सत्यमेव जयते

GOVERNMENT OF MAHARASHTRA

WORKING PLAN
for
AKOLA FOREST DIVISION
AMRAVATI CIRCLE

For The Period
2021-22 to 2030-31

VOLUME – I
(Part –I & II)

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PREFACE

This Working Plan of Akola Forest Division replaces the Working Plan of Shri. G.R.K. Rao, IFS for the period 2009-10 to 2018-2019. The PWPRof Akola Forest Division was presented by Shri.S.B. Valvi, IFS, DCF,AkolaDivisionand then was approved by the State Consultative Committee on 21/08/2018.On the basis of the recommendations made by the State Consultative Committee,the Draft Working Plan of AkolaForest Division has been prepared by Shri G.R.Madhavaraj,IFS, DCF Working Plan, Amravati.

The DWPR for Akola was submitted by Shri G. R. Madhavaraj, IFS,DCF Working Plan, Amravati in front of Standing Consultative Committee held in Nagpur on 25/03/2021 & 26/03/2021.The queries raised by the committee has been compiled and sent to CF, Working Plan, Nagpur for further necessary action.The DWPR of Akolahas been approved,subject to conditions by Regional office,Nagpuron 31/12/2021.

As the Working Plan is to be approved as per the New Code of 2014, many chapters like Maintenance of Forest Health and Vitality, Maintenance of Soil and Water Resources, Trees Outside Forests and other chapters were added to the Part II of the Plan as per the requirement of the Code. This was made known at the time of presentation before the SCC by the undersigned.

Enumeration of forest crop was done by the SoFR unit, Amravati. The analysis of the tree enumeration data was done with the help of staff (FRSS Unit) of Working Plan Division. Stock mapping was done by with the help of staff of Akola Division. Data on remote sensing was obtained from Forest Survey of India.

During the preparation of this plan, the inputs from the field staff of Akola Forest Division (Forest Guard to DCF) have been duly considered. The stock maps and enumeration results were sample verified on ground by field visits in all the ranges of the division.

I express my deep sense of gratitude for the valuable inputs given by Shri. Praveen Srivatsava, IFS, PCCF (P & M) while preparing this plan. I am also thankful to Shri. Maheep Gupta,IFS,APCCF (Working Plan-East), Nagpur & Shri S.N. Mali,IFS,CF,Working Plan,

Nagpur for their valuable guidance from time to time. The valuable inputs given by them (GIS and its layers,ASTRA software,Encroachment identification by superimposing satellite imaginaries,Digitization of stock maps and Forest cover map utility in allotting Working circles) which helped me to submit DWPR of Akola on time.I could able to present DWPR of Akolabased on GIS Applications which was appreciated in State Consultative Committee.

My thanks are also due to Shri.Pravin Chavan,IFS,CCF (T) Amravati for the cooperation extended to Working Plan staff from time to time. My words of appreciation to my team of Officers, Surveyors and support staff who relentlessly worked and extended their wholehearted support for timely completion of this Plan. I am thankful to Smt.D. N. Dongare, RFO, Shri Ashok Bodakhe, RFO, Shri. Avinash Naghate, Ranger Surveyor, Shri. Ganesh Dabre Surveyor, Shri. Satish Mohakar, Surveyor, Shri. Prakash Tayade Surveyor, all belonging to the Working Plan Division, Amravati for their untiring work in compilation & analysis of Data, allotment of coupes, felling series, tabulation and Digitization of maps with the help of GIS software.

My thanks are due to Shri.Arjuna, IFS,DCF, Akola Forest Division for providing necessary information required for preparation of this Plan. I am also thankful to the field units of Akola Forest Division for the cooperation extended to the Working Plan staff from time to time.

The SoFR unit,Amravati completed the task of enumeration of forest resources as per the procedure laid down in the National Working Plan Code, 2014. Hence, my compliments to the SoFR unit,Amravati for their timely efforts.

My words of appreciation are due to all Foresters,Forest Guards of this office for their efforts in assisting the officers and surveyors in preparation of this Plan.

The following support staffs of DCF,Working Plan Office extended their full cooperation during preparation of this Plan and deserves appreciation; those are.Shri BalasahebKhadseSteno,Dinesh SambhareAccountant, Shri Rajendra Ganjare Forester, Shri Manoj Joshi Peon, Shri.Umesh Gawande, Peon, Shri Ravi KoramForest Labour, Shri Krushna BarbuddeForest Labour, ShriBapurao Yeole, Driver.

Place:

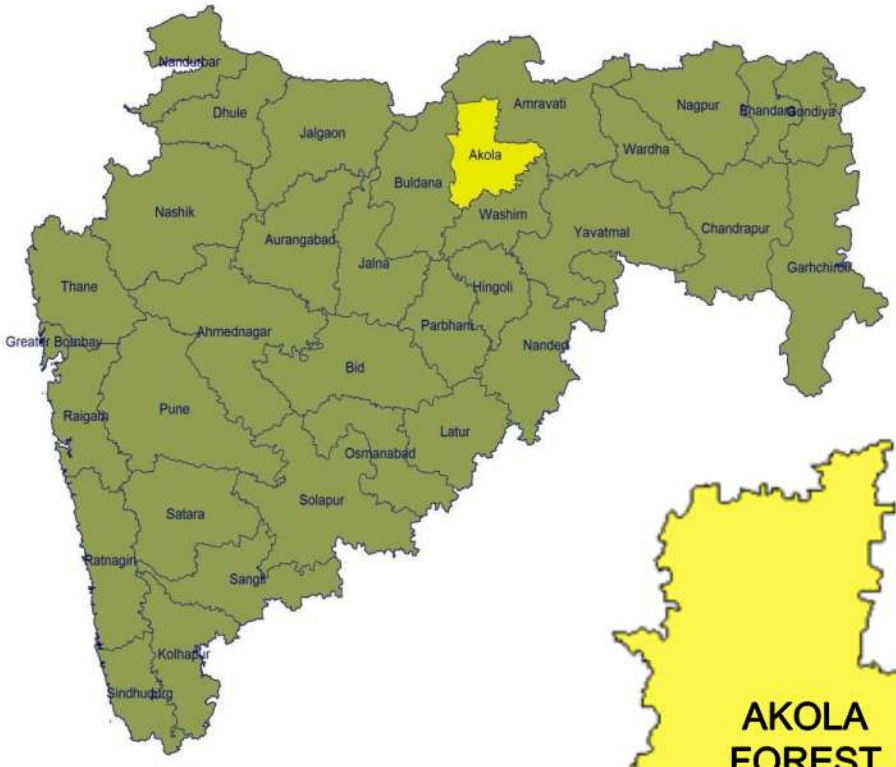
Amravati. (G.R.MADHAVARAJ IFS)

Date : 8/3/2022.

Location Map of Akola Forest Dn. Akola



MAHARASHTRA





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WORKING PLAN OF AKOLA FOREST DIVISION

EXECUTIVE SUMMARY

1. THE TRACK DEALT WITH

LOCATION:

Akola Forest division is confined to Akola district of Maharashtra State and administratively under Amravati Forest Circle, since Dated 04/12/2018. Earlier Akola Division was under administrative control of Yavatmal Forest Circle. The Washim Forest Division was newly created and separated from Akola forest Division by GR WLP-0718/CR/268/F-1, Dated 4/12/2018.Akola Forest Division situated between latitude 19 – 51" N to 21 – 17" N and Longitude -76 -7 E to 77 – 44" East.

BOUNDARIES

The District of Akola is surrounded by Amravati District and Satpuda hill ranges in the North and North-East; Washim District is in the South; Buldhana district in the West.

AREA

The Forest area of *Akola* Forest Division is 377.87 sq. km., out of this 367.75 sq. km is Reserve Forest, 8.75 sq. km. is Protected Forest, 1.37 sq. km. is Un-classed Forest. The forest area of about 9.45 sq. km is transferred to Wildlife.

TABLE SHOWING COMPARISON OF AREA UNDER PREVIOUS PLAN &NEW PLAN

(AREA IN HA)

Sr. No.	Forest Category	Area in previous Plan	Present Area
1	Reserved Forests	37457.91	36775.26
2	Protected Forests	1235.60	874.83
3	Un-classed Forests	398.44	136.93
Total		**39091.95**	**37787.02**

TABLE SHOWING DIFFERENCE IN AREA OF PREVIOUS WP AND CURRENT WP (AREA IN HA.)

Sr. No.	Item	Area in Ha.
1	Area of Old working Plan	39091.95
2	C.A. Land Received	(+)139.86
3	Area Transfer to Wildlife Division (After Unified Control)	(-) 945.30
4	Area Transfer to Washim Division	(-) 499.49
Area Dealt for New Working Plan		**37787.02**

2: MAINTAINANCE / INCREASE IN THE EXTENT OF FOREST AND TREE COVER

AREA OF FORESTS UNDER DIFFERENT LEGAL CLASSES (RF, PF, UF AND OTHERS). DISTRIBUTION OF THE AREA

The total area of Akola Forest Division is 387.89sq km. Out of this, 9.45 Sq. Km is handed over to Wildlife wing. Hence, the net area in charge of Akola Forest Division is 378.45 Sq. Km. This Working Plan covers management prescriptions for 378.45 Sq. Km.

Range wise distribution of the forest area (ha)

Sr. No	Name of Range	No of Round	No. of Beat	Old Compt	New Compt	Area in Ha.			
						RF	PF	UF	Total
1	**Akola**	3	9	212	120	5433.33	55.18	75.81	5564.32
2	**Barshitakali**	4	15	121	113	11620.19	117.9	1.65	11739.74
3	**Patur**	4	17	42	38	8874.24	0	0	8874.24
4	**Alegaon**	4	23	51	46	10847.50	701.75	59.47	11608.72
Total		**15**	**64**	**426**	**317**	**36775.26**	**874.83**	**136.93**	**37787.02**

ADMINISTRATIVE UNITS: For administrative convenience, the ranges, rounds and beats were reorganised in the year 2018-19 and the entire division has been divided into 4 Ranges, 15 Rounds and 64 Beats.

LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

The total geographical area of the district is 5845.31 sq. km. of which 377.87 sq. km. is forest. The condition of the forests and forest cover over the last decade during the implementation of the Plan based on the FSI satellite data is as follows:

SFR Year	Geographical area in sq.km.	Very dense area	Mod. dense area	Open forest	Scrub	Total	SFR Year
2017	5673	11	110	218	16	339	2017
2019	5673	11	108.44	220.93	16	340.37	2019

There is an increase in the open forest in the District.

The threats to the forests from land use and land 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.

3.MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

STATUS OF BIODIVERSITY CONSERVATION IN FORESTS

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

CONSERVATION OF GENETIC RESOURCES

The genetic resources of the forests are an invaluable asset that needs to be studied in detail. The documentation of the flora and the fauna of the Division should be taken at the earliest with the help of experts in the field. The Research Wing of the Department needs to identify areas of high biodiversity in collaboration with the Territorial Wing and to carry out research and documentation of the species available.

(1) There is no identified Fodder resource plot in Akola Forest Division.
(2) There are no identified Preservation plots in Akola Forest Division.
(3) There is no identified Medicinal Plant Conservation Area in Akola Forest Division.

4. MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY STATUS OF REGENERATION

Data on regeneration status was collected by SOFR unit Amravati during collection of enumeration data. The seedlings were enumerated in the following three categories as R1 up to 1 m height, R2 with 1 to 2 m height and R3 above 3 m height. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The status of natural regeneration is extremely poor. The natural regeneration of teak and its associates is very poor and restricted to a few patches of selected sites. Whatever regeneration occurs in the rainy season, fails to establish owing to climatic as well as biotic factors. Heavy grazing, fire incidences, trampling due to cattle movement, human population pressure to meet their demands like firewood and small timber, poor site quality and erratic rainfall are major factors that influence the establishment of regeneration in this forest area. The regeneration data shows that there are 5313 seedlings of up to 1 m height, 2256 seedlings between 1 to 2 m height and 1912 seedlings above 3 m height in a hectare in these forests. The total number of seedlings is 3160/ha. The table of regeneration is given below.

Sr. No.	Range	No. of sample	No of seedlings/ha			Total
			R1	R2	R3	
1	Akola	116	3250	855	245	1450
2	Alegaon	227	8867	3818	2792	5159
3	Barshitakli	232	5105	2882	2980	3655.67
4	Patur	184	4030	1468	1630	2376
	Total	**759**	**5313**	**2255.75**	**1911.75**	**3160.17**

The regeneration data show that there are 146 seedlings of up to 1 m height, 70 seedlings between 1 to 3 m height and 45 seedlings above 3 m height in a hectare in these forests. The total number of seedlings is 260/ha. From the table, it is found that the status of natural regeneration seems to be moderately good. The natural regeneration of teak and its associates is moderately good and restricted to a few patches of selected sites. Whatever regeneration occurs in the rainy season, fails to establish owing to climatic as well as biotic factors. Heavy grazing, fire incidences, trampling due to cattle movement, human population pressure to meet their demands like firewood and small timber, poor site quality and erratic rainfall are major factors that influence the establishment of regeneration in this forest area.

5. CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

AREA TREATED UNDER SOIL AND WATER CONSERVATION MEASURES SOIL EROSION.

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, of formation of crusts, breakdown of structure, all of which will increase infiltration, and so help the water conservation (FAO).

6.MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

GROWING STOCK OF WOOD: Mostly site quality IV is found in Akola Division. Very few patches of site quality III are found. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of previous Plan is given in the table.

LOCAL VOLUME TABLE (ROUND TIMBER) FOR TEAK (ALL INDIA TEAK SITE QUALITY IV) TABLE NO. 6.1

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.280
6	90/105	0.435
7	105-120	0.555

INCREMENT IN VOLUME OF IDENTIFIED TIMBER SPECIES: The stem analysis of Teak (Tectona grandis) carried out by selecting representative teak trees of site quality IV with different origin i.e. teak trees of seedling origin from Alegaon range compartment No.12 and the number of trees selected were 4 and Patur range compartment No. 47, one tree and compartment No. 48 two teak trees were selected as representative samples and total number of seedling origin trees selected were

seven. For coppice origin the representative samples were selected from Alegaon range compartment No. 20, and number of trees selected were four and from Patur range one teak tree was selected from compartment No. 47 of Akola Forest Division. The total number of trees selected for stem analysis were twelve from four compartments.

CARBON SEQUESTRATION AND MITIGATION:

Forest and wood products can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon so efficiently that about half the dry weight of a tree is carbon. This carbon remains locked up in the form of wood and wood products. Sustainably grown and harvested wood (and other biomass) also provides a renewable alternative to fossil fuels and enhances carbon storage. Enhanced carbon sequestration through recognized and innovative silvicultural practices, eco-restoration of degraded/mined out forestlands, improved biomass productivity, etc. will help in improving forest health and vitality. Forest soil must be kept healthy and fertile. The growth of forest crops must be kept vigorous to attain the most desirable level of biomass production within an optional time scale.

In this plan an area of 17445.41 ha is proposed under Afforestation Working Circle which is to be implemented during the plan period. This will add to the forest cover of the division and contribute to the carbon sequestration of the forest. Natural regeneration prescribed in the plan will also add biomass and carbon in the form of vegetation.

7. OPTIMIZATION OF FOREST RESOURCE UTILIZATION

RECORDED REMOVAL OF TIMBER: Timber is mainly in demand for the purpose of construction, furniture making, and preparation of agriculture implements by the local people. The main preferred species is Teak, which is followed by Ain, Dhawda, Kalam, Tiwas, Bija, Behada and Khair. Most of these species are also in demand locally for various construction purposes. Local demand of timber is met by the timber removed from the forest division. The timber depot at Medashi in Patur Range caters to the needs of the local population.

RECORDED REMOVAL OF FUELWOOD: With the introduction of modern cooking fuels like LPG gas, electric implements dependence on fuelwood has decreased. But still firewood is the main cooking fuel for most of the villagers as well as people of Akola, Barshitakali, Akot, Telhara, Balapur, Patur and Murtizapur towns. Dhawda as fuel wood is the most sought-after species for fuel wood. The other hard

wood species like Khair, Ain, Babuletc. are also preferred over some of the soft wood species like Salai, Moyen, Behada. As the demand exceeds supply, illicit lopping of the trees and carrying of head loads of lopped branches mostly by the women is frequently noticed in this area. Most of the ginning mills and processing factories of the area use alternatives such as coal and oil than firewood.
obtained.

RECORDED REMOVAL OF BAMBOO / RATTANS: Availability of bamboo is very scarce hence there is no record of recorded removal of bamboo or rattans.

8. MAINTENANCE AND ENHANCEMENT OF SOCIAL, ECONOMIC CULTURAL AND SPIRTUAL BENEFITS

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

Akola 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. Akola forest division has a total of 114 JFM committees in the forest fringe villages. The total area allotted for these committees is 9108.68 ha. This covers around 55% of the total area of the division. JFM committees have taken up plantation activities to the extent of 460 ha during the previous plan period.

- JFM micro plans are to be dovetailed 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 the programme must be ensured through transparent payment mechanisms.
- Villages which have not received funds should also be given importance.

STATUS OF EMPOWERMENT OF JFMCs: State's 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 are67and all these villages are covered under JFM and JFM Committees are in place. The total number of members in the Committee is 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 work is

satisfactory. Efforts to make the functioning and transaction of funds more and more transparent are going on in the FDA.

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.

9. ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.

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 forest in the Division. The plan is further guided by guidelines like.

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

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 program. These programs 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

10. FIVE YEAR PLANS

The forest was a subject of State List till 42nd Amendments to the Constitution of India in 1976. The State Government used to exercise its power in protection, development and management of state forest resources and earn revenue to the government. The forest management was on scientific lines even before independence to the country and it was in consonance with the Working Plans prepared in the light of scientific management. Before Independence the emphasis in the management of forest was given to the improvement of forest and harvesting of matured and valuable timber species to produce timber. The Ex- Proprietary Forest was also brought under the purview of management after independence for improvement of forest, silvicultural operations were given top priority to achieve healthy forest and these silvicultural operations, timber extraction and afforestation works were carried out with the funds made available under non-plan budget in the early independence period. Till late 70's in the last century, no Plan fund was allocated to forest sector in this area during this period. During this period the forest sector was considered as major source of providing employment to the people. The fund under the Non Plan budget provided was also made to meet the expenditure for carrying out various operations of forest management. The funds of the EGS could not be utilized because most of the forestry operations were not identified as part of EGS works. Subsequently Plan funds of this state allocated under District and State Plan with the introduction of Plan and lots of developmental activities have been taken up for management of forests.

DEVELOPMENT UNDER TWELFTH FIVE YEAR PLAN.

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

11.PAST SYSTEMS OF MANAGEMENT

GENERAL HISTORY OF FORESTS:-

In the second half of 19th century, after assigning Berar, the forests of Akola and Buldhana divisions were grouped into a single forest administrative unit. The forests of Akola were in a very much underdeveloped condition when the Berar was assigned to British in 1853. Unscrupulous fellings, shifting cultivation, illegal hunting by the villagers of the forest and neighboring areas were in practice, resulted in degradation of forests and reduction in forest area. A regular forest administration was initiated by the Govt. after appointing of Assistant Conservator of Forests for the Berar in 1865. Initially for the first few years, selection and demarcation of various reserves was carried out, for future management. Later on the Berar was split up into Northen and Southern Berar Divisions. The Northern Division was headed by Dy. C.F, whereas the Southern Division headed by A.C.F. subsequently. The forest management was further systematised by the notification issued by the Revenue and Agriculture Department of the Govt. of India.

Sr. No	Working plans in chronological order	Plan period
1	Hunt's Working Plan	1912-13 to 1941-42
2	S.A. Cornelius's Working Plan	1942-43 to 1951-52
3	S.S.Parasins's Working Plan	1965-66 to 1979-80
4	L.H.Benakatti's Working Plan	1972-73 to 1986-87
5	SHRI. THENGDI Working Plan	1994-95 to 2008-09
6	G. RAMA KRISHNA RAO Working Plan	2009-10 to 2018-19

FIFTH WORKING PLAN BY G. R. K. RAO FROM 2010-11 to 2019-20. IN THIS PLAN, FOLLOWING INDEPENDENT WORKING CIRCLES WERE PRESCRIBED:

Sr. No	Name of Working Circle
1	Selection Cum Improvement Working Circle
2	Improvement Working Circle
3	Fuel Wood Working Circle
4	Pasture Working Circle
5	Protection Working Circle

WORKING PLAN WISE PRESCRIPTION AS PER EARLIER WORKING PLAN:

1. SELECTION CUM IMPROVEMENT WORKING CIRCLE:

II. IMPROVEMENT WORKING CIRCLE:

Narnala reserve was placed in this working circle. A single felling series was formed for the entire working circle. It was worked on a cycle of 10 years. The system of treatment adopted was improvement fellings. Coupes were closed for 5 years after falling against grazing.

Results:- The regular working in this working circle on scientific lines resulted in the improvement of the crop both in composition and condition. The crop was mostly middle aged with teak as dominating species. Stringent fire protection and regulated grazing created a conducive atmosphere for healthy growth of crops.

III. Fodder Working Circle: - The grass lands previously managed under the same system were included in this Working Circle. The areas are open with grasses such as *Kushal, Burbushi, Sheda, Paunya, Marvel, Mushan,* etc. 7702.64 ha area was included with 69 Ramnans. Treatment prescribed was effective protection from grazing with wire fencing or trenches. Extensive soil and moisture conservation measures were also prescribed and the whole area was to be covered in 20 years.

Results :- No area was fenced with barbed wire. There was no work done as per the prescriptions in coupes, due every year. Cut and carry of grass were not followed as stall feeding is not common in this area. The area was subjected to frequent fires and unregulated grazing which further deteriorated the grass reserves.

IV. AFFORESTATION WORKING CIRCLE

This working circle consisted of a major portion of 'C' class reserve forests which were previously managed under various working circles, CWR, Miscellaneous, Pasture and Plantation working circles. In Gupta's plan these areas were under the treatment of afforestation working circle. The governing aim was to improve the vegetation cover both in quality and quantity and to meet local demands of small timber, fuel wood, fodder and other forest produces by undertaking plantations in degraded under stocked and blank areas.

RESULTS: Teak, Khair, Bamboo, Neem, Awala, Behada, Karanj etc. were planted in these plantations. Though, most of the plantations are good in survival but growth of plants is not satisfactory. It is also observed that considering the pressure from grazing, percentage of teak and non-browsable species must be

increased to achieve success in respect of survival and growth. Bamboo plantations have suffered greatly due to wild boar. Deep planting coupled with judicious and timely SMC works would ensure good growth.

12. STATISTIC OF GROWTH AND YIELD

The main species in Akola Forest Division is Teak. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of previous Plan in 2009 is given below.

Local Volume Table (Round Timber) For Teak (All India Teak Site Quality IV)

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.280
6	90/105	0.435
7	105-120	0.555

STATISTICS OF FOREST CARBON STOCK, WORKING CIRCLE WISE CARBON STOCK

Sr. No	Working Circle	Total Area in Ha.	Avg. Growing Stock per ha (m3/ha.)	Total Growing Stock (m3)	Total Carbon Stock (Metric tons)
1	IMPROVEMENT Working Circle	15120.27	59.17	894666.376	268400.181
2	AFFORESTATION Working Circle.	17445.41	80.20	1399121.882	419736.984
3	FODDER IMPROVEMENT Working Circle	5173.36	14.30	73979.048	22193.737
Total		**37739.04**	**51.22**	**2367767.306**	**710330.902**

FUTURE MANAGEMENT

1. BASIS OF PROPOSALS

2. **INTRODUCTION:** This Working Plan is prepared for the scientific management of the forests and Wildlife of Akola Forest Division which is co-terminus with Akola District. The primary management objective for the forests of Akola Division is to treat forests as per the requirement of site to optimise Growing Stock and in a manner as mentioned in the Introduction.

AREA ALLOCATION TO DIFFERENT WORKING CIRCLES

Sr. No.	Proposed Working Circles	Area (ha.)	Percentage
1.	Improvement Working Circle	15120.27	40.01%
2.	Afforestation Working Circle	17468.57	46.23%
3.	Fodder Working Circle	5198.18	13.76%
4.	NTFP Chapter	-	Entire area
5.	JFM Chapter	-	Entire area
6.	Wildlife Management Chapter	-	Entire area
7.	Forest Protection Chapter	-	Entire area
Total		**37787.02**	**100%**

2. 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.

GENERAL CONSTITUTION OF WORKING CIRCLE: This working circle is expected to serve as transition to SCI. Forest areas capable of producing medium to large-sized timber but not considered fit for harvesting due to preponderance of young to middle aged crop has been included in this working circle.

The areas which are deficient in stocking and require improvement through silvicultural operations and artificial regeneration, have been included in this Working Circle. The main aim is to rehabilitate and improve the status of the degraded crop and site. Therefore, obtaining produce of any kind is neither expected nor desired. However, through silvicultural operations, poles and firewood may be obtained in some quantities.

The following criteria have been used for allocation of compartments to the IWC.

☑ Areas having basal area from 4 to 8 Sq.mt per ha. are included.

☑ Areas having preponderance of middle-aged crops are included.

Sr. No.	Range	Total	Old Comptt.	New Comptt.	IWC WC	Percentage
1	**Akola**	5564.32	0	0	0.00	0.00 %
2	**Barshitakali**	11739.74	12	12	2750.26	23.43 %
3	**Patur**	8874.24	19	20	4418.83	49.79 %
4	**Alegaon**	11608.72	33	30	7951.18	68.49 %
Total		**37787.02**	**64**	**62**	**15120.27**	40.01 %

Special Objects of Management:

i) The special objects of management of the forests are:
ii) To increase the proportion of valuable species in the growing stock.
iii) To improve the condition of the growing stock by appropriate tending.
iv) To preserve and improve the composition and density of the crop for progressively increasing yield of timber and
v) To check the soil erosion by creating and maintaining the vegetative cover.
vi) To conserve soil moisture, essential for creating conditions conducive for rejuvenation and growth of NR and rootstock.

GENERAL CHARACTERISTICS OF VEGETATION:

Better quality Teak Forest are included in this working circle in which Teak constitutes about **59.84%** of the crop. In general site quality confirmed to IVb with some patches of site quality IVa. A very few patches of site quality of III and IVa are noticed mostly in sheltered pockets, along nala banks or frequently on gentle sloping plateau which have retained black cotton soil to a considerable depth. The natural associates of Teak are *Dhaoda, Moha, Ain, Lendia, Salai, Bhirra, Kalam, Char, Hiwar, Tendu, Khair, Palas, Aonla, Ghont* etc.

SILVICULTURAL SYSTEM

The growing stock consists mostly of *Teak* and miscellaneous species. Very few matured trees are available in the growing stock for harvesting. Hence there is a need to reserve all the trees of higher girth classes till the trees of lower girth classes graduate into higher girth classes. To facilitate this, improvement felling's are suggested.

FELLING CYCLE.

Felling cycle is fixed as 20 years. Only marking for improvement of the crop shall be carried out.

CALCULATION OF THE YIELD

As the felling is meant for improvement of the crop, it is not necessary to prescribe yield regulation.

COUPE DEMARCATION, TREATMENT MAP:

The coupe demarcation of annual coupes shall be carried out one year in advance of main working as per prescriptions described in the Chapter of Miscellaneous Regulations.

Treatment Map shall be prepared by the RFO and verified by the ACF. All the treatment type areas shall be shown distinctively on the map, including the areas suitable for planting and areas having adequate promising NR and rootstock.

Treatment Prescribed: The treatment proposed for various treatment type areas marked on treatment map shall be, as follows:

A-Type Areas: **Protection Areas**

They will include –

i. A_1 type areas, which have slopes of more than 25°.
ii. A_2 type areas i.e. 20 m wide strip on both sides of streams.
iii. A_3 type areas, which are susceptible to excessive erosion.

1. Soil and moisture conservation works/measures, as described in the Chapter on Miscellaneous Regulations are prescribed.
2. No harvesting is prescribed in these areas.

B-Type Areas: Under-stocked Areas

1. Soil and moisture conservation works/measures, as prescribed in the Chapter of Miscellaneous Regulations.
2. Site with clear open patch and found suitable for plantation will be taken up for afforestation works.

C-Type Areas: Congested pole crop

1. Areas with sufficient pole crops of valuable species which can be retained as a future crop.
2. No planting shall be done in these areas.

3. Thinning shall be carried out in young pole crop to bring down stems numbers and spacing, matching with the yield table, as prescribed under the Thinning Guidelines.

D -Type Areas: Well-stocked Areas

Areas having density 0.4 or over showing adequate regeneration 400 or above established seedlings are considered as well stocked areas. The following operations are carried out.

i) Tending of natural regeneration:

Singling and spacing out will be carried out among saplings of teak and other valuable species. Spacing operations should leave nearly 400 seedlings/saplings per hectare. Natural regeneration shall be encouraged by soil working and mulching around them in accordance with the guidelines for rootstock management.

ii) Singling of coppice shoots to retain one or two promising shoots is prescribed.

iii) No plantation should be carried out in these areas.

Marking Rules and Prescriptions:

Marking techniques and prescriptions described in the Chapter of the Miscellaneous Regulations shall be followed.

Marking shall be carried out under the close supervision of the RFO and under the guidance of ACF concerned. DCF shall himself inspect most coupes to ensure proper marking and to guide against excessive marking, if any.

The following rules are proposed to be observed strictly for marking in various treatments type areas.

A Type Areas: Protection Areas: No tree shall be marked for felling.

B Type Areas: Under stocked Areas:

1 All dead trees, retaining 2 trees / ha as snags and dens for nesting and resting of wildlife.
2. All live high stumps shall be marked.
3. All multiple coppice poles; retaining one or two promising pole / stool, shall be marked.

C Type Areas: Groups of young poles:

1. The congested pole crop shall be marked for thinning to maintain spacing equal to 1/3rd of the crop height and/or to bring down stem number as per the yield table.

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

D Type Areas: Well-stocked Areas:

1. All fruit bearing species, such as, *Moha, Achar, Tendu, Anola, Sitafal, Chinch, Bel*and minor forest produce yielding species, *Kullu, Semal and Salai* shall be reserved.
2. All dead and malformed trees, retaining 2 trees per hectare and all live high stumps shall be marked for felling.
3. Mature trees that have developed hollowness and show visual sign of decay will be marked for felling.
4. All, but one or two, vigorously, growing coppice pole per stool shall be marked for felling.
5. However, in this working circle no commercial felling except for improvement felling shall be carried out.

