



सर्वोच्च न्यायालय

GOVERNMENT OF MAHARASHTRA

VOLUME-II

WORKING PLAN

FOR

YAWAL FOREST DIVISION

OF

DHULE CIRCLE

PERIOD: 2019-20 TO 2028-29

BY

D. M. BHAT., (IFS.)

DEPUTY CONSERVATOR OF FORESTS,

WORKING PLAN, DIVISION DHULE



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VOLUME II- APPENDIX

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CHAPTER-1

THE TRACT DEALT WITH

1.1: NAME AND SITUATION :

Introduction:

The Yawal Working Plan covers the Reserved, Protected and Un-classed Forests (Non-Forest Areas) in the Chopada, Yawal and Raver talukas of Jalgaon District. The area is situated between 21⁰-03'-28" and 21⁰-24'-53" north latitude and 75⁰-00'-31" and 76⁰-09'-33" east longitude (lat-long extracted from GIS)

The state boundary of Madhya Pradesh constitutes the northern and eastern boundary of Yawal Division & Tapi river forms the Southern boundary of Yawal Division. Aner river constitutes the Western boundary of Yawal Division.

The Following sites have been identified to make ecotourism a success in Yawal Forest Division.

1. Pal Forest Park and Forest Guards Training School.
2. Manu Devi Mandir
3. Unap Dev Hot Water Spring.
4. Nateshwar Kamaljadevi Temple
5. Mor Dam
6. Yawal Wild Life Sanctuary
7. Suki Dam etc.

The total forest area included in this division is 82194.10 area in ha. Out of which 81809.19ha. is Reserved Forest, 359.63 ha. is the Protected Forest and 25.48 ha. is compensatory land, shown as Un-classed Forest. Yawal Division comprises of 7 Ranges, 24 Round & 107 beats.

The Forest of Yawal Division in Jalgaon District, mainly belongs to Dry Tropical Forest as per the revised survey of the Forest Types of India by Champion and Seth. The composition of the growing stock shows considerable local variation on account of various locality and biotic factors.

1.2 : CONFIGURATION OF THE GROUND

The area falls in the Deccan traps. It has more or less western aspect due to the westward flow of Tapi River and its tributaries.

The Satpudas forms a broad belt mountain ranges standing as wall along the north bank of the Tapi River. The central crest is about 610 mtrs. high. The highest peak viz. Panchpandu overlooking Yawal is 1073 mtrs high. The area is drained by Tapi River and its tributaries.

1.3: GEOLOGY, ROCK AND SOIL

The underlying rock is mainly the Deccan trap, which on disintegration turns into murum and subsequently soil of varying depths, fertility, texture and colour. The soil is mostly black to reddish brown and is mixed with organic matter.

The soil mainly falls in to three categories.

Black soil: The trap soil produced by weathering and erosion is deep brown to rich red or black (Rogur). The black soil is very rich in plant nutrients and is most favorable for cotton crop. It is sticky when wet and produces cracks on drying.

Laterite soil : Laterite is found in tropical climate under alternate dry and wet season. It is porous pitted clay like rock with variegated colors and has a limonitic crust on the exposed surface.

Alluvial Soil: This type of soils occur in strips on north side of Tapi river. It is composed of reddish and brownish clay with intercalation of gravel with kunkar. Though alluvium layers are much thicker and wider on the West, they thin out in the East.

SOIL SURVEY AND LAND-USE PLANNING :

National Bureaus of Soil survey and Land Use Planning in co-operation with Department of Agriculture, Maharashtra, developed soil resource maps for Maharashtra state. NBSS&LUP has also published soil maps at 1: 5,00,000 scale.

The Yawal Forest Division, which comprises of three Taluka namely Raver, Yawal and Chopda has the following soil categories as per NBSS&LUP classification. The polygon numbers and their description. The soil map of Yawal division is prepared along with this working plan. The polygon numbers of Yawal division are 179,244,256,260,270,277, and 278.

179: This comes under the category soils of lower Maharashtra.

Rock out crop: associated with extremely shallow, excessively drained, loamy soils on gently sloping summits and spurs with severe erosion and strong stoniness.

244: Slightly deep, moderately well drained, fine soils on very gently sloping plains and valleys with moderate salinity; associated with moderately deep, well drained clayey calcareous soils with moderate erosion.

256: Very deep, moderately well drained fine calcareous soils on very gently sloping plains and valleys with moderate erosion; associated with shallow, well drained, clayey soils with moderate erosion.

260: Very deep, moderately well drained fine calcareous soils on very gently sloping plains and valleys with moderate erosion; and slight salinity; associated with slightly deep well drained, fine soils with moderate erosion.

270: Slightly deep, well drained clayey soils on moderately sloping isolated hillocks and pediments with moderate erosion; associated with very shallow, somewhat excessively drained, loamy soils with severe erosion and moderate stoniness.

277: Extremely shallow, somewhat excessively drained, loamy soils on moderately steeply sloping rolling lands with mesas and buttes with severe erosion; associated with deep, moderately well drained, loamy, calcareous soil on very gently sloping rolling lands with mesas and buttes with severe erosion, associated with deep, moderately well drained loamy. Calcareous soils on very gently sloping rolling lands with mesas & buttes with moderate erosions.

278: Very shallow, excessively drained, clayey soils on moderately steeply sloping undulating to rolling lands with mesas and buttes with severe erosion and strong stoniness; associated with shallow excessively drained, loamy soils with severe erosion and strong stoniness.

1.4 : CLIMATIC PARAMETERS :

Climate : Being far away from the coast, there are large variations in temperature in the District. The year may be divided into four seasons. December to February forms the cold season, followed by hot season from March to May. The monsoon is from June to September, while October and November forms the post monsoon season. December is the coldest month, Temp.goes down 20⁰C and the temperature rises steadily from March and by May and the year mean daily maximum temperature reaches 44⁰C.

Rainfall : The average annual rainfall in Yawal division is 712.3 mm. Major portion of the rainfall is received during the monsoon months of June to September, July being the month of highest rainfall. The Annual rainfall between the years 2005 to 2015 is as under:

Table No. 1.1 : Rainfall

Year	Annual Rainfall in m.m.		
Taluka /Station	Chopda	Yawal	Raver
2005-06	427.00	545.00	420.00
2006-07	1413.00	1396.00	1183.00
2007-08	747.00	778.00	748.00
2008-09	538.20	457.20	428.90
2009-10	718.80	482.30	456.00
2010-11	867.20	981.40	822.40
2011-12	692.70	626.60	510.00
2012-13	469.90	485.60	413.40
2013-14	1109.60	900.50	688.30
2014-15	727.70	754.40	582.40
Average	771.11	740.70	625.24

Drought : -The tract is well supplied with rivers, streams and reservoirs. Some of the bigger streams provide perennial supply of water. A number of perennial streams existing in Satpudas and the notable are Lungda amba, Sahstraling, Unapdev, Kundapani and Ambapani. In almost all the villages and settlements, wells have been dug. Though the water table goes down in summer, the water supply is sufficient for domestic purposes. Acute scarcity of water is experienced towards the end of the hot weather.

Storms, floods and frost: - The prevailing winds are North-Easternly from October to March and South-Westernly from April to September. The winds are generally moderate. Occasional storms in pre-monsoon period are also experienced which sometimes result in uprooting of isolated trees. High floods are not of common occurrence. Frost is not recorded so far and is almost unknown in the forest areas of the district.

Soil erosion :-The effective rainfall and run-off during the south- west monsoon has important implications for crop production in the district. The effective rainfall for the south-west monsoon is computed to be around 533mm and its distribution is 110, 162, 175

and 85 mm, respectively, for the months of June, July, August, and September. On integrating the effective rainfall of the district with the water-holding capacity of the soils of the district, which is around 100-150mm per meter depth, the run-off water is estimated to be 355mm or 3,550 cubic meter of rain water per hectare per annum. The run off takes away the fertile top soil, leading to severe soil erosion in the district.

The process of soil erosion is proceeding at an alarming pace in all the marginal areas of the reserved forests of the tract. As result of fires and excessive grazing, the soil is deprived of its protective cover and consequently in the rainy season, the valuable top layers of the soil are washed away. The forest crop in such areas has degenerated into under stocked open scrub. Further degradation of such areas into valueless blanks will be only a matter of time if effective measures are not followed at once.

Gully erosion is noticed on the undulating portions of the forests adjoining well-populated tracts. The grounds are cut up into ravines where xerophytic shrubs and inferior grasses are found. Sheet and gully erosion is also met with in hilly areas where heavy felling has been carried out in the past.

Soil erosion adversely affects the fertility status and land use. National Bureau of Soil Science and Land-Use Planning has grouped the soils of Yawal, Raver & Chopada taluka into soil erosion class i.e. slight erosion. (5 tons/ha./year). Source :- Technical bulletin of NBSS & LUP Nagpur (year- 2001)

DISTRIBUTION OF AREA IN WATERSHEDS

The area of Yawal Division is distributed in 13 G.S.D.A. Watersheds. The Watershed Map of the Division is attached. The abstract of G.S.D.A. Watersheds including sub, mini and micro watersheds of Yawal Division is given.

STATE OF BOUNDARIES

The boundaries of Reserved Forests are demarcated by cairns of loose stones, erected at suitable intervals, as per instruction laid down in para 123 of Bombay Forest Manual Volume – II. The cairns are not serially numbered. The Reserved Forest area has 296 km. of external boundaries out of which 122 km. are natural boundaries. The Protected Forests are having 54.15 km. of external boundary. The Protected Forests have been demarcated by constructing cement pillars. The boundary lines and the cairns in the division are not well maintained.

LEGAL POSITION

The Forest of the tract was constituted into Reserved Forest during the period,1879 to 1910 by means of several notifications, the details of which are given in Volume II of this Plan. The details of P.F. along with the Notification No. and date of notification and date from which these areas became P.F. are given.

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

CHAPTER :- 2

MAINTENANCE /INCREASE IN THE EXTENT OF FOREST AND TREE COVER

2.1 : AREA OF FORESTS UNDER DIFFERENT LEGAL, CLASSES (RF. PF. UF. & OTHER)

Area Description :

The total forest area as per the notification and Form No.I of Yawal Forest Division is 821.94 Sq.Km. of which 818.99 Sq.Km is the Reserved Forest 3.60 sq.km.,is the Protected Forest and 0.259 Sq.Km. is compensatory land (unclassified land)

Table No. 2.1 Range wise area Statement of Yawal Forest Division.

Sr. No.	Name of Range	No. of Round	No. of Beat	Legal status wise area (ha)			
				Reserved Forest area	Protected Forest	Unclassified Forest	Total Forest area
1	Raver	4	14	13855.47	0	20.34	14061.44
2	Yawal (East)	3	14	13923.70	122.37	0	14096.04
3	Yawal (West)	3	14	13420.46	27.85	5.14	13466.21
4	Deoziri	4	16	9512.51	85.42	0	9597.93
5	Karjana	4	17	9917.01	77.62	0	9994.63
6	Vaijapur	3	16	10192.65	8.4	0	10201.05
7	Chopada	3	16	10738.83	37.97	0	10776.80
Total		24	107	81808.99	359.63	25.48	82194.10

- **Note :-** Out of total 81808.99 ha. Reserved forest, 248.36 ha. is notified under Section 4 of IFA 1927 as Reserved forest , but not declared under Section 20 of IFA.

Administrative units :

For administrative convenience, the ranges, rounds and beats were reorganized.The entire division has been divided into 7 Ranges, 24 Rounds and 107 Beats.

Legal position :

The Forest of the tract was constituted into Reserved Forest during the period, 1879 to1910 by means of several notifications.The details of which are given in **Volume II** of this

Plan. The details of P.F. was constituted out of the area received under Compensatory Afforestation.

- i) **Reserved Forest** : The forests were originally declared Reserved Forest under the provisions of the Indian Forest Act, VII of 1878, as per the notification. Subsequent changes are effected under the authority of the State Govt. Gazette notifications issued from time to time. Orders of settlement officers and corrections intimated by the Survey of India, Dehra Dun have been incorporated in the area statement i.e. in Form 1 of the Division.
- ii) **Protected Forests** : These forests were declared as Protected Forests under section 4 of the Indian Forest Act, of 1927 vide Govt. of Maharashtra Notification.

In exercise of powers conferred by section 30 and 32 of Indian Forest Act, 1927, notifications reserving trees, etc., were issued and rules were framed by the Govt. of Maharashtra under No.FLD-015/Ö.Ö.205/±ú-3 dated. 06/05/2015.

DISTRIBUTION OF THE AREA :

Yawal forest division comprises of Raver, Yawal east, Yawal west, Deoziri, Karzana, Vaijapur and Chopada Ranges. Area of the division lies in Raver, Yawal and Chopada Talukas of Jalgaon district.

As per the notifications and Form No.I, the total area of the Yawal Division is 897.0513 sq.km. of which 894.352 sq.km is the Reserved Forest , 2.440 is the Protected Forest and 0.259 sq.km is compensatory land which is shown as un-classed forest. The distribution of the area under Range, Round and Beat areas is shown in **ANNEXURE-XXXIII**. However, the area of the Division calculated by adding up area of the compartments of Reserved Forest, Protected Forest and Un-classed forest is 824.267 sq.km.

Total 981.649 hectare of Reserved Forest area was transferred to various project authorities under Forest Conservation Act 1980 for non-forestry purpose. However, the status of the land continues to be Reserved Forest. The details of the land transferred to other Agencies for non-forestry purpose is given in the **ANNEXURE-VIII**.

Total 646.33 Ha. land was received as Compensatory land in lieu of diverted Forest land, out of which 244.01 hectare have been notified as Protected Forest, 376.41 hectare is

notified under Sec 4 of IFA 1927 and 25.91 hectare remained un-classed and is under the process of notification under Sec 4 of IFA 1927. The details are given in **ANNEXURE- XVI**.

As per Govt. of Maharashtra letter No. FDC-2005/ No 221/F-5 Dated 20 January 2006 & No. FDC-2005/ No 221/F-5 Dated 2 February 2007 22559.45 ha area of 76 Compt. of FDCM, Project Division Yawal was transferred to Yawal (T) forest Division. Accordingly reorganization of Yawal Division was done. The no. of Range, Round and Beats before and after reorganization was as below.

Table No. 2.2 : Range, Round and Beats details in Yawal Division

Sr. No.	Item	Before Reorganization (As per Vasudevan, Reddy and Tiwari's Plan	After Reorganization in 2007
1	No. of Ranges	6	7
2	No. of Rounds	17	24
3	No. of Beats	68	107

While doing this reorganization, area of old Pal range was transferred to reconstituted Raver and Yawal east range, while FDCM area in Chopada Taluka was transferred to newly created Vaijapur, Chopada, Karjana & Deoziri Range.

Managing Director FDCM of Maharashtra Ltd. vide their letter No. 3346 Dated 1 Nov. 2006, has sought permission from State Govt. for transferring 14863.810 ha. area of 50 Compartments of FDCM Project Division Yawal to Yawal Forest division as in most of this area, there was illegal tree felling and the area was encroached by local people and it was highly sensitive and it was not possible for FDCM to protect and manage that area. Govt. of Maharashtra vide their letter No. FDC-2005/No. 171/F-5 dated 2 February 2007 accorded approval to the proposal Dated 1 Nov. 2006 of FDCM. As per Govt. order 14863.810 ha. area of 50 Compartments was transferred to Yawal Division (T) and FDCM Project Division Yawal was closed on 5.7.2007. Thus total area transferred to Yawal (T) Division by FDCM was 22559.45 ha. of 76 compartments. The details of total area transferred by FDCM is given in **ANNEXURE-XXXV**.

Rights and concessions :

The rights with which these forests are burdened are right of way and access to water. As regards concessions, these are enjoyed in accordance with the Forest Privilege Code, which forms a part of Bombay Forest Manual Volume-III, Part C. Apart from these, in PESA area, the right to collect Minor Forest Produce have now been assigned to the Panchayat by the Maharashtra Transfer of ownership of Minor Forest Produce in the Scheduled areas Act. 1997. Also rights to MFP have now also been assigned to Gram Sabha as per provision in sec.3 (1) of The Scheduled Tribes & Other Traditional Forest Dwellers (Recognition of Forest Rights Act 2006) have also been recognized and assigned 2287.546 hectare area.

2.2 : FOREST AREA UNDER DIFFERENT WORKING CIRCLE:

The area under the different Working Circles in the Division is given in the following tables.

Table No.2.3 Area Allocation to Different Working Circles

Sr. No.	Name of Working Circle	Area allocated (Ha.)
1	Protection Working Circle.	28229.72
2	Improvement Working Circle.	21530.85
3	Afforestation Working Circle.	14302.49
4	Miscellaneous Area Management	18131.05
Total Area of Division		82194.10
5	Non-timber Forest Produce (Overlapping) Working Circle.	Entire Area
6	Bamboo (Overlapping) Working Circle.	4880.48
7	Joint Forest Management (Overlapping) Working Circle.	49037.33
8	Wildlife Management (Overlapping) Working Circle.	Entire Area

Range wise allocation of the area of different working circles is shown in the table below:

Table No. 2.4 : Range-wise Area Allocation of Different Working Circle

Sr. No.	Range	Total Area in ha.			
		P.W.C.	I.W.C.	A. W.C.	Misc. Area Mangement
1	Raver	1995.980	3704.879	2407.608	6320.777
2	Yawal (East)	5276.392	2397.131	7239.019	747.856
3	Yawal(W est)	6840.785	2426.123	1366.28	766.677
4	Deoziri	3327.200	4866.52	0	1650.188

5	Karjana	2979.045	4553.597	0	2116.920
6	Vaijapur	4514.584	2769.199	2149.27	1522.591
7	Chopada	3295.734	1116.419	1140.317	5005.041
Grand Total		28229.720	21530.855	14302.494	18131.050

Table No. 2.5

Range	Total Area in ha.			
	NTFP (O/L) W.C.	Bamboo (O/L) W.C.	J.F.M. (O/L) W.C.	WL.Mgt. (O/L) W.C.
Raver	Entire Area	0.00	13260.01	Entire Area
Yawal (East)		140.48	6885.65	
Yawal(West)		1250.00	3978.51	
Deoziri		2790.000	5060.01	
Karjana		700.00	5891.37	
Vaijapur		0.00	5981.20	
Chopada		0.00	7980.00	
Grand Total		--	4880.48	

2.3 : PERCENTAGE OF FOREST WITH SECURED BOUNDARIES

State of Boundaries :

The total length of the external boundary of the Reserved Forests is 242.800 km of which about 109.25 km, is formed by permanent natural features and 133.55km is demarcated. These demarcated artificial boundaries are cleared lines 12m wide with numbered pillars at suitable intervals. Each pillar is surrounded by cairn of stones or earth and is placed in the middle of the 12 m wide boundary line. The pillars are serially numbered in anti-clock-wise direction. Separate series of numbers are adopted for boundary lines passing through different villages. Half width boundary line lies wherever the Reserved Forest adjoins the Protected Forests and other areas.

The total length of boundary line of Protected Forests is 54.15 km. of external boundary. The Protected Forest have been demarcated by constructing cement pillars. The

boundary line and the cairns are not well maintained. Repairs of the pillars and construction of new cement pillars were carried out as per the availability of the fund.

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

The total geographical area of three talukas Yawal, Raver & Chopada comprises Yawal Forest Division is 3014 sq. km. Out of that forest area of Yawal Forest division is 821.94sq.km. The condition of the forests and forest cover over the last decade during the implementation of the Plan based on the sanctioned as per PWPR data is as follows:

**Table No. 2.6 : Forest cover over the Last Decade during the Implementation of the Plan
(As per Sanctioned PWPR.)**

Name of working circle	Forest density (Before implementation of Mr.Reddy's working plan)					
	Total Area	>0.4 Dense	<0.4 open	Blank	Scrub Forest	Water Bodies
Protection	15260.10	6472.46	6422.76	2335.21	19.32	24.97
Improvement	21758.30	9682.80	10070.50	1717.84	4.73	42.05
Anjan	22867.70	2524.37	11789.80	7925.77	155.79	471.96
Total	59886.11	18679.63	28283.04	11978.82	179.84	538.98
Name of working circle	Forest density (After implementation of of Mr.Reddy's working plan)					
	Total Area	>0.4 Dense	<0.4 open	Blank	Scrub Forest	Water Bodies
Protection	28236.45	9733.29	11365.65	5598.01	0.00	---
Improvement	20454.49	6074.49	8062.37	3971.02	0.00	---
Anjan	15378.84	5647.05	4891.90	2409.44	150.00	---
Miscellaneous Area Management	18124.32	0.00	11685.30	6439.02	0.00	---
Total	82194.10	21454.83	36005.22	18417.49	150.00	---

From the above table it is very clear that there is an overall decrease in forest cover density (>0.4 Dense) .

**Table No. 2.7 : Statement showing details of Forest Density in Yawal Division.
(As per Sanctioned PWPR.)**

Protection W.C.	No. of Compartment with increased density	Total area (ha)	Forest density Implementation of Mr. Reddy's working plan Area (ha.)	Forest density (After Implementation of Mr. Reddy's working plan) Area (ha.)	Increase in density	% increase
Protection	11	4595.98	475.01	1084.61	690.60	128
Improvement	12	3430.49	1165.71	1643.55	477.84	41
Anjan	16	6376.86	548.16	1029.07	480.91	88
Total	39	14403.33	2188.88	3757.23	1168.44	53

From the above table it is very clear that there is increase of forest cover density (<0.4 Dense) in 39 Compartment by 1168.44 ha. (53%) with highest increase in Protection working circle which is 128%.

There is decrease in forest cover density (>0.4 Dense) of 78 compartments as below.

Table No. 2.8 : Statement showing details of Forest Density in Yawal Division

Protection W.C.	No. of Compt. with increased density	Total area (ha)	Forest density Implementation of existing working plan Area (ha.)	Forest density (After Implementation of existing working plan) Area (ha.)	Increase in density	% increase
Protection	16	7827.19	5784.20	4164.70	1619.50	28
Improvement	50	14014	7172.33	4937.25	2235.08	31
Anjan	12	5177.01	1795.99	1033.74	762.25	42
Total	78	27018.20	14752.52	10135.69	4616.83	53

There is 31% decrease of forest density in above compartments due to the encroachment on forest area.

The threats to the forests from land use and use change and forestry (LULUCF) is real and affects large areas as pressure on land for habitation, agriculture, industries,

developmental works and other activities mount up as the population increases and the accompanying wants expand.

The Plantation/Tree Outside Forests (TOF) for State of Maharashtra according to the State of Forest Report 2015 is 1,232.17 sq kms adding 2.38% to the forest cover of the State. However no specific figure for the District is available.

Disforestation Prior to 1980 :

In Reserved Forest and Protected Forest, total area disforested is 461.75 ha. and 184.58 ha respectively. Details are given in **Appendix No-VIII.**

Area Diverted for Non-forestry purposes under Forest Coservation act, 1980

Area diverted under FCA 1980 through final sanction is 976.457 ha. Area diverted lieu of this, 687.128 ha of non-forest land has been made available for compensatory afforestation.

Areas diverted under Forest Right Act, 2006.

Under Section 3 (2) of FRA, 7.00 ha. involving 12 cases has been diverted for Non-forestry purposes. The status of Implementation of FRA 2006 in Yawal Forest Division (up to Nov. 2017) is as below:

Table No. 2.9 : Status of Implementation of FRA 2006.

IFR Cases 3(1)				CFR Cases 3(1)		CFR cases 3 (2)	
No. of sanctioned cases	Area in ha.	No. Pending cases	Area in ha.	No. of cases	Area in ha.	No. of cases	Area in ha.
1366	2552.776	2015	3868.631	77	10726.20	12	7.00

This diversion of forest land to the traditional forest dwellers has further fragmented the area of the Division. The details are given in the **Appendix No.XXII/XXV.**

2.5 : THREATS TO THE FOREST :

The main threat to the maintenance of forest cover/area in the Division is encroachment. While the Division is relatively better of compared to the other areas, the propensity of people to colonise on forest land is a common obsession and some of the area is already encroached. The area is subject to further encroachment as the consolidation of boundary is not yet done. Hence consolidation of boundary must be given highest priority for encroachment area.

2.6 : DISTRIBUTION OF DIFFERENT FOREST TYPE :

The Forest of Yawal Division has been classified as follows as per Champion and Seth's classification and following are the forest types found. The majority of the forest comes under 5A/C₃ Southern dry mixed deciduous forests with very insignificant areas of the other types.

Table No. 2.10 Forest Types of Yawal Forest Division

Type	Notation	Type Description
Sub-group	5A	Southern Tropical Dry Deciduous Forest
I. Climax Type	5A/Ci	Dry teak bearing forests
	5A/Cia	Very dry teak forests
	5A/cib	Dry teak forests
	5A/c₃	Southern dry mixed deciduous forests.
II. General Edaphic types	5/E-2	Bosewellia forests
	5/E-5	Butea forests
III. Degardation stages	5/D S1	Dry deciduous scrub.
IV. General serial type	5/ISI	Dry tropical riverain forest

2.7 : TREE COVER OUTSIDE FOREST AREA :

Yawal forest division comes under Raver, Yawal and Chopda Talukas. These 3 talukas are having geographical area 3014.56 of which Yawal Forest Division is having 821.94 Sq.km. area and Pal wildlife sanctuary is having 175.58 sq.km area in these talukas. Thus total forest area is 997.52 sq.km.

The Plantation/Tree outside Forests (TOF) for State of Maharashtra according to the State of Forest Report 2015 is 1,232.17 sq. kms adding 2.38% to the forest cover of the State. However no specific figure for the District is available.

The tree outside forests in the state of Maharashtra has not been assessed yet as per the requirement of the Code and carried out by the Forest Survey of India. However, the Social Forestry Department (SFD) of the State has assessed the trees that are available from plantation that it has carried out in the District which form a substantial quantity and forest cover in the areas outside forests. The SFD has been carrying out plantations in the private areas since 1982 in the District which include block plantations, agricultural bund planting

and roadside plantations. It is interesting to note that the Department has also carried out the assessment of the success and survival of these plantations in 2005 and the results are very encouraging.

Trees Outside Forests planted under Social Forestry Jalgaon Division during the period 1982 to 2007.

1. Total beneficiaries --	2596
2. Total Planted Area --	1298 ha.
3. Total No. of seedlings planted--	25.33 lakh
4. No. of surviving trees upto 2005--	6.49 lakh
5. Percentage survival --	27%

These six and half lakhs mature trees that have survived may be presumed to have been retained by the beneficiaries to some extent. They have added a substantial additional forest cover in the district.

Trees Outside Forests planted under Social Forestry Jalgaon Division(Yawal, Chopada and Raver) during the period 2005 to 2017.

A) Block Plantation

1. Total Planted Area -	64.00 ha.
2. Total No. of Seedlings Planted-	60,000
3. Survival count of seedlings at the time of handing over the scheme	27000

B) Road-side Plantation

1.Total lengthin Km. -	124 km.
2. Total No. of Seedlings Planted	49600
3. Survival count of seedlings at the time of handing over the scheme	34720

The above information has been extracted from the booklet prepared by the Jalgaon Social Forestry Division where year-wise, scheme-wise and species planted are given. The same is too bulky to be appended.

The Trees Outside Forests need to be assessed by the Social Forestry Division of the District. With the present data already available with the Division & precise number of trees and forest cover present in the areas outside can be arrived at. There is a need to design a model for the survey of trees outside forest at the state level so that a realistic figure of the TOF could be arrived at.

2.8 : SHIFTING CULTIVATION

Shifting cultivation is not practiced in this Forest Division.

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CHAPTER :- 3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

3.1 : FOREST COMPOSITION AND DISTRIBUTION

The forests of Yawal Forest Division belong to the sub-group 5-A, 'Southern Tropical Dry Deciduous Forests' as per the revised classification of forest types of India by Champion and Seth. Within this main type, considerable local variations in the altitude are not considerable. It does not influence the distribution of various forest species, however, aspect plays an important part in determining the character of the vegetation in hilly area. Generally the western and northern slopes are better stocked than the drier eastern and southern slopes. The rocks throughout the Yawal Forest Division are Deccan trap, but the soil varies. Geology, soil type and depth plays an important role in determining the composition and quality of the crop.

The biotic factors which have resulted in the degradation of the forests, are excessive grazing, illicit felling, overdependence on forest for fuelwood, weed infestation and frequent fire. The illegal felling are often concentrated on the species most valued for various purpose. Seedling stages are particularly exposed to extermination due to excessive grazing and fire. The species surviving during degradation stages, are resistant ones, that can withstand to grazing and fire. These species are often of low utility.

Predominance of Teak :-

Teak is the predominant timber species found in the region and is associated with many species of varied importance and it is usually associated with metamorphic (calcareous, crystalline phyltite, schists and granite gneiss).

The Satpudas forms a broad belt of mountain ranges standing as wall along the north bank of the Tapi River. The central crest is about 610 mt. high. The area is drained by Tapi River and its tributaries.

Geology, Rock and Soil : The underlying rock is mainly the Deccan trap, which on disintegration turns into murum and subsequently to soil of varying depths, texture and color. The soil is black to reddish brown and is mixed with organic matter.

Dry Teak Bearing Forests (5A/C1b) :

A) Teak High Forests :- This sub –type extends over the northern part of Yawal West and East Ranges and adjoining areas in Chopda& Deoziri Range. It covers the Aner Valley in the

upper reaches and the northern slope of the main Satpuda ridge where soil and moisture conditions are favorable such as sheltered lower slopes of the hills, wild ravines and fringes of more or less perennial water sources where the soil is usually fine grained and deep. Teak occurs everywhere in varying proportion but in certain locations of Chopda & Deoziri range, its proportion in the crop is high.

The proportion of teak in the over-wood generally varies from 20 to 25% but areas with less teak in the over-wood having reproduction and advanced growth of this species are also potential teak areas. Bamboo is dense on the middle and upper slopes and often down to the poor. Karvi (*Strobilanthus callosus*) forms thick undergrowth. Boru grass (*Soorghum halepense*) grows luxuriantly in patches. The incidence of climber is less. The undergrowth especially of Karvi & grass is suppressed where the over-wood is dense. With the opening of canopy, they shoot up. On the whole the quality of the crop is IV. Where the soil depth is good the quality tends to be III. The forests are generally well stocked with a density of 0.5 to 0.6. Regeneration of teak and other species is very sparse over most of the area owing to bamboo, karvi and grass. The young crops have also suffered from fire, which have eliminated much of the re-growth of miscellaneous species. Most of the natural regeneration trying to establish, is killed by adverse factors such as fire. Teak is mostly unsound due to almost continuous damage by fire every year.

The general floristics are- Teak (*Tectona grandis*), Sadada (*Terminalia tomentosa*), Shisam (*Dalbergia latifolia*), Dhavda (*Anogeissus latifolia*), Hed or Haldu (*Adina cordifolia*), Salai (*Boswellia serrata*), Bija (*Pterocarpus marsupium*), Dhaman (*Grewia tiliaefolia*), Tiwas (*Ougeiniaoo jeinensis*), Bondara (*Lagerstroemia parviflora*), Kalam (*Mitragyna parvifolia*), Kusum (*Schleichera oleosa*), Mahuwa (*Madhuca indica*), Phasi (*Dalbergia paniculata*), Hump (*Sacopetalum tomentosum*), Rohin (*Soymida febrifuga*), Umber (*Ficus glomerata*), Kadai (*Streculia urens*), Pangara (*Erythrina variegata*), Arjun sadada (*Terminalia arjuna*), Awala (*Emblica officinalis*).

The under-storey consists of Khair (*Acacia catechu*), Charoli (*Buchanania lanzan*), Modhal (*Lannea coromandelica*), Bor (*Zizyphus mauritiana*), Bhutakes (*Cassine glauca*), Asana (*Bridelia retusa*), Palas (*Butea monosperma*), Bahava (*Cassia fistula*) and Bambo (*Dendrocalamus strictus*).

The shrubby undergrowth consists of Kevani (*Helicteres sisora*), Karvi (*Strobilanthus scallosus*), Tarwad (*Cassia auriculata*), Nirgudi (*Vitexn egundo*) and Tarota (*Cassia tora*). The grasses

commonly met with are Horn (*Sorghum alepense*), Kunda (*Ischaemum pilosum*), Pavnya (*Sehi nervosum*), Rosha (*Cymbopogon martinii*), Ukshi (*Calycoteris floribunda*) and Chilhar (*Caesalpinia piaria*) are the climbers commonly met with.

B) Superior Teak Coppice Forests:- It is confined to remaining teak areas of Yawal. Teak is the predominant species attaining pole size in its mature state. It is found on steep slopes and on flat ground. The soil depth, quality of soil and terrain determine the quality and composition of the crop. Teak occurs everywhere and its proportion varies from 25 to 40 percent. The quality of the crop mainly is IV. The quality goes down to IV-b in very shallow and overgrazed areas near habitations. The density varies from 0.4 to 0.7. The preponderance of Salai especially on the degraded hill slopes is noteworthy. The occurrence of bamboo is scanty.

The General Floristic -

Sag (*Tectona grandis*), Salai (*Boswellia serrata*), Dhavda (*Anogeissus latifolia*), Khair (*Acacia catechu*), Anjan (*Hadwickia binata*), Awala (*Emblia officinalis*), Kakad (*Garuga pinnata*), Bondara (*Lagerstroemia parviflora*), Tembhurni (*Diospyros melanoxylon*), Sadada (*Terminalia tomentosa*), Bija (*Pterocarpus marsupium*), Shisam (*Dalbergia latifolia*), Kadai (*Sterculia urens*), Charoli (*Buchanania lanzan*), Palas (*Butea monosperma*) Medsing (*Dolichadrone falcata*), Babul (*Acacia nilotica*), Bor (*Zizyphus mauritiana*), Bhutakes (*Cassine glauca*), Bamboo (*Dendrocalamus strictus*).

The shrubs commonly found :

Kevani (*Helicteres isora*), Nirgudi (*Vitex negundo*), Patari (*Trewianudi flora*), Henkal (*Gymnosporia montana*), Tarwad (*Cassia auriculata*), Tarota (*Cassia tora*) & Chirchira (*Achyranthus aspera*).

The common grasses found :

Kusali (*Heteropogon contortus*), Pavnya (*Sehima nervosum*) and Gendal (*Andropogon pumilus*), Ukshi (*Calycoteris floribunda*) and Chilhar (*Caesalpinia sepriaria*) are the climbers occurring in this type. Bandgul (*Loranthus sp.*) infestation is found throughout.

C) **Salai Forests:** This is an edaphic type. It is mixed with teak in the type or mixed with Anjan sub-type. It is mainly confined to higher hill slopes, plateau and ridges where the soil conditions are refractory. Quality of the crop is IV-a. Mainly mature and overmatured trees

are met with. Young age classes are not seen. Natural regeneration is absent. Teak regeneration is noticed under the shade of Salai trees.

D) **Anjan Forests:** This type of forests occurs in Raver, Yawal East & West, Chopda, Deoziri & Karjana ranges. The distribution of this type has been satisfactorily co-related with climate and soil conditions in the revised classification of forest types by Champion and Seth. The soil of the tract carrying Anjan Forests is characteristically shallow. Outcrops of rocks are met with frequently. The soil depth improves in depressions. Anjan areas have underlying rock of trap and the soil is usually shallow seen merging into hard murum. Anjan occurs everywhere in varying proportions. In certain places near Raver range, it is often remarkably gregarious.

The proportion of Anjan in the over-wood varies from 20 to 60%. Anjan is found as a pure crop on level and undulating ground. But it is mixed with Salai on the slopes of hills. There is practically no incidence of climbers. The quality of the crop on an average is IV-b. But in favorable localities along Suki and More rivers, the quality is IV-a or better. The forests in general are open and grassy blanks and rocky outcrops are frequent. Grass growth is heavy. The density is below 0.5.

Natural regeneration of Anjan is inadequate. Reproduction by seed where the site factors are favorable is gregarious. But grazing and regular fire prevent the young seedlings from growing. Regeneration of teak is noticed in Chopda Range and near Raver along Suki river. Teak tends to replace Anjan where the soil conditions are congenial. Anjan trees near habitations have been much hacked by pollarding for the sake of fodder. In most localities, the large trees are old pollards. Such trees are not many owing by repeated fire and mutilation.

The associates of Anjan (*Hardwickia binata*) are:

Khair (*Acacia catechu*), Dhavda (*Anogesis latifolia*), Tembhorni (*Diospyros melanoxylon*), Chaner (*Cochlospermum religiosum*), Palas (*Butea monosperma*), Bor (*Zizyphus mauritiana*), Teak (*Tectonagrandis*), Sadada (*Terminalia tomentosa*), Bija (*Pterocarpus marsupium*), Shisam (*Dalbergia latifolia*) and Bamboo (*Dendrocalamus strictus*).

The shrubby growth consists of Patari (*Trewia nudiflora*), Nirgudi (*Vitex negundo*), Hiwar (*Acacia leucophloea*), Tarwad (*Cassia auriculata*), Karsali (*Nyctanthes borstritis*) and Chirchira (*Achyranthes aspera*)

The grasses found are : Kusali (*Heteropogon contortus*), Pavnya (*Setaria manerosum*) etc. Ukshi (*Calycopteris floribanda*) and Chilhar (*Caesalpinia sepiaria*) are the climbers found in this type of forests.

Climbers and weeds:

Climbers in general are rare. They are seen in moist situation along banks of streams and in the better quality forests of Yawal (East & West), Chopda & Deoziri ranges. The climbers commonly seen are: Ukshi (*Calycopteris floribanda*), Palas (*Butea monosperma*), Ironi (*Zyzyphus oenoplea*), Chilati (*Acacia pennata*) etc.

There is no significant damage due to climbers. Shirali (*Nyctanthes arbor-tristis*) is a great nuisance at places in the more open Anjan forests of Raver range. Tarota (*Cassia tora*) is commonly seen in heavily grazed area.

3.2 : PLANT SPECIES DIVERSITY :

The floral diversity of the Division consists of 53 trees, 8 shrubs, 6 herbs, 2 bamboo, 6 grass and 10 climbers. There are more than 15 species of medical plants in the District forests. Few species of Algae, Fungi etc. present in the District were also given in the plan based on information received from the local Institutions. The list is evidently not exhaustive and inadequate for the purpose of identifying the expanse of species diversity of the plant kingdom existing in the Division. It is therefore necessary that the Division must carry out a detailed Biodiversity study, which will include both the Flora and the Fauna. In dealing with the flora, it is proposed to have detailed study of the tree spp., the shrubs and herbs species with their frequency, total basal cover, dominance and the study should also include, among others, documentation of the species that are found in the forests including insects and fungi, parasites, frost, assessment of the sensitive / Rare-Endangered-Threatened species/ IUCN Red List Species, assessment of the traditional and lesser known NTFP's including Medicinal and Aromatic Plants, identification of unique and specific vegetation that might be present in an area, etc.

3.3 : STATUS OF BIODIVERSITY CONSERVATION IN FORESTS :

The forests of Yawal are rich in Biodiversity and areas close to the Yawal Wildlife Sanctuary are particularly noteworthy. However, in view of the presence of large areas under teak, the repeated fire over the years, preferential treatment to commercial species; the enhancement of biodiversity in the forests as a whole needs to be addressed.

The plant diversity and faunal richness of the area needs to be maintained and enhanced with sincere effort of the Department, the help of the public, the initiative for formation of Biodiversity Committees, reducing the threats to the wildlife etc.

Among the important Schedule I species found in the area of the Division are as below ;

- **Carnivora** : Panther, Hyena, Jackal, Fox, Wild Dog, and Jungle Cat etc.
- **Herbivora** : Spotted deer, Sloth bear, Wild boar, Indian Hare, Barking deer, Common langur etc.
- **Aves** : Peacock, Golden backed wood pecker, Common quail, Gray partridge etc.

Heavy damage is caused by wild animals especially in plantations. Nilgai, Cheetal, Chinkara and Chausinga, Pig cause damage to regeneration and sapling.

3.4 : STATUS OF SPECIES PRONE TO OVER EXPLOITATION :

The Status of species prone to over exploitation in the Yawal Division needs further studies with the help of the conservation experts and subject experts. However, from the information derived through discussion in the field with the forest officers and staff the following species are said to be prone to over exploitation. Teak plantations in Compt 166 near Pati camp area of Deoziri range was the home of rare *forest owlet*. The last sighting was in year 2004. Due to destruction of forest and specifically that to teak plantations, after 2004, no sighting of this bird is noticed. Search of this rare bird should be taken with the help of wildlife conservationist. Habitat rejuvenation and improvement works should be taken. No felling should be done in this area.

INJURIES TO THE WILDLIFE :

Fire and Poachers are mainly responsible for destruction of Wild life in Satpuda Forest. Forest fire which occur frequently in Satpuda forest, destroy the natural habitat of the wildlife. The number of poaching incidences which occurred in the Division in the past 10 years are as under

Table No.3.1 Abstract of Species-Wise Offence Cases about wildlife in the Yawal Forest Division.

Year	No. of Offence	Type of Animal
2006-07	--	--
2007-08	1	--
2008-09	--	--

2009-10	--	--
2010-11	1	--
2011-12	--	--
2012-13	--	--
2013-14	1	Pigeon/Dove
	1	Panther (Part- Teeth & Nail)
2014-15	1	Peacock
	1	Panther (Part-Skin)
Total	6	----

Incidence of Attack By Wild Animals :- There was no incidence of death of human being due to animal attack however, some incidences of injury to human beings are reported. The cases of cattle lifting by wild animals are not very alarming.

The following table gives detail of attack by wild animals on human beings and domestic animals.

Table No.3.2 Abstract about attack cases of wildlife in the Yawal forest division.

Year	Attacking wild animal	No & type of domestic animal killed in attack		No of persons killed or injured in attack			
	Type	Type	No	Killed	Injured		
2006-07	Panther	Calf	1	--	--		
	Panther	Buffalo calf	1	--	--		
2007-08	Panther	Calf	1	--	--		
2008-09	Panther	Cow	1	--	--		
	Beer	--	--	--	1		
2009-10	--	--	--	--	--		
2010-11	Panther	Cow	1	--	--		
		Calf	1	--	--		
2011-12	Hyaena	--	--	--	3		
		Panther	Bullock	1	--	--	
			Calf	7	--	--	
			Buffalo calf	1	--	--	
2012-13	Panther	Bullcok	3	--	--		
			Goat	1	--	--	
			Buffalo	1	--	--	
			Cow	3	--	--	
			Hyaena	Goat	5	--	--
				Cow	1	--	--
			Woolf/Landga	Goat	5	--	--

	Bear	--	--	--	3
2013-14	Woolf/Landga	Buffalo	2	--	--
	Panther	Buffalo	7	--	--
		Bullock	2	--	--
		Cow	16	--	--
		Sheep	2	--	--
		Horse	1	--	--
2014-15	Panther	Cow	10	--	--
		Buffalo	2	--	--
		Bullock	1	--	--
2015-16	Panther	Cow	2	--	--
		Calf	2	--	--
		Goat	2	--	--
	Wolf	Goat/Ship	2	--	--
	Bear		--	--	01
2016-17	Panther	Sheep	2	--	01
		Bull	6	--	---
		Cow	4	--	---
		Buffalo/ Horse	2	--	--
	Total		99	--	09

Compensations has been paid to the 99 domestic animal owners and to nine persons who were injured by wild animals, during the year 2006-07 to 2016-17.

3.5: CONSERVATION OF GENETIC RESOURCES :-

The genetic resources 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 to carry out research and documentation of the species available.

- (1) Fodder resources plot has been taken up in Compartment no. 98 Near Pal village of Raver Range.
- (2) As per information received from DFO Silvicultural Scientist, Jalana, Preservation plots situated in Yawal Forest Division is as under :

Table No. 3.3 Preservation Plot Situated in Yawal Forest Division :

Division	Range	Comptt. No.	Year	Area in Ha.	Name of Plot
Yawal	Raver	55	2001	--	Pal

- (3) There is no identified Medicinal Plant Conservation Area in the Division of Yawal.
- (4) Preservation plots where valuable species are found, where local bio-climate has brought about different crop composition and any area of biological or silvicultural significance should be identified for creation of Preservation Plots in Yawal.

3.6: FAUNA AND THEIR HABITATS :

Distribution of the wildlife :

Yawal division has a fairly good distribution of wildlife especially around areas adjoining to Yawal wildlife sanctuary. Top Carnivores i.e. Panthers are present in this area. Jackal, Wild dog, Fox, Jungle Cat and Hyena are also common. Large avifauna can be seen in the tract. Migratory birds near tanks are common during the season. Peacock, Golden backed wood pecker, Common quail, Gray partridge are found in the tract.

The wildlife in the tract dealt with is seriously depleted due to the indiscriminate shooting during the zamindari regime. Apart from indiscriminate shooting, poaching and hunting, the population explosion and economic developments have led to the severe degradation of natural habitat of wildlife. The food, water and shelter, the basic needs of the wild animals have become scarce in plain, accessible areas.

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

Description of the Wildlife :

The division is rich in wild life. Almost all the forest areas of the divisions have a fairly good distribution of wild animals, but population density varies with the availability of habitat condition like food, water and shelter. Representative Central Indian fauna is found in the division and the category wise list of the animals usually found is as shown below:

Carnivora : (i) Panther (Pantherapardus) (ii) Hyaena (Hyaenahyaena) (iii) Wild Dog

(Cuonalpines) (iv) Jackal (*Canisa ureus*) (v) Common Fox (*Vulpesbe ngalensis*) (vi) Jungle Cat (*Felis chaus*).

Herbivora : (i) Sambhar (*Cervusunicolor*) (ii) Cheetal (*Axisaxis*)(iii) Wild pig (*Susscrofa*) (iv) Nilgai (*Boselaphustragocamelus*) (v) Barking Deer (*Muntiacusmuntijak*) (vii) Sloth bear (*Melursusursinus*) (viii) Black Buck (*Antilopecervicapra*) (ix) Four horned antelope (*Tetracerosquadricornis*) (x) Chinkara or Indian gazelle (*Gazellagazelle*)

Rodents : (i) Fivestriped Palm squirrel (*FunambulusPennanti*).

Reptillia : Snakes – Bamboo pit viper, slender coral snake, Bronze back snake.

Spiders- Giant wood spider, Signature spider, Camel spider, Lynx etc. ,

Frog – Skittering frog, Burrowing frog, *Microhyla* sp.

Birds : (i)Baya//Baya Weaver Bird/(*Ploceusphilippinus*), (ii)Bharadwaj/Crow Pheasant of coucal/(*Centropussinensis*), (iii)Chota basant/Crimson fronted Barbet or Coppersmith/(*Megalaimahaemacephala*), (iv)Chimani/House Sparrow/(*Passerdomesticus*), (v)Deshi Myna/Common Myna/(*Acridotherestrictis*), (vi)Ghar/Black shouldered kite/(*Elanuscaeruleus*), (vii)Ghar/Parian Kite/(*Milvusmigransgovinda*), (ix)Ghubad/Indian Screech Owl/(*Strixjavanica*), (x)Ghubad or Pingla/Spotted Owlet/(*Athenebrama*), (xi)Harial/Common green pigeon/ (*Teronphoenicoptera*), (xii)Holga/ Laughing Dove/(*Streptopeliasenegalensis*),(xiv)Kabutar/Blue Rock Pigeon/(*Columbalivia*), (xv)Kala Baza/Indian Black ibis/(*Pseudibispapillosa*), (xvi)Kala Teetar/ Grey partridge/(*Framcolinuspondiceranus*), (xvii)Khandya/Common or SmallBlue kingfisher/(*Alcedoatthis*), (xviii)Khandya/Pied kingfisher/(*Cerylerudis*), (xix)Kokila/Koel/(*Eudynamysscolopacea*), (xx)Kotwal/Black Dronga or king Crow/(*Dicrurusadsimillis*), (xxi)Kotwal/Greater Racket tailed/ Drongo/(*Dicrurusparadiseus*), (xxii)Lahuri/Jungle Bush Quail/(*Perdicularasiatica*), (xxiii)Lal Munia/Red Munia/(*Estrildaamandava*), (xxiv)Mor /Common peafowl/(*Pavocristatus*), (xxv)Nilkanth/Indian Roller or Blue Jay/(*Coracias benghalensis*), (xxvi)Partringa/Little Green Bee Eater/(*Meropsorientalis*), (xxvii)Peelak/Blackhooded Oriole/(*Oriolusxanthornus*), (xxviii)Peelak/Goldern Oriole /(*Oriolusorielolus*), (xxix)Popat/Rose ringed parakeet/(*Psittaculakrameri*), (xxx)Satbhai/Common Babbler/(*Turdoidescaudatus*), (xxxi)Satbhai/Jungle Babbler/(*Turdoidesstriatus*), (xxxii)Shikara/Shikara/(*Accipiterbadius*), (xxxiii)Shimpi/Tailor Bird/(*Orthotomussutorius*), (xxxiv)Sutar/Maharatta Woodpecker/(*Picoidesmahrattensis*), (xxxv)Tambat/Hoopoe/(*Upupaepops*), (xxxvi)Gai

Bagala/Cattle Egret/(Bubulcusibis), (xxxvii)Bagala/Grey Heron /(Ardeacinerea), (xxxviii)Bagala/Pond Heron or Paddy Bird/(Ardeolagravli), (xxxix)Pan kawla/Little Cormorant/(Phalacrocoraxniger), (xxxx)Pan Kombadi/White breasted waterhen/(Amaurornisphoenicurus), (xxxxi)Titavi/Red Wattled lapwing /(Vanellusindicus), (xxxixii)Kala Pidda/Pied Bushchat/(Saxicolicaprata), (xxxixiii)Swargiy nartak/Asian Paradise Flycatcher/ (Terpsiphoneparadise), (xxxixiv)Dhanesh/Common Grey Hornbill/(Tockusbirostris), (xxxixv)Telia munia (Sinewas)/Spotted Munia/(Lonchurapunctulata), (xxxixvi)Myna/Indian Night jar/(Caprimulgusasiaticus), (xxxixvii)Khandya/White Breastedkingfisher/(Halcyonsmyrnensis), (xxxixviii)Chuvak/Indian Robin/(Sazicoloidesfulicata), (xxxixix)Dyal/Magpie Robin/(Copsychussauraris), (xxxixxx)Khatik/Bay backed shrike/(Laniusvittatus), (xxxixxxi)Jambhal Surya Pakshi/Purple sunbird/(Nectariniaasiatica), (xxxixxxii)Ababed Leishra/Swallow/(Hirundorustica), (xxxixxxiii)Leishra/Wiretailed Swallow/(Hirundosmithii), (xxxixxxiv)Myna/Tree Pie/(Dendrocittavagabunda), (xxxixxxv)Parit/Grey Wagatai/(Motacillacapsica).

3.7: THREATS AND CHALLENGES TO WILDLIFE :

Poaching : In spite of stringent provisions as aforesaid, poaching for skin, bones and flesh continues to be the most important reason for destruction of wildlife in the division. The animals are particularly vulnerable during summer. Water in a water hole recedes to minimum.

Setting of nets and traps for catching birds, hares and sometimes small animals like deer has been employed in the past

Electrocuting the animals by laying electric wires on the tracks followed frequently by wild animals and by drawing electric current from the high tension lines passing through the forests is another method which is proving to be a potential threat to animals, besides sometimes being hazardous to local people.

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

Disease : The livestock from the villages in the forests regularly frequent the forests and share space and resources. Water borne (contagious diseases) disease are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (Haemorrhagicsepticaemia) (4) Canine

distemper, FMD has a potential to wipe out large populations, while Rinderpest, Anthrax and Rabies are highly infectious and lead to certain death.

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

Fire and habitat damage : Frequent fire damage the wildlife habitat, and animals become vulnerable to poaching. Similarly, habitat disturbances of different types create diverse kinds of stress having adverse impact on the wildlife. Fire are major culprit reducing food availability for the herbivores very drastically. Thus, wild animal habitats are very adversely affected due to recurrence of fire every year.

3.8 : PROTECTION AND MANAGEMENT OF FAUNA :

For the protection and management of the wildlife of the Division, a series of steps are taken and proposed to be taken based on the threats as identified in the plan. These include the increased patrolling measures with proper Protection Plan to be updated every year.

History of the WildLife Management :

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

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

However, after the enactment of the Wildlife (Protection) Act, 1972 and subsequent amendments in this act particularly those in 1991 and 2002, no permission for hunting of

wild animals, as game or sport, can be granted. Hunting of wild animals however can be allowed for special purpose but only in exceptional circumstances. This act also enjoins on us the responsibility for wildlife conservation outside the protected areas.

Injuries Due To Wildlife :-

The carnivores panthers particularly sometimes kill domestic cattle, grazing in the forests. There are also cases of human injury and even due to attacks from wild animals. The villagers sometimes indulge in poisoning the carcass to take revenge and cases of electrocution of wild animals by the villagers to kill the animal suspected to have killed the cattle have also been reported. In such cases the persons involved in illegal killings of the wild animals do not have any intention of poaching or trade but such activities on the part of local people pose grave danger to animal populations in the forests. (Revenge Killings). The govt. of Maharashtra therefore has evolved a policy of compensating for the loss of livestock as well as for the injury to and loss of human life. This is summarized below:

Compensation for the Loss of Livestock :-

The scheme, which was introduced for the first time in 1971, covers the loss of Cow, Buffalo, Bullock, Sheep, Goat and other livestock (as per definition given under Section 2(1) due to attack of a Tiger, Panther or any other wild animal. The present rates of compensation as per the G.R. No.WLP-100S/C. No. 2702F-1 of 02/07/2010 are as follows and compensation is to be paid within 3 months.

Table No.3.4 The Present Rates of Compensation.

Particulars	Amount to be paid
Cow, Buffalo, Bullock	75% of the market price or Rs.10000/- whichever is less;
Sheep, Goat, other, livestock	75% of the market price or Rs.3000/- and whichever is less;
Cow, Buffalo, Bullock became permanently handicapped	50% of the market price or Rs.3000/-and whichever is less;
Injury to Cow, Buffalo, Bullock, Goat	Treatment cost. (Govt. or ZP Hospital) 25% of the market price or Rs.1000/- whichever is less.

The compensation to livestock damage has to be given as per the terms and condition mentioned in the Govt. Resolution No. WLP-1008/C.No.270/F-1 Dt.02/07/2017. Some the conditions to be fulfilled are as under:

1. Death to be reported within 48 hours.
2. Carcass is not to be removed before case is made.

3. No death of any wild animal within 10 km radius area in the next 6 days.
4. Immediate investigation by forest officers as to the wild animal, which killed the cattle as well as Likely amount of compensation.
5. Compensation to be sanctioned by an officer not below DCF.
6. No compensation in case the livestock was grazing illegally.

3.10.2 : Compensation for the injury to and Loss of Human Life :

Introduced through GR dated 27.1.1986, the scheme covers death as well as injury including minor injury caused to any individual in an attack by a wild animal. Any such attack by Tiger, Panther, South Bear, Bison, Wild Pigs, Wolf, Hyena, Jackal and wild dogs is covered under the scheme. Present rates of compensation have been fixed through Govt. Resolution No.WLP-2012/CNo.337/F-1, dt.30/03/2013 and 16/01/2015. These are as follows

Table No. 3.5 Compensation for the Injury and Loss of Human Life

Particulars	Amount to be paid
Death	Rs.8.00 Lakhs.
Permanent Disability	Rs.4.00 Lakhs.
Major injury	Rs.1.00 Lakhs.
Minor injury	Upto Rs.15000
Note : Cost of medication, preferably in govt. hospital, but in case of unavailability, private medication.	

The compensation to injury & loss human life has to be given as per the terms and condition mentioned in the Govt. Resolution No.WLP-1008/C.No.270/F-1, Dated 02/07/2010 and Govt. Resolution No.WLP-2012/C.No.337/F-1, Dated 30/03/2013 and 16/01/2015. Some of the conditions for claiming and deciding above compensation are as under.

1. Such attack should not have occurred when the individual was indulging in violating the Wildlife (Protection) Act 1972.
2. Relative /Friend should report the attack within 36 hours.
3. Police / Forest officer to investigate within 3 days.
4. Death /injury due to wild animal is to be certified by the govt. medical officer.
5. Compensation due to death is to be given only to legal heir and compensation due to injury is to be given to individual concerned.
6. Compensation is to be sanctioned by the officer not below the rank of DCF/DFO.

Legal Position :

After the promulgation of the Indian Forest Act 1927, rules relating to wildlife regulations were framed under section 26 (1) and 76(d). These were essentially to regulate hunting of wild animals. Wild Birds and Animal Protection Act 1912 as amended in 1935 also ensured protection to certain animals and a check on hunting of others. Shooting block system of hunting was started from 1927. Under the provisions of the two acts, the Conservator of Forests in consultation with the DCF concerned used to declare areas having abundant game as open to hunting. The DCF accordingly used to issue shooting permits, wherein the type of game and their number allowed to be hunted together with other relevant conditions were used to be mentioned.

The Bombay Wild Animals and Wild Birds Protection Act, 1951 was extended to Khandesh region from 1.6.1961. Though this act did not propose a significant change in the management of game in the Reserved and the Protected Forests, yet it incorporated following significant provisions :

1. Its provisions are also applicable outside the Reserve and the Protected Forest.
2. Arms license holders for sports were to register themselves with the Wildlife Preservation Officer.
3. This Act prescribed a closed season for hunting and classified game into four categories, viz. Small game, big game, special big game, and pet animals.
4. It also sought to control transaction in trophies and other wildlife products.
5. Wildlife Advisory Board was constituted under this act to advise the government on various matters concerning wildlife.

Developments after 1972 :

At the national level, the Indian Board for wildlife was constituted in 1952. Its main object was to devise ways and means for conservation of wildlife through co-ordinate legislative and practical measures and sponsoring setting up of National Parks and Wildlife Sanctuaries. A comprehensive and unified National and State Park Act, 1971 was passed which provided for appointment of an Advisory Committee to advise in regard to the constitution and declaration of National Parks and Sanctuaries and formulation of policy for their administration and management. The Parliament then enacted the Wildlife (Protection) Act, 1972, which came into force in the State of Maharashtra with effect from 1st June 1973. With this, other acts relating to any matter contained in this Act and in force

in the State stood repealed. This act as amended from time to time as well as the various regulations made under this act and guidelines issued by the central and the state govt. provide for establishment of a network of national parks and sanctuaries representing various habitats and for giving protection to all type of wildlife in the state. These provisions also address issues relating to the management of wildlife outside the protected areas. Following rules have so far been enacted under the relevant sections of this act.

1. The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra with effect from 1.6.1973)
2. The Wildlife (Transactions and Taxidermy) Rules, 1973 (became effective in Maharashtra w.e.f. 16.1973).
3. Wildlife (Protection) (Maharashtra) Rules, 1975 (became effective from 6.3.1975).
4. The Wildlife (Protection) Rules and Licensing (Additional matters for consideration) Rules, 1983 (became effective w.f.13.4.1983).
5. Wildlife (Protection) Rules, 1995
6. Wildlife (Specified Plants-Condition for Possession by License) Rules, 1995.
7. Recognition of Zoos Rules, 1992.
8. Declaration of Wildlife Stock Rules, 2003.

Besides the above specific legal framework available for wildlife management, provisions contained in Indian Forest Act, 1927, Forest Conservation Act, 1980 and The Environment (Protection) Act, 1986 may go a long way in protecting and conserving the biodiversity of this division. Clearance under the Environment Protection Act, 1986 from environmental angle is required from the govt. of India for any project (other than those relating to improvement of forests and particularly the projects relating to industrial activities damaging the environment of these Protected Areas) including an industry located within 10 km from these protection areas.

Management Of Wildlife :

Wildlife and its management in Yawal Forest Division have been discussed in detailed in the part 2 of Volume I of this working plan, under Wildlife (Overlapping) Working Circle. The detail prescription for Special objectives of management for development & conservation of wildlife & its habitat, recommendations for future management, habitat development works, water hole development, protection measures for wildlife, other

protection measures and eco-development, awareness generation and eco-tourism etc. has been given in Wildlife (Overlapping) Working Circle in part 2 of this working plan.

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CHAPTER- 4

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

4.1 : STATUS OF REGENERATION :

Data on regeneration status is collected along with enumeration of the crop in four 3mx3m sub-plots in the enumeration plots. The seedlings are enumerated in the following three categories as given in the Table below. The data is analyzed and used to devise prescriptions for regeneration of forest areas by both the natural and artificial means. The focus is on tending of existing natural regeneration (NR) and rootedstock. Plantation is proposed only as a supplementary activity limited to the extent to fill the deficiency in Natural Regeneration on the degraded and blank areas.

The health and vitality of the forests depends on the availability of the regeneration as it ensures the capacity of the forests to rejuvenate in the event of any calamity. This is one of the best indicator of the health of the forests. Though the total number of seedlings across the ranges appears to be uniform, the absence of saplings in the higher size R3 is a matter of concern as it appears that the regeneration is not very encouraging. Incidences of fire, grazing and other human interferences are the root cause of the poor regeneration.

Table No.4.1 Seedlings and saplings per ha. in overall area :

Range	R1 (upto 1 mt.)	R2 (1 to 3 mt.)	R3 (more than 3mt.)	Total
Raver	27.97	17.52	0.84	46.33
Yawal (East)	41.92	18.71	2.17	62.80
Yawal(West)	31.51	13.43	1.14	46.08
Deoziri	51.47	26.23	3.39	81.09
Karjana	47.81	23.05	3.54	74.40
Vaijapur	44.32	21.12	3.11	68.555
Chopada	38.63	18.95	1.01	58.59
Average	40.51	19.85	2.17	62.54

Regeneration Plot:- Analysis :

On analysis of the regeneration data of the Division, it is observed that the regeneration is extremely poor. This alarming situation needs to be tackled on.

- The regeneration survey, as with the whole survey for the Division, was carried out as per the New Working Plan Code. This is the first such survey for the SOFR unit.
- The regeneration status of Yawal forests, ie number of seedlings, is too low to be considered a healthy forest.
- The average number of seedlings in the whole forests is only 62 seedlings with 41 R1 (seedlings up to 1m), 19 R2 (seedlings between 1-3 m) and 2 R3 seedlings beyond 3m. This is an abysmally poor regeneration status.
- The probability of the plots falling in area of encroachment, cultivation and water bodies cannot be ruled out.
- 81 plots were found with no regeneration at all, i.e. $R1=R2=R3=0$. If the area is properly represented in the sampling one can conclude that in 81 out of 334 i.e. in about 24% of the forests there is no regeneration at all.
- Out of these 334 plots, in 132 plots, the number of regeneration of R1 is Zero. This works out that 40% of the forests does not have any form of regeneration upto 1m which is an unbelievably catastrophic situation.
- Out of these 334 plots, in 131 plots, the number of regeneration of R2 is Zero. This works out that 39.5% of the forests does not have any form of regeneration between 1m to 3 m.
- Out of these 334 plots, in 299 plots, the number of regeneration of R3 is Zero. This means that 89% of the forests does not have any form of regeneration beyond 3m which is a clear indication of a dead/dying forest.

The above figures clearly show that ;

- Regeneration is abysmally poor
- Whatever little regeneration is available is not able to grow beyond the small to medium seedling stage.
- Large number of seedlings either die out after attaining 1-2 m height or could not grow beyond 1-2m height.

- Roughly only 1 out of 20 seedlings could survive to become saplings. The data presents us with a grim picture. There are many reasons that may be attributed to this calamity.
- One of the prime reasons for the lack of regeneration is fire. The menace of fire has been recognized by everyone, but the impact is yet to be fully analysed and understood. The seriousness with which the Department is taking on fire requires a rethink.
- The soil condition in the forest of Yawal has been dealt with under the chapter Soil and Moisture Conservation. It is clearly seen that the soil depth in the forest of the Division is less than 10cm in most of the areas. In fact most of the areas are exposed with rocks. Under these conditions, tender seedlings exposed to the rigors of heat and drought and fire are most unlikely to succeed to survive.

4. 2 : AREA AFFECTED BY FOREST FIRE :

The area affected by forest fire is given in the table below. During the last ten years there have been fire incidences and the figures show that the number of incidences fluctuates from year to year perhaps as per the climate condition prevailing on that year. An important step taken by the Government in 2012 involving the tendu collectors and the Tendu contractors by linking fire incidences with the forfeiture of benefits under tendu for the people and the contractors as well is said to be doing wonders in the field. Since it is a well known fact that the villagers and contractors have tendency to burn the area to facilitate fresh flush of tendu leaves from the burnt area, the step taken by the Government will help improve the forest health immensely.

Table No. 4.2 Year-wise Forest Fire Cases

Year	Fire incidence	
	No. of Cases	Area in Ha.
2007-08	80	332.40
2008-09	76	297.75
2009-10	94	332.02
2010-11	93	354.40
2011-12	125	456.66
2012-13	117	332.90
2013-14	85	194.16
2014-15	190	174.74
2016-17	228	551.82
Total	1088	3026.85

All across the country and globally, it is admitted that forest fire are under reported.

