००	३०.४५
३		एकूण	१८१०.००	१६५९.३७

तरी वृक्षतोडी बाबतचा अनुपालन अहवाल तीन दिवसात खालील स्वाक्षरीकर्ते यांना अवगत करावा.



(एम. श्रीनिवास राव)

प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन)



महाराष्ट्र राज्य

- प्रतिलिपी :- प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख), महाराष्ट्र राज्य यांना सहपत्रासह माहितीस सादर.
- प्रतिलिपी :- प्रधान मुख्य वनसंरक्षक (अ.व.वि.नि.), महाराष्ट्र राज्य यांना सहपत्रासह माहितीस सादर.
- प्रतिलिपी :- वनसंरक्षक कार्यआयोजना (पूर्व) नागपूर यांना सहपत्रासह माहिती व उचित कार्यवाहीस.
- प्रतिलिपी :- उपवनसंरक्षक (कार्य आयोजना) विभाग यवतमाळ यांना सहपत्रासह माहिती व उचित कार्यवाहीस.
- प्रतिलिपी :- उपवनसंरक्षक (प्रा.) पांढरकवडा यांना सहपत्रासह माहिती व उचित कार्यवाहीस. त्यांनी अटीचे काटेकोरपणे पालन करूनच वृक्षतोडीची व इतर कामे करावीत.

18.2 Approval of Working Plan of Pandharkawada Forest Division for period 2023-24 to 2032-33 and its letter

आवक क्रमांक - 119
दिनांक : 15/7/24
कक्ष - स्तव

वनसंरक्षक (कार्य आयोजना), पूर्व नागपूर यांचे कार्यालय

नविन प्रशासकिय इमारत, वनभवन शासकीयमुद्रणालयाजवळ झिरो माईल, नागपूर ४४०००९

E-mail apccfwpeast@mahaforest.gov.in

क्रमांक कक्ष-१/आस्था-अ/125/२०२४-२५/

दिनांक ०८/०७/२०२४

विषय :- Standing Consulative Committee meeting for the approval of DWPR

संदर्भ :- प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन) महाराष्ट्र राज्य, नागपूर यांचेकडील पत्र क्र. Desk No-4/WP/ACF/SCC/Meeting/197/24-25 nagpur dated 05/07/2024

उपरोक्त संदर्भित पत्रान्वये Standing Consulative Committee meeting for the approval of DWPR यांची दिनांक १०/०७/२०२४ रोजी सकाळी १०.०० वाजता कमांड कंट्रोल रूम वनभवन सिव्हील लाईन नागपूर येथे बैठक आयोजित केलेली आहे. तरी सदर बैठकिकरीता आपण नचुकता उपस्थित राहावे. सोबत संदर्भित पत्राची प्रत जोडण्यात येत आहे.

सहपत्र :- वरीलप्रमाणे

Anugrah

(श्रीलक्ष्मी ए.)

वनसंरक्षक(कार्य आयोजना),

पूर्व नागपूर

प्रति,

उपवनसंरक्षक कार्य आयोजना,

नागपूर/यवतमाळ✓

प्रतिलिपी :- सहाय्यक वनसंरक्षक, वनसंरक्षक कार्य आयोजना-पूर्व, नागपूर यांना माहिती व पुढील कार्यावाहीस अग्रेषित.



Government of Maharashtra

Office of the Principal Chief Conservator of Forests (Head of Forest Force),

Maharashtra State, 'Van Bhavan', Rungiri Marg, Civil Lines, Nagpur-440 001.

Ph.No. 0712-2556788 Web site : mahaforest.nic.in E-mail : pccfpmngp@mahaforest.gov.in

Sub :- Standing Consultative Committee meeting for the approval of DWPR.

No.Desk- 4/WP/ACF/SCC/Meeting/ 137-24-25

Nagpur-440 001, dated 05/07/2024

To

- 1 The Principal Chief Conservator of Forests (HoFF) M.S. and Chairman of the Standing Consultative Committee.
- 2 The Principal Chief Conservator of Forests and Member Secretary, Maharashtra State Biodiversity Board - Member
- 3 The Principal Chief Conservator of Forests (Wild Life) M.S. - Member
- 4 The Deputy Director General of Forests, IRO (Central), Regional Office, Nagpur - Member
- 5 The Additional Principal Chief Conservator of Forests (Budget, Planning & Development) M.S. - Member
- 6 The Director, Forest Survey of India, Dehradun (Uttarakhand) - Member
- 7 The Regional Director, Forest Survey of India, Nagpur (Maharashtra) - Member
- 8 The Additional Principal Chief Conservator of Forests (Conservation) M.S. - Member
- 9 The Additional Principal Chief Conservator of Forests (Information Technology & Policy) M.S. - Member
- 10 Tropical Forest Research Institute, Dakghar RFRC, Mandla Road, Jabalpur- Expert or Representative
- 11 Conservator of Forests, Working Plan-East, Nagpur - Member Secretary
- 12 Conservator of Forests, Working Plan-West, Pune - Member
- 13 Collector, Nagpur - Member
- 14 Collector, Yavatmal - Member.