2.6.11. SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

- **Natural Regeneration:** The main purpose of improvement felling carried out in Improvement Working Circle (D areas) is to improve the crop. Operations, like identification of Natural Regeneration and keeping proper spacing, soil working, soil working around the seedlings, etc. should, wherever possible, be carried out in D-areas after improvement felling.
- **Cleaning**: In the 6th year commencing from main felling following operation shall be carried out:
  - i) All climbers except of NTFP importance in the plantation area shall be cut out.
  - ii) Weeds interfering or likely to interfere with the reproduction of teak and other valuable species will be cut and removed.
  - iii) Coppice shoots of teak will be removed if NR and AR are successful; otherwise, shoots will be cut and reduced to one well grown shoot.
  - iv) The established advanced growth of teak and other valuable species will be spaced out suitably.
- **Thinning:** Thinning is proposed to be carried out in patches of dense pole crop by maintaining average spacing of 1/3rd of the crop height as prescribed in C-Type areas. The post-thinning crop should have basal area and number as close to the relevant stand table or yield table for that site quality as possible. Poles of vigorously growing non-teak trees should be preferred for retention, particularly those of Group 2 species and Group 3species.

REGENERATION:

Natural Regeneration: The NR will be protected against fire and cattle grazing. TCM or other kinds of fencing may be established. Rootstock management and tending of natural regeneration shall be carried out in B1 areas.

Artificial Regeneration: Artificial regeneration shall be carried out in B2 areas in 2nd year of main felling. It means PYO/PPO works will be taken up in the immediate year of main felling. The choice of species will be *Teak, Anjan, Saja, Khair, Shiwan, Dhaora, Salai, Bhilawa* etc. and other fruit trees.

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 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.

3. AFFORESTATION WORKING CIRCLE

GENERAL CONSTITUTION OF WORKING CIRCLE

The open forest areas having density less than 0.4 with sparse vegetation and inadequate natural regeneration and shrubby growth have been included in this Working Circle.

The Afforestation Working Circle (AFF) forms about 46.30% of the entire forest area of the division. It includes 17493.39 ha. of the forest area. The areas which were managed under Babul working circle and Catchment working circle of previous Working Plan (G. R. K. Rao's working plan) were included in the Afforestation Working Circle.

The following criteria have been applied for allocation of compartments to the AFF Working Circle:

- Compartments have large proportion of area under forest blanks.
- Compartments having poor quality open forests, which need to be afforested.

The allotment of these compartments has been done based on the Forest Cover map of the latest Forest Survey of India reports and based on the ground-survey/verifications. This is a very important Working Circle in which the forest areas that is in the possession of the Forest Department will be reclaimed to enhance the forest cover in the Division and the District.

Compartments allocation to Afforestation Working Circle

Sr. No.	Range	Total	Old Comptt.	New Comptt.	AWC	Percentage
1	**Akola**	5564.32	188	100	2700.00	48.52 %
2	**Barshitakali**	11739.74	98	83	7383.62	62.89 %
3	**Patur**	8874.24	21	18	4090.41	46.09 %
4	**Alegaon**	11608.72	17	16	3294.54	28.38 %
Total		**37787.02**	**324**	**217**	**17468.57**	**46.23 %**

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.

SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of management of this Working Circle are as follows:

- To restore the vegetative cover and of degraded and open areas and increase their productivity by site protection and tending of natural regeneration and rootstock, supplementing it with plantations, wherever, necessary.
- To check the loss of top soil by adopting suitable soil and moisture conservation measures and to increase the water absorption capacity of the soil.
- To actively involve Gram Panchayats and other village institutions like JFM committees in re-vegetating degraded areas.
- To improve the quantity and quality of fodder by planting fodder tree species and introducing superior and high yielding fodder grasses and legumes.

3.6.1: ANALYSIS OF THE CROP

Stock mapping: The stock maps were prepared by territorial staff and were correlated with the enumeration results of SOFR Unit and Satellite imagery classified data obtained from Forest Survey of India, Nagpur.

Age and density: The crop of forest areas under this working circle is mostly young to middle aged with occasional mature trees having density below 0.4 which were reflected by stock mapping and satellite imageries.

Enumeration: Enumeration work was conducted by SoFR unit, Amravati as per the National Working Plan Code 2014.

3.6.2: SILVICULTURAL SYSTEM

The area will be regenerated with suitable tree species depending on the site conditions. Tending of existing rootstock viz. the saplings, coppice shoots and poles, supplemented by plantations have been proposed as the main activities in this working circle. Yield removal is not prescribed except for removal of wind fallen, dead trees.

In view of the vicinity of these areas to habitations, fuel wood and fodder availability will be expanded through plantation of fuel wood and fodder species and by involving JFM committees.

The areas of this working circle are, primarily, in bad shape. Inadequate sub-soil moisture, highly compact soil structure and heavy biotic pressure are the main limiting factors for the establishment of seedling in this area. Top soil has been washed away and as a result vast areas do not have even adequate soil-depth to support tree crops. As a consequence, a large chunk of these areas lay bare without any significant vegetation. Hence, intensive soil and moisture conservation measures and tending of existing rootstock should go hand in hand with the efforts of artificial regeneration.

3.6.3: ROTATION PERIOD: No rotation period is fixed.

3.6.4: HARVESTABLE DIAMETERS: Not Applicable.

3.6.5: REDUCING FACTORS AND REDUCED AREAS: Not Applicable

3.6.6: FELLING CYCLE: Treatment cycle is fixed as Ten years. The entire area of this working circle will be covered in a period of Ten years.

3.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODICBLOCK (PB): Not Applicable.

3.6.8: CALCULATION OF THE YIELD

Regulation of yield: No yield is prescribed for this working circle. Only removal of dead trees (after retaining 2 dead trees/ha as snags) are prescribed.

3.6.9: TABLE OF FELLING: Not Applicable.

3.6.10: METHOD OF EXECUTING THE TREATMENT:

3.6.10.1: Demarcation, Treatment Map and Treatment Prescription: The coupe Demarcation, preparation of treatment maps and marking will abide by the prescriptions mentioned in the chapter of Miscellaneous Regulations. (Note: In the case of Zudpi Jungle, the boundary demarcation will precede the coupe demarcation for the coupes falling on the first year.)

Treatment Map: Treatment map shall be prepared in detail well in advance to facilitate effective planning for raising nursery stock and also to mobilised financial resources to execute the work.

Treatment Prescribed: Treatment map shall be prepared for each working coupes based on treatment prescribed for various areas. Treatment map should invariably be verified by ACF before estimates are technically approved by the DCF.

Area specific treatment is as below:

A -Type Areas (Protection Areas)

They will include-

- ☑ A1 type areas, which have slope more than 25°,
- ☑ A2 type areas, i.e., 30 m wide strip on both sides of streams,

B -Type Areas (Under-stocked Areas)

- The open forests with root stock as well as without root stock shall be shown in the treatment map.
- The areas which were planted earlier but the plantations have failed.

C -Type Areas(pole crop)

Areas with sufficient pole crop of valuable species which can be retained as future crop shall be marked separately.

D - Type Areas: Well-stocked Areas

Well stocked areas shall be separately shown in the treatment map.

Extent of plantation: Requirement of site would be the prime consideration for deciding the extent of plantation. However, in each coupe, not more than 50 ha be taken up for plantation. While taking plantations under special schemes such as NREGA, FDA, DPDC etc. the areas under due coupes should invariably be considered.

3.6.10.2: Marking Rules and Prescriptions

Marking technique and prescriptions described in the Chapter of the Miscellaneous Regulations shall be followed, with modifications, proposed in the following paragraphs.

Marking shall be carried out under the close supervision of the RFO and under the guidance of ACF concerned. DCF shall himself inspect the majority of coupes to ensure proper marking and to guard against excessive marking, if any.

The following rules shall be observed strictly for marking the trees in different areas.

A-Type Areas: Protection Areas:

1. No tree shall be marked for felling.

B- Type Areas: Under stocked Areas:

1. No standing tree shall be marked for felling except dead trees retaining at least 2 trees/ha as snags.
2. All live high stumps shall be marked.
3. In case of Coppice regeneration, 1 or 2 of the most promising shoots will be retained and rest marked for removal.
4. Areas which do not contain sufficient natural regeneration or rootstock will be artificially regenerated by suitable local species if the site is suitable for afforestation works. In case, the areas selected contain old unsuccessful plantations, such areas shall be treated only after examining the factors responsible for failure and upon taking prior approval from the CCF (T).

C -Type Areas: Groups of young poles:

1. The congested pole crop shall be marked for thinning to maintain spacing equal to 1/3rd of the crop height. Poles of seedling origin shall be preferred for retention over the poles of coppice origin.
2. Dead poles shall be marked for thinning.
3. Multiple poles shall be thinned to regain one promising pole per stump/stool.

D - Type Areas: Well-stocked Areas:

1. All dead trees shall be marked for felling except two trees per hectare which shall be retained as snags.
2. All live high stumps shall be cut back to the ground level.
3. All but one or two promising coppice pole per stool shall be marked for felling.

Sequence of Working: Demarcation of coupe, preparation of treatment map, marking, felling (dead trees), PPO works will be done in the sequence of operations.

3.6.11: SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not Applicable

3.6.12: Regeneration:

Natural regeneration:

Natural regeneration of teak and other species, through noticed in same patches at certain place usually die before getting established due to highly compact soil structure coupled with bad drainage, aeration, high incidence of cattle grazing and recurrent fires. To help young recruits of teak and other species to establish develop natural regeneration, the following prescriptions shall be adopted:

1. Identification of the areas containing promising natural regeneration shall be done inside the coupe.
2. The undesirable undergrowth which is preventing or likely to prevent the development of natural regeneration of the desired species shall be removed.
3. Identification of patches of natural growth and shall rigidly protected from the fire and grazing and suitable thinning and tending will be carried out coppice shoots which interfering with the development young natural seedlings shall be removed. A little opening up top of canopy by felling of marked trees and the

ground cover at some places shall boost in establishment of natural regeneration of teak and other species by providing better light and aeration.

4. Natural regeneration should be cleared of weeds within the diameter of one meter and these weeds, grasses, leaf litter, twigs, leaves and branches shall be spread in 15 cm. high layer all around the seedlings within the cleared area to provide organic mulch. Two or three spread full of earth shall be thrown to the mulch in place. Therefore, it will keep the soil around the plants free from weeds as well as help securing the loosening and aeration of the soil by worms and insects. In addition, stone mulching shall be done around the current year recruits in the areas where surface stones are available. Small stones shall be arranged in a circle closed around the very young seedlings which will help in retention of surface moisture as well as avoid accidental trampling by cattle or others.
5. These areas shall be protected from biotic interference as well as from recurring fires. Natural regeneration shall be supplemented with artificial regeneration in the understocked areas.

Artificial regeneration:

In areas where natural regeneration is not sufficient, open, or blank areas, plantations with suitable species shall be taken up under artificial regeneration. The number of seedlings to be planted is to be decided based on soil conditions, rainfall, and temperature. The choice of species to be planted will depend on the suitability of site.

Pre-Planting Operations:

PPO will be carried out one year before actual planting work is to be taken up. The planting stock in nurseries should be in good condition. The planting stock must have different species and should be healthy with sufficient height and hardy enough to be planted. The seeds for raising nursery stock shall be from known sources preferably from plus trees of high forests and certified seeds.

Choice of species: The choice of species will be based on climatic and edaphic conditions and preference of local community. The native species that occur naturally,

and of proven fodder grasses, fruit, non-wood forest produce and some of the timber species shall be preferred. Some of the species like Teak, Neem, Dhawda, Arjun, Babul, Khair, Nilgiri, Glyricidia, Jamun, Bel, Apta, Anjan, Biba, Bamboo, Behada, Hirda etc. can be planted. Palatable grass species like Sheda, Paunya and Marvel shall be preferred. Bamboo can be planted along the nalas. Better planting stock shall be ensured, and the area of plantation is closed either by TCM or fencing. It is advisable that on the mound of TCM a row of suitable fast growing thorny species shall be planted along with Agave bulbils.

First year operations:

Planting shall be completed within a fortnight from the outbreak of monsoons. The teak seedlings or stumps shall be planted after the first monsoon showers. Polybag plantation will be taken in case of miscellaneous species.

Weeding and casualty replacement:

The wedding shall be done in the first year as per following schedule.

1st weeding : by end of July

2nd weeding : by the beginning of September.

3rd weeding : by mid of October

Casualty replacement shall be carried out along with 1st weeding.

Second Year Operations and Third Year Operations:

In the SYO plantation casualty replacement and two weeding's will be done as per following schedule.

1st weeding : by end of August

2nd weeding : by end of October

Casualty replacement shall be done by mid-July. Mulching and hoeing will be carried out along with 2nd weeding. In the third-year operation only one weeding will be done during the month of September followed by thorough soil working in the month of October.

3.6.13: Associated regulations and measures:

All annual coupes and plantation sites shall be provided with fire protection. Effective protection against fire must be ensured during the fire seasons so that the survival and establishment of the seedlings for development into future growing stock can be achieved. Fire protection can be achieved through Joint Forest Management Committees. A comprehensive fire management plan shall be prepared every year.

The coupe shall remain closed to grazing for a period of 5 years after main felling. At the time of planting the under stocked area in each coupe. the seeds fodder grass like Paunya, Sheda, etc. shall be shown to have enough fodder of good quality.

4.FODDER IMPROVEMENT WORKING CIRCLE.

GENERAL CONSTITUTION OF WORKING CIRCLE:

The forests included under this working circle are-

i. Areas which were under this Working Circle in the previous plan
ii. Areas which are in the vicinity of villages and hence under severe biotic pressure

4.2 - Area allocation: Range-wise allocation of area is shown in table below:

TABLE SHOWING RANGE WISE DISTRIBUTION OF AREA ALLOTTED TO
(Area in Ha.)

Sr. No.	Range	Total	Old Comptt.	New Comptt.	Fodder Improvement WC	Percentage
1	**Akola**	5564.32	23	20	2864.32	51.48 %
2	**Barshitakali**	11739.74	12	12	1605.86	13.68 %
3	**Patur**	8874.24	2	5	365.00	4.11 %
4	**Alegaon**	11608.72	1	1	363.00	3.13 %
Total		**37787.02**	**38**	**38**	**5198.18**	13.76 %

SPECIAL OBJECTS OF MANAGEMENT

- To check the soil erosion and arrest the runoff by implementing soil and water conservation measures in the forest catchments to increase the longevity of streams and water bodies.
- 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.

- To preserve and increase the vegetal cover and to help in enhancing the water regime of the forest tracts.

GENERAL CHARATERISTICS OF VEGETATION

This Working Circle includes "C" class Reserved Forests area, which comprises of Scrub Forest, not capable of producing timber or firewood to any appreciable extent. These areas contain degraded soil and are with heavy biotic pressure. They are therefore open (density ranges from 0.1 to 0.3) containing brushwood and bushes along with the grasses. Trees are stunted, malformed and hacked and are found scattered throughout.

Tree species found are Teak, Palas, Anjan, Hiwar, Neem, Tendu, Lendia, Bhirra, Ain, Bor, Dhawda, Movai, Salai, Char, Moha, etc. Thorny and bushy species like Bor, Khair, Bharrati, Eruni, Ghot, Chilati, Phetrare are also common. Grass species Kusal, Bhurbhushi, Ghonad, Sheda, Marvel is common.

SPECIAL OBJECTIVES OF MANAGEMENT

1. To augment the demand for good palatable fodder requirement of villages.
2. Introduction of suitable palatable indigenous varieties of grasses.
3. Introduction of fodder trees and legumes in selected areas.
4. To make the judicial use of sub soil moisture by planting poly pot grass seedlings.
5. To make the ranges self-sufficient in grass seeds and root slips.

To restore the site through Soil and Moisture conservation

SILVICULTURAL SYSTEM

Based on the grass and forest resources of the site as well as the objectives of the management, the silvicultural systems to be followed as under:

1. Regulated and rotational grazing in pasture areas.
2. Regulating seeding, grass cutting and complete closure to grazing in identified Grass land.

Methods for Improving Grassland:

1. Controlled burning to avoid spreading fire during summer season.
2. Eradication of weeds and thorny shrubs-By controlled burning and uprooting.
3. Soil and moisture conservation methods:

4.3 - Area Treatment: Digging of Deep continuous Contour trench (Deep CCT) 200 cubic meter in 400 Running meter per hectare. Size of Deep CCT 20 meter long x1.00 meter wide X 0.50 meter depth, at 20 meter vertical distance.

Planting of palatable, nutritious, perennial and rain fed grass seedlings approx. 5000 seedlings per Ha. is prescribed.

On' V' shape furrow 3800 grass seedlings & on mount of Deep CCT 1200 grass seedlings is prescribed. (60 seedlings per Deep CCT mount in staggered method in three rows is prescribed).

If Deep CCT is not dug, then make the 5000 Rmt 'V' shape furrow at 2 meter distance is prescribed.

Sehimanervosum (Sheda), Chrysopogonfulvus (Dongri), Cenchrusciliaris (Madras Anjan), Cenchrussetigerus (Kala Dhaman), Dichanthiumannulatum (Marvel), Panicum maximum (Guinea grass) are mostly suitable.

Pennisetumpurpurium (Dinanath) is an annual grass is profuse seeder and occupies grassland very quickly.

Importance of Fertilizers: Grasses are very difficult to establish. In addition to weeding and soil working, application of chemical fertilizers is advisable. 20kg Nitrogen and Phosphorus per ha is suggested. For three years no grazing should be allowed. In the month of June, planting of grass seedling should be done.

FELLING CYCLE: Pasture cycle is fixed as 3 years.

CALCULATION OF THE YIELD: The yield is fixed by area.

DEMARCATION, TREATMENT MAP AND PRESCRIPTION DEMARCATION

The annual coupes shall be demarcated one year in advance. The Range Forest Officer shall prepare a treatment map for Soil and Moisture Conservation works keeping in view the principles of watershed treatment.

5. NON TIMEBER FOREST PRODUCE (NTFP) CHAPTER:

The area of this Working Circle covers the whole division and hence not specifically marked on the GIS based map.

GENERAL CONSTITUTION OF THE NTFP WORKING CIRCLE.

This working circle covers the entire forest area of the division. Non- Timber Forest Produce (NTFP) plays a key role in the life and economy of communities living in and around forests. NTFP is mostly collected by the economically backward people living in and around forest areas. The tribal people have been conserving plant and crop genetic resources as well as the knowledge on their utility. The people living in forest mostly supplement their food with leaves, tubers, flowers and fruits all year around. The medicinal plants play a key role in the health support systems in remote villages.

SPECIAL OBJECTIVES OF MANAGEMENT

As per the National Forest Policy, 1988 and 'The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006', the development of Non-Timber Forest Produce (NTFP) has been one of the most important objectives in forest management. Therefore, consistent with the above policy and law, the special objects of management are enunciated as below:

i. To protect and manage Non-Timber Forest Produce and to utilize the existing potential optimally and to enhance productivity.
ii. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques.
iii. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division.
iv. To generate employment and improve the economy of the local people and thereby improving their socio-economic conditions.

Future Interventions:

The NTFP management on sustainable basis has remained a complex process for the last several decades but in the present scenario, there is a need to adopt multipronged strategy, as under, to build up an environment to strengthen community-based management and trade of NTFPs which in turn would strengthen the livelihood of poor forest dependent population.

6. JOINT FOREST MANAGEMENT CHAPTER:

GENERAL CONSTITUTION OF WORKING CIRCLE:

This Overlapping Working Circle extends to the entire area of the Akola Forest Division which is co-terminus with the area of Akola district. Villages that are adjoining to the forest areas are the focal areas for practicing Joint Forest Management.

SPECIAL OBJECTIVES OF MANAGEMENT:

- To develop the degraded forest resources by promoting natural and artificial regeneration along with site specific Soil and moisture conservation works with the active participation of the villagers. It also aims to provide effective protection.
- To strengthen and empower local institutions for protection and conservation of forest and wildlife resources through people's participation.
- To explore and evolve strategies to generate sustainable employment to local people.
- To rehabilitate and regenerate the forest areas.
- To check soil erosion.

To protect the forests and to utilize the degraded forest areas for productive purposes in order to meet the fuel, fodder and timber requirements of the people.

POTENTIAL AREAS FOR JFM:

The following area will be suitable for JFM program.

- To develop the degraded forest resources by promoting natural and artificial regeneration along with site specific Soil and moisture conservation works with the active participation of the villagers. It also aims to provide effective protection.

- To strengthen and empower local institutions for protection and conservation of forest and wildlife resources through people's participation.
- To explore and evolve strategies to generate sustainable employment to local people.
- To rehabilitate and regenerate the forest areas.
- To check soil erosion
- To protect the forests and to utilize the degraded forest areas for productive purposes in order to meet the fuel, fodder and timber requirements of the people.

GENERAL PRESCRIPTIONS:

- JFM Micro-plans will be prepared for each village through the process of participatory rural approach. Micro plans are to be dovetailed with the prescriptions of the approved Working Plan.
- Silvicultural management, maintenance of forest boundary, removal of forest encroachment and control over illicit cutting, illicit grazing and fire should receive high priority.
- Forest protection cannot be viewed in isolation. The works depicted in the Micro-plans should be reflected in the planning process of the Gram Panchayat.
- Wherever required, NGOs are involved for creating awareness programs.
- Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
- JFM program should be implemented with complete transparency. The accounts 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 of JFM members shall be made either through A/c payee cheque or RTGS transfer or depositing directly into respective bank accounts. Payments through cash shall be strictly discouraged.
- As far as possible, all work is 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.
- Often, there is thinking in the grassroots level functionaries that JFM has to be implemented only if funds are allotted to a village. This notion is detrimental to the core values of JFM. Therefore, the supervisory officers should strive to bring suitable awareness among the grass root functionaries (FG to RFO) to change attitudes and mindset.

- Dedicated NGOs/ Civil Society groups can aid the village communities in strengthening JFM institution. Their services can be utilized by the FD in areas of capacity building of JFMCs in micro-planning, community motivation, eco-tourism initiatives, evolving models for enhancing livelihoods etc.

- Periodic evaluation of JFMCs should be done to identify performers and non-performers. While performing JMCs should be rewarded, the non-performers should be given the opportunity for improvement.

- One of the important reasons for forest degradation is the dependence of local people for firewood from forests. Therefore, to reduce such dependence, GoM vide resolution of 10th July 2012 decided to distribute LPG connections to forest fringe villages. JFMC's have played a key role in implementing this scheme spread over 61 JFM have benefitted from LPG connection. Efforts should be made to extend this scheme to all JFM villages.

- The JFM villages should also be covered with other sources of efficient fuel management like improved Chulhas with help from the Maharashtra Biodiversity Board.

- The Division should make all efforts to ensure that all JFM committees have Public Biodiversity Registers as part of the many records to kept. The State Biodiversity Board should be consulted for the same.

7. WILDLIFE MANAGEMENT CHAPTER

SPECIAL OBJECTIVES OF MANAGEMENT:

- To ensure wildlife (animals & plants found in wild) protection and conservation in the managed forests of this Division.
- To ensure scientific management of wildlife in the managed forests by undertaking measures like habitat management, waterhole development and monitoring population of the wild animals.
- To provide extra space for spill over population from adjoining protected areas.
- To ensure protection of ecologically sensitive and special habitat sites for wildlife conservation, such as riparian zones, mesic sites (natural water seepage sites), perennial water holes, natural grasslands, natural wallows, salt licks, natural resting, breeding, and nesting sites (caves snags, overhangs, groves of old Ficus trees, thick Bamboo groves).

- To check wildlife trade and smuggling.
- To promote and encourage ecotourism without disturbing and damaging wildlife.
- To generate awareness among local communities towards the need for biodiversity conservation.
- To protect wild animals from various diseases.
- To explore the possibility of engineering habitat to reduce man-animal conflict.

Marking Reservations, Other Restrictions: The following prescriptions have been made for implementation along with coupe operations and other treatment prescriptions, in the wildlife area-specific coupes.

- No felling of trees or harvesting of any sort shall be allowed in the riparian zone.
- While marking the dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.
- While harvesting at least 2 down hollow logs of low commercial value, per hectare shall be reserved for shelter of wildlife.
- Tendu collection centres or labour camps shall not be allowed near water holes frequented by the large mammals or other important wildlife species. The labour camps shall be established away from areas of high wildlife density.

8. FOREST PROTECTION CHAPTER:

GENERAL CONSTITUTION OF WORKING CIRCLE:

The entire tract of Akola Forest Division is included in this overlapping working circle. The forests of Akola Division are burdened with heavy biotic interferences, hence addressing these problems in a systematic manner necessitated incorporation of this Working Circle. The main objectives of the management of this working circle were to enforce the Indian Forest Act, 1927, Wildlife Protection Act 1972 for the effective control of illicit felling, grazing, encroachment, fire, poaching and to develop the database to monitor various offence cases in a systematic manner The entire tract of Akola Forest Division is included in this overlapping working circle. The forests of Akola Division are burdened with heavy biotic interferences, hence addressing these problems in a systematic manner necessitated incorporation of this Working Circle.

The main objectives of the management of this working circle were to enforce the Indian Forest Act, 1927, Wildlife Protection Act 1972 for the effective control of illicit felling, grazing, encroachment, fire, poaching and to develop the database to monitor various offence cases in a systematic manner.

SPECIAL OBJECTIVES OF MANAGEMENT

The forests of the division are blank to scrubby, and the quality is IV b. The soil condition is alarming and the depth of soil in most of the areas is below 30 cm. The soil erosion is excessive due to the rocks having been exposed in most cases. Therefore, intensive protection works are required to save the area from desertification.

The following objects have been proposed for the plan period: -

(i) To stop soil erosion and improve the soil depth.
(ii) To stop illicit cutting of trees and to improve Natural Regeneration.
(iii) To stop illegal grazing to improve natural regeneration and soil quality.
(iv) To protect the area from fire and encroachments.
(v) To protect the forest and wildlife with the co-operation of local villagers through JFM.

GENERAL CHARACTER OF VEGETATION

The forests of Akola 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, and 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 Akola 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.

9. MANAGEMENT FOR CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

GENERAL CONSTITUTION OF AREA:- Forest area of whole Akola division is important from the biodiversity conservation point of view.

SPECIAL OBJECTIVES OF MANAGEMENT: -

1. Document, protect and replenish indigenous vegetation and local ecosystems of the Division.
2. Protect and restore freshwater ecosystems.
3. Document and control invasive species
4. Minimize impacts of human interference and other disturbance like fire, grazing, etc. on biodiversity
5. Maintain and record indigenous peoples' ethno-biological knowledge.
6. Improve scientific knowledge and access to information about biodiversity.
7. Introduce institutional reforms.
8. Sensitize the staff on the issues of Biodiversity for better appreciation and interpretation of the area they work in.

PRESCRIPTION FOR THE MAINTENANCE & ENHANCEMENT OF BIODIVERSITY.

i. Medicinal Plants Conservation Area (MPCA) should be identified in the Akola Division. MPCA is important for development for the biodiversity conservation. The DCF should endeavor to involve the people, the Local medicinal practitioners, institutions, field botanists etc., to get the documentation of not only the medicinal plants available, the parts and method of use but also the local traditions involved with the practice and the folklore that goes with them so that this can become an integral part of the indigenous technical knowledge documentation.

ii. 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.

iii. Sensitization of the staff of Akola 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.

iv. The field functionaries of Akola Forest division shall identify areas of significant biodiversity value and take lead in In-situ conservation and Ex-situ conservation.

v. Identification of area of Birds presence in the Division is a must. Gyanganga Dam 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.

vi. Identification and documentations of local practices, indigenous technical knowledge and other ethno-biological should be carried by the department.

vii. Identification and Conservation of rare /endangered indigenous species of plants in the division.

viii. All efforts should be made to control fire and grazing in the forests as these are among the biggest enemies of biodiversity.

ix. As per biodiversity Act 2002, Biodiversity Management Committee through the gram panchayat as per the norms decided by the Government needs to be established in all the JFM's 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.

x. Capacity building for local communities, forest personnel at all levels, elected representatives, decision makers, and bureaucrats needs to include the provision of technical skills.

xi. All JFM Committees should have Public Biodiversity Registers as part of the many records to be kept. Members of the State Biodiversity Board should be consulted for the same. Necessary Workshops, training etc. required for this should be carried out.

xii. 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/bird's other species have been relegated to oblivion.

- Documentation and studies of herbaceous plants
- Documentation and studies on fungi, ferns, algae and Lichen and moss (if any).
- Carry out entomological studies (particularly butterflies).
- Carry out herpetological studies.
- Medicinal plants & practices documentation along with another indigenous technical knowledge.

In all the above studies, proper documentation with distribution of species, the abundance and threats to the species may be included.

10. MANAGEMENT OF FOREST HEALTH AND VITALITY

GENERAL CONSTITUTION OF AREA: Forest area of whole division.

SPECIAL OBJECTIVES 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) Improving 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 skeletenises 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 Akola have been worked for over 105 years under the Coppice with Reserve and Coppice standard system. The Teak Coppice, being third-fourth generation coppice has lost its vigor. To revitalize the forest the following needs to be done.

1) Wherever regeneration comes up priority for retention and nurturing should be given to seedling- origin regeneration.
2) Whenever NR is done after felling in 'D' areas and afforestation in 'B2' areas, the seedlings under NR and the species under AR should be of miscellaneous species keeping Teak to a maximum of 20 %.
3) The choice of species for afforestation and other plantation should be of miscellaneous and fruit bearing species keeping in barest minimum teak seedlings/stamps.

REGULATIONS AND MEASURES: The biotic factors which have resulted in the degradation of the forests are excessive grazing, frequent fires, illicit felling, over dependence on forest for fuelwood and weed infestation. The illegal fellings are often concentrated on the species most valued for various purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stages, are resistant ones that can stand to grazing and fires. These species are often of low utility. The following factors are discussed individually and special steps to combat and reduce the effect of each factor are required.

11. CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCE

GENERAL CONSTITUTION OF AREA: Soil and moisture are important in the area of whole division.