A point to be noticed with concern, is also the way in which reporting is done, e.g. Leaf &

litter is burnt, no loss to government. This manner of reporting reflects ignorance of the damage, fire does to the regeneration, the carbon stored in the dead wood & litter, the soil organisms, food & cover of phasants, lizards & other lower life-forms of the forests. This manner of reporting should be dealt away with forthwith.

4.3 : AREA DAMAGED BY NATURAL CALAMITIES

4.4.1 : By frost : So far no severe frost is recorded in the area.

4.4.2 : By drought : Damage due to drought is not common. However, some damage to the young plantation and young regeneration and coppice shoots is caused in the year in which the rainfall is scanty.

4.4 : AREA PROTECTED FROM GRAZING

Grazing by animals of kathewadis in areas of Chopada, Vaijapur and Yawal West and local and migratory sheep in Raver range has big problem during rainy season. Grazing has caused considerable damage to regeneration and other vegetal cover. All efforts are made by the field staff to prevent unauthorized or illegal grazing in the forest area.

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

The directives contained in the Madhya Pradesh Land Reforms Department's memorandum no. 1290-1227-XXVIII, dated 4th September 1953 prohibited grazing by sheep and goats in forests meant for production of big timber and even in the forest areas where villagers generally exercise their nistar rights. This ban is because while grazing in the forests, these animals also uproot seedling regeneration of the important species. However, subsequent directives from the Government have allowed grazing by sheep in specified areas but continued complete prohibition on grazing by goats. Following norms of concessional grazing have been prescribed under the Protected Forests (**Kahandesh Area**) Rules, 1959.

- a) Cultivators- two plough cattle per plough plus four others including one he-buffalo.
- b) Agricultural artisans and labourers four cattle including one she-buffalo provided that a calf under one year shall not be counted.

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

4.5 : LOPPING PRACTICES :-

Lopping practices are carried out in the Yawal Division. Anjan (*Hardwickia binata*) is the most sought after species for fodder in the peak summer season and is often lopped to certain extent.

4.6 : AREA INFESTED BY INVASIVE WEED SPECIES IN FORESTS :-

4.6.1 : By parasites: Bandh (*Loranthus longiflora*) is generally found on the branches of Achar, Hiwar, Salai and sometimes on Tendu, Ain, and Dhavada .

4.6.2 : By climbers and obnoxious weeds : Eruni, Chilati are the common climbers which do much damage to the tree growth all over the forest. Tarota and Rantulsi are common weeds. Rantulsi has invaded the grazing grounds and the grass birs, due to which, the grass growth has been badly affected. Undergrowth of Kharasi and kudu in teak areas is a great impediment as it prevents teak seedlings from getting overhead light. The climbers mentioned above coppice vigorously and are hardly affected by grazing or fire. The damage is caused by strangling of trees when they entwine a sapling or a tree. Usually the apical bud is destroyed. Lantana (*Lantana camara*) has also infested at many places. The thick cover of lantana prevents the regeneration of other trees.

4.7 : INSIDENCES OF PEST AND DISEASES:

Most of the forest areas under Improvemnet and Anjan working circle have been work in the past. Dew to decrease coppies vigor defects in the wood such as hollowness is notice. However attact of pet and disease is negligible.

4.8 : FOREST DEGRADATION AND ITS DRIVERS

These forests are liable to the following, injuries :

4.8.2 : By man : The damage by man can be classified into the following two categories.

4.8.2 : Illicit cutting :

Illicit cutting for wood including timber, poles and firewood is observed in the division. It is heavy in areas adjoining to thickly populated towns and villages. Chopada, Yawal, Raver, Faizpur, Sawada, Bhusaval, and Shirpurare the main places where wood are in great demand due to large scale construction activities. So they attract illicit cutters not only from the adjoining areas but from distant places also. Due to increase in the roads, the

protection of forests has become more difficult. In addition to this, the construction activity has increased in villages also and with the increase in the standard of living of people, Pucca construction is now common in most villages. The demand for fuel wood has also increased tremendously, due to increase in population. Illicit cutting of fuel wood provides an easy employment to local villagers. All these factors have put tremendous pressure on the forests and have resulted in depletion of growing stock.

Analysis of data clearly shows that, the heavy illicit felling occurred after commencement of FRA 2006. Fifteen permanent protection Camp in Deoziri, one in Yawal west and one temporary camp in Deoziri, two in Vaijapur and one in Karjana have been constructed during plan period. Fifteen permanent and two temporary wireless base stations are in operation. Eighteen Handsets are distributed to RFO, Forester and FG. Vehicles are provided to all seven Range forest officers (T) and all these are fitted with mobile wireless sets. There are Six check posts operating in the division to prevent illegal transport of forest produce. Smart phones are also provided to all RFO (Eight), Forester (Twenty Four) and FG (One hundred & seven), which was sanctioned vide PCCF, Maharashtra State, Nagpur Order dated 26.12.2007. Better control is being done due to various facilities made available to the field staff.

Illicit felling was observed in areas of Deoziri, Karjana and Vaijapur ranges adjoining to Madhya Pradesh state. Illicit tree felling by local people and also by illegal encroachers noticed in some area of Yawal west range. The Illicit cutting revealed during the last 10 years is given below.

Table No.4.3 Statement about Illicit Cutting of Trees in Yawal Division.

Year	No. of Trees felled	Volume (cm)	Value of damage (Lakh)
2006	19309	1382.639	41.87
2007	23535	1621.567	42.13
2008	25165	1887.541	38.97
2009	29142	2102.964	56.89
2010	19598	1696.119	44.25
2011	10143	1035.519	26.99
2012	5708	410.580	11.96
2013	4023	265.488	18.75
2014	3018	202.338	16.61
2015	3588	250.601	17.12
Total	143229	10855.36	315.54

4.8.3: Encroachments : 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 vide GR Nos. LEN/1078/3483/G-1, dated 27.12.1978 and FLD/1079/1366/F-3, dated 12.09.1979 to regularize all encroachments on forest lands done during the period from 01.04.1972 to 31.03.1978. This has enhanced in the tendency of people to encroach upon the forest land with a hope that in future also such encroached lands will be regularized by the Government. The problem of encroachment is more on Protected Forests, as they are surrounded by cultivation and there is no proper demarcation at most of the places.

After commencement of Forest Right Act 2006, large scale illicit tree felling for encroachment on forest land were done by local people, people from adjoining Madhya Pradesh State and from Dhule district. Most of the forest land in plain area is already encroached and new encroachments are done in remote and hilly areas which is the main challenge. Large number of claims are pending for decision. Encroachments are mostly done by Pawara community. As this is a single community residing in hills of Satpuda, it become very difficult to evict encroachments done by them as they come in large number to oppose and also lodge complaints of atrocity against forest officials and thus demoralize the forest staff. The Data of various categories of offences are analyzed and action plan is formulated accordingly.

4.8.4 : Damageby cattle : Damage caused by grazing is heavy in the forest of Yawal Division due to large cattle population. There are a lot of co-operative milk societies engaged in dairying on a large scale. The scattered patches of Protected Forests are vulnerable to grazing. Continuous and heavy incidence of grazing not only prevents regeneration of tree species but also the young regeneration obtained during the period of closure is lost soon after the areas are opened to grazing. In areas with clayey soils the trampling by cattle results in hardening of soil and reduction in the soil aeration. In sandy soils heavy grazing results in accelerated erosion and denudation.

4.8.5 : Damage by wildanimals : The damage by wild animals in Yawal Forest Division is noticed. Abundantly that browse seedlings and coppice shoots. Some damage is caused by wild boars, because it by digging the roots of young plants. Monkeys also cause some damage to fruit trees. Due to damage by wild animals, management of artificially regenerated areas is increasingly becoming challenging.

4.8.6 : Byinsects : The attacks of teak defoliator (*Hyblea parea*) and teak skeletonizers (*Hapalia macharalis*) are common in teak and occur almost each year during the period from July to October. Termite attack is also common. But in bigger trees it is confined to dead bark. The damage to weak young seedlings and planted seedlings is caused by the termite at the base of the collar.

4.8.7 : By wind and hail storms : Strong winds cause uprooting of trees all over the forest especially in open patches. Occasionally hail storms damage the fruit crops of moha and char. Hailstorm in the months of April and May, sometimes, damages tendu leaves making them unfit for bidi manufacture.

4.8.8 : By fire : Summers are hot and dry from March to June during which forests are vulnerable to fire. Fire taking place at the end of winter and beginning of summer are not severe. Whereas, a fire in the hot summer is very harmful as it kills the young seedlings and coppice shoots of all major species and plantations. Fire hardy species such as Teak, Salai, Mowai and Palas, escape slightly compared to other species. Severe fire causes considerable damage to the trees also by scorching their bases which ultimately leads to unsoundness and hollowness and renders them liable to attack by fungi and insects. Fire also indirectly cause soil erosion by destroying the soil cover as well as the organic matter.

Analysis of data of the last ten years reveals that, a total of 965 offence cases pertaining to fire have been registered in the division and the loss is shown as Rs.6.74 Lac. A scientific method for estimating loss due to forest fire needs to be evolved so that the frontline staff would take fire prevention more seriously.

Fire is common feature every year in the forests of Yawal Division because of the increased biotic interference. Fire are mostly set with the motive to get fresh tendu leaves. Fire are also set by the local villagers to facilitate the collection of Mahua flowers and also to get the new flush of grasses. Sometimes fires spread from the adjoining cultivated area of agricultural fields.

4.9 : POLLUTION CONTROL AND PROTECTION OF ENVIRONMENT

Jalgaon is a developing District devoid of major industries. The level of protection is negligible except for a small portion in the Yawal, Faijpur, Sawada, Chopada having Sugar Cane industries operating on co-operative basis.

The above industries are said to be in the non-forest area. However their effect on the forest areas and on the water resources of the forest cannot be ruled out. There is

always a tendency of industries to dump their waste/effluents into open schuduled spaces including forest areas.

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CHPATER - 5

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

5.1 : AREA TREATED UNDER SOIL AND WATER CONSERVATION MEASURES .

5.1.1: Soil Erosion :-

The effective rainfall and run-off during the South and West monsoon has important implications for the forests in the district. The effective rainfall for the south and west monsoon is computed to be around 725 mm and its distribution in Chopada, Yawal and Raver 771.11, 740.70, 625.24mm, are respectively, for the months of June, July. August, and September. On integrating the effective rainfall of the district with the water-holding capacity of the soils of the district, which is around 200 to 250mm per meter depth, the run-off water is estimated to be 250 mm or 2,550 cubic meter of rain water per hectare per annum. The run off takes away the fertile top soil, leading to severe soil erosion in the district. Soil erosion adversely affects the fertility status and land use.

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 Organic Carbon content of the soil is negatively affected due to soil erosion. Laboratory studies of soil samples collected from Yawal division has shown variation in Soil Carbon from 0.44 to 4.32% percentage.

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 the Division, in the last 10 years 9531 hectares have been taken up for plantation and can safely be presumed that this area is treated for soil conservation. However, in the last two years, in view of the Jalyukt Shivar project, large areas are being treated specifically for soil and water conservation.

5.2 : DURATION OF WATER FLOW IN THE SELECTED SEASONAL STREAMS & WATER SUPPLY

The principal natural feature is the Tapti River. Unlike the rest of the Deccan, whose rivers rise in the Western Ghats and flow eastward to the Bay of Bengal, the Tapti flows westward from headwaters in eastern Maharashtra to empty into the Arabian Sea. The Tapti receives thirteen principal tributaries in its course through Khandesh. None of the rivers is navigable, and the Tapti flows in a deep bed which historically made it difficult to use for irrigation. Most of Khandesh lies south of the Tapti, and is drained by its tributaries the Girna, Bori and Panjhra. The alluvial plain north of the Tapti contains some of the richest tracts in Khandesh, and the land rises towards the Satpuda hills, Tapi and Purna rivers and hot water springs at Unapdev in Chopda Taluka.

Suki (Tal: Raver), Abhora (Tal: Raver), Mangrul (Tal: Raver), irrigation projects/tanks which are main source of irrigation. The main source of water supply is through wells. In summer there is acute shortage of water leading to supply of drinking water to some villages by tankers and bullock carts.

5.3 : WETLANDS IN FOREST AREAS :The status of the wetlands has not been studied by the Division and there is a need for the ecological study and avifaunal documentation of the areas. It may be mentioned that some of the areas are known to be good habitat of birds which may even qualify for Important Bird Area status. The Division may engage field experts to document and study the habitat and the biodiversity of the wetlands to develop base year data for future monitoring and necessary improvements.

5.4 : WATER LEVEL IN THE WELLS IN THE VICINITY (UP TO 5KM) OF FOREST AREA : The Division has records of the water levels of the wells within its jurisdiction and some village. The information is valuable but insufficient as there are records of only Raver Taluka. It is also informed that the Division has records of the wells in the villages where JFM Committees have been established and those villages where special projects like Jalyukt Shivar, etc. are implemented for whose Micro plan, have been prepared. Records can also be obtained from the Groundwater Surveys Development Agency.

An abstract from the Ground Water Information brought out by Central Ground Water Board (CGWB), GOI, is reproduced below.

**Table No. 5.1 Water Level Data with long Term Trend (1995-2005) Data as per GSDA
Report**

Well No.	Location	Toposheet Quadrant	&	Water shed No.	Well Depth	Well Dia meter	Aquifer	DTWL (mbgl) (May 1995)	DTWL (mbgl) (April 2005)	Differ ence in DTWL (m)
12	Therole	55	C/4 1A	TE 2'	27.6	3.35	Alluvium	20.3	23.3	-3
13	Khanapur	55	C/3 3B	TE 2'	24.6	2	Alluvium	17.2	Dry	-ve
13b*	Knnapur	55	C/3 3B	TE 2'	30.25	3.7	W. basalt†	NA	12.5	NA
14	Padle Bk.	55	C/3 3B	TE 2'	15	3.4	Alluvium	8.3	10.21	-1.91
14b*	Padle Kh	55	C/3 3B	TE 2'	28	4.1	Alluvium	NA	18.27	NA
15	Mohgaon	55	C/3 3B	TE 2'	24.6	2.90* 2.90	Alluvium	23.35	Dry	-ve
15b*	Mohgaon	55 C/3 3B		TE 2'	38.65	4.4	Alluvium	NA	26.95	NA
16	Bhokri	55	C/3 3A	TE 2'	17.75	5.3	Alluvium	7.18	10.85	-3.67
17	Abhore Kh	55	C/3 3A	TE 2	14.2	3.2	W. basalt†	11.52	Dry	-ve
24	Raver	55	C/4 1A	TE 2	31.4	6	Alluvium	29.3	Dry	-ve
24b*	Raver	55 C/4 1A		TE 2	>30.00	3.2	Alluvium	NA	28.6	NA
25	Ainpur	55	C/4 1A	TE 2	13	2.4	Alluvium	4.8	7	-2.2
26	Kandwel	55	C/4 2A	TE 2	20.2	6.4	Alluvium	7.45	7.56	-0.11
27	Udhali Kh.	46	O/16 2C	TE 3	27.8	3.3	Alluvium	9.6	11	-1.4
28	Singat	46	O/16 2C	TE 3	31.5	3.1	Alluvium	24.2	29.0 (R)	-ve
29	Khirdi Kh.	46	O/16 2C	TE 3	49.3	3.3	Alluvium	44.5	46.87	-2.37
30	Vivre Kh.	46	O/16 1C	TE 3	49	3.1	Alluvium	42.85	Dry	-ve
30b*	Vivre Kh.	46	O/16 1C	TE 3	55	3.45	Alluvium	NA	51.21	NA
31	Lohara	46	O/16 1C	TE 3	36	3.50* 3.50	Alluvium	29.6	33.15	-3.55
32	Chinchati	46	O/16 3B	TE 7	25.7	5.2	Alluvium	22.45	NA	NA
32b*	Chinchati	46	O/16 3B	TE 7	33.5	3.77	Alluvium	NA	22.4	NA
33	Savkheda Kh.	46 O/16 1B		TE 7	39.85	3	Alluvium	28.7	NA	NA
33b*	Savkheda Kh.	46 O/16 3B		TE 7	53.85	3.45	Alluvium	NA	38.02	NA
34	Waghode Bk.	46	O/16 3C	TE 7	46.55	3.75	Alluvium	33.85	37	-3.15
35	Faizpur	46	O/16 2B	TE 7			Alluvium	58.15	61.2	-3.05
36	Virode	46 O/16 2B		TE 7	24.75	3.05	Alluvium	22.7	NA	NA
36b*	Virode	46 O/16 2B		TE 7	81.75	3.1	Alluvium	NA	49.83	NA
36	Sudgaon	46	O/16 3B	TE 7	17.6	2.6	Alluvium	6.8	5.36	-1.44
37	Marul	46	O/16 1A	TE 7	52	2.75	Alluvium	36.65	40.13	-3.48
38	Padalsa	46	O/16 2A	TE 7	31.5	1.85	Alluvium	23.1	Dry	NA

(**Note** :- DTWL = Depth of Water Level , mbgl = meter below ground level.)

As mentioned above, this data is an important information that the Division should make use of and monitor the hydrological status of the forest areas. It is important for the

Deputy conservator of Forests to obtain the data from the authorities dealing with the subject and to also request the authorities CGWB, GSDA etc to impart training to the staff of the Division for the recording and monitoring of the water resources in our forest areas.

5.5 : STATUS OF AQUIFERS :- Regarding the status of aquifers, an abstract from the document Report on the Dynamic Ground Water Resources of Maharashtra 2011-12 brought out by GSDA, Pune & CGWB, Central Region Nagpur is produced below.

An overwhelming population of rural Maharashtra and to some extent urban populations is dependent on groundwater for drinking purposes. It has been observed that prior to the year 1972, the use of groundwater was relatively insignificant in the State. Subsequently due to frequent occurrence of droughts, limitations of the availability of surface water, development of low cost drilling devices, easy availability of institutional finance, and energization etc. led to proliferation of irrigation wells.

Groundwater is a natural resource with both ecological and economic value and is of vital importance for sustaining life, health and integrity of ecosystems. This resource is increasingly threatened by over-extraction which has insidious long-term effects. Scarcity and misuse of groundwater pose a serious threat to sustainable development and livelihood.

It is a well-known fact that the large number of irrigation borewells/tubewells are the main source of irrigation across the State and a substantial number of these are not even on record for electricity connections. If actual draft from those borewells/tubewells had been accounted for, then the balance position would have certainly emerged as alarming.

Groundwater is one amongst the State's most important natural resources. It provides drinking water to rural as well as urban community, supports irrigation & industry, sustains the flow of streams & rivers and maintains wetland ecosystem. There is significant freshwater deficit in many areas of the State. Human health welfare and food security are at risk unless the groundwater resources are managed more effectively and efficiently by the community. It is very much obvious that over extraction of ground water over years without any compensatory replenishment is affecting large tracts of land adversely. The non-replenishment of the shallow aquifers and depletion of the deeper aquifers on account of unregulated sinking of deep borewells/tubewells, almost amounting to "water-mining" unmindful of the adverse ecological effects, is one of the contributory causes for recurring

droughts. Concerted action, therefore, is needed to reverse the present trend of periodic occurrence of droughts.

It would also be necessary to plan and control the use of groundwater under the prevailing conditions. Publication and distribution of annual reports and related programmes for creating awareness amongst the community and for educating them will have to be undertaken regularly. This will enable avoiding scarcity, as well as the hectic activity and excessive expenditure that has become characteristic of summer months.

Unlike the land resource, groundwater is a dynamic resource. The groundwater flow cannot be measured like the flow through canals or pipe lines. The groundwater flows downward and spreads according to natural gradient and the permeability of the formations. Therefore, management of groundwater in fact, involves management of a dynamic, immeasurable and uncontrollable entity. While managing the groundwater resource, it is necessary to consider it to be a common property resource and is required to be controlled appropriately with the assistance of the community. Concepts like Village level Watershed & Water Account, Village level Water Safety and Security, Basin/Sub-basin Water Auditing, Aquifer delineation and its management etc will have to be popularized and made a basis for equitable distribution of ground water.

5.5.1 : Groundwater Recharge : Compared to 2008-09, there is decrease in annual groundwater recharge. During the field visit it was observed that the water conservation structures are not being de-silted annually throughout the State. Thus there is dire need to carry out the de-silting of water conservation structures in programme on movement mode.

5.5.2 : Effect of Rainfall on Groundwater Availability :

The rainfall is the primary source for the yearly replenishable ground water in the State and has a direct impact on groundwater recharge. The variability of rainfall is also reflected into the groundwater availability. The rainfall deficit and recharge to groundwater are in inverse proportion.

5.5.3 : Reduction in cash crops :

In Jalgaon District the Banana, Wheat, Millet, Lime, Groundnut, Cotton, Sugarcane area has reduced drastically compared to 2005. This is because of depletion in the groundwater levels and drying up of the irrigation wells. Hence, there is reduction in groundwater draft in concerned watersheds. This is directly reflected into the hydrograph of the relevant watersheds.

Assessment of Dynamic Ground Water Resources of the Maharashtra.

Table No.5.2 Administrative Unit wise Categorization 2011-12

Sr. No.	District	Administrative Unit	Stage of Ground Water Develop. %	Pre-monsoon		Post-monsoon		Category
				Water level Trend	Is there a significant decline?	Water level Trend	Is there a significant decline?	
125	Jalgaon	Chopada	85.25	11.18	Yes	0.67	No	Semi critical
133	Jalgaon	Raver	117.69	18.36	Yes	18.36	Yes	Over Exploited
134	Jalgaon	Yawal	107.58	33.68	Yes	17.25	Yes	Over Exploited

5.5.4 : Aquifer Parameters :

Aquifer parameters are available from ground water exploration carried out in the alluvial area of the district. The specific capacity ranges between 0.07 and 21.6 lps/m of drawdown and the transitivity ranges from 82.5 to 2314 m²/day. The storability varies from 1.6x10⁻² and 1.057x10⁻⁴ while permeability varies from 0.19 and 154.62 m/day.

The results of pumping test analysis of dug wells in basalt show that the permeability and specific capacity ranges from 1.104 to 274.08 m/day and 12.14 to 1818.18 lpm/m respectively.

5.5.5 : Ground Water Resources :

Central Ground Water Board and Ground Water Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Jalgaon district based on GEC-97 methodology.

Ground Water Resources estimation was carried out for 11378.83 sq.km. area out of which 1635.84 sq. km. is under command and 9742.99 sq. km. is non-command. The average stage of development of the district is 70%. Stage of ground water development varies from 43 % (Dharangaon) to 117 % (Raver). The overall stage of ground water development for the district is 70%, which is borderline high for "Semi-Critical" category. Taluka wise assessments indicate that Raver and Yawal talukas fall under "Over- Exploited" category while Bodwad, Pachora, Parola and Chopda talukas fall under "Semi-Critical" category. All the remaining talukas are falling in safe category. Net ground water availability for future irrigation development is 39575 ha.

Table No. 5.3 Taluka wise Ground Water Resources of Jalgaon District (March 2009)

Taluka	Area Type	Net Annual Ground Water Availability (ham/yr)	Existing Gross Ground water Draft for Irrigation (ham/yr)	Existing Gross Ground Water Draft for Domestic & Industrial water Supply (ham/yr)	Existing Gross Ground Water Draft for all uses (ham/yr)	Allocation for domestic & industrial requirement supply up to next 25 years (ham/yr)	Net Ground Water Availability for future irrigation development (ham/yr)	Stage of Ground water Development (%)
Chopada	Command	5174.71	4482.69	147.44	4630.13	-	-	-
	Non Command	5655.73	4403.23	199.78	4603.00	-	-	-
	Total	10830.64	8885.91	347.22	9233.13	631.57	2001.14	85.25
Raver	Command	1312.84	3574.42	22.75	3547.17	-	-	-
	Non Command	8506.68	7888.64	120.86	2009.50	-	-	-
	Total	9819.62	11413.06	143.61	11556.68	152.19	0.00	117.69
Yawal	Command	1187.96	2288.29	52.64	2340.93	-	-	-
	Non Command	6409.38	5666.91	165.17	5832.08	-	-	-
	Total	7597.34	7955.20	217.81	8173.01	299.23	960.49	107.58

5.5.6 : Ground Water Development :

The yields of wells are functions of the permeability and transitivity of aquifer encountered and vary with location, diameter and depth etc. There are three type of ground water structures i.e. dugwells, borewells and tubewells in the area. Their yield characteristics are described below.

Dugwells are generally used for both domestic water requirements and for irrigation purposes in this area. The depth of large diameter dugwells in Basaltic areas of the district ranges from 5 to 15 m. The reported yield of dugwells in Basalt for irrigation purposes varies from 21 to 337 m³/day. Unit draft of dugwell in Basaltic areas is estimated to be around 1 ham / year. In Alluvial area, the dugwells are deep ranging from 25 to 50 m bgl in depth with yield varying from 120 to 200 m³/day in winter and from 100 to 150 m³/day in summer. In yield of dugwells varies from 160 to 200 m³/day in winter and 100 to 180 m³/day in summer. *The dug wells occurring in Yawal and Raver talukas are deeper than those of Chopda Taluka.*

Many hot springs occur in Tapi basin along the foothills of Satpuda Mountains. It is observed that hot springs of higher temperature occur near the junction of faults. The computed base temperature of these hot springs range upto $120^{\circ}\text{C} \pm 10^{\circ}\text{C}$. Ground water is predominantly used for irrigation, as it is the major ground water utilizing sector.

State government has drilled large number of borewells and tubewells fitted with hand pumps and electric motors for rural drinking water purposes in the district. In all GSDA, Government of Maharashtra has drilled 1346 tubewells/borewells under various schemes for rural water supply in the district upto march 2006; of which 1263 are fitted with hand pump and 83 are fitted with power pump. The discharge of successful borewells ranged from 1 to 5 lps and yield ranged form 1.8 to 52 m³/hour. Maximum high yielding borewells are encountered in Amalner taluka as 35%.

5.5.7 : Water Conservation And Artificial Recharge :

CCT, Nala bunding, Gabion structures, Vegetative bunds, Terracing etc., are the feasible water conservation structures in the Satpuda hill range. In the Basaltic area, the water conservation and artificial recharge structures feasible are check dams, gully plugs, percolation tanks, nala bunds, etc. Existing dugwells can also be used for artificial recharge; however, the source water should be properly filtered before being put in the wells. The artificial recharge structures suitable for Alluvial areas are percolation tanks and recharge wells/shafts. The most feasible artificial recharge structure suitable for Alluvial areas, are shallow recharge wells/shafts on the river bed of the tributaries. These sites need to be located where the hydro geological conditions are favorable, i.e., where sufficient thickness of de-saturated/unsaturated aquifer exists and water levels are more than 5 m deep.

Two artificial recharge schemes were taken up in the district in watershed TE-17 under VII^h 5 year plan and in watershed TE-11 under IXth 5 year plan as pilot projects under Central Sector Scheme.

The watershed TE-17 covers an area of about 235 sq.kms and is located in Yawal taluka. A total of 10 recharge structures have been constructed, which include 6 percolation tanks, 2 recharge shafts, 1 injection well and 1 dugwell recharge. The impact assessment studies indicated that 856×10^3 cubic meter of rain water was stored in 6 percolation tanks of the scheme and tanks were utilized at its maximum storage capacity. The recharge to ground water was more than 90% and evaporation losses were less than 10%. The percolation rate

was 81-500 mm/day with rise of water level witnessed upto 5 meters. Total 120 dug

wells were benefited and beneficiaries were mostly tribal villages over a land of around 1000 ha.

In watershed TE-11 scheme was taken up in IXth plan. The project was started in year 1998-99 and completed in 2001-02. The watershed TE-11 in Yawal taluka of Jalgaon district covering 28 villages has an area of 371 Sq.kms and falls in Tapi river basin. A total of 10 recharge structures have been constructed, which included 5 percolation tanks and 5 recharge shafts. The impact assessment studies indicated that 8.236 sq. km catchment was brought under rainwater harvesting. Catchment area of tanks varied from 0.425 to 4.2273 sq. km. The storage of 285.89 x 10³ cubic meter of rainwater was created in the area. The recharge to ground water due to 5 percolation tanks was 211.19 x 10³ cubic meter in spite of very low rainfall of 432.3 mm in 2001-02 against average rainfall of 674 mm. A rise of 2-10 meter water level in 30-50 ha of benefited area was observed. The beneficiaries of the schemes were mostly small and marginal land holders dominated by local tribal population on the foot hills of the Satpura Hills. Five Recharge Shafts constructed at Wadri village in the watershed TE-11 were monitored and the impact of these was very encouraging. More than 30 wells over an area of 50 ha were benefited by a rise of up to 10 m in the water levels. Around 10.50 x 10³ cubic metre of recharge was effected in one year in the area benefiting local farmers.

Earlier studies have shown that the 17 urban towns of Jalgaon district have total roof area of 7.85 sq. km. and are estimated to receive 5.42 MCM of rain during monsoon and 0.36 MCM during non-monsoon. Jalgaon city itself consists of 2.25 sq. km. roof area and 1.55 MCM rainwater is estimated to be available for harvesting during monsoon and 0.10 MCM during non-monsoon. Other 9 towns of the districts namely, Chopda, Yaval, Raver, Amalner, Edilabad, Bhusaval, Jamner, Chalisgaon and Bhadgaon may also have feasibility of rainwater harvesting for ground water augmentation. The existing dugwells, borewells or tubewells may also be used for recharging the ground water with proper filter media.

5.5.8 : Recommendations :

- I. Further ground water development in Tapi alluvial plains is not feasible, keeping in view the overall ground water availability scenario.

- II. Northern part of the district is underlain by Tapi Alluvium, which is about 450 m thick. However, upper 70-80 m of Alluvium, i.e., younger Alluvium comprises sand and gravel forming potential aquifer. The ground water in the Alluvium can be developed through dugwells and shallow tubewells.
- III. Southern part of the district is occupied by Deccan Trap Basalt, where only dugwells are most feasible structures for ground water development. The sites for borewells need to be selected only after proper scientific investigation.
- IV. Bore-wells generally tap deeper fractures, which may not be sustainable. Besides, the borewells should only be used for drinking water supply and not for irrigation.
- V. In parts of Amalner, Jalgaon, Bhusawal, Edilabad, Jamner, Erandol, and Pachora talukas, the water levels are declining @ up to 20 cm/year. The aquifers are poor to moderately yielding with low storage capacity. Therefore, ground water development may be permitted very carefully in scarcity areas only.
- VI. The overall stage of ground water development for the district is about 70%, which is borderline high for "Semi-Critical" category. Therefore, proper planning should be done for further development of ground water resources.
- VII. Taluka wise assessments indicate that talukas of Raver and Yawal fall under "Over-Exploited" category while Bodwad, Pachora, Parola, and Chopda talukas fall under "Semi-Critical" category. So further groundwater development in Raver taluka is not recommended.
- VIII. Deeper water level areas have been observed in parts of Yaval and Raver talukas, which are categorised as "Over-Exploited". Thus future water conservation and artificial recharge structures needs to be prioritised in these parts.
- IX. The scope exists for construction of suitable artificial recharge structures in the district. CCT, nala bunding, gabion structures, vegetative bunds, terracing etc and construction of minor and medium irrigation projects with lined or pipe canals may be feasible in the Satpuda hill range. The structures recommended for Basaltic areas are nala bunds, check dams and KT weirs. The existing dugwells may also be used for artificial recharge of ground water provided source water is free of silt and dissolved impurities.
- X. In the Alluvial area of the district, percolation tanks and recharge wells/shafts are suggested. The most feasible artificial recharge structure suitable in such areas, are recharge wells/shafts on the river bed of the tributaries.

- XI. The existing village ponds needs to be rejuvenated to act both as water conservation and artificial recharge structures.
- XII. Ground water quality is adversely affected at many places due to high concentration of nitrate. Adequate sanitary protection to the wells may be provided to control the nitrate contamination. Proper disposal domestic sewerage may be made to avoid nitrate contamination of ground water.

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CHAPTER – 6
MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE
PRODUCTIVITY

6.1 : INTRODUCTION :- First working plan was introduced between 1894 and 1908 and it was written for different regions. Yawal Forest Division was not a separate in this period and it was part of Jalgoan Forest Division. Prior to these plans, fellings were carried out unsystematic manner and fellings were done by government agencies, previlage holders and felling for fire wood by non previlage population on permit system. In general the fellings were confined to teak and Anjan. The exploitation was confined to large and sound trees leaving crooked and diseased trees. The permit system led to malpractices and had deleterious effect on the forests, hence regeneration.

The first working plan for Yawal division comprising of Yawal, Raver and Chopda was given by Mr Osmaston in 1901. He prescribed felling with a rotation of 90 years for teak and 45 years for miscellaneous species. Public were not given permits, this was not a sound silvicultural practice and forests were difficult to manage from thefts and fires. This plan was revised in 1918-19 by D.P. Reborio. The working plan was due for revision during the year 1938-39 but the revision work was taken up during the year 1949-50.

Shri S.H Korhalli and S.A. Mundkur's working plan was introduced in the year 1952. Partial enuemeration was carried out to ascertain the composition of growing stock. The better quality forests continued to be managed for the production of large timber. Forests of poorer quality were managed for the production of poles and fuels. The locals got employment and their economic growth got impetus of forward uplift to some extent. The working plan of Sri Korhalli and Sri Mundkur continued for forestry operations. In teak pole areas except the areas situated on steep hills of Yawal, were worked under teak pole working circle. The sillvicultural system consisted in rotation of young and middle aged trees that were widely spaced and felling the remainder. No safe guards were prescribed in under stocked areas. The prescriptions of removal of inferior growth interfering with valuable species was not

followed. The result was salai grew over established teak young growth. The coupes worked under the plan gave fairly good results since advance growth was adequate to form future crop. The artificial regeneration to the extent of 10% of the coupe area, though prescribed, was not carried out to the desired extent. Teak timber working circle was prescribed for better quality area of northern part of Yawal range. This system recommended selection cum improvement felling. Heavy felling of trees occurred and hence the exploitation girth was reduced to 105 cms to 90cms similarly in Anjan working circle coppice with resevation of all anjan except those that were fallen and dead were prescribed. The teak pole working circle area of Rebeiro's plan were included under protection working circle. In bamboo working circle, the bamboo's were to be worked on a three year felling cycle on permits. The heavy unscientific exploitation by villagers resulted in to deterioration of bamboo clumps.

The revision of the working plan by P.R.Vaidya was taken up during the year 1962 and the plan came into operation from 1966-67. Protection, selection cum improvement , coppice with reserves, anjan, plantation working circle and bamboo, kadai overlapping working circles were proscribed in this plan. For exploitation of timber for teak the exploitation girth was kept at 110 cms and for other valuable non teak species it was kept at 120cms.P.R.Vaidya working plan was continued. The objective of selection cum improvement working circle was to gradually increase the teak reproduction. But vigorous understorey of bamboo and grass, rugged nature of the terrain, shortage of labour, frequent fire etc, came in the way of artificial regeneration. Artificial regeneration of the annual coupe with species such as teak, khair, eucalyptus though prescribed could not be carried out to the desired extent. Illicit cutting for fire wood and overgrazing by cattle and sheep has further contributed to the deterioration of the growing stock.P.R. Vaidya's working plan was in operation during fifth five year plan period. It was aimed to increase the proportion of teak and other valuable species in the crop and to build up higher dimensions were aimed. A part of the mature growing stock was to be removed. However, only 24 coupes in 4 felling series from 1966-1975 had been worked by Yawal division. The Yawal project division,F.D.C.M Ltd came into existence in the year 1974. This project division clear felled 1705.6 hectares area in 3 felling series from 1975-83. Cultural operations were not carried out. The sudden opening of

canopy threw out dense tall grass which came in the way of regeneration. The forests have become more vulnerable to fire. The P.R.Vaidya's working plan ended in the year 1980-81. In the absence of new working plan P.R.Vaidya's working plan prescriptions continued till 1989. Felling was completely banned as working plan was expired.

The S.D. Samant and P.C.Thomas working plan came into operation in the year 1989-90. Forestry in turn was benefited in implementation of plan prescriptions and regeneration. Revision of stock mapping of the forests was undertaken. Special improvement works like General Utility Timber (GUT), Bamboo, Plantation of Minor forest produce, Reforestation of degraded forests, Massive Afforestation Program(MAP), were implemented during this period.

A land mark decision in forestry was taken by Government of Maharashtra on 16th of March 1992 to involve the people by Joint Forest Management(JFM) for degraded forests. Yawal wild life sanctuary comprising of 17558 hectares are of good forest have been handed over to DCF, wild life division, Nashik for specialized management with effect from 1-6-1996. Prescription of existing plan continued till 1998-99.

Mr.Vasudevan,Mr. Tiwari & Mr. Reddy's working plan was in operation from 2006-07 to 2015-16. No felling was proposed during that period also. Thus tree felling in this division was banned from 1986 to till the date. Thus forest resource productivity can't be explained from that point of view. Stem and stump analysis was not carried out as no felling is practiced in this division.

The Local Volume Table compiled in Vaidya's plan (1966-67 to 19888-89) for Teak IV-a quality is given below.

6.2 : GROWING STOCK OF WOOD

Mostly site quality IV is found in Yawal Division. Vary few patches of site quality III are found. Felling was completely banned from 1986 onwards. Thus forest resource productivity cant be explained from that point of view. Stem and stump analysis was not carried out as no felling is practice in this division.

6.3 : GROWING STOCK OF BAMBOO

Bamboo is observed in some compartments of this division. The distribution of the bamboo is sparse, having less than 100 clumps/ha. The bamboos are 10-12cm. in girth and about 6 meters in length. It indicates that low quality bamboos are found in the tract. Bamboo is associated with Teak, Shisam, Sadada and Bija. No natural regeneration of bamboo is found in the area. No bamboo working was carried out by department from 2008 onwards. The heavy unscientific exploitation by villagers resulted in deterioration of bamboo clumps.

6. 4 : INCREMENT IN VOLUME OF IDENTIFIED TIMBER SPECIES:

Stem analysis of teak and other species was not carried out as there was no tree felling from 1986 onwards. However in P.R. Vaidya's working plan exploitation girth for Teak was kept at 110 cm and for other valuable non teak species it was kept at 120 cm. Illicit cutting for fire wood and timber, over grazing by cattle and sheep and regular forest fire has further contributed to the deterioration of growing stock.

6.5 : LOCAL VOLUME TABLE

From the data of outturn available from the coupes worked by forest Labour Co-operative Societies the (FLCS), local volume tables have been compiled from IIIrd quality and IV-a quality teak trees. For selection of coupes under IIIrd and IVth quality teak forests, use of the stock maps was made of and coupes falling in the respective qualities were only selected. The outturn of timber obtained from each tree was noted against a particular girth class in which that tree was falling. Actual breast height girth was also recorded against each reading. The volumes of such trees recorded in each girth class were totalled up. Also the actual girths at breast height were totalled up. The figures thus obtained were divided by the number of readings from each girth class. The average thus arrived at were plotted and a smooth curve was drawn. Then the volumes for the mean of each girth class was read from such curves and the local volume tables given below have been arrived at.

Table No. 6.1 Local volume table for Teak.

<u>Girth class b.h. inches</u> Cms.	<u>Volume for IIIrd quality (50' to 70') Cft./</u> Cubic metre	<u>Volume for IV-a quality (40' to 50') Cft./ Cubic metre</u>
<u>Up to 12''</u> 30Cms.	<u>0.50</u> 0.014	<u>0.35</u> 0.0098
<u>12'' – 18''</u> 30 – 45 Cms	<u>1.25</u> 0.035	<u>1.20</u> 0.0336
<u>18'' – 24''</u> 45-60 Cms	<u>2.50</u> 0.07	<u>2.45</u> 0.0686
<u>24'' -30 ''</u> 60-75 Cms	<u>4.50</u> 0.126	<u>4.15</u> 0.116
<u>30'' – 36''</u> 75-90 Cms	<u>6.75</u> 0.189	<u>6.50</u> 0.182
<u>36'' - 42'''</u> 90 -105Cms	<u>11.00</u> 0.308	<u>9.00</u> 0.252
<u>42'' - 48'''</u> 105 - 129Cms	<u>15.50</u> 0.434	-----
<u>48'' - 54'''</u> 129-135 Cms	<u>21.00</u> 0.602	-----
<u>54'' - 60'''</u> 135- 150 Cms	<u>28.75</u> 0.805	-----
<u>60'' - 66'''</u> 150-156Cms	<u>37.50</u> 1.05	-----

During the preparation of the plan in order to ascertain rate of growth of teak, 20 trees from IV a quality areas of Chopada range were stem analyzed. The trees selected were well distributed. (As per Vaidy's working plan.)

Table No. 6.2

Age in years	Height in feet	Diameter in inches	Volume in C.ft.	M.A.I.	C.A.I
10	19	3.15	0.56	0.056	0.056
20	30	5.39	1.92	0.090	0.130
30	37	6.95	3.78	0.129	0.186

40	43	7.60	5.38	0.134	0.160
50	47	8.30	6.36	0.127	0.098
60	49	8.70	7.14	0.119	0.078

The intersection of CAI and MAI curves will decide the exploitable girth of that species.

6.5.1 : Enumeration :- Dy.C.F. conducted the Enumeration work in Yawal forest division as per the procedure given in National working plan code, 2014. The enumeration data was analysed to arrive at Basal area, Growing Stock etc. 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 results of enumeration and regeneration in various compartment is given in Volume II.

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

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

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

6.6: EFFORTS TOWARDS ENHANCEMENT OF FOREST PRODUCTIVITY THROUGH QUALITY PLANTATION ACTIVITIES:

During the period of the Plan, there has been no special occasion where quality plantation activities other than the usual plantation carried out year on year.

Plantations using the latest technology in terms of high-tech nurseries for raising quality planting material, drip irrigation, chain-linked fencing etc. must be tried for specific need-driven plantation in Yawal division.

6.7 : CARBON STOCK (CARBON SEQUESTRATION):

Forest play an important role in combating climate change. In addition, it has the potential to provide ecosystem services, such as carbon storage. Carbon sequestered in the forests of Yawal has been derived by extrapolation from the Growing Stock calculated from the Enumeration data. The Working circle wise estimation of Carbon Stock is given below.

Table No. 6.3 Working Circle Wise Carbon Stock

Working Circle	Total Area in Ha.	Avg. growing stock	Total Growing	Total Carbon Stock (m.ton)
Anjan Working Circle	23538.53	110.435	2599477.56	780623.90
Protection cum	15335.10	60.36	925626.64	277966.00
Improvement W.C.	20761.02	68.40	1420053.77	426442.60
F.D.C.M. Area	22559.45	47.56	1072927.44	322200.40
Total	82194.10	286.76	6018085.41	1807233.00

6.7.1 : Soil Carbon Analysis: Quantum of soil carbon is a good indicator of nutrient status of soil. During the enumeration exercise, collected soil samples (50) and the were analysed for Soil Carbon. The range of Soil carbon varied from 0.44 % to 4.35 %.

6.8 : CARBON SEQUESTRATION AND MITIGATION: This plan has proposed to put minimum 6000ha. under Afforestation WC and during the period in implementation of the Plan. It is expected that during the plan period an area of 5000 ha.would be treated/regenerated under natural regeneration. This will add to the forest cover of the District and contribute significantly to the carbon sequestration of the forest & forest plantation. Natural regeneration will add biomass & carbon in from of the vegetation due to protection. As the Plan prescribes for the controlled opening of the canopy under Improvement Working Circle, the growth of young crops because

of this opening will boost the Carbon sequestration from the atmosphere as young crop sequester more carbon.

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Chapter No. 7

OPTIMIZATION OF FOREST RESOURCE UTILIZATION

7.1 : RECORDED REMOVAL OF TIMBER :

During the past Plan of the Division, no harvesting of coupe was carried out. This was as per the Working Plan prescriptions.

The details of the illicit cutting & details about value of the material seized (from 2006-07 to 2015-16) is Rs.387.06 Lacs., which includes both timber and fuelwood.

7.2 : RECORDED REMOVAL OF FUEL WOOD :

During the past plan of the Division, no harvesting of coupe hence no removal of fuelwood.

7.3 : RECORDED REMOVAL OF BAMBOO :

Extraction of Bamboo was done only in 2007-08 where only 60000 long bamboo's & 4.64 lakh lathi bamboo's were extracted. There after, extraction of bamboo was done in the year 2014-15, 2015- 16 & 2016-17 where only 2909 long bamboo, & 2390 lathi bamboo's in total were extracted. Thus extraction of bamboo is very low.

7.4 : RECORDED REMOVAL OF LOCALLY IMPORTANT NTFP.

The important Non- timber forest produce removed and recorded from the forests, are Tendu, Gum and Grass. The other NTFP's, medicinal and aromatic plants are not recorded.

The biggest source of NTFP produce that the Division harvests is Tendu. During the past ten years the quantity of Tendu leaves collected is given below.

Table No. 7.1

Year	Yield (Std. Bags)	Royalty received Rs. Std.Bag (in Lac)
2006-07	2215.650	4.210
2007-08	5273.135	34.328
2008-09	4780.735	21.274
2009-10	4339.197	29.333
2010-11	4242.437	29.146
2011-12	1196.140	4.868
2012-13	4797.608	25.859
2013-14	Unsold	----
2014-15	Unsold	----

2015-16	Declared unproductive	---
2016-17	----	----
Total	26844.902	149.018

The other species of NTFP for the Division is the Gum tree which is mostly Dhavada, Babhul, Kadai, and Salai etc. From these trees, Gum was collected in year 2014-15 is 6133 kg. (Rs.15.32 Lakhs)The gum was collected by local people and this is one of the major source of income to the local population. But detailed record is not available.

7.4.1 : Management of Tendu :

(i) 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 nationalized by the Govt. of Maharashtra **Act No. LVII of 1969**. Tendu leaves were collected by the department through agents till 1990 season. During the 1991 season Tendu units were sold on lump sum basis. The 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 criteria 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 centers 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 Govt 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 gainfully engaged in Tendu collection in the Division to support their livelihood.
- Pruning of young Tendu plants does help in increasing leaf yield. Saplings having more than 5 cm. collar diameter shall not be pruned. However, felling of Tendu trees or branch lopping for leaf collection should not be allowed.

(ii) 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.

7.4.2 : Management Of Hirda, Beheda, Charoli, Mahua, Aawla, Bor And Other Ntfps :

7.4.3 : Collection of Hirda, Beheda, Anola, Charoli, Mahua, Aamla, Bor and Other NTFPs: Fruits of Hirda, Beheda, Awala and Char are marketable items. Similarly, fruits, flowers and leaves of certain shrubs and trees are used for variety of purpose. 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, Anola, Charoli, Mahua, Aawla, Bor** trees and to increase its stock, few of the above trees be numbered and these trees be allotted to members of JFM committee. The members of committees who have been assigned with job of protection & nurture of above trees, should protect them from fire. Range Forest Officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

Removal of NTFPs shall be within the sustainable limits of production, Felling of trees and lopping of branches shall not be permitted for NTFPs collection. Destructive removal shall not be permitted, in any case. Digging up of plant roots, branch cutting, debarking on a plant will be considered as destructive removal.

7.4.4 : Regeneration of Hirda, Beheda, Anola, Charoli, Mahua, Aamla, Bor :

Required tending is prescribed where saplings of Beheda, Aonla and Char are found in worked coupes, to remove congestion. Soil working and mulching are prescribed along with planted seedlings and to be done during coupe operations of various areas in working circles. **Hirda, Beheda, Anola, Charoli, Mahua, Aawla, Bor** are prescribed species for plantations.

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

7.5.1 : Agriculture customs and wants of the population :

The economy of the district is primarily dependent on Agriculture, which is supported by the fact that the cultivators (30.02%) and agricultural laborers (44.32%) together constitute 74.34% of the total main workers in the district as against the state average of 59.62%. The agricultural sectors thus absorb nearly $\frac{3}{4}$ th of total main workers. This is because there are not enough opportunities available in the non-agricultural sectors. The district is famous for production of bananas. Out of total area under Banana production in Maharashtra State, Jalgoan district alone contributes $\frac{3}{4}$ th of area. Cotton, Sugar cane, oilseeds are other important cash crop grown in the district.

7.5.2 : Population: The population of Yawal, Raver & Chopda Talukas as per 2011 census are as under:

Table No.7.2 Statement Showing Population Density in Yawal Forest Division

Taluka	Area in sq. km.	Inhabited villages	Uninhabited villages	cities	Population density per sq. km.	Population in thousand.
Chopda	1154.20	112	7	1	271	312.31
Yawal	950.00	88	3	2	287	272.24
Raver	910.36	114	3	2	343	312.08

Local population consists of Pawaras, Tadvils, Bhils, Lewa Patils, Vanjaris, and Harijans etc. Out of these Lewa Patils are most successful and advanced cultivators. The area under Tribal Sub Planes per 2011 census is as under:

Table No.7.3 Statement Showing Areawise Population in Yawal Forest Division.

Taluka	Tribal sub plan area			
	Village	Area in sq. km.	Total Population in thousand	Tribal Population in thousand
Chopda	25	53.16	312.31	96.38
Yawal	16	14.92	272.24	68.06
Raver	22	106.15	312.08	53.52
Total	63	174.23	896.63	217.96

7.5.3 : Land Use Pattern:

Distribution of villages according to Land Use (in ha.)

Table No.7.4 Statement Showing Population Land Use in Yawal Forest Division

Taluka	No. of Inhabited villages	No. of uninhabited villages	Cultivated area	Irrigated area	Percentage of irrigated area to total cultivable area.
Chopda	112	7	69663	12653	18.16
Yawal	88	3	59645	17599	29.51
Raver	113	3	58499	29927	51.16
Total	311	13	187807	60179	32.04

For the district as a whole, total cultivated area is 78.15% of the total area.

The main requirements for which the people depend on the Forests are as under:

Timber: Teak in most valuable and saleable in all sizes. The medium sized timber is carried to various depots where they find ready market. Due to dearth of teak and its prohibitive prices, other species like Tiwas, Neem, Anjan, Babul etc. are used for construction of houses and huts and for agricultural implements. Babul Dhavada and Khair are utilized for Bullock carts.

Firewood: The demand for fuel has increased to such a great extent that villagers from distance places also frequently enter the Forest for illicit cutting. It is normally removed by head loads. The demand for firewood both in urban and rural area is so great that it is impossible to bridge the gap between demand and supply. Charcoal manufacture is only on a small scale.

Bamboo: The demand of bamboo far exceeds its availability. Bamboo is used for making mats, baskets and variety of products. Though bamboo is mostly sold on permits from depots and leftovers in open auction, large scale illicit cutting is noticed.

Grazing: Local villagers depend heavily on the forests for grazing their cattle. In the remote forests of Satpudas, however, the grazing pressure is negligible. Grazing being the greatest need of the cattle of the villagers, adequate provision for grazing has to be made in consonance with the ones for maintenance and improvement of forests and pastures.

Minor Forest Produce: Flowers and seeds of Mahuwa are collected on large scale by the local population for their consumption. Among other fruits collected are Tembhrun, Char, Bor, Aawla etc. Tembhrun leaves are collected through licensees appointed by the Govt. There are four Tendu Units in the Division. Annual collection is approximately 5,000 std. Bags. The gums of Dhavada, Babul and Kadai are sold in open auction. Kadai gum is collected from forests areas of Yawal and sold in Madhya Pradesh. Thorn of Bor, Babul, Henkal, Hiwar etc. are used as fencing material to protect the crops from animals. Anjan leaves are lopped heavily to feed the cattle in the villages surrounding the Forests. Majority of villagers depend on the forests for their timber requirements for wooden plough & cart etc.

7.5.4 : Markets And Marketable Produce

Markets for timber and firewood are in neighboring towns and villages, which are major consumers. The important timber market towns are Raver, Faijpur, Yawal, Chopda, Bhusawal and Jalgaon. However, considerable quantity of timber and firewood are also imported from the adjoining district. Only a small quantity of charcoal is manufactured locally. Kadai, Gum and Rosha oil are mainly exported to Mumbai.

7.5.5 : Occupation and Industries :

Besides agriculture, there are small occupation/industries in the villages and urban areas which are inter linked with forests; and few of them are given below:

(i) **Bamboo articles :** Burads make baskets, mats, dholis, etc. from bamboos and sell them locally. However, there are very little natural bamboo areas to meet these

demands. Mostly bamboo articles prepared by Burads come from adjoining districts.

- (ii) **Saw mills** : There are only 17 saw mills in the Yawal, Raver & Chopada taluka of the Jalgaon district.
- (iii) **Furniture industry** : There are good numbers of furniture shops in rural and urban areas which use wood and timber from the forest area. Teak is the most prominent species used for the purpose. Furniture industry and carpentry, provide job opportunities to the hundreds of skilled carpenters engaged in furniture making, joinery works like house construction etc. In addition veneer and plywood board industry requires good quality teak and other miscellaneous species from the forest areas of this division for their sustenance and balanced growth.
- (iv) **Collection of minor forest produce** : The poor class of villagers when not engaged on agricultural works collect moha flowers and fruits, charoli, gum, honey, bark, roots, leaves etc. and sell them locally to supplement their income. Fuel and grass is also collected by these people for local selling.

7.6 : IMPORT AND EXPORT OF WOOD AND WOOD PRODUCTS

There is no record of the import and export of wood and wood products into or from Yawal. The produce that is produced from Yawal is generally locally consumed.

7.7 : IMPORT AND EXPORT OF NTFPS :

Nothing on record is available on the import and export of any of the non-timber forests produce from the District of Jalgaon. This is perhaps because the production of NTFPs in the district is insignificant.

7.8 : REMOVAL OF FODDER :

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

7.8.2 : Non Wood Forest Produce (NWFP)

- (i) **Grass** : Grass from grass birs, closed coupes and a plantation is available on cutting basis. As per the existing Govt. orders annual lease of grass birs for removal of grass on cutting basis, is first offered to Gram Panchyats, 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 off in this way is sold by auction. The grass from the areas which remain unsold by any of the above methods is sold on rated passes. In 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.

Lately it has been found that most of the grass birs remain unsold. In the sold areas very little grass is removed. Most of the time the influential people of the village purchase the grass birs and allow grazing in those areas by taking money from the cattle owners. Due to excessive cattle pressure the site conditions of grass birs have been deteriorated severely; and hence are not in position to meet the demand of the entire division as well as to fulfill objective of producing quality grass in their present shape.

7.9 : VALUATION OF THE PRODUCTS :

As mentioned earlier, the main Non wood Forest products that the Division produces are tendu, gum and fodder. It may be seen that the quantity of grass and gum is not much and the collection is very irregular. There is a need to streamline the extraction and auction of the products.

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CHAPTER :- 8

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

8.1 : NUMBER OF JFM COMMITTEES AND AREA (S) PROTECTED BY JFMC :

Yawal 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 & wildlife resources has been an integral part of management. The number of JFMCs formed are 64 and these Committees cover an area of 49037 ha. All the areas adjoining villages have been covered under JFM, which take up 60% of forest area of division currently. JFM micro plans are to be covered with broad prescriptions of approved working plan.

- Maintenance of forest boundary, removal of encroachments, control over illicit cutting, illegal grazing, fire and wildlife offences shall receive priority apart from regularly undertaken works such as SMC & Plantations.
- Transparency in programme has to be ensured through transparent payment mechanisms.
- Villages which have not received funds should also be accorded importance.

8.2 : STATUS OF EMPOWERMENT OF JFMCS :

JFM is guided by the Govt. Of Maharashtra Resolution dated 16th March 1992, 5th October 2011 and 10th July 2012. The number of villages adjoining to forests are 64 and all these villages are covered under JFM and JFM Committees are in place. The total number of members in the Committee are minimum 12 and a maximum of 24 and one-third 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 the Committee in the Division has been adequate. The Forest Development Agency is well established and its working is satisfactory. Efforts to make the functioning and transaction of funds more and more transparent are going on in the FDA.

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 and boundary pillars repairs, fire line cuttings and all other works of the Department are involved through the JFM members wherever Committee exists.

8.4 : USE OF INDIGENOUS KNOWLEDGE :

The Department has made its effort in documenting the indigenous technical knowledge of the people in the District. The Yawal Division had organized an important workshop regarding Medicinal Plants & their uses.

Apart from the medicinal practitioners, the presence of other indigenous knowledge can't be ruled out. It is a charge of the forest officers to tap all kinds of Indigenous technical 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 sacred groves in the District. Three important sites of cultural significance in the forest areas of Yawal are Pal, Unapdeo, and Manudevi Temple in respectively Raver, Deoziri and Yawal (West) Range are located in forest areas. The flow of tourists and devotees to these areas are seasonal and days specific.

8.6 : ECO-TOURISM AREAS AND ACTIVITIES :

The Division have identified important and potential area to be developed for eco-tourism in the Division. These site area at seven location (Pal Forest Park and Forest Guards Training School, Manu Devi Mandir, Unap Dev Hot Water Spring, Nateshwar Kamaljadevi Temple, Mor Dam, Yawal Wild Life Sanctuary, Suki Dam etc.) spread in threeranges. There is a need to develop these sites and to document the ecological, cultural, religious significance of each of the area and to formulate a plan by which these sites could become places for forestry extension in the future.

8.7 : SOCIAL CUSTOMS :

Yawal Forest Division comes under Yawal, Raver & Chopda talukas. According to the 2011 census, these three talukas have a population of 8,97,239 people with an average literacy rate of 66%. Agriculture is the chief occupation in this area. These three talukas are fromt the region of Khandesh. It has several tribes and communities with a rich cultural heritage. Social customs relevant to the forest or its conservation are not noticed or known to forest department.

8.8 : STATUS OF COMPLIANCE OF FOREST RIGHT ACT (FRA)

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was passed by the Parliament of India and the assent to this Act was received from the President of India on 29th December, 2006. The said Act was notified in the Gazette of India on 2nd January, 2007. For implementation of the said Act, the Central Government notified the Rules for Recognition of Forest Rights on 1st January, 2008. These Rules were further amended by the Central Government vide notification dated 6th September, 2012.

8.8.1 : Salient Provisions of the Forest Rights Act, 2006 :

Section 3 (1) : The following rights which secure individual or community tenure or both, shall be the forest rights under the Act. They are :

- (a) Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers ;
- (b) Community rights such as nistar, by whatever name called, including those used in erstwhile Princely States, Zamindari or such intermediary regime.;
- (c) Right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries.
- (d) Other community rights of uses or entitlements such as fish and other products of water bodies, grazing and traditional seasonal resource access of nomadic or pastoralist communities.
- (e) Rights including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities.
- (f) Rights in or over disputed lands under any nomenclature in any State where claims are disputed;
- (g) Rights for conversion of Pattas or leases or grants issued by any local authority or any state Government on forest lands to titles.
- (h) Rights of settlement and conversion of all forest villages, old habitation, unsurveyed villages and other villages in forests, whether recorded, notified or not into revenue villages.
 - (i) Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use.

(j) Rights which are recognized under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribals under any traditional or customary law of the concerned tribes of any State.

(k) Right of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity.

(l) Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be, which are not mentioned in clauses (a) to (k) but excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal.

(m) Right to in situ rehabilitation including alternative land in cases where the Scheduled Tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land of any description without receiving their legal entitlement to rehabilitation prior to the 13th day of December, 2005.

(II) Section 3(2) :- Not with standing anything contained in the Forest (Conservation) Act, 1980, the Central Government shall provide for diversion of forest land for the following facilities managed by the Government which involve felling of trees not exceeding 75 trees per hectare, namely :-

- (a) Schools.
- (b) Dispensary or hospital.
- (c) Anganwadis.
- (d) Fair price shops.
- (e) Electric and telecommunication lines.
- (f) Tanks and other minor water bodies.
- (g) Drinking water supply and water pipelines.
- (h) Water or rain water harvesting structures;
- (i) Minor irrigation canals;
- (j) Non-conventional source of energy;
- (k) Skill upgradation or vocational training centers;
- (l) Roads; and
- (m) Community centers;

Provided that such diversion of forest land shall be allowed only if, the forest land to be diverted is less than one hectare in each case; and the clearance of such developmental projects shall be subject to the condition that the same is recommended by the Gram Sabha.

(III) Section 5 :- The holders of any forest right, Gram Sabha and village level institutions in areas where there are holders of any forest right under this Act are empowered to

(a) protect the wildlife, forest and biodiversity;

(b) ensure that adjoining catchment area, water sources and other ecological sensitive areas are adequately protected;

(c) ensure that the habitat of forest dwelling Scheduled Tribes and other traditional forest dwellers is preserved from any form of destructive practices affecting their cultural and natural heritage;

(d) ensure that the decisions taken in the Gram Sabha to regulate access to community forest resources and stop any activity which adversely affects the wild animals, forest and the biodiversity are complied with.

(IV) Section 6(I) :- The Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both that may be given to the forest dwelling Scheduled Tribes and other traditional forest dwellers within the local limits of its jurisdiction under this Act by receiving claims, consolidating and verifying them and preparing a map delineating the area of each recommended claim in such manner as may be prescribed for exercise of such rights and the Gram Sabha shall, the, pass a resolution to that effect and thereafter forward a copy of the same to the Sub-Divisional Level Committee.

(V) Section 6 (3) :- The State Government shall constitute a Sub-Divisional Level Committee to examine the resolution passed by the Gram Sabha and prepare the record of forest rights and forward it through the Sub-Divisional Officer to the District Level Committee for a final decision.

(VI) Section 6(5) :- The State Government shall constitute a District Level Committee to consider & finally approve the record of forest rights prepared by the Sub Divisional Level Committee.

(VII) Section 6(6) :- The decision of the District Level Committee on the record of forest rights shall be final and binding.

(VIII) Section 11 :- The Ministry of the Central Government dealing with Tribal Affairs or any officer or authority authorized by the Central Government in this behalf shall be the nodal agency for the implementation of the provisions of this Act.

8.8.2 : Status of Implementation of FRA 2006 in Yawal Forest Division :

The status of implementation of this Act (upto June 2018) is given in the table below. After commencement of this Act, large scale illicit tree felling for encroachment on forest land were done by local people and people from adjoining Madhya Pradesh State and people from Dhule district. It is a matter of concern that most of the encroachments in the Yawal Division have taken place during the last ten years.

The status of assignment of forest rights to individual as per Sec. 3 (1) of Act, at the end of June 2016 is as under. Table No.8.1

Taluka	Claims approved for Agriculture & Residential Purpose		Claims pending for approval for Agriculture & Residential Purpose		Total claims	
	No.of claims	Area (ha.)	No.of claims	Area (ha.)	No. of claims	Area (ha.)
Raver	51	5.203	210	563.90	261	569.103
Yawal	115	204.48	572	966.85	687	1336.86
Chopada	1200	2343.09	1233	2337.88	2433	4680.97
Total	1366	2552.77	2015	3868.63	3494	6421.66

Under section 3 (2), in 12 cases, a total of 7.00 ha. land has been diverted for specific purposes.

8.8.3 : PRESCRIPTIONS FOR MANAGEMENT OF FOREST AREAS ON WHICH THE FOREST RIGHTS ARE RECOGNIZED :

8.8.4 : Boundary Demarcation :- The forest areas on which the individual forest rights are recognized 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 and on a Quarterly basis by the CCF. The GPS co-ordinates 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.

8.8.5 : Updation of Area Registers :- The Divisional Area Register (Form No.1) shall contain the area vested with rights under FRA in the remarks column against each Compartment / Survey No./Gat No.

8.8.6 : Awareness creation among FRA beneficiaries about the responsibilities of forest and wildlife conservation will aid in the long run to prevent further encroachments.

8.8.7 : Convergence of various schemes of In the FRA Rules 2012, there is a provision to help the holders of forest rights through convergence of various Govt. schemes relating to land improvement, land productivity, basic amenities and other livelihood measures. In this regard, special efforts need to be made to identify areas of livelihood support such as NTFP collection, processing and marketing, need based skill development programmes for self-employment.

8.8.8 : Eviction of encroachers :- 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.

8.8.9 : Constituting committees :- As per Rule 4(e), the Gram Sabha is duty bound to constitute Committees for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the Act. Similarly, as per Rule-4 (f), such Committee shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest resources and integrate such plan with the micro plans or working plans or management plans of the forest department. Therefore, the territorial officers shall examine such Conservation and Management Plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of the approved working plan.

8.9 : OTHER RIGHTS AND CONCESSIONS :

8.9.1 : Rights and Concessions :

Change in Area :- During earlier Plan period, 22559.45 ha. area of 76 Compartments of FDCM were transferred to Yawal forest (T) Division and FDCM project Division, Yawal was closed on 5.7.2007.