The meeting of the Standing Consultative Committee constituted by State Government, Revenue and Forest Department, Mantralaya, Mumbai vide G.R. No.FDM-2015/C.R.95/F-2 dated 29.04.2015 for the approval of Draft Working Plan Reports (DWPRs) of various Forest Divisions has been scheduled on 10.07.2024 from 10.00 A.M. onwards at Command Control Room, Vanbhavan, Civil Lines, Nagpur.

File : G-Prjvt-SCC Dt 10.10.2023 DWPR & PWPR And MEETING Minutes SCC Meeting Dates 10.07.24

The schedule of the meeting for DWPRs for discussion and approval of the Committee is as under:

S.N.	Date	Time	Document	Forest Division	Presenter
1	10.07.2024	10.00 to 11.30	DWPR	Gondiya	DCF, WP, Nagpur
2	10.07.2024	11.30 to 13.00	DWPR	Pandharkawda	DCF, WP, Yavatmal

You are requested to make it convenient to attend the said meeting. The soft copy of the above DWPR has been sent through e-mail.


(M. Srinivasa Rao)
Principal Chief Conservator of Forests
(Production & Management)
Maharashtra State

Copy forwarded with a request to attend and participate in the meeting to :

1. Conservator of Forests(T), Nagpur /Conservator of Forests (T),Yavatmal are instructed to attend the meeting.
2. Deputy Conservator of Forests ,Working Plan Division, Nagpur/Yavatmal to attend the meeting and make PPT presentation.
3. Dy. Conservator of Forests (T), Gondiya and Pandharkawda are instructed to attend the meeting.
4. Dy. Conservator of Forests (Resource Utilization) are inform to attend the meeting as guest.
5. Publicity & information Officer (Forests) Maharashtra State, Nagpur for information & necessary action.


(M. Srinivasa Rao)
Principal Chief Conservator of Forests
(Production & Management)
Maharashtra State

DWPR of Pandharkawda
Divisions
Dt. 10.07.2024



Government of Maharashtra

Office of the Principal Chief Conservator of Forests (Head of Forest Force),
Maharashtra State, 'Van Bhavan', Ramgiri Marg, Civil Lines, Nagpur-440 001.

Ph.No. 0712-2556788 Web site : mahaforest.nic.in E-mail : pccfpmngp@mahaforest.gov.in

Nagpur-440 001, dated 22/07/2024

No.Desk-14/WP/ACF/205/24-25

Sub :- Minutes of the Standing Consultative Committee meeting held on 10/07/2024 for Approval of DWPRs.

The minutes of the Standing Consultative Committee meeting held at Command Cont Room, Vanbhavan, Nagpur dated 10/07/2024 for approval of DWPRs of Gondiya & Pandharkawda Divisions are enclosed herewith for information and necessary action.

Encl :- Meeting Minutes

(M. Srinivasa Rao)

Member Secretary

Standing Consultative Committee
and

Principal Chief Conservator of Forests

(Production & Management)
Maharashtra State

To

1. CF (T) Nagpur, Yavatmal,
2. DCF (T) Gondiya, Pandharkawda
3. DCF (WP) Nagpur, Yavatmal.

Copy submitted with compliments along with enclosure to :

1. The Principal Chief Conservator of Forests (HoFF) M.S. & Chairman of SCC.
2. The Deputy Director General of Forests, IRO- Central, Regional Office, Nagpur.
3. The Principal Chief Conservator of Forests (Wildlife) M.S.
4. The Principal Chief Conservator of Forests, Maharashtra State Biodiversity Board.
5. The Additional Principal Chief Conservator of Forests (Budget, Planning & Development) M.S.
6. The Additional Principal Chief Conservator of Forests (Information, Technology & Policy) M.S.
7. The Additional Principal Chief Conservator of Forests (Conservation) M.S.
8. The Conservator of Forests (Working Plan) West- Pune, East-Nagpur
9. The Regional Director, Forest Survey of India.
10. Director, Tropical Forest Research Institute, Dakghar, R.F.R.C. Mandala Road Jabalpur

**Minutes of Meeting of the Standing Consultative Committee
for the State of Maharashtra
held on 10/07/2024 for approval of DWPR**

Government of Maharashtra, vide G.R. No. FDM-2015/CR-95/F-2 dated 29/04/2015 has constituted a Standing Consultative Committee (SCC) for the approval of Draft Working Plan Reports (DWPR), of various Forest Divisions of Forest Department in Maharashtra, before its submission to Government of India for approval.