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 resources.
- To enhance the ground water recharge, wherever applicable.
- Improvement and restoration of soil quality and thus raising productivity rates.
- Supply and securing of clean and sufficient drinking water for the population.
- To minimize the risks of floods, droughts, and landslides.

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 Dams in and near Forest 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.

A large proportion of the area is adjoining to various protected areas. Hence, deep CCTs should be avoided to avoid damage obstruction to wildlife.

As per the information received from the Division, the following are the major dams that are in or in the vicinity of the forest areas of the Akola Forest Division.

12. MANAGEMENT OF THE SPIRITUAL, CULTURAL ASPECT OF FORESTS AND ECOTOURISM

12.1: 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 Upanishad, 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-form 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.

The oldest visual image of the human fascination, love, and reverence for nature in India can be found in the 10,000-year-old cave paintings at Bhimbetka in Central India depicting birds, animals, and human beings living in harmony. The Indus Valley civilization provides evidence of human interest in wildlife, as seen in seals depicting images of rhino, elephant, bull, etc. Historically, conservation of nature and natural resources was an innate aspect of the Indian psyche and faith, reflected in religious practices, folklore, art and culture permeating every aspect of the daily lives of people. Scriptures and preachings that exhort reverence for nature and relate to conservation can be found in most of the religions that have flourished in the Indian subcontinent. Hinduism, Buddhism, Jainism, Christianity, Islam; and others place great emphasis on the values, beliefs, and attitudes that relate to the cross-cultural universality of respect for nature and the elements that constitute the universe. The concept of sinning against nature existed in various religious systems. Classical Indian myth is replete with similes of man in unison with the environment. Many of the rituals which

to modern society may seem meaningless and superstitious were traditional strategies to preserve the intrinsic relationship between man and nature. The worship of trees, animals, forests, rivers, and the sun, and considering the earth itself as Mother Goddess, were part of the Indian tradition (SM Nair, http://ccrtindia.gov.in/ reading room/nscd/ch/ch11.php)

13. FINANCIAL FORECAST

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 prescription of the plan it is seen that the implementation of this plan will incur an average amount of Rs. 1502.32 lakh annually in the first three years and Rs. 2944.89 lakh annually for the next seven years, that is from the fourth year onwards. The total expenditure will come to Rs. 25121.19 lakh. The expected revenue from the implementation of the plan is Rs. 2512.12 lakh annually. The expenditure and revenue of the division during the last ten years is given below:

STATEMENT SHOWING THE REVENUE, EXPENDITURE AND SURPLUS

Year	Revenue (Rs in Lakh)	Expenditure (Rs in Lakh)			Total expenditure (Col. 3+4+5)
		Conservancy & Work (Rs. In Lakh)	Establishment (Rs in lakh)	Plan (Rs in Lakh	
1	2	3	4	5	6
2009-10	177.67	241.15	604.05	422.00	**1267.20**
2010-11	108.22	230.13	617.06	437.17	**1284.36**
2011-12	163.21	218.70	755.08	981.61	**1955.39**
2012-13	225.40	211.35	829.73	1008.63	**2049.71**
2013-14	224.90	221.61	1089.98	1214.66	**2526.25**
2014-15	168.94	198.38	1083.36	1389.60	**2671.34**
2015-16	68.97	485.91	1209.26	1403.70	**3098.87**
2016-17	107.03	526.31	1207.55	1448.87	**3182.73**
2017-18	97.92	366.89	1225.94	1395.88	**2988.71**
2018-19	115.65	534.56	1066.80	2495.27	**4096.63**
Total	**1457.91**	**3234.99**	**9688.81**	**12197.39**	**25121.19**

BENEFIT COST RATIO: The benefit cost ratio for the implementation of this plan taking the figures of the ten years average is 1:156.94 Thus the cost of implementing this working plan is expected to be more than the benefit.

14. MISCELLANEOUS REGULATION

BOUNDARY DEMARCATION:

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 forestlands 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.

APPROACH TO THE FOREST DEMARCATION:

1. A well-defined forest boundary is a prerequisite for effective forest protection and its sustainable management.
2. The Identified forests areas should be taken over by the division, with due verification of records and demarcation on the site. Hence, examination of record, collection of authentic maps and demarcation of the area is essential for the entire Identified Forest within three years. The entire area under Identified Forest should be demarcated on priority within a period of 3 years from the start of this plan. The Identified Forest areas which are situated in the boundary municipal corporation or Nagar Parishad are vulnerable for non-forestry activities and hence, depending on the vulnerability, suitable method of demarcation should be adopted.
3. Fixing Boundary of the Erstwhile Forest villages.

15. SCIENCE AND RESEARCH

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 forests, 30% in moist deciduous forests 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 in 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.

There is no Preservation Plot was made in Akola Forest Division. During the process of writing this Plan the following papers, articles, report, and documents were referred to and used for the writing of the Plan.

RESEARCH GAPS: Because of the lack of any research works/paper related to the Division and the Vidarbha region, the many chapters that involve specific information on the Forest Division of Akola 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 investigated the new aspects that the need of our present times requires, 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. However, areas in which the research gap is felt most area.

CARBON SEQUESTRATION: Carbon sequestration is an important aspect of the contribution of forests 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. The research that will be required for the Tier-III level measurements of the key C-stock components over time.

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 verity of species than we ever know. This is evident from the list of the medicinal plants that have been listed by the Vaidya's of Akola following the Workshop that was held in the Division. The list is appended at the Introduction part of the Plan and the number of species used is far more than earlier known. There is a need for research to be done for the documentation of all the species that are being used by the people and to devise the best method for the harvest of the species through experimentation.

PRESERVATION PLOTS:

The following are the excerpts from the paper 'An account of Preservation Plots in Central India' by B.N.Gupta and N.G. Totey, Indian Forester, 1994 relevant for the subject in discussion.

16. SUMMARY OF PRESCRIPTIONS.

INTRODUCTION:

Akola Forest Division is situated between 19^0-51' N to 21^0-17' North latitude and between 76^0-7"E to 77^0-44' East longitude. The boundary of the Akola Division is conterminous with the boundary of the Akola District. The forest areas of Akola Division occur in compact blocks and some scattered patches. The forest type belongs to the Subgroup Southern Tropical Dry Deciduous Forest. The District of Akola is surrounded by Amravati District and Satpuda hill ranges in Melghat Tiger Project is in the North and North-East; Washim district is in the South; Buldhana district on the West.

For Administrative convenience the Ranges, Rounds and Beats were reorganized in the year 2019-2020 and the entire division has been divided into 4 Ranges, 15 Rounds and 64 Beats.

THE WORKING CIRCLEWISE SUMMARY OF PRESCRIPTION:

16.1. IMPROVEMENT 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.
4. B-type: Understocked and Blank areas (density <0.4)
    a. B1-Area with rootstock and natural regeneration.
    b. B2-Area without natural regeneration.
5. C-type: Pole crop and plantations.
6. D-type: Well stocked areas (density >0.4)

Marking:

1. A type of 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. Selection-cum-Improvement system
2. Trees above selection girth are prescribed for felling as per
3. principle of safeguarding future yield.
4. Openings created by felled trees would promote nature.
5. regeneration of light demander species
6. Removal of dead, malformed, live high stumps will improve the existing crop.

Regeneration:

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

SMC Works: To be done on watershed basis.

Subsidiary Operations:

1. SMC works as prescribed in the chapter of miscellaneous regulations shall be taken up.
2. SMC works will be along with marking operation and completed before onset of monsoon.

SMC Works are to be based on the requirement.

16.2. AFFORESTATION WORKING CIRCLE:

Coupe demarcation and treatment map:

1. Demarcation and treatment map will be prepared one year in advance.
2. Treatment map would show A, B, C, D areas.
3. A type: Protection area (Steep slopes, 30 m wide strips on both side of streams).
4. B-type: Understocked areas (density <0.4)
5. C-type: Congested Pole crop
6. D-type: Well stocked areas (density >0.4)

Silvicultural System:

1. Restorative phase – one year and productive phase – 5years
2. Removal of dead, live high stumps.
3. Plantation work in A, B type areas.

4. JFMCs to be actively involved.

Regeneration:

1. Tending of natural regeneration and existing root stock is prescribed to be given preference over plantation.

SMC Works:

1. SMC work will be done as prescribed in miscellaneous regulations.

16.3. FODDER IMPROVEMENT WORKING CIRCLE:

Coupe Demarcation:

The coupe due for closure to grazing will be demarcated one year in advance.

Treatment:

1. Removal of invasive weeds.
2. SMC works as per site requirement.
3. In suitable blank areas, regeneration of grass through seed broadcasting, area closure through enclosures is prescribed.
4. JFMCs to be actively involved.

16.4. JOINT FOREST MANAGEMENT CHAPTER:

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 & Plantations.
3. Transparency in the programme must be ensured through transparent payment mechanisms.
4. Villages which have not received funds should also be given importance.

16.5. WILDLIFE MANAGEMENT CHAPTER:

Prescription:

1. Standing Order of PCCF (WL) to be scrupulously implemented.
2. Habitat improvement works like waterhole development, meadow development to be taken up in suitable areas.
3. Creation of database w.r.t. riparian zones, saltlicks, 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 ha are 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 or JFMCs in wildlife rich areas.
14. Massive awareness creation in village communities, schools, colleges, civil society, public representatives etc.

16.6. NON-TIMBER FOREST PRODUCE (NTFP) CHAPTER:

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 training for JFMCs to be conducted for capacity building in NTFP collection and processing.

16.7. MISCELLENEOUS REGULATION:

1. Boundary demarcation of all un demarcated areas 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 Programme
4. Boundary demarcation is necessary due to honeycombing.
5. Updating of area registers
6. Where claims are finally rejected, removal of such encroachments.

17. TREE COVER OUTSIDE FOREST.

INTRODUCTION:

An accurate assessment of forest and tree resources in the country is essential for formulating a sound strategy for the forestry sector. Precise data and latest information on forest cover and volume of growing stock of forests/trees and trends of changes therein are basic ingredients for policy and planning purposes. Generally,

extensive tree wealth exists outside continuous forested areas in every country. Termed as 'Trees Outside Forests" (TOF), these are in the form of small woodlots and block plantations, trees along linear features, such as roads, canals bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas. Traditionally, these were not inventoried, and little quantitative information existed about TOF. However, lately a lot of interest has been generated worldwide in TOF. Besides providing support to rural economy, these trees are now a source of substantial forest produce in every country. Tree population along avenues has been taken up extensively since early 1950s mainly along roads, railway tracks, bunds, canals, riverbanks, in parks, in blocks and other blank areas. Farm forestry, agro-forestry and wasteland afforestation activities have subsequently increased the tree wealth of the state.

TOF Area: All lands (rural and urban) outside the Recorded Forest Area.

TOF Area (rural): The TOF area includes all areas outside the traditional /notified Reserved and Protected Forests but excludes areas of Municipality, Corporation, Cantonment Board, or a notified area Committee etc. which has population more than 5000 and more than 75% male working population are engaged in non-agricultural occupation.

18. CONTROL AND RECORDS

The following Records will be maintained in the Akola Forest Division Office:

- Control Forms
- Compartment History
- Plantations Registers
- Nursery Registers
- Divisional Notebook
- Boundary Registers.

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 forests Working Plan Amravati. The forms will be sent annually by the Deputy Conservator of Forests Akola Division to the Deputy Conservator of Forests Working Plan Amravati no later than October 1st. every year taking the necessary entries. All entries showing the deviations from the prescriptions will be underlined in red. The Deputy Conservator of Forests, Working Plan, Nagpur will scrutinize it and process it further.

18.2: COMPARTMENT HISTORY:

Compartment Histories, i.e., the records of various forestry activities and observation made in the past year will be maintained in Forms prescribed Formats are given in Volume-II of Working Plan.

Each compartment or sub compartment must have a separate file for its each record. Compartment history must be maintained by the division since they keep a record of past management practices and their effects on the growing stock.

Every year in July the Range Forests Officer should fill in the necessary information and will send it to the Deputy Conservator of Forests for scrutinizing and editing through the concern ACF who after doing so will get them typed and sign them. One copy of the forms will be filed in the divisional compartment history file while one copy of each will be sent to Range Forest Officer and Conservator of Forests, Working Plan in the month of August.

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I. INTRODUCTION

A) **VISION STATEMENT:**The following vision statement is the vision statement of the Maharashtra Forest Department (www.mahaforest.nic.in)

Globally as well as nationally, Forest Conservation is increasingly being viewed as a powerful instrument in sequestering carbon and thereby offset adverse climate change. Maharashtra Forest Department, being custodian of the State's rich and diverse bio-diversity, is committed to a conservation-centric management and protection strategy. Wild-life focused eco-tourism management hinges on sustainability. Production- be it timber or non-timber forest produce is managed with sustainability at its core. Joint Forestry Management to secure natural resources as well as livelihood security remains the major people-centric activity. Attempts are on to hone local artisans' skill in making value-added articles out of non-timber forest produce like bamboo and cane. Augmenting green cover on non-forest areas to achieve national targets of **33%** of land area under green cover remains a forefront agenda. Intensive use of Information and Communication Technology supplemented by e-governance is under effective use to monitor ongoing forestry activities. Extensive use of digital platform to project a true picture of forest conservation forms the central theme.

B) GOALS AND OBJECTIVES OF MANAGEMENT:

- Transformation of forestry into an important sector in the states economy
- Ensuring stability of Eco-system.
- Ensuring equity of the various stakeholders in using the forest resource (especially needs of local community)
- Enhancing productivity of resources.
- Increasing forest cover.
- Conservation of Gene pool and Bio-diversity.
- Becoming a responsive and transparent organization.

Primary Objectives Sectorial:

- To recommend to the State and Central government, policies which will provide an enabling environment for various non-governmental players to play an active role in this sector.
- To generate and disseminate knowledge and information relevant to the sector to various stakeholders and provide Research & Development support to the sector.

- To regulate the activities of various players involved in forestry sector development.
- To undertake co-ordinated planning along with the other government departments and agencies.
- To develop a pro-active interface with political and executive arm of the government and public
- To act as a nodal agency at the grass-root levels in the forest lands.

INSTITUTIONAL

- To develop skilled manpower base for the sector.
- To ensure technology upgradation.
- To promote a strong research base and build up an effective institution for effective knowledge management.

OPERATIONAL

- To maintain accurate and reliable data and information on forest resources and undertake periodic resource monitoring.
- To ensure effective and efficient management of forest estates under its control.
- Upgrade quality of land by soil and water conservation measures.
- To identify, map and conserve bio-diversity rich areas.
- To promote efficient utilization and value addition of forest produce including promotion of substitutes.

C) SWOT ANALYSIS FOR PRESCRIPTION OF STRATEGIES FOR ACHIEVING THE GOALS AND OBJECTIVES:

The analysis of the Strengths, Weakness, Opportunities and Threats for the whole gamut of prescriptions for the Division is not an easy task. Each of the Working Circle's prescriptions have enough reasons to justify for the SWOT analysis. However, for this analysis, we have taken the internal and external factors that would have the impact on the achievement of the goal of the Plan and also the whole gamut of factors that would play their role in the success of the Plan like, Human and capital resources, Climatic factors, Human interference.

STRENGTHS	WEAKNESSES
1. Well-regimented administration 2. Ability to maintain forest cover 3. Well intended course of action in place 4. Trained staff and well-manned 5. Finance improved over the lastthree years 6. A strong legislation and policy in place 7. Area with the forest department is well-spread 8. Overall infrastructure of nurseries, depots, quarters in place. 9. Greater awareness of conservation than before 10. People involved in all forestsvillage through Joint Forest Management. 11. Rich flora and fauna 12. Well documented Working Plan	1. High red-taoism and resistance to change 2. Inability to create/maintain dense forests 3. Over-prevalence of degraded Teak forests 4. Inability to create good Plantations 5. Lack of motivation and innovation 6. Lack of working knowledge on Working Plan prescriptions. 7. Funds deficient & not released in time 8. Lack of legal awareness and implementation 9. Area under zudpi jungle are honeycombed 10.Inadequatewirelesscommuni-cation,Wi-Fi / internet 11.Inability to tap local populationGoodwill, most Joint Forest management arenotopto the mark. 12. Many RET species are untracked

OPPORTUNITIES	THREATS
1. Cooperation from Social Forestry Department, Distt Admin, other Deptt. 2. Real time reporting andmonitoringusinglatesttechnology. 3. New zudpi jungle offer new work sites 4. Funding for plantations fromPSUs, Private Parties 5. Training in new tech and exposure visits for staff. 6. Funding from outside department 7. Creation of legal cell 8. Treatment of watersheds throughJalyuktShivar, etc 9.Creation of assets and infrastructure from CAMPA 10. Involvement of informed public and NGOs in conservation 11. Documentation and Biodiversity Studies involving educationalInstitutions, research on pathologicalproblems in forests	1. High number of vacancies 2. Lack of technology transfer on silvicultural improvements 3. Drought conditions 4. Forest fire from fields, villages, out of vengeance 5. Staff over-burdened with unproductive non-forestry works 6. Lack of control over encroachment, Grazing, Illicit felling 7. Joint Forest Management villages are divided socially, politically 8. Lack of funding 9. Spread of disease, epidemics and teak hollowness 10. Pressure from influential persons for works outside WP 11. Late felling permission

D) EXPECTED OUTCOME:

Of the many prescriptions that have been set for the treatment of the forests of the Division, the following are some of the outcomethatare expected to be achieved during the period of the plan.

a) Forest :

(i) **Consolidation:**During the period of three years from the implementation of the plan, the Zudpi Jungle area handed over to the Forest Department, the boundary will be demarcated.

(ii) **Extent of Forest Cover:**While it is our National policy to have least 33% of the geographical area under forest (in the plans), in the case of Akola it is seen that out of the geographical area of **5845.31** sq.kms. only378.45 sq.kms. (SFR of FSI 2019) is covered under forests. This works out to be meager 6.47 % of the geographical area, in order to achieve 33 % forest cover, there is a need to cover the whole area of forests which is 1928.95 sq.kms. is required to be regenerated (may except identified grasslands)

The Social Forestry Department needs to gear up for additional forest cover of 5 % in the District which seems an impossible task in the next ten years. Proper planning is required for 5 % increase in forest cover as envisaged in the 12th Plan.

(iii) **Plantations**: It is expect that an area of 37786.11 ha. will be regenerated through 33 crores Plantation. This will add to the forest cover of the District particularly in the Zudpi Jungle area in the future.

(iv) **Regeneration**: Because of implementation of the plan, the forests are expected to be more healthy and have better regeneration from opening of the canopyin 15103.48 ha. Dueto IWC to be followed by intensive Aided Natural Regeneration works. Also due to better protection from fire and grazing, thearea will be revitalised.

(v) **Health and vitality:**At the end of the plan period it is expected that the forests of the Division are more vivacious and revitalized with better regeneration, better composition of the crop, lesser disturbance of fire, grazing, illicit felling etc. resulting in better healthy forests.

b) Wildlife: It is expected that at the end of the plan period the whole area of forests will be covered with at least one waterhole in every 9 sq.kms. The documentation and study of the faunal and floral diversity of the Division/District will have been done by then.

c) Revenue: There is no felling of coupes prescribed,so no yield can be calculated.

d) Biodiversity: Because of the implementation of this Plan, Biodiversity appreciation and conservation will get a fillip in the Division. It is envisaged to have documentation and status study of medicinal plants, the lower life-forms (fungus, algae, ferns, moss & lichens), entomological study, herpetological study, etc. during the course of the plan through projects to be designed by the Division. At the end of the plan, Biodiversity Committee in all JFM-implemented village in the Division

through the PRIs, which the Forest Department will catalyze, are expected to be formed.

e) **Soil and Water Conservation:** Throughout the plan period different forms of regeneration and additional area as per site conditions are expected to be treated for soil and moisture conservation. All major dams/wetlands identified in the plan will have been treated on watershed management principles by the end of the plan period.

E) ABSTRACT OF PLAN PRESCRIPTIONS IN FOLLOWING FORMAT:

Chapter No. (Vol-I, Part-II)	**Para No/ Sub para No.**	**Prescribed Activity**
A	B	C
Chapter 2IWC	**2.6.10.1**	**Coupe Demarcation & Treatment Map :** * Demarcation and Marking: One year in advance * Treatment Map to be prepared * A type: Protection area (A1: Steep slopes, A2: 20 M wide strips along streams, A3: excessively erosion prone areas) * B-type: Understocked areas (density <0.4) * C-type: Congested Pole crop * D-type: Well stocked areas (density >0.4)
	2.6.10.2	**Marking :** * A type area: No marking * B type: All dead trees, live high stumps * C type: The congested pole crop shall be marked for thinning. * D type: All fruit bearing species shall be reserved. * All dead & malformed trees retaining 2 tress 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.
	2.6.2	**Silvicultural System :** * Hygienic operation of improvement felling. * Adequate growing space is provided to trees of valuable species. * The improvement felling supplemented by tending of naturally generated crop & root stock will aid in transition of middle aged stem to maturity. * The species whose population in the 'stand' dynamics is less than 1% shall be retained till they reached the rotation age.
	2.6.12	**Regeneration :** * Natural Regeneration: NR of seed origin of valuable species to be preferred and managed through cultural operations. * Artificial Regeneration: Only in B type area if site is suitable. * Strict protection from fire and grazing * Tending operation for Natural regeneration in the 'D' type area & Root stock management in the 'B' type shall be taken up.
	2.6.10.1	**SMC Works :** * SMC works, as described in the chapter of Miscellaneous Regulations are prescribed in A & B type area.

	2.6.11	**Subsidiary Operations :** Cleaning operations: 6th Year 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.
Chapter 5 NTFP Chapter	**5.6.13.3 to 5.6.13.9**	**Prescription :** * Documentation of NTFP collection. * JFMCs to be actively involved in NTFP collection and processing. * Scientific method for Gum tapping as per rules suggested by FRI to be used. * Regular trainings for JFMCs to be conducted for capacity building in NTFP collection and processing.
Chapter 7 Wildlife Chapter	**7.6.14.1 to 7.6.14.4**	**Prescription :** * Standing Order of PCCF (WL) to be scrupulously implemented. * Habitat improvement works like waterhole development, meadow development to be taken up in suitable areas. * Creation of database w.r.t. riparian zones, saltlicks, natural wallows, resting places etc to be created. * Vaccination of livestock to be monitored * Intelligence gathering to check wildlife trade * Secret service fund to be effectively used. * Regular Sensitization of staff * During marking, at least 2 dead trees per ha is to be kept as snags. * No fruit tree to be marked. * TenduPhadis / labour camps should not be close to waterholes. * Compensation as per Govt. orders to be dispersed immediately and transparently.

		* Effective control on forest fires. * Eco-development works to be started either through EDCs or JFMCs in wildlife rich areas * Massive awareness creation in village communities, schools, colleges, civil society, public representatives etc.
Chapter 9 JFM	**9.6.13.5**	**Prescription :** * JFM micro plans are to be dovetailed 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.
Chapter 14Miscllen eous Regulation	**14.1 to 14.16**	**Miscellaneous Regulation:** * Boundary demarcation of all un demarcated areas (Entire Zudpi jungle area, Acquired Private Forest & Non Forest land taken over for C.A.& undemarcated PF) to be accomplished in first three years of the Plan. * Boundary pillar which is not easily vulnerable to damage. * Three years Survey and Demarcation Programme * Boundary demarcation is necessary due to honeycombing. * Updation of area registers * Where claims are finally rejected, removal of such encroachments.

F) WORKS PRESCRIBEDDURING THE PLAN PERIOD MUST BE GIVEN IN A TABULAR FORM ALONG WITH ANNUAL TARGET

Chapter No. (Vol-I, Part-II)	Para No. / Sub para No.	Prescribed Activity	Year wise (year 1 to 10) distribution physical target (Ha.)									
A	B	C	D									
2-IWC	2.6.10.1, 2.6.10.2	Demarcation and marking	755	755	755	755	755	755	755	755	755	755
	2.6.2, 2.6.10.1	Coupe working (Hygienic Felling) (D+B area)	750	750	750	750	750	750	750	750	750	750
	2.6.12.2	Natural Regeneration – ANR+Nursing of naturally occurring seedlings and coppice management etc. in Under stocked patches	370	370	370	370	370	370	370	370	370	370
		PPO/PYO(Pre-planting works)	370	370	370	370	370	370	370	370	370	370
		FYO (First year operations)	370	370	370	370	370	370	370	370	370	370
		SYO (Second year operations)	370	370	370	370	370	370	370	370	370	370
		TYO (Thired year operations)	370	370	370	370	370	370	370	370	370	370
	2.6.10.1	Soil and	755	755	755	755	755	755	755	755	755	755
		moisture conservation works	cum	cum	cum	cum	cum	cum	cum	cum	cum	cum
	2.6.12	Plantation (Teak/ Mix) PPO/PYO (Pre -	200	200	200	200	200	200	200	200	200	200

		planting works)										
		FYO (First year operations)	200	200	200	200	200	200	200	200	200	200
		SYO (Second year operations)	200	200	200	200	200	200	200	200	200	200
		TYO (Third year operations)	200	200	200	200	200	200	200	200	200	200
		4th YO (Forth year operations)	200	200	200	200	200	200	200	200	200	200
		5thYO (Fifth year operations)	200	200	200	200	200	200	200	200	200	200
3-AWC	2.6.10.1, 2.6.10.2	Demarcation and marking	1751.91	1751.91	1751.91	1751.91	1751.91	1751.91	1751.91	1751.91	1751.91	1751.91
	2.6.2, 2.6.10.1	Coupe working (Hygienic Felling) (D+B area)	725	725	725	725	725	725	725	725	725	725
	2.6.12.2	Natural Regeneration – ANR+Nursing of naturally occurring seedlings and coppice management etc. in Understocked patches	195	195	195	195	195	195	195	195	195	195
		PPO/PYO(Pre-planting works)	370	195	195	195	195	195	195	195	195	195
		FYO (First year operations)	370	195	195	195	195	195	195	195	195	195
		SYO (Second year operations)	370	195	195	195	195	195	195	195	195	195
		TYO (Thired year operations)	195	195	195	195	195	195	195	195	195	195

		Soil and moisture conservation works	500 cum	500 cum	500 cum	500 cum	500 cum	500 cum	500 cum	500 cum	500 cum	500 cum
		Plantation (Teak/ Mix) PPO/PYO (Pre - planting works)	200	200	200	200	200	200	200	200	200	200
		FYO (First year operations)	200	200	200	200	200	200	200	200	200	200
		SYO (Second year operations)	200	200	200	200	200	200	200	200	200	200
		TYO (Third year operations)	200	200	200	200	200	200	200	200	200	200
		4th YO (Forth year operations)	200	200	200	200	200	200	200	200	200	200
		5thYO (Fifth year operations)	200	200	200	200	200	200	200	200	200	200
3-Pasture	3.6.11	Demarcation and marking	556	556	556	556	556	556	556	556	556	556
	3.6.11, 3.6.12, 3.6.13	Deep Ploughting	40	40	40	40	40	40	40	40	40	40
	3.6.11, 3.6.13	Seed Brodcasting in July	40	40	40	40	40	40	40	40	40	40
	3.6.11, 3.6.13	Enclosure	40	40	40	40	40	40	40	40	40	40
	3.6.11, 3.6.13	Removal of Shurbs& Weeds	50	50	50	50	50	50	50	50	50	50
7-Wild Life Chapter	7.6.14.4	Preparation of Water Holes (Total Water Holes 42)	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes	50 Water Holes
10-Misellen eous Regulati	14.1	New Demarcation of Zudpi Jungle, Non	346 ha.	346 ha.	346 ha.	0	0	0	0	0	0	0

ons (Boundary demarcation)		forest land taken over for C.A. and Aquired Pvt. Forest &Undemarcated PF										
14-Misellen eous Regulations (Boundary demarcation)	14.2	Fixing Boundary Pillars (Artificial &Natural RF Boundary)	200 Pillars	200 Pillars	200 Pillars	200 Pillars	200 Pillars	200 Pillars	200 Pillars	200 Pillars	200 Pillars	200 Pillars
	14.2	Fixing Boundary Pillars (Artificial & Natural PF Boundary)	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars	4000 Pillars

II. GLOSSARY OF LOCAL TERMS USED IN THE PLAN

Balli	A thin pole suitable for use as a rafter.
Bidi	A cigarette prepared by rolling dried leave generally of *Tendu* (Diospyros melanoxylon)
Doh	A deep pond in a stream or river.
Geru	A paint prepared form red chalk.
Jagir	A estate belonging to a Zamindar.
Jagirdar	The holder of Jagir
Jamindari	A estate belonging to a Zamindar.
Lakh	A hundred thousand.
Malki lands	Lands belonging to private individuals.
Murram	A reddish hard soil.
Nagar	A plough.
Nala	Awater course.
Naka	Brrier on road for checking forest produce in transit.
Nista	Land tenure system which exist in Vidarbha.
Nistar	Forest produce required for bona-fide agricultural or domestic needs.
Nistar Patrak	Record of Nistar rights on Government Land.
Raiyatwari	A form of land tenure, applied to land in rayatwari Tenure and to villagers holding such land.
Ramna	A grass reserve.
Shikar	Hunting.
Tahsil	A part of civil district formed for administrative Purposes.
Warli	A rectangular boundary cairn.