Parliament has enacted a law of the Panchayat (Extension to the Scheduled Areas) Act. No. 40 of 1996). The said Act provides for endowing by the State, the Panchyats in the Scheduled areas, with such power and authority as may be necessary to enable them to function as institution of self Govt. Further it provided the Gram Sabha specifically with the ownership and marketing of minor forest produce.

Govt. of Maharashtra has enacted a law, the “ Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act.1997 and has also amended Maharashtra Minor Forest Produce (Regulation of Trade) Act. 1969 (Act.No.45 of 1997) vide which ownership of 33 MFP specified in the Scheduled, found in the Govt. land has been transferred to the Panchyats. The Honorable Governor of Maharashtra had modified the existing Act and has given ownership of all MFP to Gram Sabha vide notification dated 19.08.2014.

Govt. of India vide enactment dated 2 December 2006, called The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006 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 and occupied forest land before the 13th of December, 2005.

Total 976.457 hectare of Reserved Forest Land was transferred to various project authorities under Forest Conservation Act 1980. However, the status of the land continues to be Reserved Forest.Total 646.33 hectare land was received as compensatory land in lieu of diverted forest land.

8.9.2 : General Objects Of Managements :

1. Maintenance of environmental stability through conservation and wherever necessary, restoration of the ecological balance.

2. Checking soil erosion and denudation in the catchment areas of rivers reservoirs in the interest of soil and water conservation for mitigating droughts and for retardation of siltation of reservoir.
3. Increasing forest cover by assisting the natural regeneration by protecting the forest from fire, grazing etc and tending the root stock.
4. Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal population.
5. Creating a massive people's movement with the involvement of women for achieving these objective and to minimize pressure on existing forest.
6. Providing LPG, Biogas to the people residing in or on the fringe of forest and thus releasing the pressure on forest for fuel wood.

8.10 : DEPENDENCY OF LOCAL PEOPLE ON NTFP.

There are no significant no. of people / community dependent on the forest produce. There are some Buruad families in the division whose livelihood depend on bamboo's by acquiring from nearby forest area and selling them at concessional rates.

8.11 : OTHER ASPECT :

There is no transhumant population of grazing community available in Yawal Forest division. However livelihood of local community depends upon forest for grazing of their cattle. They have cows, buffalos on large scale with some ships and goats. The range wise grazing units have been formed. Every year the grazing passes are issued to local community people for grazing purpose.

The Grazing settlement of Jalgaon District was done By V.A. Date and the same was approved by the Govt. vide no. MFC 1371/66402/z(A) dt. 30/09/1997. According to the Grazing settlement, the number of grazing units in Yawal Division is 37. The details of grazing units are not incorporated in Reddy's plan but it needs to be incorporated in new working plan.

The forest has degraded over a period of 4 decades. There had been tremendous increase in the cattle population; hence the grazing settlement done earlier has become outdated.

Table No.8.2 Cattle population in Yawal, Raver & Chopada taluka of Yawal forest division.

Taluka	Year	Cows	Bullocks	Buffalo	Sheep	Coat	Hourse
Yawal	2006-07	17508	11305	19355	20472	865	51
	2014-15	36339	17485	35932	38742	1825	168
Raver	2006-07	18841	12212	29234	23242	2660	95
	2014-15	37201	15193	34530	25290	4225	151
Chopada	2006-07	21184	18609	21395	27368	110	57
	2014-15	25906	23993	21361	45339	0	110
Total	2006-07	57534	42126	69984	71082	3635	203
	2014-15	99446	57391	91823	109371	6050	429

Table No. 8.3 Details of grazing permits and passes issued and grazing fees collected 2006-07 to 2015-16

Year	No. of grazing permits issued (Cattle units)	Grazing fees collected in Rs.
2006-07	21760	23981
2007-08	21760	23981
2008-09	21463	23400
2009-10	27174	29389
2010-11	23902	25648
2011-12	27188	29162
2012-13	25176	28441
2013-14	23137	25758
2014-15	16287	18503
2015-16	12283	14509
Total	220130	242772

Details about illegal grazing cases booked and penalty recovered from 2006-07 to 2015-16. Table No.8.4

Year	No. of Grazing cases	No.of animals caught grazing without permit	Amount recoverd as penalty & auction of inpounded animals (Rs.)
2006-07	18	213	36355
2007-08	9	225	6285
2008-09	11	189	31185
2009-10	16	68	7265
2010-11	18	161	34585
2011-12	14	55	10285

2012-13	17	268	96860
2013-14	10	66	74000
2014-15	1	2	2400
2015-16	16	607	190000
Total	130	1851	489220

Similarly local people also collect and store fodder grasses for summer season. Natural regeneration is found adversely affected in those areas, wherever rotational grazing system is not followed properly. Likewise, proportion of non-fodder grasses is slowly increasing in such area. Therefore grazing in such areas needs to be managed properly to avoid adverse effect on quantity and quality of fodder species.

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CHAPTER :- 9

ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAME WORK

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 of the Division. The National Forest Policy of 1988 is the basic guide for the management strategy of this Plan. The Indian Forest Act 1927 and its amendment is the Principal Law governing the administration of the forests in the Division. The Plan is further guided by guidelines like :

9.1.1 : National Wildlife Action Plan (2002-2016) :

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

- i. Restoration of Degraded Habitats outside Protected Areas
- ii. Control of Poaching, Taxidermy and Illegal Trade in Wild Animal and Plant Species
- iii. Monitoring and Research
- iv. Human Resource Development and Personnel Planning
- v. Ensuring People Participation in Wildlife Conservation
- vi. Conservation Awareness and Education

9.1.2 : National Forestry Action Plan :

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

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

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

Strategies :-

- i. For sustainability and productivity of forests, the production to be increased at least 3 to 5 m³ per ha per year by promoting appropriate silvicultural treatments.
- ii. Hygiene of forests to be improved through suitable silvicultural practices.
- iii. Efforts to be made to bring one-third geographic area of the country under forest and tree cover by plantations on all categories of wastelands and agro forestry.
- iv. Plantations on non-forest wastelands to be done mostly with fuel wood species as 70% of the wood produced from forests are used as fuel wood. Species of pulpwood and other industrial wood may be encouraged in farm forestry.

9.1.3 : Hon'ble Orders of Supreme Court of India :

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

Hon'ble Supereme Court passed an order on 22.09.2000 in Inter-Locutory application No 424 saying that regeneration of forest should be commensurated with felling carried out under a working plan. To achieve this, it must be ensured that no felling be carried out without allocating necessary fund to regenerate the felled areas. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.

Following the directions of Hon'ble apex court in their older dated 22.09.2000 in IA No.424; a core group was constituted to decide the extent of felling.

As per these Orders, fellings are to be carried out by the State Government only after obtaining the permission from core group constituted by the Ministry of Environment and Forest, New Delhi, which is complied with by the Department.

9.1.4 : Forest Rights Act, 2006 :

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

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was passed by the Parliament of India and the assent to this Act was received from the President of India on 29th December, 2006. The said Act was notified in the Gazette of India on 2nd January, 2008. These Rules were further amended by the Central Government vide notification dated 6th September, 2012.

The Yawal Division is in the process of digitizing the polygons of the areas handed over to the villagers under FRA. There is a need to guide and train the villagers on how best to use the forest land to meet all their needs.

9.1.5 : Biological Diversity Act, 2002 :

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

India is a party to the United Nations Convention on Biological Diversity signed at Rio de Janeiro on the 5th day of June, 1992. This Convention reaffirms the sovereign rights of the states over their biological resources. Therefore, legislation was enacted by the Indian Parliament in 2002 to give effect to the United Nations Convention.

This Act aims to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto. The State Government has established the State Biodiversity Board and this body is looking into the various aspects of biodiversity conservation and benefit sharing, if any, arising out of the biodiversity.

As of now No Biodiversity Management Committees have been formed in the District of Yawal. There is a need to establish Village Biodiversity Management Committees at least in all the Gram Panchayats where JFM is being implemented on priority basis.

9.1.6 : GOI Orders/GOM Resolutions, Circulars etc.

Joint Forest Management approach was adopted for degraded forest area of the State vide GR dated 16 March 1992. The programme was extended to Good Forest areas vide Govt. Resolution dated 25/04/2003. The latest revision in G.R. has been made on 5th October 2011 and 10th July 2012. All JFM activities should be in consonance with the broad prescriptions of the Working Plan. The Micro-plans are to be dovetailed with the prescriptions of the Working Plan.

9.2 : STATUS OF APPROVED WORKING PLAN AND COMPLIANCE:-

Working Plan sanctioned is implemented but not fully due to various reasons like lack of funds, unavailability of area, due to Eco-Sensitive Zone etc. No deviation proposal are received.

9.3 : NUMBER OF FOREST OFFENCES

The numbers of forest offences that have been registered under the different categories in the last ten years are given below :

Table No. 9.1 The Extent of damage due to fire, illicit cutting & other offences.

Year	Fire		Grazing		Illicit cutting		Other		Total	
	No.of Cases	Loss in Lakh	No. of Cases	Loss in Lakh	No.of Cases Teak and Non Teak	Loss in Lakh	No. of Cases	Loss in (Rs)	No. of Cases	Loss in (Lakh)
2006-07	20	0.10	18	0.36	966	41.87	0	0	1004	42.33
2007-08	80	0.91	9	0.6	1224	45.66	190	0	1503	47.17
2008-09	76	0.44	11	0.31	1656	41.08	198	0	1941	41.83
2009-10	94	0.62	16	0.07	2523	62.08	200	0	2833	62.77
2010-11	93	0.53	18	0.34	1523	34.93	186	0	1820	35.8
2011-12	125	0.71	14	0.10	1245	23.17	148	0	1532	23.98
2012-13	117	1.42	17	0.96	1236	14.26	131	0	1501	16.64
2013-14	85	0.61	10	0.74	1021	17.10	115	0	1231	18.45
2014-15	85	0.61	1	0.02	944	17.66	44	0	1074	18.29
2015-16	190	0.77	16	1.90	1034	14.88	42	0	1282	17.55
TOTAL	965	6.72	130	5.4	13372	312.69	1254	0	15721	324.81

Table No. 9.2 No. of trees cut illegally with material seized from 2006-07 to 2015-16.

Year	No. of trees cut illegally	Teak (cmt) illicit cutting	Amt. of Material seized (Rs)
2006-07	19309	459.713	54.19
2007-08	25456	704.536	67.88
2008-09	25200	754.926	40.33
2009-10	32048	1056.182	33.41
2010-11	15889	668.794	37.83
2011-12	7983	443.811	29.14
2012-13	5295	400.505	22.75
2013-14	3511	208.619	19.00
2014-15	3275	171.007	387.02
2015-16	3161	221.956	-----
TOTAL	141127	5090.049	691.55

9.4 : STATUS OF RESEARCH AND DEVELOPMENT:-

Not much research or development work is being carried out in the Division.

9.5: HUMAN RESOURCE CAPACITY BUILDING EFFORTS.

The staff of the Division is trained as per their rank-related training in the respective Forest Schools, Rangers Colleges etc. Apart from this regular training, they are also updated with the new technology and developments in the field particularly in GIS and IT related fields. The status of special training of the staff is as follows :

- **Status of Trained Staff :**

1. Training for GIS & GPS - Surveyor 02, Forester 09 & Forest Guard 15 were trained.
2. Facilities of Personal Digital Assistants (189 PDAs) are given to all guards with application like Offences cases, Fires, encroachment, grazing etc.

However, the feedback received from the field is that the PDAs are being used mostly as mobile phones. There are also problems related to the lack of coverage for the use of internet for immediate sending of information as required. There is a need to further train the guards in the use of the PDAs and to ensure full use of the technology.

9.6 : FOREST RESOURCE ACCOUNTING :

In this Plan, all efforts have been made to place on record all the tangible benefits received from the forests. The accounting for the intangible benefits is a task that the Division is not in a position to make, nor is it possible to be done by the WPO with limited resources. However, 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 taken as the basis for the calculation of the tangible and intangible benefits for accounting the forest values in the Division. The factor of benefits that have been taken while accounting forest area is as follows :

For calculating the average Net Present Value per ha. of forest in India the following monetary value of goods and services provided by the forest have been considered.

- (i) Value of timber and fuel wood
- (ii) Value of Non Timber Forest Products (NTFP)
- (iii) Value of Fodder
- (iv) Value of Eco-Tourism
- (v) Value of Bio-Prospecting
- (vi) Value of Ecological Services of Forest
- (vii) Value of Flagship Species
- (viii) Carbon 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 & Seth have been reduced into the following Eco-classes, namely :

Eco-Class I - Consisting of Tropical Wet Evergreen Forests, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forest

Eco-Class II- Consisting of Littoral and Swamp Forests

Eco-Class III- Consisting of Tropical Dry Deciduous Forests

Eco- Class IV- Consisting of Tropical Thorn Forest and Tropical Dry Evergreen Forests

Eco- Class V - Consisting of Sub-tropical Broad Leaved Hill Forests, Sub Tropical Pine Forests and Sub Tropical Dry Evergreen Forests

Eco-Class VI- Consisting of Montane Wet Temperate Forests, Himalayan Moist Temperate Forests, Himalayan Dry Temperate Forests, Sub Alpine Forest, Moist Alpine Scrub and Dry Alpine Scrub.

The forests of Yawal come under the Eco Class III and the value attached to this Class area as given below as per the canopy density. The average value of the forests stands at Rs.6,26,000/- per ha. and varies with the type of forest and its attributes. This value has further been revised by the India Institute of Forest Management, Bhopal and is yet to be approved. The IIFM study is more comprehensive and takes into account all aspects of the intangible benefits that the forest eco-system provides.

Below is given the value of the forest of Yawal as per the current and proposed NPV value which takes into account the tangible and some components of the intangible benefits.

Table No. 9.3 Calculation of Forest Worth Based on NPV

Area of Yawal under different canopy density		Current rate of NPV (Rs. Lakh/ha.)	Value of Forests as per current rate (Rs. Lakhs)	Proposed rate of NPV (Rs.Lakh/ha.)	Values of forest as per proposed rate Rs.Lakhs
Category	Area (ha.)				
VDF	4200.00	8.03	33726.00	25.08	105336.00
MDF	27100.00	7.50	203250.00	18.62	504602.00
OF	50800.00	6.26	318008.00	11.17	567436.00
Total	82194.00	----	554984.00	---	1177374.00

The value of the forests of Yawal comes to Rs.554984.00 Lakh as per the current NPV rates and Rs. 1177374.00 Lakhs as per proposed NPV rates, which has taken in to account all the ecosystem services and functions of the forests.

Thus the value of the Forest when computed holistically taking into account its myriad tangible and intangible benefits that it provides, is far more than what can be gained through the traditionally viewed benefits of timber and other forest produce. Forest resource accounting will be more comprehensive, if we are in a position to decide all intangible benefits at the local level which may be taken up as one of the projects in due course of time.

9.7 : BUDGETARY ALLOCATIONS TO THE FORESTRY SECTOR

Table No. 9.4 Statement Showing the Revenue & Expenditure :

Year	Revenue Rs. in Lakhs	Expenditure Rs. In Lakhs			Total Expenditure in Lakhs.
		Non Plan	Plan	EGS	
2006-07	51.57	34.08	133.51	129.92	297.51
2007-08	73.30	105.98	131.91	8.38	246.27
2008-09	162.561	132.45	391.08	23.13	546.66
2009-10	182.146	159.35	462.39	17.41	639.95
2010-11	152.72	188.58	625.25	62.12	875.95
2011-12	125.184	214.74	874.40	25.62	1114.76
2012-13	107.50	327.53	748.53	39.51	1115.57
2013-14	58.85	288.37	619.20	42.74	950.31
2014-15	32.17	293.27	1153.77	42.36	1489.40
2015-16	47.10	390.08	1361.00	26.77	1777.85
Total	993.101	2134.43	6501.01	417.96	9053.43

The department also has an independent Evaluation cell headed by an officer of the rank of C.C.F. at the Head Office. Annual evaluation reports on various activities of the department from Plantations SMCs, MPCAs, Building & Constructions are prepared and submitted to Government. The evaluations is guided by the evaluation code.

9.8 : EXISTENCE OF MONITORING, ASSESSMENT AND REPORTING MECHANISM :

Monitoring & assessment is done at Range Forest Officer, ACF & Dy.C.F. levels, CCF(T) & CF(WP) as per GR No. Sankirna-2011/F-N0.289/F-7, dt. 29/09/2011 also required to ensure proper implementation of WP.

9.9 : PUBLIC AWARENESS AND EDUCATION :

Public awareness is carried out by the Division and the Social Forestry Wing of the Department in the District. As per information from the Dy. Director of the SFD, a total of 120 school in Yawal have Eco-Clubs as part of the National Green Army Scheme of the Government of India. In each of the Club, there are at least 50 members. In these schools regular year round programmes are held and all important days related to the Environment and Forests are celebrated enthusiastically. Regular field visits, projects etc are also taken up. Seed Banks are established in each of the Schools.

The Division also celebrates Van Mahotsav and Wildlife Week on a regular basis and various programmes like Essay /Drawing/ Extempore Speech Competitions are held at all levels upto the State level.

9.10 : ADEQUATE MANPOWER IN FOREST DIVISION.

9.10.1 : Staff :Yawal forest division is coterminous with the district boundary and is headquartered at Jalgaon. It is headed by an officer in the rank of the Deputy Conservator of Forests. The statement showing the names of Dy. Conservator of Forests, Yawal Division has been shown in **Appendix No. -----**

Further reorganization of the Forest Department was done&Yawal Forest Division was created in 1966 by bifurcating the Jalgaon Forest Division. For Satpuda Forest, first working plan was introduced in the year 1901.

Yawal Division has sanctioned strength of **216 posts** in total, including **162 permanent** posts and **54 temporary** posts ranging from the Deputy Conservator of Forests to the Van Major. The details of the staff and the manpower, in the Division, as on date, are given in the table below:

Table No. 9.5 Present staff position in the Yawal Division :

Designation of the Post	Permanent posts	Temporary posts	Total
Class -1			
D.Y.C.F.	1	0	1
A.C.F.	2	1	3
Total Class -1	3	1	4
Class -2			
RFO	7	1	8
OS	0	1	1
Total Class -2	7	2	9
Class -3			
Head Clerk	1	0	1
Accountant	10	0	10
Clerk	12	0	12
Stenotypist	1	0	1
Forester	29	2	31
Forest Guard	84	49	133
Forest Surveyor	2	0	2
Jeep Driver	3	0	3
Police Constable	1	0	1
Total Class -3	143	51	194
Class -4			
Naik	1	0	1

Peon	3	0	3
Watchman	5	0	5
Total Class -4	9	0	9
Grand Total	162	54	216
Van Majoor	0	101	101

9.10.2 : Labour Supply :

There is acute shortage of labour especially during the planting season. The main reason for the non-availability of labour is, they more attached towards agricultural operations because of the comparatively lighter works, higher wages and other amenities.

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CHAPTER :- 10

FIVE YEAR PLANS

10.1 : INTRODUCTION : Since 1947, the Indian economy has been premised on the concept of planning. This has been carried through the Five-Year Plans, developed, executed, and monitored by the Planning Commission (NITI Aayog after 2014). With the Prime Minister as the ex-officio Chairman, the commission has a nominated Deputy Chairman, who holds the rank of a Cabinet Minister. Montek Singh Ahluwalia is the last Deputy Chairman of the Commission (resigned on 26 May 2014). The Eleventh Plan completed its term in March 2012 and the Twelfth Plan is completed its term in March 2017. There after 13th five year plan is in operation.

Revised versions of the formula have been used since then to determine the allocation of central assistance for state plans.

The new government led by Narendra Modi, elected in 2014, has announced the dissolution of the Planning Commission, and its replacement by a think tank called NITI Aayog (an acronym for National Institution for Transforming India).

The first working plans were introduced between 1894 and 1908 and they were written for different regions. Yawal Forest Division was not separate in this period and it was part of Jalgaon Forest Division. For Satpuda Forest, first working plans were introduced in the year 1901.

The following plans were written for Satpuda forest (Chopada, Yawal and Raver ranges) :

Osmaston's Working Plan	1901-02 to 1911-12
Reberio's Working Plan	1918 – 1919 to 1950-51
Korhalli and Mundukar's W.P.	1951-52 to 1966-67
Vaidy's Working Plan	1965-66 to 1988-89
Thomas and Samant's Working Plan	1989-90 to 2005-06
Vasudevan, T.S.K. Reddy and Tiwari's W.P.	2006-07 to 2015-16

10.1.1 : As per Twelfth five year plan (2012-2017) document under environment, forestry & wildlife 209 following are the monitorable targets

1.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 % of critically polluted stretches in rivers by 2017 and 100% by 2020.
- 3) States to meet NAAQS in urban areas by 2017.
- 4) To reduce emission intensity of our GDP in line with the target of 20 to 25% reduction over 2005 levels by 2020.

10.1.2 : Forests and Livelihood :

- 1) Greening 5 million ha under Green India Mission 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.

10.1.3 : Wildlife, Ecotourism and Animal Welfare :

1. Twenty per cent of veterinary professional in the country will be trained in treating wildlife.
2. Interated Ecotourism District Palns 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.

10.1.4 : Ecosystem & Biodiversity.

- 1) Restore 0.1 million ha 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.

10.1.5 : AS PER THE TWELFTH PLAN DOCUMENT OF THE PLANTING COMMISSION UNDER ENVIRONMENT, FORESTRY AND WILDLIFE THE FOLLOWING ARE THE GOALS.

10.1.6 : Environment :

- 1) Epidemiological studies to assess improvement in health status due to better management of Environment and ecology.
- 2) Promotion and adoption of cleaner technology, strengthening and initiation of reforms in regulations, policy making and enforcement institutions for environmental governance.
- 3) Move towards cumulative and strategic EIA.
- 4) Ensure ecological flows in all rivers by regulating abstractions so as to allow conservation of river in ecosystems through developing a legal framework and management strategy for conservation of river basins.
- 5) Promotion of recycling and reuse of treated sewage in urban projects such as sanitation, Landscaping, central air conditioning and so on.

10.1.6 : Forests and Livelihood :

- 1) Improve forest Productivity, production and sustainable management of biodiversity (equity in access to benefit sharing with local people).
- 2) Restoration and intensification of forest-range lands/grazing – land management and establish community grazing land around forest fringe villages.
- 3) Build capacity of Village Forest Committees/ Joint Forestry Management Committees for management of forest resources including ecotourism.
- 4) Revive seed orchards and silviculture plots for various forest types of the country, as well as, for enlisted species under Minor Forest Produce/ Non Timber Forest Produce (MFP/NTFP) including genetic improvement of and establishment of clonal orchards.

10.1.7 : Wildlife, Ecotourism and Animal Welfare :

- 1) Reducing and managing human wildlife conflict.
- 2) Commercialization of permissible marine products rich in poly unsaturated fatty acids (PUFAs), vitamin and so on.
- 3) Promotion of ecotourism and participatory eco-development support livelihood of local population.

10.1.8 : Ecosystem and Biodiversity :

- 1) Develop national targets and indicators related to biodiversity and support actions to strengthen implementation of Biological Diversity Act, 2002 and ensure bio-safety for economic and social development of local communities.

Assess coastal biodiversity resources, ensure sustainable management, restoration of mangroves, coral reefs and wetlands and support livelihood.

10.1.9 : DEVELOPMENT UNDER TWELTH FIVE YEAR PLAN :

(i) The year 2015-16 was the fourth year of XIV the Five-Year Plan. An investment of Rs.1361 lakhs was made on various developmental programmes implemented under forestry and related sectors as stated below.

Activities :-

A. Non Tribal sub plan (State)

1. Strengthening of check Nakas
2. Strengthening of existing wireless network
3. Strengthening of Mobile Squad
4. Supply of cooking gas
5. Joint Forest Management

B. CENTRALLY SPONSORED SCHEMES

1. Modern forest fire control and management (IFPC)
2. National Afforestation Programme

C. FORESTRY AND WILDLIFE (TRIBAL SUB PLAN) (STATE)

1. Supply of cooking gas

D. Non Tribal District scheme

1. Soil and Moisture Conservation on forests areas
2. Estt. Of central nursery
3. Forest protection from fire

4. Reforestation of degraded forest (RDF)
5. Development in Forest Tourism
6. Compensation to the farmers for losses caused by the wildlife

E. FORESTRY AND WILDLIFE (TSP) (District)

1. Joint Forest Management (OTSP)
2. Plantation of General use

F. FORESTRY AND WILDLIFE (NON TRIBL) (STATE)

1. Construction of Van Talao
2. Massive Afforestation
3. Afforestation for soil Conservation

G. FORESTRY AND WILDLIFE (NON TRIBAL) (District)

1. Forest Building (Repairs)
2. Soil and water conservation on forests areas
3. Forest roads & bridges (4406-4415)
4. Forest Protection from fire
5. Wild Life & Nature Conservation
6. Development of Forest Tourism
7. Compensation to the formers for doses caused by the Wildlife

Table No.10.1

Year	Expenditure incurred on above activities under (plan/ Non plan /MREGS) funds in Lakhs
2013-14	950.31
201-15	1489.40
2015-16	1777.85
Total	4217.56

It is observed that there is more than double increase in the expenditure in the Division, for various forestry activities. This is a very encouraging sign. With the implementation of the Working Plan in right earnest, the goals of the five year plan can be achievable.

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CHAPTER:-11

PAST SYSTEMS OF MANAGEMENT

11.1 : GENERAL HISTORY OF THE FORESTS :: GENERAL HISTORY OF THE FOREST

The forests of the Yawal division were constituted as reserved forests in 1881 and succeeding years prior to 1902., The fellings were carried out in very unsystematic manner and were done through three agencies, viz. 1) Government Agency; 2) privilege holders. 3) non-privileged population (on permit basis)

Prior to the year 1872, the respective Assistant Collectors (Bhil Agents) were in-charge of Forest areas. The Bhils and other Tribes used to cut whatever they wanted to, except Teak and Rosewood, for which the Principal Bhil Agent granted the permission. Forest Conservancy began in the Satpudas in the year 1872.

Between the year 1872 to 1896, fellings done by the Government Agency were of unregulated selection type. Areas where felling had carried were not demarcated and the girth limits, above which trees had to be felled, were not prescribed. In general the fellings was confined to Teak in Yawal and Chopda ranges, and Anjan in Raver range. The annual output varies greatly and depended upon the demand labour available. Exploitation was confined to large and sound trees leaving crooked and diseased trees standing.

The felling done by privilege holders, which included Bhils, inhabitants of Forest Villages and other unsettled tribes had considerable adverse effects on the forests. Their activities extended over the whole forests and were confined to green and dead wood of all species except the reserved trees of Teak and Blackwood. Subsequently in the year 1884-85 the privileges defined and two species were reserved which were not to be felled. Although the privilege were defined, they were not firmly regulated and the malpractice and irregular felling continued.

The third Agency which included a variety of non-privilege holders such as liquor distillers, brick burners, bangle manufacturers and ginning factories were

allowed to get firewood on permit system. Removal of dead timber including teak on permit at fixed fee per cartload was allowed. This permit system led to malpractice and had a deteriorious effect on the forests, their regeneration and improvement.

11.1.1 : Management Of The Forest And Tree Growth :

The first working plan was introduced in the year 1901. The following plans were written for Satpuda forests (Chopda Yawal and Raver ranges):

With the introduction of working plan in 1901, cutting of greenwood by privilege holders was restricted to annual coupes. In 1911, the North Tapi Privilege Code was revised and the most harmful privilege of cutting of greenwood on fees for sale was abolished. The privilege of removing deadwood for sale or batter was restricted to head loads. The areas of Chopda, Yawal and Raver ranges of Satpuda forests were organized under the working plan prepared in 1901 by Osmaston. He prescribed a common system of working for the entire forests, irrespective of whether it was Anjan or Teak forests. The silvicultural system was felling with a rotation of 90 years for Teak and 45 years for misleouns species was prescribed. No operation for the improvement of growing stock was prescribed. Further, public were also allowed to remove material under permits. This practice proved to be unsound both silviculturally well as economically.

Table No. 11.1 List of Working Plans for the Reserve Forests of Yawal Division :

Sr. No.	Working Plans in chronological order	Plan period
1	Osmaston's Working Plan	1901 to 1911
2	Reberio's Working Plan	1918 -1919 to 1951-52
3	Korhalli and Mundkur's	1951-52 to 1964-65
4	Vaidy's Working Plan	1965-66 to 1988-89
5	Thomas and Samant's Working Plan	1989-90 to 2005-06
6	Vasudevan, T.S.K. Reddy and Tiwari's Working Plan	2006-07 to 2016-17

11.2 : PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS :

11.2.1 : Reberio's Plan(1918-19)

V.D.P.Reberio revised the above Plan in 1918-19. In this Plan, the areas were distinguished into various types based on the growth, composition, condition and accessibility. For the better quality forests of Yawal range where Teak was capable of producing large sized timber, the 'Teak Timber Working Circle' was formed. The silvicultural system adopted was improvement felling with a felling cycle of 30 years. Teak trees exceeding 105 cm. in girth and Tiwas, Khair, Bibla trees above 60 cm. in girth were to be marked for felling. Improvement of the existing growth by removal of dead, dying, unsound, badly damaged and crooked trees were prescribed. The medium quality teak forests were grouped under Teak Pole Working Circle. In all, 24 felling series were found. The marking rules prescribed that on undulating grounds and moderate slopes 15 to 25 standards per acre were to be retained whereas on steep slopes 30 trees were to be retained. Rotation of 45 years was fixed. The silvicultural system adopted was Coppice with Standards. The system was subsequently found unsuitable. In 1938-39, modified clear felling system was introduced. All sound advance growth upto 30 cm. in girth in case of valuable species and upto 45 cm. in girth in case of Teak were to be reserved. In addition to this, all fruit trees, shade trees and Anjan trees except the dead ones were to be reserved. Anjan areas were separately constituted into Anjan Working Circle with a felling cycle of 30 years. Originally some trees of sound Anjan and other valuable species were to be reserved. But in 1938-39, the prescriptions were changed and all Anjan trees except the dead ones, all good pole crop up to 30 cm. girth of valuable species and all fruit and shade trees were to be reserved. In all 38 felling series were formed.

11.2.2 : Korhalli and Mundkur's Plan (1952-1967)

This Working Plan was due for revision during the year 1938-39 but the revision was taken up during the year 1949-50 and the Plan of S.H.Korhalli and S.A. Mundkur was introduced in the year 1952. During the revision also no stock mapping of the forests was undertaken. In order to ascertain the composition of growing stock, partial enumeration was carried out and linear sample plots were enumerated both in worked and un-worked areas of Teak Pole Working Circle and

Anjan Working Circle. The better quality forests continued to be managed for the production of large timber. It was contended that regeneration would only be possible where advance growth is established under the mature crop. The forests of poorer quality were managed for the production of poles and fuel. In such forests, regeneration was expected mainly by coppice. The inaccessible forests were excluded from working.

The following Working Circles were formed of the areas included in the Plan of Korlhalli and Mundkur.

(i) Teak Pole Working Circle

All Teak pole areas except the areas situated on steep hills of Yawal range of Reberio's Plan were included in this working circle, Teak forests were of quality III and IV. But same treatment i.e. modified clear felling with reservation of valuable species upto 45 cm. in girth (upto 60 cm. in better areas) was prescribed. The silvicultural treatment consisted in rotation of young and middle aged trees that were widely spaced and felling the remainder. But, since no such reservations were made in some of the worked coupes, over exploitation took place. No safe guards were also prescribed in under stocked areas. The prescription of removal of inferior growth interfering with valuable species was not followed. As a result, Salai grew over established teak young growth. The coupes worked under the plan gave fairly good results since advance growth was adequate to form future crop. But where the advance growth was absent, the areas have been monopolised by weeds. Cutting Back Operations were neither prescribed nor carried out. Cultural operations like cleanings and thinning were not properly carried out. Artificial Regeneration to the extent of 10% of the coupe area, though prescribed, was not carried out to the desired extent. Whatever plantations taken were not tended or protected from fire.

(ii) Teak Timber Working Circle

It included all the better quality areas in the northern part of Yawal range. They are situated on the steep slopes and smaller hills between the main ridge of the Satpuda hills in the South and Aner river in the North. The areas actually constituted in this Working Circle included poorer quality forests also. The areas were devoid of younger age classes. Dense bamboo and grass growths were noticed. The silvicultural system prescribed was Selection-cum-Improvement felling. The felling

cycle of 30 years was prescribed. But heavy selection felling occurred due to the fact that exploitable girth was reduced from 105 cm. to 90 cm. The forests as a whole got impoverished with scattered young to middle aged trees over dense tall grass. Plantations were not raised and no cultural operations carried out.

(iii) Anjan Working Circle

It included all the predominantly Anjan areas as in the previous plan. Teak had spread in several Anjan areas in Chopda range. The silvicultural system prescribed was Coppice with Reservation of all Anjan except those that were fallen or dead. A felling cycle of 30 years was prescribed. The stockings of the forests were extremely variable and as a result tree growth was further reduced leading to pure Anjan stands with scattered bushy growth of Khair, Dhavada etc. in places. No felling of mature Anjan, illicit cutting and overgrazing by cattle and sheep and recurrent fires have further contributed to the deterioration of the growing stock. It has now resulted into xerophytic forests.

(iv) Protection Working Circle

The areas partly of the former Teak Timber Working Circle and partly of former Teak Pole Working Circle in Yawal range under Reberio's Plan was included under Protection Working Circle. These areas were situated on either side of the main ridge of the Satpudas on Steep and often precipitous slopes. No particular prescriptions were made due to steep slope. Some accessible and valuable forests, which could have been exploited, were also included.

(v) Bamboo Working Circle (Overlapping)

Bamboos were prescribed to be worked on a three-year felling cycle on permits. The bamboo was exploited on permit by local villagers as well as purchasers from adjoining area. Owing to large size of coupes supervision was difficult and rules were often violated. There was heavy unscientific exploitation resulting into deterioration of Bamboo clumps.

(vi) Minor Forest Produce Working Circle (Overlapping)

This comprised of all the forests dealt with under different working circles of the plan. Rosha, Chilar, Kadai, Apta and Tendu etc. were the minor forest produces included.

11.2.3 : Vaidya's Plan

The revision of the working plan by **P.R.Vaidya** was taken up during the year 1962 and this plan was in operation from **1966-67 to 1980-81**. Subsequently this plan was extended up to the year 1984-85. During this revision stock mapping of the forests was undertaken and forest areas were divided into blocks and compartments for the first time. The following working circles were constituted:

- i) Protection Working Circle.
- ii) Selection cum-improvement Working Circle.
- iii) Coppice with Reserve Working Circle.
- iv) Anjan Working Circle.
- v) Plantation Working Circle.
- vi) Bamboo (Overlapping) Working Circle.
- vii) Kadai (Overlapping) Working Circle.

(i) Protection Working Circle

This working circle comprised of the protection forests from Haripura range. The total area covered by this working circle is 4420.70 hectare. The main object in formation of this working circle was to maintain and improve the existing soil cover in the vulnerable areas spread along the steep slopes on the ridges of Satpudas. Only removal of dead teak trees, to improve the present stocking and its density by diffused plantations, if feasible had been prescribed. No silvicultural method of management was prescribed. Planting in pits, wherever sufficient soil depth was available, was proposed. Species recommended for planting were poly-pots of Hirda, Jambhul, Anjan, Bamboo and Khair. Due to the very steep nature of the terrain, it was emphasized to guard against any method of concentrated regeneration involving clear felling, which would accelerate the process of soil erosion. Weeding, cleaning and replacement of casualties till the area is considered as successfully reboised was prescribed to improve the stocking.

(ii) Improvement Working Circle

This working circle included better quality Teak high forests of Haripura and Deoziri ranges. The total area of this working circle was 12091.17 hectares. The method of treatment prescribed was Selection-cum-Improvement felling on 30 years cycle. The main aim of the treatment was to increase the proportion of Teak and other valuable species like Shisam, Bija, Ain, Haldu, Tiwas etc. in the crop and to build up stock of higher dimensions of the same. This was in view of the fact that large sized trees were removed in the part and there was dearth of such trees in the present growing stock. Areas liable to erosion, areas dangerously under-stocked, a strip of one chain along the nallas and precipitous slopes were to be excluded from working. In the workable areas one out of two Teak trees of 107 cm. and above in girth at b.h. was to be marked for felling. All mature trees of other valuable species were to be marked for felling on silvicultural availability. Exploitable girth for Teak was kept at 110 cm. but for Shisam, Bija, Ain and Haldu it was 120 cm. In patches containing adequate advanced growth of Teak and other valuable species, the over wood was expected to be opened up suitably for improving the existing stock. Yield was to be regulated by area. One thinning in the 15th year commencing from the main year of felling was prescribed.

(iii) Coppice with Reserve Working Circle

In this working circle were included Superior Teak Pole Forests of Deoziri, Chopda and Haripura ranges. The bulk of the forests were of IV a quality. This working circle corresponds to Teak Pole Working Circle of Mundkur's plan except that Teak III quality areas of Chopda range were allotted to Selection-cum-Improvement Working Circle. Predominantly Teak areas of Anjan Felling Series of Chopda range were also allotted to this working circle. The total area covered by this working circle was 40226.44 hectare. The method of treatment was 'Coppice with Reserves' with a rotation of 45 years for Yawal and Chopda ranges. Yield was to be regulated by area. Areas liable to erosion, steep and precipitous slopes, strips of one chain width along nallas and under-stocked areas were to be excluded from felling. In patches of young pole crop thinning was expected to be carried out while in the areas of low density, improvement felling consisting of removal of dead, dying unsound and over mature trees were to be carried out. All healthy trees of edible

flowers and fruits are to be reserved. One thinning in the 12th year and second in the 24th year after main felling was prescribed for Haripura and Deoziri ranges.

(iv) Anjan Working Circle

This working circle comprised of all the forests, having predominantly Anjan as principal species. These forests were in Raver, Pal, Haripura and Chopda ranges. The total area of this working circle was 42301.01 hectare. The method of treatment prescribed was improvement felling on 30 years felling cycle. Artificial regeneration over 15 percent coupe area was prescribed in order to improve the value of forests by planting Teak, Khair and Eucalyptus. Yield was regulated by area. All dead over mature trees were to be marked for felling while healthy trees of species of Mahuwa, Temburni, Char, Hirda, Behada, Kadai and Khair were to be reserved. In unworkable area, no felling of living trees was prescribed on steep slopes, in understocked areas, eroded areas and places liable to serious erosion. In workable areas, all dead, dying and over mature and seriously diseased trees were prescribed for felling. Cleaning in the 6th year and one thinning in the 15th year, commencing from the year of main felling was prescribed to help the re-growth of valuable species.

(v) Plantation Working Circle

This Working Circle included some of the areas of Pal and Haripura ranges. The total area falling under this working circle was 661.66 hectare. The silvicultural system prescribed for this working circle was clear felling and planting with Teak. The chief object was to convert artificially as much of the better quality mixed forests as possible into normal series of Teak plantations to enhance the capital value of the forests. Only sequence of felling and a plantation programme was prescribed in this working circle. Cleaning in the sixth year and thinning in the tenth year was also prescribed.

(vi) Bamboo (Overlapping) working Circle

This was an overlapping working circle, which included all bamboo forests of Haripura, Deoziri and Chopda ranges. The total area covered by this working circle was 24334.36 hectare. The standard bamboo felling rules were prescribed. Felling cycle was 4 years. Bamboos were to be sold on permit.

(vii) Kadai (Overlapping) Working Circle

This was also an overlapping working circle, which included Kadai forests of Raver, Haripura, Deoziri, and Chopda ranges. This working circle was 52889.24 hectare in extent. The object was to regulate the Kadai Gum tapping in the area. Each tree was to be tapped for 3 years and was to be given rest for the next three years. Second Tapping cycle was to begin in the 7th year and was to be continued for another 3 years. Blaze method was proposed to tap the gum.

13.2.3.1: Results of working the forests under Vaidya's Plan

No operations like removal of dead trees, diffused planting in pits etc. were carried out. Biotic factors like fire, grazing and illicit felling continued and the forests started deteriorating.

In case of Selection-cum-Improvement Working Circle, the object was to gradually increase the teak reproduction. Vigorous under-storey of bamboo and grass, rugged nature of the terrain, shortage of labour, frequent fires etc. came in the way of artificial regeneration. Increasing the proportion of Teak and other valuable species in the crop and to build up higher dimensions were aimed. A part of the mature growing stock was also to be removed. However, only 24 coupes in 4 felling series from 1966 to 1975 had been worked by Yawal Division. The Yawal Project Division F.D.C.M. Ltd. clear felled 1705.60 hectare area in 3 felling series from the year 1975 to 1983. The areas worked by the Department now present scattered young to middle aged trees over dense tall grass. Regeneration is conspicuously absent. Cultural operations were not carried out. The areas planted up by Yawal Project Dn. of the F.D.C.M. Ltd., also ended up as failures. The sudden opening of the canopy threw out dense tall grass, which came in the way of regeneration. The forests have become more vulnerable to fire.

All the teak areas of IV-b quality of Chopda, Deoziri, and Haripura ranges were grouped together in Vaidya's Plan. The soil was poor, regeneration by coppice as well as seedlings coppice was adequate at places. The treatment prescribed was coppice with reserves with a rotation of 45 years for Haripura, Chopda and Deoziri ranges, with the object of improving the condition, composition and density of the crop. In actual practice, however, it was found that the forests under this working circle had not been worked according to the prescriptions laid down in the plan.

Much of the coppice growth of valuable species was found to have been suppressed by species of comparatively less value. Many unsound trees also had been marked for reservation. In many cases, inferior species dominated to the detriment of the valuable species. The main future crop was to be from the coppice growth, which was unfortunately neglected and did not receive subsequent cultural operations necessary for its development. No thinning of young pole crop in patches was carried out. Cleaning in the 6th year and one thinning in the 12th year and second in the 24th year after main felling, prescribed in the plan, were not carried out. 120 coupes out of 460 coupes belonging to 21 Felling Series of Yawal Division were actually worked. Examination of the coupes worked in the past showed that cutting back operations had not been carried out and the teak coppice shoots are growing congested with the coppice growth of valuable species. Thus the chief object of management of these forests to supply on a sustained basis small and medium sized timber was defeated.

Yawal Project Division of the F.D.C.M. Ltd., clear felled 1499.24 hectare area in 3 felling series and tried to regenerate the same artificially. They also met with failure due to aggressive growth of grass and fire.

In case of Anjan Working Circle, the object was to increase the proportion of valuable species and to free the existing reproduction of valuable species. Artificial regeneration to the extent of 15% of the annual coupe with the species such as Teak, Eucalyptus and Khair though prescribed was not carried out to the desired extent. No attempts were also made to take up artificial regeneration of Teak in suitable areas of not less than 2 hectare. The light crown thinning in the pole crop of Anjan was not carried. Trees of inferior species interfering with valuable species were also not removed. 6th year cleaning and 15th year thinning commencing from the year of main felling were not carried out in any coupes in Raver, Pal, Haripura, and Chopda ranges. Illicit cutting for firewood and overgrazing by cattle and sheep has further contributed to the deterioration of the growing stock. These factors coupled with recurrent fires have accelerated soil erosion in this tract. Year after year, the areas remained un-worked but no large scale attempts to arrest these ill-effects were made and these areas which once harbored good forests, have deteriorated to

drastically. In all, 38 coupes in 22 out of 31 felling series in Yawal division were actually worked.

In plantation Working Circle, artificial regeneration to the extent of 10 hectare in annual coupes for converting artificially as much as of the better quality mixed forests into a normal series of teak plantations, was not carried out to the desired extent. Only 425.51 hectare in 13 coupes out of 30 coupes were worked. The success was not very satisfactory. The results of the attempts made for afforestation works were also not satisfactory because the sites selected were not suitable, the plantations were not effectively protected from fires, grazing and frequent illicit cutting.:

11.2.4 : Thomas and Samant's Plan

The revised working plan by P.C.Thomas and S.D.Samant came into force from 1989-90 to 1998-99. During this revision stock mapping of the forests was undertaken.

The following working circles were constituted:

<u>Sr.No.</u>	<u>Working Circle.</u>	<u>Area in ha.</u>
1)	Protection Working Circle.	3987.74
2)	Coppice with Reserve W.C.	15154.23
3)	Anjan Working Circle.	19147.00
4)	Afforestation Working Circle.	5192.47
5)	Wild Life Working Circle.	23335.00
6)	Miscellaneous Working Circle.	1678.22
7)	Babmoo (Overlapping) W.C.	Entire
8)	Minor Forest Produce (Overlapping)Working Circle.	Entire

(i) Protection Working Circle :

This Working Circle included the Protection Forests of Haripura Range. Total area of the Working circle was 3987.74 hectare. The main object of this working circle was to maintain and improve the existing soil cover, vegetation in the vulnerable areas, which spread along the steep slopes on the ridges of Satpuda, forming catchment area of the water courses in the region.

As the exploitation in this working circle would have led to soil erosion and affected the productivity of agriculture lands in the lower region, no felling was

prescribed in these forests. For restocking, dibbling of seeds were suggested in the compartments. Strict protection from grazing, fire and illicit cutting was prescribed. Anti soil erosion works like nalla bunding, check dams were suggested to check soil erosion. Woody climbers over 15 cm. girth in the accessible areas were to be cut. Removal of fallen wood was allowed.

(ii) Coppice with Reserve Working Circle.

In this working circle 24298.33 hectare area of superior teak pole forest of quality IV-a and some compartments containing quality III teak forests of Deoziri Range and Haripura ranges were included. The Special object of management was to improve the condition, composition and density of the crop, to ensure adequate regeneration and to obtain maximum sustainable yield of small timber, pole and fuel. All the immature groups of pole were reserved. In order to increase the proportion of non-teak species like Bija, Ain, Semal, Shivan, Haldu, Khair etc. the proportion of these trees was to be kept at 50% of the reserved trees. The number of reserved trees/poles per hectare prescribed was 150. The rotation of 45 years was prescribed. At this age Teak was expected to achieve a diameter of 22.6 cm. at B.H. Yield was to be regulated by area.

(iii) Anjan Working Circle.

In this working circle the main species is Anjan, which occurs predominantly in the forest of Mohmandli, Pal, Haripura and Chopda Ranges. The objects of management were to increase the proportion of economically important species and to enhance the production of fuel, small timber and Anjan leaf fodder to meet the demand of local people. Anjan forests were mostly of poor quality and were generally open. As the stocking in these forests was extremely variable, from dense patches of Anjan to under stocked patches carrying mixed forests, a conservative system to improve the growing stock was prescribed and the forests continued to be managed under the system of improvement felling. Felling cycle of 30 years was prescribed. Anjan and Teak were prescribed as the principal species to be raised in blank areas. Other valuable species like Khair, Sisoo, Siras were also suggested for raising in poorly stocked areas..

(iv) Afforestation Working Circle. Due to heavy and excessive grazing these areas had been denuded and depth and quality of the soil was rather poor. All the areas needing afforestation were included in this working circle. The main object was rehabilitation of tree cover in shortest possible time for production of fuel, small timber and fodder to meet local demands. Hardy and draught-resistant species such as Neem, Siras, Sisoo, Anjan, Karanj, Khair etc. were suggested. No fixed rotation was prescribed

(v) Wild Life Working Circle: This working circle dealt with the areas that were exclusively set aside for preservation of wild life. The Yawal Game Sanctuary was constituted vide Govt. Notification No. WLP/1668/151600-Z, dt. 21-2-1969. The area of Game Sanctuary and buffer zone were already separated and excluded from the plan. The special objects of management were to preserve the variety of flora and fauna representing the biological diversity and genetic resource and to take special care of the needs of wild life conservation. In the sanctum sanctorum of the sanctuary even the dead trees were to be retained. Outside the sanctum sanctorum only the dead trees were to be removed. Strict protection against illicit felling, encroachments were prescribed. Fruit plants like Ficus, Mulberry, Jamun etc. were suggested for planting on the banks of rivers and tanks. Along the riverbanks and in the moist areas edible wild fruit and flower trees were suggested for planting. Bunds and permanent water holes were suggested for providing drinking water to wild life during lean period. The detailed management plan was to be prepared by CCF, Wildlife .

(vi) Miscellaneous Working Circle This working circle consisted of 1678.22 hectare which was earmarked for dis-forestation for giving to landless people and for executing various irrigation projects. Out of this, only 127.41 hectare area was diverted for non-forestry purpose under FC Act.

(vii) Bamboo (Overlapping) Working Circle: This working circle overlaps Coppice with Reserve Working Circle and Protection Working Circle of Haripura and Deoziri Ranges. The objects of management were to harvest the bamboo on scientific basis so as to obtain maximum sustained yield and to provide for artificial regeneration of bamboo, where natural regeneration is not adequate, so as to increase further yield. Bamboos were prescribed for harvesting under four-year cutting cycle. Each cutting

series had been divided into four coupes, one of which remains open for extraction every year.

(viii) Minor Forest Produce Working Circle. This was an overlapping Working Circle covering the entire area of the Division. The object of management was to ensure scientific collection of various MFPs and to increase or at least maintain the yield of various MFPs. Procedure for tapping of Kadai gums were prescribed in detail. Artificial plantation of Tembhrun by dibbling of treated seeds was also recommended. Mahua trees were not to be felled and given adequate representation in Artificial Regeneration Programmes. Karanj saplings were to be planted along the nallas, river banks and as avenue trees.

13.2.4.1 : Results of working the forests under Thomas and Samant's Plan

During this plan revision of stock mapping of the forests was done. In Protection working circle dribbling of seeds for restocking was not carried out. The area has not been effectively protected from grazing, fire and illicit cutting. Works to control soil erosion in the area were also not carried out due to non availability of funds. In coppice with reserves working circle the cultural operations and thinning works were not carried out. As the coupes were sparse and the density less than 0.4, as the coupes were unfit for the working, the felling was not carried out. In anjan working circle due to poor and sparse tree growth felling of anjan trees were not done. Afforestation of anjan, teak and other suggested species were also not carried out.

In afforestation working circle, no afforestation works as prescribed were carried out during previous working plan. But under different schemes plantation works were carried out in the division, details of which are given in the Annexure X. The success of these plantations was not very satisfactory. In miscellaneous working circle which consisted of 1678.22 hectares, which was earmarked for disforestation for giving ot landless people and for executing various irrigation projects only 127.41 hectares area was diverted for non forestry purposes under FC Act. Bamboo working was carried out in the division, though not strictly as per the cutting rules. The outturn of bamboo is given in Annexure VI. Under Minor forest Produce working circle plantations of khair, Moha and other fruit bearing species were carried out to

some extent during the plan period. The minor forest produce extracted from the forests along with quantity and prices are given in the Annexure IX.

11.2.5 : VASUDEVAN, T.S.K. REDDY AND TIWARI'S AND PLAN (2006-07 TO 2015-16)

FORMATION OF WORKING CIRCLES :-Following working circle were constituted

1. Protection with Improvement Working Circle.
2. Improvement Working Circle.
3. Anjan Working Circle.
4. Plantation (Overlapping) Working Circle.
5. Non-Timber Forest Produce Working Circle.
6. Bamboo (overlapping) Working Circle.
7. Forest Protection Working Circle.
8. Joint Forest Management Working Circle.
9. Wild life Management Working Circle.
10. Eco-Tourism Working Circle.
11. Survey and Demarcation Working Circle.

(i) PROTECTION WITH IMPROVEMENT WORKING CIRCLE :

This Working Circle was constituted of forest area from Raver, Yawal West, Yawal East and Chopada East ranges which belonged to the Protection, Afforestation, and Miscellaneous Working Circles of the previous plan.

The common species are Teak, Khair, Tiwas, Bamboo, Tembhrun and Mahua. Karvi and Sabri are found in patches.

• SPECIAL OBJECTS OF MANAGEMENT :

- a. To preserve and improve the existing vegetal cover in vulnerable areas with a view to maintain and improve microclimatic and micro-edaphic conditions of the site.
- b. To improve the vegetation by seed dibbling on precipitous slopes ($>25^{\circ}$) and trench/pit planting on slopes ($<25^{\circ}$) along with soil and moisture conservation structures.
- c. The compartments adjoining to wildlife sanctuary forms a buffer between sanctuary area and other forest areas where human activity starts.

- **METHOD OF TREATMENT :**

No felling will be carried out and the existing vegetation in the area shall be preserved, In areas already eroded soil conservation works, such as nala bunding and gully plugging and water conservation measures such as water absorption trenches (WATs) or will be taken up. The rain water that falls in the area will be arrested and allow to percolate to improve the water regime of the area in the under-stocked and blank areas seed sowing of locally found species will be done. The area will be closed for grazing and protected from fire.

- **PAST RESULTS :**

No marking and no improvement felling were done as all the area of this working circle falls within a limit of Eco sensitive zone of Yawal wildlife sanctuary. The works of improvement like plantation works, soil and moisture conservation, seed dibbling in blank areas have been taken.

- **Artificial Regeneration:**

The details of plantation works carried are as follows. Table No. 11.1

Year	Coupe No.	Number of coupe	Total Coupe area (Ha)	Area Proposed for treatment (Ha.)	Actual Plantation works taken (Ha.)
2007-08	I	5	1604.43	160.50	80
2008-09	II	5	1765.28	176.50	70
2009-10	III	5	2058.56	200.00	350
2010-11	IV	5	1611.77	297.99	464
2011-12	V	4	1449.98	0	203.50
2012-13	VI	4	1510.23	0	130
2013-14	VII	4	1443.42	0	70
2014-15	VIII	4	1683.99	0	77
2015-16	IX	4	1170.01	0	97
	Total	40	14297.67	834.99	1541.50

Total 834.99 ha area was proposed for artificial regeneration but actually 1541.50 ha. plantations are done. In felling proposal no plantations were proposed in coup no. V to IX but actual plantations were done as per the availability and

suitability of area for plantations. 80 ha. Plantation was done in advance coupe. Out of these plantations, 1016.50 ha.(63%) plantations were found successful (Survival more than 60%), 505 ha. (31.14 %) plantations were found partially successful (Survival between 41% to 60%) and 100 ha. (6.16%) were found failure (Survival less than 40%).

- **Natural Regeneration:**

The details of Natural regeneration works carried are as follows **Table No. 11.2**

Year	Coupe No	Total Coupe area (Ha)	Area Proposed for treatment (Ha.)	Actual works carried (Ha.)		
				With fund	Shramdan	Total
2007-08	I	1604.43	159.43	50	5	55
2008-09	II	1765.28	176.28	75	0	75
2009-10	III	2058.56	200.00	25	5	30
2010-11	IV	1611.77	745.00	25	10	35
2011-12	V	1449.98	1499.98	0	5	5
2012-13	VI	1510.23	1510.23	25	5	30
2013-14	VII	1443.42	700.00	25	0	25
2014-15	VIII	1683.99	450.00	55	15	70
2015-16	IX	1170.01	312.00	50	5	55
		14297.67	5752.92	330	50	380

5752.92ha. area was proposed under natural regeneration but only 380 ha. (7 %) was achieved. The achievement is very less compared to proposed area. This might due to lack of funds. Proper assessment of area available for NR was not done and the proposed area were exaggerated than actual available for NR. The NR works are actually carried in Year 2011-12 to 2016-17.

- **Soil and moisture conservation works:** Soil and moisture conservation works were carried as per the availability of funds through DPDC and Jalyukta Shiwar programme.

Table No. 11.3

Year	Coupe No	CCT (Ha)	CNB	ENB	Gully plugging (Ha)
2007-08	I	25	10	0	10
2008-09	II	52	0	0	0
2009-10	III	48	0	0	0
2010-11	IV	0	0	0	0
2011-12	V	69	16	1	0
2012-13	VI	0	0	0	0

2013-14	VII	50	0	0	0
2014-15	VIII	0	0	4	0
2015-16	IX	35	0	0	25
	Total	279	26	5	35

These works were not done as per the working plan schedule. The works of CCT, Gully plugging was very effective in arresting the soil erosion and has increased the water regime of the soil which resulted in improving the biomass. Water is made available to the wildlife through Cement Nala Bandh.

Seed dibbling on precipitous slopes were not done however seed dibbling of neem, khair, karanj within plantation areas have been done giving good results.

(ii) **IMPROVEMENT WORKING CIRCLE :**

This working circle is already there in Vasudevan, Reddy and Tiwaris plan and there is no change in the forest management system Teak is the principal species with Dhavada , Salai and Tembhrun, Moha, Awla etc. as the associates. The forests are well stocked. In higher hill slopes and plateaus with poor soil, Salai is predominantly found. Occurrence of bamboo is sparse. The growing stock is middle aged and reproduction is adequate. Quality is generally IV-a.

• **THE SPECIAL OBJECTS OF MANAGEMENT :**

1. To improve the condition of the growing stock by tending existing rootstock.
2. There is a need to improve blank areas into well stock areas through artificial regeneration.
3. To safeguard the areas against soil erosion and thereby preserve and improve the site quality.
4. The upper reaches and steep slopes will be protected so that grasses can come up in these areas.
5. To increase the proportion of valuable species in the growing stock.
6. The upper reaches and steep slopes will be protected so that grasses can come up in these areas.

• **METHOD OF TREATMENT :**

No felling is prescribed in the entire area However, dead trees will be removed if economically viable. All climbers will be cut and parasites removed where possible. All live stools of illicit felling cut high above the ground level will be

fashioned so that coppicing takes place. Soil & moisture conservation works will be carried out so as to prevent soil erosion and to allow percolation of rain water to the ground. The details of marking rules and subsidiary, silvicultural operation will be given in the draft plan.

- **Past Results :-** When working plan was sanctioned on 17 September 2007, it was a period when Forest Right Act 2006 was enacted. After commencement of this Act, large scale illicit felling was started in the forest area of Yawal Division. There was apprehension in the mind of every forest officials that, if any coupe working is done, there are more chances of encroachment and illicit cutting in forest area. This assumption was also supported by the letter no 3346 dated 1.11.2006 of Managing Director FDCM addressed to Secretary Forest Maharashtra State mentioning that, it was impossible for them to protect their forest area due to illicit felling and encroachment. And thus area of FDCM was handed over to Yawal territorial Division and Yawal FDCM Division was closed on 7.6 2007. Therefore no marking and felling were done, however the works of improvement like plantation works, tending of rooted stock in plantation areas, soil and moisture conservation, seed dibbling in blank areas, have been taken.

Table No. 11.4 Artificial Regeneration: The details of plantation works carried, are as follows.

Year	Coupe No	Number of coupes	Total Coupe area (Ha)	Area Proposed for treatment (Ha.)	Actual Plantation works taken (Ha.)
2007-08	I	14	1125.19	107.00	316
2008-09	II	14	1236.05	118.00	243
2009-10	III	14	1113.58	112.00	315
2010-11	IV	12	980.66	490.33	516
2011-12	V	11	924.70	630.00	226
2012-13	VI	11	1040.01	575.00	285
2013-14	VII	11	986.83	575.00	15.61
2014-15	VIII	11	1061.91	350.00	360
2015-16	IX	11	953.28	300.00	70
Total-		109	9422.43	3257.33	2346.61

Total 3257.33 ha. area was proposed for artificial regeneration but 2346.61 ha. plantations were actually done. The achievement is 72 %. Plantations on 310 ha. were also taken in advance coups. Out of these plantations, 1490 ha.(53.31%) plantations were found successful (Survival more than 60%), 674.61 ha. (24.13%) plantations were found partially successful (Survival between 41% to 60%) and 630 ha. (22.54%) were found failure (Survival less than 40%).

Proportion of species as prescribed in this working circle could not be maintained. The proportion prescribed for teak was rigid and could not be maintained as teak seed was not locally available due to illicit cutting of all middle age to mature trees. The species planted includes Neem, Khair, Sisoo, Amla, Shiwan, Karanj, Anjan, Papda, Bamboo, Beheda, Moha and small proportion of Teak. Most successful species all over the division are Neem, Khair, Sisoo, Karanj. Bamboo has excellent growth in Deoziri range. Khair has attended girth up to 30 cm in fourth year.

Most of the planting was done on trenches. This becomes very much effective in conserving the soil. This has also resulted in to excellent growth of grasses and induced NR.

- **Natural Regeneration:**

The details of NR works taken during Plan period area as below. Table No. 11.5

Year	Coupe No	Total Coupe area (Ha)	Area Proposed for treatment (Ha.)	Actual works taken (Ha.)		
				With fund	Shramdan	Total
2007-08	I	1125.19	159.55	0	5.00	5
2008-09	II	1236.05	174.75	0	10.00	10
2009-10	III	1113.58	167.00	0	10.00	10
2010-11	IV	980.66	510.66	0	15.00	15
2011-12	V	924.70	200.00	0	10.00	10
2012-13	VI	1040.01	465.01	0	15	15
2013-14	VII	987.05	200.00	0	15.00	15
2014-15	VIII	1061.91	250.00	10	0	10
2015-16	IX	953.28	200.00	45	0	45
Total-		9422.43	2326.97	55	80	135

2326.97ha. area was proposed under natural regeneration but only 135 ha. (5 %) was achieved. The achievement is very less compared to proposed area due to

exaggeration of available area and paucity of fund. NR of teak, Dhavada , khair, ain, is very good. Counting, singling, coppicing and soil working for NR is done. The NR works done are not as per the working plan scheduled. Arrear coupes are also treated through Sharman since 2012-13.

- **Soil and moisture conservation works:** Soil and moisture conservation works were carried as per available funds through DPDC and Jalyukta Shiwar. The details are as below. **Table No. 11.6**

Year of operation	Coupe No	CCT (Ha)	CNB	ENB	Gully plugging (Ha)
2007-08	I	20	20	0	0
2008-09	II	0	30	0	10
2009-10	III	0	0	0	0
2010-11	IV	0	0	0	80
2011-12	V	0	0	0	0
2012-13	VI	0	0	0	0
2013-14	VII	0	0	0	0
2014-15	VIII	20	0	0	25
2015-16	IX	0	0	0	0
Total		40	50	0	115

These works were not done as per the working plan schedule. Objectives of this working circle were achieved to the greater extent within the availability of funds and through Shramdan.

3. ANJAN WORKING CIRCLE :-

This working circle comprises of all the forests bearing predominantly Anjan as the principal species. These areas carry a better percentage of Anjan than other species and hence it is necessary to give separate treatment to these areas. These areas belonged to Anjan, Working Circle of Vasudevan, Reddy and Tiwaris, Working Plan.

The forests are predominantly Anjan-bearing and it occurs in varying proportion but in localities near Pal in Raver range, Chaugaon, Lasur, Umarti of Chopada range, it is often gregarious. Anjan predominance is seen in the extreme east and west of the division. The composition of the crop varies from

almost pure crop of Anjan on level and undulating ground to the mixed one on the slopes of the hills having mainly Salai.

- **The special object of management are :**
 1. To meet the local demand of small timber, firewood and Anjan fodder leaves to the extent possible.
 2. To safeguard the areas against soil erosion and thereby preserve and improve the site quality.
 3. To improve the growing stock as well as to bring more area of Anjan under regeneration.
- **Past Results :-** No marking and felling were done due to apprehension of encroachment however, the works of improvement like, plantation works, NR, soil and moisture conservation, seed dibbling in blank areas have been taken.
- **Artificial Regeneration:**

The details of plantation works carried are as follows. Table No. 11.7

Year	Coupe No	Total Coupe area (Ha)	Area Proposed for treatment (Ha.)	Actual Plantation works taken (Ha.)
2007-08	I	1118.90	168.00	304
2008-09	II	1194.65	179.00	341
2009-10	III	1309.46	201.00	165
2010-11	IV	1180.20	590.11	476
2011-12	V	1148.44	550.00	251
2012-13	VI	1123.79	675.00	242
2013-14	VII	1130.35	675.00	64
2014-15	VIII	1184.01	450.00	152
2015-16	IX	1020.4	380.00	283
Total-		10410.2	3868.11	2278

Total 3868.11 ha area was proposed for artificial regeneration but actually 2278 ha plantations were done. The achievement is 59%. Plantations on 553 ha. was also done in advance coupes. Out of these plantations 1779 ha.(62.83%) plantations were found successful (Survival more than 60%), 902 ha. (31.86 %) plantations were found partially successful (Survival between 41% to 60%) and 150 ha. (5.29 %) were found failure (Survival less than 40%).

The proportion prescribed for anjan was 50% and that could not be maintained as seeding of anjan was not available regularly every year. Planting of anjan requires one and half year old plants. Sufficient plants could not be made available. The species planted includes Anjan Neem, Khair, Sisoo, Amla, Shiwan, Karanj, Papda, Bambo, Behda, Moha and Teak.