In this connection, a meeting of the Standing Consultative Committee was organized on 10/07/2024 at Command Control Room, Vanbhavan, Nagpur. Shri. Shailesh Tembhurnikar, PCCF (HoFF), M.S., Nagpur chaired the meeting. The following members of the Committee and field officers were present in the meeting.

Sr. No.	Name	Designation
1	Shri. Shailesh Tembhurnikar	PCCF (HoFF), Maharashtra State and Chairman of SCC.
2	Shri. Maheep Gupta	PCCF (Wildlife), Maharashtra State.
3	Shri. M. Shrinivasa Rao	PCCF (P and M), Maharashtra State and Member Secretary of SCC
4	Shri. P. Kalyan Kumar	APCCF (Budget, Planning and Development), M.S. , APCCF (Conservation) M.S. , APCCF (ITP), M.S. (Additional charge)
5	Shri. Pravin Chauhan	APCCF (Protection), M.S.
6	Smt. A Shreelaxmi	CF (WP-East), Nagpur (Additional charge)
7	Shri. V.T.Ghule	CF (T), Yavatmal
8	Shri Umesh Varma	DCF (RU), PCCF (P &M) Office
9	Shri M. Rajkumar	Scientist – D, Tropical Forest Research Institute, Jabalpur, MP
10	Shri. B. N. Naik	Assistant Director, Forest Survey of India, Nagpur
11	Shri. Pramod B. Panchbhai	DCF (T), Gondiya
12	Shri. Kiran Jagtap	DCF (T), Pandharkawda
13	Shri. Dhananjay Waybhase	DCF(WP), Yavatmal (Additional charge)
14	Shri. Ashish Pandey	DCF(WP), Amravati
15	Ms. Priya Malwe	ACF (WP), Desk-14 ,PCCF (P &M) Office
16	Shri Sunit Waghmare	Ranger Surveyor , Desk-14 ,PCCF (P &M) Office

Shri. Shailesh Tembhurnikar, PCCF (HoFF), M.S., Nagpur welcomed all the committee members and briefly introduced the agenda of the meeting.

After detailed discussion on the DWPRs, following suggestions / corrections were suggested by the Committee Members.

1	2	3	4	5	6	7
Yavatmal	Pandharkawda (DWPR)	Shri. Dhananjay Waybhase, DCF, WP, Yavatmal (Addl.Charge)	Shri. S.G. Tembhurnikar, PCCF (Ho/P)	In Afforestation Working Circle, prescribed works like Natural Regeneration, SMC works, grassland development, bio restoration tanks to be included.	Shri. Dhananjay Waybhase, DCF, WP, Yavatmal and concerned Territorial Division	Within 15 days
			Shri. P. Kalyan Kumar, APCCF (Budget, Planning and Development), M.S. / APCCF (Conservation) (JTP), M.S. (Additional charge)	In Afforestation Working Circle, GIS data layers be used by WPO to cross check the data.		
			Shri. Pravin Chauhan, APCCF (Protection), M.S.	No digging of pits under trees canopy should be done in Afforestation Working Circle		
Committee's Remarks - The Committee approved the DWPR of Pandharkawda Division subject to incorporating the above suggestions.						

At the end of the meeting Shri. M. Shrinivasa Rao, PCCF (P and M) Maharashtra State and Member Secretary of SCC proposed the formal vote of thanks.

(Shri. M. Shrinivasa Rao)
Member Secretary,
Standing Consultative Committee

Principal Chief Conservator of Forests,
(Production & Management), Maharashtra State.

(Shri. S.G. Tembhurnikar)
Chairman,
Standing Consultative Committee

Principal Chief Conservator of Forests,
(Head of Forest Force) Maharashtra State



GOVERNMENT OF MAHARASHTRA
FOREST DEPARTMENT



OFFICE OF THE DEPUTY CONSERVATOR OF FORESTS,
WORKING PLAN, YAVATMAL

Vanbhavan, 1st Floor, Opp. Church, Apsara Talkies Road, Yavatmal -445001



DCF/WPY/Deck-03//C.No. 105/2024-25

Dt 1.08.2024

✓ To, The Conservator of Forest,
Working Plan- East,
Nagpur.

Ref: - Letter No.Desk-14/WP/ACF/205/24-25 dt. 22/07/2024 – regarding minutes of the Standing Consultative Committee meeting held on 10/07/2024 for approval of DWPRs.