III. LIST OF FLORA
Local and Botanical Names of Plants Occurring in Akola Forest Division.

A-Trees

Local Name	Botanical Names	Family	Remarks
Achar H. Charoli M.	*Buchanania lanzan, spreng Syn. Buchanania latifolia Roxb.*	Anacardianceae	F
Ahl H. M.	*Morinda tinctoria, Roxb*	Rubiaceae	L. O
Ain, M., Saja H.	*Terminalia alata, W. and A.*	Combretaceae	A
Am H. K. Amba, M.	*Mangifera indica , Linn*	Anacardianceae	F
Amaltas, H.M. Bhanaka bongru	*Cassia fistula, linn*	Caesalpiniaceae	F
Anjan, M. H. K.	*Hardwickia binata, Roxb*	Caesalpiniaceae	L. F.
Aonla, H. M. K.	*Emblica officinalis, Gacrtn*	Euphorbiaceae	V. A.
Amta, H. Apta, Bhosa M. Bhosai, K.	*Bauhinia racemosa, Roxb*	Caesalpiniaceae	F
Babul, H.M. K.	*Acacia arabica, Willd*	Mimosaceae	R
Bad, (Wad)	*Ficus bengalensis, Linn.*	Urticaceae	
Bahera, H. M. K.	*Terminalia bellerica Roxb*	Combretaceae	A
Bel. H. M. Bela K.	*Aegle marmelos, Correa*	Rutaceae	F
Ber H. Bor, H. M. K.	*Zizyphus jujuba, Lamk Syn. Zizyphus mauritiana Lamk*	Rhamnaceae	A
Bhilawa H. BibaM .Choso, K.	*Semecarpus anacardium, Linn f.*	Anacardiaceae	F
Bhirra, H. M. K.	*Chloroxylon swietenia, D. C.*	Meliaceae	

Bija, H. M.	*Pterocarpus marsupium Roxb.*	Fabaceae	O
Local Name	**Botanical Names**	**Family**	**Remarks**
Chandan, H. M. K	*Santalam album ,Linn.*	Santalaceae	
Chichwa	*Albizzia odoratissima, Benth.*	Mimosaceae	
Dhaman, K.	*Grewia tiliaefolia, Vahl.*	Tiliaceae	V. R
Dhaora, H. M. K.	*Anogeissus latifolia, Wall .*	Combretaceae	V. A
Dhoban, H. M	*Dalbergia paniculata, Roxb.*	Fabaceae	A
Garari	*Cleistanthus collinus, Benth.*	Euphorbiaceae	
Gondan (Gondni or lasora	*Cordia dichotoma*	Boraginaceae	
Goolar, Umbar	*Ficus recemosa, Roxb.*	Urticaceae	
Hingan	*Balanitis aegyptiaca, Planch*	Balanitaceae	
Harra, H .Hilda, M.K. Hirda, M. K.	*Terminalia chebula, Retz.*	Combretaceae	R
Hiwar, M.	*Acacia leucophloea, willd.*	Mimosaceae	L, O.
Chinch M. Chicha, K . Imli, H.	*Tamarindus indica, Linn.*	Caesalpiniaceae	O
Jamrassi, H.M. Niru, K.	*Cassine glauca, Pers.*		O.
Jamun, H. Jambhul, M. Jambu K.	*Syzygium cumini L*	Myrtaceae	L. A.
Juliflora	*Prosopis Juliflora, D.C.*	Mimosaceae	
Kachnar, H.	*Bauhinia variegate, Linn.*	Caesalpiniaceae	L. F.
Kakai, Menkal	*Florourtia Indica, Herit.*	Capparidaceae	
Kalam, M. Kuram, K. Kurumbo K.	*Mitragyna parvifolia, Korth Syn Stephegyne parvifolia, Korth.*	Rubiaceae	F.
Kala-shirish, M.	*Albizzia lebbeck, Benth*	Mimosaceae	O
Karanji	*Pongamia glabra, Vent.*	Fabaceae	
Kasai ,H.Katiyen, M. Karkha K.	*Bridelia retusa, spreng.*	Eupherbiaceae	A.
Katbor	*Canthium praviflorum, Lamk.*	Rubiaceae	
Kawit	*Feronia lemonia*	Rutaceae	
Khair, H. M. K.	*Acacia catechu, Willd.*	Leguminosae	
Kahu, H. Kowa, K. Arjun M	*Terminalia arjuna, Bedo.*	Combretaceae	L.A.
Kulu H. M. Karhai, H. M. Teklet K	*Sterculia urens ,Roxb.*	Sterculiaceae	A.
Kukum K. Shendri M	*Schleichera oleosa, Willd.*	Sapindaceae	O.
Lendia	*Lagerstroemia parviflora, Roxb.*	Lythraceae	
Lokhandi, M.K.	*Ixora parviflora, Vahl.*	Rubiaceae	L.A.
Maharuk, H. M. Marukha, K.	*Ailanthus excelsa, Roxb.*	Simarubaceae	R.
Mahua ,H. K. Moha, K.	*Madhuca latifolia, Roxb.*	Sapotaceae	F .
Jhan, K. Mokha H. M.	*Schrebera swietenioides, Roxb.*	Oleaceae	A.
Mohin, H.M. K. Moyen	*Lannnea grandis, Engl*	Anacardiaceae	A.
Nim or neem	*Azadirachta, indica*	Meliaceae	
Pachara	*Capparis grandis,Linn.*	Copparidaceae	
Pakar or phepar	*Ficus virens, Roxb*	Urticaceae	
Palas, H.M. Pharsa K.	*Butea monosperma,*	Fabaceae	L. A.
Pangra	*Erythrina indica,Lamk.*	Fabaceae	
Panjra	*Erythrina suberosa,Roxb.*	Fabaceae	
Phetra	*Gardenia turgida, Roxb.*	Rubiaceae	
Pipal	*Ficus religiosa,Linn.*	Urticaceae	
Rohan	*Soymida febrifuga,A.Juss.*	Meliaceae	
Kinhi, Pandhara shirish	*Albizzia procera, Benth .*	Mimosaceae	
Sagaon,sagwan,Teak	*Tectona grandis,Linn.*	Verb-enaceae	
Salai , H. M. K.	*Boswellia serrata, Roxb*	Burseraceae	V. A.

Local Name	Botanical Names	Family	Remarks
Saundal	*Prosopis spicigera, Linn.*	Mimosaceae	
Semal	*Bombax ceiba*	Bambacaceae	
Shisham, H. M.	*Dalbergia latifolia, Roxb*	Fabaceae	O.
Sisoo, K. M.H.	*Dalbergia sisoo, Roxb*	Fabaceae	
Sitaphal H. K.	*Anona squamosa. Linn.*	Anonaceae	
Kasmar, K. Shivan, M	*Gmelina arborea, Roxb.*	Verbenaceae	O.
Tendu, H. Tembru, M. K. Tembhurni, M. K.	*Disopyros melanoxylon, Roxb*	Ebenaceae	
Tinsa, H.Tiwas, M.	*Ougeinia dalbergioides, Benth Sym. Ougeinia oogeinensis.*	Ebenaceae	

B – Shrubs

Local Name	***Botanical Names***	Family
Aghada	*Achyranthes aspera, Linn.*	Amarantaceae
Bhandar, K.	*Colebrookia oppositifolia, Smith*	Labiatae
Bharati, M. K.	*Maytenus emarginata*	Celastraceae
Chilati	*Mimosa hamata*	Mimosaceae
Dikamali	*Gardenia gummifera, Linn*	Rubiaceae
Gokhru	*Xanthium strumarium, Linn.*	Compositae
Harsingar, K. Parijact M	*Nyctanthes arbortristis, Linn.*	Oleaceae
Indrajawa or Kuda	*Holorrhena antidysenterica,Wall.*	Apocynaceae
Dhawati	*Woodfordia floribunda, Salish.*	Lythraceae
Lantana, Raimuniya	*Lantana camara, Linn.*	Verbenaceae
Mororphal	*Helicteres isora,Linn.*	Sterculiaccae
Nirgudi	*Vitex negundo,Linn*	Verbenaceae
Takal or taikal	*Clerodendron phlomoides, Linn.*	Verbenaceae
Tarota	*Cassia tora, Linn.*	Caesalpiniaceae
Tarwad or tarod	*Cassia auriculata, Linn.*	Caesalpiniaceae
Yelati or yelatri	*Dichrostachys cinerea, W.&A.*	Mimosaceae

C-Climbers

Local Name	Botanical Names	Family
Dudhiyel	*Lehnocarpus frutesens. Br.*	Apocynaceae
Chilati, M.	*Caesalpinia sepiaria Roxb*	Caesalpiniaceae
Gunj or gumehi	*Abrus precatorious, Linn.*	Fabaceae
Ironi	*Zizyphus oenoplia, Mill.*	Rhamnaceae
Kachkhuri	*Mucuna pruriens, Baler.*	Fabaceae
Mahul	*Bauhinia vahlii, W.&A.*	Caesalpiniaceae
Malkangni	*Celastrus paniculata, Willd.*	Celastraceae
Palasvel M	*Butia suparba*	Fabaceae
Piwarbel	*Combretum ovalifolium*	Combretaceae
Waghoti or Waghotibel	*Capparis horrida, Linn.*	Capparidaceae
Wasanel	*Cocculus hirsutus*	Menispermaecae

D- Grasses, Sedges and Bamboos

Local Name	Botanical Names	Family
Bamboo, E. *Basa*, H. M. K.	Dendrocalamus strictus nees.	Poaceae
Baru, K. *Boru,* K.	Sorghum halepense, pers.	Poaceae
Bhurbhui or Bhurbhusi	Eragrslis tenella, Roem.	Poaceae
Ghonal or Ghonad or Gondel	*Themada triandra*	Poaceae

Local Name	Botanical Names	Family
Harad hadki	*Aristida hystrix, Linn*	Poaceae
Hariali	*Cynodon dactylon, Pers.*	Poaceae
Kans	*Saccharum spontaneum, Linn.*	Poaceae
Kasd	*Coix lacryma-jobi, Linn.*	Poaceae
Kunda	*Ischaemum pilosum, Hack*	Poaceae
Kusal, M.	*Heteropogon contortus, (L Beauv. Ex Roem. And Sch.*	Poaceae
Kusli	*Aristida funiculate, Trin.*	Poaceae
Lona	*Dinebra arabica, Jacq.*	Poaceae
Machadi	*Andropogon annulatus, Forsk.*	Poaceae
Marvel	*Dicanthium annulatum, Forsk.*	Poaceae
Masrul mushon	*Iseilma laxum, Hack.*	Poaceae
Mushel	*Iseilma, Spp.*	Poaceae
Pandhad	*Chloris virgata, Sw.*	Poaceae
Paonia	*Ischoemum syleatum, Hack*	Poaceae
Pokli	*Apluda varia, Linn.*	Poaceae
Rusa, H. Tikhadi M. K.	*Cymbopogon martini, stapf Syn.*	Poaceae
Seepi or seprut	*Panicum isachne, Roth.*	Poaceae
Sheda or shahala chorada	*Ischoemum laxum, Br.*	Poaceae

Note. - V.A – Very abundant;A- Abundant F – Frequent; O – Occasional; R - Rare; V.R. Very rare; L- Local { prefixed to any of the above.)

E - List of Medicinal Plants in Akola Forest Division

Table showing list of important medicinal plants and their uses

Sr.No.	Local Name	Botanical Names	Parts used
1	Aghada	*Achyranthus aspera*	Roots and seeds are used in Aurvedic medicines
2	Adulsa	*Adhatoda zelanica*	Leaves used in cough and bronchial asthma
3	Bel	*Aegle marmelos*	Fruits are used medicines
4	Maharukh	*Ailanthus excelsa*	Leaf extract is used for washing wounds and skin eruptions
5	Shirish	*Albizia lebbeck*	Bark and seeds are used given in piles and diarrhoea
6	Piwala dhotra	*Argemone mexicana*	Yellow juice is used in dropsy and jaundice
7	-	*Aristolochia bracteolata*	Leaf –paste is used as a remedy for itche and insect bite

Sr.No.	Local Name	Botanical Names	Parts used
8	Kadu neem	*Azadirachta indica*	All parts of the plants are used as medicinally. Seeds yield oil which is used for various skin diseases. The leaflets twigs are used for cleaning for teeth.
9	Hinganbet	*Balanites aegyptiaca*	Fruits decoction is used as fish poison and as detergent.
10	-	*Baliospermum montanum*	Seeds are used as drastic purgative. The roots are cathartic.
11	Salai	*Boswellia serrata*	Resin is used in preparation of ointment for sores and external eruptions.
12	Rui	*Calatropis giagantea*	Milky latex is applied for curing tooth-ache.
13	Amaltas or Bahawa	*Cassia fistula*	The pulp of fruit is taken as purgative.
14	Malkagni	*Celastrus paniculata*	Oil extracted from the seeds is used as stimulant.
15	Tilwan	*Cleome viscosa*	Juice of leaves is put in to ears to cure tooth-aches.
16	.Gokharu	*Clitoria ternatea*	Various parts of plants are used medicinally.
17	Vasan-vel	*Cocculus hirsutus*	Roots are used in chronic rheumatism
18	Awla	*Emblica officinalis*	Fruits are the rich source of vitamin C.
19		*Evolvulus alsinoides*	Leaves are used in chronic bronchitis and asthma.
20	Wad	*Ficus benghalensis*	Barks, roots and leaves are used in medicines.
21	Murud-sheng	*Helicteres isora*	Fruits are used against cough.
22	Talim khana	*Hygrophila auriculata*	Seeds are used in medicine.
23	Mahua	*Madhuca longifolia*	Oil is good laxative, used in rheumatism and treatment of inflammation, sprains, epilepsy and digestive disorders .Fruits -phrodisiac.

Sr.No.	Local Name	Botanical Names	Parts used
24	Arani	*Maerua oblongifolia*	Juice or ash of leaves is used as preventive in dysentery.
25	-	*Malvastrum coromandelianum*	Juice or ash of leaves is used externally by local people for healing wounds and bruises.
26	Khaj-khuiri	*Mucuna pruriens*	Roots and seeds are medicinal.
27	Chitrak	*Plumbago zeylanica*	Roots are used in rheumatism ,skin diseases and diarrhea.
28	-	*Polygala arvensis*	Roots are given in fever and dizziness.
29	Peru	*Psidum guajava*	Leaf decoction is used to cure pain in teeth.
30	Satap	*Ruta graveolens*	Rue is narcotic and stimulant.
31	Jambhul	*Syzygium cumini*	The kernel is used in diabetes.
32	Behada	*Terminalia bellirica*	Fruits are used as tannins and in Triphala churna that is laxative powder.
33	Parpimpal	*Thespesia populnea*	The extract of bark is applied externally for skin diseases.
34	Gulvel	*Tinospora cordifolia*	Roots are used as antidote in snake bite.
35	Gokhru	*Tribulus terrestris*	Roots used as tonic.
36	Dagadipala	*Tridax procumbens*	Juice of leaves used to cure wounds and cuts.
37	-	*Tylophora indica*	Leaves are used to cure bronchial asthma, leaves are also used against cold and fever.
38	Ashwagandha	*Withania somnifera*	Roots are used in treatment of leucoderma, nervous breakdown, leaves in fever and ophthalimities.
39	-	*Zornia gibbosa*	Roots given to children to induce sleep.

IV. LIST OF FAUNA
The Common and Zoological Names of Animal, Birds, and Reptiles Commonly Found in Akola Forest Division.

A. Mammals

Sr. No.	Common English Name	Zoological Name	IUCN Status
1	Panther	*Panthera pardus*	Near Threatened
2	Wild dogs	*Cuon alpinus*	Endangered
3	Jungle cat	*Felis chaus*	Least Concern
4	Striped Hyena	*Hyaena hyaena*	Near Threatened
5	Sloth Bear	*Melursus ursinus*	Vulnerable
6	Porcupine	*Hystrix indica*	Least Concern
7	Small Indian civet	*Veverricula indica*	Least Concern
8	Mongoose	*Herpestes edwardsii*	Least Concern
9	Pangolin	*Manis crassi caulata*	Endangered
10	Fox	*Vulpus benghalensis*	Least Concern
11	Indian Gaur	*Bos gaurus*	Vulnerable
12	Sambar	*Cervus unicolour*	Vulnerable
13	Blue bull/Nilgai	*Boselaphus tragocamelus*	Least Concern
14	Spotted Deer/Cheetal	*Axis axis*	Spotted Deer/Cheetal
15	Barking deer	*Muntiacus muntjack*	Least Concern
16	Four Horned Antelope/Chausinga	*Tetraceros quadricornis*	Vulnerable
17	Rhesus macaque	*Macaca mulatta*	Least Concern
18	Langoor	*Presbytes entellus*	Least Concern
19	Wild Boar	*Sus scrofa*	Least Concern
20	Black Napped Hare	*Lepus nigricollus*	Least Concern
21	Peacock	*Pavo cristatus*	Least Concern
22	Wolf	*Canis lupus*	Endangered
23	Grey Jungle Fowl	*Gallus sonnerati*	Least Concern
24	Black buck	*Antelope cervicapra*	Least Concern

B. List of Birds in Akola District, Maharasthra

(As per Bahar Nature Foundation Document)

Sr. No	Common Name	Scientific Name	Marathi Name
Order: GALLIFORMES: Patridge & Quails			
Family: PHASIANIDAE			
1	Grey Francolin	*Francolinus pondicerianus*	राखी तित्तिर
2	Painted Francolin	*Francolinus pictus*	रंगीत तित्तिर
3	Common Quail	*Coturnix coturnix*	सामान्य लावा
4	Rain Quail	*Conturnix coromandelica*	वर्शा लावा
5	Jungle Bush Quail	*Perdicula asiatica*	जंगल दावा
6	Rock Bush Quail	*Perdicula argoondah*	पाषाण लावा
7	Barred Button Quail	*Turnix suscitator*	गुंडूर बटलावा
8	Small Button Quail	*Turnix sylvatica*	सामान्य बटलावा
9	Grey Junglefowl	*Gallus sonneratti*	राखी रानकोंबडी
10	Red Junglefowl	*Gallus gallus*	लाल रानकोंबडी
11	Indian Peafowl	*Pavo cristatus*	मोर, लांडोर
Order: ANSERIFORMES: Ducks, Geese			
Family: DENDROCYGNDIAE			
12	Lesser Whistling Teal	*Dendrocygna javanica*	अडई
Family: ANATIDAE			
13	Bar-headed Goose	*Anser indicus*	राजहंस
14	Knob-billed Duck / Comb Duck	*Sarkidiomis melanotos*	नटका बदक
15	Cotton Pygmy-goose	*Nettapus coromande lianus*	काणूक बदक
16	Spot-billed Duck	*Anas poecilorhyncha*	हळदी कुंकू बदक
17	Ruddy Shelduck	*Tadorna ferruginea*	चक्रवाक
18	Northern Shoveler	*Anas clypeata*	थापट्या बदक
19	Northern Pintail	*Anas acuta*	तलवार बदक
20	Mallard	*Anus platyrhynchos*	चतुरंग बदक
21	Common Teal	*Anas crecca*	चक्रांग बदक

Sr. No	Common Name	Scientific Name	Marathi Name
22	Red-crested Pochard	*Netta rufina*	मोठी लालसरी
23	Common Pochard	*Aythya ferina*	लालसरी बदक
24	Tufted Duck	*Athya fuligula*	शेंडी बदक
Order: PICIFORMES: Woodpeckers, Barbets			
Family: PICIDAE			
25	Yellow-crowned Woodpecker	*Dendrocopos mahrattensis*	पिवळ्या मुकुटाचा सुतार
26	Brown-capped pygmy Woodpecker	*Dendrocopos nanus*	बुटका सुतार
27	Lesser Goldenback	*Dinopium benghalense*	छोटा सोनपाठी सुतार
28	White-naped Woodpecker	*Chrysocolaptes festivus*	पांढऱ्या मानेचा सुतार
29	Rufous Woodpecker	*Micropternus brachyurus*	तांबूस सुतार
30	Eurasian Wryneck	*Jynx torquilla*	मानमोडी
Family: MEGALAIMIDAE			
31	Coppersmith Barbet	*Megalaima haemacephala*	तांबट
Order: BUCEROTIFORMES: Hornbills			
Family: BUCEROTIDAE			
32	Indian Grey Hornbill	*Ocyceros birostris*	राखी धनेश
Order:UPEPIFORMES: Hoopoes			
Family: UPUPIDAE			
33	Common Hoopoe	*Upupa epops*	हुदहुद
Order:CORACIIFORMES: Rollers,Kingfishers,Bee-eaters			
Family: CORACIIDAE			
34	Indian Roller	*Coracias benghalensis*	भारतीय निलकंठ
Family: ALCEDINIDAE			
35	Common Kingfisher	*Alcedo atthis*	सामान्य ढिवर
Family: HALCYONIDAE			
36	White-throated Kingfisher	*Halcyons myrnensis*	पांढऱ्या छातीचा ढिवर
37	Stork-billed Kingfisher	*Halcyon capensis*	बलाकचोच ढिवर
Family: CERYLIDAE			

38	Pied Kingfisher	*Ceryle rudis*	कवड्या ढिवर
Sr. No	**Common Name**	**Scientific Name**	**Marathi Name**
Family: MEROPIDAE			
39	Green Bee-eater	*Merops orientalis*	वेडा राघू
40	Blue-tailed Bee-eater	*Merops philippinus*	निळ्या शेपटीचा राघू
41	Chestnut-headed Bee-eater	*Merops leschenaulti*	बदामी डोक्याचा राघू
Order: CUCULIFORMES: Cuckoos			
Family: CUCULIDAE			
42	Pied Cuckoo/Jacobean Cuckoo	*Clamator jacobinus*	चातक
43	Common Hawk Cuckoo	*Hierococcyx varius*	पावश्या
44	Indian Cuckoo	*Cuculus micropterus*	भारतीय कोकीळ
45	Grey-bellied Cuckoo	*Cacomantis passerinus*	कारूण्य कोकीळ
46	Asian Koel	*Eudynamys scolopacea*	कोकीळ
47	Sirkeer Malkoha	*Phaenicophaeus leschenaultii*	लाल चोचीचा मुंगश्या
Family: CENTROPODIDAE			
48	Southern Coucal	*Centropus (sinensis) parroti*	भारद्वाज
Family:PSITTACIDAE			
49	Alexandrine Parakeet	*Psittacula eupatria*	करण पोपट
50	Rose-ringed Parakeet	*Psittacula krameri*	कंठवाला पोपट
51	Plum-headed Parakeet	*Psittacula cyanocephala*	टोई पोपट
Order: APODIFORMES : Swifts			
Family: APODIDAE			
52	White-rumped Spinetail	*Zoonavena sylvatica*	पांढऱ्या पाठीची आभोळी
53	Little Swift	*Apus affinis*	घर पाकोळी
54	Asian Palm Swift	*Cypsiurus balasiensis*	ताड पाकोळी
Family: HEMIPROCNIDAE			
55	Crested Tree Swift	*Hemiprocnae coronata*	तुरेवाली पाकोळी

Sr. No.	Common Name	Scientific Name	Marathi Name
Order: STRIGIFORMES : Owls, Nightjars			
Family:TYTONIDAE			
56	Barn Owl	*Tyto alba*	गव्हाणी घुबड
Family:STRIGIDAE			
57	Indian Scops Owl	*Otus bakkamoena*	भारतीय पिंगळा घुबड
58	Indian Eagle-Owl	*Bubo bubo*	हुमा घुबड
59	Brown Fish-Owl	*Ketupa zeylonensis*	मासेमार घुबड
60	Mottled Wood Owl	*Strix ocellata*	चट्टेरी वन घुबड
61	Spotted Owlet	*Athene brama*	ठिपकेदार पिंगळा
Family:CAPRIMULGIDAE			
62	Indian Nightjar	*Caprimulgus asiaticus*	भारतीय रातवा
63	Savana Nightjar	*Caprimulgus affinis*	फ्रँक्लीनचा रातवा
Order: COLUMBIFORMES : Pigeons			
Family:COLUMBIDAE			
64	Blue Rock Pigeon	*Columbalivia*	पारवा
65	Yellow-footed Green Pigeon	*Treronphoenicoptera*	पिवळ्या पायाची हरियल
66	Eurasian Collared -Dove	*Streptopelia decaocto*	कंठवाला होला
67	Red Collared-Dove	*Streptopelia tranquebarica*	लालपंखी होला
68	Spotted Dove	*Streptopelia chinensis*	ठिपकेदार होला
69	Laughing Dove	*Streptopelia senegalensis*	छोटा तपकिरी होला
Order: GRUIFORMES : Cranes, Crakes			
Family: RALLIDAE			
70	Brown Crake	*Amaurornis akool*	तपकिरी फटाकडी
71	Slaty-breasted Rail	*Gallirallus striatus*	निळ्या छातीची पाणकोंबडी
72	White-breasted Waterhen	*Amanrornis phoenicurus*	पांढऱ्या छातीची पाणकोंबडी
73	Purple Swamphen	*Porphyrio porphyrio*	जांभळी पाणकोंबडी
74	Common Moorhen	*Gallinula chloropus*	काळी पाणकोंबडी

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75	Common Coot	*Fulica atra*	चांदी बदक
Order: CICONIIFORMES			
Family: PTEROCLIDAE			
76	Chestnut-bellied Sandgrouse	*Pterocles exustus*	भटतित्तिर
77	Painted Sandgrouse	*Pterocles indicus*	रंगीत भटतित्तिर
Family: SCOLOPACIDAE			
78	Common Snipe	*Gallinago gallinago*	सामान्य पाणलावा
79	Common Greenshank	*Tringa nebularia*	सामान्य हिरवा टिलवा
80	Common Redshank	*Tringa totanus*	सामान्य टिलवा
81	Wood Sandpiper	*Tringa glareola*	ठिपकेदार तुतारी
82	Green Sandpiper	*Tringa Ochropus*	हिरवी तुतारी
83	Common Sandpiper	*Actities hypoleucos*	सामान्य तुतारी
84	Little Stint	*Calidris minuta*	छोटा टिलवा
85	Sanderling	*Calidris alba*	कवड्या टिलवा
Family: ROSTRATULIDAE			
86	Greater Painted Snipe	*Rostratula benghalensis*	रंगीत पाणलावा
Family : JACANIDAE			
87	Pheasant-tailed Jacana	*Hydrophasia nuschirurgus*	लांब शेपटीचा कमळपक्षी
88	Bronze-winged Jacana	*Metopidiu sindicus*	कांस्य पंखी कमळपक्षी
Family: BURHINIDAE			
89	Great Thick-knee (Great Stone-Curlew)	*Esacus recurvirostris*	मोठा करवानक
90	Indian Thick-knee	*Burhinus (oedicnemus) indicus*	भारतीय करवानक
Family: CHARADRIIDAE			
91	Black winged Stilt	*Himantopus himantopus*	शेकाट्या
92	Little Ringed Plover	*Charadrius dubius*	कंठी टिटवा
93	Kentish Plover	*Charadrius alexandrinus*	केंटीष टिटवा

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94	Yellow-wattled Lapwing	*Vanellus malabaricus*	माळटिटवी
95	Red-wattled Lapwing	*Vanellus indicus*	टिटवी
Family: GLAREOLIDAE			
96	Indian Courser	*Cursorius coromandelicus*	भारतीय धाविक
97	Small Pratincole	*Glareola lactea*	छोटा आर्ली
Family : LARIDAE - Gull, Tern			
98	Pallas's Gull	*Ichthyaetus ichthyaetus*	पल्लासचा कुरव
99	Black-headed Gull	*Larus ridibundus*	काळ्या डोक्याचा कुरव
100	River Tern	*Sterna aurantia*	नदी सुरय
101	Little Tern	*Sterna albifrons*	छोटा सुरय
Family:ACCIPITRIDAE– Raptors			
102	Osprey	*Pandion haliaetus*	मोरघार
103	Black-shouldered Kite	*Elanus caeruleus*	कापशी
104	Black Kite	*Milvus migrans*	घार
105	Brahminy Kite	*Haliastur indicus*	समुद्री घार
106	Shikra	*Accipiter badius*	शिक्रा
107	Besra	*Accipiter virgatus*	बेसरा
108	Eurasian Sparrowhawk	*Accipiter nisus*	युरेकश्यन चिमणमार ससाणा
109	White-rumped Vulture	*Gyps bengalensis*	पांढऱ्या पाठीचे गिधाड
110	Indian Vulture	*Gyps Indicus*	लांब चोचीचे गिधाड
111	Red-headed Vulture	*Sarcogyps calvus*	राज गिधाड
112	Egyptian Vulture	*Neophron percnopterus*	पांढरे गिधाड
113	Pied Harrier	*Circus melanoleucos*	कवड्या भोवत्या
114	Short-toed Snake Eagle	*Circaetus gallicus*	पांगुळ सर्पगरूड
115	Black Eagle	*Ictinaetus malayensis*	काळा गरूड
116	Steppe Eagle	*Aquila nipalensis*	नेपाळी गरूड
117	Bonelli's Eagle	*Hieraaetus fasciatus*	बोनेलीचा गरूड
118	Grey Headed Fish Eagle	*Icthyophaga icthyaetus*	राखी डोक्याचा मत्स्यगरूड
119	Crested Hawk-Eagle	*Nisaetus cirrhatus*	तुरेवाला गरूड

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120	Crested Serpent Eagle	*Spilornis cheela*	तुरेवाला सर्पगरूड
121	Oriental Honey Buzzard	*Pernis ptilorhyncus*	मधुबाज
122	White-eyed Buzzard	*Butastur teesa*	पांढऱ्या डोक्याचा बाज
123	Indian Spotted Eagle	*Aquila hastata*	भारतीय ठिपकेदार गरूड
124	Greater Spotted Eagle	*Aquila clanga*	मोठा ठिपकेदार गरूड
Family: FALCONIDAE			
125	Common Kestrel	*Falco tinnunculus*	सामान्य नारझिनक
126	Lesser Kestrel	*Falco naumanni*	छोटा नारझिनक
Family: PODICIPEDIDAE- Grebes			
127	Little Grebe	*Tachybaptus ruficollis*	टिबूकली
128	Great Crested Grebe	*Podiceps Cristatus*	मोठी टिबूकली
Family: Anhingidae			
129	Darter	*Anhinga melanogaster*	तिरंदाज
Family: PHALACROCORACIDAE			
130	Little Cormorant	*Phalacrocorax niger*	लहान पाणकावळा
131	Great Cormorant	*Phalacrocorax carbo*	मोठा पाणकावळा
Family : ARDEIDAE- Egrets, Herons			
132	Little Egret	*Egretta garzetta*	लहान बगळा
133	Intermediate Egret	*Mesophoyx intermedia*	मध्यम बगळा
134	Great Egret	*Casmerodius albus*	मोठा बगळा
135	Cattle Egret	*Bubulcus ibis*	गाय बगळा
136	Grey Heron	*Ardea cinerea*	राखी बगळा
137	Purple Heron	*Ardea purpurea*	जांभळा बगळा
138	Striated Heron	*Butorides striatus*	हिरवी ढोकरी
139	Indian Pond Heron	*Ardeola grayii*	ढोकरी
140	Black crowned night Heron	*Nycticorox nyctiorax*	रात्रींचर ढोकरी
141	Black Bittern	*Dupetor flavcollis*	काळा वंचक
142	Cinnamon Bittern	*Ixobrychus cinnamomeus*	बदामी वंचक
143	Yellow Bittern	*Ixobrychus sinensis*	पिवळा वंचक