- **Natural Regeneration:** When the seeding were good, profuse regeneration of anjan seedlings was observed. Due to strict protection from grazing and fire, very good survival of anjan is noticed in area of Yawal East and Raver ranges. The details of NR works taken are as below. **Table No. 11.8**

Year	Coupe No	Area Proposed for treatment (Ha.)	Actual works taken (Ha.)		
			With fund	Shramdan	Total
2007-08	I	222.90	0	0	0
2008-09	II	240.65	35	0	35
2009-10	III	134.00	0	31	31
2010-11	IV	1180.00	0	0	0
2011-12	V	300.00	25	10	35
2012-13	VI	448.79	40	10	50
2013-14	VII	200.00	125	5	130
2014-15	VIII	250.00	25	0	25
2015-16	IX	200.00	75	0	75
Total-		3176.34	325	56	381

3176.34 ha. area was proposed under natural regeneration , but only 381 ha. (12 %) was achieved. The achievement is very less compared to proposed area, due to inadequate funds. Proper assessment of area available for NR was not done as NR of anjan was not to that extent (31% of total coup area) as proposed. The proposed area was exaggerated than actual area.

- **Soil and moisture conservation works:** Soil and moisture conservation works were carried as per availability of funds mainly through DPDC and Jalyukta Shiwar. The details of work carried are as below. **Table No. 11.9**

Year of operation	Coupe No.	CCT (Ha)	CNB	ENB	Gully plugging (Ha)
2007-08	I	75	0	0	0
2008-09	II	40	0	0	0
2009-10	III	135	0	0	0
2010-11	IV	25	19	0	0
2011-12	V	107	9	1	45
2012-13	VI	10	2	0	7
2013-14	VII	48	0	4	8
2014-15	VIII	170	8	12	75
2015-16	IX	165	12	5	0
Total-		775	50	22	135

During plan period, 775 ha. CCT, 135 ha. gully plugging , 50 CNB and 22 earthen bunds works were taken. All these works were found very effective in conserving the soil and moisture. The works of CCT were also become very effective in removal of encroachment and rejuvenation of these areas with vegetal and grass cover.

- **Achievement of objectives**

1. Local demand of small timber, firewood couldn't be fulfilled as no felling is done however, anjan leaves are used for fodder.
2. Due to plantations, soil and moisture conservation works, these areas are well protected from soil erosion and definitely, there is improvement in site quality.
3. Growing stock is improved due to protection and various soil and moisture conservation treatments.

- **Plantations on area received from FDCM**

Plantations were also taken on area received from FDCM. Total 2189.90 ha. Plantations were taken during plan period. Out of these plantations, 965 ha.(44.06 %) plantations were found successful (Survival more than 60%), 1074.90 ha.(49.08 %) plantations were found partially successful (Survival between 41% to 60%) and 150 ha. (6.84 %) were found failure (Survival less than 40%).

4. PLANTATION (OVERLAPPING) WORKING CIRCLE :

This is an overlapping working circle. The division area is covered in previous three working circles and in all three working circle, blank fillings and soil and moisture conservation works were prescribed.

There are some successful plantations in the division, and these plantations are covered in this working circle. The old and successful plantations in the Division were included in this working circle. This is an overlapping working circle.

The special object of management are :

1. To improve the growing stock by tending of the existing Plantations.
2. To meet the local demand of fire wood and small timber to the extent possible.

As the object of management is improvement, only climber cutting, tending etc are proposed to be carried out in this working circle.

- **METHOD OF TREATMENT :**

Cut Back Operation :- The stumps of illicity cut tree will be felled in slanting manner by saw. Dressing of the stool will be carried out. The area will be protected from fire.

First Year Operation :- Two vigorous and straight coppices coming from the lower most side will be retained. Other coppices will be cut. Seed sowing will be carried out in the blank areas. Soil and moisture conservation works will also be taken up. Area will be protected from fire.

Second Year Operation :- All climbers will be cut. If some miscellaneous plants are having multiple leaders only the most vigorous shoots will be retained and others will be cut.

- **Past Results :-**

No further study about the success and failure plantation. No tending operations were carried out in these plantations; hence objectives of this working circle could not be achieved.

5. NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE :

This is an overlapping working circle extends over the entire plan area.

Minor forest produce comprises all forest products other than timber and fuelwood and include medicinal plants, gums, resins oleoresins, essential oils,

fatty oils, edible and wild plants, tanning acids, fodder and forage plants, colouring material, katha, oxalic acids, saponins, insecticides, green manures, beads, rubber plants, plants useful for paper baskets, wicker work including canes, beedi leaf, thatching material, broom material etc. Besides these plant products, animal products such as lac, honey and wild animal extracts like horns, hoover, ivory, hides, which are now banned from trade are included amongst minor forest produce or non timber forest produce.

- **SPECIAL OBJECTS OF MANAGEMENT :**

1. To generate employment and improve the economic situation of the local rural people.
2. To identify and assess different NTFP resources in the division.
3. The local people should be taught about the collection / tapping technologies and sorting of the collected produce.
4. Assessing the NTFP potential of the division.

Parliament has enacted a law “The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996 (Act No.40 of 1996)”. The said Act provides for endowing by the States, the Panchayats in necessary to enable them to function as institution of self Govt. It further provided that a State Legislature should ensure inter-alia that the Panchayats at the appropriate level and the Gram sabhas are endowed specifically with the ownership of minor forest produce.

Govt. of Maharashtra has enacted a law “Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act. 1997 and has amended Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No. 45 of 1997)”. Vide which ownership of 33MFP specified in the Schedule, found in the Govt. land has been transferred to the Panchayats.

- **Past Results :- :**

Another development is the 73rd Constitutional Amendment which gives right on minor forest produce to the Gram Sabha in PESA. The Honorable Governor of Maharashtra has modified existing Acts and has given the right of all minor forest produce (including Tendu, and Bamboo) to the Gram Sabha vide notification dated 19.8.2014.

Efforts were made to cultivate lac for which training were also imparted to the JFM members but it could not succeed. No systematic work of MFP collection is done except fir Tendu by departmental collection. Gum has a tremendous potential. Training was also given to the people of village Bormali in Vaijapur range for enhancing the productivity of gum.

36 villages of this division fall in PESA. Various programme of income generation from MFP were taken by District Administration under Centrally sponsored scheme like Human Development Mission (Manaw Vikas Mission) and other schemes in areas assigned as community right under FRA. Technology inputs and field trainings were provided to staff and villagers for extraction and value addition of the NTFP such as Gum, Lac etc. No resource survey has been done for NTFP.

The collection of tendu leaves is one of the income generating sources for local tribal's. The details of royalty received during plan period from tendu collection are as below.

Table No. 11.10

Year	Yield (Std Bags)	Royalty received (Lakh)
2006-07	2215.650	4.210
2007-08	5273.135	34.328
2008-09	4780.735	21.274
2009-10	4339.197	29.333
2010-11	4242.437	29.146
2011-12	1196.140	4.868
2012-13	4797.608	25.859
2013-14	Unsold	-
2014-15	Unsold	-
2015-16	Declared unproductive	--
Total	26844.902	149.018

Data of gum collected in year 2014-15 from some villages, where training was given is as below. Table No. 11.11

Range	Name of JFMC	Name of village	No of beneficiaries	Production(k g)	Price in lakh
Karjana	Devhari	Devhari	28	448	1.12
	Melane	Ghodachapar	19	295	0.74

	Melane	Jirayetpada	36	628	1.57
	Melane	Melane	50	1068	2.67
	Melane	Gomalpada	55	1626	4.06
	Karjane	Karjane	38	698	1.74
	Bormali	Bormali	132	1302	3.25
Deoziri	Deoziri	Deoziri, Deogad	10	68	0.17
	Total		368	6133	15.32

Out of 64 JFMC's, almost in all JFMC's gum is collected but no proper record is kept. This is not a complete data and the gum collection was much more. Moha flowers and Moha seeds are collected locally and are used for domestic purpose. Recently Cassiadora seeds were found collected by local peoples residing near forest. It is learnt that these seeds are to be used in tea and medicine. No data is available of its collection.

6. BAMBOO (OVERLAPPING) WORKING CIRCLE :

This is an overlapping working circle. 13 compartments with 2938.48 areas of Deoziri, Karjana and Yawal West ranges were included in this working circle. Areas falling in the Protection Working Circle, which was included in this working circle in the earlier plan, being situated in steep slopes were excluded from this working circle.

- **SPECIAL OBJECT OF MANAGEMENT**

1. To harvest mature bamboo scientifically so as to get maximum sustained yield.
2. To meet the local demand of bamboo to the maximum possible extent.

The distribution of the bamboo is sparse, having less than 100 clumps/ha. The bamboos are 10-12cm. in girth and about 6 meters in length. It indicates that low quality bamboos are found in the tract. Bamboo is associated with Teak, Shisam, Sadada and Bija. No natural regeneration of bamboo is found in the area.

- **METHOD OF TRAETMENT :**

The felling cycle will be of four years. Entire area will be divided into four coupes. Every year one coupes will be worked.

Past Results :- The main objective of management of this working circle was to harvest mature bamboo scientifically so as to get maximum sustained yield and to

meet the local demand of bamboo to the maximum possible extent. The felling cycle was of four years. Entire area was divided into four coupes. Every year one coupe was to be worked. Coupes were not worked regularly. Extraction was done only in 2007-2008 but not done in succeeding years due to apprehension of encroachment. There after in the 2015-16 & 2016-17 only 2314 Long bamboo & 2390 kurane bamboo (short bamboo) was extracted.

7. FOREST PROTECTION WORKING CIRCLE :

This is an overlapping working circle covering the entire forest area of the division. The forests are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated the constitution of this working circle. Illicit felling, Grazing, Encroachment, poaching and fire are the major causes for the damage of the forests.

- **SPECIAL OBJECTS OF MANAGEMENT:**

1. To enforce the Indian Forest Act 1927, Wildlife Protection Act 1972 as amended till 2018 for the effective control of illicit felling, grazing, encroachments poaching and fire.
2. To develop the database to monitor various offence cases in a systematic manner.

- **ILLICIT FELLING:**

Illicit felling in the forest area is growing at an alarming rate. This is observed near areas adjoining to Madhya Pradesh. Mostly teak trees are felled and carried away across the border after converting them to square logs or planks at site itself. Faster communication including vehicle facilities, adequate defense capabilities, frequent training and establishment of forest stations at strategic places were recommended to control illicit felling and wildlife offences. Establishing intelligence network for this purpose were also recommended.

- **PAST RESULT :-** Illicit felling was observed in areas of Deoziri, Karjana, and Vaijapur ranges adjoining to Madhya Pradesh state. Illicit felling by local people and also by illegal encroachers was noticed in some area of Yawal west range.

Table No.11.12 The details of illicit felling from 2006- to 2015 is given below.

Year	No. of trees felled	Volume (cm)	Value of damage (Lakh)
2006	19309	1382.639	41.87
2007	23535	1621.567	42.13
2008	25165	1887.541	38.97
2009	29142	2102.964	56.89
2010	19598	1696.119	44.25
2011	10143	1035.519	26.99
2012	5708	410.580	11.96
2013	4023	265.488	18.75
2014	3018	202.338	16.61
2015	3588	250.601	17.12
Total	143229	10885.357	315.54

Above data clearly shows that, heavy illicit felling was observed after commencement of FRA 2006.

- **FIRE PROTECTION :**

Fire adversely affects natural regeneration, forest growth, ground Flora, soil organisms and site productivity. Effective fire control were prescribed in the plan.

- **PAST RESULTS :** Severe problem of fire is observed in Yawal division. Fire have caused maximum damage to the forest. Natural regeneration of Teak, anjan and other valuable species was also damaged due to annual fire. As the terrain is very difficult with steep slope and valleys it becomes very difficult to control fire. Annually fire protection plan were prepared. As per the plan and provisions in working plan, fire line cutting and burning, deployment of firewatchers were done every year. Movement of protection vehicles was increased during fire season to monitor and control fire.

The number of fire incidences and area burnt during last 10 years is as under.

Table No. 11.13

Year	No of fire incidences	Area burnt (Ha)	Loss (Rs.)
2007	35	158.750	44900
2008	83	298.900	70175
2009	65	269.750	38100
2010	105	367.644	71200

2011	97	374.280	61225
2012	123	391.054	55483
2013	140	414.605	174111
2014	106	202.010	70215
2015	77	188.117	71960
2016	219	921.660	44300
Total	1050	3586.76	701669

Grazing: Grazing by katherwadi animal's in the areas of Chopada, Vaijapur and Yawal West similarly grazing by local and migratory sheep in Raver range is a big problem during rainy season. Grazing has caused considerable damage to regeneration and other vegetal cover. All efforts were made by the field staff to prevent this illegal grazing in the forest area and could control to some extent.

The details of illegal grazing cases registered from 2006-07 to 2015-16.

Table No. 11.14

Year	No of Grazing cases	No of Animals caught grazing without permit	Amount of compensation (Rs) recovered
2006-07	18	213	36355
2007-08	9	225	6285
2008-09	11	189	31185
2009-10	16	68	7265
2010-11	18	161	34585
2011-12	14	55	10285
2012-13	17	268	96860
2013-14	10	66	74000
2014-15	1	2	2400
2015-16	16	607	190000
Total	130	1851	489220

- **ENCROACHMENT:** After commencement of Forest Right Act 2006, large scale illicit tree felling for encroachment on forest land were done by local people, people from adjoining Madhya Pradesh State and people from Nandurbar district. Most of the forest land in plain area is already encroached and new encroachments are done in remote and hilly areas which is the main challenge. Large number of claims are pending for

decision. Encroachments are mostly done by *Pawara tribal's*. As this is a single community residing in hills of Satpuda, it becomes very difficult to evict encroachments done by them as they come in large number to oppose and also lodge complaints of atrocity against forest officials and thus demoralize the forest staff.

DCF has to analyze data about various categories of offences and formulate action plan for the protection of forests accordingly.

8. JOINT FOREST MANAGEMENT WORKING CIRCLE :

National Forest Policy 1988 envisages the importance of involvement of local people in the protection of forests. It also emphasizes the importance of traditional rights of forests dwellers.

- **SPECIAL OBJECTS OF MANAGEMENT :**

1. Reforestation of degraded forests with the participation of villagers.
2. Plantation and its protection with the help of forest protection committee.
3. To let avail usufructs derived from such afforestation to the villagers.
4. To create awareness about importance of forest amongst the people.
5. To help in translating the 73rd Amendment in practice for Forest Conservation and Development.
6. To increase vegetal cover.
7. To check soil erosion.
8. To bring about soil and moisture conservation.
9. And ultimately bring about the integrated development of the adjoining villages with help of all other development agencies.

- **PAST RESULTS :-** Joint forest management programme has been taken up as per the Govt. of Maharashtra Resolution dated 25th April 2003 and Resolution dated 5 October 2011. There are 56 JFM committees and 7 EDCs in Yawal Division. Total 49036.78 ha. area is assigned to these committees for protection and management purpose. Efforts have been made to motivate the villagers to take participatory management of forest including plantations on forest land near these villages under various schemes like FDA, State JFM etc. As per the Govt. of Maharashtra Resolution Dated 28 Nov. 2014, RDF Plantation works

under DPDC funds has to be taken through JFMC and the same is being implemented From 2015-16.

The details of plantations works allotted to these JFMC's during last five year is as under. Table No.11.15

Year	Number of JFMC's	Area assigned for plantations under various schemes (ha.)				
		JFM	EDC	FDA	RDF	Total
2011-12	4	0	0	100	0	100
2012-13	4	50	0	50	0	100
2013-14	3	25	0	50	0	75
2014-15	0	0	0	0	0	0
2015-16	13	25	100	0	216	341
Total	24	100	100	200	216	616

Gradatation of JFMC of Yawal Division is given below. Table No. 11.16

Range	No. of JFMC's	Area assigned to JFMC's (Ha.)	Categorization of JFMC's				No. of JFMC's registered under Society Act
			A	B	C	D	
Raver	17	13259.47	3	0	14	0	12
Yawal East	9	6885.65	3	6	0	0	5
Yawal West	7	3978.50	0	1	6	0	4
Deoziri	7	4483.48	0	1	5	1	7
Karjana	6	6467.90	0	5	1	2	5
Vaijapur	8	5981.20	0	2	6	0	7
Chopada	9	41056.280.58	0	0	5	2	7
Total	64	49036.78	6	15	38	5	47

JFMC's are also involved in various activities of Forest parks. Entry fees from visitors are collected by committee.

Table No. 11.17 Entry fees collected by JFMC.

Range	Name of forest park	Name of committee collecting the fees	2013-14 (Rs.)	2014-15 (Rs.)	2015-16 (Rs.)
Raver	Pal	Pal	0	0	97181
Yawal West	Manudevi	Adgaon	321365	273970	248885

Karjana	Unapdeo	Adavad	57803	61805	81000
		Total	379168	335775	4270066

Some committees are getting revenues from MFP collection also. The details are as below. Table No. 11.18

Range	Name of JFMC	MFP	Fees collected (Rs)	
			2015-16	2016-17
Deoziri	Deoziri	Grass	14300	3000
Yawal East	Vadri	Gum	50030	365810
Yawal West	Haripura	Gum	0	30640
Total			64320	399450

To minimize the pressure and dependency of local population on forest for fire wood, the villagers residing adjoining or in the vicinity of forest are provided with the LPG gas connection.

The details of LPG provided since 2012-13 are as below Table No. 11.19

Year	ST	SC	Others	Total
2012-13	267	0	0	267
2013-14	245	0	0	245
2014-15	151	10	34	195
2015-16	100	129	128	357
Total	763	139	162	1064

This has definitely saved 30 to 40 % of fuel wood and also saved the time of fuel wood collection.

9. WILDLIFE MANAGEMENT (OVERLLAPING) WORKING CIRCLE :

National Forest Policy 1988 aims at conservation of natural heritage of the country preserving the natural forests with the vast variety of flora and fauna which represents the remarkable biological diversity and genetic resources of the Country.

- **SPECIAL OBJECTS OF MANAGEMENT :**

1. To protect the existing wild life population both flora and faunal.
2. To create ideal conditions for betterment of wildlife.
3. To take steps of check all the destruction of wildlife.

4. To preserve for all times, areas of biological importance, outside the protected areas, as a national heritage for the benefits, education and aesthetic value for the mankind.

- **METHOD OF TREATMENT :**

1. The habitat will be protected from fire, grazing and other damages.
2. Access to Natural water sources will be provided.
3. Additional water sources will be created to draw the animals away from water near human settlement, thus reducing the conflict and risk of disease transmission from domestic stock. Check dams and small reservoirs may be created for additional sources of water.

- **Past Results :-** Regular patrolling was done to protect both flora and fauna. Timely compensation were paid in cases of crop damage, cattle kill by wildlife to avoid any conflict. Illegal grazing was restricted to some extent by which better and conducive conditions are made available to wildlife. All care and preventive measures are taken to control any fire in wildlife rich area. Precautions are taken to avoid poaching incidences.

There are 16 Dam/ tanks in division, which has sufficient water through out the year. 121 CNB, 10 ENB were constructed during plan period. Nalla rejuvenation works were also done during summer as per the availability of funds. Various awareness programmers like celebration of wildlife week, rallies by students & trekking in forest areas were conducted.

10. ECO TOURISM WORKING CIRCLE :

Eco tourism management seeks to integrate and balance several potentially conflicting objectives, protection of natural and cultural resources, provision of recreation opportunities and generation of economic benefits. In the absence of effective planning and management, ecotourism can lead to significant negative impacts on vegetation, soil, water, wildlife, historical resources. Such impacts can be both ecologically and culturally significant and may negatively affect visitor satisfaction.

This was an overlapping working circle. The objective of this working circle was to disseminate information regarding flora and fauna and their significance to the people and to increase public support for conservation of Forest and Wildlife by

creating, understanding and fostering awareness and concern for conservation needs.

Sustainable Forest Management :

With rapidly increasing human and livestock population there is immense biotic pressure on our forests. In order to solve the predominant human-forest conflicts, the concepts of people's participation and Joint Forest Management have been evolved and separate working circle was proposed for this purpose.

Eco-tourism is the best way in which the public can be made aware of the pivotal and difficult role that played by the forest department in conserving India's forests. This would in turn lead to much greater appreciation of Forest department and increase the importance that is attached to it.

The following sites have been identified to make ecotourism a success in Yawal Forest Division.

1. Pal Forest Park and Forest Guards Training School.
2. Manu Devi Mandir.
3. Unap Dev Hot Water Spring.
4. Nateshwar Kamaljadevi temple.
5. Mor Dam
6. Yawal Wildlife Sanctuary.
7. Suki Dam.

• SPECIAL OBJECTS OF MANAGEMENT :-

1. To disseminate information regarding flora and fauna and their significance to the people.
2. To increase public support for conservation of Forest and Wildlife by creating understanding and fostering awareness and concern for conservation needs.

• Past Results :- Pal in Raver Range, Unapdeo in Karjana range and Manudevi in Yawal West Range are having good potential for development from the eco tourism point of view. Other areas having potential for eco tourism area are Mor Dam Forest Eco Tourist centre in Yawal East Range and Nateshwar Kamaljadevi Forest Eco Tourist centre in Chopada range. Picnic sites, play grounds for children, amenities such as drinking water facility, public toilets, various hedge gardens, rose garden, establishment of interpretation centre at Pal and Unapdeo are done during plan period through funds made available from DPDC. Pal,

Manudevi and Unapdeo Forest Eco parks are maintained by respective Joint Forest Management Committees.

Manudevi is the most important area in Yawal West range, rich in flora and fauna and large numbers of wildlife conservationist, students, and research scholars visit that area. Pal is a place of attraction for students and people from distance places as it is close to Yawal wildlife sanctuary.

11. SURVEY AND DEMARCATION WORKING CIRCLE :

This is a overlapping working circle where the whole of the division area is covered. It is very important to have such working circle because forest area which is assigned to forest dwellers has no boundary mark and there is every possibility of extending their areas.

- **Past Results :-** Area of Yawal Forest Divisions have been demarcated by loose boulder cairns. During field verification it is found that these loose boulders cairns are in externally bad condition. There is urgent need to demarcate the forest and revenue boundaries with cement masonry pillars.

Repairs of damaged cairns was done as per the working plan prescriptions, the details of works done are as below. Table No. 11.20

Year	Boundary pillars		Total	Length in Km.
	Class II	Class I		
2007-08	670	327	997	66.00
2008-09	300	281	581	75.00
2009-10	682	568	1250	64.31
2010-11	1158	900	2058	105.05
2011-12	575	513	1088	63.27
2012-13	78	71	149	8.25
2013-14	320	301	621	65.99
2014-15	362	236	598	53.94
2015-16	503	254	757	62.59
Total	4648	3451	8099	591.13

Statement showing details of yearwise plantation in Yawal Forest division.

Plantation was taken under various Schemes during the 2006-07 to 2015-16 . The year wise plantations done are as below. **Table No. 11.21**

Year	Target in ha.	Area planted in ha.
2005-06	----	612.00
2006-07	---	578.38
2007-08	---	649.00
2008-09	513	1324.94
2009-10	800	1355.00
2010-11	800	1192.00
2011-12	740	1510.64
2012-13	800	862.00
2013-14	500	444.40
2014-15	700	553.00
2015-16	1850	450.00
Total	-----	9531.36

The present condition of plantations in the division is satisfactory. However results after 5th of the plantation are not satisfactory. The reasons attributed to the failure are

1. Failure to protect plantation from fire and grazing.
2. Encroachment due to FRA 2006
3. Other biotic factors.

There was no harvesting of timber of firewood from 1986 onwards. However illicitly cut timber & firewood material was seized in last 10 years. Information about that is given below.

No. of trees cut illegally with material seized in last working plan period.

Table No.11.22

Year	No. of trees cut illegally	Teak cmt illicit cutting	Amt. of Material seized (Rs)
2006-07	19309	459.713	54.19
2007-08	25456	704.536	67.88
2008-09	25200	754.926	40.33
2009-10	32048	1056.182	33.41

2010-11	15889	668.794	37.83
2011-12	7983	443.811	29.14
2012-13	5295	400.505	22.75
2013-14	3511	208.619	19.00
2014-15	3275	171.007	387.02
2015-16	3161	221.956	-----
TOTAL	141127	5090.049	691.55

The average price obtained from the sale of material leftover after illicit felling and material seized at other places in the division during working plan period is as under. Table No.11.23

Year	Average price per cubic meter in Rs.			Average price per each bamboo in Rs.
	Teak Timber	Non Teak Timber	Firewood	
2006-07	41690	-----	201	10.80
2007-08	54400	1436	331	7.33
2008-09	13413	2898	664	10.21
2009-10	14352	5512	769	8.25
2010-11	16976	2603	987	11.73
2011-12	16312	3891	1155	7.00
2012-13	17910	4080	539	11.70
2013-14	14095	4498	594	8.76
2014-15	18567	3691	544	17.65
2015-16	17458	4060	729	16.54

11.2.5.1 : STATUS OF FOREST COVER AND NATURAL REGENERATION AFTER IMPLEMENTATION OF MR. REDDY'S WORKING PLAN.

During implementation of earlier working plan, various plantation works, NR, soil and moisture conservation works were taken to enhance health and vitality of forests. As mentioned in the earlier working plan, due to repeated fire and illegal grazing, the status of natural regeneration was very poor. All forest staff was sensitized and with joint efforts of JFMC's illegal grazing by Kathewadi animals and by sheep heard were controlled to some extent.

Forest area of Yawal division is having steep slope and valleys and it is very prone to fire hazard. Many incidences of fire for clearing the site for encroachment and for gum collection were observed. Incidences of fire were also noticed as a revenge of encroachment removal action. Special patrolling teams were deployed in fire sensitive areas. Excellent grasses were developed in fire & grazing controlled areas. In such areas good natural regeneration of Teak, Khair, Dhavada and Anjan is observed.

Forest Density: Forest density of all compartments is assessed through stock mapping by DCF Yawal. The results are as below. Area in ha. Table No. 11.24

Name of working circle	Total Area	Forest density (Before implementation of Reddy's working plan)					Forest density (After implementation of Reddy's working plan)				
		<0.4 open area	Blank area	Scrub Forest area	Water Bodies area	>0.4 Dense area	<0.4 open area	Blank area	Scrub Forest area	Water Bodies area	
Protection	15260.1	6472.46	6422.76	2335.21	19.32	24.97	5333.84	6901.23	3000.06	0	24.97
Improvement	21758.3	9682.8	10070.5	1717.84	4.73	42.05	7925.56	10030	3760.73	0	42.05
Anjan	22867.7	2524.37	11789.8	7925.77	155.79	471.96	2371.72	11914.2	7969.43	140.45	471.96
Total	59886.11	18679.63	28283.04	11978.82	179.84	538.98	15631.12	28845.35	14730.21	140.45	538.98

From the above table it is very clear that there is an overall decrease in forest cover density (>0.4 Dense) .

However, it is observed that there is also an increase in forest cover density as below.

Table No.11.25

Name of the Working Circle	No of Compt. with increased density	Total area (Ha)	Forest density (Before implementation of Reddy's working plan) Area (Ha)	Forest density (After implementation of Reddy's working plan) Area (Ha)	Increase in density	% increase
Protection	11	4595.98	475.01	1084.61	690.60	128
Improvement	12	3430.49	1165.71	1643.55	477.84	41
Anjan	16	6376.86	548.16	1029.07	480.91.	88
Total-	39	14403.33	2188.88	3757.23	1168.44	53

From above table it can be seen that there is increase of Forest cover in 39 compartments.

There is decrease in forest cover density (>0.4 Dense) of 78 compartments as given below.

Table No.11.26

Name of the Working Circle	No of Compt. with increased density	Total area (Ha)	Forest density (Before implementation of Reddy's working plan) Area (Ha)	Forest density (After implementation of Reddy's working plan) Area (Ha)	Decrease in density	% Decrease
Protection	16	7827.19	5784.20	4164.70	1619.50	28
Improvement	50	14014	7172.33	4937.25	2235.08	31
Anjan	12	5177.01	1795.99	1033.74	762.25	42
Total-	78	27018.2	14752.52	10135.69	4616.83	31

There is 31 % decrease of forest density in above compartments due to the encroachment on forest areas.

- **Natural Regeneration**

Along with the due coupes, natural regeneration is carried in area transferred from FDCM and advance coupes through available funds and under Shramdan.

The details of natural regeneration carried during working plan period is given below. Table No.11.27

Name of Working Circle	With fund from various sources Area in Ha.	Shramdan by JFMC Area in Ha.	Total area in Ha.	Plants per Ha.
Protection	770	85	855	382
Improvement	150	185	335	451
Anjan	612	225	1037	535
Area transferred from FDCM	355	309	664	375
Total	1887	804	2891	436

On an average 436 Naturally Regenerated seedlings per hectare are treated. Natural Regeneration prominently includes Teak, Anjan, Khair, Dhavada and Ain species.

Stock mapping for the whole area of the division including area taken back from FDCM, after implementation of Reddy's working plan, was carried out & the results for the whole area is given below. Table No.11.28

Area in ha.

Name of working circle	Total area	Forest density (After implementation of Reddy's working plan)				
		>0.4 Density	<0.4 Density	Blank	Scrub Forest	Plantations undertaken
Protection	28229.720	9733.29	11358.92	5598.01	0.00	1541.50
Improvement	20454.49	6074.49	8062.37	3971.02	0.00	2346.61
Anjan	15378.84	5647.05	4891.90	2409.44	150.00	2278.00
Miscellaneous Area	18131.05	0.00	11692.03	6439.02	0.00	0.00
Total	82194.10	21454.83	35998.49	18417.49	150.00	6166.11

SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN

Some special work of improvement in the management of forest has been taken in the last few years. Notable among these are..

1. GR No. FDM 2011 /C No. 100/F2 Dt 5/10/2011

Implicating the Tendu contractor in case of fire happening in his jurisdiction which has resulted in the dramatic decrease in incidence of fire.

2. Total 131 PDAs were distributed to the staff of division preloaded with application on offence reporting, fire incidence, Beat checking, etc. in which incidences of fire and other illicit activities can be tracked more accurately with geo-tagged photos and lat-long details. Communication gap between the DCF and his officers to the lowest functionary of the Division is being slowly bridged. Real time reporting of illicit incidence has become a possibility if the technology is being used properl

11.3 : PAST YEILD REVENUE AND EXPENDITURE :

Statement showing the Revenue, Expenditure:Table No. 11.29

Year	Revenue Rs. in Lakhs	Expenditure Rs. in Lakhs			Total Exp.
		Non Plan	Plan	EGS	
2006-07	51.57	34.08	133.51	129.92	297.51
2007-08	73.30	105.98	131.91	8.38	246.27
2008-09	162.561	132.45	391.08	23.13	546.66
2009-10	182.146	159.35	462.39	17.41	639.15
2010-11	152.72	188.58	625.25	62.12	872.95
2011-12	125.184	214.74	874.40	25.62	1114.76
2012-13	107.50	327.53	748.53	39.51	1115.57
2013-14	58.85	288.37	619.20	42.74	950.31
2014-15	32.17	293.27	1153.77	42.36	1489.40
2015-16	47.10	390.08	1361.00	26.77	1777.85
Total	993.10	2134.43	6501.01	417.96	9053.40

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CHAPTER :-12
STATISTICS OF GROWTH AND YIELD

12.1 : INTRODUCTION :-

In Korhalli and Mundkur's Plan the growth data for teak was compiled from the Teak Pole Working Circle from different places by carrying out stem analysis. In Vaidya's Plan stem analysis of teak trees were carried out from IV-quality areas of Chopda range and stump analysis of teak trees were carried out from quality III forest of Yawal range.

12.1.1 : ENUMERATION :-

Enumeration after Reddy's plan was a joint effort by the survey of forest resources (SOFR) Nagpur, territorial Division and the Working Plan Division. "Systematic Line Plot Sampling with Random Start" was resorted to with square plot 31.62 X 31.62 meters (each plot size is 0.1 ha.) roughly at interval of 750 meters. The sampling intensity was 0.1%. The Statistical design and overall technical guidance was given by Chief Forest Statistician, M.S., Nagpur. The period of enumeration was from Jan. 2018 to April 2018. Analysis of the data was done by the Chief Forest Statistician. On scrutiny of data following results are obtained.

- Statement I : Estimated Growing Stock- No. of Sound Trees in population area.
- Statement II : Estimated Growing Stock- No. Of Sound Trees per ha.
- Statement III : Percentage Distribution of Total stock to the Species Overall Girth Classes.
- Statement IV : Percentage of Stock of Species in Girth Classes to the Total Stock in that Particular Girth Classes.
- Statement V : Estimated Growing Stock –Volume in Cubic Meter per ha. Some noteworthy results of comparison of past and current enumeration is described in statement below.

Comparison between Two Enumerations. Table No. 12.1

Past Enumeration (Sept. 2003 to November 2003).		Current Enumeration (Jan.2018 toApril 2018).	
Name of Working Circle	No.of trees per hectare	Name ofWorking Circle	No.of trees per ha.
Anjan W.Circle	176.153	Anjan Working Circle	111.93
Afforestation W.Circle	197.667	Protection cum improvement W.C.	60.35
Coppice with Reserve W.Circle	346.47	Improvement W.C.	80.86
Buffer Zone W.Circle	208.749	F.D.C.M. Area	48.04
MiscellaneousW.Circle	155.266	----	----
Protection W.Circle	220.286	-----	----
Weighted Average	242.15	Weighted Average	76.75

It is observed that the total estimated no. of trees per ha. in current enumeration (Jan./18 to April /18) is decreased as compared to previous (Sept./03 to Nov./03) tree enumeration.

12.1.2 : Following reasons are enlisted for decrease in number of trees / ha. in current enumeration (Jan 2018 to April 2018)

1. Heavy Illicit felling in the forest areas & mostly occurring after commencement of Forest Right Act 2006.
2. Encroachment on the Forest areas due to provision of the forest right Act.
3. Heavy grazing resulting in great damage to natural regeneration & vegetal cover.
4. Occurance of regular forest fires in forest areas causing maximam damage to the forest.

Table No. 12.2 As per current Enumeration (Jan.2018 to April 2018).

Working Circle wise No. of sound trees per ha.

Name of W.Circle	Total	General Utility Species	Special Utility Species	Minor Forest Produce Species	Other Species	Teak
Anjan Working Circle % distribution	<u>111.93</u> (100%)	<u>28.40</u> (25.37)	<u>35.50</u> (31.71)	<u>4.43</u> (3.96)	<u>43.60</u> (38.96)	<u>27.80</u> (24.84)
Protection W.C. % distribution	<u>60.35</u> (100%)	<u>18.51</u> (30.68)	<u>23.91</u> (39.62)	<u>1.92</u> (3.18)	<u>16.01</u> (26.53)	<u>17.14</u> (28.40)
Improvement W.C. % distribution	<u>80.86</u> (100%)	<u>40.56</u> (50.11)	<u>18.18</u> (22.49)	<u>7.59</u> (9.38)	<u>14.58</u> (18.03)	<u>38.48</u> (47.59)
F.D.C.M. Area % distribution	<u>48.04</u> (100%)	<u>19.23</u> (40.03)	<u>13.94</u> (29.02)	<u>2.80</u> (5.82)	<u>12.08</u> (25.14)	<u>18.45</u> (38.41)
Total (WeightedAverage)	76.75	<u>27.07</u>	<u>23.00</u>	<u>4.30</u>	<u>22.38</u>	<u>25.91</u>
%ofstock total stock	100%	35.27	29.97	5.60	29.16	33.76

A. Anjan Working Circle- It is observed that species of General Utility viz. Sadada, Bondara, , Sisam, Tiwas & Teak are 28.40 % to the total growing stock.. The species of special utility viz. Dhavada, Hiwar, Kalam, Khair, & Sawar are 35.50% to the total growing stock. The Minor Forest Produce species viz. Apta, Awala, Beheda, Bel, Bor, Moha, Palas and Tembhorni are 4.43% to the total growing stock, Rest of the species are 43.60% to the total growing stock..

B. Protection Working Circle :- It is observed that species of General Utility viz. Biza, Teak, Kakad, Tiwas is 18.51 % to the total growing stock. The species of special utility viz. Dhavada , Salai, Kalam, Khair, are 23.91% to the total growing stock. The Minor forest produce species viz. Apata, Awala, Moha, Palas and Tembhorni are 1.92% to the total growing stock. Rest of species are 16.01% to the total growing stock.

C. Improvement Working Circle :- It is observed that species of General Utility viz. Sadara, Bondara, & Teak are 40.56% to the total growing stock. The species of special utility viz. Dhavada ,Kalam, Khair, & Shivan are 18.18% to the total growing stock. The Minor Forest Produce species viz. Apta, Awala Behada, Bel, Biba, Bor, Char, Moha, Nirgudi, Palas and Tembhorni are 7.59% to the total growing stock. Rest of the species are 18.58% to the total growing stock.

D. F.D.C.M.Area :- It is observed that species of General Utility viz. Bondara, Sadada, Kakad and Teak are 19.23 % to the total growing stock. The species of Special Utility viz. Dhavada , Kalam, Khair, & Hiwar are 13.94% to the total growing stock. The Minor Forest Produce species viz. Apta, Awala Behada, Bel, Biba, Bor, Char, Moha, Nirgudi, Palas, Siras and Tembhurni are 2.80% to the total growing stock.. Rest of the species are 12.08 % to the total growing stock.

**No. of Trees per Ha. Table No.12.3
(Period of Enumeration Sept. 2003 to Nov.2003)**

Name of Working Circle	Total Growing stock per ha.	Teak Per ha.	%of stock of Teak to total stock
Anjan Working Circle	176.15	45.591	25.88
Afforestation Working Circle	197.667	34.667	17.54
Coppice with Reserve W.C.	346.47	169.696	48.97
Buffer zone Area	208.749	30.357	14.54
Miscellaneous W.C.	155.266	60.088	38.70
Protection Working Circle	220.286	66.863	30.55
Total weighted percentage	242.708	84.512	34.92

(Period of Enumeration Jan.2018 to April 2018) Table No.12.4

Name of Working Circle	Total Growing stock per ha.	Teak Per ha.	%of stock of Teak to total stock
Anjan Working Circle	111.93	27.80	24.84
Protection W.C.	60.35	17.14	28.40
Improvement W.C.	80.86	38.48	47.59
F.D.C.M. Area	48.04	18.45	38.41
Total weighted Average	76.75	25.91	33.76

Comparative Statement of the Survey 2003 & 2018. Table No. 12.5

Year of Survey	General Utility species		Special Utility Species	Minor Forest Produce species	Other species	Total
	Teak	NonTeak				
Sept. 2003 to Nov. 2003	84.51	11.64	10.73	21.41	113.86	242.15
Jan.2018 to April 2018	25.91	1.16	23.00	4.30	22.38	76.75
% of stock of Jan. 2018 to April 2018 to the stock of survey 2003	30.66	9.96	214.35	20.08	19.65	31.70

From the above Table No.12.5 it is seen that the overall stock is decreased to 31.70% as compared to survey carried out in 2018.

Working Circlewise Volume in cum.per ha. Table No.12.6/ A

Name of W.Circle	Total	General Utility Species	Special Utility Species	Minor Forest Produce Species	Other Species
Anjan Working Circle	17.92	2.67	6.13	0.28	8.84
% stock to total stock	100	14.87	34.22	1.56	49.36
Improvement W.C.	10.20	4.17	2.60	1.16	2.28
% stock to total stock	100	40.84	25.48	11.38	22.30
Protection W.C.	11.16	2.01	4.79	0.23	4.13
% stock to total stock	100	18.04	42.88	2.06	37.01
F.D.C.M. Area	5.49	1.95	1.47	0.35	1.72
% stock to total stock	100	35.59	26.79	6.32	31.29
Total (WeightedAverage)	11.27	2.73	3.70	0.51	4.33
%ofstock total stock	100	24.17	32.85	4.54	38.44

Comparative statement of percentage distribution to total stock of species overall girth classes.Table No. 12.6/ B

Year	Name of working circle	Girth class wise estimated % distribution			
		15U30	31U45	Remaining Girth class	Estimated overall Girth class
Sept. 2003 To Nov. 2003	Anjan W.C.	30.50	26.86	42.64	100
	AfforeStationW.C.	59.53	20.91	19.56	100
	C.W.R.W.C	46.41	31.35	22.24	100
	BufferZonearea	27.20	22.88	49.92	100
	MiscW.C.	40.40	33.90	25.70	100
	ProtectionW.C.	29.71	29.55	40.74	100
	Weighted Average	38.96	27.58	33.47	-----
Jan.2018 to April 2018	Anjan Working Circle	30.11	25.61	44.28	100
	Protection cum Improvement W.C.	28.83	27.73	43.44	100
	Improve-ment W.C.	28.83	31.33	39.84	100
	F.D.C.M. Area	34.47	29.43	36.10	100
	Weighted Average	30.56	28.53	40.92	---

12.1.3 : Local Volume Table

The Local Volume Table compiled in Vaidya's plan for Teak IV-a quality is available.

Local volume table for Teak & Non Teak species. Table No. 12.7

<u>Girth class b.h. in inches</u> Cms.	<u>Volume for IIIrd quality (50' to 70')</u> Cft./ Cubic metre	<u>Volume for IV-a quality (40' to 50')</u> Cft./ Cubic metre	<u>Volume for IV-a quality for Non Teak (40' to 50')</u> Cft./ Cubic metre
<u>Up to 12"</u> 30Cms.	<u>0.50</u> 0.014	<u>0.35</u> 0.0098	0.134
<u>12" – 18"</u> 30 – 45 Cms	<u>1.25</u> 0.035	<u>1.20</u> 0.0336	0.272
<u>18" – 24"</u> 45-60 Cms	<u>2.50</u> 0.07	<u>2.45</u> 0.0686	0.627
<u>24" -30 "</u> 60-75 Cms	<u>4.50</u> 0.126	<u>4.15</u> 0.116	0.1186
<u>30" – 36"</u> 75-90 Cms	<u>6.75</u> 0.189	<u>6.50</u> 0.182	0.1950
<u>36" - 42"</u> 90 -105Cms	<u>11.00</u> 0.308	<u>9.00</u> 0.252	0.2917
<u>42" - 48"</u> 105 - 129Cms	<u>15.50</u> 0.434	-----	0.4089
<u>48" - 54"</u> 129-135 Cms	<u>21.00</u> 0.602	-----	0.5465
<u>54" - 60"</u> 135- 150 Cms	<u>28.75</u> 0.805	-----	0.7045
<u>60" - 66"</u> 150-156Cms	<u>37.50</u> 1.05	-----	0.8829

12.2 : STATISTICS OF FOREST CARBON STOCK

Carbon Stock Estimation: Forests play an important role in combating climate change. In addition, it has the potential to provide ecosystem services, such as carbon storage. Carbon sequestered in the forests of Yawal has been derived by extrapolating from the Growing Stock calculated from the Enumeration data. The Working circle wise estimation of Carbon Stock is given below.

Table No. 12.2: Working Circle Wise Carbon Stock 12.8

Working Circle	Total Area in Ha.	Avg. growing stock /ha.(m3/ha)	Total Growing Stock (m3)	Total Carbon Stock (Metric tone)
Anjan Working Circle	23538.53	110.435	2599477.56	780623.90
Protection cum	15335.10	60.36	925626.64	277966.00
Improvement W.C.	20761.02	68.40	1420053.77	426442.60
F.D.C.M. Area	22559.45	47.56	1072927.44	322200.40
Total	82194.10	286.76	6018085.41	1807233.00

12.2.1 : Soil Carbon Analysis: Quantum of soil carbon is a good indicator of nutrient status of soil. During the enumeration exercise, SOFR unit collected soil samples (60) and they were analysed for Soil Carbon. The range of soil carbon varied from 0.4% to 5%.

The above efforts have been made but it is apparently inadequate. With the current manpower and the level of expertise available with the Department, it will not be possible to immediately come up with definite figures of Carbon Stock taking into consideration the different pool of Carbon, as is expected to be estimated.

Considering the fact that the Forest of Survey of India, Dehra Dun has already come up with the calculation of the current Carbon Stock of India in its publication 'Carbon Stocks of India' this Working Plan has taken advantage of the same. The excerpts from this publication are produced below and a calculation for the carbon stock of Yawal District taking the C-values of the Tropical Dry Deciduous Forests for the state of Maharashtra were extrapolated for this calculation.

12.2.2 :Excerpts from FSI's publication 'Carbon Stock in India's Forests':

Introduction:

Carbon is an element commonly found on earth in various forms. It is an essential element of all forms of life. The bodies of living organisms contain a substantial portion of carbon. Carbon is also found in large quantities in non-living things like oil, nature gas, coal, rocks and air. Globally carbon is held in a variety of different stocks as oceans, fossil fuel deposits, terrestrial system and the atmosphere. In the terrestrial system, carbon is stored in rocks, sediments, swamps,

wetlands, forests, forest soil, grassland and agricultural area. About two thirds of global terrestrial carbon is contained in forests and forest soil. In addition, there are some non-natural human-created carbon stocks as wood products and waste dumps.

The exchange of carbon among its various forms from the atmosphere, oceans and land is called the carbon cycle. The most significant form of carbon exchange is by the plant. Plants draw in carbon dioxide (CO₂) from the atmosphere through the process of photosynthesis and turn it into biomass (wood, leaves, fruits etc.). A part of the CO₂ taken in by plants is returned to the atmosphere through respiration. Thus, the carbon cycle is renewed and continues interminably.

The delicate balance maintained by nature is being overturned by anthropogenic factors. The extraction of fossil fuels from the earth and many other human induced activities are overloading the atmosphere with carbon dioxide and other greenhouse gases thereby raising serious issues including the very survival of the human race.

Excessive quantities of greenhouse gases disturb the balance of transfer of heat through the atmosphere. Normally solar radiation absorbed by space heats the earth while infrared radiation lost to space cools the earth. The presence of excessive anthropogenic greenhouse gas emission (mostly carbon dioxide from fossil fuel burning) in the atmosphere reduces the Earth's ability to cool to outer space through infrared radiation. The result is a heightening of the greenhouse effect, a nature process by which gases as CO₂ absorb and reflect long-wave radiation retaining much of that heat in the Earth's atmosphere and consequently warming the planet.

Human induced disturbance to the carbon cycle have been both direct and indirect. Direct effects include the addition of new carbon to the active global carbon cycle through the combustion of fossil fuels and land use change leading to modification of the vegetation structure and distribution. Indirect human impacts on the carbon cycle include changes in other major global biogeochemical cycle, alteration of the atmosphere composition through the additions of pollutants as CO₂ and changes in the biodiversity of landscape and species. Currently about three-quarters of the direct human induced disturbances to the global carbon cycle are due to fossil-fuel combustion. Emission currently exceed 6 GT C_{yr} (gigatonnes of

carbon per year) and are still increasing.

12.2.3 : Carbon and Forest Eco-System

Forests play an important role in mitigation and adaptation of climate change. Forests sequester and store more carbon than any other terrestrial ecosystem and are an important natural 'brake' on climate change. Carbon sequestration by forests has attracted much interest as a mitigation approach, as it has been considered a relatively inexpensive means of addressing climate change immediately. In India, the varied climate regimes, the large geographical area, varied topography, long coastline and the possession of the oceanic island have endowed it with a diversity of natural biomass from desert to alpine meadows, from tropical rain forests to temperate pine forests, from mangroves to coral reefs and from marshland to high altitude lakes.

Research is still in progress to understand the effect of climate change on life forms and ecosystem. It has been suggested that the increased proportion of carbon dioxide in the atmosphere increase fertilization effect and enhances growth in plants. In that case warming and an increase in atmosphere CO₂ should productivity and increase the sink potential of vegetation (assuming nutrient supply is adequate and enough moisture is available). A study on the effects of CO₂ fertilization on vegetation and soil in temperate forest ecosystem suggests that plant C increase in response to excess atmospheric CO₂ (Downing et al., 1992).

Gregor draws the conclusion that climate change might have positive effects on some of the factors of the forest ecosystem but the overall effect of global warming on the forests does not seem to be positive in terms of an increase in the absorption of carbon. Greenhouse effect result in air pollution, damage to forests, drier and warmer summers, frequent droughts and heat periods as well as frequent extreme wind storm events which would offset any possible effect resulting from longer vegetation periods (Gregor, 1992).

The main carbon pools in tropical forest ecosystems are the living biomass of trees and under story vegetation and the dead mass of litter, woody debris and soil organic matter. The carbon stored in the aboveground living biomass of trees is typically the largest pool and the most directly impacted by deforestation and degradation.

While living trees are growing, they continued to store carbon and therefore acted as carbon sinks. Consequently, mature forests are huge storehouses of carbon. The young trees which grow faster rates also work as carbon sinks. The bigger (and older) the trees, the higher is their ability to cycle and sequester carbon (Morris Bishop, 1998). Though, it is important to consider the annual rate of carbon uptake, one should not ignore the carbon holding capacity within a forest which is a more critical factor (Harmon et al., 1990). In India, a more effective management practice is selective felling of those trees which have already attained a matured age and no more work as sink. On felling such trees, younger trees are planted which sequester more carbon.

Forests that play a potentially significant role in climate change adaptation, maintenance of ecosystem services and provision of livelihood options, are increasingly threatened by deforestation, fragmentation, climate change and other stressors linked to human activities. A particular effect of climate change is likely to be on forest to provide soil and water protection, habitat for species and other ecosystem services. The potential negative impacts of climate change on dry forests are of particular concern since dry forest soil are more of particular concern since dry forest soil are more susceptible to wind and water erosion. According to the Millennium Ecosystem Assessment, dry lands occupy 41% of the earth's land area and home to more than 2 billion people. Intensive human intervention as fire, grazing, agriculture, firewood collection, has adversely transformed many forests.

12.2.4 : Methodology for the assessment of Forest Carbon

The 'Good Practices Guidance' (GPG) developed by Intergovernmental Panel on Climate Change (IPCC) is universally accepted source book for concepts, definitions, various pools, methods, default values, various required equations etc. for preparing account of forest carbon stocks (FCS). Since the subject has been developing in last two decades, many new concepts and methods have emerged but still many challenges remain. The GPG uses the term "Categories" to refer specific sources of emissions/ removals of greenhouse gases. As per the IPCC GPG 2003, the categories are: Forest land, Cropland, Grassland, Wetlands, Settlements and other land. Each land-use category is further subdivided. The following subcategories are considered for the sector:

Forest land remaining Forest land: An increase in the carbon stocks of Forest Land remaining Forest Land would mean improvement in canopy density and growing stock of forest. A decrease in the carbon stock of Forest Land remaining Forest Land is generally considered as degradation of forest resources.

12.2.5 : Land Converted to Forest land: Any non-forest land converted to Forest land would generally be considered as afforestation.

According to GPG, the calculation of GHG inventories require information on extent of area (in case of LULUCF) of an emission/removal category termed as 'Activity data' and emission or removal of GHG per unit of area (removal of CO₂per ha. of added forest area) termed as 'Emission factors. The main aim is to estimate these factors for the reporting unit. Once these are estimated, the emission or removal, can be ascertained using the change in carbon stocks.

The different approaches are given in the GPG to present the activity data (the change in area of different land categories). **Approach 1** identifies the total area for each land category; it only provides "net" area. **Approach 2** identifies the land conversion between categories by tracking and provides tabular information about land-use conversion. **Approach 3** involves, in addition, the spatial tracking of land-use conversion.

The total carbon which is stocked in the forests is divided into several pools and the emission factors are derived from assessments of the changes in carbon stocks in these carbon pools. These factor are developed using estimates which are used at different levels; global, national and sub-national and based on the level the 'Tier levels' (Table 12.1) are defined which are independent of the approach being followed.

In general, moving to higher tiers improves the accuracy of the inventory and reduces uncertainty, but the complexity and resources needed for conducting inventories also increases with higher tiers.

The Tier 1 approach employs the basic method and default emission factors provided in the 1PCC Guidelines (Workbook), Tier 1 methodologies usually use activity data that are spatially coarse, such as nationally or globally available estimates of deforestation rates, agricultural production statistic and global land cover maps.

The Tier 2 approach applies emission factors and activity data which are defined by the country. Tier 2 can also apply stock change methodologies based on country-specific data. Country-defined emission factors/activity data are more appropriate for the climatic regions and land use systems in the country.

At Tier 3, higher order methods including models and inventory measurement are repeated over time and supported by high-resolution activity data and disaggregated at sub-national level. Such systems may use Remote Sensing and GIS tools for tracking land-use change over time.

In Forest ecosystem, enormous carbon is stored which is classified in five pools by GPG. The living portion of biomass carbon is classified in two approaches to emission accounting: the inventory approach and the activity based approach, which are outlined below. Both approaches are supported under IPCC guidance (IPCC, 2003) and are based on the underlying assumption that the flows of GHGs to or from the atmosphere are equal to changes in carbon stocks in the biomass and soils.

Table No. 12.4: Different Forest Carbon Pools

Pools		Description
Living Biomass	Above ground biomass (AGB)	All living biomass above the soil including stem, stump, branches, bark, seeds and foliage.
	Below ground biomass (BGB)	All living biomass of live roots. Fine roots of less than 2 mm diameter (country Specific) are often excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead Organic Matter	Litter	Includes all non-living biomass with a diameter less than a minimum diameter chosen by the country (for FSI 5 cm.), laying dead, in various states of decomposition above the mineral or organic soil.
Soil	Soil organic matter	Include organic carbon in mineral and organic soil (including peat) to a specific depth chosen by the country (for FSI 30 cm) and applied consistently through the time series.

12.2.5 : Data Acquisition for Forest Carbon Accounting

(i) Collating existing forest data

Forest carbon accounting can make use of existing national, regional or global data. Sources will vary between territories, as will the reliability and uncertainty of the source. However, good quality secondary data reduces. However, good quality secondary data reduces both time and cost requirement for accounting.

At a national level, forest inventories, woody biomass assessments, agricultural surveys, land registry information and scientific research can prove useful for land classification and model parameters. Data on temperature, rainfall, soil type and topography should also be sources at smaller scales. In particular, data sources will include national statistical agencies, sectoral experts and universities.

(ii) Using remote sensing

Remote sensing is useful in forest carbon accounting for measurement of total forest area, forest types and canopy cover.

(iii) Data from field sampling

Actual field data is preferable to default data for forest carbon accounting and is required to verify remotely sensed information and generalised data sets. Gathering field measurements for forest carbon accounting requires sampling as completer enumerations are neither practical nor efficient. By definition, sampling infers information about an entire population by observing only a fraction of it. In order to confidently scale up this data to the required geographical level, proper sampling design is vital.

Stratified random sampling is generally used for forest carbon inventory as mostly forest areas are heterogeneous. Under stratified sampling, forest area are stratified into homogenous strata and samples are selected from each strata randomly. This provides precise estimates for different strata and also population. Once sample sites have been selected, established methods of biomass inventory are employed for different pools.

12.2.6 : Accounting for Forest Carbon Stocks (i) Above-Ground Biomass (AGB):

The AGB carbon pools consists of all living vegetation above the soil, inclusive of stems, stumps, branches, bark, seeds and foliage. For accounting purposes, it can be broadly divided into two parts viz. trees and understory. The most comprehensive method to establish the biomass of this carbon pool is destructive sampling, whereby vegetation is harvested, dried to a constant mass and the dry to-wet biomass ratio established. Destructive sampling of trees, however, is both expensive and somewhat counter-productive in the context of promoting carbon sequestration. Two further approaches for estimating the biomass density of tree biomass exist and are more commonly applied. The first directly estimates biomass density through biomass regression equations. The second converts wood volume estimates to biomass density using biomass expansion factors (Brown, 1997).

12.2.7 : Below-Ground Biomass (BGB):

The BGB carbon pool consists of the biomass contained within live roots.

As with AGB, although less data exists, regression equation from root biomass data have been formulated which predict root biomass based on above-ground biomass carbon (Brown, 2002; Cairns et al., 1997)

12.2.8 Dead Organic Matter (wood):

The DOM wood carbon pools includes all non-living woody biomass and includes standing and fallen trees, roots and stumps with diameter over 10 em.

12.2.9 Dead Organic Matter (Litter):

The DOM litter carbon pool includes all non-living biomass with a size greater than the limit for soil organic matter (SOM), commonly 2 mm, and smaller than that of DOM wood, 10 em. diameter. This pool comprises biomass in various states of decomposition prior to completer fragmentation and decomposition where it is transformed to SaM.

Soil Organic Matter (SOM):

SOM includes carbon in both mineral and organic soil and is a major reserve of terrestrial carbon (Lal et al., 2001). Inorganic forms of carbon are also found in soil; however, forest management hag greater impact on organic carbon and so inorganic carbon impact is largely unaccounted. SOM is influenced through land use

and management activities that effect the litter input. In SOM accounting, factors affecting the estimates include the depth of which carbon is accounted, commonly 30 cm. and the time lag until the equilibrium stock is reached after a land use change, commonly 20 years.

Forest Carbon Stock under different carbon pools in the Tropical Dry Deciduous forest type area in Maharashtra State as calculated by the FSI is reproduced as under:

Forest Carbon Stock Of Tropical Dry Deciduous Forests in Maharashtra

(Table No. 12.10)

(In '000 tons)

Forest type stratum	Density	Area in Sq.Km.	AGB	BGB	Dead Wood	Litter	SOM	Total	C Stock /ha. (tons)
Tropical Dry Deciduous	VDF	4707.9	29331.3	11517.2	215.7	3134.0	27713.2	71911.5	152.75
	MDF	10351.4	61047.4	23970.9	152.6	773.5	57679.5	143623.9	138.75
	OF	10804.3	12816.5	5032.5	142.1	343.0	49471.8	67805.9	62.76
Total		25863.6	103195.0	40521.0	510.4	4250.5	134865.0	283341.3	109.55

12.2.10 : Forest Carbon Stock Of Tropical Dry Deciduous Forests In Yawal:

The Forests of Yawal Division mainly falls in Tropical Dry Deciduous Forests. On the basis of above data for forest type of Tropical Dry Deciduous Forests in Maharashtra, the Carbon Stock in Yawal Forest Division is calculated to be as under:

Forest Carbon Stock Of Tropical Dry Deciduous Forests in Maharashtra

Table No.12.11

(In '000 tons)

Forest type stratum	Density	Area in Sq.Km.	AGB	BGB	Dead Wood	Litter	SOM	Total	C Stock /ha. (tons)
Tropical Dry Deciduous	VDF	42	261.66	102.73	1.923	27.93	247.212	641.455	152.75
	MDF	271	1598.08	321.40	126.015	8.59	1240.63	3294.715	138.75
	OF	508	602.48	236.22	6.654	16.103	2325.62	3187.077	62.76
Total			2462.22	660.35	134.592	52.623	3813.462	7123.247	109.55

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Part II

Future Management

Chapter No:-1 BASIS OF PROPOSALS

1.1 : OBJECTIVES OF MANAGEMENT.

1.1.1 : Introduction : This Working Plan is prepared for the scientific management of the Forests and Wildlife of Yawal forest division, which is co-terminus with three talukas i.e. Yawal, Raver & Chopda talukas of Jalgaon district. The primary management objective for the Forests of Yawal Division is to treat forests as per the requirement of site so as to optimize Growing Stock and in a manner as mentioned in the Introduction.

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

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

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

- Maintenance of environmental stability through preservation and where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of forests.
- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biodiversity and genetic resources of the country.
- Checking the soil erosion and denudation in the catchment area of the rivers, lakes and reservoirs in the interest of soil and water conservation for mitigating flood and droughts and for retardation of siltation of reservoirs.
- Checking the extension of sand dunes in the desert areas and along the coastal tracts.
- Increasing the forest/tree cover in the country through massive afforestation and social forestry programs, especially, on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- Increasing productivity of forests to meet essential national needs.
- Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- Creating a massive peoples movement with the involvement of women, for achieving this objectives and to minimize pressure on the existing forests.

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

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

- Existing Forest and forest lands should be fully protected and their productivity improved. Forests and vegetative cover should be increased rapidly on hill slopes, in catchments of the rivers, lakes, reservoirs, ocean shores, on semi arid, arid and desert tracts.

- For conservation of biodiversity, network of national parks. Sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately.
- Provision of sufficient fodder, fuel and pasture, especially, in areas adjoining to forest is necessary in order to prevent depletion of forests beyond sustainable limit.
- Minor forest produce provides sustenance to the tribal population and other indigenous population residing in the around the forests. Such produce should be protected, improved and their production should be enhanced with due regard to generation of employment and income.
- Schemes and projects which interfere with forest on the steep slopes, catchments of rivers, lakes and reservoirs, geologically unstable terrain and other ecologically sensitive areas should be severely restricted.
- No forest should be permitted to be worked without the approved working plan which should be in keeping with the national Forest Policy and direction of the Hon' able Apex court.
- The rights and concessions enjoyed by the tribal and other rural poor living within and near the forests should be fully protected. Their domestic requirements of fuel wood, Fodder, Minor forest produce and construction timber should be the first charge on forest produce.
- Inculcate in the people, a direct interests in forests and make them conscious of the value of forester, wildlife and nature in general through forest extension, education and training.

1.2 : METHOD OF TREATMENT TO BE ADOPTED

1.2.1 : Functional Classification of Forests:

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

- Protection Forests:** It include forests on steep slopes (25⁰ and above), along river banks and the forests that have become depleted through maltreatment and

further exploitation of which will accentuate soil erosion and adversely affect the productivity of agricultural lands in the region. The management should aim at conserving these forests, through soil and moisture conservation measures, so that they may exert beneficial influence on the soil, water regime and the physical and climatic factors of the locality.

b. **Tree Forests:** These forests are situated in remote tracts that are mainly capable of growing large sized timber and other products of commercial value.

c. **Minor Forests :** It includes forests that are interspersed with cultivated lands and are capable of producing small timber and fuel wood and providing grazing which are indispensable needs of adjoining agricultural population.

d. **Pasture Lands:** These are openly stocked forests or scrub lands that have ceased to yield even the small timber but the conveniently situated for providing grazing to the cattle used for agricultural works.

e. **Miscellaneous Forests:**

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

- **Remaining Areas** needed for other purposes.

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

A. **Protection Forests:** This type of Forests includes the forest found on Steep slopes (More than 25⁰), areas along the water courses and in the Catchments of big water bodies. It generally includes good quality forests. They will be managed to protect the area from soil erosion and to minimize the siltation of water bodies. Soil and Moisture Conservation measures will be taken to protect the erosion prone lands and to improve the underground water table. The commercial felling will not be the priority in these areas. These prescriptions have been included for treatment of A-1 type areas of different Working Circles.

B. **Tree Forest:** This type of forest includes the better quality forests, especially of good site quality, capable of producing medium to large-sized timber, which are comparatively away from local habitations. They will be managed to produce medium to large sized timber. Steep slopes will be excluded from harvesting

operations, but will be covered for soil and moisture conservation work. The natural regeneration will be tended and areas having inadequate natural regeneration will be planted with suitable valuable species. These areas have been included to be worked under SCI Working Circle.

C. **Minor Forest:** These areas will be managed to meet the local need of small timber, poles and fuel wood. The growing stock is mainly of site quality IVA and IVB. The density varies from 0 to 0.4 and natural regeneration is deficient in open areas. These forests have been worked under A forestation Working Circle, where only hygienic fallings are prescribed.

D. **Pasture Land:** This area includes forests which are adjoining to villages with heavy biotic interference. They are not capable of producing even small timber and fire wood to any appreciable quantity. These areas will primarily be managed to provide fodder by introducing fodder trees species and superior grasses. Rotational grazing is prescribed. Soil and moisture conservation works will be taken along with planting and sowing of grass seeds. These areas are included in the Grass & Fodder Resources Management Working Circle.

1.2.2 : Treatments Prescribed:

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

1.2.3 : The General Approach of the Treatments:

- i. The entire forests on steep and precipitous slopes will be protected from harvesting. 20 meter wide strips on either sides of streams and watercourses will also be protected from harvesting in the similar manner.
- ii. Special habitat management for wildlife conservation will receive high priority. Riparian zones and **mesic** sites, important for wildlife management, will receive added protection and treatment. Adequate buffer will be provided to such sites while preparing treatment maps for coupe extraction. Snag, den trees and down longs shall be sufficiently protected, to meet the habitat requirement of birds and small animals. Wildlife requirements shall be the most important consideration for water body management in forest areas.
- iii. The forests of Yawal Division are extremely important from wildlife management point of view.
- iv. Preference will be accorded to natural regeneration and rootstock management. Natural regeneration and promising coppice growth will receive suitable tending and soil working to stimulate growth and development. Areas treated under natural regeneration shall be protected from fire and grazing, at places where natural regenerations is inadequate or is not likely to succeed.
- v. Management of forests close to villages will be given priority for meeting demands of local people for small timber, poles, firewood fodder, non-wood forest produce, etc. Local people will be actively involved in forest management, forest protections, plantations and development of natural resources in the village. Management of forest close to villages shall primarily be done through JFM committees.
- vi. Non-Timber forest Produce (NTFP) has great potential for sustainable economic development of local communities with conservation of forest resources. Sustainable NTFP production will be given high priority in the forest management.
- Vii Sustainable use of forest resources will remain the guiding principle for managing the demands of forest produce and services. Various government and non-government agencies will be engaged in identification and promotion of ecologically sound and economically feasible alternatives like wood saving technology, stall-feeding, population control of cattle and livestock improvement.