With reference to the subject cited above, the point wise compliances of Pandharkawada division are as follows:

Sr. No.	Name of the officer and Designation who raised issue	Issues raised	Compliance
i.	Shri S.G. Tembhuralkar, PCCF (HoFF)	In Afforestation Working Circle, prescribed works like Natural Regeneration, SMC works, grassland development, bio restoration tanks to be included.	Prescriptions like Natural Regeneration, SMC works, grassland development, bio restoration tanks are included in Afforestation Working Circle (Page no. 227 to 229)
ii.	Shri P. Kalyan Kumar, APCCF (Budget, Planning and Development), M.S./APCCF (Conservation) (ITP), M.S. (Additional charge)	In Afforestation Working Circle, GIS data layers be used by WPO to cross check the data.	In Afforestation Working Circle, GIS data layers have been used by WPO to cross check the data.
iii.	Shri. Pravin Chauhan, APCCF (Protection), M.S.	No digging of pits under tree canopy should be done in Afforestation Working Circle	Prescriptions regarding pre planting operations have been included in Afforestation Working Circle. (Page no. 227)

Attachment- Updated Draft Working Plan of
Pandharkawada Forest Division

21/7/2024
21/8/2024
आपक-जायक (लिपीक)
वनसंरक्षक
(कार्य आयोजना) गुरु, नागपूर
गर्जे कर्मचारि

(Dhananjay K. Waybhase, IFS)
Dy. Conservator of Forest,
Working Plan Division,
Yavatmal



महाराष्ट्र शासन
वनविभाग



उप वनसंरक्षक, कार्य आयोजना, यवतमाळ यांचे कार्यालय
"वनभवन", पहिल्या माळा, अण्णरा टोंकीज रोड, धर्वचे रामोर, यवतमाळ - ४४५००९ (म.रा.)
दूरध्वनी क्रमांक: ०७२३२-२४४२८९, ईमेल: ofwpyavatmal@mahaforest.gov.in,
ofwpyvat@gmail.com

जा.क्र.उवसं/काआय/कक्ष-५/प्र.क्र./रेस/१०४/२०२३-२४ यवतमाळ ४४५००९ दिनांक-०१/०६/२०२४.

प्रति,

मा. प्रधान मुख्य वनसंरक्षक
(उत्पादन व व्यवस्थापन)
महाराष्ट्र राज्य, नागपूर.

विषय- गोंदिया व पांढरकवडा वनविभागाची प्रारूप कार्य आयोजना खंड-१ व खंड-२ सादर
करणेबाबत.

संदर्भ - १) स्थायी सल्लागार समितीची बैठक दि. १०/०७/२०२४.
२) आपले कार्यालयीन पत्र क्र. कक्ष १४/प्रनुवसं (उ.व.व्या) /का.आ./आर.एस./ २१० /२४-२५
नागपूर -१ दिनांक ३०/०७/२०२४.

उपरोक्त संदर्भीय पत्र क्र. १ च्या अनुषंगाने दि. १०/०७/२०२४ रोजी आपल्या अध्यक्षतेखाली
पार पडलेल्या स्थायी सल्लागार समितीने पांढरकवडा वनविभागाच्या प्रारूप कार्य आयोजनेमध्ये
उपस्थित केलेल्या मुद्द्यांची पूर्तता करण्यात आली असून सदर मुद्दे कार्य आयोजना खंड-१ व खंड-
२ मध्ये समाविष्ट करण्यात आलेले आहेत.

संदर्भीय पत्र क्र. २ च्या अनुषंगाने current wage board rate, current schedule
rate for timber and poles, current schedule rate for firewood and bamboo हे
नवीन दर वापरून खंड-१ व खंड-२ मध्ये जोडण्यात आलेले आहे.

करीता पांढरकवडा वनविभागाची प्रारूप कार्य आयोजना खंड-१ व खंड-२ (२ प्रतीत) सविनय
सादर करण्यात येत आहे.

सहपत्र :- पांढरकवडा वनविभागाची प्रारूप कार्य
आयोजना खंड-१ व खंड-२ च्या २ प्रती.

(धनंजय वासभासे, शा.व.रो.)

उपवनसंरक्षक

(कार्य आयोजना), यवतमाळ.

प्रतिलिपी - १) मा. वनसंरक्षक, कार्य आयोजना-पूर्व, नागपूर, यांना माहितीस व उचित कार्यवाहीस
सविनय सादर.

प्रतिलिपी - २) उपवनसंरक्षक (प्रा.) पांढरकवडा यांना माहितीस सन्नेह अग्रेषित.

YTL.Mar.Letter2023



Government of Maharashtra

Office of the Principal Chief Conservator of Forests (Head of Forest Force),

Maharashtra State, 'Van Bhavan', Ramgiri Marg, Civil Lines, Nagpur-440 001,

Ph.No. 0712-2556788 Web site : mahaforest.nic.in E-mail : pccfpmngn@mahaforest.gov.in

No.Desk-14/WP/ACF/214/24-25

Nagpur-440 001, dated 06/08/2024

To

Deputy Director General of Forests (Central),
Ministry of Environment, Forests and Climate Change,
Government of India, New Secretariat Building, Ground Floor,
East Wing, Opposite VCA Stadium, Civil Lines, Nagpur-440 001.