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Family: PHOENICOPTERIDAE-Ibis			
144	Glossy Ibis	*Plegadis falcinellus*	तकतकीत शराटी
145	Black Ibis	*Pseudibis papillosa*	काळा शराटी
146	Black Headed Ibis	*Threskiornis melanocephalus*	पांढरा शराटी
147	Eurasian Spoonbill	*Platalea leucorodia*	चमचाचोच
Family : CICONIIDAE -Storks			
148	Painted Stork	*Myeteria leucocephala*	रंगीत करकोचा
149	Asian Openbill	*Anastomus oscitans*	उघडचोच करकोचा
150	Black Stork	*Ciconia nigra*	काळा करकोचा
151	Woolly Necked Stork	*Ciconia episcopus*	पांढऱ्या मानेचा करकोचा
Order: PASSERIFORMES			
Family: PITTIDAEZ			
152	Indian pitta	*Pitta brachyura*	नवरंग
Family: IRENIDAE			
153	Jerdon's Leafbird	*Chloropsis jerdoni*	जेरडनचा पर्णपक्षी
Family: LANIIDAE			
154	Long-tailed Shrike	*Lanius Schach*	लांब शेपटीचा खाटिक
155	Bay- backed Shrike	*Lanius vittatus*	उदी पाठीचा खाटिक
156	Southern Grey Shrike	*Lanius meridionalis*	राखी पाठिचा खाटिक
157	Brown Shrike	*Lanius cristatus*	तपकिरी खाटिक
Family: CORVIDAE			
158	Rufous Treepie	*Dendrocitta vagabunda*	टकाचोर
159	House Crow	*Corvus splendens*	कावळा
160	Indian Jungle Crow	*Corvus (macrorhynchos) Culminatus*	डोमकावळा
161	Indian Golden Oriole	*Oriolus oriolus*	भारतीय हळद्या
162	Black Headed Oriole	*Oriolus xanthornus*	कृष्णशिर्ष हळद्या
163	Large Cuckoo-Shrike	*Coracina macei*	मोठा कोकीळ खाटिक
164	Scarlet Minivet	*Pericrocotus flammeus*	नारिंगी गोमेंट

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165	Small Minivet	*Pericrocotus cinnamomeus*	छोटा गोमेट
166	Black Drongo	*Dicrurus macrocercus*	कोतवाल
167	Ashy Drongo	*Dicrurus leucophaeus*	राखी कोतवाल
168	White-bellied Drongo	*Edolius caerulescens*	पांढऱ्या पोटाचा कोतवाल
169	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	महाभृंगराज कोतवाल
170	White-throated Fantail	*Rhipidura albicollis*	पांढऱ्या कंठाची नाचण
171	White-browed Fantail	*Rhipidura aureola*	पांढऱ्या भुवईची नाचण
172	White-spotted Fantail	*Rhipidura albogularis*	पांढऱ्या ठिपक्यांची नाचण
173	Indian Paradise-flycatcher	*Terpsiphone paradisi*	स्वर्गीय नर्तक
174	Common Iora	*Aegithina tiphia*	सामान्य सुभग
175	Common Woodshrike	*Tephrodormis pondicerianus*	रान खाटिक
176	Black-headed Cuckooshrike	*Coracina melanoptera*	काळ्या डोक्याचा कोकीळ खाटिक
Family: MUSCICAPIDAE			
177	Blue Rock Thrush	*Monticola solitarius*	निल कस्तुर
178	Orange-headed Thrush	*Zoothera citrina*	नारंगी डोक्याचा कस्तुर
179	Tickell's Blue Flycatcher	*Cyornis tickelliae*	टिकेलचा निळा मासेमार
180	Verditer Flycatcher	*Eumyias thalassinus*	निलांग मासेमार
181	Taiga Flycatcher	*Ficedula albicilla*	तैगा मासेमार
182	Black-naped Monarch	*Hypothymis azurea*	काळ्या मानेचा आकाशी मासेमार
183	Bluethroat	*Luscinia svecica*	शंकर
184	Oriental Magpie Robin	*Copsychus saularis*	दयाळ
185	Indian Robin	*Saxicoloides fulicatus*	चिरक
186	Black Redstart	*Phoenicurus ochruros*	काळा थिरथिरा
187	Common stone chat	*Saxicola torquata*	सामान्य गप्पीदास
188	Pied Bush Chat	*Saxicola caprata*	कवड्या गप्पीदास

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189	Brown Rock Chat	*Cercomela fusca*	तपकिरी गप्पीदास
Family: STURNIDAE			
190	Chestnut-tailed Starling	*Sturnia malabaricus*	बदामी शेपटीची मैना
191	Brahminy Starling	*Sturnia pagodarum*	भांगपाडी मैना
192	Rosy starling	*Pastor roseus*	गुलाबी मैना
193	Asian Pied Starling	*Gracupica contra*	कवडी मैना
194	Common Myna	*Acridotheres tristis*	साळुंकी
Family:PARIDAE			
195	Great Tit	*Parus major*	मोठा रामगंगा
Family: DICAEIDAE			
196	Thick billed Flowerpecker	Dicaum agile	जाड चोचीचा फुलटोच्या
Family:HIRUNDINIDAE			
197	Dusky Crag Martin	*Hirundo concolor*	धुसर पंकोळी
198	Barn Swallow	*Hirundo rustica*	माळ भिंगरी
199	Wire-tailed Swallow	*Hirundo smithii*	तार-शेपटी भिंगरी
200	Red-rumped Swallow	*Cecropis daurica*	लालपाठी भिंगरी
201	Streak-throated Swallow	*Petrochelidon fluvicola*	रेशाळ कंठी भिंगरी
Family:PYCNONOTIDAE			
202	Red Vented Bulbul	*Pycnonotus cafer*	लाल बुड्या बुलबुल
203	White-browed Bulbul	*Pycnonotus luteolus*	पांढऱ्या भुवईचा बुलबुल
Family:CISTICOLIDAE			
204	Zitting Cisticola	*Cisticola juncidis*	रेषाळ वटवट्या
205	Ashy Prinia	*Prinia socialis*	राखी वटवट्या
206	Plain Prinia	*Prinia inornata*	वटवट्या
207	Grey Breasted Prinia	*Prinia hodgsonii*	राखी छातीचा वटवट्या
208	Jungle Prinia	*Prinia sylvatica*	रान वटवट्या
Family:ZOSTEROPIDAE			
209	Oriental White-eye	*Zosterops palpebrosus*	चश्मेवाला
Family:SYLVIIDAE			
210	Blyth's Reed Warbler	*Acrocephalus dumetorum*	ब्लीथचा बोरू वटवट्या

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211	Clamorous Reed Warbler	*Acrocephalus stentoreus*	बडबड्या बोरू वटवट्या
212	Booted Warbler	*Hippolais caligata*	पायमोज वटवट्या
213	Greenish Warbler	*Phylloscopus trochiloides*	हिवट पर्णवटवट्या
214	Sulpher-bellied Warbler	*Phylloscopus griseolus*	पिवळ्या पोटाचा वटवट्या
215	Common Chieffchaf	*Phylloscopus Callybita*	चिपचिप
216	Lesser Whitethroat	*Sylvia curruca*	पांढऱ्या गळ्याचा छोटा वटवट्या
217	Common Tailor Bird	*Orthobomus sutorius*	शिंपी
218	Yellow-eyed Babbler	*Chrysomma sinense*	पिवळ्या डोक्याचा सातभाई
219	Common Babbler	*Turdoides caudatus*	सामान्य सातभाई
220	Large Grey Babbler	*Turdoides malcolmi*	राखी सातभाई
221	Jungle Babbler	*Turdoides striatus*	जंगली सातभाई
222	Tawny-bellied-Babbler	*Dumetia hyperythra*	पिंगट पोटाचा सातभाई
Family:ALAUDIDAE			
223	Indian Bushlark	*Mirafra erythroptera*	भारतीय चंडोल
224	Singing Bushlark	*Mirafra cantillanus*	गायक चंडोल
225	Ashy-crowned Sparrow Lark	*Eremopterix grisea*	डोंबारी
226	Rufous-tailed Lark	*Ammomanes phoenicurus*	तांबूस शेपटीचा चंडोल
227	Sykes's Lark	*Galerida deva*	साईक्सचा चंडोल
228	Crested Lark	*Galerida cristata*	तुरेवाला चंडोल
229	Oriental Skylark	*Alauda gulgula*	गुलगुला चंडोल
Family:NECTARINIDAE			
230	Purple-rumped Sunbird	*Leptocoma zeylonica*	जांभळ्या पाठीचा सुर्यपक्षी
231	Purple Sunbird	*Cinnyris asiatica*	जांभळा सुर्यपक्षी
Family:PASSERIDAE			
232	White Wagtail	*Motacilla alba*	पांढरा धोबी

Sr. No	Common Name	Scientific Name	Marathi Name
233	White browed Wagtail	*Motacilla maderaspatensis*	कवड्या धोबी
234	Yellow Wagtail	*Motacilla flava*	पिवळा धोबी
235	Grey Wagtail	*Motacilla cinerea*	करडा धोबी
236	Citrine Wagtail	*Motacilla citreola*	पिवळ्या डोक्याचा धोबी
237	Paddyfield Pipit	*Anthus rufulus*	धान चरचरी
238	Blyth's pipit	*Anthus godlewskii*	ब्लीथची चरचरी
239	Tawny pipit	*Anthus campestris*	पिंगट चरचरी
240	House Sparrow	*Passer domesticus*	चिमणी
241	Chestnut-shouldered Petronia (Yellow throated Sparrow)	*Gymnoris xanthocollis*	रानचिमणी / पितकंठी चिमणी
242	Baya Weaver	*Ploceus philippinus*	सुगरण
243	Red Avadavat (Munia)	*Amandava amandava*	लाल मनोली
244	Indian Silverbill	*Euodice malabarica*	चांदीचोच मनोली
245	Black headed /Tricoloured Munia	*Euodice malacca*	कृष्णशिर्ष मनोली / तिनरंगी मनोली
246	Scaly-breasted Munia	*Lonchura punctulata*	ठिपकेदार मनोली
247	White-rumped Munia	*Lonchura striata*	पांढऱ्या पाठीची मनोली
Family:FRINGILLIDAE			
248	Common Rosenfinch	*Carpodacus erythrinus*	गोरली
249	Crested Bunting	*Lonchura lathami*	तुरेवाला भरिट
250	Black-headed Bunting	*Emberiza melanocephala*	कृष्णशिर्ष भरिट
251	Grey-necked Bunting	*Emberiza buchanani*	करड्या मानेचा भरिट

Apart from the above following birds were said to be found in Akola as per earlier Working Plan.

Sr. No.	Common Name	Zoological Name
1.	Purple wood pigeon	*Columba punices*
2.	Common Crane	*Gru sgrus*
3.	Sarus crane	*Grus antigone*
4.	Brown wood Owl	*Strix leptogrammica*

IUCN Listed Threatened Birds from Akola District

Sr.No.	Common Name	Latin Name	मराठी नांव	RDB Status
1.	Alexandrine Parakeet	*Psittacula eupatria*	करण पोपट	NT
2.	Great Thick knee	*Esacus recurvirostric*	मोठा करवानक	NT
3.	River Tern	*Sterna aurantia*	नदी सुरय	NT
4.	White-rumped Vulture	*Gyps benghalensis*	पांढऱ्या पाठीचे गिधाड	CR
5.	Indian Vulture	*Gyps indicus*	भारतीय गिधाड	CR
6.	Egyptian Vulture	*Neophron precnopterus*	पांढरे गिधाड	EN
7.	Red-headed Vulture	*Sarcogyps calvus*	राज गिधाड	CR
8.	Steppe Eagle	*Aquila nipalensis*	नेपाळी गिधाड	EN
9.	Grey-headed Fish Eagle	*Icttyaophaga icthyaetus*	राखी डोक्याचा मत्स्य गरूड	NT
10.	Indian Spotted Eagle	*Aquila hastate*	छोटा ठिपकेदार गरुड	VU
11.	Oriental Darter	*Anhinga melanogaster*	तिरंदाज	NT
12.	Black-headed Ibis	*Treskiomis melanocephalus*	पांढरा शराटी	NT
13.	Painted Stork	*Myeteria leucocephala*	रंगीत करकोचा	NT
14.	Woolly necked Stork	*Ciconia episcopus*	पांढऱ्या मानेचा करकोचा	NT

Key: RBD – Red Data Book
CR – Critically Endangered
VU – Vulnerable
NT – Near Threatened
EN – Endangered

C - Reptiles of Akola District

Sr.No.	Reptillia	Scientific Name
	Trionychidae	
1	Softshell Turtle	*Lissymis*
	Geckonidae	
1	Yellow-green House Gecko	*Hemidactylus flavivirdis*
2	Brook's Gecko	*Hemidactylus cf. brooki*
3	Bark Gecko	*Hemidactylus leschenaultia*
4	Square Spotted Gecko	*Hemidactylus gracilis*
5	Termite Hill Gecko	*Hemidactylus triedus*
6	Kollegal Ground Gecko	*Geckoella collegalensis*
7	Nebulosus Ground Gecko	*Geckoella nebulosi*
	Agamidae	
1	Common Garden Lizard	*Calotes versicolor*
2	Forest Rock Lizard	*Psamophilus blanfordianus*
3	Fan Throated Lizard	*Sitana spinaecephalus*
	Scincidae	
1	Common Brhamhiny Skink	*Eutropis Carinata*
2	Littile Skink	*Eutropis macularia*
3	Little Skink	*Eutropis innotata*
4	Snake Skink	*Lagosoma punctate*
5	Lined suppled Skink	*Lygosoma guntheri*
6	Gunther's Snake Skink	*Lygosoma guntheri*
7	Snake Skink	*Lygosoma punctate*
	Lacertidac	
1	Jerdons Snake-eyed Lizard	*Ophisops jerdoni*
	Varanidae	
	Bengal Monitor Lizard	*Varanus bengalensis*
	Chameleonidae	
1	Indian Chameleon Lizard	*Chameleon zelanicus*
	Typhlopidae	
1	Bramhiny Blind Snake	*Indotyphlops braminus*
2	Beacked Worm Snake	*Grypotyphlops acutus*

Sr.No.	Reptillia	Scientific Name
	Boidae	
1	Red Sand Boa	*Eryx johnii*
2	Common Sand Boa	*Eryx conicus*
	Pythoniade	
1	Indian Rock Python	*Python molurus*
	Colubridae	
1	Indian Rat Snake	*Ptyas mucosa*
2	Common Trinket Snake	*Coelognathus helena*
3	Common Wolf Snake	*Lycodon aulicus*
4	Barred Wolf Snake	*Lycodon striatus*
5	Common Kukari Snake	*Oligodon arnensis*
6	Russell's Kukari Snake	*Oligodon taeniolatus*
7	Common Cat Snake	*Boiga tristis*
8	Forstein's Cat Snake	*Boiga forsteni*
9	Bronze Back Tree Snake	*Dendrelaphis tristis*
10	Banded Racer	*Argyrogena fasciolata*
11	Gunthers racer	*Coluber ventromaculatus*
12	Green Keelback Snake	*Macropistodon plumbicolor*
13	Buffstriped Keelback	*Amphiesma stolatum*
14	Checkered Keelback Snake	*Xenocrophis piscator*
15	Olive Keelback Snake	*Antretium nastus*
16	Green Vine Snake	*Ahaetulla nastus*
17	Indian Smooth Snake	*Coronella brachyra*
18	Indian egg eater snake	*Elachistodon westermanni*
	Elapidae	
1	Spectacled Cobra	*Naja naja*
2	Common Krait	*Bungarus ceruleus*
3	Slender Coral Snake	*Calliophis melanurus*
	Viperidae	
1	Saw Scaled Viper	*Echis carinata*
2	Russell's Viper	*Daboia russelli*

1) Preliminary Survey of Reptile Fauna of Vidhabha Region, Maharashtra, (Central India) Presented By: Parag Dandge & Ashish Tiple.

2) The 8th Indian Symposium of Odonatology & Biodiversity 2014 Nagpur.

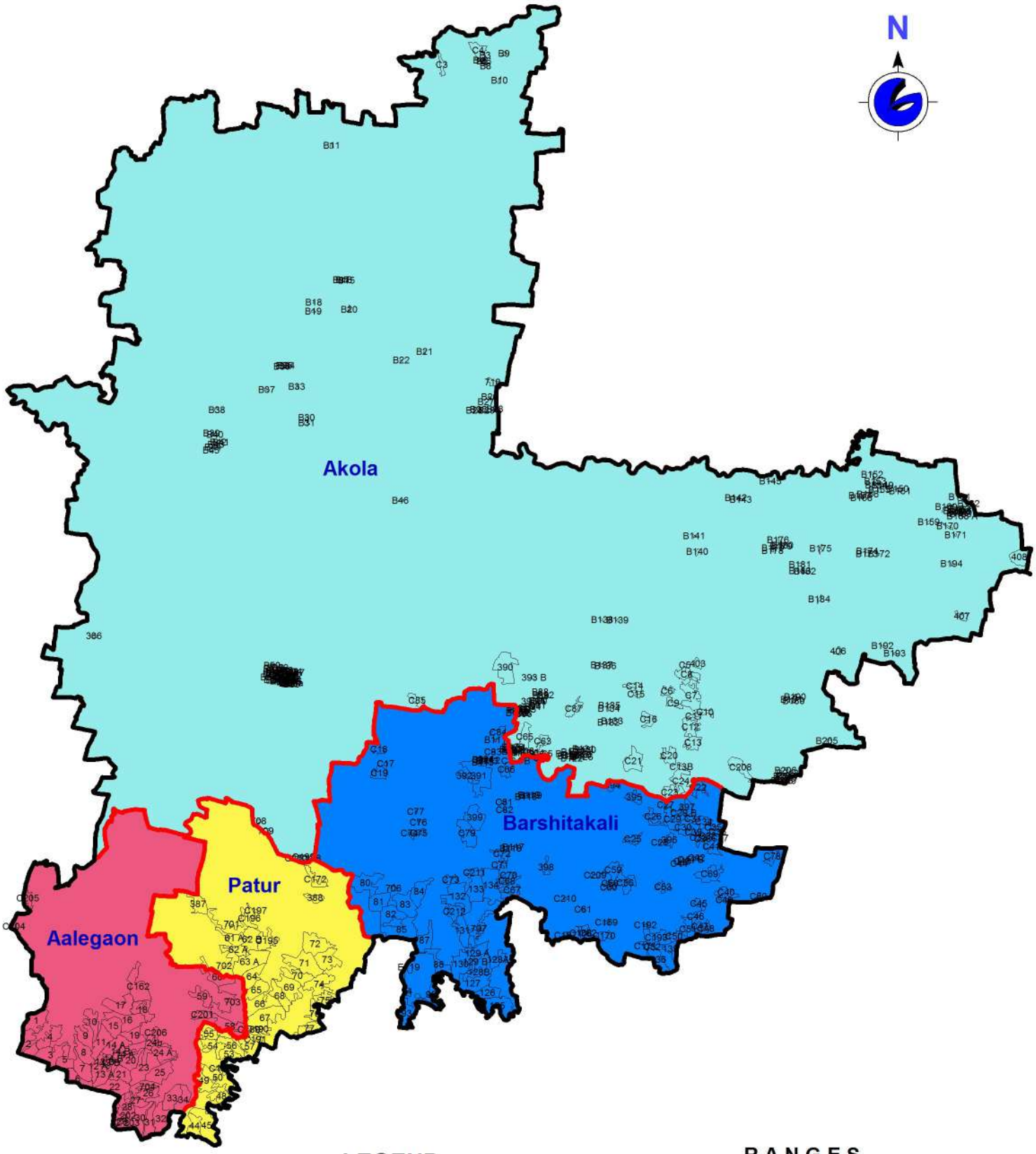
D. OTHERS

List of Algae, Fungi, Bryophytes, pteridophytes found in Akola Forest Division

Sr.No.	Species
1	**Algae –** Spirogyra, Chara, Oedogonium, Hydrodictyon, Mougotia, Oscillotoria, Nostoc, Naviculla, Scenedesmus, Cosmarium, Pinularia, Cymbella.
2	**Fungi –** Aspergillus, Chaetomium, Penicillium, Mucor, Rhizopus, Fusarium, Alternaria, Pyricularia, Curvularia, Helminthosporium.
3	**Bryphytes** – Riccia, Notothallus
4	**Pteridophytes –** Pteris, Nephrolepis, Azolla, Lsoetes.

Akola Forest Division, Akola

Administrative Map



LEGEND

- Division Boundary
- Range Boundary
- Patur — Range Name
- 4 — Compartment with No.

RANGES

- Akola Range
- Alegaon Range
- Patur Range
- Barshitakli Range

Scale

0 5 10 15 20

Kilometers

Scale - 1:500000

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

Part- I

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

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CHAPTER - 1

THE TRACT DEALT WITH

1.1. NAME AND SITUATION:

1.1.1. LOCATION

Akola Forest Division is confined to Akola district of Maharashtra State and administratively under Amravati Forest Circle, since Dated 04/12/2018. Earlier Akola Division was under administrative control of Yavatmal Forest Circle. The Washim Forest Division was created and separated from Akola Forest Division by GR WLP-0718/CR/268/F-1, Dated 4/12/2018. Akola Forest Division situated between latitude 19^0 – 51' N to 21^0 – 17' N and Longitude -76^0 -7' E to 77^0 – 44' East. The details of Toposheet are given in **Appendix No. XIII** of Volume II.

1.1.2. BOUNDARIES.

The District of Akola is surrounded by Amravati District and Satpuda hill ranges in the North and North-East; Washim district is in the South; Buldhana District on the West.

1.1.3. AREA

The Forest area of Akola Forest Division is 377.87 sq. km., out of this 367.75 sq. km is Reserve Forest, 8.75 sq. km. is Protected Forest, 1.37 sq. km. is Un-classed Forest. The forest area of about 9.45 sq. km is transferred to Wildlife.

TABLE NO.1.1

TABLE SHOWING COMPARISON OF AREA UNDER PREVIOUS PLANAND NEW PLAN

(AREA IN HA)

Sr. No.	Forest Category	Previous Plan Area	New Plan Area
1	Reserved Forests	37457.91	36775.26
2	Protected Forests	1235.60	874.83
3	Un-classed Forests	398.44	136.93
Total		**39091.95**	**37787.02**

TABLE SHOWING DIFFERENCE IN AREA OF PREVIOUS WP AND NEW WP

TABLE NO. 1.2

Sr. No.	Item	Area in Ha.
1	Area as per old working Plan	39091.95
2	C.A. Land Received	(+)139.86
3	Area Transfer to Wildlife Division (After Unified Control)	(-)945.30
4	Area Transfer to Washim Forest Division	(-)499.49
Area Dealt for New Working Plan		**37787.02**

TABLE SHOWING AREA OF NEW WORKING PLAN

TABLE NO. 1.3

Sr. No.	Name of Range	No of Round	No. of Beat	Old Compt	New Compt	Area in Ha.			
						RF	PF	UF	Total
1	**Akola**	3	9	212	120	5433.33	55.18	75.81	5564.32
2	**Barshi takali**	4	15	121	113	11620.19	117.9	1.65	11739.74
3	**Patur**	4	17	42	38	8874.24	0	0	8874.24
4	**Alegaon**	4	23	51	46	10847.50	701.75	59.47	11608.72
		15	**64**	**426**	**317**	**36775.26**	**874.83**	**136.93**	**37787.02**

The details of the area transferred to Wildlife Division are given in **Appendix No. XIV** of Volume II.

1.1.4. The area of Akola district is 5845.31 sq. km. The forest area of Akola Division is 377.87 sq.km. area of the district, whereas total forest area is approximately 6.47 % of geographical area of the district.

TABLE NO.1.4

TABLE SHOWING % OF FOREST AREA WITH RESPECT TO GEOGRAPHICAL AREA

	Area in Sq. Km.		
Division/ Sanctuary	**Forest area in**	**Geographical area of District**	**Forest area as % of geographical area**
Akola Division	377.87	5845.31	6.47
Washim Division	4.99		0.08
Narnala Wildlife Sanctuary	21.81		0.37
Katepurna Wildlife Sanctuary	17.70		0.30
Total	**422.37**	**5845.31**	**7.23**

1.2. CONFIGURATION OF THE GROUND:

1.2.1. The Division is the part of *Ajanta* System towards South & *Satpudas* in the North. The *Balaghat* plateau situated on the *Ajanta* hills covers the southern half of the Akola Forest division. The area of Akola Forest Division is situated between the plains of Penganga, Man and the Purna Rivers which known as Payanghat. The average elevation of this plateau in Division is about 396.34m to 548.78 m. above Mean Sea Level (MSL) and Narnala Forest is the highest point is 930m. above Mean Sea Level (MSL). On slopes and ridges of the plateau and in the valleys intervening lie the main blocks of forest.

1.2.2. The vast fertile plain of *Purna* and Penganga rivers known as *Payanghat* extends north of *Balaghat* Plateau; this covers the greater part of the northern half of the Division. As The tract is quite monotonous with undulations just enough to maintain a natural system of drainage.

1.2.3. Towards north of *Paynghat* an elevated natural feature situated in the ranges of *Satpuda* hills. Which is popularly known as *Melghat*. Only a small part of these hills falls in Akola Forest Division.

1.3. GEOLOGY, ROCK, AND SOIL:

1.3.1. Only two geological formations are known to occur in this Division viz. *Purna* alluvium and *Deccan* trap. The *Purna* alluvium is restricted to *Purna* valley and occurs in considerable deposits over trap, which is sometimes mixed up with a calcareous conglomerate. Efflorescence of soda salts occur in some of the Babul bans (now *Prosopis* Forests) situated on the *Purna* alluvium.

1.3.2. The *Deccan* trap, which covers almost the entire Division belongs to the cretaceous period, when sheets of semi-molten trap break through the cretaceous strata and is found in this area in horizontal layers. The underlying rock over the entire Division consists of hard grey basalt, and numerous samples of amygdaloidal with zeolitic vesicles may be seen everywhere. The *Lonar* Lake falls within this region of trap. It is a large hollow, very nearly circular, more than 1.6 km in diameter, with sides almost precipitous. It resembles a crater but is not one. There are, however, no dykes and no trace of ash bed or lava flows, thus there is a total absence of everything that would characterize a volcano. On the other hand, the trap beds around its rim are found to dip away from it, eliminating any chance of its being considered the result of sinking. It is probably an explosion crater.

1.3.3. The soil over the entire trap area varies from a light reddish sandy loam, on the ridges and hillsides, to black cotton soil in valleys and depressions, and on some plateaus. The reddish sandy loam of varying consistency interned with the rounded fragments of the underlying rock covers most of the forest areas. This varies in suitability for the tree growth according to its depth and to the physical characteristics and the structure of the underlying rock.

1.3.4. The soil on the *Balaghat* is in general poor and shallow. Alluvium occurs in some of the large valleys in narrow strips and black cotton soil 0.5 to 1 m in

depth on some parts of the plateau. On slopes, soil varies from Murum to light black. Usually, the hill slopes flanking ravines area covered with boulders strewn over the surface. Teak especially grows well in such localities as these afford a safe lodgment for seeds and a good foothold for tree growth. Basalt, whenever in the form of hard impenetrable rock lies very near the surface, the soil is dry and shallow and quite unsuited to tree growth. In some localities there occur granular laterite beds, which are lacking in moisture and are almost impenetrable by the roots of the trees. The growth on such soils is invariably scanty, stunted, and malformed.

1.3.5. The *Purna* alluvium overlies *Deccan* trap. It consists of black cotton soil with calcareous conglomerate which lies immediately below it. It is invariably found along the river courses along with a soil of light brown in colour, called *Kunkery*, which contains a high percentage of soda salts. The depth of these alluvial deposits exceeds in places to 45 m. In breadth it extends roughly 25 km to the north and 16 km to the south of *Purna* River. In these fertile plains of *Purna*lie the patches of Prosopis Forests.

1.4. CLIMATE PARAMETERS:

1.4.1. Temperature: The climate of *Akola* district in general is dry & hot, the maximum and minimum temperature recorded in *Akola* District is 47°C and 8°C respectively. The temperature rises rapidly after February and continues till May. In the month of May, the mean daily maximum temperature at Akola is 47°C and mean daily minimum temperature is 30°C.

The winter in the Division is moderate. The average daily mean temperature rarely goes below 8°C. It is of short duration i.e., from November to January. The increase in temperature is noticeable during February and the hot season seems to be extending from the beginning of March to the end of June, the hottest months being May and June. In general, it is hotter over the *Payanghat* than on the *Balaghat*. The year wise temperature data for the period from 2008-09 to 2019-20 is shown in **Appendix No. XV** of Volume II.

1.4.2. Rainfall: The average annual rainfall in the district varies from 159mm to 697mm. The bulk of the rainfall is received from the South-West monsoons, which usually break in the latter half of June, continues for nearly three months, and usually ends in the latter half of September. The year wise rain-fall data for the period of 2008 to 2019 is shown in **Appendix No. XVI** of Volume II gives *Tahsil* wise rainfall data of Akola District.

1.4.3. Humidity: In general, the weather condition are dry and hot in this region During the South-West monsoon, The relative humidity is between 60% to 80% where as in summer season the humidity drops down to 20% even less. which is the driest part of the year.

1.5. WATER SUPPLY:

1.5.1. The tract is drained by one main river namely, the *Purna*. The *Purna* which rises near *Bhaisdehi*, in *Betul* district of M.P. flows due West across Amravati and Akola district into Akola. The *Balaghat* plateau is drained north-wards by the *Nalganga*, the *Biswa*; and the *Gyan* in *Akola* district. The *Kate* or Lower *Purna*rises in the *Ajanta* hills to the West of *Akola* district and runs through them paralleled to and south of the *Penganga*. Lower *Purna*dry up during summer leaving only few pools; so also, the nalas and streams running through the forests. Most of the wells are, however, perennial. Wells sunk in *Purna* valley hold brackish water.