- vii. Involving local people in managing forests and generating awareness in rural and tribal areas is considered indispensable for the forest conservation.
- viii. Reducing biotic pressure on forests, particularly, illicit felling, unsustainable grazing, fire and encroachment near villages will be considered on priority basis.
- ix. Boundary demarcation will be carried out in time-bound manner for ensuring territorial integrity of forests.

1.3 : CONSTITUTIONS OF WORKING CIRCLES

1.3.1 : Analysis and Valuation of the Crops:

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

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

1.3.2 :Working Circles and Their Distribution: For the scientific management of forests, a compartment has been used as a unit for distribution. The allocation of compartments is based on preponderance of suitability to specific working circle.

Following working circles are prescribed for Yawal Forest Division.

1. Protection Working Circle.

Area having high Altitude, steep slope and valleys not suitable for working is allotted to the Protection Working Circle (PWC). This Working circle is expected to protect from illicit cutting, encroachment, Fire. No felling activities are proposed in this working circle.

2. Improvement Working Circle :-

Areas having sparse tree crops, open areas without tree growth and isolated small forest patches are included in this Working circle (IWC.) In such areas the focus

would be upon tending of existing NR and rootstock. In natural regeneration management, the seedlings of seed origin of desirable species will be given preference over the coppice. If NR is insufficient or absent 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 on open areas and isolated patches. CCT and Deep CCT works are recommended on areas with gentle slope as this will provide barrier to soil erosion.

3. Afforestation working circle:-

This working circle is newly proposed. All blank areas of main working circle i.e. Protection working circle, Improvement working circle and Anjan working circle suitable for plantation are included in this working circle.

SMC works, seed sowing of Neem, Khair, Moha, other local sps. and plantation of locally found suitable sps. including Bamboo, MFP and Medicinal plants will be done. In addition to this, dressing of all illicitly cut trees and cutting of all dead, dying and malformed trees will be done.

4. Non-Timber Forest Produce (Overlapping) Working Circle :-

This overlapping working circle extends over the entire plan area. Presently Tendu, Moha, Gum is the major source of revenue. The main objective management of this working circle is to generate employment & improve the economic condition of Rural people.

5. Bamboo (Overlapping) Working Circle :-

This is an Overlapping circle, in Deoziri, Karjana & Yawal (West) areas harvesting of bamboo will be done by JFMC. The main objective of this working circle is to harvest mature bamboo scientifically so as get maximum sustained yield and to meet the local demand of bamboo to maximum possible extent. It is also proposed to take under planting of bamboo.

6. Joint Forest Management (Overlapping) working Circle:-

This overlapping working circle extends to the entire area of the Yawal forest division which is co-terminus with the area of Raver, Yawal & Chopada talukas of Jalgaon District. Villages that are adjoining to the forest areas, are the focal areas for practicing Joint Forest Management. JFM Committees should be involved in plantation activities, protection, NTFP collection and eco-tourism.

7. Wildlife Management (Overlapping) working Circle :-

This working circle extends over entire area of Yawal Division. Wild life rich area in the Division should be identified & focus must be given in this area for improving wild life habitat suggesting rejuvenation & improvement work.

The allocation of forest areas under various working circles of the current working plan has been given in following table. Area Allocation to Different Working Circle.

Table No.1.1

Name of Working Circle	Area Allocated (Ha.)
Protection Working Circle	28229.72
Improvement Working Circle	21530.855
Afforestation Working Circle	14302.494
Miscellaneous Area management	18131.05
Non-timber Forest Produce (Overlapping) Working Circle	Entire Area
Bamboo (Overlapping) Working Circle	4880.48
Joint Forest Management (Overlapping) Working Circle	49037.00
Wild life (Overlapping) Working Circle.	Entire Area

Table No.1.2 :- Statement showing working circle wise comparison between Earlier and Proposed working plan.

Working Circle as per old plan	Total Area (Ha.)	Working Circle as per proposed plan	Total area (Ha.)
Protection with improvement working Circle	15556.64	Protection Working Circle	28229.72
Improvement Working Circle	20761.02	Improvement Working Circle	21530.855
Anjan Working Circle.	23538.48	Afforestation Working Circle.	14302.494
Plantation management (Overlapping) W.C.	----	Miscelinous Area management	18131.05
Non-timber Forest Produce (Overlapping) Working Circle		Non-timber Forest Produce (Overlapping) Working Circle	Entire Area
Bamboo (Overlapping) Working Circle.		Bamboo (Overlapping) Working Circle.	4880.48
Forest Protection (Overlapping) Working Circle.		Joint Forest Management (Overlapping) Working Circle	49.037
Joint Forest Management (Overlapping) Working Circle		Wild life (Overlapping) Working Circle.	Entire Area
Wild life management (Overlapping) Working Circle.		-----	
Eco-tourism (Overlapping) Working Circle.		-----	
Survey & demarcation (Overlapping) Working Circle.		-----	
Area with FDCM	22559.45	-----	

1.4 : PERIOD OF WORKING PLAN AND NECESSARY FOR INTERMEDIATE REVISION

Period of Plan the plan-:

This plan will be implemented for a period of 10 years from the year 2018-19 to 2028-29. However, the midterm review shall be carried out.

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CHAPTER :-2

FORMATION OF WORKING CIRCLES.

PROTECTION WORKING CIRCLE.

The area of this working circle has been clearly marked on the GIS based map of 1:50000 which is appended as Management Map in the Plan and a copy of the same is given on a smaller scale on A4 size here.

2.1 : GENERAL CONSTITUTION

This Working Circle includes 28229.72 hectare forest area from Raver, Yawal West, Yawal East, Chopda, Raver, Deoziri & Karjana ranges. These areas belonged to the Protection cum improvement, Improvement & Anjan Working Circles of the previous plan. The main objective of this working circle is to maintain and improve the existing soil tree cover and to conserve and enhance the existing tree growth. This working circle compartments surround the Yawal wild life sanctuary and acts as a buffer.

In current working plan, area around Yawal wildlife sanctuary are included in protection working circle. It also includes other hilly area with steep slope and difficult terrain difficult to work and which needs strict protection

2.2 : GENERAL CHARACTERISTICS OF VEGETATION :-

The growing stock is characterized by a mixture of large number of species. As these forests are situated on steep hill slopes, with shallow and murumy soil, Salai along with its common associate Dhavda are more frequent. Dhavada trees are found in abundance and Dhavada forms main regeneration crop in these forests. The other common species are Teak, Khair, Tiwas, bamboo, Tembhrun and Mahua. At places, exposed sheet rocks and grassy blanks are found along with patches of Karvi and Sabri. The crop is mostly young and middle aged, close to 60% of the crop is less than 45cms in girth. At present the natural regeneration is khair, bor, Dhavada etc. Anjan germinates profusely but dies back due to repeated fires in the forest.

2.3 : FELLING SERIES,CUTTING SECTIONS:-

The area of this working circle is divided in to seven treatment series with avg. area of 4032 ha. Each series is further divided into 10 coups.

2.4 : BLOCKS, COMPARTMENTS AND JFM AREAS :-

The details of compartments in this working circle have been provided in the Appendix----- of vol II

2.5 : SPECIAL OBJECTS OF MANAGEMENT

- To preserve and improve the existing vegetal cover in vulnerable areas with a view to maintain and improve microclimatic and micro-edaphic conditions of the site.
- To improve the vegetation by seed dribbling on precipitous slopes(>25⁰) and trench/pit planting on slopes < 25⁰ along with soil and moisture conservation structures.
- The compartments are adjoining to wild life sanctuary and forms a buffer between sanctuary area and other forest areas where human activity starts.
- The special object of management of Protection Working Circle areas is the protection of fragile forest sites and to prevent the siltation of the dams and water bodies by checking the soil erosion in the forest catchments through soil and water conservation measures.

2.5.1 : ANALYSIS AND VALUATION OF THE CROP

i) Stockmapping: Classified forest density maps from Forest Survey of India for the year 1998 have been procured and compartment boundaries have been over laid on these maps and satellite image density maps are generated and will be given to the field staff. The results of stock mapping are indicated in Annexure I.

ii) Quality and Age Class: These forests are having a crown density of 0.4 to 0.5. Nearly 90% of the crop is less than 75 cms girth class and about 60% of the crop is less than 45 cms girth size. The tree growth wherever occurring is mostly malformed because of lopping, fires and grazing. In some compartments no appreciable natural regeneration of any tree species is observed. Soil depth is sufficient in most of the areas but due to grazing pressure adjoining to revenue areas the soil has become compact.

Range wise allocation of compartment and area for Protection w.c.

(Area in ha.)Table No. 2.1

Range	RF		PF		Unclass Forest		Total Compt.	Total Area
	No.of compt.	Area	No. of compt.	Area	No. of compt.	Area		
Yawal East	10	5276.392	---	---	---	---	10	5276.392
Yawal West	18	6840.785	--	--	--	--	18	6840.785
Raver	05	1995.98	---	---	---	---	05	1995.98
Chopada	16	3295.734	----	----	----	----	16	3295.734
Vaijapur	21	4514.584	---	---	---	---	21	4514.584
Karjana	18	2979.045	---	---	---	---	18	2979.045
Deoziri	12	3327.200	---	---	---	---	12	3327.200
Total	100	28229.720	--	---	---	---	100	28229.720

About 42% of forest area of this working circle is having more than 0.4 density forest and 41% of the area has open forest. The forests of this working circle were in protection , miscellaneous and afforestation working circles of previous working plan. The enumeration details are given in **Appendix I of Vol. II**

Table No. 2.2

Type of area	Area in ha.	% of area w.r.t WC area %	Remarks
Well stocked , Density >0.4	11705.15	41.45	The forest area of the working circle has steep slopes and forms buffer zone to wild life sanctuary
Open forest, Density <0.4	10926.56	38.70	
Blanks	5598.01	19.82	
Scrub Forest	0.00	0.00	
Water bodies	0.00	0.00	
Total area	28229.72	---	

41.45% of forest area is well stock and 38.7 % area of this working circle is under stock with 19.82% area is blank.

2.5.2 : SILVICULTURAL SYSTEM :- Silvicultural system is proposed on the pattern of watershed management viz.ridge to valley treatment approach. Harvesting of green trees is prohibited. However, removal of dead trees by retaining two dead trees per hectare as snags is permitted. These areas are proposed to receive strict protection from grazing and fire.

2.5.3 : ROTATION PERIOD :- The rotation of 10 years is fixed to tackle the whole area. This working circle is divided into five working series and each working series has been divided into 10 coupes.

2.5.4 : HARVESTABLE DIAMETER:-

No harvestable diameter is decided as no harvesting is involved in this working circle.

2.5.5 : REDUCING FACTERS:- Not applicable.

2.5.6 : FELLING CYCLE: Treatment cycle is fixed at Ten years.

2.5.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS:

Not applicable.

2.5.8 : CALCULATION OF YEILD : Not applicable

2.5.9 : TABLE OF FELLING : Not applicable

2.5.10 : METHOD OF EXECUTING THE FELLING : Not applicable

2.5.11 : SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING:

2.5.11.1 .METHOD OF TREATMENT:

i) Cutting Back Operations: Cutting Back Operations will be carried out in the area.

(a) All badly damaged trees not likely to recover will be cut. (b) All climbers which are not of ecological and economical values will be cut.

ii) Cleaning: Cleaning operations are given below:

(a) All climbers, which are not of ecological and economical values, will be cut.

(b) Coppice shoots, if required, will be reduced to one per stool.

(c) Inferior growth which may interfere with the teak or miscellaneous species of choice will be removed.

(d) Damaged and malformed poles will be cut back.

2.5.11.2 : DEMARCATION OF COUPES AND PREPARATION OF TREATMENT MAP:

Except for 1st coupe in the sequence of working of this draft plan period, coupes will be demarcated one year in advance, But 1st coupe will be demarcated in the first year of operation and main working will be in the same year where as in other coupes it will be in following year.

Preparation Of Treatment Map: After demarcation of the coupe, Range Forest Officer will inspect the area and prepare a treatment map for the same and it shall

be thoroughly verified by the Assistant Conservator of Forests. The treatment maps will show the following areas

Type A - Protection Areas: It will include following areas:

- (a) The area having steep slopes i.e. more than 25°.
- (b) Eroded areas or areas liable to erosion.
- (c) 20 meter wide strip on either side of water courses.

Type B - Understocked Areas: The forest areas having less than 0.4 density are included in this category.

Type C – Well stocked areas and areas with Young Poles: The forest areas having more than 0.4 density are included in this category. There are patches of forest which are having pole crop in this working circle area. But topography of the working circle is having steep slopes and is vulnerable for soil erosion. Removal of existing crop is detrimental and it is very difficult to develop vegetation with artificial regeneration in the area. Keeping the vulnerability of the area removal of pole crop is not prescribed in this working circle.

- (i) All dead trees except two per ha will be marked for felling.
- (ii) All high stumps shall be cut.
- (iii) Coppice shoots shall be reduced to one per stool provided seedling regeneration of any tree species is absent.

MARKING RULES:

Marking will be done in the same year along with demarcation. The marking technique is described in detail in the chapter XIII-Miscellaneous Regulations. Following marking rules are laid down:

- (i) All pollarded trees will be cut back.
- (ii) All stumps of illicitly cut trees will be dressed to produce strong coppice shoot provided seedling regeneration of any tree species is absent in the surrounding.
- (iii) 2 dead trees per hectare will be retained for snag and den of wildlife.
- (iv) In this working circle, felling of any kind of tree is totally prohibited and the existing vegetation in the area shall be preserved.

The marking rules for each type of area will be as follows:

Type A - Protection Area: Only dead trees will be marked for felling provided their removal will not cause soil erosion.

Type B - Understocked Area: All edible fruit and flower yielding trees will be reserved from felling. The following trees will be marked for felling:

- (i) All dead and malformed trees after retaining two dead trees/ha.
- (ii) All but one vigorously growing coppice shoot per stool provided seedling regeneration of any tree species is absent.
- (iii) All high stumps will be cut.

Type C- Groups Of Young Poles: All edible fruit and flower yielding trees such as *moha, char, tendu, aonla, chinch, bel, sitafal*, and trees of *kulu* will be reserved from felling. No pole crop removal is recommended in these areas. The following trees will be marked for felling .

- (i) All climbers, which are not of medicinal value, will be cut.
- (ii) All pollarded trees will be cut back.
- (iii) All stumps of illicitly cut trees will be dressed to produce strong coppice shoot provided seedling regeneration of any tree species is absent in the surrounding.
- (iv) 2 dead trees per hectare will be retained for snag and den of wildlife.

The main object of the management is to maintain and improve the adequate vegetative cover and to preserve the soil on the slopes. Intensive fire protection works and essential cultural operations like removal of dead, dying shall be carried out. The slopes of these forests are very steep and it is very difficult to regenerate artificially on these steep slopes. Hence live tree removal from these forests is completely prohibited. Collection of minor forest produce like *Mahua* flower and fruit, *Char, Bel, Tendu, Gum* etc is permitted to the local tribes / villagers for their bonafide use.

The forests areas under this working circle need special treatment in the form of soil and moisture conservation works. Where ever the slopes are steep, no cct or dct is stipulated. Slopes being extremely steep, during rains the time of concentration is very low and rain water run off attains high velocities with in no time. In these areas the following soil and moisture conservation works are prescribed. Forest areas with steep slopes(>25⁰) cement check dams at regular intervals on the nalas, with gabian structures on the upstream side of the check dam as a support to reduce velocity of water flowing in the nala and also to prevent early siltation of the check dam.

Forest areas where slopes are $<25^{\circ}$, cement check dams at regular intervals on the nalas, with loose boulder structures on the upstream of the check dam should be constructed as a support to reduce velocity of water flowing in the nala and also to prevent early siltation of the check dam. To check the soil erosion and enhance the moisture regime, vegetal cover of the tract is to be increased through bush sowing and dibbling of *Lendi*, *Jatropha*, *Neem*, *Kusum* seeds in the under stocked and blank forest areas. It shall be carried out on regular basis through the concerned *vanmajors*, Beat Guards. Where soil depth is poor, grass seeds shall be broadcasted followed by closure for grazing.

The protection working circle surrounds Yawal wild life sanctuary and forms eco sensitive zone to wild life sanctuary. The working circle was discussed with Conservator of Forests(wild life) Nashik regarding wild life improvement activities in this working circle area. Water holes, and cement check dams for development of wild life are proposed in these compartment areas. Watch towers at suitable locations should also be constructed to observe the wild life and also fire incidences in the forest.

Eco Sensitive Zone:-

Eco Sensitive Zone Should also be the part of management of this working Circle. If the Eco Sensitive Zone are not declared, then restrictions of working within 10.00 km around PA will continue

If Eco Sensitive Zone is declared, then it is done so by specifying the prohibited, regulated, and permitted, activities. In such areas only habitat improvement works can be undertaken with the prior permission of the Competent Authority.

2.5.12 : REGENERATION:

The NR is the best source for getting growing stock, provided available NR is well protected and tended. The NR has grazing, fire and weed growth as its worst enemies amongst many such things. In this area of forests where NR can be secured only by means of systematic weeding commenced in first rainy season and continued there after until the plants are free from the risks of suppression.

NR is most promising means of regeneration. The area shows good regeneration of teak, khair, dhawla and in some areas anjan also. Singling, tending,

weeding and soil working should be done till it gets established and developed. These works should be continued at least for three years.

In these forest areas, NR of teak and anjan have suffered from fire as observed by die-back phenomenon depending upon incidences and extent of fire occurrences. In deciduous forests, teak seedling suffer from desiccation, which needs mulching individually to reduce this effect.

Inducement Of Natural Regeneration:

(i) Identified NR will be rigidly protected from grazing, trampling and fire incidences, by resorting to rigid grazing control fire protection measures applicable to current coupe of working.

(ii) Abundant natural reproduction, from teak seed lying dormant on the ground, could be induced by opening canopy, cutting and burning undergrowth completely. The seedlings, which spring up in abundance as a result of clearing and burning, are to be weeded from beginning itself and weeding requires to be continued for three years, till the plants are established. Hence, the weeding out of lantana will be carried out in favour of NR successively up to third year.

Even after the above operations, if NR is not satisfactory, on the slopes saucer shaped pits of 30 cm x 30 cm x 30 cm will be prepared wherever light is available on the ground. Pits will have a baffle wall on the down hill side to support the soil. Treated seeds of teak, germinated ain seeds and other misc. species will be sown and will be weeded thrice and mulched twice in a year until they get established. This work will be carried out during the CBO period and sowing will be done just before the onset of rains.

(i) Coppice shoots interfering with NR when established should be removed.

(ii) The NR should be cleared off weeds within the diameter of 1 meter. The mulching should be done by spreading the twigs and debris to the extent of six inches layer, followed by a layer of leaves, burnt up material and a sufficient earth over it (about a ghamela). This will facilitate protection from fire, drips from the nearby overgrowth and leading to mulching.

(iii) In the case of NR of valuable miscellaneous species like arjun, *ain*, *haldu*, *tiwas*, etc. also protection, weeding and soil working shall be carried out.

Artificial Regeneration:

Planting Techniques: - In earlier working plan forest blank and under stocked areas where slopes are less than 25 degrees and teak is predominant, 50% Teak will be planted by stump and where ever Anjan is predominant, 50% Anjan should be planted with seedlings raised in polypots/root trainers and other 50% should comprise of bio fuel trees like Karanj, Neem, Mahua, Jatropha on CCT etc, or lac insect host trees like Kusum, Bor, Khair, Palas, Pimpal, Acacia auriculiformis etc., or gum exudating trees like Kadai, Salai, Khair, Dhavada, movai etc. should be planted, was mentioned. As Teak seed is not readily available and Anjan also does not show promising results, it becomes very difficult to maintain ratio of these species. Plantation of locally found suitable species including 10 % Bamboo, 20% MFP and medicinal plants should be done. Most suitable species found for regeneration by seed are Neem, Khair, Karanj while that for poly pot planting, suitable species are Neem, Khair, Awala, Papda, Bamboo, Shiwan and Sisoo. Plus trees of these species should be identified in the division and the seed of these trees should be used for raising plants in nursery or seed sowing. All these miscellaneous species which have tremendous NTFP value, are naturally found in the forests of Yawal forest division. These miscellaneous species should be raised in polypots or root trainer containers.

Area (A): - No planting shall be done. However in case of *nala* and river banks planting of bamboo at espacement of 6m x 6m and *jamun, arjun, grasses, agave,* etc., at espacement of 3m x 3m should be undertaken.

Area (B): - In these areas, plantation shall be undertaken by doing seed dribbling on precipitous slopes and pit or trench planting on gentler slopes along with soil and moisture conservation works.

Area (C): - This area does not need any planting. In areas where the field officer feels that the regeneration is inadequate, 625 plants per hectare should be artificially supplemented to improve the stock of the area.

Bamboo under planting shall be undertaken in the areas -B, Area -C, to facilitate putting up of desired increment to growing stock and improve production capacity of the growing stock, including older plantation.

As NR is the principal method of regeneration, only shortfall left after considering available quantity of NR should be planted by gap planting. However this cannot be quantified.

2.5.13 : ASSOCIATED REGULATIONS AND MEASURES.

Fire Protection: Main-working coupes will be fire traced and rigidly fire protected for a period of Five years from the year of working. In the month of October / November after the demarcation is over all the undergrowth will be uprooted. The cut material will be spread over the area to be planted in such a way that the cut material remains sufficiently away from the stems of the trees and burning does not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests.

Since the area of this working circle is sensitive to fire hazard, fire lines of 12 meter at the interval of 0.5 km across the contour should be maintained by fire tracing at higher altitude.

The NR needs to be protected from the hazards of fire so that the regeneration becomes future growing stock. Hence the main thrust should be on protection of regeneration.

To ensure effective protection from fire, the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation, modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed & fire protection will be done through the village protection committee.

As such the area being prone to fire hazard and NR of species being the first and the biggest causality, this economic source of regeneration should be rigidly protected from fire. It causes damage to productive crop also. The comprehensive Fire Fighting Scheme should be chalked out so that effective Fire Fighting force is created for, for the period 15th February to 15th June on 24 hour duty on suitable area basis.

The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

Grazing Control: No grazing shall be allowed in protection forests. In case of emergent situation, the rotational grazing may be allowed. The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6th Dec.1968 according to which the grazing incidence in protected forests should not **exceed one cattle unit for 10 acres.**

Soil And Moisture Conservation Works:

In eroded areas, soil and conservation works, such as nala bunding, gully plugging and water conservation measures such as water absorption trenches (WATs) & LBS will be taken.

On the steep slopes, neither cct nor dct works be carried out to prevent soil erosion. Slopes being extremely steep, during rains the time of concentration is very low and rain water runoff attains high velocities with in no time. In these areas the following soil and moisture conservation works are prescribed.

1. Forest areas with steep slopes(>25⁰) cement check dams at regular intervals on the nalas, with gabion structures on the upstream side of the check dam as a support to reduce velocity of water flowing in the nala and also to prevent early siltation of the check dam.
2. Forest areas where slopes are <25⁰, cement check dams at regular intervals on the nalas, with loose boulder structures on the upstream of the check dam should be constructed as a support to reduce velocity of water flowing in the nala and also to prevent early siltation of the check dam.
3. To check the soil erosion and enhance the moisture regime, vegetal cover of the tract is to be increased through bush sowing and dibbling of seed. On gentler slopes (<25⁰) CCT works should be done and fresh seed of *Jatropha curcus* should be sown at 0.5m intervals. *Jatropha* seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from *Jatropha* fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.

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CHAPTER NO:- 3

IMPROVEMENT WORKING CIRCLE

The area of this working circle has been clearly marked on the GIS based map of 1:50000 which is appended as Management Map in the Plan and a copy of the same is given on a smaller scale on A4 size here.

3.1 : GENERAL CONSTITUTION OF THE WORKING CIRCLE.

The areas, which require improvement through Silvicultural operations and artificial regeneration, have been included in this working circle. This working circle comprises of some areas from earlier Anjan working circle having good Anjan growth. This working circle also includes old plantation areas of earlier plantation management overlapping working circle for treatment. The main aim is to improve the status of the crop and land. Therefore obtaining produce of any kind is neither expected nor regulated. This Working circle also includes the areas belonging to the upper precipitous and very steep slopes. As far as possible a continuous blocks of such forests have been included.

This working circle is constituted from Protection cum improvement working circle, Anjan Working circle and area taken back from FDCM. Also 359.63 hectare Protected Forests spread in 15 villages and 25.48 hectare of Unclassed Forests (compensatory land) in 2 villages (which are proposed PF) are included this Working Circle. Total area of this working circle is 21530.855 ha, spread over Yawal East – West, Chopda, Raver, Deoziri, Vaijapur & karjana ranges.

COPARMENT ALLOCATION

Range wise allocation of compartment and area for Improvement w.c.

Table No.3.1

Range	RF		PF		Unclass Forest		Total Compt.	Total Area
	No.of compt.	Area	No. of compt.	Area	No. of compt.	Area		
Yawal East	08	2269.761	05	127.370	-	-	13	2397.131
Yawal W.	10	2393.133	04	27.85	01	5.14	14	2426.123
Raver	12	3684.536	-	-	02	20.34	14	3704.879
Chopada	04	1078.449	03	37.97	-	-	07	1116.419
Vaijapur	10	2760.799	01	8.40	-	-	11	2769.199
Karjana	19	4475.967	04	77.62	-	-	23	4553.587
Deoziri	17	4481.10	07	85.42	-	-	24	4866.52
Total	80	21143.745	24	359.630	03	25.48	107	21530.845

(Area in ha.)

3.2 : GENERAL CHARACTERS OF THE VEGETATION

Teak is the principal species with Bija, anjan, salai, shisham and Tembhrun, Awla etc. as the associates. The forests are also well stocked in general and with certain open and blank patches. In higher hill slopes and plateaus with poor soil, Salai is predominantly found. Occurrence of bamboo is seen in this forest area. The crop is generally young and middle aged. Nearly 60 to 70% of the crop is less than 45 cms girth size. Quality is generally IV-a.

3.3 : FELLING SERIES, CUTTING SECTIONS:-

The area of this working circle is divided into Ten treatment series with avg. area of 2153 ha. Each series is further divided into 10 coups.

3.4 : BLOCKS, COMPARTMENTS AND JFM AREAS :-

The details of compartments in this working circle have been provided in the Appendix----- of vol II

3.5 : SPECIAL OBJECTIVES OF MANEGAMENT

- To improve the condition of the growing stock by tending existing rootstock.
- There is a need to improve blank areas into well stocked areas through artificial regeneration.

- To safeguard the areas against soil erosion and thereby preserve and improve the site quality.
- The upper reaches and steep slopes will be protected so that grasses can come up in these areas.
- to increase the proportion of valuable species in the growing stock.
- The upper reaches and steep slopes will be protected so that grasses can come up in these areas.

3.5.1 : ANALYSIS AND VALUATION OF THE CROP

The site qualities of the area are IV-a and IV-b. Teak forms the major species of the growing stock. The growing stock predominantly contains middle-aged crop and trees of inferior injayali species are only found in mature classes. The stock mapping of the compartments is done by procuring Forest Density Classified Satellite Images from Forest Survey of India, Dehradun, The Images procured belong to the year 1998. Compartment boundaries are overlaid on these images and density maps are prepared.

Soil depth is sufficient in most of the areas but in areas close to revenue areas soil got compact due to biotic interference.

Table No.3.2

Type of area	Area in hectares	% of area w.r.t WC area	Remarks
Well stocked , Density >0.4	7797.455	36.21	The forest area of the working circle has Teak & Anjan as dominant species
Open forest, Density <0.4	9762.37	45.34	
Blanks	3971.02	18.45	
Scrub Forest	0.	-	
Water bodies	-	-	
Total area	21530.845	-----	

Nearly 36.21% of the forest area of this working circle is well stocked forest and 45.34% of the forest is under stocked and blanks constitute only 18.45% of the working circle area.

3.5.2 : SILVICULTURAL SYSTEM.

All advance growth will be nurtured along with gap filling by artificial regeneration. Fellings will be purely on Silvicultural considerations aiming at improvement of the growing stock.

Forest areas containing dense pole crops will be thinned along with coupe working. Growth of naturally regenerated pole crop will be encouraged by the tending, cleaning operations and improvement felling as well as protection from fire and grazing.

3.5.3 : ROTATION PERIOD :

A rotation of 10 years is kept to tackle the whole area. The working circle has been divided into 10 working series and each working series is divided into 20 coupes.

3.5.4 : HARVESTABLE DIAMETER:-

No harvestable diameter is decided as no harvesting is involved in this working circle.

3.5.5 : REDUCING FACTERS:-

Not applicable.

3.5.6 : FELLING CYCLE:

Treatment cycle is fixed at Ten years.

3.5.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS:

Not applicable.

3.5.8 : CALCULATION OF YEILD : Not applicable

3.5.9 : TABLE OF FELLING : Not applicable

3.5.10: METHOD OF EXUCUTING THE TREATMENT:

COUPES DEMARCATION & TEATMENT MAP

Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

Preparation of Treatment Map : It will be prepared by RFO and verified by ACF. The trace of the coupe map will show the contours along with important features like *nala*, streams, old plantation, etc.

Treatment Prescribed :- The treatment proposed for various treatment type areas marked on treatment map shall be as follows: -

Type 'A'- PROTECTION AREAS: The areas consisting of patches over 25⁰ slope or more and 20 meter strip on both sides of the rivers or *nalas*.

Type 'B'- UNDERSTOCKED AREAS/BLANKS: Blanks and under stocked patches (crown density below 0.4), with slopes below 25⁰, and minimum area exceeding 2 hectare in extent, Continuous Contour Trenches should be taken with proper alignment. A baffle wall should be provided at every 10 meter interval. Freshly collected *Jatropha* seed should be used i.e. DCF should ensure the seed is from that very season, is collected or purchased. *Jatropha* seed should be sown at every 50 cms interval and seed of locally available species, as per DCF's choice should be sown at 50 centimeter interval. *Jatropha* plants on TCM have come up successfully in Yawal Forest Division.

Type 'C'- WELL STOCKED AREAS, OLD PLANTATIONS AND GROUPS OF YOUNG POLES: This will include areas with crop density more than 0.4. This will include patches of well-grown poles suitable for retention as future crop in addition to old plantations. The patch should not be less than one ha in extent.

TREATMENTS PROPOSED: The various treatments proposed are as under:

Area 'A': (i) The soil and moisture conservation treatment shall be as given in Miscellaneous Regulation.

(ii) Planting *Bamboo*, *Jamun*, *Arjun*, *Agave* and grasses along the nala and river bank.

Area 'B': (i) Under stocked and blank forest areas where slopes are <25⁰, cement check dams/ earthen dams at regular intervals on the *nalas*, with loose boulder structures on the upstream of these dams should be constructed to prevent early siltation of the check dam. After siltation of loose boulder structures *agave suckers* or *khus/vetivera grass slips* should be planted on the silted soil. On gentler slopes (<25⁰) CCT works should be done and fresh seed of *Jatropha curcus* should be sown at 0.5m intervals. *Jatropha* seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from *Jatropha* fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.

(ii) In earlier working plan plantation of 50% teak with stumps and other 50% should comprise of bio fuel trees like karanj, neem, mahua, jatropha on CCT etc, or lac insect host trees like kusum, bor, khair, palas, pimpal, acacia auriculiformis etc, or gum exudating trees like kadai, salai, khair, Dhavada , movai etc was proposed. This prescriptions and proportion of species could not be followed as these are not practicable. Plantations of locally found suitable species including 10 % Bamboo, 20% MFP and medicinal plants should be done.

All these miscellaneous species which have tremendous NTFP value are naturally found in the forests of Yawal forest division. These miscellaneous species should be raised in polypots or root trainer containers. pits or trenches as per suitability of site should be adopted. The DCF should choose the model with technical approval from CCF(T).

Area 'C': In areas where there is adequate regeneration, these areas does not need any planting. But in areas where the regeneration is not seen or the field officer felt it is inadequate 625 plants per hectare should be supplemented with artificial regeneration.

MARKING RULES FOR IMPROVEMENT WORKING CIRCLE.

Marking For Type 'A' Area:

No marking will be carried out.

Marking For Type 'B' Area:

- (i) All dead, dying and diseased trees after retaining 2 dead trees per ha. shall be marked for felling.
- (ii) All live high stumps shall be cut as close to the ground as possible and dressed.
- (iii) All malformed advance growth of Teak up to 30 cm. shall be cut back
- (iv) The established multiple coppice shoots will be reduced to one per stool retaining the vigorous one which is closer to the ground.
- (iv) The undesirable under growth, which is preventing growth of natural regeneration of desired species will be removed.

Marking For Type 'C' Area:

(i) All dead, dying, diseased and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling.

(ii) In patches not less than 0.5 ha. In extent and having Teak reproduction in seedling stage, heavy openings in middle canopy by cutting miscellaneous growth will be carried out.

(iii) The existing established teak reproduction upto 20c.m., in girth at breast height will be freed by marking overwood for removal

(iv) Malformed advance growth of Teak upto 30c.m. in girth will be cutback. The overwood and inferior species likely to interfere with the coppice growth will be marked for felling.

(v) Thinning, marking will be carried out in favour of Teak and other valuable species. No fruit bearing tree shall be marked for felling .

(vii) The pole crop patches of not less than one hectare shall be identified having advance growth of any species and it shall be spaced out to one third of the top height, while retaining the vigorous and straight poles. Silvicultural thinning shall be done as per yield table. The thinning shall be done in such a manner that epicormic branches do not come up. Thinning in old teak plantation will be carried out as given in the miscellaneous regulations.

3.5.11 : SUBSIDIARY SILVICULTURAL OPERATIONS: The Subsidiary Silvicultural operations includes (1) Cleaning and (2)Thinnings.

Cleaning: A cleaning operation will be carried out in the 5th year commencing from the year of main felling.

- 1) All climbers will be cut over entire area of the coupe, if necessary.
- 2) Damaged, malformed saplings, and coppice shoots will be cutback.
- 3) Multiple coppice shoots will be reduced to one promising shoot per stool provided no other seed origin sapling is available at that place.
- 4) Fast growing inferior species and bamboo interfering or likely to interfere with reproduction of teak & other valuable species will be cut.

5) In thick patches of teak, advance growth & established regeneration of other valuable species a spacing between sapling to be retained, should vary from 2 meter to 2.59 meter depending on the height of the sapling.

Cleaning in plantation areas should be carried out as & when required depending upon the crop condition.

Thinning: Thinning in plantation areas will be carried out when the running age of teak stand is in the multiple of 5 years. The first thinning will be mechanical. During first mechanical thinning trees in alternate diagonal lines will be removed. The subsequent thinnings will be silvicultural as prescribed in the Chapter on Miscellaneous Regulations.

OTHER REGULATIONS:

Fire Protection:

Main-working coupes will be fire traced and rigidly fire protected for a period of Five years from the year of working. In the month of October / November after the demarcation is over, all the undergrowth will be uprooted. The cut material will be spread over the area to be planted in such a way that the cut material remain sufficiently away from the stems of the trees and burning does not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests.

The NR needs to be protected from the hazards of fire so that the regeneration becomes future growing stock. Hence the main thrust should be on protection of regeneration.

To ensure effective protection from fire, the workable schemes of fire protection should be carried out in which due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed & fire protection will be done through the village protection committee.

As such the area being prone to fire hazard and NR of species being the first and the biggest causality, this economic source of regeneration should be rigidly protected from fire. It causes damage to productive crop also. The comprehensive

Fire Fighting Scheme should be chalked out so that effective Fire Fighting force is created for, for the period 15th February to 15th June on 24 hour duty on suitable area basis.

The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

Grazing control: In other areas the grazing shall be regulated as per the grazing policy of the State Govt.

CHOICE OF SPECIES

In earlier working plan, plantation of 50% teak with stumps and other 50% should comprise of bio fuel trees like Karanj, Neem, Mahua, Jatropha on CCT etc, or lac insect host trees like kusum, bor, khair, palas, pimpal, acacia auriculiformis etc, or gum exudating trees like kadai, salai, khair, Dhavada, movai etc was proposed. This prescriptions and proportion of species could not be followed as these are not practicable. Plantations of locally found suitable species including 10 % Bamboo, 20% MFP and medicinal plants should be done.

All these miscellaneous species which have tremendous NTFP value are naturally found in the forests of Yawal forest division. These miscellaneous species should be raised in polypots or root trainer containers. pits or trenches as per suitability of site should be adopted. The DCF should choose the model with technical approval from CCF(T).

The planting model approved by the competent authority shall be implemented from time to time.

3.5.12 : REGENERATION:

Natural Regeneration: The NR will be protected against fire and animals. TCM or other kind of fencing may be established.

Artificial Regeneration and choice of species:-

PPO+PYO operations:- As approved by the competent authority.

Method of Planting: -

The planting model approved by the competent authority will be implemented and C.C.F. (Territorial) will provide guidance from time to time.

Pre-Planting And Planting Operations:

The pre-planting and planting operations as approved by the competent authority shall be carried out.

3.5.13 : ASSOCIATED REGULATIONS AND MEASURES

Protection from Fire: Main-felling coupes will be fire traced and rigidly fire protected for a period of **Five years** from the year of felling. In the month of October / November after the demarcation is over all the undergrowth of lantana will be uprooted. The cut material will be spread over the area to be planted in such a way that the cut material remain sufficiently away from the stems of the trees and burning does not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests.

The NR needs to be protected from the hazards of fire so that the regeneration becomes future growing stock. Hence the main thrust should be on protection of regeneration.

To ensure effective protection from fire the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed & fire protection will be done through the village protection committee.

The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

As such the area being prone to fire hazard and NR of species being the first and the biggest causality, this economic source of regeneration should be rigidly protected from fire. It causes damage to productive crop also. The comprehensive Fire Fighting Scheme should be chalked out so that effective Fire Fighting force is created for, for the period 15th February to 15th June on 24 hour duty on suitable area basis.

Irrigated Plantations: Where ever there is a water body(dams) in the forest or on the fringe of forest irrigated plantation should taken. Depending on the situation i.e. terrain and site quality, flood irrigation or drip irrigation plantation should be

proposed. The site inspection should be done by RFO and ACF and submit a feasibility report to DCF, about the extent of area and the type of irrigation to be given. After personal inspection the DCF should seek funds for irrigation plantation from CCF(Territorial).

Grazing Control: - The areas of main working shall remain closed to grazing for a **period of 5 years**. The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6th Dec.1968 Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. The method of rotational grazing be followed. As per functional classification this working circle can mainly be classified as minor forests and the maximum grazing incidence prescribed for it is 1.2 ha per cattle unit. This will facilitate opening of area on rotational basis. The closed areas should be specifically mentioned in the grazing licenses and villagers be communicated of such closures by suitable means such as drum-beating, notices on prominent places, village Panchayat officers etc. and by binding grass pullies or stacks along the boundaries of closed coupes.

Soil Conservation Works:

Intensive soil and moisture conservation works like gully plugging, nala bunding, nala rejuvenation, LBS should be taken for preservation of water regime for longer period. CCT and Deep CCT works are recommended on areas with gentle slope as this will provide barrier to soil erosion. This work will also induce the NR. Cement plugs or Earthen *Bandhara* be taken up to preserve moisture for a longer period simultaneously in the catchments areas cement plugs/ earthen *Bandhara* be treated so as to prevent siltation in the dams. On gentler slopes (<25⁰) CCT works should be done and fresh seed of *Jatropha curcus* or suitable site specific local species should be sown at 0.5m intervals. Charoli being native to Yawal division and has very good NTFP value should be collected during season and sown on trenches. *Jatropha* seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from *Jatropha* fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Works shall be

completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.

People's Participation: The people's participation is the need of the hour, to protect the forest from fire, grazing, illicit cutting etc. Unless the villagers living nearby are made aware of the material benefit from the forest, they would not feel associated with the well being of the forest and may not visualize the distinct valuable utility of forests for their material benefit they get or likely to get. Therefore it should be expedited through viable measures like.

Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle.

By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests.

Grazing and fodder as well as fuel wood should be related with their efforts for protection and management of forests.

Incentives to FPC/Village committees in terms of cash awards/ free grants on annual basis would be formalized. These measures would help actively involve people in the forest management and should benefit them in the longer run. The people should be made aware of their responsibilities so that long lasting relations get strengthened and well being and sustenance of forests along with people is ensured.

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CHAPTER NO:- 4

AFFORESTATION WORKING CIRCLE

4.1 : GENERAL CONSTITUTION:

This is a newly created overlapping working circle. All blank areas of main Working Circle i.e. Protection Working Circle, Improvement Working Circle and Anjan Working Circle which is suitable for plantations will be included in this working circle. The total area under this working circle is 14302.494 ha. spread over Raver, Yawal East, Yawal West, Chopda, Vaijapur, Karjana & Deozari of the division.

Table No.4.1

Range	RF		PF		Unclass Forest		Total Compt.	Total Area
	No.of campt.	Area	No.of campt.	Area	No.of campt.	Area		
Yawal East	19	7239.019	-	-	-	-	19	7239.019
Yawal West	3	1366.28	-	-	-	-	3	1366.28
Raver	7	2407.608	-	-	-	-	7	2407.608
Chopada	3	1140.317	-	-	-	-	3	1140.317
Vaijapur	6	2149.27	-	-	-	-	6	2149.27
Karjana	0	0	-	-	-	-	0	0
Devziri	0	0	-	-	-	-	0	0
Total	38	14302.494					38	14302.494

4.2 : GENERAL CHARACTERISTICS OF VEGETATION

This working circle generally comprises of degraded open forest areas interspersed with forest blanks or brushwood. The blank areas have dominance of Khair, Palas and Bhirra.

The allotted areas in general are under stocked and open with crop density usually less than 0.4, though patches of better stocked areas are also met with in some compartments. The most of the PF areas allotted to this WC, especially, those near the villages are highly degraded and lays bare without any significant tree crop.

4.3 : FELLING SERIES, CUTTING SECTION

The area of this working circle is divided into Eleven treatment series with avg. area of 1400 ha. Each series is further divided into 10 coups.

4.4 : BLOCKS, COMPARTMENTS AND JFM AREAS :-

The details of compartments in this working circle have been provided in the Appendix----- of vol II

4.5 : SPECIAL OBJECTIVE OF MANAGEMENT:

1. To cover the blank area with vegetative growth,
2. To reclaim the area by soil and moisture conservation works,
3. To increase the productivity of forest land
4. To involve the local people in plantation activities.
5. To maintain and preserve the biodiversity of the area by encouraging the plantation of indigenous speices.

General Prescription for Treatment.

1. Dressing of all illicitly cut trees and cutting of all dead, dying and malformed trees except retaining 2 dead treed per hectare should be done.
2. The undesirable under growth, preventing growth of natural regeneration of desired species will be removed.
3. Under stocked and blank forest areas where slopes are $<25^{\circ}$ should be treated by intensive soil and moisture conservation works like gully plugging, nala bunding, nala rejuvenation, Loose Boulder Structures. CCT and Deep CCT works are recommended on areas with gentle slope as this will provide barrier to soil erosion.
4. Seed sowing of Neem , Khair, Moha, and other local species should be done in bushes as per site suitability before the onset of Monsoon
5. Plantations of locally found suitable species including 10 % Bamboo, 20% MFP and medicinal plants should be done.

Table No 4.2

Type of area	Area in hectares	% of area w.r.t WC area
Open forest, Density <0.4	7809.16	54.6
Blanks	6493.33	45.4
Scrub Forest	-	-
Water bodies	-	-
Total area	14302.494	-----

Nearly 45.4% of the forest area of this working circle is blank and 54.6% area is under stock having density less than 0.4.

4.5.1 : ANALYSIS OF CROP...

4.5.2 : SILVICULTURAL SYSTEM:.....

4.5.3 : ROTATION PERIOD :- The rotation of 10 years is fixed to tackle the whole area. This working circle is divided into five working series and each working series has been divided into 10 coupes.

4.5.4 : HARVESTABLE DIAMETER:-

No harvestable diameter is decided as no harvesting is involved in this working circle.

4.5.5 : REDUCING FACTERS:-

Not applicable.

4.5.6 : FELLING CYCLE:

Treatment cycle is fixed at Ten years.

4.5.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS:

Not applicable.

4.5.8 : CALCULATION OF YEILD : Not applicable

4.5.9 : TABLE OF FELLING : Not applicable

4.5.10 : METHOD OF EXUCUTING THE FELLING : Not applicable

4.5.11 : DEMARCATION OF COUPES, PREPARATION OF THE TREATMENT MAP AND METHOD OF TREATMENT

1. The proposed annual working coupes will be demarcated one year in advance of working. After demarcation of the area, a treatment map shall be prepared by the field staff and shall be verified by a ACF. Site specific treatment plan needs to be prepared giving due weightage to the site conditions.

The following areas shall be shown distinctively in the map:

I) Area 'A' – Protection areas : It shall include the following areas

- i. Areas with steep slopes i.e. more than 25⁰
- ii. Eroded areas or areas liable to erosion.
- iii. Twenty meters wide strip on either side of the water courses.

- II) Area 'B'–Under stocked areas:** include areas with crop density less than 0.4. Area suitable for taking up afforestation shall be marked on it and shall also show prominently the type and location of SMC works to be undertaken.
- III) Area 'C' - Old plantation areas:** include areas under old plantations.
- IV) Area'D'–Well stocked areas:** include areas with crop density more than 0.4. All prominent nallahs, perennial sources of water, water bodies etc. shall also be shown in the TM and numbered. Laying of grids shall be done only in B and D type areas. In B areas where plantations are prescribed, grids of 0.5 (100X50 mtrs) hectare size while in D areas, grids of 1 ha. size (100x100 mtrs) shall be laid. Grid wise record of operations eg. Planting of seedlings, tending of NR, root stock management, singling of coppice, weeding etc. shall also be maintained by the RFO.

2. Method of Treatment :

Inadequate sub-soil moisture, highly compact soil structure, fire damage and heavy biotic pressure are the main limiting factors for the establishment of seedlings in this area. Top soil has been washed away from many of the areas. Areas are mostly degraded. Hence intensive soil and moisture conservation measures need to be taken up in these areas. Afforestation works will be undertaken in the next year only after the area has been fully treated for the SMC measures.

The various treatments proposed for the above mentioned areas are as follows:

- I. Area 'A':**
- i. The SMC works including nalla- bunding and gully plugging will be carried out wherever needed.
 - ii. Cutting of Ficus, Vitex spp. (Nirgudi), bulbils of Agave etc. shall be planted for binding the soil where ever possible.
- II. Area 'B' :** These area shall be treated in following two stages:
- a. Restorative Phase :** This phase will be of one year duration and will prepare the site for the planting activity by improving its soil moisture content. During this phase, soil and moisture conservation works shall be carried out during the initial first year. The area of the annual working unit shall be protected completely from biotic interference by digging a T.C.M or LHF.

During this phase various works will be taken up as under:

- i. Preparation of the T.C.M. and/or live hedge around the working area: Preparation for the live hedge should be started before the rains set in so that the seeds/cuttings/seedlings of suitable local species should be sown/planted at the onset of the rains.
- ii. Species like Chilhar, Agave, Vitex, Bamboo, Karvand and other suitable local species should be grown on the mound of the hedge or TCM.
- iii. The SMC works like van tale, nalla-bunding, gully-plugging, contour trenches etc will be carried out as per the site suitability before the rains set in and as per the prescriptions given in Section 8.
- iv. Singling and cutting back of the rooted stock.
- v. Motivating and encouraging the villagers for undertaking planting and forest protection under J.F.M.

b. Productive Phase :

In the second year, the planting activity shall be taken in the same working unit only after ensuring that the area is fully treated with SMC works.

- i. Rooted stock shall be properly tended.
- ii. Suitable local miscellaneous species including fuel wood, fodder tree species, NTFP and medicinal plant species will be planted in the under-stocked areas having good soil depth.

Areas prone to excessive grazing as well as areas found unsuitable for afforestation shall be excluded from planting activity.

III. Area 'C' :

- i. The plantations shall be treated as per the prescriptions and sequence of working as given in
- ii. the 'Old Plantations Management W.C.
- iii. Any other successful old plantation or its part on slopes less than 25° that is not included in 'Old Plantations Management WC' inadvertently but falls within the coupe shall be worked as per its year of formation and sequence of working given for other plantations in the appendix.

IV. Area 'D' :

- i. No planting shall be done in these areas.

Introduction of Grasses:-

Area suitable for introducing fodder grasses should be identified. These type of areas should be well trained, plain to gentle slopping with 15 cm depth of soil not less than 2 ha. in extent at one place and such type of areas must be mostly under stocked or blank.

Along the counter, ploughing of strips and planting of tussocks or plants of Sheda, Paonia, Marvel, etc., grasses should be done. Nalla bunding and gully plugging is also prescribed with uprooting of weeds and coppice shoots in 2nd and 3rd year of operation.

SOIL AND MOISTURE CONSERVATION WORKS.

The area gets heavy average annual rainfall ranging between 500 to 700 mm. but most of the valuable rain water goes waste as run-off into the streams of Narmada Rivers. On the other hand gets a scanty average annual rainfall of about 550 to 650 mm. only. Therefore a large tract of the division faces an acute shortage of water during the summer months. The soil becomes compact during the pinch period resulting in poor drainage as well as poor aeration of the soil. Intensive SMC works viz. gully plugging, nalla-bunding, contour trenching, van-tale and other appropriate water harvesting structures shall be undertaken as per site requirement for helping young regeneration to establish easily. Ridge to valley concept shall be followed while treating the watershed. A village shall be taken as a unit of holistic development. For this purpose, it shall be endeavored to integrate forestry management interventions with development schemes of other departments.

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Chapter No:-5

NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

5.1 : Non timber forest produce (Overlapping) working circle :-

The area of this working circle covers the whole Division and hence not specifically marked on the GIS based map.

5.2 : GENERAL CONSTITUTION OF WORKING CIRCLE.

This overlapping working circle extends over the entire plan area. Presently tendu is the major source of revenue to the division. The collection tendu leaf is one of the most important income generating activity in the division.

5.3 : GENERAL CHARACTERISTICS OF VEGETATION :

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

5.4 : FELLING SERIES, CUTTING SECTIONS:- Not Applicable

5.5 : BLOCKS, COMPARTMENTS AND JFM AREAS :- Not Applicable

5.6 : SPECIAL OBJECTS OF MANAGEMENT

The special objects of management of this working circle are as below:

- 1) To generate employment for the Forest Protection Committee members and improve the economic situation of the local rural people.
- 2) To identify and assess different NTFP resources in the division. That is girth class wise, beat wise, enumeration of commercially important NTFP species like *Anogeissus latifolia*, *Sterculia urens*, *Boswellia serrata*, *Schleichera oleosa*, *Butea monosperma* etc.
- 3) The local people should be taught about the collection/tapping technologies and storing of the collected produce.

4) The department after assessing the NTFP potential of the division, should do market survey and assesses the market and find most competitive price for the produce collected by the local people.

5.6.1 : ANYALYSIS OF THE CROP: Not applicable

5.6.2 : SILVICULTURAL SYSTEM: Not applicable

5.6.3 : ROTATION PERIOD :- The rotation of 10 years is fixed to tackle the whole area. This working circle is divided into five working series and each working series has been divided into 10 coupes.

5.6.4 : HARVESTABLE DIAMETER:- No harvestable diameter is decided as no harvesting is involved in this working circle.

5.6.5 : REDUCING FACTERS:- Not applicable.

5.6.6 : FELLING CYCLE:Tretment cycle is fixed at Ten years.

5.6.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS: Not applicable.

5.6.8 : CALCULATION OF YEILD : Not applicable

5.6.9 : TABLE OF FELLING : Not applicable

5.6.10 : METHOD OF EXUCUTING THE FELLING : Not applicable

5.6.11 : SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING : Not applicable

5.6.12 : REGENERATION : Not applicable

5.6. 13 : ASSOCIATED REGULATION AND MEAURES:

OWNERSHIP AND MONOPOLY PROCUREMENT OF THE NTFP:

Parliament has enacted a law "The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996 (Act No.40 of 1996)". The said Act, provides for endowing by the States, the Panchayats in the Scheduled areas, with such powers and authority as may be necessary to enable them to function as institution of self Govt. It further provided that a State Legislature should ensure inter-alia, that the Panchayats at the appropriate level and the Gram sabhas are endowed specifically with the ownership of minor forest produce.

Govt. of Maharashtra has enacted a law “Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act, 1997 and has amended Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No.45 of 1997)”, vide which ownership of 33 MFP specified in the Schedule, found in the Govt. land has been transferred to the Panchayats. The MFPS included in the Schedule are [1] Mahuwa flower,[2] Mahuwa fruits,[3] Gum,[4] Hirda ,[5] Charoli,[6]Awala,[7] Baheda,[8] Neem seeds,[9] Karanj seeds,[10] Amaltas seeds,[11] Chinch, [12] Tamarind seeds, [13] Lac of Palas , [14] Lac of Kusum ,[15] Seeds of *Jatropha*, [16] Takda/ Pauda , [17] Nirmali/ Kapi, [18] Guggul, [19] Bapchi bee(seed) [20] Kunchala kari,[21] Shikakai, [22] Reetha,[23] Biba, [24] Gunj seed,[25] Broom grass, [26] Mango seed, [27] Wavding, [28] Baphali, [29] Cut Grass and fodder, [30] Honey , [31] Palas leaves,[32] Sitaphal , [33] Cashew nuts. The copy of the said Act will be included as AppendixLXXVI, in Draft Working Plan.

Panchayats are to strictly adhere to the prescriptions contained in the Working Plan with regards to the harvest of minor forest produce. In the areas not covered under the Working Plan the Panchayats are to adhere to the rules made, with regard to the harvesting of minor forest produce, by the conservation of forests of the concerned circle.

The following Gram Panchayats of Chopda, Yawal and Raver Talukas are included in Scheduled Area:

Chopda – Vijapur, Karjane, Mohrad, Umarti, Devhari, Melane, Borajanti, Satrasen, Vishnapur, Krishnapur = 10.

Yawal – Borkhede Kd., Parsale Bd., Gadrya, Malonda = 4

Raver – Pal, Jinsi, Pimpri, Abhone Bd., Sahastraling, Mohmandali, Janori, Lohare, Kusumbe Bd., Kusumbe Kd., Padve Bd., Nimdya = 12.

AGENCIES FOR COLLECTION:

The *Maharashtra* Tribals’ Economic Condition (Improvement) Act, 1976 empowers the state government to enforce monopoly procurement of certain goods including the NTFP in the Tribal Sub-plan Areas. The Maharashtra Tribal Development Corporation (TDC) serves as the Chief Procurement Agent. List of items covered under the monopoly procurement vary among talukas and from year to

year. This procurement provision is binding and therefore to be carried out accordingly.

The Deputy Conservator of Forests should take initiative to implement the Amendment 73 in Scheduled areas. During the field study it is observed no body is aware of the amendment and its benefits. Women Self Help Groups(SHGs) should be promoted to collect the NTFP produce and marketing facility should be provided by the forest department. This would avoid exploitation of poor tribal by middle men.

METHOD OF TREATMENT .

The trade of minor forest procured is governed by Minor Forest Produce (Regulation of trade)Act 1969.

The trade of tendu leaves in particular is governed by Maharashtra Forest Produce(Regulation of tendu leaves) Rules 1969. In this regard Ordinance R&D.D. 10 Dec 1997 published in part IV of Maharashtra State Gazette 18 Dec 1997 (pp 682) should be considered by the Dy.C.F., Yawal.

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

Fire Protection measures: Collection of NTFP is often associated with forest fire, 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 to get better flush of *tendu* leaves. If left unattended such fires spread into forests as forest fires.

The village *panchayats* and JFMCs shall be involved in awareness generation program to control forest fires. Villagers should be encouraged to ensure that such cleaning do not end up as forest fire.

In case of forest fire, legal action should be taken against the defaulters. Strict vigilance is necessary during the months of March-April to check the spread of fires in time during *tendu* season.

Documentation of NTFP collection: The Beat Guards shall send monthly reports to the Range Forest Officer on the quantity of NTFP collected in their beats. The Range

Forest Officer shall compile and send the details to the division office. The division office shall compile the figures for each species for the division with a view to monitor their collection and harvest, to sustainable limit.

Non-destructive collection of NTFP: Unless detrimental to the wildlife conservation and site conditions, sustainable harvesting of herbs non-destructive removal of flower, fruit and other medicinal parts can be permitted.

Compartments having promising regeneration areas of NTFP species shall be identified and tended to remove congestion in the crop.

Considering site suitability and local needs; NTFP species like GUM, LAC, BIO FUELS shall be given due importance in various plantation schemes.

Except dead, no NTFP tree shall be marked for felling during the coupe working under various working circles.

MANAGEMENT OF *TENDU*:

Tendu leaves collection is monopoly of the state government under the Maharashtra Forest Produce (Regulation of Trade) Act, 1969. The *tendu* leaf collection shall be carried out in the manner prescribed by the Principal Chief Conservator of Forests from time to time.

Collection of *tendu* leaves: *Tendu* is the prominent revenue generating NTFP of this tract. *tendu* leaves are used for manufacturing *bidis*. The collection season of *tendu* leaves is short, and is hardly a month, from the last week of April to the last week of May.

Tendu is the only NTFP that has been quantified to certain extent. But it is necessary to estimate the exact quantity of *tendu* leaves that the unit yields. *Tendu* contractor collection can not exactly provide the exact potential of the unit. The unit should be departmentally collected once in every five years. Necessary budget provisions should be made one year in advance.

Tendu leaves collection is an income generating activity for most local and tribal villages in the region. The local village communities shall be gainfully engaged in *tendu* collection in the division to support their livelihood.

Pruning of young *Tendu* plants does help in increasing the leaf yield. Pruning in the compartments may be allowed at 3-year interval. However, felling of *Tendu* trees or branch lopping for leaf collection shall be dealt with firmly.

Tendu regeneration: In view of the 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..

Maintenance and improvement of *tendu* in the forest crop composition is proposed by ensuring regeneration of *tendu* and by protection.

Singling of shoots and soil working around *tendu* seedlings is prescribed in the plantation and rootstock areas to promote the growth of *tendu* seedlings along with the annual coupe working in the area-specific working circles.

It is proposed to ensure inclusion of *tendu* in significant proportion in mixed plantations prescribed under various area specific working circles.

Soil Working for *tendu* trees: Digging of 30 cm deep trench encircling *tendu* trees of diameter matching tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse suckers come out. Singling and tending shall increase the population of this species. The practice is proposed to regenerate areas deficient of *Tendu* species in stocking.

MYRABOLONS:

USE: These NTFP are used in many ways. *Hirda*, *Beheda* and *Aonla* are most common amongst Myrobalans. These are of high medicinal value and are used in many

Ayurvedic medicines. *Hirda* and *Beheda* are given to children in villages invariably for cold, cough and stomach disorder.

YIELD: So far no study has been conducted to know the yield of fruits for trees of such species.

FORMATION OF UNITS AND COUPES: The range shall be the unit. Since working is annual and covers the entire area and sounit will also be the coupe.

AGENCY FOR HARVESTING: As per latest amendment to Panchayati Raj Act, the ownership of the minor forest produces in schedule areas is with gram panchayat. The collection and disposal of that is to be carried out by the gram panchayat as decided by the concerned gram sabha. Hence the collection and disposal of these minor forest produces will be governed by the panchayat concerned. In the non-scheduled areas, for large-scale operation, the units shall be given on lease. The lessee will collect the same as per the direction of the Deputy C.F. concerned. The lease period should be from 1st July to 30th June. Lease shall be given for one year by calling tender at division or circle level. On failure of tender, departmental harvesting can be thought of, provided marketing tieup is made with user industries.

Market: All probable industrial consumers shall be identified and quality grades be fixed and department shall act as a facilitator between JFMC and consumer.

GUM :-

The forests of Yawal forest division has substantial gum yielding trees like Dhavada (*Anogeissus latifolia*), Salai (*Boswellia serrata*), Kadai (*Sterculia urens*), Babul (*Acacia Senegal*), Gum arabica (*Acacia arabica*) etc. These are used in medicines, chemicals, cosmetics and food industries. *Salai* gum is mostly used as incense and is said to be used in the Indian medicines for rheumatism and nervous diseases. It has the possibility of becoming an important substitute for imported Canada balsam, used as mounting media in the preparation of microscopic slides. This gum is very similar to turpentine oil. Varnish and paints prepared from it have been found to be suitable. It may also be suitable in the manufacture of elastic adhesive, lacquers, oilcloth compositions, ink and perfumery. *Kulu* gum is the costliest gum and is having export potential. *Dhavada* gum is very good for the preparation of many food items. It is mostly used in the preparation of sweets. So it

is in great demand before *Diwali*. *Jaipur*, *Udaipur* and *Jodhpur* are the big markets for consumption.

Regeneration of Gum Yielding Trees: NR of **gum yielding trees** such as *Kulu*, *Dhavada* and *Salai* shall be provided soil working along with other planted seedlings during coupe operations of area specific working circles.

Soil Working of Gum Yielding Trees trees:

- i) Digging of 30cm deep trench encircling *Kulu*, *Dhavada* and *Salai* trees of diameter matching the tree crown has been found to be useful to regenerate the species from roots; By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient *Kulu*, *Dhavada* and *Salai* in stocking.
- ii) *Kulu*, *Dhavada* and *Salai* is prescribed to be included in the list of species prescribed in various area specific working circles.

Yield: The study of yield of gums has not been done in this tract. The production is low. No scientific method for tapping has been used so far in this area. This is a very potential field of employment generation and revenue earning. Besides, the regulations of the collection are very important from protection of forest from the fire point of view.

The DCF should exactly assess the total resource in his division. The resource survey should be girth class wise and beat wise. Each NTFP tree should be numbered and recorded properly by the beat guard. A study should be conducted by the DCF regarding the gum exudation from trees girth class wise and exactly assess the gum potential of the division. The methodology to carry out these activities should be devised by DCF with the approval of the CCF of the circle.

Tapping Rules: The rules for tapping, derived by the FRI, *Dehradun*, are as follows:

- i) The tapping season will commence from November to end of May each year. No tree below 90 cm in girth will be tapped.
- ii) Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.
- iii) Only trees above 90 cm in girth at breast height will be tapped.

iv) Each tree will be tapped continuously for 3 years and will be given a 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.

v) The initial blaze of 20 cm wide and 30 cm in length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edge having 7.5 cm wide blade. The blaze is made 0.6 cm deep in the bark.

vi) Blaze may be made horizontally leaving approximately equal space between the blazes. The blazes should not have any loose fiber.

a) No fresh blaze will be made on the partially healed up surface or old wounds.

b) Each blaze will be in a shape of parabola with a 2.5 cm wide base. The curved side of the parabola will be upwards and of height not more than 7.50 cm and the depth of the blaze will not exceed 0.6 cm in the wood.

c) At the end of the session, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10 cm x 12.5 cm x 0.6 cm in width, height and depth respectively.

d) Since the tapping is to be done continuously for three years the total height of the blaze at the end of three years of tapping will be 37.5 cm, the width and depth remaining the same.

e) In the second cycle i.e. in the 7th year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operation will be repeated till unblazed portion is fully covered.

Grading: The collected gum is graded into three classes:

i) white, ii) yellowish, iii) Black coloured.

White coloured gum fetches higher price in the market compared to yellowish and black gum. Yellowish gum fetches less price as compared to white one. Black gum fetches the lowest price. When gum is collected it is a mixture of all the three grades. By grading the gum the trader is able to assess correctly and offers correct price. So skill for grading be provided to the people by organizing training to the gum collectors.

The colour of the gum is dependent upon the climatic conditions. It is said that clear sky in the night will exude white coloured gum.

Formation Of Units And Coupes: Range is the unit.

Agency: As per latest amendment to *Panchayat Raj Act*, the ownership of the minor forest produces in schedule areas is with gram *panchayat*. The collection and disposal of that is to be carried out by the gram *panchayat* as decided by the concerned gram sabha. Hence the collection and disposal of these minor forest produces will be governed by the *panchayat* concerned. In the non-scheduled areas, for large-scale operation, collection may be done either by FLCS or other agency under terms and conditions as decided by the Government.

Market: There is monopoly purchase by TDC under the provisions of Monopoly Act. Besides, the export of raw or finished goods shall be explored. The Dhavada gum has been accorded GRAS(Generally Regarded As Safe) status by Food and Drug Administration of USA. The status for this gum has provided immense market in western world. These markets should be explored by the forest department for obtaining better price to the gum. Dhavada gum is an exclusive product of India and Sri Lanka.