Sub :- Approval of Draft Working Plan of Pandharkawada Forest Division for the
Period 2023-24 to 2032-33 Regarding.

Reference :- 1. SCC meeting minutes held on dt 10/07/2024
2. Deputy Conservator of Forest, Working Plan, Yavatmal letter No desk --
3/WP/103, dt 01/08/2024

Vide reference at 1, DWPR of Pandharkawada has been approved in SCC
meeting which was held on dt 10/07/2024.

Vide reference at 2, DWPR of Pandharkawada has been submitted by Deputy
Conservator of Forest, Working Plan, Yavatmal for sanction, after incorporating the
suggestions given in the SCC meeting referred at 1 above.

Hence, it is requested to accord sanction to Draft Working Plan for
Pandharkawada Forest Division, Pandharkawada for the Period 2023-24 to 2032-33.

Encl- Copy of Pandharkawada DWPR, Vol - I & II
With SCC meeting minutes and compliance

(M. Srinivasa Rao)

Principal Chief Conservator of Forests,
(Production and Management)
Maharashtra State.

Copy to : Principal Chief Conservator of Forests (Head of Forest Force)
Maharashtra State, Nagpur for information.

Copy to : Conservator of Forest (T) Yavatmal for information.

Copy to : Conservator of Forest, Working Plan (Dist) Nagpur for information.

Copy to : Dy. Conservator of Forest, Working Plan, Yavatmal for information vide
reference at 2.



GOI letters -106



भारत सरकार
GOVERNMENT OF INDIA
विभाग, वातावरण, वन्यजीव और जलवायु परिवर्तन
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
Regional Office, Ground Floor, East Wing,
New Secretariat Building Civil Lines, Nagpur - 440001,
moefcentral-nagp-mef@gov.in



F.No. 12-9/2004(FOR)/13730

Date: 12.11.2024

To,

The Principal Chief Conservator of Forests (P & M)
Van Bhawan, Ramgiri Road, Civil Lines,
Nagpur - 440001.

Subject: Review meeting to discuss the pending Working Plans of
Pandharkawada, Jawhar, Dahanu and Yavatmal Forest Division,
Maharashtra Forest Department - Regarding.

Reference:

1. DWPR of Pandharkawada Forest Division submitted vide letter No. Desk-14/WP//ACF/214/24-25 dated 06.08.2024;
2. DWPR of Jawhar Forest Division submitted vide letter No. Desk-14/WP//ACF/192/24-25 dated 10.06.2024;
3. DWPR of Dahanu Forest Division submitted vide letter No. Desk-14/WP//ACF/193/24-25 dated 21.06.2024;
4. DWPR of Yavatmal Forest Division submitted vide letter No. Desk-14/WP//ACF/189/24-25 dated 10.06.2024

Sir,

I am directed to refer to the subject and reference cited above and to inform that, DWPRs pertaining to four Forest Division i.e. Pandharkawada, Jawhar, Dahanu and Yavatmal Forest Divisions have been received from the State Forest Department seeking approval of the Central Government as per the provisions of VSS Rules, 2023 and National Working Plan Code 2023.

2 Preliminary scrutiny revealed certain shortcomings in the DWPRs and requires clarification. Hence, review meeting is scheduled on **14th November 2024** at **10:15 AM** at Regional Office to review above mentioned DWPRs.

3 In view of the above, concerned officials from the State Forest Department may kindly be asked to attend the review meeting with relevant records.

This is issued with the approval of competent authority.

Yours faithfully,

(C.B. Tashildar)

महाराष्ट्र वन विभाग
दूरध्वनी क्र.-0712 2556788
Email ID:
dvcform@maharashtraforest.gov.in
dvcfr@maharashtraforest.gov.in

महाराष्ट्र वन विभाग
प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख) महाराष्ट्र राज्य, नागपूर यांचे कार्यालय
वन भवन रामगिरी रोड, सिव्हील लाईन्स, नागपूर - 440 001

ई-मेलव्दारे/

क्र. कक्ष-14/का.आ./सवस/प्र.क्र. /2024-25/ 256

दिनांक 13 नोव्हेंबर, 2024

विषय :- यवतमाळ, पांढरकवडा, डहाणू व जव्हार वन विभागाचे DWPR चे सादरीकरण करणेबाबत.

संदर्भ :- केंद्र शासनाकडील पत्र क्रमांक 12-9/2004(FOR)/13730,
दिनांक 12/11/2024

विषयांकित प्रकरणी, संदर्भित पत्राचे अवलोकन व्हावे.