1.5.2. Ground Water Status: In the northern portion of the valley, belt an East-West stretch extending for over 30 km, with average width of 6 km, is the potable freshwater belt with a discharge of 8 to 12 liters per second within a depth range of 40 meters. In the southern part of the valley south of river *Purna* there is acute scarcity with the river's alluvium, but the major part of the alluvial portion of the district is generally free from it.

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CHAPTER – 2

MAINTENANCE/INCREASE IN THE EXTENT OF FOREST AND TREE COVER

2.1: AREA OF FORESTS UNDER DIFFERENT LEGAL CLASSES (RF, PF, UF AND OTHERS) DISTRIBUTION OF THE AREA

2.1.1. The total area of Akola Forest Division is 377.87Sq.km. Out of this, 9.45 Sq. Km. is handed over to Wildlife wing. Hence, the net area in charge of Akola Forest Division is 377.87Sq.Km. This Working Plan covers management prescriptions for 377.87Sq.Km.

Table No. 2.1:

Range wise distribution of the forest area (ha)

Sr No	Name of Range	No of Round	No. of Beat	Old Compt	New Compt	Area in Ha.			
						RF	PF	UF	Total
1	**Akola**	3	9	212	120	5433.33	55.18	75.81	5564.32
2	**Barshitakali**	4	15	121	113	11620.19	117.9	1.65	11739.74
3	**Patur**	4	17	42	38	8874.24	0.00	0.00	8874.24
4	**Alegaon**	4	23	51	46	10847.50	701.75	59.47	11608.72
Total		**15**	**64**	**426**	**317**	**36775.26**	**874.83**	**136.93**	**37787.02**

2.1.2: ADMINISTRATIVE UNITS:

For administrative convenience, the ranges, rounds, and beats were reorganised in the year 2018-19 and the entire division has been divided into 4 Ranges, 15 Rounds and 64 Beats.

2.1.3 LEGAL POSITION

The Government forests of originally notified whereas state forest under the Berar Forest (Amendment) Law of 1891 or lands declared as unoccupied Government waste lands. In 1911 the Indian Forest Act, VII of 1878 was applied to Berar because of Government of India's notification No. 2197- I-B, all the State Forests which were notified under Berar Forest Law. Later on, additions and alterations in the Govt. Reserved Forest have been notified under Indian Forest Act XVI of 1927 and was

applied to Berar Forest vide Government of India's notification number 719 – I of 13th December 1927. All the Reserved Forests of West Berar Division was notified and defined as 'A' or 'C' class forest depending upon their constitution of area and the classifications were notified under Indian Forest Act. The changes in 'A' and 'C' class areas were affected by executive orders. The Akola Forest Division has **36775.26 ha** Reserved Forest and 874.83 ha Protected Forest, under the Indian Forest Act 1927, and 136.93 ha. Unclassed forest.

List of notifications of Reserved Forest / Protected Forest is given in **Appendix No. XVII.**

Several alterations and adjustments affecting the area of the Reserve and Protected Forests have subsequently taken place.

2.1.4 RIGHT AND CONCESSIONS:

RESERVED FOREST

There are no rights in the Reserved Forest except the right to way and access to water. There is no commutation of *nistar or paidawar* in the Akola Forest Division. Various concessions have been granted from time to time to the agriculturists and others by the erstwhile Government of Madhya Pradesh and Government of Maharashtra. The following concessions have been permitted:

- The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of the Reserved Forests, in accordance with, the grazing rules in force.
- Agriculturists of villages in the vicinity of the Reserved Forest are given certain quantity of bamboo and firewood for their bona fide domestic use at concessional rates. None of these concessions is a legal right.

The inhabitants of the forest villages were allowed to cultivate the lands allotted to them on payment of nominal rent. They were also permitted to graze their cattle and to obtain timber and other forest produce for their bona fide domestic use as per the rules laid down in MP Forest manual. Since, the transfer of these villages to Revenue Department, they are treated at par with other villages.

PROTECTED FOREST:

Before abolition of the proprietary rights all lands belonged to the proprietors. A village administration paper called "Wazib-ul-arz," was prepared for every settlement; and plots of land were separately recorded, showing the Khasara number and area which was set apart for a particular purpose. Under section 202 of the Central Province Land Revenue Act, 1917, a provision was also made for punishing the violation of any of these customs. Under the provision of the Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahala, Alienated Lands) Act, 1950 (Act I of 1951), all communal and other wastelands became property of the Government while occupied lands continued to be private. To distinguish between the rights existing on the government wastelands and on the other lands, a provision was made in the Madhya Pradesh Land Revenue code, 1957 prescribing the preparation of the Nistar Patrak and Wazib-ul-arz for every village. The Nistar Patrak deals exclusively with management and use of the government land while the Wazib-ul-arz deals with community and customs use over private land.

The nistar officers have formed grazing and nistar zones by clubbing together surplus villages with deficit villages, while self-sufficient villages had been treated as individual zones. Villages assigned to particular zone can exercise their nistar rights within that zone.

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

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

2.2: FOREST AREA UNDER DIFFERENT WORKING CIRCLE:

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

Table No. 2.2: Area allocation to different working circles.

Sr. No.	Proposed Working Circles	Area (ha.)	Percentage
1.	Improvement Working Circle	15120.27	40.01%
2.	Afforestation Working Circle	17468.57	46.23%
3.	Fodder Working Circle	5198.18	13.76%
4.	NTFP Chapter	-	Entire area
5.	JFM Chapter	-	Entire area
6.	Wildlife Management Chapter	-	Entire area
7.	Forest Protection Chapter	-	Entire area
Total		**37787.02**	**100%**

2.2.1: The range-wise allocation of area under the different working circles is given in the following table.

Table No. 2.3: Range-wise area allocation to different working circles

Sr. No.	Range	IWC WC	AWC	Fodder Improvement WC	Total
1	**Akola**	0.00	2700.00	2864.32	5564.32
2	**Barshitakali**	2750.26	7383.62	1605.86	11739.74
3	**Patur**	4418.83	4090.41	365.00	8874.24
4	**Alegaon**	7951.18	3294.54	363.00	11608.72
Total		**15120.27**	**17468.57**	**9198.18**	**37787.02**

2.3: PERCENTAGE OF FOREST WITH SECURED BOUNDARIES:

The forests were clearly demarcated in the past and the boundaries of the forest areas are maintained. The total length of the external boundary Akola Forest Division is 1530.142 kms, out of which 1493.222 kms is artificial boundary and 36.92kms is natural boundary.

The boundary demarcation adjoining to private lands is not properly maintained. The demarcation of Reserved Forests is well maintained as compared to the demarcations of Protected and Un-classed Forests. The precast pillars are not

erected in the field. Proper boundary demarcation and maintenance of boundaries is the need of the hour; encroachments are increasing day by day, specially on those forests which are adjoining to private lands.

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

The total geographical area of the district is 5673 sq. km. of which 387.89 sq. km. is forest. The condition of the forests and forest cover over the last decade during the implementation of the Plan based on the FSI satellite data is as follows:

TABLE NO. 2.4: FOREST COVER OVER THE LAST DECADE DURING THE IMPLEMENTATION OF THE PLAN

SFR Year	Geographical area in sq.km.	Very Dense Forest	Mod. Dense Forest	Open Forest	Scrub	Total
2017	5673	11	110	218	16	339
2019	5673	11	108.44	220.93	16	340.37

There is a decrease in the Moderate Dense Forest in the District but overall, there is an increase of the forest area by1.37**sq.kms**.

The threats to the forests from land use and land 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.

2.4.1: DISFORESTATION PRIOR TO 1980

In this division, the total area disforested is 853.62 ha. Details are given in **Appendix No. XIX.** of Volume II.

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

The Department has received **139.86 ha** compensatory land for various projects. These lands are notified under RF.

The total area of **29.053 ha.** forest land diverted for non-forestry purposes in last 10 years in the division.
The total area of **139.86 ha**. has received as compensatory land in the last 10 years in the division. (2.67 ha. Land is pending for section 20)

The details of the forest area received for compensatory afforestation against FCA 1980 is given in **Appendix No. VII A** of Volume II.

The details of the forest area diverted for non-forestry purposes under FCA 1980 is given in **Appendix No. VII B** of Volume II.

The details of area "Identified Forest" as per Supreme Court's order is given in **Appendix No. XX** of Volume II.

2.4.2 : Area diverted for non-forestry purposes under Forest Rights Act 2006 :

The status of implementation of FRA 2006 in Akola Forest Division (up to March 2020) is as below.

TABLE NO. 2.4.1: THE STATUS OF IMPLEMENTATION OF FRA 2006 IN Akola FOREST DIVISION

Type of Claim	No. of cases received by Gram Sabha	No. of cases rejected by Gram Sabha	No. of cases rejected by SDLC	No. of cases rejected by DLC	No. of cases finally accepted by DLC	No. of cases pending for decision at DLC
Individual	767	491	231	0	48	0
Community	69	13	52	0	10	0
Total	**836**	**504**	**283**	**51**	**58**	**0**

The diversion of forest land to the Traditional Forest Dwellers has fragmented the area of the division. The details are given in **Appendix-V**. of Volume II.

2.5: THREATS TO THE FOREST:

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

2.6: DISTRIBUTION OF DIFFERENT FORESTTYPES:

2.6.1: The majority of the important forests are confined to the hilly region and fall under the "Southern Tropical Dry Deciduous Forests". Dry Teak i.e., 5A/C1 of Champion and Seth's classification. These forests lie on soil derived from trap and are characterized by the presence of Teak of varying quality depending on the configuration of the ground and the depth of soil. The rest of less important forests such as *Prosopis* Forests occur in a few big and numerous small, isolated blocks scattered over fertile plains of "*Purna*" rivers. Areas under "Anjan (*Hardwickiabinata*) are quite extensive where in "*Anjan*" occurs in pure patches or mixed with *Teak* and is representative of the E-3-*Hardwickia* forests of Champion's classification.
For management purpose the following local types can be distinguished: -

TABLE NO. 2.5: FOREST TYPE OF AKOLA FOREST DIVISION

Type	Notation	Type description
I	5A/C1	Dry Teak Forests
II	5A/C3	Open Mixed Forests
III	5A/E2	Salai Forests
IV	5A/E3	Anjan forests
V	5D/S4	Grass lands with brushwood
VI		Prosopis forests

2.7: TREE COVER OUTSIDE FOREST AREA:

The total geographical area of the district is 5845.31 sq. km. of which 422.37 sq. km. is forest. The Plantation/ Tree outside Forests (TOF) for State of Maharashtra according to the State of Forest Report 2021 is 12108 sq. kms adding 3.93% 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 as 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 the years of 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 road-side plantations. It is interesting to note that the Department has also carried out an assessment of the success and survival of these plantations in 2021 and the results are very encouraging.

TREES OUTSIDE FORESTS PLANTED UNDER SOCIAL FORESTRY AKOLA DIVISION DURING THE PERIOD 2008 TO 2018

Between 2008 to 2018, the Social Forestry Akola Division carried out Block plantation for a total of 459 beneficiaries and planted 596 ha. Area. The total number of seedlings planted was 12.42 lakhs of which the total number of seedlings surviving at the time of handing over the scheme was 8 lakhs During this period, roadside plantation of length of 738 km. with 12.42 lakhs planted seedlings was carried out of which the total of 8 lakhs seedlings survived at the time of handling.

The Growing Stock of TOF cannot be assessed due to inadequate data from the SFD. The potential area for extension of Tree outside forest, yet to explored by SFD. Thus, there is a need for proper assessment of Tree Outside Forest should be done by the Social Forestry Division of the District. 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 arrive.

2.8. SHIFTING CULTIVATION (JHUMMING).

Shifting cultivation is not practiced in this forest division.

2.9. COMMITTEE FOR IDENTIFICATION OF COMPENSATORY AFFORESTATION

A Committee for identification of land banks for Compensatory Afforestation was constituted as per Ministry guidelines. The total area of **139.86 ha**. has received compensatory afforestation in last 10 years in the Division. The prescription for compensatory afforestation land is allotted to concerned working circles adjoining to the area. For example, if the CA land is adjoining to Afforestation working circle, then CA land allotted to Afforestation working circle.

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CHAPTER 3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

3.1. FOREST COMPOSITION AND DISTRIBUTION.

The forest of Akola forest division falls under the category of "Tropical Dry Deciduous Forest "of Champion and Seth's revised survey of Forest types of India and belongs to sub group 5A/C1 "Southern Tropical Dry Deciduous Forests". These forests lie on soils derived from trap and are characterized by the presence of Teak of varying quality depending on the configuration of the ground and the depth of soil. The rest of less important forests such as Babul (Prosopis) Forests occur in a few big and numerous small isolated blocks scattered over fertile plains of "Purna" rivers. Areas under "Anjan (Hardwickia binata) are quite extensive where in "Anjan" occurs in pure patches or mixed with Teak and is representative of the E-3-Hardwickia forests of Champion's classification. 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 fires. The illegal fellings are often concentrated on the species most valued for various purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stages, are resistant ones, that can stand to grazing and fires. These species are often of low utility.

a] Dry Teak bearing forests - 5A/C1 :-

In this type superior Teak forest are found which are confined to area crop, better rainfall, its soil condition and area of favourable climatic conditions. These forests are mainly occur in valleys and gently sloping areas with Northern aspects.

These forests are extended on the plateau surrounding the forest villages of Ambabarwa and Chunkhadi continuing upto mangeri village in Ambabarwa reserve. The site quality varies from IVA to IV B. The crop condition is generally well on sheltered lower slopes of hills and valleys of alluvium soils. The crop density varies form 0.4 to 0.6 with some blank and under stocked patches. The Teak (Tectona grandis) is a dominating species,

which constitutes upto 80 % in some of the patches. The crop with its natural associates of Ain (Terminalia alata),. Dhawda (Anogeissus latifolia), Lendia (Lagerstroemia parviflora) shiwan(Gmelina aoborea), Kalamb(Mitragyna paoviflora),Telia,Shisham (Dalbergia latifolia), Bija (Pterocarpus marsupium) etc. The crop is mainly young to middle aged dominating with malformed crop. In some of the patches, the status of natural regeneration is satisfactory.

The Sandal (Santalum album) trees are noticed in Chikalwal round and Narnala forest area. The status of natural regeneration of Sandal is poor. Teak is the most dominating species and with its associates in this forest. The constitution of various species of the crop is given as below :-

Upper Storey: - Teak (Tectona grandis) is principal species and main associates are Dhawada (Anogeissus latifolia), Ain (Terminalia alata), Tiwas (Ougenia oogeinessis), Lendia (Lagerstroemia parviflora) and Tendu (Disopyros melanoxylon). Some of the other associates are Satpudi (Dalbergia paniculata), Bhirra (Chloroxylon swietenia), Kalamb (Mitragyna parviflora), Rohan (Soymida febrifuga), Salai (Boswellia serrata), Semal (Bombax ceiba), Beheda (Terminalia bellerica). Shisham (Dalbergia latifolia), Bija (Pterocarpus marsupium) and Bel (Aegle marmelos).

Under Storey:- The understorey consists of trees shrubs, grasses and climbers. The major species are-

Trees:- Amaltas (Cassia fistula), Aonla (Emblica officinalis), Char (Buchanania lanzan), Dudhi (Wrightia tinctoria), Ghoti (Zizyphus xylocarpa), Palas (Butea monosperma), Dhaman (Grewia tiliaefolia), Moyen (Lannea grandis), Bartondi (Morinda tinctoria), Lokhandi (Ixora parviflora).

Shrubs:- Bharati (Gymnosporia montana), Parijatak (Nyctanthes arbortristis), Mororphali – (Helicteres isora), Dhayati (Woodfordia fructicosa), Raimunia (Lantana camara), Tendu (Diospyros melanoxylon).

Grasses:- Bhurbhusi (Eragrostis tenella), Kodmor (Apluda varia), Marvel (Dilabthium annulatus), Dub (Cynodon dactylon), Paonya (Ischoemum sulcatum).

Climbers:- Palasvel (Butea superba), Mahul (Bauhinia vahlii), Pivervel (Combretum ovalifolium), Chilati (Acacia pinnata), Iruni (Zizyphus oenoplia) Gunj (Abrus precatorious), Ran kand (Dioscorea bulbifera) Ran draksh (Vitex tenuifolia)

All these forests have been worked at least once under some or other form of felling in the past, and as such some sort of age gradations are noticed. The bulk of the crop is young between 15-60 cm. girth classes. The crop has suffered from fire at many places, which have eliminated much of the re-growth of miscellaneous species where fires have been frequent and severe, open stands of Teak poles which are stunted and malformed are visible. Trees of bigger dimensions are rare and are confined to valley portions with better soil.

b] Dry mixed deciduous forests - 5A/C3

These forests formed as the most important common type, situated generally in dry exposed localities where the layer of soil is superficial and the soil moisture is low with heavy grazing and frequent fires. Majority of this forest conformed to site quality IV B however at a very few places it is found patches of site quality III and IV A, which are confined mostly in sheltered pockets, Nala banks and gentle slope plateau, where soils having a considerable depth. Teak occurs in gregarious patches forming 60 to 80% of over wood. At some places Salai becomes a dominating species and on exposed spurs Dhawda comes under Salai. On many sites of old cultivation and open areas Palas, Ain, Lendia and thorny species appear first and Teak follows rapidly. The natural regeneration of teak is sporadic on lower gentle slopes and decreases along the steeper slopes and very sparse on hill tops. Most of the regeneration of teak is of coppice origin. Due to its endurance against fires and other damaging effects.

Trees:- Salai (Boswellia serrata), Dhaora (Anogiesus latifolia), Aonla (Emblica officinalis), Palas (Butea monosperma), Ber (Zizyphus jujuba), Ghont (Zizyphus xylopyra), Ain (Terminalia tomentosa), Ahl (Morinda tinctoria), Jamrasi (Elaeodendron glaucum), Khair (Acacia catechu), Hiwar (Acacia leucophloea), Achar (Buchanania latifolia), Tendu (Diospyros melanoxylon), Amaltas (Cassia fistula), Kalamb (Mitragyna parviflora), Gongal (Cochlospermum gossypium), Mahua (Madhuca latifolia), Moyen (Lannea grandis) and Behera (Terminalia bellerica). Koha (Terminalia arjuna) is common along most of the bigger nallas and streams. Other less common associates are :- Bija (Pterocarpus marsupium), Tiwas (Ougenia dalbergioides), Dhaman (Grewia tiliaefolia), Mokha (Schrebera swietenioides),

Kullu (Sterculia urens), Kusum (Schleichera oleosa), Reproduction of Teak is often quite good and among other species Dhaora, Palas, Lendia, Ain and Kulu regenerate well. Teak and most other species coppice well. Undergrowth is not dense, except in moist valleys or along nala banks where Nirgudi (Vitex negundo), Marorphal (Helicteres isora), and Bhandar (Colebrookia oppositifolia), Bharati (Gymnosporia montana) are found in dense patches. In dry localities Bharati (Gymnosporia montana), Chilati (Mimosa rubicaulis), stunted Khair (Acacia catechu) occur, and at very few places Lantana (Lantana camara) and Kharasi (Byctanthes arobortristis) are found. The principal grasses are Sheda (Schima nervosum), Ghonad (Themeda quadrivalvis), Kusal (Heterpogon contortus), Rusa (Cymbopogon martini) and Bhurbhusi (Eragrostis tenella).

Climbers :- Chilati-choti (Acacia pennata), Malkangni (Celastrus paniculata), Piwarbel (Combretum decandrum), Nagbel (Cryptolepis buchanani), Dudhi (Hemedesmus indicus), Dhimarbel (Ichnocarpus frutescens), Mahul (Bauhinia vahlii), Ironi (Zizyphus oenoplia).

c] Boswellia Forest - 5A/E2

This type of forest covers many reserves in Ambabarwa, Hamdari, Cidona, etc. It occurs almost as a pure crop on dry and exposed soils at mixture with a few scattered Khair, Rohan, Ghont, Chilati, etc. These forests are dominated by Salai and representing of degraded forests. The site quality of Teak is IV B. In many areas Salai crop is mostly malformed and unsound. The reproduction Salai is fairly good whereas natural regeneration of Teak and other species is scanty.

d] Babul Forest - 5A/E3

Babul bans found in water logged areas in some of the broader valleys mainly of Morna reserve of Akola Range. In this area Babul bans are found along streams and nalas.

Most of these forest are situated in the Payanghat however some scattered blocks of forest found on the Northen part of Balaghat plateau commonly known as Babul bans. Three main varieties of Babul have been identified – 1) Telia, 2) Kauria, 3) Ramkati. Ramkati appears like broom with ascending cupressi formed branches. This variety grows faster but occurs in sporadic

form of forest and found adjoining to cultivations. Religious sentiment is attached against the felling of this variety.

The other two verieties can be identified with following features :-

Telia	Kauria
1. Bark relatively smooth and lightly cracked	1. Bark rough and fissured
2. Colour of shoots bright brown spines short slender and few	2. Colour of shoots grey spines long, stouter and numerous
3. Pods monoli form	3. Pods flat but little constricted between the seeds.

Both Telia and Kauria prefer deep moist soils. Telia variety grows faster and long lived. Based on economical value Telia variety is considered as much superior for the purpose of timber used for various agricultural implements. The wood of Telia variety is compact, closed grained, durable and seasons well whereas timber of Kauria variety is coarse, brittle and seasons badly and cracks during the process and it is used rarely. Both the varieties have almost equal fuel value.

Babul (Acacia nilotica) is a strong light demander and it is not a good coppicer, Karuia variety is much more susceptible to fungus attack. Majority of Babul bans consists of Kauria variety and seeds are being disbursed by floods along streams. The growth of Babul is good on deep soil and well drained alluvium along the bank of rivers and Nalas. Kauria grows well on light black soil and poor on shallow and hard soils, slow stunted growth, hardly achieve 20 feet in height. It germinates well and grows faster.

Babul forests occur almost pure. However, at places following species are found scattered in them:-

Apta (Bauhinia racemosa), Ahl (Morinda tinctoria), Amaltas (Cassia fistula), Bahera (Terminalia belerica) Rarely noticed, Chandan (Santalum album), Ghont (Zizyphus xylopyra), Lasora (Cordia myxa), Umbar (Ficus glomerata), Chinch (Tamrindus indica), Jamun (Eugenia jambolana) along nala banks, Kawit or Kith (Feronia elephantum), Katbor (Canthium parviflorum), Kalam (Stephegyne parvifolia), Koha or Arjun (Terminalia arjuna), Lendia (Lagerstroemia parviflora), Maharukh (Ailanthus excelsa), Palas (Butea monosperma), Ain (Terminalia tomentosa), Pakar (Ficus infectoria), Panjra

(Erythrina suberosa), Lokhandi (Ixora pariviflora) and Sitaphal (Anona squamosa).

The undergrowth generally consists of Chilati (Mimosa rubicaulis), Ber (Zisyphus jujuba), Bharati (Gymnosporea montana), Nirgudi (Vitex negundo), Tarwad (Cassia auriculata), Tarota (Cassia tora), Pachara (Capparis grandis), Yelati (Dichrostachys cinerea), Takal (Clerodendron phlomoids) and a few herbs.

The climbers are Chilati- Choti (Acacia pennata), Gunj (Abrus precatorius), Ironi (Zyzyphus oenoplia), Piwarbel (Combretum decandrum), Wassanbel (Cocculus villosus), and Kanchkhuri (Mucuna pruriens).

The common grasses are :- Bhurbusi (Eragrostis tenella), Sheda (Ischaemum laxum), Ghonad (Anthistiria ciliata), Kunda (Ischaemum pilosum), Kushal (Andropogon contortus), Marvel (Dichanthium annulatum), Paunya (Ischeomum sulcatum), Tikhari (Cymbopogon martini), Harali (Cynoodon dactylon), Kusli (Aristida funicalata), Musrut (Iseilma laxum), Nandbar (Panicum javanicum), Pakli (Apluda-varia) and Seprut (Panicum isachme).

e] OPEN MIXED FORESTS: These forests occur intermixed with Teak and Anjan types. Along with the miscellaneous species Teak occurs in strips or patches in areas adjoining Teak forests in all large reserves. Dense patches of better quality of mixed crop are met within the moist valleys along banks of water courses only. Generally these are open formation of very poor quality below site quality IV and are usually situated on soils varying from murum mixed with light black cotton to deep black cotton soils situated on the plateau or on similar water logged areas in some of the broader valleys. The undergrowth is usually dense along banks of streams and in pockets of the hill sides and sheltered slopes but sparse elsewhere. Climbers are found on the banks of the streams. Reproduction of most of the species is inadequate.

The tree species commonly found in the Mixed type of forests are Dhawda (Anogeissus latifolia), Salai (Boswellia serrata), Khair (Acacia catechu), Ghot (Zizyphus xylopyra), Palas (Butea monosperma), Lendia (Lagerstromia parviflora), Amaltas (Cassia fistula), Jamrasi (Cassine glauca), Gongal (Cochlospermum religiosa), Kulu (Sterculia urens), Ain (Terminalia tomentosa), Dudhi (Writia tinctoria), Kalam (Mitragyna parviflora), Tendu

(Diospyros melanoxylon), Achar or Charoli (Buchanania lanzan), Semal (Bombax ceiba), Apta (Bauhinia racemosa), Aola (Emblica officinalis), Mokha (Schrebera swietenioides), Moha (Madhuka latifolia), Kala-shirish (Albizzia lebbek), Chichwa (Albizzia odoratissima), Bija (Pterocarpus marsupium), Shivan (Gmelina arborea), Dhoban (Dalburgia paniculata), Dhaman (Grewia tiliaefolia), Kasai (Bridelia retusa), Pangra (Erythrina indica), Kusum (Schleichera oleosa), Movai (Lannea grandis), Rohan (Soymida febrifuga), Tiwas (Ougenia oojeinesis), Koha (Terminalia arjuna).

The under growth consists of species like Bharati (Gymnosporia montana), Tarota (Cassia tora), Nirgudi (Vitex negundo).

The climbers noticed are Dudhi (Ichnocarpus frutescence), Piwarbel (Combratum decandrum), Malkanguni (Celestrus paniculate), Kanch Khuari (Mucuna pruriens).

Some of the main grass species are- Kusal (Heteropogan contortus), Sheda (Sehima nurvosum), Ghonal (Themada trianora), Rusa (Cymbopogan martini) Bhurbhusi (Erogvostis tenella), Paoniya (Ischoemum sulcatum), Barru (Sorghum halepense)

f] GRASS LANDS WITH BRUSH WOOD type 5D/S4

This type of forest consist of Grass Ramnas or fodder reserves. The woody species occur scattered and principally with Bharati (Gymnosporium montana), Khair (Acacia catechu), Amaltas, Palas, Tendu, etc. The grasses generally found are Kusal (Aristida funicalata), Sheda (Ischaemum laxum), Paonia (Ischeomum sulcatum), Bhurbhusi (Eragrostis tenella), Ghonad (Anthistiria ciliata), Kunda (ischaemum pilosum), etc.

3.2. PLANT SPECIES DIVERSITY

As mentioned above the first exhaustive work was published by the Botanical Survey of India in a document named Flora of Akola District by S. Y. Kamble, Sudhir Gajanan Pradhan, which describes 91 tree species, 97 Shrubs, 255 Herbs, 60 Grass species and 64 Climber/Twiners. They have recorded 16 endemic or rare plants from the district.

FLORISTIC DISTRIBUTION:

Trees:

Teak (Tectona grandis) is the most dominant species. It surpasses all other component species in frequency and density. It is seen mixed in various proportions with other species. Even most valuable species like Chandan (Santalum album) have its appearance in the area. It is because of the efforts by our predecessors of sowing of Chandan seeds in bushes in large areas but this species is again disappearing rapidly. Anjan (Hardwikia binata) is again another dominant species of this area, but it is lopped heavily for fodders. Even illicit cutting of Anjan is common for firewood. Therefore Anjan Forest has a rarely good appearance. Salai (Boswellia serrata) also have presence in large scale. But in the most of the area it is crooked or stunted. Most of Babul (Acacia nilotica) bans were situated in the Payanghat in scattered blocks. But in most of the places this species is replaced by Prosopis juliflora. Ain (Terminalia crenulata), Lendia (Lagerstronia parviflora), Kalam (Mitragyra parviflora), Kulu (Sterculia urens),Dhawda (Anogeissus latifolia), are a most another common tree species. Bija (Pterocarpus marsupium), Shisham (Dalburgia latifolia) have rare appearance.

Bamboos:

Bamboo (Dendrocalanus strictus) very rarely occur with the territory of this Division.

Climbers:

There are as many as 64 climbers/twinners recorded in the district. Mahulvel (Bauhinia valhii),Chilati (Acacia pinnata), and Palasvel (Butea superba) are the main woody climbers. Malkanguni (Celastrus paniculata), Gunj (Abrus precatorius), Kach kuyari (Mucuna pruriens), Gulvel (Tinospora cardifolia), are of medicinal importance. Moist places of the forest abounds in a variety of woody climbers.

Shurbs :

There are 97 shrubs that exists in the area. Raimunia (Lantana camara), Bharati (Meytenius emarginata), Nirgudi (Vitex negundo), Tarota (Cassia tora) are most common Shrubs.

Herbs:

There are as many as 255 species of herbs recorded in the district. Most of the herbs have medicinal value. But herbs like Rantulsi (Hyptis suveolens) and Chatak chandani (Paothenium hysterophorus) are found on large area.

Grasses:

There are few grass lands or fodder reserves in this Division. In most of the grassy blanks, soil depth is less. They are associated with brush wood or stunted tree growth. The most common grass species are Kusali (Heteropogan contortis), Pochati (Apluda mutica), Gondel (Themade triandra), Mothi kusal (Aristida setacea) and Thikhadi (Cympopogan martinii), Marvel (Dicanthian annulatum).

Plant parasite:

The flowering plant parasites occurring in the forests of this Division are Bandgul (Cuscuta chinensis) and Amar vel (Cascuta reflexa), It is noticed that these species are gradually spreading in Ghatbori forest range, away from the human habitations.

Exotics:

The exotic species found in this Division are Eucalyptus hybrid, Eucalyptus camaldulensis, Grevillea robusta etc.