Other Regulations:

- i) The compartment wise list of such trees shall be prepared and maintained at beat, round and range levels.
- ii) Cleaning around the trees to facilitate gum collection and to avoid fire, shall be done.
- iii) Gum producing trees shall be reserved from felling.
- iv) A strict watch is necessary to enforce tapping rules and check unauthorized collection of gum and tapping during the period of rest.the blaze should be slightly slopping outwards to avoid lodging of guggul in the blazed pocket in case initial blazing is done by edge.
- vii) The *guggul* starts oozing out soon after blazes are made and may be collected initially after a month i.e. by about December when the blazes may also be freshened. Subsequent collections and freshening may be done at fortnightly up to May. Thus 12 freshenings may be required to be made during the year.

viii) In each freshening, the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm is increased on either side in width at the end of 12th freshening. This means that about 0.3 cm should be scraped off either side in width in each freshening.

ix) The lowest row of blazes will be at one metre above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 metre from the ground level. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.

x) The number of blazes to be made on each tree will depend on its girth at breast height as given below:

MOHA:

Moha collection: *Moha* trees were found all over Yawal forest division. The villagers in the tract have local system for allocation of collection rights of *moha* flowers and fruits. In view of traditional approach of allocation of collection rights by the local communities. It is advised to number the *moha* trees and document the trees allocated to each moha collector. Beat wise and girth class wise moha trees should be enumerated by the territorial staff both on forest and non forest lands.

Moha regeneration: NR of *moha* shall be provided by dibbling of moha seeds in the plantations and by carrying out weeding and soil working along with other planted seedlings during coupe operations of area specific working circles.

Soil working of Moha trees: Digging of 30cm deep trench encircling *moha* trees of diameter matching the tree crown has been found useful to regenerate the species from root suckers; By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *moha* in stocking.

Moha is prescribed to be included in the list of species prescribed in various area specific working circles.

Moha Flower:

i) **Use And Nutritive Value:** *Moha* flower is a rich source of sugar, vitamins and calcium. The flower, in its ripe form, has almost 73% sugar and is, therefore, even a better medium for fermentation than grapes. *Moha* flower is eaten raw or cooked.

This is eaten also after frying or baking into cakes. More usually, the corolla tubes, after removing the stamens, are boiled for about 6 hours and left to simmer until water evaporates completely. The odour disappears as a result of cooking and the material becomes soft and jelly like. It is eaten with rice, tamarind, grains or other food or as sweetmeat. Dried *moha* flower is also boiled with rice and mixed with wheat flour and this provides a wholesome food. After drying, it becomes valuable food additive to diet. *Moha* flower is largely used in the preparation of distilled liquor also. This liquor is actually the beer of India having strong smoky foetid odour, which disappears on aging. It is reported to excite gastric irritation and produce other adverse effects. Redistilled and carefully prepared liquor is good quality without having adverse effects and closely resembles to Irish Whisky. The corollas were in the past, exported, to France for distillation of cheap brandy. However, the French Government in order to protect their home industry prohibited the import of the same. Subsequently, it was imported by Europe for feeding pigs.

ii). *Moha* spirit prepared by distillation of liquid containing fermented *moha* flowers is the most important alcoholic drink in many of the areas. It makes a potent drink and efforts are required to be made to refine it in modern distilleries. The flower is also used for the preparation of certain kinds of non-alcoholic food drink by some tribes. The flower is also used for the preparation of vinegar. *Moha* having appreciable proteins and vitamins has valuable nutrition content.

iii) Syrup of good quality is prepared from the corollas by extraction with hot water clarification with activated charcoal and evaporation under vacuum. The syrup with very high sugar content (61%) has a golden yellow colour with the odour of fresh flower. It is a substitute for honey. Apart from human consumption, *moha* flower offers an excellent food to the livestock and wild animals as well.

iv) Nutrition analysis of flower showed digestible crude protein 3.08 %, total digestible nutrients 73.7% and starch equivalent to 53.1 %. The flesh of animals particularly of pigs, fed on *moha* flowers, acquires a delicate flavour.

***Moha* Fruit:**

i) **Use And Nutritive Value:** A ripe fruit has cream coloured epicarp, which is edible. *Moha* berries were eaten raw or cooked. Cattle, sheep, goats, monkey and parrots

also eat them. They have medicinal value as well. Fruit fallen on the ground are easily attacked by insects and ants thus becomes unfit for human consumption.

ii) The *moha* seed oil. A thick oil light yellow in colour and extracted from the seeds, is used by forest tribes for cooking purpose, as an illuminance and hair oil. It is also used in the manufacture of soaps, particularly, laundry chips. In many areas it is also used as an adulterant for 'Ghee' for which it is clarified with butter mark to mask the disagreeable colour. The oil finds use in medicines also.

iii) Crude oil has a deep colour, high acidity, unpleasant odour and bitter test. Refining and hydrogenation yield product similar to mutton tallow or cocoa butters. Oil having acid value below 13 may be refined by treatment with caustic soda and that with higher acid value is extracted with alcohol and further treatment with alkali. Refined oil finds use in the manufacture of lubricating grease and fatty alcohol. The oil is also used for candles, as batching oil in Jute Industry and as a raw material for the production of stearic acid.

iv) The yield of oil from the seeds depends on the efficiency of the equipment employed for crushing them. It is 20-30% of the weight of the kernels when crushed in '*ghanis*', 34-37% in expellers and 40-48% when extracted by solvents.

v) *Moha* oil shall have a set of characteristics. For this purpose ISI standards have been prescribed which are as below:

Yield:

i) *Moha* trees starts bearing flowers and fruits between 10th to 15th years of planting. A study with reference to the yield of *moha* flowers and fruits has been conducted by the MVSS, Chandrapur in comptt.No.195 in Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girths were selected for the purpose of this study Results obtained are as below:

Table No.5.1 Yield Of *Moha* Flower And Fruits

Weight in Kg.		
G. B. H. in Cm	Flower	Seed
076 - 090	06.00	1.20
091 - 105	10.00	1.00
106 - 120	11.25	2.00

136 - 150	13.30	2.75
151 - 175	13.00	3.80
176 - 190	13.00	4.00
206 – 220	20.00	4.30
Average	12.94	2.72

(Note:As year 1992 was not a good seed year, the average obtained above is on lower side.)

ii). The rates of royalty in Rs/Qtl. Of Moha flower and seed as decided by the T.D.C. for the years, 95-96 to 1999-2000 is Rs.3/quintle.

Formation Of Units And Coupes:

i) The range shall be the unit of working for the purpose of this working circle. Since operation is to be carried annually throughout the area and so the unit will be the coupe in this case.

ii) The collection of *moha* flowers and seeds is presently being done by individuals. Normally they confine themselves around their village only to collect *moha* flower and seeds. As per latest Amendment to *Panchayati Raj Act*, the ownership of the minor forest produce in schedule areas is vested with of *gram panchayat*. The collection and disposal of produce is to be carried out by the *gram panchayat* as decided by the concerned *gram sabha*. Most of the tract is under schedule areas. Hence the collection and disposal of these minor forest produces will be governed by the *panchayat* concerned. In the non-scheduled areas, for large-scale operation, collection may be done either by FLCS or any other agency under terms and conditions as decided by the Government.

Market: Moha flower and seed come under Monopoly Act and so the collection of *moha* flower and seed is carried out by people and purchased by the TDC. If TDC is not operating in the division the forest department should take initiative to search the market all over the country and the trader who offers maximum price should be given the Transit Pass. This exercise is necessary by forest department because the price given to the produce should be uniform all over the division.

Other Regulations:

i). Compartment wise list of Moha trees shall be prepared and maintained at beat, round and range levels.

ii) One of the important reasons of forest fire is the burning of leaf litter on ground under Moha trees by the people to collect *moha* flower. Therefore, before the start of flower falling, the ground under the *moha* tree crown shall be cleaned with the cooperation of villagers and *chaukidars*. This may be treated, as one of the most important duties of the Beat Guard, failure in it and occurrence of fire shall be viewed seriously.

ii) The measures for enhancing the production and productivity by local means shall be explored and taken up.

BIOFUEL PLANTS:

Jatropha seeds (Jatropha curcas) :-

This seed is in demand for its oil. The oil can also be used as biofuel and can supplement our depleting petroleum resources. The plant can be raised from cuttings or by dibbling seeds and forms a very good live hedge. It should be planted on CCTs, to stabilize nallah bunds, T.C.M.s and also other boundaries, fencings etc.

Karanj (Pongamia pinnata): -

This seed oil can also be used as biofuel and the oil can also be used for arthritis cure. The seed is also used for Brochoitis cure, The seed of this plant should be sown on CCTs, TCM and seedlings should also be raised to plant in plantations. Plus trees of Karanj should be identified, trees which yield 10 to 15 kgs of seed per square meter of crown area should be identified as plus trees, and cleft grafting should be done for faster and better yield of karanj seed.

Also Neem, Moha seed also has oil content which can be used as biofuel. For lower end machines like diesel pump and diesel generator, expel the oil in a regular oil expeller, fine filter the oil and can be used directly in these diesel machines. It can also be blended with diesel to an extent of 10 to 15% and run the diesel vehicles.

The bio fuels have more viscosity compared to diesel. Hence a process called 'Trans-esterification' a simple chemical process would reduce the viscosity of biofuels. These technologies are available with Punjabrao Krishi Vidya peeth, Akola and Vishveshwarayya National Institute of Technology(formerly Regional Engineering

College,REC), Nagpur(VIT). Forest Department should take initiative to first assess the resource i.e. number of Karanj, moha, neem trees in each and every beat (both forest and non forest land) and start collecting the seed for making biofuels.

During agricultural exhibitions diesel pumps running on biofuels should be demonstrated to the farmers to make common man aware of biofuel and popularize the biofuel.

OTHER NON TIMBER FOREST PRODUCE WITH POTENTIAL IN THE DIVISION:

Apta leaves (Bauhinia racemosa) :-

These leaves are also used for making beedis. The trade is by and large confined to Gujarat state.

The Apta seedlings should be planted in plantation areas to increase their relative proportion.

Awla fruits (Emblica officinalis): -

These fruits are eaten raw and in pickled form. Being one of the richest sources of vitamin 'C' it also forms part of the ayurvedic system of medicine. It is one of the three ingredients of "Triphala", an important ayurvedic preparation. This species does well in afforestation areas, even in dry zones and should be made part of the plantation programme all over the area.

Agave leaves (Agave sisilana, Agave americana) :-

Agave leaves have demand because of its fibres. It is a good live-hedge and should be planted on the TCM and nallah bunds.

Tarwad bark (Cassia auriculata) :-

This shrub grows all over in open exposed forests especially in dry areas. It has demand in tanning industry. Production can be increased by broadcasting seed on T.C.M. nallah bunds, and spaces between the trenches in afforestation works.

Khair wood (katha) (Acacia catechu) :-

Khair has great demand in Katha industry and there was a "Khair Overlapping Working Circle" in the earlier plan. However there is a marked depletion of the stock of these trees and it needs to be built up by taking up plantations of this species in suitable areas and making this species a must in regular afforestation programmes. Besides katha this tree also exudates gum and is also a good lac insect host plant.

Rosha grass (Cymbopogon martinii) :-

This grass has demand due to its essential oil, which is of medicinal importance. It can be introduced in the afforestation areas between the trenches by dibbling of seed wherever there is demand.

Tarota seed (Cassia tora) :-

The seed has demand as it is used in some beverages and cattle feed. The plant comes up naturally in blank areas. However its proportion can be increased by dibbling seed in blanks with shallow soil.

Honey :-Honey produced by honeybees is a very important product because of its medicinal and nutritional value. The extraction of honey should be done scientifically to get more yields. It can be a very good cottage industry for the people living in the midst of forests. The processing and marketing can be managed by forming co-operatives.

Safed Musali (Chlorophytum tuberosum) :-

It is a herb with tuberous roots. The tubers are used as tonic and is of great medicinal importance. It is collected and sold by the tribals at the rate of 400-500 Rs. Per kg. to the traders. Its indiscriminate removal needs to be controlled and regularized.

Ghat bor fruits (Zizyphus xylopyra) :-The fruits are in demand for tanning industry. The plants can be raised by dibbling seeds on the plantation T.C.M.s and also in 'Protection Working Circle' areas, where the slopes are steep. This tree is also a good host for lac insect and can be developed for lac cultivation.

CONSERVATION OF MEDICINAL PLANTS .

Many valuable species of medicinal plants grow in this tract. The following measures should be adopted for the conservation of medicinal plants in the tract :

1. Forest Protection Committees/ JFM committees should be entrusted with the responsibility of protecting patches rich in medicinal plants from biotic interference.
2. Training programmes should be organized at regular intervals to familiarize members of FPCs /JFMCs with the medicinal plants, their sustainable management, non-destructive harvest and utility in treating various diseases.
3. The FPCs/JFMCs should be encouraged to prepare an exhaustive inventory of medicinal plants in their territory.

4. Efforts should be made to artificially propagate those species of rare medicinal plants categorized as “endangered”, “vulnerable” or “near-threatened”.

RESEARCH WORKS:

There are so many Non Timber Forest Produce and Medicinal Plants in the forest which are unidentified and untapped. The efforts of the department shall be to explore them and manage them scientifically. The identification of medicinal plants in the field to be taken up for study immediately.

OTHER IMPORTANT PRINCIPLES AND PROCEDURES:

The following are important principles and procedures:

1. The annual estimates for collection of Non Timber Forest Produce and Medicinal Plants shall be made based upon the experience.
2. The annual estimates for collection of NTFP shall be approved by the Chief Conservator of Forests.
3. The Range Forest Officer for the respective range shall issue the passes for collection of NTFP to the lessees and keep record of the collection etc.
4. The Non Timber Forest Produce and Medicinal Plants lease units shall have distinct boundaries.
5. NTFP collection estimates shall be based upon the inventories of forest resources.
6. Scheme shall be formulated for improving yield of Non Timber Forest Produce and Medicinal Plants e.g. plantations, protection against disease etc.
7. Measures shall be taken to maintain and improve the present output of the Non Timber Forest Produce and Medicinal Plants.

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Chapter No:-6

BAMBOO (OVERLAPPING) WORKING CIRCLE

6.1 : GENERAL CONSTITUTION

This is an Overlapping Working Circle. Bamboo bearing area transferred by FDCM is included in this working circle. The Bamboo species occurring in the areas is Manvel (*Dendrocalamus strictus*). In the forests of Deoziri, Karjana and some area of Yawal West ranges, good growth of bamboo is seen confined to slopes, and along the banks of the water courses. In most of the areas, low quality bamboos are found. The total area under this working circle is 4880.48 ha. spread over the division. All successful and partly successful bamboo plantations are included in this working circle. All other area having good bamboo crop is included in this working circle.

6.2 : GENERAL CHARACTERS OF THE VEGETATION.

The Bamboo species occurring in the areas are Manvel (*Dendrocalamus strictus*) in the teak forests of Chopda, Vajapur and Yawal East ranges. Luxuriant growth of bamboo is seen confined to slopes, sheltered valleys and along the banks of the water courses. There was no sufficient control over the cutting and exploitation of bamboos, which resulted in their ruthless exploitation and ultimately the deterioration of the clumps.

6.3 : FELLING SERIES, CUTTING SECTIONS AND JFM AREAS:- Not Applicable

6.4 : BLOCKS, COMPARTMENTS AND JFM AREAS

It is proposed to include 36 compartments with an area of 4880.48 ha. in this working circle. The compartments included in this working circle are given in the **Appendix No. II of Vol. II**

6.5 : SPECIAL OBJECTS OF MANAGEMENT

1. To harvest mature bamboo scientifically so as to get maximum sustained yield.
2. To meet the local demand of bamboo to the maximum possible extent.

6.5.1 : ANALYSIS AND VALUATION OF THE CROP

The distribution of the bamboo is sparse, having less than 100 clumps/ha. The bamboos are 10-12 cm. in girth and about 6 meters in length. It indicates that low

quality bamboos are found in the tract. Bamboo is associated with Teak, Shisam, Sadada and Bija. No natural regeneration of bamboo is found in the area.

6.5.2 : SILVICULTURAL SYSTEM: Not applicable

6.5.3 : ROTATION PERIOD :- The rotation of 10 years is fixed to tackle the whole area. This working circle is divided into five working series and each working series has been divided into 10 coupes.

6.5.4 : HARVESTABLE DIAMETER:- No harvestable diameter is decided as no harvesting is involved in this working circle.

6.5.5 : REDUCING FACTERS:- Not applicable.

6.5.6 : FELLING CYCLE:The felling cycle will be Three years. Entire area is divided into Ten coupes. Every year one coupe will be worked.

6.5.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS: Not applicable.

6.5.8 : CALCULATION OF YEILD : Not applicable

6.5.9 : TABLE OF FELLING : Not applicable

6.5.10 : METHOD OF EXECUTING THE CUTTINGS

The coupes will be demarcated, as per the standard procedure and while working Bamboo clumps the following rules will be followed:

1. No harvesting works should be permitted between 15th June to 15th October in order to facilitate the growth of new bamboos.
2. No clump should be considered fit for harvesting unless it contains more than 12 mature clumps. No clumps below the age of two years will be felled.
3. In a mature clump the following types of culms (green and living) will be retained.
 - a) All current season's i.e. less than one year old culms.
 - b) From the rest culms equal in number to the current season's (i.e. less than one year old) culms or eight, whichever is more.
4. The cutting height of culms will be between 15 cms. to 45 cms. above ground level i.e. above the first inter-node above the ground. The cut shall be slant with a sharp instrument. All cutting debris shall be removed at least one meter away from the periphery of each worked clump.

5. Following acts will be strictly prohibited:-
- a) Digging of rhizome.
 - b) Lopping of bamboo clumps for fodder.
 - c) Use of tender bamboo clumps for bundling.

6.5.11 : SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not applicable

6.5.12 : REGENERATION

Artificial Regeneration

The Bamboo plantations will be taken up as per the approved model of plantations.

As in most of the bamboo area, the growth of bamboo is poor, soil working in trench of 0.60 mt x 0.30mt size in 3 to 4 mt diameter around clumps should be done to enhance the growth.

6.5.13 : ASSOCIATED REGULATIONS AND MEASURES

Operations In The Event Of Flowering

As soon as gregarious flowering is noticed from any locality, its extent should be correctly assessed and recorded in the compartment histories and also in the "Divisional Note Book". A report should also be made to the Conservator of Forests, the State Silviculturist and the D.C. F. Working Plan.

As the bamboos start flowering gregariously, the whole area will have to be effectively closed to grazing. It should also be strictly fire protected for the next ten years protected so as to facilitate the germination of bamboo seeds falling on the ground and their subsequent establishment and clump formation. The division should equip itself to cut and transport the dry clumps after flowering in the shortest possible time.

Fresh seeds of bamboo will be collected from the clumps. The requirement of seeds by various divisions, silviculturist and private buyers will be ascertained in advance by giving wide publicity and the seeds will be dispatched promptly as per demand. The division will also raise nurseries as per requirement. The seeds should be sown

on raised beds of standard size in the last week of May or first week of June. The germinated seeds will be transplanted to polythene bags in October-November.

Tending operations:- It is essential to look after the young regeneration properly till the time the clump formation starts. The following operations will be carried out depending on the age of the crop.

Crop age between 1 to 3 years:- During this period the area will normally contain thick seedling crop and the clump formation does not start. During this period following tending operations will be carried out.

- i) The area will be thoroughly gone over and 0.6 metre diameter foci at the rate of 300 per hectare will be formed, distributed evenly over the whole area.
- ii) All the rank growth of grasses, weeds and even bamboo seedlings upto a distance of 1.5 metre all round the foci formed as above, will be cleared so that the growth of the bamboo seedlings in the selected foci is not hampered.
- iii) All climbers within and around the foci upto 1.5 metre distance will be completely removed.
- iv) The whole area will be strictly protected from fire and grazing.

Crop age between 3 to 8 years:-

During this period the clump formation starts but the crop is yet immature for exploitation. During this period following operations will be carried out.

- i) All badly grown, twisted and damaged culms from the selected foci, will be removed.
- ii) All weeds, grasses and climbers, within and around the foci upto a distance of 1.5 metre, will be completely removed.
- iii) Tree growth of species, other than Teak, Ain, Shisham, Bija, Tinsa, Tiwas, Dhavada, Haldu, Karanj, Semal, Mowai and Bhirra over topping the clumps, will be removed.
- iv) The whole area will be strictly protected from fire and grazing.

Crop age over 8 years:- When the crop age is 8 years, the clump formation is normally completed and clumps are mature enough for exploitation. The treatment during this period will be of the nature of exploitation-cum-tending. The felling rules, already prescribed in the earlier paragraphs, will be applied here.

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CHAPTER NO:- 7

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

7.1 : INTRODUCTION:

National Forest Policy 1988 envisages the importance of involvement of local people in the protection of forests. It also emphasizes the importance of traditional rights of forest dwellers. Priority for the use of forest produce is given to forest dwellers and the use of forests for industrial purpose is discouraged.

As a follow up action on this new forest policy, and the encouraging experiences from West Bengal in J.F.M., the Government of India issued a set of J.F.M., guidelines in 1990 encouraging forest departments to involve local people in the management of the forests. Over the past 9 years, most of the states have issued their own guidelines. Maharashtra Government has also issued the guidelines and passed Government Resolution no SLF-1091/CASE NO 119/91/F-11 to the effect on 16th March 1992, the JFM activity was adopted for degraded forest area of the state and new guidelines have been issued vide GR No. MSC/2000/C.No. 143/F-2, dated 25.4.03.

Villagers themselves are required to voluntarily participate in the program. Forest protection committee (FPC) is to be formed in each village. The members of the committee will help in protection and development of forests and they will receive in turn a share in the usufructs and output from the forest areas assigned to such committee. The JFM area will be managed according to the micro-plans prepared jointly by the Deputy Conservator of Forests and members of the FPC. These micro-plans shall contain the details of forest and village development. This has to be sustainable, should cater to aspirations of local communities and at the same time the silvicultural requirements of the forests are to be met properly.

Later, the government of India advised the state governments to take up the Joint Forest Management in well stocked forest areas on experimental basis and accordingly guidelines dated 25.4.03 cited above have authorized the forest department in the state in this respect. Summary of guidelines is as follows

Good forests within 2 km from a village are to be covered under the program on experimental basis and stage by stage other villages containing good forests are to be brought under it.

JFM is to be implemented with the help of *gram panchayat* and forest produce available is to be provided on priority to meet bonafide local needs.

The village having non-forest land, which has agreed to participate in the program, may be brought under the scheme.

Help of the institutions of local self-govt., NGO, environmental The scheme though does not intend to facilitate agriculture based professions but non-irrigated horticulture schemes in (private) wastelands may be encouraged if approved in the micro-plan. expert, if any available locally, may be solicited.

The scheme though does not intend to facilitate agriculture based professions but non-irrigated horticulture schemes in (private) wastelands may be encouraged if approved in the micro-plan.

The program underlines conservation of forests and wildlife and therefore any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

7.2 : GENERAL CONSTITUTION:

This is an overlapping working circle. Joint Forest Management may be taken up in any village if the forests belong to the category as defined in the Government of Maharashtra Resolution dated 16th March 1992. The total area under this working circle is 49037.00 spread over 64 villages where JFMC is active.

However with a view to afforest the degraded and denuded forests of Yawal Division and to improve some of the under stocked areas closer the villages efforts shall be made to motivate the villagers to take up JFM in these villages.

A micro plan of a village where the degraded forest area is falling shall be considered. A.C.F .and R.F.O., shall prepare a detailed micro plan of the village after conducting a PRA exercise as per G.R. Dated 16-3-1992. The details of the villages where J.F.M. has been implemented in Yawal is given in Appendix No.....

7.3 : GENERAL CHARACTERISTICS OF VEGETATION: The forests of Yawal Forest division belong to the sub-group 5-A, Southern Tropical Dry Deciduous Forests as per the revised classification of Forest types of India by Champion and Seth.

7.4 : FELLING SERIES, CUTTING SECTIONS AND JFM AREAS:- Not Applicable

7.5 : BLOCKS, COMPARTMENTS AND JFM AREAS

It is proposed to include 36 compartments with an area of 49037.00 ha. in this working circle. The compartments included in this working circle are given in the

Appendix No. II of Vol. II

7.6 : SPECIAL OBJECTS OF MANAGEMENT:

The special objects of management are as follows

- (a) Reforestation of degraded forests with the participation of villages.
- (b) Plantation and its protection with the help of forest protection committee.
- (c) To let avail usufructs derived from such Afforestation to the villagers.
- (d) To create awareness about importance of forest amongst the people.
- (e) To help in translating the 73rd Amendment in practice for Forest Conservation and Development.
- (f) To increase vegetal cover.
- (g) To check soil erosion.
- (h) To bring about soil and moisture conservation.
- (i) To utilize the land for the productive purpose according to its capability.
- (j) And ultimately bring about the integrated development of the adjoining villages with help of all other development agencies.

7.6.1 : ANALYSIS OF THE CROP : Not Applicable.

7.6.2 : SILVICULTURAL SYSTEM: Not applicable

7.6.3 : ROTATION PERIOD :- Not applicable.

7.6.4 : HARVESTABLE DIAMETER:- Not applicable

7.6.5 : REDUCING FACTORS:- Not applicable.

7.6.6 : FELLING CYCLE: Not applicable

7.6.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS: Not applicable.

7.6.8 : CALCULATION OF YIELD : Not applicable

7.6.9 : TABLE OF FELLING : Not applicable

7.6.10 : METHOD OF EXECUTING THE CUTTINGS: Not applicable

7.6.11 : SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not applicable

7.6.12 : REGENERATION : Regeneration and protection of NTFP areas and collections, Grading, value addition and marketability of various NTFPs in the division are proposed to be given focus for working under JFM program.

7.6.13 : ASSOCIATED REGULATION & MEASURES:

Implementation: Implementation of the prescriptions under this working circle are totally dependent on the willingness of the villagers, neither the compartments are allotted nor the felling series are formed. But if some villagers do not show interest, the areas of those villages shall be tackled under the concerned working circle. Any other village may be tackled under J.F.M., from any range and any working circle if the D.C.F., deems them fit. The micro plan prepared under the overall frame work of the respective working circle of the working plan for that village shall supercede the working plan so far as that village is concerned. This shall not be considered as a deviation from the working plan prescription.

THE PRINCIPLES: Following principles should be adhered to during the implementation of J.F.M. in any village.

1. Eco system Protection
2. Participatory, Democratic structure.
3. Open Communication.
4. Management of Responsibility and Benefit sharing in Relation to Traditional usage.
5. Gender Equity.
6. Community Responsibility.
7. Effective Conflict Resolution.
8. Traditional Rights and use.
9. Discrete Jurisdiction and Explicit Agreements and last but not the least.
10. Effective Monitoring and Advocacy

Joint forest management programme has been taken up as per the Govt. of Maharashtra Resolution dated 25th April 2003 and Resolution dated 5 October 2011.

There are 56 JFM committees and 7 EDCs in Yawal Division. Total 49036.78 ha. area is assigned to these committees for protection and management purpose. Efforts have been made to motivate the villagers to take participatory management of forest including plantations on forest land near these villages under various schemes like FDA, State JFM etc. As per the Govt of Maharashtra Resolution Dated 28 Nov. 2014, RDF Plantation works under DPDC funds has to be taken through JFMC and the same is being implemented From 2015-16. Twenty Four JFMC's were allowed 616 ha. of plantation during 2011-12 to 2015-16. The status of these plantations is satisfactory. Sixty four JFMC's are working in Yawal Forest division, catagriszation of JFMCs is given below.

A grade	:-	06 JFMCs
B grade	:-	15 JFMCs
C grade	:-	38 JFMCs
D grade	:-	05 JFMCs

METHOD OF TREATMENT:

The areas shall be treated according to the J.F.M. Plan for the village to be prepared in consultation with the villagers as per the guidelines issued by the government vide G.R. No SLP/1091/C.N. 119/F-11, Mantralaya, Bombay dated 16th March 1992. Similarly, the guide lines issued by the central government in this connection vide its letter No 6-21/89, F.P. dated 01-06-1990 shall be considered. The Forest Development Agency(FDA) project sponsored by , Ministry of Environment and Forests, Government of India, is a wonderful opportunity for forest department for J.F.M implementation. This project gives lot of flexibility to plan as per local demands. The entry point activity provision helps in developing relationships with the villagers.

Micro plan to be prepared should be broadly based on the prescriptions given for the areas under consideration. Micro plan duly sanctioned by competent authority will not be considered as deviation to this plan prescriptions. The following activities should be tried out in villages as per local situation

- a) Conducting Medical Camps with local Medical Authorities/NGO's like Rotary/Lions clubs or Indian Medical Associations of the district. Medicines may be supplied free to the villagers from entry point activities.

- b) Focus on Economic improvement activities like implementation of Amendment 73. The earmarked NTFP products in JFM/scheduled areas should be implemented. The awareness to this amendment is not seen in the villages. The local authorities should take initiative, conduct meetings in the villages and self help groups should be formed. The collection of NTFP like gums, lac moha flowers, honey, Natural dyes(palas flowers,bixa, Dhavada sal etc) should be done by SHG's and the marketing should be done by forest department by contacting traders all over the country. Who ever offers best price to the NTFP the Transit Pass should be issued. The departmental intervention is essential in the beginning, so that the villager is not cheated by the middle men. Once the awareness has set in the villages the department can become a silent regulator.
- c) Electrify villages with generators running on biofuels like Karanj seed oil, Jatropha oil, Moha, Neem oil. The oil expelling facilities should be provided at a prominent place in the division. Even esterification facilities should also be made available near the oil expeller for effective use of bio fuels.
- d) Regular training programs to the villagers regarding scientific lac cultivation(Indian Lac Research Institute ILRI, Ranchi), GUM grading techniques/ spray drying techniques for removing impurities in gum so that the villager can get better price for the NTFP collected.
- e) NTFP theme plantations, like GUM yielding species plantations (Dhavada, Salai, Khair, Hiwar, Movai Babul etc), Lac insect host plant plantations (Kusum, Palas, Khair, Bor, Raintree, Acacia auriculiformis, Pimpal etc), Bio fuel plant plantations(Karanj, Neem, Moha, Jatropha, Palas etc) should be taken around the JFM villages in consultaiton with the villagers. The program underlines conservation of forests and wildlife and therefore any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

General Prescriptions

1. JFM Micro-plans will be prepared for each village through the process of participatory rural approach. Micro plans are to be dovetailed with the prescription of the approved 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. 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.
4. Whenever required, NGOs be involved for creating awareness programs.
5. Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of work, undertaken in JFM villages in financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
6. JFM program should be implemented with complete transparency. The account of JFMCs shall be annually audited as per Govt. instructions and a copy of such audited statement shall be shared with Gram Panchayat. All payments to JFM members shall be made either through a/c payee cheques or RTGS transfer or depositing directly into respective bank accounts. Payments through cash shall be strictly discouraged.
7. As per 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 program. Periodic reviews at various levels will aid in good implementation.
8. Often, there is thinking in the grass root level functionaries that, JFM has to be implemented only if funds are allotted to villages. Therefore, the supervisory officer should strive to bring suitable awareness among the grass root functionaries (FG/RFO) to change their attitudes and mindset.
9. 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 model for enhancing livelihoods.etc

10. 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.
11. One of the important reasons for forest degradation is dependence of local people for firewood from forest. Therefore, to reduce such dependence, GoM vide resolution of 10th July 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 expand this scheme of JFM villages.
12. The JFM villages should also be covered with other source of efficient fuel management like Improve Chulhas with help from the Maharashtra Biodiversity Board.
13. 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. The State Biodiversity Board should be consulted for the same.

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CHAPTER NO:- 8

WILD LIFE MANAGEMENT (OVER LAPPING) WORKING CIRCLE

The area covers the whole Division and is therefore not specifically marked on GIS based map.

8.1 : GENERAL CONSTITUTION:

National Forest Policy 1988 aims at conservation of natural heritage of the country preserving the remaining natural forests with the vast variety of flora and fauna. Which represents the remarkable biological diversity and genetic resources of the country.

Forest Management should take special care of the needs of wild life conservation and for the corridor linking the protected area in order to forest management plans should include prescriptions for this purpose. It is specially essential to provide maintain genetic continuity between artificially separated sub sections of migrant wild life.

Also the wild life (protection) Act 1972 emphasizes to protect wildlife.

For better management of wildlife and to preserve the bio diversity, creation of protected areas (PAs) and their specific management practices are in force in approximately 4% of the forest areas other than protected areas in varied proportion. These areas also the store house of bio-diversity. Hence there forest areas are also to be managed with specific focus on wild life both flora and fauna.

This is an overlapping working circle and it extends over entire geographical area of Yawal forest division comprising of three tehsils namely Raver, Yawal and Chopda of Jalgoan district. The Deputy Conservator of Forests, Yawal Forest Division stationed at Jalgaon is the ex-officio Deputy wild life warden who is responsible for protection, conservation and development of wildlife in the division. He is assisted by Assistant Chief Wild life warden and other staff under his control.

The tract dealt with was fairly rich in the number and varieties of Wild life once upon a time. But it stands in perilous state today. Yawal Game Sanctuary was established in Yawal Forest Division vide Govt. Notification No.WLP/1668/151600-Z, dt. 21-2-69. This has helped in the preservation of Wild Life to some extent in large and continuous stretch of Satpudas. 17,558.14 hectare area of Yawal Wild Life

Sanctuary have been handed over to DCF, Wild Life Division, Nashik for specialized management w.e.f. 1-6-1996. The sanctuary is managed by Conservator of Forests, Wild Life, stationed at Nashik as per sanctioned management plan. Other than Sanctuary areas are also with different wild life and they need protection. Hence an overlapping wildlife management working circle is prescribed.

8.2 : GENERAL CHARACTERISTICS OF VEGETATION: The forests of Yawal Forest division belong to the sub-group 5-A, Southern Tropical Dry Deciduous Forests as per the revised classification of Forest types of India by Champion and Seth.

8.3 : FELLING SERIES, CUTTING SECTIONS AND JFM AREAS:- Not Applicable

8.4 : BLOCKS, COMPARTMENTS AND JFM AREAS: Entire forest area of the Division.

Appendix No.

8.5 : SPECIAL OBJECTS OF MANAGEMENT:

10.2.1: This overlapping working circle has been constituted to achieve the following objectives,

- a) To protect the existing wild life population both flora and faunal.
- b) To create ideal conditions for betterment of wild life.
- c) To take steps to check all the destruction of wildlife.
- d) To preserve for all times, areas of biological importance, outside the protected areas, as a national heritage for the benefits, education and aesthetic value for the mankind.

8.5.1 : ANALYSIS:

a) **Carnivorous** :- (i) Pather (Pantherapardus) (ii) Hyaena (Hyaenahyaena) (iii) Wild dog (Cuonalpinus) (iv) Wolf (Canislupus)(v)Jackal (Canisaureus) (vi) Fox (Vulpusbengalensis) (vii) Sloth bear (Melursus ursinus) (viii) Wild cat (Felischaus)

b) **Herbivorous** :- (i) Nilgai (Boselaphustragocamelus) (ii) Barking deer (Muntiacusmunjak) (iii) Wild boar (Susscrota) (iv) Sloth bear (Melursusursinus) (v) Black buck (Antilopercervicapra) (vi) Chinkara (Gazellagazella). (vii) Mongoose (Harpestesedwardsi)

c) **Fruitivorous** :- (i) Three stripped palm squirrel (Funambuluspalmarun).

d) **Omnivorous** :- (i) Porcupine (Hystrixindica) (ii) Hare (Lepusnigricollis)

e)Wild Birds:- (1) Baya (PloceusPhilippinus) (2) Bharadwaj (Centropussinensis) (3) Chota basant (Magalaima (4) Chimni (Passerdomesticus) (5)Deshi myna (Acridotherestrictis) (6) Ghar (Elanuscaeruleus (7) Ghar (Milvusmigransgovinda) (8) Ghbad (Strixleptogrammica) (9) Ghubad (StrixJavanica) (10) Ghubad or Pingla (Athenebrama) (11) Harial (Teronphoenicoptera) (12) Holga (Streptopeliasenegalensis) (13) Holga (Streptopeliachinensis) (14) Kabutar (Columbalivia) (15)Kala baza (Pseudibispapillosa) (16) Kala teetar (Francollnuspondiceranus (17) Khandya (Alcedolatthis) (18) Khandya (Corylerudis) (19) Kokila (Eudynamyssoclopacea) (20) Kotwal (Dicrurusparadiseus) (21) Kotwal – Raceket talled (Dicrurusparadiseus) (22) Lahuri (Peridiculaasiatica) (23) Lal munia (Estrilda amandava) (24) Mor (Pavocristatus) (25) Nilkanth (Coraciasbenghalensis) (26) Patringa (Meropsorientalis) (27) Peelak (OriolusXasnthomus) (28) Peela- Goldan orole (Oriolusorilolus) (29) Popat (Psittaculakrameri) (30) Satbhai (Turdoidesstriatus) (31) Satbhai-Jungle babbler (Turdoidesstriatus) (32) Shikra (Accipiterbadius) (33) Himpi (Othotomussutorius) (34) Sutar (Picoidesmahrattensis) (35)Tamable (Upupaepops (36) Gai bagala (Bubulcusibis) (37) Bagala (Arodeolacinerea) (38) Bagla (ArodeolaGrayii) (39) Pan kawla (Phalacrocoraxniger) (40) Pan kombadi (Amauornisphoenicurus) (41) Titavi (Vanellusindicus) (42) Kaka pidda (Saxicolacaprata) (43) Swargiy nartak (Tfepsiphoneparadise) (44) Dhanesh(Tockusbirostris) (45) Telia munia (Lonchurapunctulata) (46) Myna (Caprimulgusasiaticus) (47)Khandya (Halcyonsmyrnesis) (48) Chuvak (Copsychussaularis) (49)Dyal (Copsychussaularis) (50) Khatik (Laniusvittatus) (51) Jambhla surya pakshi (Nectariniaasiatica) (52) Ababed leishra (Hirundorustica) (53) Leishra (Hirundosmasthii) (54) Myna (Dendorocittvagabunda) (55) Parit (Motacilla caccpica)

f)Reptiles :- i) poisonous Snakes:-1.Nag (Najanaja) 2.Manyar(Bungaruscaeruleus)

3. Phurse (Echiscarinatus) 4. Ghonus (Vipersrusselli)

ii) Non Poisonous Snakes 1. Ajagar (PythonMolurus) 2. Dhaman (Ptyasmucosus) 3. Harantol (Dtryophisnasutus)

- 8.5.2 : SILVICULTURAL SYSTEM:** Not applicable
- 8.5.3 : ROTATION PERIOD :-** Not applicable.
- 8.5.4 : HARVESTABLE DIAMETER:-** Not applicable
- 8.5.5 : REDUCING FACTORS:-** Not applicable.
- 8.5.6 : FELLING CYCLE:** Not applicable
- 8.5.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS:** Not applicable.
- 8.5.8 : CALCULATION OF YIELD :** Not applicable
- 8.5.9 : TABLE OF FELLING :** Not applicable
- 8.5.10 : METHOD OF EXECUTING THE CUTTINGS:** Not applicable
- 8.5.11 : SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING:** Not applicable
- 8.5.12 : REGENERATION :** Not applicable
- 8.5.13 : ASSOCIATED REGULATION & MEASURES:**

Distribution Of Wildlife:

The current working circle, being overlapping in nature, no demarcation of separate habitat improvement areas have been prescribed here. The prescription mentioned in the succeeding section will be followed for habitat improvement during their working. The forest areas can provide good habitat for various wild animals. Now-a-days these forests areas are in proximity to human settlements and forest areas are close to agricultural areas and also the approaches to these forest areas have become more convenient due to network of roads both pucca and kachcha roads. The wild life in these areas are under the pressure of biotic interference.

Table No. 8.1 Comparative Figures of 2016 and 2017 Census

Wild Animal	No. of animals as per 2016 census	No. of animals as per 2017 census
Hare	52	69
Panther	04	07
Hyena	21	27
Deer	47	57

Jackal	18	22
Neelgai	32	36
Wild boar	70	53
Bear	10	12
Bhekar	11	14
Wild dogs	30	25
Wolf	21	32
Total	316	354

INJURIES TO THE WILD LIFE

Fire and Poachers are mainly responsible for destruction of Wild Life in Satpuda forests. Forest fires which occur frequently in these forests destroy the natural habitat of the wildlife, also the scarcity of water forces the animals to migrate.

INCIDENCES OF ATTACK BY WILD ANIMALS

The following table gives details of attack by wild animals on human beings and domestic animals: Table No. 8.2

Year	Attacking wild animal	No & type of domestic animal killed in attack		No of persons killed or injured in attack		
		Type	No	Killed	Injured	
2006-07	Panther	Calf	1	--	--	
	Panther	Buffalo calf	1	--	--	
2007-08	Panther	Calf	1	--	--	
2008-09	Panther	Cow	1	--	--	
	Beer	--	--	--	1	
2009-10	--	--	--	--	--	
2010-11	Panther	Cow	1	--	--	
		Calf	1	--	--	
		Buffalo calf	1	--	--	
2011-12	Hyaena	--	--	--	3	
	Panther	Bullock	1	--	--	
		Calf	7	--	--	
2012-13	Panther	Buffalo calf	1	--	--	
		Bullcok	3	--	--	
		Goat	1	--	--	
		Buffalo	1	--	--	
		Cow	3	--	--	
		Hyaena	Goat	5	--	--
		Cow	1	--	--	
Woolf/Landga	Goat	5	--	--		

	Bear	--	--	--	3
2013-14	Woolf/Landga	Buffalo	2	--	--
	Panther	Buffalo	7	--	--
		Bullock	2	--	--
		Cow	16	--	--
		Sheep	2	--	--
		Horse	1	--	--
2014-15	Panther	Cow	10	--	--
		Buffalo	2	--	--
		Bullock	1	--	--
2015-16	Panther	Cow	2	--	--
		Calf	2	--	--
		Goat	2	--	--
	Wolf	Goat/Ship	2	--	--
	Bear		--	--	01
2016-17	Panther	Sheep	2	--	01
		Bull	6	--	---
		Cow	4	--	---
		Buffalo/ Horse	2	--	--
	Total		99	--	09

Compensations were given to domestic cattle owners and legal heir of the persons injured as per the norms provided in the Govt. Resolution.

LEGAL POSITION:-

Wild life (Protection) Act,1972 is applicable for entire Maharashtra. Indian Forest Act 1927 also deals with wild life. Maharashtra Wildlife (Protection) Rules, 1975 are applicable. Hunting of wild life animals has been completely banned as per the amendments made to the Wild life (Protection) Act,1972 in the year 1991.

AREAS UNDER WORKING CIRCLE:

This is an overlapping working circle and encompasses whole areas under present day Yawal Forest Division.

PRESCRIPTIONS:

These prescriptions are applicable to all forest areas and also to the whole civil district, where ever possible.

- (a) Soil and moisture conservation works will be taken up, where ever possible, in all forest areas, additional measures to be taken to form water holes.
- (b) Reorientation of people's awareness about wildlife through programs like wild life week celebrations in educational institutions and remote villages.

- (c) Involving local student and general public for wild life census operations and counting of winter fowls at water bodies and wetlands during every winter.
- (d) Wild life watch towers at suitable spots, if available, will be created.
- (e) Shelter and hiding places, if not existing naturally, will be provided by artificial means.
- (f) Inoculation of cattle permitted to graze in these forests is to be compulsorily resorted to protect the wild life from contagious diseases of cattle.
- (g) Creating artificial barrier to restrict the wildlife not to raid the agricultural fields(which is increasing day by day)
- (h) Estimation of wildlife will be carried out every third year during first week of May.

Special Suggestions :-

1. Wildlife rich area in the division should be identified and focus should be given on this area.
2. for many migratory birds. Many wildlife and nature lovers, teachers, students visit this area. Nature interpretation centre shall be constructed here.
3. Manudevi in Yawal West range are very rich in flora and fauna and home for many migratory birds. Many wildlife and nature lovers, teachers, students visit this area. Nature interpretation centre shall be constructed here.
4. Special protection measures like protection from fire, grazing, destruction of habitat should be taken in wildlife rich area.
5. Teak plantations in Compt 166 near Pati camp area of Deoziri range was The home of rare **forest owlet**. The last sighting was in year 2004. Due to destruction of forest and specifically that to teak plantations, after 2004, no sighting of this bird is noticed. Search of this rare bird should be taken with the help of wildlife conservationist. Habitat rejuvenation and improvement works should be taken. No felling should be done in this area.
6. Works of water hole, check dam, nala rejuvenation shall be taken at suitable places
7. At the border area of Yawal sanctuary, fodder development scheme, solar bore well should be taken.
8. Man animal conflicts related to Bear, Monkey are noticed. Training should be given to forest staff for handling the mob and rescuing the animals. Awareness camps like

celebration of wildlife week, trekking, and bird identification camps should be organized.

GENERAL MEASURES FOR PROTECTION:

- (a) Areas should be strictly and effectively protected from fire
- (b) A vigilant watch should be kept on poachers by creating checking gates at strategic points vis-à-vis check post for checking the forest produces in transit.
- (c) During summer, the scarcity of water leads to drive the animals to a few water pools exposing themselves as prey to poachers including local inhabitants. Such areas should be kept under constant vigilance.
- (d) Compensation for cattle and human killings by wildlife should be made immediately as per law to create sympathy towards wildlife and to check any sorts of revenge to be taken by villagers.
- (e) If there exists any cattle lifter or man eater that should be translocated safely to safe areas to have rapport with villagers.
- (f) To have awareness for the wild life in the areas drive regarding wild animals should be taken from time to time.
- (g) To have an orphanage to rear the ailing animals to recoup and then to set free in their natural home.

WATER SUPPLY:

In the areas where there is an acute shortage of water required by wild life, construction of water holes will be made with provision to regular supply of water there. Creation of vantis(Vantalab) to harvest water for purpose of wildlife, construction of anicuts, bunds on nalas at suitable sites should be made to provide permanent water holes to the wildlife.

WILD LIFE TOURISM:

A wild life tourism centre would be developed at centrally located place. An ideal site is PAL which is close to sanctuary area and is conveniently linked with Chopda, Yawal and Jalgaon towns in the division.

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CHAPTER NO :-9

MISCELLANEOUS AREA MANAGEMENT

9.1 : GENERAL CONSTITUTION :-

This working circle constitutes the areas diverted for non forestry purposes & the total encroachment area included under FRA- 2006. This encroached area includes areas involved in sactioned Cases by District Committee and areas involved in cases pending with it.

9.2 : GENERAL CHARACTERISTICS OF VEGETATION : The area under FRA, FDCM area included. The forests of Yawal Forest division belong to the sub-group 5-A, Southern Tropical Dry Deciduous Forests as per the revised classification of Forest types of India by Champion and Seth.

9.3 : FELLING SERIES, CUTTING SECTIONS AND JFM AREAS:- Not Applicable

9.4 : BLOCKS, COMPARTMENTS AND JFM AREAS:

Distribution Of Area Of Working Circle:-The total part of 155 compart-ments admeasuring 18131.05 ha. area is included in this working circle. Out of the part of 155 compartments, part of 52 compartments admeasuring 976.46 ha., area is diverted for various non-forestry purposes. While part of the 152 compart-ment admeasuring 17154.59 ha., is encroached under FRA-2006. However, the status of the area remains as Reserved Forest.

Yawal division has a severe problem of encroachment. No proper record and data of encroachment is available.

The encroachment in Yawal Forest Division is either in the form of claims approved or claims pending under Forest Right Act, 2006 and areas without any claims under FRA. These areas are scattered all over the compartments.

Rangewise details about Area diverted for Non-Forestry purpose, Area under claims (IFR) and illegal encroachment. Table No.9.1

Range	Total Area of Range (Ha)	Area diverted for Non-Forestry purpose (ha.)	Details of Encroachment		
			Area of claims(IFR) approved under FRA 2006 Act (Ha)	Area in pending claims (IFR) under FRA 2006 Act.(Ha)	Encroachment without any claim under FRA 2006 Act (Ha)
Raver	14061.44	295.064	5.203 (51)	563.900 (210)	0
Yawal east	14096.04	196.42	88.50 (48)	462.936 (305)	136.46
Yawal west	13466.21	146.783	115.98 (67)	503.914 (267)	121.31
Deoziri	9597.93	0.00	115.38 (68)	0.00	331.21
Karjana	9994.63	272.00	536.81 (330)	1233.862 (511)	755.96
Vaijapur	10201.05	47.45	861.25 (501)	587.511 (368)	389.860
Chopda	10776.80	18.74	829.64 (301)	516.507 (257)	146.24
Total	82194.10	976.457	2552.763 (1366)	3868.63 (1918)	1881.040

The areas without any claim under FRA (1881.04 ha.) shall be immediately evicted in phased manner with due procedure as per law.

Range wise allocation of compartment and area for w.c. Table No.9.2

Range	RF		Total Compt.	Total Area in Ha.
	No.of compt.	Area		
Yawal East	23	747.856	23	747.856
Yawal West	14	766.677	14	766.677
Raver	22	6320.777	22	6320.777
Chopada	27	5005.041	27	5005.041
Vaijapur	29	1522.591	29	1522.591
Karjana	27	2116.92	27	2116.92
Deoziri	13	1651.188	13	1651.188
Total	155	18131.050	155	18131.050

Appendix No.

9.5 : SPECIAL OBJECTIVES OF MANAGEMENT

1. Identification and preparation of record of all encroachment area.
2. To survey and demarcate the area which has been approved by the competent authority.
3. To identify the pending cases under Forest Right Act, 2006.
4. To evict the ineligible encroachments.

9.5.1 : ANALYSIS OF THE CROP : Not applicable

9.5.2 : SILVICULTURAL SYSTEM: Not applicable

9.5.3 : ROTATION PERIOD :- Not applicable.

9.5.4 : HARVESTABLE DIAMETER:- Not applicable

9.5.5 : REDUCING FACTORS:- Not applicable.

9.5.6 : FELLING CYCLE: Not applicable

9.5.7 : DIVISIONS INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS: Not applicable.

9.5.8 : CALCULATION OF YIELD : Not applicable

9.5.9 : TABLE OF FELLING : Not applicable

9.5.10 : METHOD OF EXECUTING THE CUTTINGS: Not applicable

9.5.11 : SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not applicable

9.5.12 : REGENERATION : Not applicable

9.5.13 : ASSOCIATED REGULATION & MEASURES:

Recognition and approval of claims: List of ineligible encroachers will be prepared by the concerned Range Forest Officer. All illegal encroachment and the claims, decided in favour of Government, under Forest Rights Act, 2006, will be evicted in phased manner. The period of the phase will be decided by the Dy. Conservator of Forest Yawal under the instructions of Chief Conservator of Forest Dhule.

Eviction procedure.

1. The details of encroachments should be properly recorded in the forest documents like POR, spot/panchnama, location map etc.
2. Provisions of Indian Forest Act 1927 will be invoked while dealing with encroachment cases.
3. The help of revenue and Police department will be taken to evict the encroachments.

Treatment Proposed

1. The forest boundary will be demarcated permanently at site by pillars and where possible by TCM of size 1.90m x 1.00m x 0.60m.
2. Deep CCT will be taken at suitable interval for restricting further encroachment as it is found more effective.
3. The pits planting 3m x 3m spacing in of pit size 30cm x 30cm x 30cm will be done where digging of TCM is not possible.
4. Soil and moisture conservation works will be taken as per the requirement of the area.

Protection from new encroachment: The area evicted will remain prone to fresh encroachment. The concerned beat guard will carry continuous petrolling before premansoon to prevent any encroachment in these areas and mention about encroachment if any noticed in his fortnightly beat 'Khariyat' report. The Deputy Conservator of Forest Yawal will take regular review about encroachment on these areas in his monthly meetings.

Rangewise details about the claims under CFR of FRA 3(1) & 3 (2)

Table No.9.3
(Area in ha.)

Range	Total Area	Under CFR of FRA 2006	
		Area Under CFR [3(1)]	Area Under CFR [3(2)]
Raver	14061.44	5456.46 (42)	0.15 (1)
Yawal east	14096.04	-----	0.00
Yawal west	13466.21	----	0.00
Deoziri	9597.93	1534.73 (5)	1.078 (3)
Karjana	9994.63	70.35 (2)	3.898 (6)
Vaijapur	10201.05	25.38 (15)	1.00 (1)
Chopda	10776.80	3639.28 (13)	0.874 (1)
Total	82194.10	10726.20 (77)	7.00 (12)

This chapter includes the following areas :-

1. Reserved forest which was diverted for various non forestry purposes under Sardar Sarovar Project.

The extent of the area is 976.457 ha. The status of that area is still reserved forest, though the area is used for non forestry purposes.

2. **The Reserved Forest areas which are encroached under FRA 2006.**

This includes total area 6421.69 ha. under IFR, out of which claims for 2552.76 ha. land has been sanctioned by District Committee & remaining claims for 3868.63 ha. land are under scrutiny. In addition to that 10726.20 ha reserved forest has been allotted under Sec.3(1) of FRA-2006 & 7.00 ha reserved forest has been allowed under Section 3(2) FRA as Community Forest Right.

- **Prescriptions for management of forest areas on which the forest rights are recognized :**

1. Boundary Demarcation :- The forest areas on which the individual forest rights are recognized 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 a year from the date of commencement of this Working Plan. The progress of boundary demarcation works shall be monitored on a monthly basis by the DCF and on a Quarterly basis by the CCF. The GPS co-ordinates 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.

2. Updation of Area Registers :- The Divisional Area Register (Form No.1) shall contain the area vested with rights under FRA in the remarks column against each Compartment / Survey No./Gat No.

3. Awareness creation:- Among FRA beneficiaries about the responsibilities of forest and wildlife conservation will aid in the long run to prevent further encroachments.

4. **Conversions of various Govt. schemes :-** In the FRA Rules 2012, there is a provision to keep the holders of forest rights through convergence of various Govt. schemes relating to Agro-forestry, 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.

Suggestive steps for the increase of Forestry / Agro Forestry.

- a) Afforestation on these lands acquired under FRA should be planned by FRA beneficiaries.
- b) Drawing up appropriate time specification plan inessential, which will require the involvement of the Social Forestry Department and the Agriculture Departmental with the Forest Department.
- c) Farmers must be encouraged and motivated by way of providing the technical assistance and co-operation by forest department and SFD for taking up plantations.
- d) Land laws, if any, should be so modified wherever necessary to facilitate and motivate individuals to undertake tree planting and grow fodder plants, grasses and MFP on their land acquired under FRA.
- e) Appropriate regulations governing the felling of trees on private holding should be appropriately relaxed.
- f) High quality planting stock including clonally planting stock supported with improved silvicultural management practices can be used in respect of tree crops for timber fuel-wood & fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality improvements.
- g) People's support in forest conservation is to be recognized by the state forest department. Appropriate extension program measure to 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 Centers must be established to guide

agri-silvicultural and silvicultural techniques to ensure optimum use of their land and water resources.

- h) The wood-based industries have important role to play in development of agro-forestry. They should consider making appropriate arrangements with farmers, play a facilitative role in arranging quality-planting material, and enter into buy back arrangements.
- i) Preferred Tree and bamboo species under agro forestry by farmers and not naturally available in neighboring forests may be exempted from the transit permit and felling regulations.

5. Rejection of illegal encroachment :- 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. **Cases under FRA having possession upto Dec. 2005 should be regularized and cases after that should not be regularized at any cost.**

6. Preparing & implementing conservation & management plan for community :- As per Rule 4(e), the Gram Sabha is duty bound to constitute Committees for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the Act. Similarly, as per Rule-4 (f), such Committee shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest resources and integrate such plan with the micro plans or working plans or management plans of the forest department. Therefore, the territorial officers shall examine such Conservation and Management Plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of the approved working plan.

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CHAPTER NO :-10

ECO TOURISM

10.1 : INTRODUCTION:

Eco tourism is the new buzzword in the realm of tourism throughout the world. Mr Hector Ceballos Lascurain is the father of Eco tourism who coined the word ECO TOURISM in 1983. He said that “Eco Tourism respects the environment, encourages and promotes the well being of local people. Nature tourism may or may not do this”. A mechanical implementation with an over emphasis on physical and financial targets without making an attempt to understand the spirit of the program would end up in causing irreparable damage to the environment. It is more difficult to establish and run a successful eco tourism enterprise. A main difference is the need to take into account the environmental factors and successfully integrate them with business and social concerns in a carefully thought out and implemented plan. Eco tourism generates more employment and provides enormous opportunities for entrepreneurship.

Eco tourism management seeks to integrate and balance several potentially conflicting objectives, protection of natural and cultural resources, provision of recreation opportunities and generation of economic benefits. In the absence of effective planning and management, ecotourism can lead to significant negative impacts on vegetation, soil, water, wildlife and historic resources. Visitation may diminish along with the economic benefits and resource protection incentives. Eco tourism has been the fastest growing sector in tourism with an estimated annual growth rate of 10 to 15% over the last few years and it is expected to grow even more in future. The present government emphasis is on eco tourism, with proper planning. It is a onetime investment activity, which triggers enormous employment opportunities in various fields like transportation, restaurant, hotel, tourist guide, shopping, other entertainments like cinema halls etc.

10.2 : ECO TOURISM

- A. Ecotourism is responsible travel to natural areas, which conserves the environment and improves the welfare of local people. (The ecotourism society 1993).
- B. Tourism that involves travelling to relatively undisputed natural areas with the specified object of studying, admiring and enjoying the nature and its world of plants and animals as well as any existing cultural aspects found in these areas is defined as ecotourism.(World Tourism Organization).
- C. Ecotourism is about creating satisfying a hunger for nature, about exploiting tourism's potential for conservation and development and about averting its negative impact on ecology, culture and aesthetics.

10.2.1 : Basic Principles Of Eco Tourism:

- 1. Avoids negative impacts that can damage or destroy the integrity or character of the natural or cultural environment being visited.
- 2. Educates the traveler on the importance of conservation
- 3. Directs revenues to the conservation of natural areas and the management of protected areas.
- 4. Brings economic benefits to local communities and directs revenues to local people living adjacent to protected areas.
- 5. Emphasizes the need for planning and sustainable growth of tourism industry, and seeks to ensure that tourism development does not exceed the social and environmental "carrying capacity".
- 6. Retains a high percentage of revenues in the host country by stressing the use of locally owned facilities and services.
- 7. Increasingly relies on infrastructure that has been developed sensitively in harmony with the environment.

10.3 : SUSTAINABLE FOREST MANAGEMENT- ECOTOURISM AS A TOOL:

Forestry has traversed through various phases over the past century. During British rule the main focus was on production forestry and after independence the focus slowly shifted from production forestry to protection forestry. However with rapidly increasing human and livestock population there is immense biotic pressure on our forests. In order to solve the predominant human-forest conflicts, the concepts of people's participation and Joint Forest Management have been evolved.

To maintain the forests sustainably over an indefinite period and its dependence on both government and foreign grants is to be reduced there is an immediate need to evolve a revenue-generating aspect of forestry that does not result in the extraction of any forest produce i.e. timber, firewood etc. The only way to bring this sort of revenue generation is through Ecotourism. It is in this sector that the future of forestry lies. In the new millennium, the time has come to move from merely conservation forestry to towards “Intellectual Forestry”, the basis of which is Eco Tourism.

10.3.1 : Greater awareness generation among the public: -

It is observed that whenever on talk of stake holders in forestry, the focus is always on forest dwelling communities, forest dependant communities, local NGO’s and the forest department. The city and town dwelling urban forest independent communities are not at all considered as having any stake in the forestry. It is a matter of irony, however that almost all the decision makers and opinion-leaders of the country, be they top bureaucrats, judges, industrialists, famous personalities and even politicians, etc are all members of this community. Even though this segment comprises only a small percentage of country’s population, its ability to influence decision making is much more significant.

Ecotourism is the best possible manner in which these forest independent communities can be made aware of forestry in India. Ecotourism could also expose school children, the future generation of policy makers to the relevance and importance of our forests. As people today are becoming increasingly aware about environmental issues, this is the right time to promote ecotourism.

10.3.2 : Benefits for the local communities:-

Ecotourism can play a very significant role in reducing the dependence of local communities (both forest dwelling and forest dependent) on the forests. Setting up of an ecotourism unit would not only provide them with a means of employment at the unit itself, but would also make them stakeholders in the financial progress of such an enterprise. The Ecotourists would also constitute a ready made markets for NTFPs such as honey, charoli, Dhavada, gum and other items such as embroidery products, local handicrafts etc, at their door steps. High quality micro enterprises such as poultry farming, vegetable supply units could also

be set up and centered around the ecotourism unit. Such a Participatory Ecotourism Strategy (PES) would not only cut operational costs for the ecotourism unit but would at the same time reduce the traditional dependence of the local communities on the adjoining forests by providing an alternative source of livelihood. In addition to the above, ecotourism could be used as an effective communication and extension tool to convince the local communities and especially the children there in about the benefits of conserving the forests and natural ecosystems.

Local tribal youth will be selected and training will be given to them on ecotourism and related topics like identification of birds, animals, flora and other important features that are seen during the tour. The traditional knowledge of the tribal youth will also be utilized during the tour.

10.3.3 : Benefits for the Forests and the Forest Department:

By providing the local people with alternative sources of income, ecotourism would drastically reduce the biotic pressure in the region which would automatically lead to greater habitat improvement. Other habitat improvement work such as clearing weeds for making view lines, creating salt pits for the wild life etc. would be mutually beneficial for both the forest and the ecotourists. The unit operates and the visiting ecotourists would also back up as eyes and ears of the forest department in curbing all illegal activities such as felling, poaching etc. The forest department would also get an opportunity to educate the city dwellers, villagers.

The forest department has hitherto largely been perceived as far removed from the general public. Ecotourism is the best way in which the public can be made aware of the pivotal and difficult role that is played by the forest department in conserving India's forests. This would in turn lead to much greater appreciation of Forest department and increase the importance that is attached to it.

Ecotourism will be a successful industry only if natural resources are protected. And natural resources will be best protected if there is a strategy frame work in place and park staff and local communities understand the concept and take a lead role in the process. One important measure of both the success and sustainability of ecotourism is the management of visitor impacts to ensure the long term protection of natural and cultural resources, as well as continued visitor enjoyment and use.

Pal in Raver range, Mor dam in Yawal East range, Manudevi in Yawal West range, Unapdeo in Karjana range, Sati Anushaya Kamaljadevi in Chopda range are the place of Eco tourism in the division. Various works have been taken during current working plan still there is lot of scope for improvement. Activities like play ground for children should not be taken.

10.3.4 : Following works and activities will be taken.

1. All Forest parks will be completely fenced with chain link fencing
2. Emphasis will be given on creating wood lots of medicinal plants, forest tree fruit garden, creeper garden, hedge garden, bamboo plantation etc
3. Nature and cultural interpretation/ awareness centre will be created. These should be fully utilized and should be open for the public
4. Audio-visual aids and equipments shall be provided.
5. Improvement in eco-tourism infrastructure such as internal roads, view points, regulation of entry/exit at gates shall be done.

10.4 : ECOTOURISM POTENTIAL OF YAWAL FOREST DIVISION:

Yawal Forest Division has very good ecotourism potential. The division has substantial tribal population, mainly Bhils, Pawaras , tadivis etc. The division has about 82194.10 ha. of forest area mainly teak and Anjan bearing forests. The following sites have been identified and listed below that have great potential and resourceful to make ecotourism a success in Yawal Forest Division.

1. Yawal Wild Life Sanctuary.
2. Pal Forest Park and Forest Guards Training School.
3. Sukhi Dam.
4. Manu Devi Mandir.
5. Unap Dev Hot Water Spring.
6. Nateshwar kamaljadevi tempal
7. Mor Dam

10.4.1 : Yawal Wild Life Sanctuary

It is located at a distance of 4 5 kilometres from Jalgoan town. The Sanctuary has very good forest area and the total extent of forest area is about 17000 hectares. The Sanctuary is home for wild animals like Panthers, Bears, Wild Boars, Neelghai,,

black buck, Hyena, Jackels etc. The territorial division and wild life division should come together to chalk out a eco tour trail within the Sanctuary. A lucky visitor can sight some of these animals during eco tour trekking. Water Shed Development works like Continuous Contour Trenches(CCTs), Loose Boulder Structures, Cement Check dams, Percolation tanks, different plantation models should be developed at some location of eco tour to educate the ecotourist about the benefits of soil, moisture and water conservation works through display boards. Local tribal youth should be trained to act as ecotour guides. Wild Life division should create facilities to erect tents for visitors with in the forest.