2. संदर्भित पत्रात कळविल्याप्रमाणे यवतमाळ, पांढरकवडा, डहाणू व जव्हार वन विभागाचे DWPR चे सादरीकरण दिनांक 14/11/2024 रोजी सकाळी 10.15 वाजता करावयाचे आहे. करिता खालीलप्रमाणे अधिकारी यांनी DWPR चे सादरीकरण करावे

अ. क्र.	वनवृत्त	वनविभाग	वेळ	सादरीकरण करणारे अधिकारी	
1.	यवतमाळ	यवतमाळ	सकाळी 10.15 ते 10.45	श्री. धनंजय वायभासे, DCF (T) यवतमाळ व पांढरकवडा	श्री. धनंजय वायभासे, DCF (WP) यवतमाळ
2.		पांढरकवडा	सकाळी 10.45 ते 11.15		
3.	ठाणे	डहाणू	सकाळी 11.15 ते 11.45	श्री. निरंजन दिवाकर DCF (T) डहाणू	डॉ. सायपुन शेख, DCF (WP) ठाणे
4.		जव्हार	सकाळी 11.45 ते 12.15	डॉ. सायपुन शेख, DCF (T) जव्हार	

3. DWPR चे सादरीकरण केल्यानंतर तसा अहवाल या कार्यालयास सादर करावा
सहपत्र - वरीलप्रमाणे

(एम. श्रीनिवास राव)

प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन),
महाराष्ट्र राज्य

प्रती,

उप वनसंरक्षक (प्रादेशिक), डहाणू, जव्हार, यवतमाळ, पांढरकवडा.

उप वनसंरक्षक (कार्य आयोजना), यवतमाळ, ठाणे.

प्रतिलिपी - मुख्य वनसंरक्षक (प्रादेशिक), ठाणे / वनसंरक्षक (प्रादेशिक), यवतमाळ, यांना माहिती व आवश्यक कार्यवाहीस अग्रेषित.

प्रतिलिपी- वनसंरक्षक (कार्य आयोजना), पुर्व / पश्चिम पुणे यांना माहिती व आवश्यक पुढील कार्यवाहीस अग्रेषित.



महाराष्ट्र शासन
वनविभाग

उप वनसंरक्षक, कार्य आयोजना, यवतमाळ यांचे कार्यालय
वन भवन, 1 ला माळा, चर्च रोड, यवतमाळ - 445001 (म.र.)

दूरध्वनी क्रमांक: 07232-244289. Email ID: cfwp.yvatmal@mahaforest.gov.in, cfwp.yvf@gmail.com

क्रमांक: उवसं/काआ/कक्ष-4/आस्था/228/2024-25

यवतमाळ दिनांक 13/11/2024

विषय :- यवतमाळ व पांढरकवडा, वनविभागाचे DWPR चे सादरीकरण करण्याबाबत.

संदर्भ :- 1) प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापना) महाराष्ट्र राज्य यांचे पत्र क्र. कक्ष.

14/का.आ./सवस/प्र.क्र. /2024-25/256 दि. 13/नोव्हेंबर/2024

2) केंद्र शासनाकडील पत्र क्रमांक 12-9/2004(FOR)/13730, दिनांक 12/11/2024

विषयांकित प्रकरणी, संदर्भित पत्राचे अवलोकन व्हावे.

संदर्भित पत्रात कळविल्याप्रमाणे यवतमाळ व पांढरकवडा, वन विभागाचे DWPR चे सादरीकरण दि.14/11/2024 रोजी सकाळी 10.15 वाजता करावयाचे आहे. परंतु खालील स्वाक्षरी करते हे आईच्या आजारपनास्तव किरकोळ रजेवर मुख्यालयाबाहेर सुट्टीवर असल्याने सदर सादरीकरण करण्याकरीता श्री संदीप भरत गिरी, सहाय्यक वनसंरक्षक (कार्यआयोजना) यांना प्राधिकृत करण्यात येत आहे. तरी सदर सादरीकरणास परिपूर्ण माहितीसह वेळेवर उपस्थित राहावे.

DWPR चे सादरीकरण करून संपूर्ण माहिती दिल्यानंतर तसा अहवाल या कार्यालयास सादर करावा.

सहपत्र :- वरील प्रमाणे.

(धनंजय वायभासे, भा.व.से.)

उपवनसंरक्षक,
कार्य आयोजना, यवतमाळ.

प्रती.

श्री संदीप भरत गिरी, सहाय्यक वनसंरक्षक (कार्यआयोजना) यवतमाळ.