3.3: STATUS OF BIODIVERSITY CONSERVATION IN FORESTS:

The forests of Akola are rich in Biodiversity and areas close to the Narnala and Katepurna Wildlife Sanctuary are particularly noteworthy. However, in view of the presence of large areas under teak, the repeated fires 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.

Assessment of status of plant and faunal species and their periodic monitoring can be helpful in formulating strategies for conservation, maintenance and enhancement of overall biodiversity through sustainable

management and use practices. Assessment of biodiversity especially the lower forms of life (algae, fungi, lichen, epiphytes, parasites, etc.) of a forest division must be made an on-going programme with the support from State Biodiversity Board. All these assessment will help in updating and enriching the Peoples Biodiversity Register(PBR) as provided in Biodiversity Act,2002.

There were 535 Biodiversity Committees formed in Akola Division. Preparation of People's Biodiversity Register (PBR) is under procees in the Division.

The in-situ and ex-situ conservation efforts should be undertaken for sensitive/RET/ IUCN Red List species and their habitats in the Division.

Among the important Schedule I species found in the area of the Division are Panther, Sloth bear,Black buck,Pangolin, Indian White Backed Vulture and Peafowl.

3.4: STATUS OF SPECIES PRONE TO OVER EXPLOITATION

There has been no study with relation to species being overexploited.

3.5: CONSERVATION OF GENETIC RESOURCES

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

(1) There is no identified Fodder resource plot in Akola Forest Division.
(2) There is no identified Preservation plots in Akola Forest Division .
(3) There is no identified Medicinal Plant Conservation Area in Akola Forest Division.

3.6: FAUNA AND THEIR HABITATS.

3.6.1: Distribution of the wildlife

Akola division has a fairly good distribution of wildlife especially around areas adjoining Narnala and Katepurna wildlife sanctuary. Top Carnivore Panther is present. Nilgai, sambhar and cheetal as well as wild

boars are found all over the tract. Jackal, jungle cat and hyaena are also common. Large avifauna can be seen in the tract. Migratory birds near tanks are common during the season. Barking deer, sloth bear, langur and monkeys are also common mammals. Common wild birds include painted sand grouse, common sand grouse, pea fowl, grey jungle fowl, red jungle fowl, red spur fowl, painted partridge, grey partridge, jungle bush quail, black breasted quail, indian bustard quail, common or grey quail, pigeon, crane, dove, cotton teal, whistling teal and comb duck are found in the tract.

The wildlife in the tract dealt with is seriously depleted due to the indiscriminateshooting during the jamindari 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.

3.6.2: DESCRIPTION OF THE WILDLIFE

The division is rich in wildlife. Almost all the forest areas of the division have a good distribution of wild animals, but population density varies with the availability of habitat conditions 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 (Panthera pardus) (ii) Hyaena (Hyaena hyaena) (iii) Jungle Cat (Felis chaus) (iv) Wild Dog (Cuon alpinus) (v) Jackal (Canis aureus) (vi) Common Fox (Vulpes bengalensis) (vii) Leopard Cat (Felis bengalensis)

Herbivora: (i) Bison-Gaur (Bos gaurus) (ii) Sambhar (Cervus unicolor) (iii) Cheetal (Axis axis) (iv) Nilgai (Boselaphus tragocamelus) (v) Barking Deer (Muntiacus muntjak) (vi) Wild pig (Sus scrofa) (vii) Sloth bear (Melursus ursinus) (viii) Black Buck (Antilope cervicapra) (ix) Four horned antelope

(Tetraceros quadricornis) (x) Chinkara or Indian gazelle (Gazella gazella bennettil).

Rodents: (i) Three striped palm squirrel (Funambulus palmarun) (ii) Porcupine.

Reptillia: (i) Softshell Turtle (Lissymis) (ii) Brook's Gecko (Hemidactylus cf. brooki) (iii) Bark Gecko (Hemidactylus leschenaultia) (iv) Square Spotted Gecko (Hemidactylus gracilis) (v) Termite Hill Gecko(Hemidactylus triedus)(vi) Kollegal Ground Gecko (Geckoella collegalensis) (vii) Nebulosus Ground Gecko (Geckoella nebulosi) (viii) Common Garden Lizard (Calotes versicolor) (ix) Forest Rock Lizard (Psamophilus blanfordianus) (x) Fan Throated Lizard (Sitana spinaecephalus) (xi) Common Brhamhiny Skink (Eutropis Carinata) (xii) Littile Skink(Eutropis macularia) (xiii) Little Skink (Eutropis innotata) (xiv) Snake Skink (Lagosoma punctate) (xv) Lined suppled Skink (Lygosoma guntheri) (xvi) Gunther's Snake Skink (Lygosoma guntheri) (xvii) Snake Skink (Lygosoma punctate) (xviii) jerdons Snake-eyed Lizard (Ophisops jerdoni) (xix) Bengal Monitor Lizard(Varanus bengalensis) (xx) Indian Chameleon Lizard (Chameleon zelanicus)(xxi) Bramhiny Blind Snake (Indotyphlops braminus) (xxii) Beacked Worm Snake (Grypotyphlops acutus) (xxiii) Red Sand Boa (Eryx johnii) (xxiv) Common Sand Boa (Eryx conicus) (xxv) Indian Rock Python (Python molurus) (xxvi) Indian Rat Snake (Ptyas mucosa) (xxvii) Common Trinket Snake (Coelognathus Helena) (xxviii) Common Wolf Snake (Lycodon aulicus) (xxix) Barred Wolf Snake (Lycodon striatus) (xxx) Common Kukari Snake (Oligodon arnensis) (xxxi) Russell's Kukari Snake (Oligodon taeniolatus) (xxxii) Common Cat Snake (Boiga tristis) (xxxiii) Forstein's Cat Snake (Boiga forsteni) (xxxiv) Bronze Back Tree Snake (Dendrelaphis tristis) (xxxv) Banded Racer (Argyrogena fasciolata) (xxxvi) Gunthers racer (Coluber ventromaculatus) (xxxvii) Green Keelback Snake (Macropistodon plumbicolor) (xxxviii) Buffstriped Keelback (Amphiesma stolatum) (xxxix) Checkered Keelback Snake (Xenocrophis piscator)(xl) Olive Keelback Snake (Antretium nastus) (xli) Green Vine Snake (Ahaetulla nastus) (xlii) Indian Smooth Snake (Coronella brachyra) (xliii) Indian egg eater snake (Elachistodon westermanni) (xliv) Spectacled Cobra (Naja naja) (xlv) Common Krait (Bungarus ceruleus) (xlvi) Slender Coral Snake (Calliophis melanurus) (xlvii) Saw Scaled Viper (Echis carinata) (xlviii) Russell's Viper (Daboia russelli)

Birds: (i) Painted sand grouse (Pterocles indicus) (ii) Common sand grouse (Pterocles exustus) (iii) Pea fowl (Pavo cristatus) (iv) Grey jungle fowl (Gallus sonne ratil) (v) Painted partridges (Francolinus pictus) (vi) Grey partridges (Francolinus pondicerianus) (vii) Jungle bush quail (Pardicula aisstics) (viii) Black breasted Rain quail (Cturnix coronandelicus) (ix) Indian Bustard quail (Turnix suscitator) (x) Indian or yellow legged button quail (Turnix tanki) (xi) Red spur fowl (Galloperdix spadices) (xii) Crane (Grus antigone) (xiii) Spotted bill duck (Anas poecilorhyncha) (xiv) Pigeon (Treron phoonicoptera) (xv) Dove (Streptpotia spps) (xvi) Cotton teal (Nettapus coromandelianus) (xvii) Whistling teal (Dendrocugnajavanica).

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, when the number of such water holes is drastically reduced and water in a water hole recedes to minimum.

One of the dangerous methods of poaching through poisoning of drinking water by mixing urea in large concentration has been devised by the poachers. When an animal drinks such water, it dies within hours due to intense gas formation in the stomach and choking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets and traps for catching birds, hares and sometimes small animals like deer has been employed in the past but of late the poachers have been found using the improvised traps for killing the large animals like tigers very effectively.

Electrocuting the animals including tigers 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 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) diseases are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (Haemorrhagic Septicaemia) (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 the health of the herbivore population. Outbreaks of contagious diseases like Foot and Mouth Disease drastically reduce the herbivore population.

Fire and habitat damage: Frequent fires damage wildlife habitats, and animals become vulnerable to poaching. Similarly, habitat disturbances of different types create diverse kinds of stress having adverse impact on the wildlife.

Fires are major culprit reducing food availability for the herbivores very drastically. Thus, wild animal habitats are very adversely affected due to recurrence of fires 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.

3.8.1: 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 ex-proprietary forests prior to the abolition of their rights, which was followed by the shooting block system and the licenses similar to the Reserved Forests. Presently, the law does not permit sport hunting of wild animals. The wildlife is threatened by habitat damage caused by factors like increasing human and cattle population, encroachment for cultivation, poaching facilitated by the improved road network and efficient weapons. The poaching problem has attained a menacing proportion as

evident from large seizures all over the country. Greater attention to wildlife management, however, is a heartening trend. The wildlife and the territorial divisions at Akola are 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.

From time immemorial the wild animals have occupied a place of pride in the folklore of Indian culture. They were respected and protected by the tribal's who never used to kill the animals for fun or pleasure. However, hunting became an important pastime for the Rajas and Maharajas who used to hunt and kill the animals for meat as well as for preparing trophies. In the Reserved Forests, hunting was restricted, and licenses were used to be issued for small game, big game, etc. and shooting blocks were set apart, where the animals specified in the license only could be hunted.

Prior to the abolition of proprietary rights, hunting in the malgujari forests was done with the permission of the malgujars. Consequent to the vesting of these forests in the government as Protected Forests, hunting in these forests was also regulated by fixing shooting blocks and by issuing licenses.

However, after the enactment of the Wildlife (Protection) Act, 1972 and subsequent amendments to 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 purposes but only in exceptional circumstances. This act also enjoins on us the responsibility for wildlife conservation outside the protected areas.

The wildlife, which used to flourish in the forests of the division, is threatened due to various factors like population explosion, encroachments, improved network of roads and availability of sophisticated weapons. Due to the increase in demand for wildlife products all overthe world, poaching problems have increased over the years and hence special protection measures are necessary to protect wildlife.

3.8.2: INJURIES DUE TO WILDLIFE

The carnivores, tigers and panthers particularly sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. The villagers sometimes indulge in poisoning the carcass to take revenge and cases of electrocution of wild animals by the villagers to kill the animal suspected to have killed the cattle have also been reported. In such cases the people 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 summarised 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 SA)) due to attack of a Tiger, Panther or any other wild animal. The present rates of compensation as per the GR No.WLP-100S/C.No.2701F-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

Sr.No.	Particulars	Amount to be paid
1	Cow, Buffalo, Bullock	75% of the market price or Rs.10000/- whichever is less;
2	Sheep, Goat, other livestock	75% of the market price or Rs.3000/- whichever is less;
3	Cow, Buffalo, Bullock became permanently handicapped	50% of the market price or Rs.3000/- and whichever is less;
4	Injury to Cow, Buffalo, Bullock, Goat	Treatment cost. (Govt. or ZP Hospital) 25% of the market price or Rs.1000/- whichever is less.

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

1. Death to be reported within 48 hours.

2. The carcass is not to be removed before the 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 under DCF.
6. No compensation in case the livestock was grazing illegally.

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/C.No.337/F-l, dt.30/03/2013 and 16/1/2015. These are as follows:

TABLE NO. 3.5: COMPENSATION FOR THE INJURY AND LOSS OF HUMAN LIFE

S.N.	Particulars	Amount to be Paid
1	Death	Rs.8.00 lakhs.
2	Permanent disability.	Rs.4.00 lakhs.
3	Major injury	Rs.1.00 Lakh.
4	Minor injury	Upto Rs.15000
Note: Cost of medication, preferably in govt. hospital, but in case of unavoidability, private medication.		

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

1. Such an 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.

3.8.3: LEGAL POSITION

The first step towards the protection of wildlife was taken by including certain provisions, in this regard, in the Berar Forest Act of 1886. Under Section (3) sub section 7, the definition of forest produce incorporated the 'skins, tusks, bones, and horns' and as per Section 10, sub section 4, 'The residency by orders may regulate any part of the State Forests for hunting, shooting, fishing, poisoning water and setting up traps or snares."

The Berar Forest Act, 1886 amended in 1891 provided under section 7(b) that Forest Produce includes the following when found in or brought from a forest: "Wild animals, skins, tusks, horns, bones, silk cocoons, honey and wax and all other parts or produce of animal." Section 7 (2)(b) of this act after this amendment provided that anyone who hunts, shoots, fishes, poisons water or sets traps or snares, shall be punishable with the fine which may extend up to fifty rupees or, when the damage resulting from the offence amounts to more than twenty-five rupees, to double the amount of such damage. Section 1 0(4)(iii) of this act empowered the resident to frame the rules regarding regulation of hunting, shooting, fishing, poisoning water and setting traps and snares.

Vide Notification G.LF.D. No. 2197-1-B, dated 13th October 1911, the Indian Forest Act, 1878 was also made applicable. Section 2(b)(iii) included wildlife in its definition of the forest produce. Section 25 (i) provided that any person in contravention of any rules, which the local Government may from time to time prescribe, kills or catches elephants, hunts or shoots fishes, poisons water or sets traps or snares shall be punishable with imprisonment for a term which may extend to six months or with fme not exceeding five hundred rupees or with both in addition to compensation for damage done to the forests.

After the promulgation of the Indian Forest Act 1927, rules relating to wildlife regulations were framed under section 26(I) and 76(d). These were

essentially to regulate hunting of wild animals. The 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 Vidarbha 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 were also applicable outside the Reserve and the Protected Forests.
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 games into four categories, viz. small game, big game, special big game, and pet animals.
4. It also sought to control transactions in trophies and other wildlife products.
5. Wildlife Advisory Board was constituted under this act to advise the government on various important 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-ordinated 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 regarding 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 1 st 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. The 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 III 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 Recognition of Zoos Rules, 1992.
7. 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 PAs.

MANAGEMENT OF WILDLIFE: Wildlife and its management in Akola Forest division have been discussed in detail in part 2 of Volume I of this working plan, under Wildlife Management Chapter. 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 Management Chapter 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 was collected by SOFR unit Amravati during collection of enumeration data. The seedlings were enumerated in the following three categories as R1 upto1 m height, R2 with 1 to 2 m height and R3 above 3 m height. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The status of natural regeneration is extremely poor. The natural regeneration of teak and its associates is very poor and restricted to a few patches of selected sites. Whatever regeneration occurs in the rainy season, fails to establish owing to climatic as well as biotic factors. Heavy grazing, fire incidences, trampling due to cattle movement, human population pressure to meet their demands like firewood and small timber, poor site quality and erratic rainfall are major factors that influence the establishment of regeneration in this forest area. The regeneration data shows that there are 5313 seedlings of upto 1 m height, 2256 seedlings between 1 to 2 m height and 1912 seedlings above 3 m height in a hectare in these forests. The total number of seedlings is 3160/ha. The table of regeneration is given below.

Table No.4.1: Regeneration status

Sr. No.	Range	No. of sample	No of seedlings/ha			Total
			R1	R2	R3	
1	Akola	116	3250	855	245	1450.00
2	Barshitakli	232	5105	2882	2980	3655.67
3	Patur	184	4030	1468	1630	2376.00
4	Alegaon	227	8867	3818	2792	5159.00
Total		**759**	**5313**	**2255.75**	**1911.75**	**3160.17**

4.2: AREA AFFECTED BY FOREST FIRE:

The area of Akola Forest Division is prone to fires due to deciduous nature and the dry climate. Fire is one of the most destructive agencies of forest development which takes place during the dry season that starts from February continuous up to June. The details of forest fire are given in **Annexure-XII.** During this period the forests are very vulnerable to fires and the fires that take very end of winter and at the beginning of summer are not that much damaging. Most of the fires that are taking place in these forests are manmade and accidental which hamper the establishment of natural regeneration. The leaf litter on the ground and highly combustible undergrowth of grasses catch fire immediately and spread instantly. The damage is very severe when freshly felled material is lying in the coupe and fire takes place in the plantation. Young regeneration suffers a lot mainly of teak and other species get damaged or killed due to die back. In this area fires are put by grazers, intentionally or unintentionally, villagers who go for Mohua collection to forest. Repeated fires in the forest areas of this dry zone during the dry season cause extensive damage to the tree growth and reproduction. Late fires in the grassy areas or in closed coupes result in fire calamity. In this area fires are generally ground and creeping fires. Fire causes extensive damage to the forests especially forest growth, regeneration, ground flora, soil micro-organisms and soil productivity.

4.3: AREA DAMAGED BY NATURAL CALAMITIES:

4.3.1. By Drought: The erratic and scanty rainfall in every year caused drought like conditions in the recent past. The drought affects the growth of plantation, establishment of regeneration and growth of forest crops as soil moisture and water are vital ingredients of growth and regeneration.

4.3.2. By Frost: Injury due to frost is not seen in this area.

4.3.3. Damage by Wind and storms: No considerable damage is noticed due to windstorms in this area.

4.3.4. Soil erosion: Soil erosion is noticed in this area especially along the river Purna and its tributaries. Sheet erosion is common in the entire area.

Gully formation takes place due to erosion along the riverbanks. In some of the areas the roots of trees are exposed due to excessive erosion of soil leading to windfall of trees.

4.4: AREA PROTECTED FROM GRAZING:

Grazing by domestic animal's damages forests by destroying young regeneration, plantation due to trampling of the areas and excessive movement of cattle population leads to compaction of soil resulting in the less porosity of the soil which is less conducive for the establishment of young regeneration. Uncontrolled cattle movement is common in the forests around the villages. The incidences of grazing are high in and around the forest areas where villages are situated. Continuous, unlimited grazing is very much harmful for tree growth and for the establishment of regeneration. The forest will establish in the areas where there is regulated grazing or no grazing, while considerable damage has been noticed in the areas where there is excessive grazing more than the carrying capacity of the forests. Grazing in the forests is not uniform as cattle population is restricted to village areas and villages in turn are nearer to water spots. The grazing pressure is high in the forests, especially in the summer season *i.e.,* February to June. During this period the forests go dry, and, in some areas, the grazers indulge in lopping of trees to feed their cattle. The sheep and goats are not allowed to graze in the forests which are meant for production of timber. However, the forests are still suffering from grazing of sheep and goats in this region.

4.5: LOPPING PRACTICES:

Lopping is seen mostly in forest areas adjacent to the villages. Grazers also do lopping while grazing their cattle.

4.6: AREA INFESTED BY INVASIVE WEED SPECIES IN FORESTS:

Damage by climbers is mostly confined to the forests along the riverbank of Purna and along the nalla banks in this area. Cheelati, Ironi are the main climbers which cause harm to the forest in this area. Sometimes damage by Lantana is also noticed affecting both regeneration and growth by covering forest growth and competing for spaces.

4.7: INCIDENCES OF PEST AND DISEASES:

When Plants are injured may be due to Fire lopping, Felling of Trees during harvesting and such other reasons they start becoming vulnerable to diseases and pests. softwood species like Salai, Mowai, Bhera are attacked by wood borer in sect all species are susceptible to attack of Fungi and Mould, such tree starts decaying and tree quality deteriorates.

4.8: FOREST DEGRADATION AND ITS DRIVERS:

The forests of Akola Forest Division mostly suffer from unregulated grazing, illicit felling, encroachments, and repeated fires significant damage caused by these agencies coupled with erratic rainfall. The other agencies which caused injury to the forests such as droughts, frost, floods, plants, and insects are negligible.

Degraded scrub forests: These forests are highly degraded with malformed stunted teak growth. These forests are characterized by a very little tree growth and in some patches without any tree growth. Some of these forests are managed under pasture, under fodder reserved in the previous Working Plans. The “C” class Reserved Forests of this division falls in this category of the forests. The floristic composition is like that of good quality and crooked quality teak forests except that they have a very few trees and mainly contained scrub and grasses. Most of these areas situated adjoining to the villages bearing heavy biotic pressure for a long time and degradation has taken place over the years due to unregulated grazing, frequent fires, and heavy illicit felling. The soil is generally murumy, very dry, highly compact open without any humus. The degradation of the soil takes place over the years and due to that the moisture content and the absorption capacity of most of these forests are very low.

Illegal Cutting: Illegal Cutting is common and increasing day by day both for commercial and domestic purposes. Local people in and around the forest area of the division may indulge in Illegal Cutting for meeting their domestic needs such as requirement of fuel, small timber, firewood as there is a huge gap between demand and supply of forest produce. People generally indulge in Illegal Cutting due to unemployment, higher prices of some of the forest products in the market like teak. These social causes make the people to indulge in Illegal Cutting. Lopping of trees and shrubs for rab burning of field

has further deteriorated the situation. In general, Illegal Cutting, lopping, and pollarding of forest species has further deteriorated the forest crop in terms of quality and quantity of the forests.

Table No. 4.3: List of Offence Cases

Year	Fire	Grazing	Illicit felling	Others	Total
2009-2010	29	12	397	147	585
2010-2011	31	7	404	114	556
2011-2012	12	8	583	203	806
2012-2013	32	11	455	242	740
2013-2014	29	3	269	252	553
2014-2015	45	2	297	253	597
2015-2016	05	9	439	276	729
2016-2017	11	8	395	137	551
2017-2018	42	10	510	191	753
2018-2019	22	9	514	164	709
Total	**258**	**79**	**4263**	**1979**	**6579**

Encroachments:

Encroachment is not so serious in this area but forest areas adjoining agricultural fields of farmers are being encroached especially during the month of monsoon. Some of the forest areas have been cleared, denuded, and utilized for agricultural purposes. The total area under encroachment in the division is 52.139 ha. The details of encroachment are given in **Appendix-XXI.**

Damage by wild animals:

In this area Nilgai, Sambar and Chital cause lot of damage to the young regeneration due to grazing by these animals. Also, wild pigs, hares, and porcupines cause damage to the plantation. Wild pigs' damage is noticed in bamboo plantation at the young stage. The porcupines usually eat the rhizome, bark of Haldu, Moha and Amaltas near the base of the tree, which hampers the proper establishment of the tree. Monkeys cause considerable damage to flowers and fruits of the trees. Chital cause damage to the bark of the Shivan at the base thereby girdling the tree, which results in the death of the tree. The damage caused by wild animals is not that serious when compared to damage caused by the other domestic animals. Moreover, the wild animals' damage to the forests is compensated both in the form of propagation of regeneration activities and maintaining the health of forests by removing excess of certain trees and hence maintaining biodiversity.

Mining: Mining is prohibited in the forest areas by the Act. There is no report of illegal mining/quarrying in the forest area.

4.9: POLLUTION CONTROL AND PROTECTION OF ENVIRONMENT:

Environmental pollution is the introduction of contaminants into the natural environment that causes adverse changes. Pollution can take the form of chemical substances or energy, such as noise, heat, or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution. Pollution control is a term used in environmental management. It means the control of emissions and effluents into air, water, or soil. Without pollution control, the waste products from overconsumption, heating, agriculture, mining, manufacturing, transportation, and other human activities, whether they accumulate or disperse, will degrade the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control.

Pollution is the outcome of human activities, particularly carried out in connection with industrial development. As such pollution is a recent phenomenon. Nevertheless, some of the pollutant substances such as smoke, ash, lava and toxic gases that have come to be categorized as air pollution

were already being produced by jungle fire and volcanic eruptions long before man came on this earth. Problem of environment pollution became serious when man arrived on the scene a million years ago. As the activities of human beings have increased, problems of environment pollution too have become acute.

Though there is no severe pollution in forest areas of Akola division, incidences of water pollution due to heavy usage of fertilizers for agricultural crops in fields adjacent to forest areas are noticed. Air pollution occurs due to vehicular traffic on roads and brick kilns operating in the areas adjacent to forest areas. There is no heavy pollution caused by industries in this division.

Law relating to environment protection:

In the Constitution of India there was no entry on environment protection in the legislative lists. In 1976 the Indian Parliament through 42nd amendment to the Constitution of India incorporated two articles. 48-A and 51-A(g) relating to the environment. Article 48-A directs the State to endeavor to protect and improve the environment in the forest and wildlife field of the country. Article 51-A (g) imposes on the citizens of India, a fundamental duty to protect and improve the natural environment.

In 1992, by way of the seventy fourth amendment, article 343-W and the Twelfth Schedule entry of 8 were incorporated in the Constitution of India. Accordingly, a state legislature can pass legislation on Urban Forestry, protection of the environment and promotion of ecological aspects.

1. The environment (Protection) Act 1986 (EPA) was passed under the provisions of Article 253 of the Constitution to achieve the following objectives.
2. To implement the decisions taken at the UN conference on the Human Environment held in Stockholm in June 1972.
3. To enact general laws on environmental protection which could cover gaps in the areas of major environmental hazards as the existing laws generally focused on specific types of pollution.

4. To coordinate activities of the various regulatory agencies under the existing laws and creation of an authority or authorities for environment protection.
5. To provide a deterrent punishment to those who endanger human environment safety and health.

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CHAPTER-5

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

5.1: AREA TREATED UNDER SOIL AND WATER CONSERVATION MEASURES SOIL EROSION

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. Similarily, reducing erosion will usually involve preventing splash erosion, or formation of crusts, 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 Dams in and near Forest 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.

A large proportion of area is adjoining to various protected areas. Hence, deep CCTs should be avoided to damage obstruction to wildlife. 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.

2. SOIL CONSERVATION AS PART OF COUPE WORK

(i) Nala Bunding and Check Dams : The primary objectives 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 loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.

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 variation 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 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.

Soil erosion adversely affects the fertility status and land use. National Bureau of Soil Science and Land-Use Planning have grouped into different erosion classes, their areal extent and expected soil loss is given below:

TABLE NO. 5.1: DIFFERENT SOIL EROSION CLASSES

Erosion class	Area		Expected soil loss (tonnes ha -1yr-1
	Ha	(%) TGA*	
Slight	440.78	0.12	5-10
Moderate	0	0	0
Severe	976.35	0.56	10-15
Water bodies	82.03	0.55	10-15

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 level and water holding capacity of the soil.

The exact area treated under soil conservation cannot be assessed as no special work for soil conservation alone is carried out but SMC works form part of the plantations works.

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

There are one main rivers flow in this division, this is the Purna. Katepurna, Shahanur, Morna, Mun, Nod, Uma, Vidrupa are the tributaries of the Purna river. The villages which are situated on the banks of these river and their tributaries are generally better placed for drinking water. The other villages have a lot of problem of drinking water especially during the months of summer. Eratic rainfall in the past few years has aggravated the situation of drinking water in this division. In the year 2005 there was lot of scarcity for drinking water in Akola town and a special train was arranged for drinking water supply to Akola city by the district administration. The ground water potential is very poor especially in Akola and Akot tahsils which is aggravated by salt water availability in the ground water. Precipitation is received mainly through South-West monsoon and it is harvested in dams, tanks and wells.

The drainage system in the division includes one major river i.e. The Purna. The other minor rivers are tributaries of the above rivers. They are the Katepurna, Shahanur, Morna, Mun, Man, Nod and Uma which are the tributaries of the Purna river.

1. **Purna River :** It is a perennial stream of the Payanghat plain which rises in the South facing scarps of Gavilgad hill range in the districts of Amravati. It flows towards the West of the district, forming Northern boundary of the tahsils Murtizapur, Akola and Balapur and the Southern boundary of Akot tahsil. The Purna river is not navigable though it is a perennial river because of siltation at many places. At many places, its channel is 30 meter deep and 200 meter wide. The bank of the river is generally of soft alluvium. A large number of streams rising in the scarp to its North and to its South, joining the river forming a fairly dense drainage network in this region. Most of the tributaries of the river Purna look like water pools during hot weather and developing swirling floods during rainy season. The river has length of 100 Km in the Division and its banks are badly broken and dissected by a strong rill erosion undercutting of bank. The valley of Purna has many streams developing into a sub - parallel drainage system to the main river before their confluence with the main river. The Katepurna tributary is the most significant out of all the tributaries of the river Purna.

2. **Katepurna River :** The Katepurna is the most significant tributary, which rises in the Northern slopes of the Ajanta hill ranges about 7 Km. North of Washim at an elevation of approximately 320 meter from MSL. The flow of the river is Northern in a non- perennial channel, having overall turn by sharp bend Westwards and Northwards and the banks are mostly liable for erosion.

3. **Uma River :** It rises in the extreme Southern parts of Murtizapur tahsil near the village Poho and flows to the North. The river is almost perennial and it has a fairly straight course, braided in section and crossed at many points by fords. It confluence the Purna river near the village Durgavad about 10 Km upstream of the river Katepurna confluence after flowing sub-parallel to main river on its left bank for about 10 Km. The river has low banks throughout the length having a

narrow channel and is liable to flooding during the rains. The river has got length of about 60 Km. entirely flows within the division.

4. **Morna River** : The river Morna takes its birth in the of Malegaon tahsil of Washim district near Shirpur village and flows through an open and flat country of the plateau, before crossing to the large village of Medsi on the edge plateau. The river goes through the ghats in a romantically picturesque country. Its sharp bends in between interlocking spurs developing a deep valley with a cliff face on the outer bank and wide deep alluvial flats on the inner bank before entering into Payanghat plain. In this section, the Purna – Akola -Khandwa railway line closely passes the river and sticks to the narrow edge adjoining the valley side and crosses the river at no less than four different places to gain foothold from one side of the deep valley to other. Descending down from the scarp the river flows through a fairly gentle sloping country with a perennial channel on its bed. It forms a kind of cut of Akola town just after it will join on its right bank by the tributary, Indrupa. In Its lower course the river has developed extensively meander and cut off loops unlike many other left bank tributaries of the Purna. It develops a sub - parallel course for nearly 20 Km before joining the main river near the village Andura. The total length of the river is approximately 120 Km.