10.4.2 : PAL FOREST PARK AND FOREST GUARDS TRAINING SCHOOL:

Pal is located on the plateau of Satpudas at a an approximate distance of 22 km. from Raver. Sultan Mohammed Tughalak had camped at Pal during transfer of his Capital from Delhi to Daulatabad. Pillars of old fort and other remains give historical importance to the place. There is also a Forest Park, which is an important picnic spot for the school children and people of the nearby towns. It is also an access point to Yawal Wild Life Sanctuary for the visitors. A Forest Rest House with 4 suites, 'A' shaped rest house, a Log Hut and a dormitory facility exist for the tourist at Pal. An interpretation center may be constructed here for distributing information related to Forest and Wild Life.

The forest Park can be further developed in to a bio diversity centre. The park already has different species. All species present in the park should be labeled with the species name in English and its local name in Marathi. An Arboretum, medicinal plants(local and other species), Palmetum, Bambusetum, Ficarium should be developed. Along with sacred structures like Navagraha Van, Nakshatra van, Panchvati van, Shiva Panchayatana should developed in the park, So that Pal should become a ECOTOURISM COMPLEX for a eco tourist.

Ecotourism Complex – Objectives/purpose/functions.

1. To provide eco friendly infrastructure preferably on the fringes of wild life protected area which takes care of minimum lodging and boarding facilities in pucca houses, huts, machans and tents as per requirements of the tourists.
2. To provide mini- libraries to enable visitors to spend their time usefully and elicit support for protection of wild life.

3. To provide indoor games like carrom and chess for the entertainment of visitors.
4. To earn revenue for the state government.
5. TO provide income to local people by employing them as guides, watchers etc.
6. To facilitate sale of locally made crafts to tourists.
7. To impart education on nature conservation.
8. Lastly, to facilitate all round development.

10.4.3 : SUKHI DAM/DHARAN:

Sukhi Dharan is located at a distance of 10 to 12 km from Pal. It is an excellent water body for attracting water birds and is an ideal location for bird watchers. Fruit bearing trees of different species(singapur cherry, bor, pimpal, umbar, peru etc.) should be planted around the dam area, so that fruits are available for the birds round the year and the dam site can become major bird attracting place for both water and bush birds in large numbers. Shelters shall be developed for bird resting and nesting in the vicinity of the dam. Bird feeders and bird baths should be provided in good numbers for bird attraction around the dam. Sukhi Dam has created a large water body which is ideally suited for boating. In consultation with dam authorities boating should be promoted (presently the dam water bodies are being promoted as boating sites by irrigation authorities.).

10.4.4 : MANUDEV I MANDIR.

Manudevi Mandir is located at a distance about 35kilometres from Jalgoan and about 16 kilometers from Chopda town. Jatras are conducted on important occasions at Manudevi mandir and this place attracts large number of people. The mandir is an ideal location to provide environment education and awareness to common people. An eco-development program should be taken up around the mandir area The surrounding areas should be planted with shade providing trees and benches for pilgrims should be provided. A biodiversity centre, medicinal plots, bambusetum, palmatum, sacred structures like Nakshatra van, Navagraha van, Panchavati van, Shiva panchayatana etc. should be developed around the temple area. These structures would educate people about the plant species and its relationship with the religion.

10.4.5 : UNAPDEV HOT WATER SPRING:

Unapdeo is situated at the base of Satpudas, at an approximate distance of 5 km. from Adawad village. It is at a distance of 80 km. from Jalgaon and 20 km. from Chopda. It is famous for hot water spring. The temperature of water at the source is around 60 to 70 degree Celsius. The legend says that Lord Ram created the water spring by an arrow for treating Sharbhang Rishi. In the surroundings there are temples of many Hindu Gods. Every Sunday the place is visited by a number of pilgrims. The Division has already initiated development of this area. For development of Unapdeo and construction activities are in progress.

10.5 : RESOURCES REQUIRED FOR DEVELOPMENT OF ECOTOURISM/FUTURE COURSE OF ACTION:

The Deputy Conservator of Forest should take initiative to prepare plans and estimates for the developmental activities at these places of interest and submit the estimates to Forest Department, District Authorities or Maharashtra Tourism Development Corporation for resources. In eco tourism it is a one time capital investment provides platform or triggers multi dimensional activities like transportation, food industry, shops for locally made articles in these places of interest.

Unless the environment is safe guarded ecotourism is in danger of being a self destructive process, destroying the very resource upon which it is based. Therefore necessary safeguard should be sensitized about the protection of environment. The ecotourism should not be allowed to transform into eco terrorism by neglecting the principles of ecotourism at implementation phase. The aim of ecotourism is to utilize the natural beauty to the optimum while keeping up our social obligation and commitment to conserve and preserve the ecology and environment.

Eco centers: Eco centers will be created at Ambapani area of Yawal West range in Compartment no 107, 106 and Pati camp area of Deoziri range Following activities are proposed under Eco centre

1. Providing Eco-camps facilities for visitors.
2. Eco-trails around the eco-centers.

3. Eco-watch towers with binoculars, camera, wireless handsets
4. Providing drinking water facilities
5. Erection of boards and signage at appropriate places.

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CHAPTER NO:- 11

BIODIVERSITY CONSERVATION.

11.1 : STATUS OF BIODIVERSITY:-

The area of this forest division is situated in biodiversity rich part of Maharashtra. Extreme seasonal variation, diverse topographical characters, undulating areas with many rich valleys and table lands watered by annual and perennial streams, in the catchment of Tapi river & its tributaries like Gul, Mor rivers creates diverse habitat with flora and fauna. Therefore different kinds of plants animals, harbor in these division. Primitive types like Bhil, Pawara & Tadavi are sharing common habitat with wildlife of this area as these tribal communities resides adjacent to the forest, it creates tremendous biotic pressure from both sides resulting in man & animal conflict situations frequently. Increasing encroachment is a major problem to be addressed.

This forest division is rich in floral diversity pertaining to this area. The Forests of Yawal Division of Jalgaon District, mainly belong to Dry Tropical Forests as per the "Revised Survey of the Forest Types of India" by Champion and Seth. The composition of the growing stock shows considerable local variations on account of various locality and biotic factors. The forests belong to sub group Dry Teak Forest (5A/Cib), Teak high forest, Superior teak coppice forests, Salai forest, Anjan forests.

Teak (*Tectona grandis*), Sadada (*Terminalia tomentosa*), Shisam (*Dalbergia latifolia*), Dhavda (*Anogeissus latifolia*), Hed or Haldu (*Adina cordifolia*), Salai (*Boswelli aserrata*), Bija (*Pterocarpus marsupium*), Dhaman (*Grewia tiliaefolia*), Tiwas (*Ougeinia oojeinensis*), Bondara (*Lagerstroemia parviflora*), Kalam (*Mitragyna parvifolia*), Sawar (*Salmalia malabarica*), Tembhrun (*Diospyros melanoxylon*), Kusum (*Schleichera oleosa*), Mahuwa (*Madhuca indica*), Phasi (*Dalbergia paniculata*), Humb (*Sacopetalum tomentosum*), Mokha (*Schrebera swietenoides*) Rohin (*Soymida febrifuga*), Umbar (*Ficus glomerata*), Kadai (*Streculia urens*), Pangara (*Erythrina variegata*), Arjun sadada (*Terminalia arjuna*), Awala (*Embllica officinalis*) are the main species of general floristics.

The under-storey consists of Khair (*Acacia catechu*), Charoli (*Buchanania lanzan*), Modhal (*Lannea coromandelica*), Bor (*Zizyphus mauritiana*), Bhutakes (*Cassine glauca*), Asana (*Bridelia retusa*), Palas (*Butea monosperma*), Bahava (*Cassia fistula*) and Bamboo (*Dendrocalamus strictus*).

The shrubby undergrowth consists of Kevani (*Helicteres isora*), Karvi (*Strobilanthes callosus*), Tarwad (*Cassia auriculata*), Nirgudi (*Vitex negundo*) and Tarota (*Cassia tora*). The grasses commonly met with are Horn (*Sorghum halepense*), Kunda (*Ischaemum pilosum*), Pavnya (*Sehima nervosum*) and rosha (*Cymbopogon martinii*). Ukshi (*Calycopteris floribunda*) and Chilhar (*Caesalpinia sepiaria*) are the climbers commonly met with.

Teak is the predominant species attaining pole size in its mature state. It is found on steep slopes and on flat ground. The soil depth, quality of soil and terrain determine the quality and composition of the crop. Teak occurs everywhere and its proportion varies from 20 to 30 percent. The quality of the crop mainly is IV. The quality goes down to IV-b in very shallow and overgrazed areas near habitations. The density varies from 0.4 to 0.6. The preponderance of Salai especially on the degraded hill slopes is noteworthy. The occurrence of bamboo is scanty.

This area is a very good habitat for Panther, Hyaena, Wild dog, Jakal, Jungle cat and Sloth bear. The herbivores commonly found are Barking deer, Wild boar, Black buck, Chinkara, Mongoose etc. The rodents found are Porcupine, Hare etc. The area is rich in Avifauna with more than 50 type of birds visiting to big water bodies adjoining to Narmada and Tapi River. Types of birds includes Bhaya, Papat, Shikara, Shimpi, Sutar, Bagala, Pankawala, Khandya Ghubad, Kotwal etc.

It is very essential to make inventory of the floral and faunal diversity of this rich and diverse habitat as no scientific study has been undertaken. To highlight the loss of habitat and to conserve genetic diversity, scientific interventions are the need of the time.

11.2 : NEED TO CONSERVE BIODIVERSITY :

Biodiversity is essential for maintaining the ecological functions, including stabilizing of the water cycle, maintenance and replenishment of soil fertility, pollination and cross-fertilization of crops and other Vegetation, Protection against soil erosion and stability of food producing and other ecosystems. Conservation of biological diversity leads to conservation of essential ecological diversity to preserve the continuity of food chains. Biodiversity provides the base for the livelihoods, cultures and economies of several hundred millions of people, including farmers, fisher fold, forest dwellers and artisans. It provides raw material for a diverse medicinal and health care systems. It also provides the genetic base for the continuous up Gradation of agriculture, fisheries, and for critical discoveries in scientific, industrial and other sectors. The rapid erosion of biodiversity in the last few decades has impacted on the health of the land, water bodies and people. Biodiversity is a wealth to which no value can be put. In the final analysis, the very survival of the human race is dependent on conservation of biodiversity. It is evident that this invaluable heritage is being destroyed at an alarming rate due to several reasons.

Conservation and sustainable use of biological resources based on local knowledge systems and practices is ingrained in Indian ethos. The country has a number of alternative medicines, like Ayurveda, Unani, Siddha and Homeopathic systems which are predominantly based on plant based raw materials in most of their preparations and formulations. Herbal preparations for various purposes including pharmaceutical and cosmetic form part of traditional biodiversity uses in India and in Yawal as well. The benefits that we derive from the biodiversity are many and a few of them are noted below:

11.2.1 : Food provision :- Animals, plants, mushrooms, fruits, tubers, flowers etc., you name them and we find their use in some form of food by many people's groups. India food security, where we are able to have sufficient and surplus grains through the green revolution, was made possible because we were having wild varieties of rice, wheat etc apart from introduction of good irrigation and fertilizers.

11.2.2 : Genes: Wild animals and plants are sources of genes for hybridization and genetic engineering. New improved varieties of plants, particularly food grains, are essential to be developed and this would not be developed and this would not be possible without the presence of genetic diversity.

11.2.3 : Biological control agents: Some species of living things help us control invasive species without the use of poisons. Epidemics in forests and agricultural and agricultural crop are perpetuated by monocultures and vast plantations. Diversity however, serves to balance nature on its own.

11.2.4 : Natural Products: Many of the medicines, fertilizers and pesticides we use are derived from plants from plants and animals. We also get products such as oils, adhesives & silk from natural sources.

11.2.5 : Environmental Services: We rely to plants and animals for important processes such as soil aeration, fertilization and pollination.

11.2.6 : Enjoyment: Biodiversity and wildlife is often the subject of aesthetic interest. In India and Yawal we can see the people are being more and more aware about the value and function of wildlife and biodiversity. The level of appreciation and interpretation of both has also increased for the better.

11.2.7 : Scientific interest: The diversity of plants and animals inspires scientific inquiry in many different realms.

11.3 : PRESCRIPTION FOR THE MAINTENANCE & ENHANCEMENT OF BIODIVERSITY.

(i) Sustainable harvesting of Medicinal Plants should be strictly adhered to. As the division already has the list of local medicinal practitioners (LMP) and the species used by them, it shall be the duty of the Division to chalk out the ways and means of sustainable harvest, with or without the consultation with the LMPs, at its own discretion.

(ii) Sensitization of the Staff of Yawal division to the issues of biodiversity is of utmost importance. The Division shall involve such experts and institutions in consultation with the Maharashtra Biodiversity Board, Nagpur for such trainings and workshops. Our tendency to limit our management practice to only teak and prominent wildlife species should be done away with.

(iii)The field functionaries of Yawal forest division shall identify areas of significant biodiversity value and take lead in in-situ conservation and Ex-situ conservation.

(iv) Identification of area of birds presence in the Division is a must. It is known to be rich in avi-fauna and needs to be studied for further protection. It should be the endeavor of the Division to explore potential sites/ areas that would qualify as IBAs.

(v) Identification and documentations of local practices, indigenous technical knowledge and other ethno-biological should be carried by the department.

(vi) Identification and Conservation of rare/ endangered indigenous species of plants in the division.

(vii) All efforts should be made to control fire and grazing in the forests as these are among the biggest enemies of biodiversity.

(viii) As per biodiversity Act 2002, Biodiversity Management Committee through the gram panchyat as per the norms decided by the Government needs to be established in all the JFMos villages. The local guard should provide all help and co-operation to the gram sabha for the establishment of the works as and when required.

(ix) Capacity building for local communities, forest personnel at all levels; elected representatives, decision makers, and bureaucrats needs ot include the provision of technical skills.

(x) All JFM Committees should have Public Biodiversity Registers as part of the many records to be kept. Members from the State Biodiversity Board should be consulted for the same. Necessary Workshops, training etc required for this should be carried out.

(xi) The forest division in consultation with the local Colleges, anthropological/Social science institutions and the Maharashtra State Biodiversity Board should carry out Biodiversity studies on the lesser known lower life forms of the flora and fauna. It may be seen that as the forest department has concentrated its working in the higher life form of trees and mammals/birds other species have been relegated to oblivion.

- Documentation and studies of herbaceous plants
- Documentation and studies on the fungi, ferns, algae and Lichen and moss (If any).
- Carry out entomological studies (Particularly butterflies)
- Carry out herpetological studies.

In all the above studies, proper documentation with distribution of species, the abundance and threats to the species may be included.

11.4 : LEGAL ENACTMENT

In view of above consideration, the Biological Diversity Act, 2002 has been enacted to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits. In pursuance of Biological Diversity Act, 2002, Rule 2004 framed and came into force into 15th April 2001. The Act provides for statutory bodies like National Biodiversity Authority at the National level and State Biodiversity Boards at State levels, to regulate access to Biological Diversity. Maharashtra Biological Diversity Rules 2008 was notified under section 63(1) of Biological Diversity Act 2002 on 10th December 2008. Government of Maharashtra vide their notification dated 2.1.2012 has created Maharashtra State Biological Diversity Board. Under the provision of Rule no.23 of Maharashtra Biological Diversity Rules 2008, District level, Taluka level & village level Biodiversity committees should be formed. The District level committee has been formed in Jalgaon District under the Chairmanship of the Collector.

At every local level, every local body shall constitute a Biodiversity Management Committee within its area of jurisdiction.

Function of the Committee:- The main function of Biodiversity Management Committee (BMC) is to prepare people biodiversity register in consultation with local people. The register shall contain comprehensive information on availability and knowledge of local biological resources, their medicinal or other use of any other traditional knowledge associated with them.

The other functions of the BMC are to advice on any matter referred to it by the State Biodiversity Board or Authority for granting approval, to maintain data about the local Vaidus and practitioners using the biological resources.

The Authority shall take steps to specify the form of the People's Biodiversity Registers, and the particulars it shall contain and the format for electronic database.

The Authority and the State Biodiversity Boards shall provide guidance and technical support to the Biodiversity Management Committees for preparing Peoples Biodiversity Registers.

The People's Biodiversity Registers shall be maintained and validated by the Biodiversity Management committees.

The committee shall also maintain a Register giving information about the details of the access to biological resources and traditional knowledge granted, details of the collection fee imposed and details of the benefits derived and the mode of their sharing.

Three talukas namely Raver, Yawal & Chopada comes under Yawal Division. Taluka level Biodiversity committees are not formed so far. The DCF should take initiative to form those committees as early as possible with help of Taluka Agriculture Officer and Block Development Officer.

These three talukas comprises of 317 villages. Out of that 64 villages are adjoining to forest areas having JFM committees. DCF Yawal should take immediate efforts to form Biodiversity committees in those villages. In remaining 253 villages which are not adjoining to forest areas, the DCF Yawal should contact Agricultural Officer and BDO to form Biodiversity committees in those villages. A time bound programme should be arranged by DCF to form Biodiversity committees in the villages of those talukas.

A Note On The Biodiversity Act 2002

Introduction:

India is party to the United Nation Convention on Biological Diversity signed at Rio de Janeiro on the 5 Day of June,1992. This conservation reaffirms the sovereign rights of the state over their biological resources. Therefore, legislation was enacted by the Indian Parliament in 2002 to give effect to the United Nation Convention.

This Act aims to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental there to.

Important provision of the Act :

- (a)** Section 2 (a) defines the term Benefits Claimer so as; the conservers of biological resources, their byproducts, creators and holders of knowledge and information

relating to the use of such biological resources, innovations and practices associated with such use and application.

- (b)** Section 2(b) defines the terms biological diversity as; the variability among living organisms from all sources and the ecological complexes of which they are part, and includes diversity within species or between species and of eco-systems.
- (c)** Section 2(c) defines the terms Biological resources as; plants animals and micro-organisms or parts there of their genetic material and by-product (excluding value added products) with actual or potential use or value, but does not include human genetic material.
- (d)** Section 2(o) defines the terms sustainable use has the use of components of biological diversity in such manner and at such rate that does not lead to the long – terms decline of the biological diversity thereby manning its potential to meet the needs and aspirations of present and future generations.
- (e)** Section 3(1) regulates the access to Biological diversity for persons mentioned in section 3 (2) who shall, without previous approval of the National Biodiversity Authority (NBA), obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.
- (f)** Section 3(2) : The person who shall be required to take the approval of the NBA under section 3(1) are the following, namely : (a) a person who is not a citizen of India; (b) a citizen of India who is non-resident as defined in clause (30) of section 2 of the Income-Tax Act,1961; (c) a corporate body, association or organization not registered in India or registered in India under any law for the time being force which has any non-India participation in its share capital or management.
- (g)** Section 4 : No person shall, without the previous approval of the NBA ,transfer the results of any research relating to any biological resources occurring in, or obtained from, India monetary consideration or otherwise to any person who is not a citizen of India or citizen of India who is non- resident as defined in clause (30) of section 2 of the Income –tax Act, 1961 or a body corporate or organization which is not registered or incorporated in India or which has any non-Indian participation in its share capital or management.

- (h)** Section 6 (1) : No person shall apply for any intellectual property right (IPR), by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the NBA before making such application.
- (i)** Section 7 : No person, who is a citizen of India or a body corporate, association or organization which is registered in India, shall obtain any biological resource for commercial utilization, or bio-survey and bio-utilization for commercial utilization except after giving prior intimation to the state Biodiversity concerned.
- (j)** Section 8 (1) : Central Government for the purposes of this Act, shall appoint a body called the National Biodiversity Authority (NBA).
- (k)** Section 21(1) : The National Biodiversity Authority shall while granting approvals shall ensure that the terms and conditions subject to which approvals granted secures equitable sharing of benefits arising out of the use of accessed biological resources, their by-products, innovations and practices associated with their use and application and knowledge relating thereto in accordance with mutually agreed terms and condition between the person applying for such approval, local bodies concerned and the benefits claimers.
- (l)** Section 21 (4) : NBA shall in consultation with the central Government frame guidelines for operational zing section 21(1).
- (m)** Section 22 (1) : For the purposes of this Act, state Government may, by notification in the official Gazette, establish state Biodiversity Board.
- (n)** Section 37 (1) : Without prejudice to any other law for the time being in force, the state Government may, from time in consultation with the local bodies, notify in the official Gazette, areas of biodiversity importance as biodiversity heritage sites under the Act .
- (o)** Section 37 (2) : The state Government, in consultation with the Central Government, may frame rules for the management and conservation of all the heritage sites.
- (p)** Section 38 : Without prejudice to the provisions of any other law for the time being in force, the central Government, in consultation with the concerned state Government may from time to time notify any species which is on the verge of extinction or likely to extinct in the near future as a threatened species and prohibits

or regulate collection thereof for any purpose and take appropriate steps to rehabilitate and preserve those species.

(q) Section 41 (1) : Every local body shall constitute a Biodiversity Management Committee (BMC) within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticates stocks breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

(r) Section 41(2) : The NBA and SBA shall consult the Biodiversity Management Committees (BMCs) while taking any decision relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the BMCs.

(s) The BMCs may levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purposes from areas falling within its territorial jurisdiction.

(t) Section 55(1) : Whoever contravenes or abets the contravention of the provision of sections 3,4 or 6 shall be punishable with imprisonment for a term which may extend to five years, or with fine which may extend to ten lakh rupees and where the damage caused exceeds ten lakh rupees such fine may commensurate with the damage caused, or with both.

(u) Section 58 : The offences under this Act shall be cognizable and non-bailable.

(v) Section 59 ; The provisions of this Act shall be in addition to, and not in derogation of the provisions in any other law, for the time being in force, relating to forests or wildlife.

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Chapter No:-12

MANAGEMENT OF FOREST HEALTH AND VITALITY

12.1 : INTRODUCTION : This chapter on maintenance and enhancement of Forest Health and vitality deals with the general condition of the health and vigor of the forest and steps that are needed to be taken in order to maintain and improve it.

Health forests are essential for sustainable forest management, yet forests, like other ecosystems, are subject to a number of threats that can cause tree mortality or reduce their ability to provide a full range of goods and services. The cause of the negative impacts on forest health and vitality vary from place to place, and the magnitude and duration of the impacts are not easy to assess. Causes include, but are not limited to, insects and diseases, over exploitation of wood and non-wood forest products, poor harvesting practices, poor management, uncontrolled grazing, invasive species, air pollution and extreme climatic events (e.g. drought, frost, storms and floods) The complexity and interrelationship of these factors and their impact on the health and vitality of forests are difficult to unravel, Indirect impacts may be far reaching and include social, economic and environmental dimensions.

12.2 : GENERAL CONSTITUTION OF AREA: Forest area of whole division.

12.3 : GENERAL CHARACTERISTICS OF VEGETATION :

The forests of Yawal Forest Division belong to the sub-group 5-A, southern Tropical Dry Deciduous Forests as per the revised classification of forest types of India by Champion and Seth. Within this main type, local variation in the altitude are not much, it does not influence the distribution of various forest species, however, aspect plays an important part in determining the character of the vegetation in hilly area. Generally the western and northern slopes are better stocked than the drier eastern and southern slopes. The rocks throughout the Yawal Forest Division are Deccan trap, but the soil varies. Geology, soil varies. Geology, soil type and depth plays an important role in determining the composition and quality of the crop.

12.4 : SPECIAL OBJECTIVE OF MANAGEMENT :

A) To improve the overall health of trees by striving for better composition, normal age distribution sturdy structure high vigor of the forest which is achievable by.

- (1) Improve the regeneration status of the forest by encouraging seedling origin new regeneration.
- (2) Minimizing the occurrence and impact of forest fire on forest.
- (3) Detecting and containing pests and diseases from defoliators and skeletonisers to all forms of parasites, fungal attacks.
- (4) Ensuring grazing in forest is kept to a minimum.
- (5) Reducing human interference of all forest, from illegal felling, grazing, hunting etc. by enforcing the law & changing moral perception.

B) As the forest of Yawal have been worked for over 90 years under the coppice with Reserve and Coppice standard system, the presence of teak in most part the forest is less than 34% & the Teak coppice has lost its vigor to revitalize the forest.

- (1) Wherever, regeneration comes up priority for retention and nurturing, should be given to seedling –origin regeneration.
- (2) The choice of species for Afforestation in Anjan working circle & Afforestation working circle should be of miscellaneous and fruit bearing species keeping in the barest minimum teak seedling/stumps.

12.4.1 : ANALYSIS OF THE CROP :

The analysis of forest crop of Yawal Forest Division is done in this plan in each working circle and part-I Chapter –VI. (Maintenance and Enhancement of Forest Resource Productivity.)

Biotic interference like excessive grazing, illicit felling, overdependence on forest for fuel wood weed infestation and frequent fire has resulted in the further degradation of the forests. The illegal felling are often concentrated on the species most valued for various purposes. Seedling stage are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stage are resistant ones, which can stand ton grazing and fires. These

species are often of low utility, tend to become gregarious and do much harm to forest health.

Total Forest area in charge of Yawal Forest Division is 82194.10 ha. The forests of the Yawal division can be classified into two strata viz. Teak and Miscellaneous.

FACTS : - As per this FSI report Inventory of Forest Resources of Yawal division shows the condition of the crop and health status in very poor condition. One can only presume that an area where the forests with little regeneration, overabundance of a single species and subjected to various biotic and abiotic pressure would be in poor health and vitality.

Dense forest is partially present in the division and the forest area is gradually converting into open and scrub forests due to heavy biotic pressure. Heavy grazing and erosion have been noticed in considerable area.

Regeneration is inadequate in 60% of forest area due into biotic interference. Proper steps should be taken to minimize such interference.

(i) About 20 % of the forest crop is pole crop, Big timber is almost absent and only the small sized trees predominantly occurring in the forests. The crop needs protection so that it could grow well.

(ii) About 7000 ha. forest area requires to be planted/ afforested with suitable species to increase the vegetative cover.

In the light of the above and the observations made in the forest of Yawal it is seen that there is a great need for the restoration of the forests and the improvement of the health and vitality in the whole Division.

An improvement indicator the vitality of the forests is the presence of the regeneration as the status of regeneration in the forests represents its future crop. The regeneration of the Yawal Division is extremely poor. A detail analysis of the same is given in chapter 4 . In order to tackle this situation, special steps need to be taken and among them is the carrying out of Aided Natural Regeneration in the coupes as prescribed in each working Circle.

12.5 : REGULATION AND MEASURES:

The biotic factors which have resulted in the degradation of the forests are excessive grazing, frequent, fires, illicit felling, overdependence on forest for fuel

wood and weed infestation. The illegal felling are often concentrated on the species most valued purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stage, are resistant ones that can withstand to grazing and fires. These species are often of low utility, the following factors are discussed individually and special steps to combat reduce the effect of each factor are required.

1) Grazing reduction: Grazing not only destroys the regeneration which is vital for forest health but it also cause compaction of the soil. The presence of grazing also bring with it many menaces like compaction with the wild animals for food, destruction of the cover of bird and pheasants, weeds dispersal, possible infection etc. Hence it is essential to contain grazing through.

- (i) Stall feeding.
- (ii) High milk yielding cows
- (iii) Discard unproductive cattle.

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 controlled grazing.

Closing of the area of nature Regeneration from grazing should be strictly followed. This is neglected part but with the compulsory Aided Nature Regeneration prescribed for post-harvest areas. DCF should take extra measures to ensure total closure of grazing.

2) Fire : A fire in the hot summer is very harmful as it kills the young seedling and coppice shoots of all major species and plantations. Fire hardy species such as Teak, Bhirra, Salai, Mowai, Palas escape slightly compared to other species. Severe fire cause considerable damage to the trees also by scorching their bases which ultimately leads to unsoundness and hollowness and renders them liable to attack by fungi and insects. Fire also indirectly cause soil erosion by destroying the soil cover as well as the organic matter. Scientific method for estimating loss due to forest fire needs to be evolved so that the frontline staff would take fire prevention more seriously.

(i) Firelines: The creation and maintenance of fire lines as traditionally done and described here in detail under Miscellaneous Regulation, should be carried out. However there is a need to improve its effectiveness and the DCF should look for ways and means to do so with necessary improvement and modifications.

(ii) Fire Blower: Fire blower are very effective for the clearing the litter from the ground and breaking the spread of fire. The use of these blowers has proven very effective in labour intensiveness of firefighting and in containing the damage from fire. The blower should also be used for maintaining the fire lines, as over time the other dry material falling on the fire line area makes the fire line ineffective.

(iii) Fire Alerts : Fire alerts are being sent to the concerned by the FSI Dehradun on registration. It shall be mandatory on the part of the DCF to register himself and the RFOs up to Beat guard for receiving these fire alerts from the FSI. Though there may be issues of positional accuracy, inability of detection of small fire and probability of false alarms, the systems will however keep the fighting machinery in alertness.

(iv) Cost estimation and reporting : The practice of fire reporting is very vague and reflects the lackadaisical approach to and indifference or the lack of knowledge on the harm of fire on the forests. No loss to government is to be done way with, considering the fact what fire does to regeneration, soil organism, water holding capacity, soil erosion, ground dwelling pheasants & small animal, no forest officer should say that there is no loss to the government.

(iv) Fire- Fighting squad: It is said that desperate times call for desperate measures. The critical condition of the forests of Yawal necessitates taking up radical steps to revitalize the forests. It is necessary for the DCF to erect fire watch towers and establish fire fighting squads to tackle fire menace in the Division whose duty shall be in line with the squads deployed in the wildlife areas. These squads shall be concentrated in areas where natural regeneration is being nurtured in the treated coupes and elsewhere in the Division. This measure is independent of the fire-watchers etc. that area engaged in plantation areas. The squads shall ensure that no fire incident occurs anywhere in the Division particularly in areas of NR.

(3) Aided Nature Regeneration : As it has been observed that there is hardly any regeneration in the forests of the Division, the norm of soil working in the forests of Yawal which provide for soil working on 400 seedling/ha in a coupe is being

modified. In the forests of Yawal Aided Natural Regeneration is a must and a provision for the same is given.

Hence, wherever NR is prescribed and the number of seedling/sapling being less than 400, the DCF should take up aided Natural Regeneration by planting miscellaneous species of associates of teak in teak areas and any miscellaneous species in non-teak areas. 625 seedling are prescribed to be raised by ANR in such areas. As the number of regeneration varies from 0 to 350 or more, the treatment should be such that total number of naturally occurring seedling and ANR seedling should be 625 in numbers. It shall be necessary to ensure that the soil working and mulching be carried out meticulously to ensure that whatever natural regeneration exists is nurtured properly.

This is an important step to help forest regain its health and vitality which has been under much stress from biotic interference and managerial neglect. Reference to the planning Department GR.No.2011/CNO.130/EGS-10A Dated 28.12.2011 for carrying out ANR in the forest areas may be made for preparing estimates.

(4) Illegal Felling :

Illicit cutting for wood including timber, poles and firewood is observed in the division. It is heavy areas adjoining to thickly populated towns and villages. Due to increase in the roads, the protection of forests has become more difficult. The demand for fuel wood has also increased tremendously, due to increase in population. Illicit cutting of fuel wood provides an easy employment to local villagers. All these factors have put tremendous pressure on the forests and have resulted in depletion of growing stock and deterioration of forest health and vitality. All efforts should be made to reduce illegal felling from the forests.

(5) Encroachment :

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 encroachment on forest lands done during the period from 01.04.1972 to 31.03.1978. This increased in 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. Encroachment anywhere irrespective of size should be removed as per law.

(6) Improvement in Diversity of forests:

To maintain the diversity of forest appropriate measures should be taken up. Teak wherever planted should be from certified seed and seedling of known source. As maximum area is under teak the gap planning in such areas should be done with miscellaneous species only.

(7) Diseases and pest :

As discussed in Hollowness, etc. the conservator of forest, working plan has initiated study on the hollowness and the same is given in detail in para 4.7.

Eutectonagrandis (Skeletenizer) and *Hylea peura* (Defoliator) are also commonly observed to affect the teak plants of the Division. Considering that most of the area is dominated by teak, it is necessary that the means of controlling these pests be done as mentioned above for hollowness..

General: Field staff should be made aware of the diseases and their remedial steps wherever possible. Any diseases or pest seem to have adverse impact on the forest, should be recorded and documented. Photograph of the pest, the affected tree/forest and other evidence should be kept. The sample of the pest (borer, Lepidoptera, fungus etc.) Should be collected and sent to institutions like BSI, FSI, ICFRE, etc. for further study and remedial step. The division should hold workshops to bring awareness among the staff on the importance and the means to maintain forest health and vitality.

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Chapter No :-13

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES.

13.1 : INTRODUCTION :This chapter on conservation and Maintenance of soil and water resource focuses on the need to put soil and water on an important pedestal as that which is given to wildlife and forests. In the Department, soil and water conservation need necessary be tagged to the other conservation measures like plantations works etc but needs to be recognized as an important independent activity. Soil and water are two important natural resources that support the existence of all the being including human and forests.

13.2 : GENERAL CONSTITUTION OF AREA:

soil and moisture is important in the area of whole division.

13.3 : GENERAL CHARACTERISTICS OF SOIL AND WATER RESOURCES IN YAWAL :

The National Bureau of soil survey and land use planning. ICAR and Dept of agriculture, GOM etc have published the soil Resource Atlas, Jalgaon District in 2005. The characteristics of the three talukas namely Yawal, Raver & Chopada are extracted from this Atlas and Discussed below. Yawal forest division comprises of three talukas namely Yawal, Raver & Chopada of Jalgaon District.

Soil Type : soils are varied in nature. Their extent and development depends on the environmental setting in which they have been evolved. The knowledge on the kinds of soil and their extent is very essential for sustainable land use planning. Soil resources inventory provide this kind of information, obtained through a systematic interpretation of satellite imageries, aerial photographs, field survey, laboratory characterization. During the systematic survey of three talukas i.e. Raver, Yawal & Chopada of Jalgaon District.

Soil Depth :- The soil depth is of vital important for plant growth as it provides foothold to plant to draw the required water and nutrients from underground sources. As such the greater soil depth normally results in better forest growth. It takes about 500-1000 years to develop an inch thick soil from the hard basement/rock due to different action & inter of various soil forming factor and processes. However a very little time is required to erode this soil if the canopy

protection is removed. The depth of soil, therefore depends on the climate, lands use land cover and condition responsible for management practices.

The distribution of soil in different depth classes of Raver, Yawal & Chopada taluka of the Jalgaon district is given below. Table No. 13.1 : The soil depth class

Depth Class	Depth (cm.)	Area	
		Ha.	(%) TGA*
Extremely shallow	< 10	61787.70	20.50
Very shallow	10-25	40086.20	13.30
Shallow	25.50	50333.80	16.70
Slightly deep	50-75	22002.20	7.30
Moderately deep	75-100	22605.0	7.50
Deep	100-150	72938.80	24.20
Very deep	>150	31108.30	10.32
Water bodies	--	538.00	0.18
Total		301400	-----

Soil Erosion

The soil have been grouped into different erosion classes, their areal extent and expected soil loss is given below.

Different erosion classes Table No.13.2

Erosion class	Area		Expected soil loss (tones ha./ yr)
	Ha	(%)TGA*	
Very slight	249134	82.66	Less than 5
Slight	38154	12.66	5-10
Moderate	12056	04.06	10-15
Severe	1518	0.51	15-20
Water bodies	538	0.01	--
Total	301400	----	---

*Total geographical area

Slope:

The slope can be defined as an element of the surface inclined to the horizon. A slope possesses a gradient, giving it a direction or orientation in space.

The gradient in the terrain is the result of several factors viz. relief, drainage, climate and geology operating in the area.

Class of Slope**Table No.13.3**

Class	Slope(%)	Area	
		(ha)	(%)TGA*
Very gently sloping	1-3	65969	21.82
Gently sloping	3-5	1031188	43.90
Moderately sloping	5-10	71846	23.80
Steeply sloping	>15	31859	10.46
Water bodies	--	538	0.02
Total		301400	----

***TGA:- Total geographical area**

It is seen that the area falling under forest are highly prone to erosion coming under severe category. The soil depth is very low and is seen to be in most places to be less than 10 centimeters. The slope in the forests areas is comparatively high than any area in three talukas namely Yawal, Raver & Chopada comprising Yawal forest division, which is seen from the slope map above showing areas to be > 15% slope. This makes soil and water conservation in the forest area very critical for the filtration of water, the prevention of siltation of dams, the longevity of the live streams, the supply of water, the survival of the dams and every aspect of water regime management.

13.4 : SPECIAL OBJECTIVES OF MANAGEMENT:

- * To protect, conserve and improve the forest land forming part of watershed for more efficient water retention and infiltration.
- * To protect and enhance the water resource originating from forest lands.
- * To check soil erosion and to reduce the effect of sediment yield on the watershed.
- * To rehabilitate the deteriorating lands.
- * To moderate the floods peaks at downstream areas.
- * To increase infiltration of rainwater.

- * To improve and increase the production of timbers, fodder and other forest resource.
- * To enhance the ground water recharge, wherever applicable.
- * Improvement and restoration of soil quality and thus, raising productivity rater.
- *Supply and securing of clean and sufficient drinking water for the population.
- * To minimize the risks of floods, droughts and landslides.

13.5 : ASSOCIATED REGULATIONS AND MEASURES:

There are always strong links between measures for soil conservation and measures for water conservation. Many measures are directed primarily to one or the other, but most contain an element of both. Reduction of surface run-off by structures or by changes in land management will also help to reduce erosion. Similarly, reducing erosion will usually involve preventing splash erosion, or formation of crusts, or breakdown of structure, all of which will increase infiltration, and so help the water conservation (FAO).

The soil and moisture conservation works would start along with the marking of coupe and be completed before the onset of monsoon. Wherever feasible, the local stones obtained from the forests including other material from climber cutting, bamboo cleaning and shrub clearance should be used for brushwood check dams to arrest the soil loss.

The major activities to be taken up under this chapter are 1) Treatment of areas near the water bodies 2) Soil Conservation as part of Coupe Work.

(1) Treatment of the Watershed Area

It is prescribed to follow watershed management approach viz. the ridge-to-valley approach for carrying out soil and moisture conservation works. The contour trenching and gully plugging/check dams, as given under, have been prescribed to constitute the major component of these works.

As per the information received from the Division, the following are the major dams that are in or in the vicinity the forest areas of the Yawal Forest Division.

**Major dams in or in the Vicinity of the Forest Areas (Raver, Chopada & Yawal Table
No.13.4**

Name of Dam	Type of the dam	Range	Storage capacity in TCM.	Actual area irrigated in ha..
Hatnur	Large	Raver, Yawal & Chopada	388.00	37838
Suki	Medium	Raver	50.16	5128
Ambhora	Medium	Raver	7.44	1115
Mor	Medium	Yawal	9.50	2055
Mangrul	Medium	Raver	8.98	1683
Gul	Medium	Chopada	23.25	3653
---	--	Total	467.33	51472

While working on soil and moisture conservation works, the vulnerability of the forest areas to erosion should be kept in mind. Reckless implementation of Soil and Moisture conservation structures in the past has sometimes resulted in more erosion in the slope areas, which should be avoided. Maps of the above water bodies along with the area adjoining to the forests are shown. These areas should be given priority for the treatment of soil & water conservation.

Soil Conservation as part of Coupe Work

(i) **Nala Bunding and Check Dam:** The primary objective of nala bunding and check dam is to reduce the run-off water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the nala bed or from the dug up soil. No blasting shall be done for this purpose. Where sufficient boulders are not available brushwood may be used. In this plan check dams of both the loose rubble for arresting silt and soil loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.

The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions, locally availability of suitable materials. However, to narrow the wide variations in implementation, the norms for gully plugging or nala bunding is proposed as 5 meter³ /hectare of loose rubble filling or earthwork unless otherwise prescribed in the specific scheme.

The streambeds more than 8 meters in width shall not be covered under the nala bunding . Nala is more than 8 meters in width at the top should normally require elaborate engineering structures for bunding, and therefore, such bunds should not

be considered as part of the quantity prescribed here. Each of such nalabundh, if required, should be treated as an independent project.

The forest tanks are proposed to be taken up in suitable sites without causing damage to the tree crop either during construction or due to submergence.

In the three talukas i.e. Yawal, Raver & Chopada comprising Yawal forest Division, there are 6 Projects have been constructed for the irrigation or other purposes. So maintenance of dams is very important. Most of the catchment areas of these dam covered by forest areas. In order to avoid siltation in the Dam, SMC work should be carried out in the catchment area to control the soil erosion, SMC structures like, Continuous Contour Trench (CCT), Loose Boulder Structure (LBS), Gabian Structure, Water Absorption Trench (WAT), Forest ponds, Wandona, Cement plug, Earthen Nala Bund etc. can be taken as per site specification.

Details of CCTmodels as given below:Table No.13.5

Sr.	Model no.	Slope %	Distance Between CCT	Length Ha.CCT	CCT Ha.	Excess water Drain out from CCT(gap)	Length of CCT including Gap (Mtr)	Unit of peaching sqmt	Gully plugging (Unit m3)	Seed Kg	Agave
1	5	0 to 4	10	--	1000	--	1000	--	20	10	1200
2	6	4 to 8	8	50	1179	3	1250	--	20	11.79	1400
3	7	8 to15	6	30	1514	3	1666	--	20	15.14	1700
4	8	15 to 33	4	20	2174	3	2500	--	20	21.74	2400

* **Source** As per Maharashtra Govt. Water conservation Department ,No- 2013/F.N. 114/Water-7,and Dt.10 October,2013

(iii) Forestry measures: Afforestation of eroded lands is best method of erosion control. The standing vegetation and dried leaves on the floor intercept the rain and reduce the impact of rain drops, thus averting the erosion process. Moreover, decomposition of fallen dead plant part i.e. leaves and twigs not only increase the fertility of the soil but also improve the soil structure, which resist the soil erosion. Therefore, areas as prescribed in the various Working Circle for raising plantations should be taken in right earnest.

(iv) Other Measures: These include:

(a) Gully control: To check the formation or widening of gullies by constructing bunds, dams, drains or diversions through which excess runoff water is channeled.

(b) Stream bank protection : To grow vegetation alongside the river bank, to construction drains, concrete or stone pitching etc. For checking the cutting and caving of river banks.

(v) Implementation of other schemes: Soil & moisture conservation work under Jalayukta Shivar and other scheme may be taken up in the division. The norms as given in the above CCT models above should be followed.

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Chapter No:-14

MANAGEMENT OF THE SPIRITUAL, CULTURAL ASPECT OF FORESTS AND ECOTOURISM

14.1 : INTRODUCTION: For the people of India, environmental conservation is not a new concept. Historically, the protection of nature and wildlife was an ardent article of faith, reflected in the daily lives of people, enshrined in myths, folklore, religion, arts, and culture. Some of the fundamental principles of ecology-the interrelationship and interdependence of all life-were conceptualized in the Indian ethos and reflected in the ancient scriptural text, the Isopanishad, over 2000 years ago. It says, This universe is the creation of the Supreme Power meant for the benefit of all his creation. Each individual life-forms must, therefore, learn to enjoy its benefits by forming a part of the system in close relation with other species. Let not anyone species encroach upon the other's rights.

14.2 : ECOTOURISM:

Much attention has been paid to the question of what constitutes ecotourism, and numerous concepts and definitions exist (Ballantine and Eagles 1994; Blarney 1995; Bottrill and Pearce 1995; Buckley 1994). The Ecotourism Society, based in the USA and the most international of the ecotourism organization, defines ecotourism as responsible travel to natural areas that conserves the environment and improves the welfare of local people. The Australian National Ecotourism Strategy defines ecotourism as a natural environment and is managed to be ecologically sustainable. Numerous other definitions exist around the world. The FAO uses a definition that is more general as "ecotourism is tourism and recreation that is both nature-based and sustainable". Tourism is also now a day, a recognized industry all over world.

Ecotourism is also recognized, as important industry, by UNWTO (United Nations World Tourism Organized). The World Tourism Day celebration started by UNWTO since 1980 to aware the people about significant role of tourism in social, economic and cultural values.

Ecotourism is now defined as 'responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves

interpretation and education ' (TIES, 2015). Education is meant to be inclusive of both staff and guest.

Principles of Ecotourism:

Ecotourism is about uniting conservation, communities, and sustainable travel. This means that those who implement, in and market ecotourism activities should adopt the following ecotourism principles:

- Minimize physical, social, behavioral, 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 to 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.

Ecotourism Policy:

- i) Ministry of Tourism, in Government of India has declared Eco-tourism in Indian Policy and guidelines, 1998. This policy has underlined the activities of tourism ought to be environment-friendly having no adverse impact on ecosystem.
- ii) The UNWTO came into force on 27 September 1970. To aware the people about the role and impact of tourism on society, the UNWTO started celebrating World Tourism Day on 27 September every year since 1980. Every year a theme is launched on the eve of World tourism Day by UNWTO. Ecotourism, Environment Protection, Climate change, Biodiversity, Community development became theme of World Tourism Day in the year 2002, 2008,2010 and 2014 respectively.
- iii) Government of Maharashtra, in Tourism and cultural affair vide Resolution No. MTC-2005/2/CR-172/ Tourism, Mumbai dated-2006, declared Tourism Policy-2006 having tourism vision 2025. This policy has identified Ecotourism sector, Infrastructure development, public-private partnership, capacity building & creating awareness etc. are highlights of this policy.

- iv) Govt. of Maharashtra in Revenue and forest Department vide Resolution No. WLP 1002/C.R.53/F-1, Mumbai dated 20.2.2008 has declared Eco-tourism Policy 2002. This policy illustrates the role of state holders, capacity building of state holders, Information, Education and communication, selection of eco-tourism centers and operationalization of it, formation of Maharashtra, Eco Tourism Promotion Board to promote ecotourism. This policy laid down principles of Eco tourism as below,
- * The Ecotourism 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.

- v) The Govt. 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 identification of various types of tourism etc. are important provisions in eco-tourism policy 2008.

14.3 : POTENTIAL ECO-TOURISM SITES IN YAWAL FOREST DIVISION.

Yawal Forest Division has its varied flora and fauna ranging from the grasslands the wetland to the thick forests and has quite few ecotourism sites of potential. They are not properly developed and require immediate attention.

The Division has identified the potential eco-tourism sites and the list is reproduced below.

- Yawal Wild Life Sanctuary.
- Pal Forest Park and Forest Guards Training School.

- Sukhi Dam.
- Manu Devi Mandir.
- Unap Dev Hot Water Spring.
- Nateshwar kamaljadevi tempal
- Mor Dam

Not much has been developed in these sites. Some of the sites are actually not in the forest area but are included as they can form a circuit that would be linked with the eco-tourism sites for better packages whenever these sites are developed with proper management plan.

The social aspect of forests in the context of ecotourism is very important as it provides the people with employment. The other important social contribution of ecotourism is the exposure to the other cultures and the chance to educate others about once own culture. It is generally observed that small projects in JFM villages and ecotourism sites not only provides employment to the youths but also gives a boost to their self-confidence.

The eco-sites identified also have lot of spiritual significance and religious sentiments attached to them.

It shall be the duty of the DCF to harness the spiritual and cultural sentiments of the people to woo them back to the traditional conservation values that every Indian is proud of.

Apart from keeping in mind the principles of eco-tourism the Division should take all care that the following area adhered to:

1. While developing above eco-tourism sites, it should be verified that the proposed activities must not attract nor violate provisions under Forest Conservation Act.1980
2. The Deputy Conservator of Forests shall prepare a Ecotourism Development Plan for the Division incorporating the above sites and any other potential sites.
3. Local people especially the JFM Committees and EDCs wherever are in existence, should be fully involved right from the planning stages.
4. Adequate training and capacity -building of the staff and locals should form part of the development plan.

5. 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 Do's and Don'ts for such tourism.
6. Any local traditional product crafts, food items / local cuisine cultural display etc. should be encouraged as part of the eco-tourism package.
7. The development of the eco-tourism 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 the interests of the forests and wildlife should be of prime importance. The different actors/stakeholders like the community visitors, businesses NGO's should no doubt be taken into consideration. A common phenomenon is that ecotourism can generate both symbiosis and conflict between conservation (e.g., natural areas) and development (e.g., businesses) has been widely touted but the potential for conflict should not be ignored.

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Chapter No :-15

FINANCIAL FORECAST

15.1 : INTRODUCATION: -There has been a steady increase in the funding to the Working Plan activities of the Forest Division in the past two years. This increase is a good sign and needs to be maintained. Looking into the prescriptions of the plan it is seen that the implementation of this plan will incur an average amount of Rs. 1022.38 lakh annually in the first three years and Rs.1241.43 Lakh annually for the next seven years that is from the fourth year onwards. The total expenditure will come to Rs. 11754.10 Lakh annually. The expenditure and revenue of the Division during the last ten years is given below:

Statement showing the Revenue, Expenditure & Surplus Table No.15.1

Year	Revenue Rs. in Lakhs	Expenditure Rs. In Lakhs			Total Expenditure in Lakhs.
		Non Plan	Plan	EGS	
2006-07	51.57	34.08	133.51	129.92	297.51
2007-08	73.30	105.98	131.91	8.38	246.27
2008-09	162.561	132.45	391.08	23.13	546.66
2009-10	182.146	159.35	462.39	17.41	639.95
2010-11	152.72	188.58	625.25	62.12	875.95
2011-12	125.184	214.74	874.40	25.62	1114.76
2012-13	107.50	327.53	748.53	39.51	1115.57
2013-14	58.85	288.37	619.20	42.74	950.31
2014-15	32.17	293.27	1153.77	42.36	1489.40
2015-16	47.10	390.08	1361.00	26.77	1777.85
Total	993.101	2134.43	6501.01	417.96	9053.43

Hidden among the cost is the Crop damage cost. In Yawal Division four cases damaging agriculture crop on 3 ha. was given compensation of Rs.40040/-. Similarly there were 99 cases of wildlife attacks on domestic animals and a compensation of Rs.7.42 Lakhs & Nine injuries of human beings due to wildlife compensating Rs. 9.00 Lakhs were given.

15.2 : SOURCE OF FUNDS FOR THE IMPLEMENTATION OF THE PLAN

The sources of funds during the last Plan were Plan Schemes, Non-Plan schemes, CAMPA, District Plan (DPDC), MNREGA, special Project Jalyukt Shivar, etc.

PLAN Funds: From the Plan expenditure statement, as provided by the DCF for the last 3 years average, the annual Plan funding is Rs.1044.65 lakh. Going by this average, the expenditure that would be required for the implementation of the Plan/Scheme needs to be enhanced.

NON PLAN : The amount received by the last three years under Non Plan averages approximately to Rs. 323.90 lakhs per year.

CAMPA: The CAMPA is an important source of funding. In the Yawal Division, the CAMPA fund between 2011-12 to 2013-14 was Rs. 5.00 lakhs. This can be increased for the core forestry operations for the implementation of the plan.

District plan: The District Plan funding for the up gradation of Nurseries, the development of Eco-Tourism sites, etc should be explored.

MNREGA: Labour intensive works that can be implemented through MNREGA should be thought of as a good source of funding. EGS, which is the original scheme started for employment guarantee as the first such scheme in the country by the Government of Maharashtra, should also be tapped into as done in the past.

NAP(FDA) : The National Afforestation Program implemented all over the country with emphasis on peoples participation should be made use of for the implementation of the Working Plan prescriptions.

Special Projects: State specific and District-specific projects like Jalyukt Shivar and others should be taken up for the implementation of the Plan. However, it should be noted that the implementation of such projects should be as per the Working Plan and not in conflict with it. A point to be noted is that sometimes the DCF taking the opportunity of the funds available, takes up work on coupes not due even though such work could be carried out on the due coupes. This should be avoided.

15.3 : BENEFIT COST RATIO:

The cost of implementing this Working Plan is expected to be more than the benefit. This is the B.C. ratio of only those parts of the tangible benefits that would be directly extracted as per the tables placed below.

As discussed under the Chapter 9 in Para 9.6 Forest Resource Accounting, if the value of the benefits of the Forest including tangible and intangible is taken into account, the amount that is being derived as benefit far outweighs and exceeds the little investment that will be put in. The value of the benefits derived from the Forests is around Rs. 554984 lakhs as per the current rate of NPV value for the Yawal Forest. As the NPV rate is taken for the benefits accruable over the period of 20 years the annual benefit comes to Rs. 277492 lakhs. This figure as per the new NPV rate proposed is Rs. 1177374.00 lakh but the annual period is variable for various forest types and situations. Hence it is difficult to find the annual benefits.

A. Regeneration

Natural Regeneration

Projection of Expenditure in various working circle Table No.15.2

Working Circles	Area in ha.	Workable area per year in ha.	Exp. (Rs. in lakhs)	No. of man days to be generated
Protection	28229.72	400.00	33.64	7800
Improvement	21530.845	400.00	33.64	7800
Total		800.00	67.28	15600

ABSTRACT (NR work) Table No.15.3

Year	Man days	Wages in Rs.	M.S. in Rs.	Labour welfare & contingency (7 %)	Total
First year operation	8.00	2720.00	453.00	190	3363.00
Second year operation	6.50	2210.00	257.00	154	2621.00
Third year operation	6.00	2040.00	245.00	142	2427.00
Total	19.50	6770.00	955.00	446	8411.00

ABSTRACT for Root stock and coppice shoot. Table No. 15.4

Year	Man days	Wages in Rs.	M.S. in Rs.	Labour welfare & contingency (7 %)	Total in Rs.
First year operation	11.50	3910.00	350.00	298	4558.00

Note :-

A. Natural Regeneration.

1. In case area contains less number of natural regeneration than required (6.25 sapling per ha.) of important species of height 60cm, then man days per sapling /rooted should be used to prepare the estimate.
2. Treatment map should be prepared by concerned RFOs & it should be verified by ACF.
3. Treatment maps should be prepared as per approved working plan & the same.
4. GPS reading of all the four corners of the coupe / site for natural regeneration / rooted shoot & coppice shoot management works should be taken and the same should be recorded in the plantation register.
5. Daily wage rate should be used as per scheme & actual site.

B. Artificial Regeneration.

Afforestation Working Circle

Projection of Expenditure for Afforestation working circle Table No.15.5

Working Circles	Area in ha.	Workable area per year in ha.	Exp. (Rs. in Lakh)	No. of man days to be generated
Afforestation W.C.	14302.494	350	11000.00	5.00 Lakh

Note:-

1. 1250 staggered trenches of the size (2 m x 0.60m x 0.30 m) are considered for planting 2500 plants per ha.

2. ABSTRACT (A R)Table No. 15.6

Year	Man days	Wages in Rs.	M.S. in Rs.	Labour welfare & contingency (7%)	Total in Rs.
PPO / PYO	432.30	146982	16025	10289	173296
FYO	301.84	102626	26556	7184	136366
SYO	115.63	39314	3559	2752	45625
TYO	78.35	26639	---	1865	28504
4 th year	38.50	13090	---	916	14006
5 th year	34.00	11560	---	809	12369
Total	1000	340000	46140	23815	410166

3. Rs. 340/- per man-days is considered.

4. 18.40 man-days per ha. for Gully plugging is considered.

C. Water holes

Wildlife Overlapping working Circle.Table No. 15.7

Working Circles	No. of water holes	Water holes Per year	Exp. (Rs. in lakhs)	No. of man days to be generated
Wildlife Overlapping W.C.	30	03	8.25	-----

Note :- Rs.2.75 Lakh per water hole is considered.

D. Boundary demarcation:- Projection of Expenditure for Boundary Demarcation

Table No. 15.8

Particulars of work	Quantum of work	Man days per unit	Rate	Exp. in lakhs
Fixing boundary pillars	590 km.	1	340	2.06
Preparation of pillars Class – I	1770 pillars	---	4100/ pillar	72.57
Preparation of pillars Class – II	4130 pillars	----	2500/ pillar	103.00
Total	-----	---	--	177.63

**Abstract of year wise Requirement of Funds for Implementation of Working Plan Table
No.15.9 (Rs. in Lakhs)**

Working Circle	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	
Protection	33.64	33.64	33.64	33.64	33.64	33.64	33.64	33.64	33.64	33.64	336.40
Improvement	33.64	33.64	33.64	33.64	33.64	33.64	33.64	33.64	33.64	33.64	336.40
Afforestation	606	1081	1138	1236	1285	1236	1187	1138	1089	1004	11000.00
Wildlife	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	82.50
Boundary demarcation per year Class-I pillars 177 & Class-II pillars 4133	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	178.00
Total	699.33	1174.33	1231.33	1329.33	1378.33	1329.33	1280.33	1231.33	1182.33	1097.33	11933.30

Total funds required for Ten years - Grand Total 11933.30 Lakh.

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Chapter No:-16

MISCELLANEOUS REGULATION

16.1 : BOUNDARY DEMARCATION:-

In order to keep the integrity of forest areas intact, strict vigilance over the forest boundary and periodic verification of the demarcation on the ground for the entire forest area has been prescribed. Areas which are un-demarcated should be attended on priority.

Objectives: 1. To Maintain territorial integrity of forest lands in the division by delineating their boundaries by permanent pillar marks to act as legal boundary marks.

2. To ensure effective protection of the forest resources of the entire division against adverse influences.

16.2 : PETTY FELLING AND EXTRACTION

Petty Felling and Extraction for research and training needs should be allowed. It is necessary to emphasize the fact that experimental, preservation and sample plot, seed stand and their demarcated surrounds, etc. are excluded from all operation prescribed in the working plan. Special grants in exceptional circumstances for maintenance of these may be allowed, which do not cause much deviation.

16.3 : RIGHTS AND CONCESSIONS

Parliament has enacted a law of the Panchayat (Extension to the Scheduled Areas) Act. No. 40 of 1996). The said Act provides for endowing by the State, the Panchayats in the Scheduled areas, with such power and authority as may be necessary to enable them to function as institution of self Govt. Further it provided the Gram Sabha specifically with the ownership and marketing of minor forest produce.

Govt. of Maharashtra has enacted a law, the "Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act.1997 and has also amended Maharashtra Minor Forest Produce (Regulation of Trade) Act. 1969 (Act.No.45 of 1997) vide which ownership of 33 MFP specified in the Scheduled, found in the Govt. land has been transferred to the Panchayats. The Honorable Governor of Maharashtra

had modified the existing Act and has given ownership of all MFP to Gram Sabha vide notification dated 19.08.2014.

Govt. of India vide enactment dated 2 December 2006, called The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006 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 and occupied forest land before the 13th of December, 2005.

There are no significant no. of people / community dependent on the forest produce. There are some Buruad families in the division whose livelihood depend on bamboo's by acquiring from nearby forest area and selling them at concessional rates.

There is no transhumant population of grazing community available in Yawal Forest division. However livelihood of local community depends upon forest for grazing of their cattle. They have cows, buffalos on large scale with some sheep and goats. The range wise grazing units have been formed. Every year the grazing passes are issued to local community people for grazing purpose.

16.4 : APPROACH TO THE FOREST DEMARCATION:

1. Well-defined forest boundary is a prerequisite for effective forest protection and its sustainable management. However, in some PF the forest boundary has not been demarcated as given by DCF in Appendix XX and this need to be carried out in the first 3 year of the implementation of the Plan. Forest areas vulnerable to boundary obliteration need to be identified for survey and demarcation so that forest encroachment on the forest fringes could be detected, promptly. Presence of boundary marks also serves as psychological barrier against the forest encroachment. Forest boundaries adjoining private land shall receive the highest priority to ensure protection of these areas.

2. Fixing Boundary of the Erstwhile forest villages.

16.4.1 : Boundary Demarcation :-Its is prescribed to work the entire boundary of Reserve Forest & Protected Forest in 5 years period. Details of the compartment boundary for the purpose are given in **Appendix No. III of Vol. II**

16.4.2 : Routine Boundary Maintenance:

1. The Beat Guard after his personal inspection of the entire compartment must submit the Compartment Inspection Certificates every month. The certificated must record forest encroachments, illicit cutting and condition of forest boundaries including pillar numbers and inter-pillar visibility conditions. Separate certificate should be submitted for each compartment.
2. The Round Officer should submit similar certificates for his inspections. Half of his certification should involve checking of the work done during the previous month by the Beat Guards in his jurisdictions, and the other half should involve checking of the compartments not reported by the Beat Guards during the months. He should also submit monthly report regarding the action taken on the forest offences recorded and the progress of forest enquiries entrusted to him.
3. The Range Forest Officer can allow the delay not exceeding 15 days for reasons recorded in writing. Default on this account for consecutive 2 months should be viewed as dereliction of duty and should attract disciplinary action.
4. The Range Forest Officer should check accuracy of the Compartment Inspection Certificates according to the prescribed norms covering each round. He should personally check in least 2 (two) vulnerable compartments other than those covered by the Beat Guards and the Foresters during the previous month.
5. The Range Forest Officer, Mobile Squad will co-ordinate cross-checking of Compartment Inspection Certificates.
6. These guidelines shall be applied along with other directives issued for the forest protection from time to time. Other field officers will carry out their field inspections according to these guidelines as modified from time to time. As per Maharashtra Forest Manual 2012, duties of forest Guard. Round Forest officers, Range Forest officer as well as ACFs shall be applied along with directives issued for the forest protection.

16.4.3 : Specification Of Boundary Pillars:

The prescribed design must be followed to carry out the task of fixing the boundary pillars as prescribed. According to provision contained in the BFM Vol. III, Chief Conservator of Forests is empowered to give sanction to the design of the pillars. However, may 2001 instructions referred to as above have given uniform

specification for this purpose. Accordingly 1.40-meter long cement concrete pillars at roughly 50 meters interval on the external forest boundaries will be erected. Wherever the external boundary is shared with other government land, the interval should be increased to 100-150 meters and intermediate pillars may be 0.90 meter long. Both types of pillars should be embedded to 0.40 meter depth in the cement-concrete base. The prescribed tapering cross-section of the 1.40 meter pillar is 0.10 x 0.15 meter at the top and 0.15 x 0.23 meter at the base. The 0.90- meter pillars are parallel pipe with 0.15 meter widths and thickness. As per review of forest staff work is very poor for cement concrete pillars. Most of the cement concrete pillars get broken for removal of steel bar by local people. Hence Protection for pillars becomes essential.

16.4.4: Specification Of A Boundary Cairns:

Artificial boundaries should be marked with a series of boundary Cairns. A Cairn should be made of loose stones upon excavated foundation to a depth of 30 (thirty) centimetres and shaped like a truncated cone. Interspaces between the large stones should be filled in with small stones, and the outer stones will be wedged with stone chips. A cairn will be 1.20 meter high, and have 1.20 meter top diameter and 1.80 meter base diameter, as described in the Central Province and Berar Forest Manual. A slab stone (0.20 x 0.20 x 0.90 meter) of a timber stake projecting 1/2 (half) meter in the centre will be fixed firmly on the top of the cairn, and marked with cairn serial number. Each boundary marks (cairns) must be visible from its neighbouring ones on both sides. Distance between two consecutive boundary marks should not exceed 250 meters. The cairn stone or post should be colour washed white for the open forests and red for the closed forests. The cairn tops should have direction of boundary lines shown by the same colour lines radiating from the centre. Such Cairns can be made of earthen mass, where stone boulders are not available.

16.4.5 : 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 the compelling reasons. Such reasons must be reduced in writing and entered as a note

on the master set of the maps. This master set will be made available to the Working Plan division for updating the working maps and the digital database with GPS reading. Also register for maintenance of boundary pillars be updated at range and division level.

16.4.6 : 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. Tress should not be felled for the boundary line, but shrubby undergrowth should be cleared. Norm for the external boundary line is 12 meters. The internal compartment boundary lines should be 3 meter wide.

16.4.7 : Comartment Plates:

Metal plates on the boundary trees at a height of 2.0 to 3.0 meters will be fixed on the corners and roughly at half-kilometre interval on the side away from the compartment. The colour of the plate and lettering should agree with the state- level general guidelines. Till such guidelines are available, red letters on white plates will be used. Size of the plate and letters should not be less than 15 cm and 10 cm, respectively. Strokes should be at least 2 cm wide.

16.4.8 : Colour Wash On The Boundary Marks:

The Beat Guard will be responsible for annual freshening of the pillar numbers, the compartment plates and the colour-wash of the boundary pillars carried out in September-October. He must submit details for work done in each compartment in his *Annual Colour- Wash Report*. The Round officer will carry out sample checking of the report in the manner decided by the Range Forest officer. Only material cost should be admissible for the purpose.

16.4.9 : Review And Monitoring Of Boundary Demarcation Works:

Continuous review and monitoring of boundary demarcation works is absolutely necessary to ensure time bound implementation. Dy. CF Yawal shall get the annual work plan for boundary demarcation prepared from RFOs, well in advance and make suitable budgetary provisions. He shall review the implementation of works every month and report the progress to CR, Working Plan on a quarterly basis. CCF (T), Yawal shall review the progress every quarter and instruct for course corrections.