प्रतीलीपी : मुख्यवनसंरक्षक (प्रादेशिक) यवतमाळ यांना माहितीस व आवश्यक कार्यवाहीस सविनय सादर.

प्रतीलीपी : वनसंरक्षक (कार्यआयोजना) पुर्व नागपुर यांना माहितीस व आवश्यक कार्यवाहीस सविनय सादर.



“वृक्षवल्ली आम्हां सोवले वनधरे”
दूरध्वनी क्र. ०२१३-२५६३८८
Web site: maharashtraforest.nic.in
ma.pcc@maharashtraforest.gov.in



महाराष्ट्र शासन

प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख)

‘वनभवन’, रामगिरी मार्ग, सिव्हील लाईन्स, नागपूर-४४० ००१

प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन), महाराष्ट्र राज्य

विषय: पांढरकवडा वन विभागाच्या सन २०२३-२४ ते २०३२-३३ पर्यंत या कालावधीच्या प्रारूप कार्य आयोजनेस अंतिम मंजूरीबाबत.

क्र. कक्ष-१४/सवसं/ २६७/२४-२५

नागपूर-१ दिनांक ३०.१२.२०२४

प्रति

उपवनसंरक्षक,
कार्य आयोजना, यवतमाळ.

संदर्भ :- भारत सरकार, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय यांचेकडील पत्र क्र.

WP 85/ROH/2023-NGP-13860 दिनांक 24.12.2024

उपवनसंरक्षक, कार्य आयोजना विभाग, यवतमाळ यांना कळविण्यात येते की, उपरोक्त संदर्भित पत्रान्वये केंद्र शासनाने पांढरकवडा वन विभाग कार्य आयोजनेस सन २०२३-२४ ते २०३२-३३ पर्यंत नमूद पत्रातील अट क्र. १ ते २७ या अटीचे अधीन राहून मान्यता प्रदान केलेली आहे. सोबत संदर्भित पत्राची छायांकीत प्रत सहपत्रित करण्यात येत आहे.

३.० मान्यता पत्रास केंद्र शासनाने उपस्थित केलेल्या मुद्द्यांची पूर्तता कार्य आयोजना खंड १ व २ मध्ये करण्यात येवून पूर्तता अहवाल केंद्र शासनास सादर करण्याच्या दृष्टीने या कार्यालयास दिनांक १५ जानेवारी, २०२५ पर्यंत सादर करावा.

३.० तथापी संदर्भित पत्रात नमूद केलेल्या अटीच्या अधीन राहून दिलेल्या निर्देशाप्रमाणे सदर कार्य आयोजनेस तातडीने अंमलात आणावी.

४.० सन २०२४-२५ करिता वृक्षतोड प्रस्ताव केंद्र शासनाच्या मंजूरीकरिता या कार्यालयास १ जाठवड्याच्या आत सादर करावा.

सहपत्र - बरिलप्रमाणे.

(एम. श्रीनिवास राव)

प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन)

महाराष्ट्र राज्य

प्रतिलिपी - प्रधान मुख्य वनसंरक्षक (वन बल प्रमुख), म.रा., नागपूर यांना माहितीकरीता सादर.

प्रतिलिपी - वनसंरक्षक (प्रादेशिक), यवतमाळ यांना सहपत्रासह माहितीकरीता अर्पित.

प्रतिलिपी - वनसंरक्षक (कार्य आयोजना), पूर्व नागपूर यांना माहितीकरीता अर्पित.

प्रतिलिपी - उपवनसंरक्षक (प्रादेशिक), पांढरकवडा यांना माहितीकरीता अर्पित.



भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
Regional Office, Ground Floor, East Wing,
New Secretariat Building Civil Lines, Nagpur - 440001,
apccfcetral-ngp-mef@gov.in



F. No.: WP-85/RON/2023-NGP/13860

Date: 24.12.2024

To,

The Secretary (Forests),
Revenue and Forest Department,
Government of Maharashtra,
Mantralaya, Mumbai-400032.

Subject: Approval of Working Plan of Pandharkawada Forest Division for the period 2023-24 to 2032-33- regarding.

Sir,

I am directed to refer to the PCCF (P&M), Maharashtra office letter No. Desk-14/WP/ACF/214/24-25 dated 06.08.2024, regarding the subject matter of obtaining prior approval of the Central Government under the VSSA, 1980.

In this context, the Detailed Working Plan Report (DWPR) of the Pandharkawada Forest Division has been examined by the Regional Office, considering the relevant provisions of the VSSA, 1980, along with the associated Rules, Guidelines, and the National Working Plan Code.