16.5 : MANAGEMENT OF PRIVATE ACQUIRED FORESTS:

In yawal district, 249.12 ha of private acquired forest spread over 23 survey numbers of 7 villages is incharge of Forest Department. Boundaries of these areas are to be demarcated on priority within 3 years. Management prescriptions have been given to this area as per its present status.

16.5.1 : Demarcation, Preparation Of Treatment Map And Marking Of Coupe:

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 Certificated' in the prescribed format, given in the following paragraph, which is to be verified by the concerned Assistant Conservator of Forests.

2. Format for the Coupe Demarcation Certificate is prescribed, as follows, in Form No.19.1:

Form No. 15.1 | -----
--R.F.O. -----certify
that I have personally inspected the demarcation of the coupe No.-----
-----in Compartment No.-----of F.S.-----
----- of W.C.-----on dated-----
-----and found that the coupe has been demarcated as prescribed in
the working plan.The area of the coupe is-----
hectares.

Date:

Signature of the RFO

3.Demarcation Of Coupes : Annual coupes have been prescribed to be demarcated by cutting and clearing bushy undergrowth on 3 (three) meter wide line and by erecting pillars or posts up to 2 meter height in middle of the cut line at suitable intervals, so as one pillar shall be visible from the other one, except where the coupe boundary runs along streams, fire line or road. The pillars shall bear the

coupe number, name of the felling series and the working circle on the side away from the coupe.

4. Selected trees, above 45 cm gbh at suitable intervals standing on the periphery of the coupe will be given two coal tar bands and a geru band in between after scrapping the loose dead bark. The lower coal tar band will be at B.H. and other coal tar band will be 15cm above it. Just below the lower coal tar band Tree serial number in Arabic will be given on the side away from the area of the coupe. The bands and serial numbers of such trees will be maintained in the marking register in, the following, From No.19.2

List of trees on the coupe boundary

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 SCI Working Circle will normally be divided into four

approximately equal sections. Sections will be demarcated by 1.5 m. wide cut lines by clearing brushwood, unless the section line runs along a permanent feature.

7. Trees above 45cm girth, selected at suitable intervals on the inner edge of the 1.5m wide cleared section line will be given two coal tar bands 15cm apart, the lower coal tar band being at breast height. Just below the lower coal tar band section number will be given on the side away from the area they would denote.

8. Demarcation of Other Areas Given in the Treatment Map: The other categories of areas shown in the treatment map will be marked by giving one geru band at B.H. and one coal tar band 5cm above it.

9. Assessment of Natural Regeneration: At the time of survey and demarcation the staff should also assess the number of Natural Regeneration in the coupe. The actual number obtained by total count or sampling, will decide the number of ANR seedlings that would be required at the time of NR operation as part of the post-harvest works in the coming year. The details in para 15.21 (iii) (v) should be followed.

Treatment Map:

1. Immediately, after completion of demarcation of the coupe, Forester will prepare the Treatment map of the coupe under the close supervision of RFO by clearly showing the various Treatment-type areas as prescribed in the chapter 9. The concerned ACF will verify the

treatment map and make corrections, if necessary, before submission to the DCF Yawal for approval.

The treatment map will bear the date of preparation by the Range Forest Officer and verification by the Assistant Conservator of Forests.

2. 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.

16.6 : MARKING OF TREES FOR HARVESTING.

1. After approval of treatment map, marking of trees for harvesting shall be carried out as per prescriptions given in respective working circles. 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. Making is prescribed to be done by the forester concerned under the close supervision of RFO and constant guidance of ACF concerned. The DCF shall himself

inspect majority of coupes to ascertain proper marking as per prescriptions of working plan as well as to guard against the excessive marking. To ensure this close supervision, a marking certificate in following format is prescribed.

Form 15.3

I-----RFO,----- Personally inspected the marking of the coupe No.-----in compartment No.-----of felling series -----in-----Working circle-----on dt.----- and found that marking of trees for felling has been done as prescribed in the working plan.

Date :

Signature of the RFO

These certificates shall be regularly and frequently checked and verified by ACF as Well as Deputy Conservator of Forests.

3. Trees marked for felling will be given geru bands at breast height and will bear marking hammer impression at the B.H. (breast height) as well as at the base on the blazes of sixes 10cm X 10cm. The blaze size should be strictly adhered to so as to aid in identification of marked trees at the time of felling.

4. Following trees in addition will bear digit serial number both at B.H.(Breast Height) and at the base.

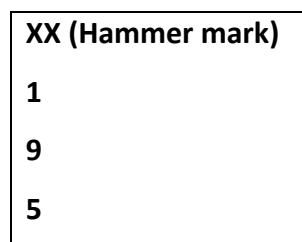
a) All trees of Teak, Bija, Shisham, Ain, Tiwas, Haldu, Kalam, Dhaora and other timber yielding trees of 45 cm and above, girth at b.h.(o.b.)

b) Trees of all other species, of and above, 60cm girth at b.h.

5. The remaining trees marked will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series.

6. The number of the tree marked shall be written vertically on the blaze, shown as under:

For Tree no.195



7. All trees bearing serial numbers will be individually recorded in marking (recording) book in, the following, Form No.19.3 Serial number given in coal tar must

be recorded in the marking book. Remarks column shall invariably mention about the deformities if any, such as Dead,

Top broken, Hollow, severe insect damage etc.

Form No.15.4 Format for Marking of Trees for Harvesting

Tree Digit No.	Serial No. Coal tar	Name of species	GBH (OB)	Remarks

8. Abstract of trees marked for felling will be made in 15 cm girth classes. Timber, poles and firewood trees will be shown, separately.

9. Malformed trees alone will be recorded as fuel trees, except that of teak. A tree will be classified as fuel tree only when it is incapable of yielding any useful sawn timber or pole.

16.7 : FOREST PROTECTION

16.7.1 : Status of forest offence cases : The Range Forest Officer, the Assistant Conservator of Forests and the Deputy Conservator of Forests will take review of forest offence cases at least once, every month. Shifting of boundary marks along the forest boundary shall be viewed seriously, and the adjoining landholders or encroachers would be charged in the court for omission or commission causing obliteration of the forest boundary. Charges regarding all cases of forest encroachments must be submitted before the Judicial Magistrates within 3 months. Similar time-bound action is recommended in all cases of timber theft. All cases of violation of the Forest (Conservation) Act, 1980 shall be dealt with timely and firmly.

16.7.2 : Routine monitoring : The Deputy Conservator of Forest shall personally carry out routine checking of the Range Offence Register and the Round Enquiry Reports in at least 4 Ranges every year. Similarly, the Chief Conservator of Forests shall check these records in at least one Range every year, and circulate the inspection report to all the Ranges.

16.7.3 : Regular training : The Deputy Conservator of Forests and the Assistant Conservator of Forests will periodically convene staff meeting to review and impart training for the boundary management and for effective disposal of offence cases.

16.7.4 : Awards and Rewards: Staff who has performed exemplarily in forest protection should be nominated for State and National awards.

16.7.5 : JFM activities : JFM activities open up communication channel, discourage forest offences and provide village bodies an opportunity for direct involvement in forest protection. Therefore, JFM activities should be encouraged, and taken advantage of as a workable strategy for effective forest protection.

16.7.6 : Fire Protection

Fire adversely affects natural regeneration, forest growth, ground flora, soil organisms and site productivity. Effective fire control as prescribed in the plan is essential for the forest development. The division officials and local people should be sensitised about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

Classification of fire control

Class-I (Complete Fire Protection) : The Class-I fire control areas include all felling coupes, thinning coupes (six years), plantation (five years), the A-type areas (permanent), forest depots (permanent), forest nurseries (permanent), Special Wild life habitat areas (permanent) and any other areas of special importance decided as such by the Chief Conservator of Forests (Territorial) **Yawal.**

Class- II (General Fire Protection): The Class-II fire control areas include the remaining areas of the Selection-Cum-Improvement Working Circle as well as any other areas, which deserve this protection in the opinion of the Chief Conservator of Forests (Territorial) **Yawal.**

Class- III (General Vigilance): The remaining forest areas (that is, areas not included in the above two classes) and G and FRM areas are identified as the Class-III fire control areas.

Any special measure for the fire protection is not undertaken, but deliberate setting of fire and burning the forest is prohibited.

Fire Control Measures :

1. A fire protection scheme for the entire division shall be prepared before February each year, identifying the watch points (including watch towers), strategic locations, strength of fire watchers at each location, deployment of vehicles, use of wireless sets, supervising of the forest staff and the co-ordination protocol.

2. Each location is proposed to have 5 to 10 persons (24 x7) including regular staff and fire watchers. The fire prevention should be treated as a high priority item. The scheme should be implemented sincerely during the fire season.
3. Areas deliberately burnt for silvicultural reasons under the sanction of the Chief Conservator of Forests (Territorial) ----- Fire in such areas need not be reported unless spreads beyond such area.
4. All the Class-I and Class-II areas will have external fire lines and internal fire lines division the forest area into convenient blocks. The Class II areas will also have cut and cleared Guide-lines.
5. Fire Watchers and local forest staff will constantly patrol the Class-I and Class-II fire control areas. The directives require that fire in the Class-I areas be reported to the Deputy Conservator of Forests, immediately, along with details of the area burnt and the damage inflicted on the forest corp.
6. The group of fire watchers shall immediately rush to the site and extinguish fire as soon the fire spot is located by upcoming smoke in their area of operation. Modern firefighting tools should be used for extinguishing the fire. The supervising officials should mobilize reinforcement in case of large fire. Utmost care will be taken to quench the smoldering material. Providing a thick layer of soil over such material is generally effective.
7. The fire lines will be kept clear of all growth and combustible material during the fire season. Leaf litter and other dry material on the fire lines will be collected periodically along the edge and burnt before the fire season starts.
8. The cutting of fire lines should be completed in December. Fire tracing (burning) should be completed in February, and thereafter should require permission of the Deputy Conservator of Forrest and physical presence of gazette officer.
9. The division officer shall maintain a Register of fire lines, and enter the period of cutting and burning of fire lines. The register will be kept up to date and checked every year, in March.
10. Standard widths of fire lines are prescribed in the Table 19.2. The supervising officer will decide the width unit for carrying out the fire line work on the shard boundary.
11. Establishment of 24*7 Control Room at Range and Division Office by pooling of resources in necessary to swiftly deploy the teams for dousing fires.

12. Fireline cutting and burning works are to be done with the close cooperation of JFMCs. This will instill a sense of direct responsibility on the JFMCs to protect forests from fire. This would act as a performance assessment tool for the department to assess the JFMCs. The funds for fire line cutting and burning shall be allotted by DCF to the JFMCs and the concerned RFO would get the works executed from them. This approach will bring a sense of ownership to the JFMCs.

Standard width of various types of fire lines Table No.16.1

Characteristics of the area	Width of fire line
External Reserved & Protected Forest Boundary	12 Meter
Naturally or artificially regenerated areas (For 5 Years)	6 Meter
Remaining coupe boundary	3 Meter
Both sides of roads and cart tracks passing through the forests	6 Meter
Timber, Bamboo and firewood depots	40 Meter

13. Negligence in the fire protection by the staff should be taken as dereliction of duties. The supervisory officers have been proposed to, extensively, verify the fire control measures.

14. Fire Blower: The Division has purchased 113 number of fire blowers for extinguishing fire. These blowers are very effective for the clearing the litter from the ground and breaking the spread of fire. The use of these blowers has proven very effective in reducing the labour intensiveness of firefighting and in containing the damage from fire. The blowers should also be used for maintaining the fire lines, as over time the litter and other dry material falling on the fire line area makes the fire line ineffective. The staff should be trained in the application of other modern fire-fighting tools also.

15. Fire Alerts: Fire alerts are being sent to the concerned by the FSI Dehra Dun on registration. It shall be mandatory on the part of the DCF to register himself and the RFOs up to the Beat guards for receiving these fire alerts from the FSI. Though, there may be issues of positional accuracy, inability of detection of small fires and

probability of false alarms, the system will however keep the fire fighting machinery in alertness.

16. Cost estimation and reporting: The practice of fire reporting is very vague and reflects the lackadaisical approach to and indifference or the lack of knowledge on the harm of fire on the forests. The oft-repeated repeating is Leaf, litter is burnt. No Loss on government is to be done away with. Considering the fact what fire does to regeneration, soil organisms, water holding capacity, soil erosion, ground dwelling pheasants & small animals, no forest officer should say that there is no loss the government.
17. Fire-fighting Squad: The critical condition of the forest of Yawal necessitates taking up radical steps to revitalize the forests. It is necessary for the DCF to erect fire watchtowers and establish fire-fighting squads to tackle fire menace in the Division whose duty shall be in line with be squads deployed in the wildlife areas. This is in line with what is given pts. 1,2,5,6 above but with a thrust on fire protection only. The squads shall ensure that no fire incident occurs anywhere in the Division particularly in areas of NR.

16.8 : ILLICIT CUTTING:

Illicit felling in the forest area is growing at alarming rate. Since the subject is dealt separately according to the series of directives for the purpose, recommendations of this plan are of a little consequence. However, faster communication including vehicle facilities, adequate defense capabilities, frequent training and establishment of forest stations at strategic places are recommended to control illicit felling and wildlife offences. Establishing intelligence network for the purpose is strongly recommended. The Secret Service Fund scheme instituted by the Govt. of Maharashtra should be used to control illicit tree fallings.

On addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should take up efficient wood utilization and energy efficient alternatives like smokeless chulhas, biogas, LPG connections, Solar cookers, etc.

16.9 : FOREST ENCROACHMENT

The cause of forest encroachment should be examined thoroughly and addressed in a comprehensive manner. All the necessary support should be provided, and encroachment should be evicted as early as feasible. The boundary management and standard administrative guidelines will help contain encroachment.

The forest areas under encroachment from 1978 onwards are 268.120 Ha. The efforts undertaken by the division lead to eviction of encroachment in 2.71 ha. The Balance area under encroachment after 1978 onwards is 266.41 Ha. (Appendix LVII). Renewed and concerted efforts on the part of division staff for eviction of encroachment are proposed on priority basis.

Small isolated patches of the forestland and often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.

16.10 : SOIL AND MOISTURE CONSERVATION:

The areas adjoining the human habitations, especially, the Protected Forest have become devoid of vegetation by way of illicit cutting, heavy grazing and repeated fires. The compaction of soil reduces percolation of water and the water holding capacity of the soil. Due to these factors, NR of teak and its associates die back before being established as part of future crop.

The soil and moisture conservation is crucial to maintain and improve the site conditions as well as water regime of a given tract. Moreover, extensive sivicultural works have been prescribed in the working plan to regenerate the forests primarily assisting and tending the existing NR and the available rootstock. To ensure the success of this operation in improving the forests, soil and moisture conservation works are of utmost importance.

The soil and moisture conservation works would start along with the marking of coupe and be completed before the onset of monsoon. Wherever feasible, the local material obtained from climber cutting, bamboo cleaning and shrub clearance should be used for brushwood check dams to arrest the soil loss.

It is prescribed to follow watershed management approach viz. the ridge-to-valley approach for carrying out soil and moisture conservation works. The contour

trenching and gully plugging/check dams, as given under, have been prescribed to constitute the major component of these works.

A large proportion of area is adjoining to various protected areas. Hence, deep CCTs should be avoided to avoid damage to wildlife.

Nala Bunding and Check Dams : The primary objective of nala bunding and check dams is to reduce the run off water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the nala bed or from the dug up soil. No blasting shall be done for this purpose. Where sufficient boulders are not available brushwood may be used. In this plan check dams of both the loose rubble for arresting silt and soil loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.

The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions, and local availability of suitable materials. However, to narrow the wide variations in implementation, the norm for gully plugging or nala bunding is proposed as 5 meter³ / hectare of loose rubble filling or earthwork unless otherwise prescribed in the specific scheme.

The streambeds more than 8 meters in width shall not be covered under the nala bunding. Nalas more than 8 meter wide at the top should normally require elaborate engineering structures for bunding, and therefore, such bunds should not be considered as part of the quantity prescribed here. Each of such nala bunds, if required, should be treated as an independence project.

The forest tanks are proposed to be taken up in suitable sites without causing damage to the tree crop either during construction or due to submergence.

16.11 : REGENERATION

Plantations should be taken up on selective basis and only in the areas having good soil depth and which are well drained. Also the areas selected should have no or negligible grazing pressure. If the area was already planted and resulted in failure, the cause of failure shall be examined and only after eliminating such causal factors, the area be taken up for raising new plantations with the prior approval of CCF(T), Yawal. B2 type areas in the various working circles. i.e the under-stocked areas with scanty natural regeneration are prescribed to be considered but such areas should

specifically be put to above tests before taking up plantation there. In the rest of the under-stocked areas, attempts will be made to encourage natural regenerations.

Broad criteria for regeneration in general have been developed in the foregoing paragraphs.

JFMCs should be involved in all types of Afforestation activities.

Tending of Natural Regeneration : Wherever Natural Regeneration exists, it will be given preference to artificial regeneration. It is necessary to encourage natural regeneration considering the existence of sufficient rootstock in majority of areas and successful experience in its management in the past. Natural regeneration is proposed to be achieved in two ways;

i) Identifying seedling and saplings (those having attained a height of 60 cm. and occurring roughly at a spacing of 5 m, that is about 400 seedlings per ha.) of valuable species. Growth of these seedlings/ saplings shall be encouraged by way of weeding, singling, soil working and mulching in the same way as in case of plantations.

ii) The areas devoid of seedling/saplings of seed origin but containing sufficient rootstock shall be tended (stool dressing, singling, removal of congestion etc.) in favour of valuable species. While doing so, the species, which are less in number in stocking (as indicated by enumeration results) shall however be given preference.

iii) As has been observed that there is hardly any regeneration in the forest of the Division, the norm of soil working in the forests of Yawal which provides for soil working on 400 seedlings/ha in a coupe is being modified. In the forests of Yawal,

Aided Natural Regeneration is a must.

iv) Hence, wherever NR is prescribed (B1 or D areas) and the number of seedling/saplings being less than 400, the DCF should take up Aided Natural Regeneration by planting miscellaneous species in non-teak areas. As the number of natural regeneration seedlings/saplings varies from 0 to 350 or more, the treatment should be such that the total number of naturally occurring seedlings and ANR seedlings should be 625 in numbers. It shall be necessary to ensure that the soil working and mulching be carried out meticulously to ensure that whatever natural regeneration exists is nurtured properly.

v) This is an important step to help the forest regain its health and vitality which has been under much stress from biotic interference and managerial neglect. Reference to the Planning Department GR No. 2011/CNO.130/EGS-10A DATED 28.12.2011 for carrying out ANR in the forest areas may be made for preparing estimates. A model estimate of 100 NR Seedlings and 525 ANR seedlings is attached in the Plan as Appendix No. LXXIX A in order to project cost calculation but actual estimate should be as per actual field condition decided after due survey and evaluation.

Artificial Plantation: Only the areas neither having sufficient seedlings/saplings of seed origin nor sufficient root stock but are found to be suitable for plantation of suitable species shall be covered under the plantation programme. As far as possible, tall seedlings are to be used in plantations.

Choice of species in artificial regeneration: Naturally occurring local species will be preferred for the plantations.

Roads, Cart Tracks and Culverts:

The forest areas of the division have a good network of roads and cart tracks. The Public Works Department of the state government or the Zilla Parishad maintains large number of roads passing through the forest area. Some stretches have been permanently transferred to the Department. The division is proposed to compile a comprehensive record for all roads passing through the forest area and the roads transferred to the division for maintenance, on priority basis.

The extent of forestry operations and gravity of forest protection concerns should determine the priority for maintenance of the forest roads.

Unwarranted up-gradation of the forest roads should be discouraged, but required culverts may be constructed in stretches useful for the forest protection. In no case, provisions of Forest Conservation Act, 1980 be violated.

Irregular Harvesting:

Restriction on irregular harvesting: irregular harvesting of timber, firewood and other NWFPs is prohibited, except in the following cases:

Felling for the haulage roads: The Deputy Conservator of Forests 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.

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 purpose 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 Deputy Conservator of Forests may permit felling of trees on forestland diverted for the non-forestry purposes as approved under the provisions of the Forest (Conservation) Act, 1980. The material obtained from such harvesting will be brought to the depots and will be disposed as per departmental procedures.

16.12 : MAINTENANCE OF THE FOREST LAND RECORDS:

Maintenance of the land records and forest maps: The forestland records and the forest maps will be brought up to date, and maintained as such. A certificate to this effect will be recorded annually in the Form No 1- Register during the month of June.

Reconciliation of the revenue records: The revenue records will be reconciled on the basis of the forest notifications. The Collector and the Deputy Conservator of Forests will jointly ensure that the Revenue Records are brought up to date according to the forest notifications. Since the Divisional Commissioner issues the forest notifications, there is no apparent need to issue separate orders for the mutation entries. The Revenue Department will provide a certified copy of the Records of Rights to the Yawal 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 Yawal Division. The Collector and the Deputy Conservator of Forests shall send the details of all grants or occupancy rights issued since 1980 to the Nodal Officer at Yawal.

Management of Preservation Plots/Research Plots:

The Preservation Plots / Research Plots which are in existence are to be maintained as per the objectives of the ongoing studies and should not be interfered with during regular coupe working.

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Chapter No :-17

SCIENCE AND RESEARCH

During the process of writing of this Plan the following papers, articles, reports and documents were referred and used for the writing of the Plan.

Table No.17.1 list of papers, articles, reposts and documents

Sr. No.	Department	Subject
1	FSI (Forest Survey of India) i) SFR 2005 ii)SFR 2009 iii) SFR 2015 iv) Carbon Statistics of India	1) The condition of the forests & forest cover over the last decade during the implementation of the plan based on the FSI satellite data. 2) The Plantation Tree outside forest for the State of Maharashtra (SFR 2015) Carbon & Forest Eco-system Methodology for the assessment of Forest Carbon, accounting of Forest Carbon Stock.
2	Indian Institute of Forest Management, Bhopal (IIFM)	Net Present Value.
3	Ground Water Survey & Development Agency (GSDA)	1) Assessment of Dynamic Ground Water Resources of the Maharashtra & aquifer parameters. 2) Taluka wise Ground Water Resources in Jalgaon District.
4	Control Ground Water Board (CGWB)	Water level data with the long term trend (2001 to 2010 Ground Water Recharge, Ground Water Development.
5	IUCN red list. Org	IUCN Status of animals.
6	Maharashtra AAR 2015	Scheme under the 12 th Five Year Plan.
7	Social Forestry Jalgoan	Information regarding Tree Cover outside forest area.
8	Supreme Court Orders	Hon'ble supreme Court order in writ petition (202 of 1995) dated 12/9/2000 in interlocutory application No.424
9	National Bureau of Soil Survey & Land use Planning (NBLSS)	1) Soil Erosion classes & their areal extent & expected Soil Loss.2 2))Slope, Soil erosion, soil texture maps.
10	Twelfth Five year Plan document under Environment, Forestry & Wildlife 209	Five year Plan Target & Goals.
11	Geological Survey of India (GSI)	Rock Formation in Jalgaon District.

12	ACF, Silvicultural Scientist, Jalna	Information regarding preservation plot in Yawal Division
13	Maharashtra Remote Sensing Application Centre (MRSAC)	Village boundary & Survey no. data of Jalgoan district.
14	An Account of preservation plots in Central India by B.N.Gupta & N.G. Totey,	Information on the Preservation plots in Maharashtra
15	Tropical Forest Research Institute, Jabalpur. Designing rural Technology Delivery Systems for mitigating agricultural distress:	Area of wastelands, crop pattern etc. and soil and moisture conservation related information.

17.1 : RESEARCH GAPS:

Because of the lack of any research works/paper related to the Division, the many chapters that involve specific information on Yawal Forest Division could not be written with accurate data. The research gap is in almost every aspect of the Working Plan as our writing of the Plans in early years has not looked into the new aspects that the need of our present times require, like Biodiversity and all its components, Climate change and Carbon sequestration\NTFP research, ITK, Trees outside forests, Social and cultural aspects of forests, Ecosystem services etc.

17.2: BIODIVERSITY:

Apart from a few mammals, trees and a few major herbs and shrubs, the Department does not have record of the whole gamut of biodiversity of the divisions. IN this Plan, information were taken from different sources for Birds, reptiles etc.

In highlighting the above, it is clear that a Biodiversity Assessment study is very much required for the documentation of the richness of our forests. This is also a prescription for the Biodiversity WC.

17.3 : CARBON SEQUESTRATION :

Carbon sequestration is an important aspect of the contribution of forest towards Climate Change. However, since we do not have base data, it would be difficult to monitor the increase/decrease in sequestration levels. Also, the methodology for the assessment of the different pools of Carbon should be very clear to the SOFR units so that information will be more accurate.

17.4 : NTFP RESEARCH:

NTFP is integral to the health and productivity of the forests. Though we have data on the major NTFP tree species and few prominent medicinal plants, It is known that the people around forests use many more variety of species than we ever know. The list is appended in Introduction part of the Plan and the number of species used is far more that earlier known. There is need for research to be done for the documentation of all the species that are being used by the people and also to devise the best methods for the harvest of the species through experimentation.

17.5 : PRESERVATION PLOTS:

The following are the excerpts from the paper an account of Preservation Plots in Central India by BN Gupta and NG Totey, Indian Forester, 1994 relevant for the subject in discussion.

Introduction:

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 IIIrd All India Silvicultural Conference (Anon, 1929), 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 aerial types was generated (Anon., 1939). In 1961 during the Xth all India Silvicultural Conference emphasis was laid for 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 forest (Stable sub-climax stages) and climax forests.

Preservation Plots in Maharashtra

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. Out of these, 48-50% plots fall in dry deciduous forest, 30 % in moist deciduous forest and about 20-22% in subtropical hill forests. There are 36 forest types as per Champion and Seth (1968) in Maharashtra spread over 44044 km² (Anon. 1991) but preservation plots have been identified only 5-8 types like 3B/C1, 3B/C2, 5A/C1, 5A/C3, 8A/C2 etc. The remaining forest types though important from the point of view of biodiversity are not covered.

Table No.17.2 : Forest types of Yawal Forest Division

Type	Notation	Type description
Sub-group I. Climax types	5A	Southern Tropical Dry Deciduous Forests.
	5A/ci	Dry teak bearing forests
	5A/cia	Very dry teak forests
	5A/cib	Dry teak forests
	5A/c ₃	Southern dry mixed deciduous forests
II. General Edaphic types	5/E-2	Boswellia forests
	5/E-5	Butea forests
III. Degradation stages	5/D S1	Dry deciduous scrub,
IV. General serial type	5/ISI	Dry tropical river rain forest

While as per the above research document and account of preservation plots in Central India by BN Gupta and NG Totey, In Indian Forester, 1994, the preservation Plots are found to have been established in the Sub- group 5-A Southern tropical Dry deciduous forest.

There is need to have such plots also in the rest of the Forest types found in Yawal Division namely, 5/E-2 Boswellia forests, 5/E-5 Butea forests ,5/D S1- Dry deciduous scrub and 5/ISI-Dry tropical River rain forest. The work for the identification, plots size, demarcation and data collection should be done with the help and collaboration with the silviculturist, Pune and his subordinate office at Jalna.

- 1) The DCF Yawal should survey the area of the Division and identify the area under the above forest types namely, 5/E-2Boswellia forests, 5/E-5 Butea forests, 5/D S1-Dry deciduous scrub and 5/ISI-dry tropical riverrain forest.
- 2) In India, it is recorded that the size of the Preservation plot varies from 0.1 ha to 4000 ha. The DCF shall lay plots of the size of not less than 4.0 ha and to a maximum, of 20 ha. for each of the forest types mentioned above.
- 3) 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.
- 4) These plots shall be protected from all human interference including harvesting operations, if prescribed in the Plan. Activities shall be limited to those that would ensure protection and maintenance.
- 5) 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)
- 6) The forest shall also be described in a proper manner as to its species composition, forest storeys, condition of the crop, health and vitality, presence of pests etc.
- 7) The shrubs and herbs present in the Plot should be well-documented. This shall include the lower life- forms.
- 8) The fauna available in the area should also be surveyed and documented.

Sample Plots

For the preparation of this Working Plan a total of 1296 sample plots were laid and the relevant detailed information was recorded. These are distributed in different Working Circles under different ranges and are well-distributed throughout the division. A total of 50 number of representative plots were chosen taking 10 from each Working Circle and the details are shown below:

Selection of Plots: As the forests of Yawal is of one single forest type of sub-group 5-A Southern Tropical Dry Deciduous forests, with a sprinkling of other types, the major variation in the forest is not in the type of the forests but in the attributes (like density, composition age distribution etc.) within the type. As the Working Circles were identified based on these attributes, each Working Circle stands as

representative of the density and composition of the forest, hence the choice of 10 sample plots from each Working Circle. Secondly, the ten sample plots chosen are the most representative for each of the Working circle in terms of species distribution, age density and other factors.

Regeneration Plots:

Selection of Plots: The Sample Plots have been surveyed as per the New Working Plan Code 2014 and have in them the four numbers of 3 x 3 m sub-plots recorded for the regeneration too. These plots will also be the plots where regeneration will also be studied. 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 removed.
- The monitoring should be done periodically, the period of which should be decided in consultation with the SOFR unit and the Research wing.
- The role of mycorrhiza and litter cover management should be considered.

The aim of the monitoring of the regeneration is to find out under what conditions the regeneration of a particular species comes up best and under what conditions they grow best. In knowing these, the next step would be to create those conditions that are most suitable for the regeneration of the forests.

NTFP Plots

As stated elsewhere in the Plan, the forest of Yawal have been worked for over hundred years under selective preference to Teak through the Coppice with Reserves and coppice with Standards. The presence of teak is overwhelming as also mentioned by the FSI report.

As such, the richness in non-timber species in general and NTFP species in particular is not very encouraging. Due to the overabundance of teak and the impact of fire over the years, the ground vegetation is also very poor in most areas. Under these circumstances, the yield of NTFP is negligible.

There is identified Medicinal Plant Conservation Area in the Division of Yawal

as below. Table No. 17.3

Range	Compartment No.	Medicinal Plants
Karjana	220, 221, 219, 218, 217, 216, 170, 172, 186, 207, 208, 199, 200, 201, 187, 203, 204, 205, 196, 197, 193, 194, 195, 188, 189, 202, 198, 209, 210, 211, 213, 212, 214, 215, 185	Moha, Awala, Behada, Bahawa, Hirda, Bija, Charoli, Bel, Murudsheng, and Palas etc.
Raver	19, 21, 11, 12, 13, 16, 15, 17, 14, 18, 27, 55, 59, 56, 57, 58, 60, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 25, 26, 30, 24, 31, Gt.No. 297, 20, 23	As above and Neem, Dhavada, Khair, Maharukh, Shatavari, Chinch etc.
Range	Compartment No.	Medicinal Plants
Deoziri	171, 169, 168, 166, 167, 165, 173, 164, 177, 162, 163, 175, 176, 183, 184, 179, 161, 178, 180, 181, 182, 190, 191, 192, 155, 156, 291a, 291b, 291c, 291d, 291e, 291g, 154, 157, 158, 152, 153, 159, 160	As above
Yawal East.	33, 37, 42, 34, 35, 36, 43, 44, 45, 46, 47, 68, 69, 67, 71, 72, 73, 74, 75, 76, 77, 78, Gt.No. 289g, 289f., 79, 80, 289h, 81, 82, 289a, 289b, 289c, 289d, 289e, 86, 87, 88, 83, 84, 94, 85,	As above
Yawal West.	96, 97, 98pt., 99pt., 100, 101, 103, 104, 92, 93, 89, 90, 91, 289i, 290d, 140, 141, 290a, 290b, 290c, 142, 143, 144, 105, 106, 145, 107pt., 108, 146, 147, 149, 151.	As above and Gulvel
Vaijapur	238, 248, 241, 242, 243, 244, 245, 246, 247, 248, 251pt., 251pt. 258pt., 249, 250, 252, 253, 229, 235, 228, 236, 237, 233, 234, 239, 227, 291h, 223, 225, 226, 224, 232, 222, 230, 231,	As above
Chopada	285, 286, 287, 292a, 292c, 284, 260, 292b, 258pt, 259, 261, 282, 283, 263, 281, 265, 280, 262, 264, 268, 270, 278, 279, 266, 267, 276, 277, 275, 274, 273, 271, 272, 254, 256, 255, 269, 257	As above

Some of the medicinal plant species found in this plot are: *Cassia fistula*, *phyllanthus emblica*, *Aegle marmelos*, *Terminalia arjuna*, *Acacia nilotica*, *Semecarpus anacardium*, *Tamarindus indica*, *Anogeissus latifolia*, *Terminalia Chebula*, *Eugenia jambolana*, *Acasica catechu*, *Sterculia urnes*, *Madhuca indica*, *Azadirachta indica*, *Gmelina arborea*, *Moringa citrifolia*, *Wrightia tinctoria*, *Vitex negundo* etc.

Information available from the DCF Yawal, the process of documentation is going on and until such documentation and assessment of the medicinal plants is complete, it would not be wise to carry out any kind of experimentation. It may be worthwhile to mention the FAO website document (<http://www.fao.org/docrep/ARTICLE/WFC/XII/0100-A1.HTML>) dealing with medicinal plants that mention specifically about the harvest of medicinal plants thus:

The vital traditions of sustainability have been ingrained into societies through their emphasis in rituals and their mention in ancient scriptures. For example in Charak-sahita, one of the most important Ayurvedic texts of India, it has been mentioned that the branches and leaves of medicinal plants should be collected in rainy and spring seasons, roots in summer or late winter when the leaves have fallen down of fully matured, barks, tubers and latex in autumn, heartwood in early winter and flowers and fruits according to their season (Sharma, 1994). Further regarding the harvesting of Madana (*Randia dumetorum*) fruits, its has been mentioned.

“These should be collected during the period of transition between spring and summer in pusya, aswini or mrgasivas constellation and maitra muhurta. Those which are unripe, undamaged, non-green, pale colour, free from organisms, undecomposed, uneaten by animals, not too small (immature should be) taken”

(Charak Sahita: Kalpsthnam, I.13)

In Fact the sustainable harvesting practices do not require any sophisticated or special efforts. Only awareness and certain precaution are required. A few examples may bring out the Point-

When the roots of Satavari (*Asparagus racemosus*) are dug out, the big and small roots are separated. The bigger roots are washed with water, dried and

stored. The smaller roots are separated along with the disc and stored in sand in a cool place without washing. These very roots are used as planting material for the next season.

During harvesting of Safed musali (*Chlorophytum borivillianum*) one or two roots along with the disc are left in the soil. They lie dormant and sprout in the next rainy season, thus naturally propagating itself.

The roots of Nagarmotha (*Cyperus rotundus*) are dug out in Oct. Jan. But if only the black roots are taken out and the unripe red roots are allowed to remain in the soil, they sprout again in the next rainy season to produce another plant, thus ensuring sustainability.

In agreement with the above opinion, it is felt that no unnecessary harvesting experimentation may be required.

Data to be collected: The Completion of the documentation and assessment of the medicinal plants in the MPCA area is the first and foremost priority.

Only after the completion of the above, the following experiment may be carried out in the area inside the MPCA.

- Permanent plots of suitable sizes may be laid for development of safe harvesting protocol and the optimum limit of the harvest should be standardized for assured regeneration of the species. The following harvesting regimes may be experimented to work out safe harvesting limit.
 - 50 % harvest of the marketable parts (by leaving 50 % of the whole number)
 - 25% harvest of the marketable parts (by leaving 75 % of the whole number)
- The plots should be laid in triplicate.
- The plots so treated shall be visited after a gap of one year to enumerate the number of new recruits and the effect of above removal shall be calculated using standard mathematical formulae.
- The above experiment shall be done through the Management Committee of the MPCA.

Other Research And Experimental Plot

It is necessary to emphasize the fact that experimental and sample plots and their demarcated surrounds are under the complete control of the Silviculturist and are thus excluded from all operations prescribed in the Working Plan.

Research division, Jalna, has established seed orchard plots at Pal Range of Yawal Forest Division. Anjan plot was established in the year 1997-98 and another plot of Charoli, Moha and Arjun was established in the year 2000-01 in compartment no 55 and a teak seed orchard in compartment no 241. (Source DFO, Silviculture Division, Jalna).

Improved nurseries are already being established throughout the state. It may be mentioned that as of the time of writing of this Plan the poly bags are being replaced with root trainers in almost all nurseries. Also Mist chambers, polyhouse, shade nets, compost sheds, vermicompost and other facilities are either established or being established. In the Division, there is a need to institutionalize the creation and maintenance of such nurseries as incidences have happened when relapses to the old technique for the sake of convenience or lack of maintenance.

In order to generate superior quality seeds/ seedlings and planting stock, the Division should also ensure the use of certified source and from known source from known source from the forest Department.

Chapter No :-18

SUMMARY OF PRESCRIPTIONS

18.1 : INTRODUCTION:

The Yawal Working Plan covers the Reserved, Protected and Un-classed Forests (Non-Forest Areas) in the Chopada, Yawal and Raver talukas of Jalgaon District. The area is situated between 21⁰-03'-28" and 21⁰-24'-53" north latitude and 75⁰-00'-31" and 76⁰-09'-33" east longitude(lat-long extracted from GIS)

The state boundary of Madhya Pradesh constitutes the northern and eastern boundary. Tapi river forms the Southern boundary. Aner river constitute the Western boundary.

Forests of Yawal division are under scientific management since 1901 when the first working plan of Osmaston's was implemented. This Plan replaces the working plan written by Mr. Vasudevan, Mr. T.S.K.Reddy & Mr. Tiwari. For administrative convenience the ranges, rounds and beats were reorganized in year 2006 and the entire division has been divided in to 7 Ranges,24 Rounds and 107 Beats.

Table No.18.1

Name of Range	Legal status wise area (Ha)			Total Forest area.
	Reserved Forest area	PF	Unclassed forest	
Raver	14041.10	0.00	20.34	14066.48
Yawal (East)	13973.67	122.37	0	14096.04
Yawal (West)	13433.22	27.85	5.14	13466.21
Deoziri	9512.51	85.42	0	9597.93
Karjana	9917.01	77.62	0	9994.63
Vaijapur	10192.65	8.40	0.00	10201.05
Chopada	10738.83	37.97	0.00	10776.80
Total	81808.99	359.63	25.48	82194.10

18.2 : DISTRIBUTION OF AREA TO VARIOUS WORKING CIRCLES: The Allocation of forest areas under various working circles of the proposed working plan is as under.

Area Allocation to Different Working Circle. Table No.18.2

Name of Working Circle	Area Allocated (Ha.)
Protection Working Circle	
Improvement Working Circle	
Afforestation Working Circle	
Miscelinous Area management	18131.05
Non-timber Forest Produce (Overlapping) Working Circle	Entire Area
Bamboo (Overlapping) Working Circle	4880.48
Joint Forest Management (Overlapping) Working Circle	49037.00
Wild life (Overlapping) Working Circle.	Entire Area

The Working Circle wise summary of prescriptions:

I. PROTECTION WORKING CIRCLE:

Coupe Demarcation & Treatment Map:

1. Demarcation and marking: One year in advance
2. Treatment Map to be prepared as prescribed.
3. A Type: Protection area (A1 : Steep slopes, A2:20 M wide strips along stream, A3: excessively erosion prone areas)
4. B-type : Under stocked and Blank areas (density <0.4)
 - a. B1-Area with rootstock and NR,
 - b.B2- Area without NR
- 5.C-type: Pole crop and plantations
6. D-type: Well stocked areas (density>0.4)

Marking:

1. A type area: Only dead trees will be marked for felling provided their removal will not cause soil erosion.
2. B type: Dead and diseased trees, live high stumps.
3. C type: Thinning marking.
4. D type:
 - a. Dead & malformed trees, live high stump are to be marked.
 - b. Tending operations

Silvicultural system:

1. Hygienic operations (removal of dead, malformed, live high stumps) will improve the existing crop.

Regeneration:**1. Natural Regeneration:**

- a. NR of seed of origin of valuable species to be preferred and managed through cultural operations in D areas and B1 areas.
- b. Strict protection form fire and grazing.
- c. Tending of natural regeneration of valuable species B Type area.

2. Artificial Regeneration: Only in B type area if site is suitable.

3. SMC Works:

- a. Gully plugging and other SMC works, as described in the chapter of Miscellaneous Regulations shall be taken up in the A3 type area.
- b. SMC works will be along with marking operation and completed before on set of monsoon.
- c. SMC Work to be based on the requirement of site.

4. Subsidiary Operation:

- a. CBO Works: Subsequent year of main felling
- b. CBO Works like cutting left over marked trees, removal of damaged trees, singling of multiple coppices shoots, etc
- c. 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 as per Hon. SC orders.
- d. Cleaning operations: 6th Year.

II. IMPROVEMENT WORKING CIRCLE:**Coupe Demarcation & Treatment Map:**

1. Demarcation and marking: one year in advance
2. Treatment Map to be prepared
3. A type: Protection area (A1: Steep sloper, A2:20 M wide strips along streams, A3: excessively erosion prone areas)
4. B-type: Under stocked area (density <0.4)
5. C-type: Congested pole crop
6. D-type:Well stocked areas (density>

Marking

1. A type area: No marking
2. B-type: All dead trees live high stumps
3. C-type: The congested pole crop shall be marked for thinning.
4. D-type: All fruit bearing species shall be reserved.

All dead & malformed trees retaining 2 trees per ha. And all live high stumps shall be marked for felling. Matured trees that have developed hollowness and show visual sign of decay will be marked for felling.

Silvicultural System:

1. Hygienic operation of improvement felling.
2. Adequate growing space is provided to trees of valuable species.
3. The improvement felling supplemented by tending of naturally generated crop & root stock will aid in transition of middle aged stem to maturity.
4. The species whose population in the stand dynamics is less than 1% shall be retained till they reached the rotation age.

Regeneration:

1. Natural regeneration: NR of seed origin of valuable species to be preferred and managed through cultural operations.
2. Artificial Regeneration: Only in B type area if site is suitable.
3. Strict protection from fire and grazing.
4. Tending operation for Natural regeneration in the D type area & Root stock management in the B type shall be taken up.

SMC Works

SMC works, as described in the chapter of Miscellaneous Regulations are prescribed in A & B type area.

Subsidiary Operations:

1. Cleaning Operations: 6th Year
2. Thinning is proposed to be carried out in the patches of Dense pole crop By maintaining average spacing of one third of the crop height.

III. AFFORESTATION WORKING CIRCLE:

This working circle covers all the blank areas of Protection, Improvement and Anjan working circle.

Method Of Treatment

1. Dressing of all illicitly cut trees and cutting of all dead, dying and malformed trees except retaining 2 dead trees per hectare should be done.
2. The undesirable under growth, preventing growth of natural regeneration of desired species will be removed.
 3. Under stocked and blank forest areas where slopes are $<25^{\circ}$ should be treated by intensive soil and moisture conservation works like gully plugging, nala bunding, nala rejuvenation, Loose Boulder Structures. CCT and Deep CCT works are recommended on areas with gentle slope as this will provide barrier to soil erosion.
 4. Seed sowing of Neem , Khair, Moha, and other local species should be done in bushes as per site suitability before the onset of Monsoon
 5. Plantations of locally found suitable species including 10 % Bamboo, 20% MFP and medicinal plants should be done.

Regeneration:

1. Natural regeneration : All seedlings and saplings of valuable species more than 1 meter height will be nursed as future crop
2. Strict protection form fire and grazing.

SMC Works:

Soil & Moisture conservation works to prevent soil erosion siltation.

IV . BAMBOO (OVERLAPPING) WORKING CIRCLE.

This is an overlapping working circle. It covers most of the Bamboo bearing areas. The Bamboo species occurring in the areas is Manvel (Dendrocalamus strictus). In the forests of Deoziri, Karjana and some area of Yawal West ranges, good growth of bamboo is seen confined to slopes, and along the banks of the water courses. In most of the areas, low quality bamboos are found.

Treatment Proposed :-

- All successful and partly successful bamboo plantations should be included in this working circle

- As in most of the bamboo area, the growth of bamboo is poor, soil working in trench of 0.60 mt x 0.30 mt size in 3 to 4 mt diameter around clumps should be done to enhance the growth.
- All other area having good bamboo crop but which were not included in current working plan shall be included in this working circle.
- Tending operations are proposed in this working circle.
- Bamboo plantation on suitable areas be under taken.

V. JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE:

Prescription:

1. JFM Micro plans are to be dovetailed with broad prescriptions of approved working plan.
2. Maintenance of forest boundary, removal of encroachments, control over illicit cutting, illegal grazing, fire and wildlife offences shall receive priority apart from regularly undertaken works such as SMC P1 & antation.
3. Transparency in program has to be ensured through transparent payment mechanisms.
4. Villages which have not received funds should also be accorded importance.

VI. NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE.

Prescription:

1. Documentation of NTFP collection.
2. JFMCs to be actively involved in NTFP collection and processing.
3. Scientific method for Gum tapping as per rules suggested by FRI to be used.
4. Regular trainings for JFMCs to be conducted for capacity building in NTFP collection and processing.

VII. MISCELLANEOUS REGULATION:

1. Boundary demarcation of all un demarcated areas (Entire Zudpi jungle are, Acquired private Forest & Non Forest land taken over for C.A) to be accomplished in first three years of the plan.
2. Boundary pillar which is not easily vulnerable to damage.
3. Three years Survey and Demarcation Program.
4. Boundary demarcation is necessary due to honeycombing.

5. Updating of areas registers
6. Where claims are finally rejected, removal of such encroachments.

VIII. WILDLIFE MANAGEMENT(OVERLAPPING) WORKING CIRCLE

This working circle extends over entire area of Yawal Division and it exist in Reddy's plan and it is retained with following suggestions

1. Wildlife rich area in the division should be identified and focus should be given on this area.
2. for many migratory birds. Many wildlife and nature lovers, teachers, students visit this area. Nature interpretation centre shall be constructed here.
3. Manudevi in Yawal West range are very rich in flora and fauna and home
4. for many migratory birds. Many wildlife and nature lovers, teachers, students visit this area. Nature interpretation centre shall be constructed here.
5. Special protection measures like protection from fire, grazing, destruction of habitat should be taken in wildlife rich area.
6. Teak plantations in Compt 166 near Pati camp area of Deoziri range was
7. The home of rare **forest owl**. The last sighting was in year 2004. Due to destruction of forest and specifically that to teak plantations, after 2004, no sighting of this bird is noticed. Search of this rare bird should be taken with the help of wildlife conservationist. Habitat rejuvenation and improvement works should be taken. No felling should be done in this area.
8. Works of water hole, check dam, nala rejuvenation shall be taken at
9. suitable places
10. At the border area of Yawal sanctuary, fodder development scheme, solar bore well should be taken.
11. Man animal conflicts related to Bear, Monkey are noticed. Training should be given to forest staff for handling the mob and rescuing the animals. Awareness camps like celebration of wildlife week, trekking, and bird identification camps should be organized.

Prescription:

1. Standing Order of PCCF (WL) to be scrupulously implemented.
2. Habited improvement works like waterhole development, meadow

- development to be taken up in suitable areas.
3. Creation of database w.r.t. riparian zones, natural wallows, resting places etc. to be created.
 4. Vaccination of livestock to be monitored.
 5. Intelligence gathering to check wildlife trade.
 6. Secret service fund to be effectively used.
 7. Regular Sensitization of staff.
 8. During marking, at least 2 dead trees per has is to be kept as snags.
 9. No fruit tree to be marked.
 10. Tendu Phadis /labour camps should not be close to waterholes.
 11. Compensation as per Govt. Orders to be dispersed immediately and transparently.
 12. Effective control on forest fires.
 13. Eco- development works to be started either through EDCs of JFMCs in wildlife rich areas.
 14. Massive awareness creation in village communities, schools, colleges, civil society, public representatives etc.

IX . MISCELLANEOUS AREA MANAGEMENT

The total part of 155 compart-ments admeasuring 18131.05 ha. area is included in this working circle. Out of the part of 155 compartments, part of 52 compartments admeasuring 976.46 ha., area is diverted for various non-forestry purposes. While part of the 152 compartment admeasuring 17154.59 ha., is encroached under FRA-2006. However, the status of the area remains as Reserved Forest.

Prescriptions for management of forest areas on which the forest rights are recognized :

1. Boundary Demarcation :- The forest areas on which the individual forest rights are recognized 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 a year from the date of commencement of this Working Plan. The progress of boundary demarcation works shall be monitored on a monthly basis by the DCF and on a Quarterly basis by the CCF. The GPS co-ordinates 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.

2. Updation of Area Registers :- The Divisional Area Register (Form No.1) shall contain the area vested with rights under FRA in the remarks column against each Compartment / Survey No./Gat No.

3. Awareness creation:- Among FRA beneficiaries about the responsibilities of forest and wildlife conservation will aid in the long run to prevent further encroachments.

4. Conversions of various Govt. schemes :- In the FRA Rules 2012, there is a provision to keep the holders of forest rights through convergence of various Govt. schemes relating to Agro-forestry, 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.

Suggestive steps for the increase of Forestry / Agro Forestry.

- a) Afforestation on these lands acquired under FRA should be planned by FRA beneficiaries.
- b) Drawing up appropriate time specification plan inessential, which will require the involvement of the Social Forestry Department and the Agriculture Departmental with the Forest Department.
- c) Farmers must be encouraged and motivated by way of providing the technical assistance and co-operation by forest department and SFD for taking up plantations.
- d) Land laws, if any, should be so modified wherever necessary to facilitate and motivate individuals to undertake tree planting and grow fodder plants, grasses and MFP on their land acquired under FRA.
- e) Appropriate regulations governing the felling of trees on private holding should be appropriately relaxed.

- f) High quality planting stock including clonally planting stock supported with improved silvicultural management practices can be used in respect of tree crops for timber fuel-wood & fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality improvements.
- g) People's support in forest conservation is to be recognized by the state forest department. Appropriate extension program measure to 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 Centers must be established to guide agri-silvicultural and silvicultural techniques to ensure optimum use of their land and water resources.
- h) The wood-based industries have important role to play in development of agro-forestry. They should consider making appropriate arrangements with farmers, play a facilitative role in arranging quality-planting material, and enter into buy back arrangements.
- i) Preferred Tree and bamboo species under agro forestry by farmers and not naturally available in neighboring forests may be exempted from the transit permit and felling regulations.

5. Rejection of encroachment :- 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. **Cases under FRA having possession upto Dec. 2005 should be regularized and cases after that should not be regularized at any cost.**

6. Preparing & implementing conservation & management plan for community :- As per Rule 4(e), the Gram Sabha is duty bound to constitute Committees for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the Act. Similarly, as per Rule-4 (f), such Committee shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest

resources and integrate such plan with the micro plans or working plans or management plans of the forest department. Therefore, the territorial officers shall examine such Conservation and Management Plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of the approved working plan.

X. Eco tourism.

The following sites have been identified and listed below that have great potential and resourceful to make ecotourism a success in Yawal Forest Division.

- Yawal Wild Life Sanctuary.
- Pal Forest Park and Forest Guards Training School.
- Sukhi Dam.
- Manu Devi Mandir.
- Unap Dev Hot Water Spring.
- Nateshwar kamaljadevi tempal
- Mor Dam

Following works and activities will be taken

- All Forest parks will be completely fenced with chain link fencing
- Emphasis will be given on creating wood lots of medicinal plants, forest tree fruit garden, creeper garden, hedge garden, bamboo plantation etc
- Nature and cultural interpretation/ awareness centre will be created. These should be fully utilized and should be open for the public
- Audio-visual aids and equipments shall be provided.
- Improvement in eco-tourism infrastructure such as internal roads, view points, regulation of entry/exit at gates shall be done.

XI. BIODIVERSITY CONSERVATION.

The area of this forest division is situated in biodiversity rich part of Maharashtra. Extreme seasonal variation, diverse topographical characters, undulating areas with many rich valleys and table lands watered by annual and perennial streams, in the catchment of Tapi river & its tributaries like Gul, Mor rivers creates diverse habitat with flora and fauna. Therefore different kinds of plants animals, harbor in these division.

Prescription for the maintenance & Enhancement of Biodiversity.

(i) Sustainable harvesting of Medicinal Plants should be strictly adhered to. As the division already has the list of local medicinal practitioners (LMP) and the species used by them, it shall be the duty of the Division to chalk out the ways and means of sustainable harvest, with or without the consultation with the LMPs, at its own discretion.

(ii) Sensitization of the Staff of Yawal division to the issues of biodiversity is of utmost importance. The Division shall involve such experts and institutions in consultation with the Maharashtra Biodiversity Board, Nagpur for such trainings and workshops. Our tendency to limit our management practice to only teak and prominent wildlife species should be done away with.

(iii) The field functionaries of Yawal forest division shall identify areas of significant biodiversity value and take lead in in-situ conservation and Ex-situ conservation.

(iv) Identification of area of birds presence in the Division is a must. It is known to be rich in avi-fauna and needs to be studied for further protection. It should be the endeavor of the Division to explore potential sites/ areas that would qualify as IBAs.

(v) Identification and documentations of local practices, indigenous technical knowledge and other ethno-biological should be carried by the department.

(vi) Identification and Conservation of rare/ endangered indigenous species of plants in the division.

(vii) All efforts should be made to control fire and grazing in the forests as these are among the biggest enemies of biodiversity.

(viii) As per biodiversity Act 2002, Biodiversity Management Committee through the gram panchyat as per the norms decided by the Government needs to be established in all the JFMos villages. The local guard should provide all help and co-operation to the gram sabha for the establishment of the works as and when required.

(ix) Capacity building for local communities, forest personnel at all levels; elected representatives, decision makers, and bureaucrats needs to include the provision of technical skills.

(x) All JFM Committees should have Public Biodiversity Registers as part of the many records to be kept. Members from the State Biodiversity Board should be consulted

for the same. Necessary Workshops, training etc required for this should be carried out.

(xi) The forest division in consultation with the local Colleges, anthropological/Social science institutions and the Maharashtra State Biodiversity Board should carry out Biodiversity studies on the lesser known lower life forms of the flora and fauna. It may be seen that as the forest department has concentrated its working in the higher life form of trees and mammals/birds other species have been relegated to oblivion.

- Documentation and studies of herbaceous plants
- Documentation and studies on the fungi, ferns, algae and Lichen and moss (If any).
- Carry out entomological studies (Particularly butterflies)
- Carry out herpetological studies.

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Chapter No:-19

TREE COVER OUTSIDE FOREST AREA

19.1 : INTRODUCTION:

This Chapter deals with the important aspect of tree presence and its contribution for tree cover of the District and forest Division of Yawal.

Trees outside the forest are defined by default, as all trees excluded from the definition of forest and other wooded lands. Trees outside the forest are located on “other lands” mostly on farm lands, community lands, land along the roads, river, railway line, canal and built-up areas, both in rural and urban areas. A large number of TOF consist of planted or domesticated trees. TOF include trees in agro forestry systems, orchards and small woodlots. They may grow in meadows, pastoral areas and on farms, or along rivers, canals and roadsides or in towns, gardens and parks. Some of the land use systems include all cropping and shifting cultivation, permanent tree cover crops (e.g. coffee, cocoa), windbreaks, hedgerows, home gardens and fruit-tree plantations .

The Tree Outside Forest (TOF)/ Plantation for State of Maharashtra, according to the State of Forest Report 2015, is 1,232.17 sq. kms. This area adds 2.38% to the tree cover of the State, However no specific figure for the Jalgoan District is available. The trees outside forest in the State of Maharashtra has not been assessed yet as per the requirement of the Code and as carried out by the Forest Survey on India.

The total geographical area of the Yawal division comprising of three talukas i.e. Raver, Yawal & Chopada is 3014 sq. km. Out of which 997.00 sq.km. is forest. The total forest cover works out to be just about 34% of the total geographical area.

As noted in the para 2.7 in Par I, the 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 born fruits in many ways. The SFD has been carrying out plantations in the private areas since 1982 in the District which include block

plantations, agricultural bund planting and road-side plantations which form a substantial quantity and forest cover in the areas outside forest.

As per its assessment of the above period 1982-2007, out of the planted area of 1298 ha there were 2596 beneficiaries. The Number of seedlings planted was 25.33 lakhs. Out of these, the findings are that 6.49 lakhs trees were found have survived/ are standing. These trees are adding valuable tree cover to the District.

Between 2005 to 2017, the Social Forestry Yawal Division carried out block plantation planted 64 ha. area. The total number of seedlings planted were 60000 of which the total number of seedling surviving at the time of handing over the scheme was 27000. During the period the Road-side Plantation of a length planted of 124 km. With 49600 planted seedling was carried out. Out of which the total of 34720 seedlings survived at the time of handling over the scheme. Hence, the total No. of plants at the time of handling over the scheme is 61720. The assessment of the survival as on date is required to be carried out. The above information has been extracted from the booklet prepared by the Jalgaon Social forestry Division where year-wise, scheme-wise and species planted are given. The same is too bulky to be appended.

The Trees Outside Forests need to be assessed by the Social Forestry Division of the District. With the present data already available with the Division, a precise number of trees and forest over present in the areas outside forest can be arrived at. There is a need to design a model for the survey of trees outside forest at the state level so that a realistic figure of the TOF could be arrived at.

The Forest Survey of India, Ministry of Environment and Forest has come up with the field manual on assessment of trees outside forest (urban) which may be taken as a guide for the assessment of the TOF in the urban areas of the District.

19.2 : AGRO FORESTRY

Agro forestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboo, 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 dynamic, ecologically 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 smallholder farmers and other rural people because it can enhance their food supply, income and health. Agroforestry systems are multifunctional systems that can provide a wide range of economic, socio-cultural, and environmental benefits.

There are three main types of agroforestry systems:

Agrisilvicultural systems are a combination of crops and trees, such as alley cropping or homegardens.

Silvi-pastoral systems combine forestry and grazing of domesticated animals on pastures, rangelands or on-farm.

The three elements, namely trees, animals and crops, can be integrated in what are called **agro silvi-pastoral** systems and are illustrated by home-gardens involving animals as well as scattered trees on croplands used for grazing after harvests.

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

Availability of Land for agro-forestry:

Table No. 19.1 Change in Land-use Pattern in three talukas comprising Yawal Forest Division. (1990-95 to 2005-10)

Taluka	Year	T.G.A.	A.U.F.	A.N.A.F.	O.U.L.E.	F.L.	N.S.A
Chopada	1990-95	115400	19629	2912	2192	5104	65131
	2005-10	115400	19629	2805	2192	4510	62064
Yawal	1990-95	95000	35163	4308	2666	1192	57146
	2005-10	95000	35163	929	7182	510	62216
Raver	1990-95	91000	45000	4397	5246	1683	64260
	2005-10	91000	45000	3790	1881	820	63763

Note :-

- **T.G.A.** - **Total Geographical area**
- **A.U.F.** - **Area under forest**
- **A.N.A.F.** - **Area not available for cultivation**
- **O.U.L.F.** - **Other uncultivable land excluding fallow land.**
- **F.A.** - **Fallow Land**
- **N.S.A.** - **Net sown area.**

The above table gives a picture of what area is under fallow (both current and other fallows), area which is very much needed figure for assessing the possible expansion and scope of forestry and agroforestry.

Not only is agroforestry possible in the area sown but the area under current fallow and other fallow which is about 5840 ha. is a potential area for agroforestry under its different types namely, Agrisilvicultural, Silvipastoral and Agrosilvipastoral.

The areas not available for cultivation, Fallow land & uncultivable land excluding fallow land is another opportunity that is open for the creation of forest crops that would benefit the local people and ease the pressure on the forests. As envisaged by the National Forest Policy, it is important that the wastelands in any part of the country and in this District should not remain but be transformed into productive lands by way of forestry and agroforestry.

The Social Forestry Department of the State and the Department of Agriculture/Horticulture in collaboration with the Forest Department should work towards the possibility of bringing this area under some form of forestry and agro forestry.

Plantation on Non Forest Government Land :- Such areas should be identified and Plantation of suitable local species along with species of commercial importance should be planted with help of community participation. Suitable silviculturable and management practices must be applied for getting good output. Peoples participation is necessary for getting good results.

Roadside/Canal-side Plantations:

With the adoption of the Bihar Model of Roadside Plantation, it is seen that the burden of the **SFD** staff in taking up such plantation has reduced and that the

success of the plantation is also excellent. This rate of plantation could be increased covering more sites and taking up more such plantations in the future.

Other Models and Plantation:

The following types of Agroforestry possibilities should also be explored as per the site conditions and the requirement of the people.

- a. Boundary/Bunds Plantation: Trees on boundary + crops
- b. Block plantation: Trees + Crops
- c. Energy plantation : Trees + crops during initial year
- d. Alley cropping: Shrubs + crops
- e. Agrihorticulture: Fruit trees + crops
- f. Agrihortisilviculture : Trees + fruit trees + crops
- g. Hortipasture : Fruit trees + pasture/animals
- h. Shelterbelts : Trees + /- crops
- i. Windbreaks : Trees + /-crops
- j. Homesteads: Multiple combination of trees, fruit trees etc.

Suggestive Steps for the Increase of Agroforestry

(a) As per the table above, the identification of the fallow lands, culturable and unculturable wasteland Range/Taluka-wise in agricultural land which is available for taking up afforestation should be done at the District level.

The area under community land should be given priority for plantations.

(b) Drawing up appropriate time specific action plan is essential, which will require the involvement of the Social Forestry Department and the Agriculture Department along with the Forest Department

(c) Farmers must be encouraged and motivated by way providing them technical assistance and cooperation by forest department and SFD for taking up planting trees

(d) 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.

(e) Wherever possible, degraded lands should be made available for this 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 holding should be appropriately relaxed.

(f) High quality planting stock including clonal planting stock supported with improved silvicultural management practice can usher in a second green revolution in India this time in respect of tree crops for timber and fuel-wood / fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality improvements.

(g) Peoples support in forest conservation is to be recognized by the state forest departments. Appropriate extension program are to 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 to ensure optimum use of their land and water resources.

(h) The wood based industries have important role to play in 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.

(i) Preferred Tree and bamboo species under agro forestry by farmers and not naturally available in neighboring forests may be exempted from the transit permit and felling regulations.

(j) The possibility of a Public-Private Partnership in regenerating the culturable wasteland and barren unculturable wastelands of about 260 sq.kms. should be explored. This can also be explored for raising the improved planting material for supply to the farmers.

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Chapter No:-20

CONTROL AND RECORDS

20.1 : CONTROL AND RECORDS:

The following records will be maintained in the Yawal Forest Division office:

- i. Control Forms.
- ii. Compartment History.
- iii. Plantation Registers.
- iv. Nursery Register
- v. Divisional Notebook
- vi. Boundary Registers

Control Forms: All control forms and Compartment histories shall be maintained as per the formats prescribed in **Appendix No. IV of Vol II.**

The records of all harvesting, subsidiary cultural operations, regeneration works and soil and moisture conservation works carried out as per this working plan prescriptions, will be maintained in the control forms. The prescribed proforma of the control forms have been given in the Volume II of Appendix- -----

Two sets of control forms will be prepared. One set will be kept in the division office and the other set will be submitted to the Deputy Conservator of Forest, working Plan, Dhule. The forms will be sent annually by the Deputy Conservator of Forest Yawal Division to the Deputy Conservator of Forest, working Plan, Dhule not later than October, 1st every year taking the necessary entries. All entries showing the deviations from the prescriptions will be underlined in red color. The Deputy Conservator of Forest, working Plan, Dhule will scrutinize it and process further.

20.2 : COMPARTMENT HISTORY:

Compartment histories i.e. the records of various forestry activities and observations made in the past year will be maintained in Forms prescribed in **Appendix V of Vol. II**

Each Compartment must have a separate file its records. Compartment history must be maintained in the office of Yawal forest division since they keep the record of past management practices and their effects on the growing stocks.

Every year, in July, the range Forest Officer should fill in the necessary information and will send it to Dy. C.F Yawal forest Division for scrutinizing, editing through ACF in charge, who after doing so will get them typed and sign them. One copy of the forms will be sent to Deputy Conservator of Forest, working Plan, Dhule for scrutiny.

20.3 : PLANTATION AND NURSERY REGISTERS: Plantation registers & Nursery registers will be maintained for tall the areas regenerated artificially as per established departmental procedures.

20.4 : DIVISIONAL NOTE BOOK: At divisional level, all important matters will be recorded by the DCF Yawal division every year with his explicit opinions about the working plan operations. A brief note about the plantation will also be recorded by the DCF under appropriate heads.

20.5 : FIRE RECORDS: They should be maintained as per the latest orders from State Government from time to time.

20.6 : OTHER RECORDS: List of amendments to working plan and list of area changes will be maintained in prescribed forms.

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