Upon careful examination of the DWPR, prepared by Shri Dhananjay K. Waybhase, IFS, and Shri Anand Reddy Yellu, IFS, the Central Government hereby grants approval for the said Working Plan for the period 2023-24 to 2032-33, under the powers conferred by the VSSA, 1980. This approval is subject to the following conditions:

1. The approved working scheme for the period 2023-24 shall be incorporated in the final copy and the current working plan shall be revised as 2023-24 to 2032-33;
2. Details of number of proposals approved under VSSA, 1980 and details of the Compensatory Afforestation carried out in lieu of diverted forest area in the division shall be annexed in the final copy;
3. The Status of notification of non forest area received for compensatory afforestation in RF/PF shall be compiled and annexed;
4. The orders of Hon'ble Supreme Court in the matter of Godavarman

Thirumulkpad Vs Union of India in W.P. (Civil) No. 202/95 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.

5. Further, in compliance with order to Hon'ble Supreme Court's Order dated 22.09.2000, the Government of Maharashtra shall ensure that regeneration of forests is commensurate with felling carried out under this Working Plan.
6. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with felling. In the events 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.
7. As per the directions issued by MoEF&CC vide letter dated 23.02.2018, Regional Offices of MoEF&CC are authorized to decide the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with felling. Instruction/ directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling is to be done by State Government only after seeking permission from REC, RO (WCZ), Nagpur.
8. Fruits bearing naturally grown trees shall not be clear felled for any purpose whatsoever.
9. Prescriptions of micro plans for JFM (if made) should not deviate from the broad framework/guidelines of the Working Plan and shall be in accordance with various orders of Hon'ble Supreme Court.
10. No deviations shall be made from the prescriptions of Working Plan without prior approval of the Central Government under VSSA, 1980. However, deviations of positive nature i.e. voluntary plantations carried out outside the working area under any project, schemes and compensatory afforestation shall be approved by the competent authority as per the provisions of the working plan code.
11. The exploitable girth of tree species and period of felling cycle shall not be lower than what was approved in previous working plan.
12. In the vicinity of Nalas and water bodies felling shall not be undertaken. Further felling shall not be undertaken near the known resting/nesting places of wild animals and birds.
13. No commercial felling shall be carried out along the 2 km strip of all perennial Rivers of State; further, no commercial felling shall



be carried out along the strip of 500 meters of all seasonal Rivers; only eco-restoration work shall be carried out.

14. Volume details of all kinds of fellings viz; dead and diseased trees, grants of right and concession and all illicit felling should be compiled along with the estimation of their standing volumes as per the same volume table used for the assessment of growing stock. This report shall be prepared annually working circle and compartment wise by the territorial Sub- DFO and shall be submitted to the CF, Working Plan for this purpose within 02 months of the end of control year.
15. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the prescription of Working Plan. Proper mechanism has to be in place for the collection of NTFPs in sustainable manner
16. Status of rare, endangered and near extinct species shall be monitored closely and adequate measures will be taken for their protection and conservation.
17. Execution of Working Plan shall be in conformity with the National Forest Policies, 1988.
18. No regularization of existing encroachment should be done without following due procedure. and an appendix may be added giving details of the encroachment of the forest area in the division. A definite plan has to be made to remove encroachment and vacated area shall be planted with suitable local species as per Government of India and Hon'ble Supreme Court Orders/Guidelines in the matter.
19. Eco-tourism shall/may be undertaken on sustainable basis. No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed for public. Such sites will be declared as Plastic Free Zones. These eco-tourisms sites will be managed by the forest department as per the prescriptions of the working plan.
20. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.
21. Proper mechanism has to be put in place to control illegal felling, grazing and fire. Proper fire management plan shall be prepared and executed meticulously.
22. Lac cultivation, if any, will be practiced as per the provisions of Forest (Conservation) Act, 1980.
23. While managing forests, provisions of the Biological Diversity Act,



2002 and Wildlife Protection Act, 1972 shall be fully complied.

24. Annual Plan of Operations under Compensatory Afforestation Fund Act, 2016 and Compensatory Afforestation Fund Rules, 2018 shall be in conformity with Working Plan prescriptions.
25. All the Unclassed Forest, acquired CA areas and acquired Private Forests should be notified as RF/ PF in time-bound manner at the earliest.
26. Midterm review of Working Plan shall be undertaken after five years so as to review the compliance of conditions as laid down in this approval. Modification/addition in some conditions may be made to meet the objectives, with the approval of Regional Office, Nagpur.
27. 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. Relevant modifications in the working plan are required to be carried out so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under VSSA, 1980 or any other statute and National Forest Policy from time to time.

This is issued with the approval of Competent Authority, Regional Office (WCZ), MoEF&CC, Nagpur.

Yours faithfully,


(C.B. Tashildar)
AIGF (Central)

Copy to:

1. The Additional Director General of Forests (FC) Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi-110003.
2. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
3. Guard File.


(C.B. Tashildar)
AIGF (Central)