5. **Mun River :** It rises in the Northern Ajanta scarps of Chikhali tahsil of Buldhana district and flows East through the Ghatbori Reserved Forest area to enter the district of Akola. Another tributary rising the Uttavli scarps in Buldhana District and joining the Mun at foot of scarp near the village Pimpalkura after which the river flows Northerned is cut by another stream the Vishwamitri rising and a similar scarp within the district and flows in Northward direction and confluence North. The river flows through a flat alluvial country making curves and graceful meander. The river Mun flows through Balapur township, and it is joined by a small tributary the Mas River and flows downstream where the river Nirguna and its tributaries join Mun river. Both the Nirguna and Its tributary the Bordi river which rise in the Medsi and Patur Reserved Forests of the ghat country and flow North. After its confluence with the Bhuikund the Mun river is crossed by the Mumbai - Nagpur railway line over a bridge which is South- East of Nagzari railway station. The Mun river has got a fragile bank which are highly gullied very much

liable for soil erosion which confluence the Purna river near the village of Khajikhed on it left bank. It forms a for quite distance the boundary between the Buldhana, Akola and Washim district.

6. The tributaries of Purna joining at the right bank from the North are comparatively smaller hill torrents draining the foothill slopes of Melghat. Out of these the Nagzari, the Gautami, the Witruba and the Shahanur are the most important tributaries. The river Shahanur was diverted at Dahihanda at the end of last century in the South-East of the Akot tahsil, so that it joins the Purna immediately enter in the districts with new channel carries the water so rapidly, that it always remains dry except during the short intervals of floods. The total length of this river is 120 km. All these tributaries of Purna by and large are dry in the lower courses and their banks are fragile which are subjected to heavy gully erosion in thick deposits of alluvium therefore the villages located on the bank of these tributaries are subjected to floods during rainy season. Many villages and larger township are located along the banks of these tributaries and these townships mostly depend upon for drinking water. The left bank tributaries of Mun river are much more important than the right one and the main river itself flows closer to the Northern scarp's slopes than the Southern one.

7. **Lakes and Tanks :** There are many perennial tanks and lakes especially in the Payanghat plains of the division have a few tanks are found around the villages of Mardi, Punda situated in the foothills of Akot tahsil. The villages Banbada- budruk, Kutasa both are in Shahanur valley and Ghusar and Akhatwada which are in minor tributaries on the left bank of the Purna. A few perennial tanks are found in the trap country of the Washim plateau around Mohaja, Bhat, Wakad, and Risod all these are mostly small basins like depressions collecting the rain water from Amphitheatre like basin and supplemented springs. They provide locally drainage system, which are around tanks and lakes.

8 **Springs :** A number of springs occur on the Southern slope of Balaghat plateau descending down to the Godavari valley. These springs occur at 500 meters MSL formed probably good exposure and intra –trapper aquiver. These springs are uncommon and the Northern scarp slope.

Table No. 5.2: Major Dams in or in the Vicinity of the Forest Areas

Sr. No	Name of the Dam	Range
1	Morna	Patur
2	Nirguna	Patur
3	Mahan	Barshitakli
4	wan	Akola

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 avi-faunal documentation of the areas. 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 no records of the water levels of the wells within its jurisdiction and some villages. 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. is implemented for whose Micro plan have been prepared. Records can also be obtained from the Groundwater Surveys Development Agency. This information needs to be submitted and to be formed as part of the Plan.

IRRIGATION

Irrigation is one of the most important inputs for development of agriculture. The main sources of water supply are open well irrigation canal, river. Lift irrigation is also quite common in these areas.

There are more than 35 Irrigation projects , 4 medium and the remaining are minor projects.

Medium Projects 1. Katepurna 2. Uma 3. Morna 4. Nirguna **Minor Projects** 01. Januna 02.Pimpalgaon Hande 03. Pimpalgaon Ch. 04. Sisa Udegaon 05. Borgaon Manju 06. Wathod 07.Amdari	08. Singdoha 09. Tuljapur 10. Nagri 11. Sawerkheda 12. Ghota 13. Mahan 14. Ridhora 15. Sonkhas 16. Pimpri Kh. 17. Dharur 18. Nandkhed 19. Bhilkhed 20. Ghonga	21. Hiwerkhed 22. Zodga 23. Khondala 24. Karhal 25. Aslola Ghana 26. Jawla 27. Waghi 28. Kolambi 29. Koyali Tank 30. Borgaon 31. Mohagaon

The network of canals from dam is to point of utilization of water and lifting of water from dams and wells with the help of electric and diesel pumps are the major sources of irrigation. There is a need to collect the data for the whole 5 km radius from the forest vicinity and to monitor the rise and fall of the levels over the seasons and the years.

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 sustentative 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 facts, 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. This is predominantly due to decrease in recharge due to water conservation structures. During the field visit it was observed that the water conservation structures are not being de-silted annually throughout the State. This has directly reflected in reduction of recharge due to water conservation structures. Thus there is dire need to carry out the de-silting of water conservation structures in programme or movement mode.

5.5.2: Effect of Rainfall on Groundwater Availability

The rainfall is the primary source for the yearly replenishable groundwater 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.

Table No. 5.4: Assessment of Dynamic Ground Water Resources of the Maharashtra Administrative Unit wise Categorization 2011-12

Sr. No.	District	Admin-iterative Unit	Stage of Ground Wate Development %	Pre-monsoon		Post-monsoon		Category
				Water level Trend	Is there a significant decline	Water level Trend	Is there a significant decline	
15	Akola	Akola	43.23	-5.02	No	-8.94	No	Safe
16	Akola	Akot	72.40	-10.57	No	-13.70	No	Safe
17	Akola	Balapur	42.78	2.56	No	0.29	No	Safe
18	Akola	Barshitakli	37.00	-0.19	No	-3.58	No	Safe
19	Akola	Murtijapur	47.17	-5.04	No	-10.37	No	Safe
20	Akola	Patur	45.43	0.10	No	-0.29	No	Safe
21	Akola	Telhara	35.83	-20.33	No	-20.84	No	Safe

5.5.4: Aquifer Parameters

According to the pumping tests conducted on wells piercing Alluvium and Deccan Trap Basalt in the district of Akola have revealed that transmissivity for

Alluvial formation range from 0.89 to 1475.96 m2/day and Pumping tests conducted on exploratory wells piercing Deccan Trap Basalt have revealed that transmissivity varies from 8.35 to 395.85 m2/day whereas storability ranges from 8 x10-8 to 4.2 x 10-2.

5.5.5: Ground Water Resources

As per the Ground Water Information Akola District of the CGWB Report of 2013, Central Ground Water Board and Groundwater Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Akola district based on GEC-97 methodology as on 2009. Ground Water Resources estimation was carried out for 5119.45 sq. km area of which **47.29** sq. km is under command and **4313.08** sq. km. is non-command. About **760** sq. km. area has poor quality of ground water. Taluka wise ground water resources are shown below:

Table No. 5.5: Taluka wise Ground Water Resources of Akola 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 (%)
1	2	3	4	5	6	7	8	9
Akola	Command	962.55	367.94	20.40	388.34			
	Non-Command	3980.89	1525.91	222.69	1748.59			
	Total	**4943.45**	**1893.85**	**243.09**	**2136.94**	**489.24**	**2562.24**	**43.23**
Akot	Command	878.39	717.85	17.46	735.31			
	Non Command	3870.95	2640.07	63.25	2703.33			
	Total	**4749.34**	**3357.92**	**80.71**	**3438.64**	**161.28**	**1265.45**	**72.40**
Balapur	Command	386.61	277.06	17.26	294.33			
	Non Command	4160.83	1519.67	131.38	1651.05			
	Total	**4547.43**	**1796.74**	**148.65**	**1945.38**	**297.29**	**2453.41**	**42.78**
Barshitakli	Command	744.10	210.40	23.87	234.26			
	Non Command	6218.56	2127.31	214.28	2341.59			
	Total	**6962.66**	**2337.71**	**238.14**	**2575.85**	**473.45**	**4138.46**	**37.00**

1	2	3	4	5	6	7	8	9
Murtijapur	Command	580.55	481.93	40.22	522.15			
	Non Command	4739.75	1779.95	207.27	1987.22			
	Total	**5320.30**	**2261.89**	**247.49**	**2509.37**	**494.86**	**2565.96**	**47.17**
Patur	Command	1029.97	714.54	51.60	766.14			
	Non Command	4749.99	1778.60	81.02	1859.63			
	Total	**5779.96**	**2493.14**	**132.62**	**2625.76**	**265.24**	**3021.58**	**45.43**
Telhara	Command	3809.76	1047.69	38.06	1085.76			
	Non Command	3866.57	1596.53	68.32	1664.85			
	Total	**7676.33**	**2644.22**	**106.38**	**2750.60**	**212.80**	**4792.75**	**35.83**
Total	Command	8391.93	3817.41	208.87	4026.29			
	Non Command	31587.54	12968.04	988.21	13956.26			
	Total	**39979.47**	**16785.45**	**1197.08**	**17982.55**	**2394.16**	**20799.85**	**44.98**

As per the estimation the total annual ground water recharge is (3997.94) MCM with the natural discharge of 57.10 MCM, thus the net annual ground water availability comes to be (3997.94) MCM. The gross draft for all uses is estimated at (179.82) MCM with irrigation sector being the major consumer having a draft of (167.85) MCM. The domestic and industrial water requirements are worked at (23.94) MCM. The net ground water availability for future irrigation is estimated at (207.99) MCM. Stage of ground water development varies from 35.83% (Telhara) to 72.40% (Akot). The overall stage of ground water development for the district is 44.98%. In general, the level of ground water development in the district is quite low and all the Talukas fall in “Safe” Category.

5.5.6: Ground Water Development

Almost entire district is underlain by the Deccan Trap Basalt formation. Isolated areas in the northern and central part of the district are hilly and have poor ground water development potential. The ground water development potential is low in the northern part, along the hills. The ground water in areas underlain by Deccan Trap Basalt may be developed through dug wells and dug-cum-bored wells (DCB). Borewells may be suitable at locations where fractured Basalt or inter-low zones form the deeper aquifer, particularly the area with high development potential. However, the sites for borewells may be located after proper scientific investigations.

Alluvial aquifers in the district are restricted to small areas along the rivers and do not form significant aquifer. The ground water in these areas may be developed through dug wells and dug-cum-bored wells.

Table No. 5.6: Nature and Yield Potential of Aquifers

Sr. No.	Taluka	Main Aquifer	Yield Potential	Type of Wells Suitable
1	Akola	Basalt	Low	Dug Well,DCB
2	Akot	Basalt	Low	Dug Well,DCB
3	Balapur	Basalt	Low	Dug Well,DCB
4	Barshitakli	Basalt Alluvium	Low to High	Dug Well,DCB, Borewell
5	Murtijapur	Basalt	Low to Mediam	Dug Well,DCB, Borewell
6	Patur	Basalt &Alluvium	Low to Mediam	Dug Well,DCB,Borewell
7	Telhara	Basalt	Low to High	Dug Well,DCB,Borewell

5.5.7: Water Conservation and Artificial Recharge

In Basaltic area, the artificial recharge structures feasible are check dams, gully plugs, percolation tanks, nalla bunds, etc. Structures like gully plugs and contour bunds are most favorable in hilly areas, particularly in parts of Akot, Patur talukas. Existing dug wells can also be used for artificial recharge; however, the source water should be properly filtered before being put in the wells. The most feasible artificial recharge structures suitable for Alluvial areas are Percolation tanks and recharge wells. The ground water in a part of the alluvial area is saline. In such areas, quality of ground water needs to be considered before selecting the site. In the areas with poor ground water quality, water conservation structures are more feasible.

The sites for artificial recharge structures 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.

5.5.8: Recommendations

1. The major part of the district is underlain by Deccan Trap Basalt, where dug wells are the most feasible structures for ground water development. The sites for bore wells need to be selected only after proper scientific investigation.

2. Bore wells generally tap deeper fractures and inter flow zones, which may not be sustainable. Besides, the bore wells should only be used for drinking water supply and not for irrigation.
3. Ground water quality is adversely affected by nitrate contamination in 57% of the samples collected in May 2011. Thus all the wells used for water supply should be first analysed for nitrate contents and if the nitrate content is found beyond permissible limit the ground water may be used for other purposes than drinking. Adequate sanitary protection to the wells may be provided to control the nitrate contamination.
4. The overall stage of ground water development for the district is only 44.98%, thus a lot of scope for further development exists.
5. The scope exists for construction of suitable artificial recharge structures in the district. The structures recommended for the hilly-Basaltic area in the northern part are: contour bunds, gully plugs, nala bunds and check dams. For other Basaltic areas, the nala bunds, check dams and KT weirs are suggested. The existing dug wells may also be used for artificial recharge of ground water provided source water is free of silt and dissolved impurities.
6. The most feasible artificial recharge structure suitable for alluvial areas restricted along the banks of Purna River and its tributaries are shallow recharge wells on the river bed of the tributaries. Percolation tanks are also suitable, wherever source water availability is there.
7. The existing village ponds need to be rejuvenated to act both as water conservation and artificial recharge structures.

CONCLUSION:

Aquifers are an important resource for the District and the forests in particular which need to be recharged and enhanced. The papers/reports from which extract is reproduced above, reveals that Akola aquifers are still safe and not overexploited. Yet given the recommendations above, the DCF shall make all efforts to implement them for the betterment of the water regime in the forest areas and the District as well.

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CHAPTER – 6

MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

6.1: GROWING STOCK OF WOOD:

Mostly site quality IV is found in Akola Division. Very few patches of site quality III are found. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of previous Plan is given in the table

LOCAL VOLUME TABLE (ROUND TIMBER) FOR TEAK

(ALL INDIA TEAK SITE QUALITY IV) TABLE NO. 6.1

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.183
6	90/105	0.435
7	105-120	0.555

6.2: GROWING STOCK OF BAMBOO:

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

6.3: INCREMENT IN VOLUME OF IDENTIFIED TIMBER SPECIES:

The stem analysis of Teak (Tectona grandis) carried out by selecting representative teak trees of site quality IV with different origin i.e., teak trees of seedling origin from Alegaon range compartment No.12 and the number of trees selected were 4 and Patur range compartment No. 47, one tree and compartment No. 48 two teak trees were selected as representative samples and total number of seedling origin trees selected were seven. For coppice origin the representative samples were selected from Alegaon range compartment No. 20, and number of trees selected were four and from Patur range one teak tree was selected from compartment No. 47 of Akola Forest Division. The total numbers of trees selected for stem analysis were twelve from four compartments. The results obtained out of stem analysis have been computed and the following curves were drowned.

A. Age/ Diameter curve at breast height over bark.

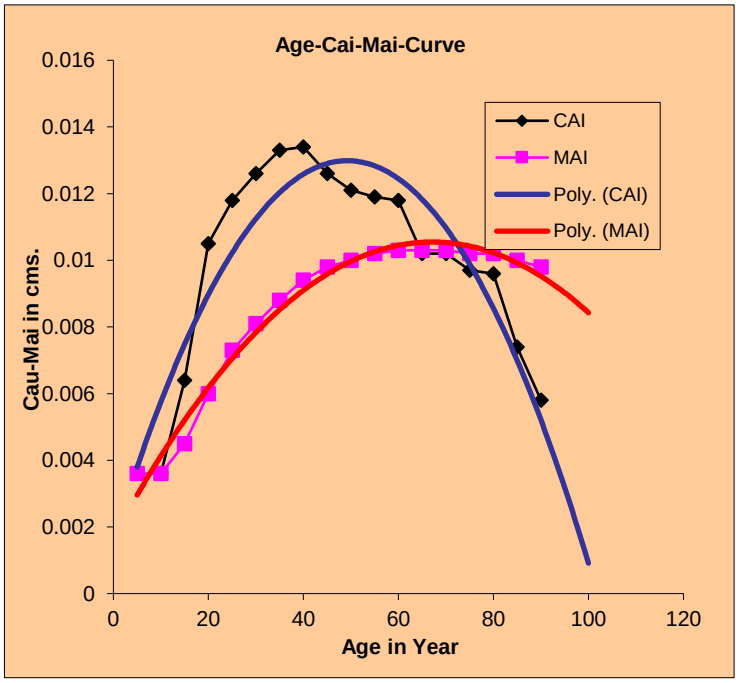
B. Height/ Age curve

C. Age/ Volume curve

STEM ANALYSIS FOR TEAK OF SITE QUALITY IV (seedling ORIGIN)

In case of seedling origin, the stem analysis reveals that the C.A.I. and the M.A.I. culminate at the age of 69 years, represents the girth of 105 Cms at the breast height.

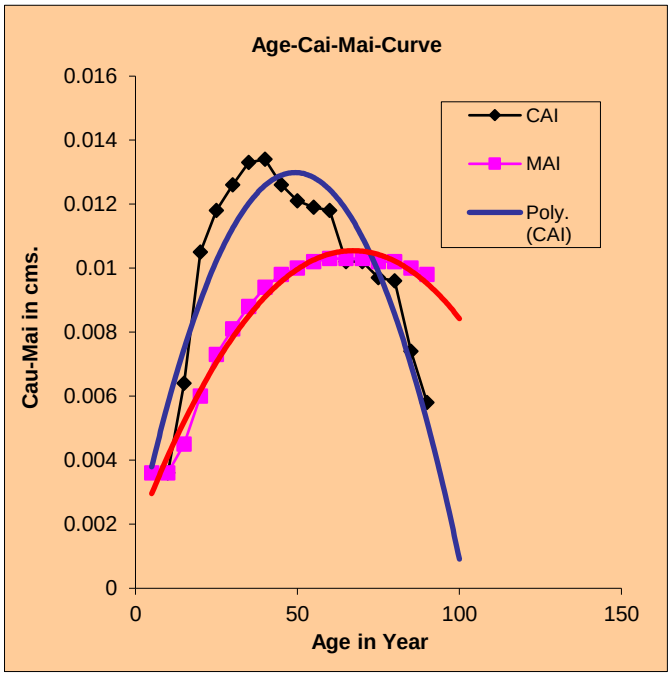
SR. NO.	AGE	HEIGHT	DBH(O.B)	GBH(OB)	VOLUME	CAI	MAI
1	5	3.30	2.80	8.80	0.0180		0.0036
2	10	6.00	5.70	17.91	0.0360	0.0036	0.0036
3	15	8.70	8.50	26.71	0.0680	0.0064	0.0045
4	20	10.80	11.80	37.08	0.1206	0.0105	0.0060
5	25	12.40	15.40	48.40	0.1840	0.0118	0.0073
6	30	13.70	18.70	58.77	0.2432	0.0126	0.0081
7	35	14.80	21.60	67.88	0.3100	0.0133	0.0088
8	40	15.60	24.10	75.75	0.3772	0.0134	0.0094
9	45	16.40	26.20	82.34	0.4400	0.0126	0.0098
10	50	17.10	28.20	88.63	0.5007	0.0121	0.0100
11	55	17.50	29.70	93.35	0.5600	0.0119	0.0102
12	60	18.00	31.10	97.75	0.6191	0.0118	0.0103
13	65	18.40	32.40	101.83	0.6700	0.0102	0.0103
14	70	18.90	33.70	105.92	0.7215	0.0102	0.0103
15	75	19.30	34.70	109.06	0.7700	0.0097	0.0102
16	80	19.70	35.50	111.57	0.8182	0.0096	0.0102
17	85	20.00	35.90	112.83	0.8550	0.0074	0.0100
18	90	20.30	36.40	114.40	0.8840	0.0058	0.0098
19	95	20.50	36.80	115.66			
20	100	20.80	37.00	116.29			



STEM ANALYSIS FOR TEAK OF SITE QUALITY IV (COPPICE ORIGIN)

In case of coppice origin, the stem analysis reveals that the C.A.I. and the M.A.I. culminate at the age of 69 years, represents the girth of 105 Cms at the breast height.

SR. NO.	AGE	HEIGHT	DBH(O.B)	GBH(OB)	VOLUME	CAI	MAI
1	5	3.30	2.80	8.80	0.0180		0.0036
2	10	6.00	5.70	17.91	0.0360	0.0036	0.0036
3	15	8.70	8.50	26.71	0.0680	0.0064	0.0045
4	20	10.80	11.80	37.08	0.1206	0.0105	0.0060
5	25	12.40	15.40	48.40	0.1840	0.0118	0.0073
6	30	13.70	18.70	58.77	0.2432	0.0126	0.0081
7	35	14.80	21.60	67.88	0.3100	0.0133	0.0088
8	40	15.60	24.10	75.75	0.3772	0.0134	0.0094
9	45	16.40	26.20	82.34	0.4400	0.0126	0.0098
10	50	17.10	28.20	88.63	0.5007	0.0121	0.0100
11	55	17.50	29.70	93.35	0.5600	0.0119	0.0102
12	60	18.00	31.10	97.75	0.6191	0.0118	0.0103
13	65	18.40	32.40	101.83	0.6700	0.0102	0.0103
14	70	18.90	33.70	105.92	0.7215	0.0102	0.0103
15	75	19.30	34.70	109.06	0.7700	0.0097	0.0102
16	80	19.70	35.50	111.57	0.8182	0.0096	0.0102
17	85	20.00	35.90	112.83	0.8550	0.0074	0.0100
18	90	20.30	36.40	114.40	0.8840	0.0058	0.0098
19	95	20.50	36.80	115.66			
20	100	20.80	37.00	116.29			



6.4: EFFORTS TOWARDS ENHANCEMENT OF FOREST PRODUCTIVITYTHROUGH QUALITY PLANTATION ACTIVITIES:

In Akola Forest Division plantation activities have been carried out in the past ten years is given in **Appendix- XXII**. A total of 3709.32 hectares of plantation has been done during the plan period. Plantations include teak and miscellaneous species. The summary of plantations is given in the table below.

Table No.6.4: Plantation carried out by forest department.

Sr. No.	Year	Area (ha)	No. of Plants
1	2010	0	0
2	2011	1106.30	537840
3	2012	566.70	504271
4	2013	365	188675
5	2014	419.10	337185
6	2015	25	39750
7	2016	213.73	89352
8	2017	436	265758
9	2018	577.49	506974
10	2019	0.00	0.00
Total		**3709.32**	**2469805**

6.5: CARBON STOCK:

Forests play an important role in combating climate change. In addition, it has the potential to provide ecosystem services, such as carbon storage. In forest ecosystem, enormous carbon is stored which is classified in five pools by GPG. The living ecosystems Ems of biomass carbon is classified in two pools; the 'above ground biomass' (AGB) and 'below ground biomass' which are stores of significant amount of carbon. The 'dead organic matter' (DOM) is also classified into two pools: 'dead wood' and 'litter'. The fifth pool is 'Soil organic matter' (SOM) which contains substantial amount of organic carbon. Carbon sequestered in the forests of Akola Forest Division has been derived by extrapolating from the growing stock calculated from the enumeration data. The various working circle wise estimation of Carbon Stock in Akola Division is given below.

Table No. 6.5: Carbon stock in different working circles

Sr. No.	Working Circle	Total Area (ha)	Average growing stock (m^3/ha)	Total growing stock (m^3)	Total carbon stock (metric tonnes)
1	Improvement Working Circle	15120.27	59.17	894666.38	268400.20
2	Afforestation Working Circle	17445.41	80.20	1399121.88	419736.98
3	Fodder Improvement Working Circle	5173.36	14.30	73979.05	22193.74
Total		37739.04	00	2367767.31	710330.90

6.6: SOIL ANALYSIS:

Quantum of soil carbon is a good indicator of nutrient status of soil. During the enumeration exercise, SOFR unit collected soil samples (50) and they were analysed for Soil Carbon. The range of soil carbon varied from 0.4% to 4.4%.

The details are given in Digital Maps.

6.7: CARBON SEQUESTRATION AND MITIGATION:

Forest and wood products can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon so efficiently that about half the dry weight of a tree is carbon. This carbon remains locked up in the form of wood and wood products. Sustainably grown and harvested wood (and other biomass) also provides a renewable alternative to fossil fuels and enhances carbon storage. Enhanced carbon sequestration through recognized and innovative silvicultural practices, eco-restoration of degraded/mined out forestlands, improved biomass productivity, etc. will help in improving forest health and vitality. Forest soil must be kept healthy and fertile. The growth of forest crops must be kept vigorous to attain the most desirable level of biomass production within an optional time scale.

In this plan an area of **17445.41** ha.is proposed under Afforestation WC which is to be implemented during the plan period. This will add to the forest cover of the division and contribute to the carbon sequestration of the forest.

Natural regeneration prescribed in the plan will also add biomass and carbon in the form of vegetation.

Further detailed studies for carbon sequestration potential of Akola forests need to be carried out. It must include values of two wildlife sanctuaries- NARNALA AND KATEPURNA Wildlife sanctuary which fall in Akola district but are outside jurisdiction of Akola Territorial Division.

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CHAPTER – 7

OPTIMIZATION OF FOREST RESOURCE UTILIZATION

7.1: RECORDED REMOVAL OF TIMBER:

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

Table No.7.1: Timber auctioned and revenue realized

Sr.No.	Year	Timber (m^3)	Revenue (Rs.)
1	2009-	620.251	11625330
2	2010-	99.036	3918000
3	2011-	792.272	21005140
4	2012-	681.062	18283150
5	2013-	758.937	22650130
6	2014-	375.375	10064150
7	2015-	560.05	15772250
8	2016-	275.313	8509950
9	2017-	427.069	14853000
10	2018-	346.220	10398545

7.2: RECORDED REMOVAL OF FUEL WOOD:

With the introduction of modern cooking fuels like LPG gas, electric implements dependence on fuelwood has decreased. But still firewood is the main cooking fuel for most of the villagers as well as people of Akola, Barshitakali, akot, Telhara, Balapur, Patur and Murtizapur towns. Dhawda as fuel wood is the most sought after species for fuel wood. The other hard wood species like Khair, Ain, Babuletc. are also preferred over some of the soft wood species like Salai, Moyen, Behada. As the demand exceeds supply, illicit lopping of the trees and carrying of head loads of lopped branches mostly by the women is frequently noticed in this area. Majority of the ginning mills and processing factories of the area use alternatives such as coal and oil than firewood.

Table No.7.2: Firewood auctioned and revenue realized

Sr. No.	Year	Quantity (m^3)	Revenue (Rs.)
1	2009-2010	21.500	56600
2	2010-2011	18.019	96300
3	2011-2012	36.203	70500
4	2012-2013	26.400	62300
5	2013-2014	22.470	58200
6	2014-2015	15.600	52200
7	2015-2016	22.176	118900
8	2016-2017	17.500	40300
9	2017-2018	13.500	32500
10	2018-2019	14.600	11000

7.3: RECORDED REMOVAL OF BAMBOO/RATTANS:

Availability of bamboo is very scarce hence there is no record of recorded removal of bamboo or rattans.

7.4: RECORDED REMOVAL OF LOCALLY IMPORTANT NTFPs INCLUDING MAPs:

7.4.1: Non timber forest produce: Tendu perhaps is one of the major revenues earning forest produce of non-timber forest produce. There are 4 Tendu units in Akola forest division. The trade of Tendu units is fluctuating. The quantum of revenue realized has increased over the years. The scattered distribution of tendu leaves, lesser areas available for collection and quality of tendu leaves determine the price of the tendu leaves. The detail of sale of tendu leaves is given in the table below.

7.4.1.1: MANAGEMENT OF TENDU:

Collection of Tendu Leaves: Tendu is the prominent revenue generating NTFP of this tract. Tendu leaves are used for manufacturing Bidis. Tendu trade has been 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 criterion for Bidi manufacturers. The quality depends on the colour textures 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 government in conjunction with various laws presently I 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 centimeters collar diameter shall not be pruned. However, felling of Tendu trees or branch lopping for leaf collection should be dealt with firmly.

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.

Table No.7.3: Tendu units auctioned, standard bags collected and revenue realized

Sr. No.	Year	Unit Auctioned	Target (Std Bags)	Actual Yield (Std Bags)	Revenue (Rs.) (Actual)
1	2010	Akola Division	5600	4856.74	3910992
2	2011		5600	4935.98	5241091
3	2012		5000	11912.66	4289391
4	2013		1000	874.87	357000
5	2014		3400	3114.091	933982
6	2015		7550	6190.328	2137973
7	2016		11750	6307.967	3603973
8	2017		4100	3429.986	8000973
9	2018		3800	1512.087	5129973
10	2019		1800	1709.072	1709982

7.4.1.2: MANAGEMENT OF BEHDA, AOLA, CHAR, AND OTHER NTFPS:

Collection of Behda, Aonla, Char and Other NTFPs: Fruits of Behada, Aonla and Char are marketable items. Similarly fruits, flowers and leaves of certain shrubs and trees are used for variety of purposes. Current level of collection is quite erratic and, therefore poor indicator of their potential in the tract.

Collection of species, which are not covered under the monopoly procurement by govt. agencies, should be allowed by the joint forest management committees or village panchayat for better protection of Behda, Aonla, Char trees and to increase its stock, few of the above trees be numbered and these trees be allotted to members of JFM committee. The members of committees who have been assigned with job of protection and nurture of above trees, they should protect them from fire. Range forest officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

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.

Regeneration of *Behda, Aonla, and Char:* Required tending is prescribed where saplings of *Behda, 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. *Behda, Aonla*and *Char* are prescribed 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

Akola is the district of the state having geographical area extending over to 5428.00 sq. km forming about percent of the total area of the state. As per 2011 census, the total population of Akola district is 14,11,281 lakhs.

The main forest produce that are harvested from the forests of Akola division and those which support the livelihood of people, are given as under.

1) Timber: Teak is the most valuable timber of the Division. It is used for construction, furniture and various other articles. But due to its prohibitive prices and non-availability in sufficient quantity other species such as Ain, Dhaora, Bhirra, Lendia, Kalam, Dhaman, and Bamboos are used. The demand is heaviest in the intensively cultivated and rich plains. For the manufacture of the carts, Teak is preferred for the body; Tiwas, Ain, Dhaman, Tendu for shaft; Dhaora for axles; Tiwas, Kusum or Kahu for naves; Teak for spokes and Shivan for yokes. For agricultural implements, such as plough; Tiwas, Khair and Babul are preferred in that order. Dhaora and Dhaman are used for axe handles and Semal for dug outs.

2) Firewood: There is a great demand for firewood throughout the Division. Dhaora, Khair, Bhirra and Ain are valued as firewood. Due to heavy demand inferior firewood of softwood species like Salai and Mowai is also extracted. Due to increase in small dhabas of the on the highways and in small township the overall demand for firewood has increased.

3) Bamboo: Bamboo are in general is in degraded position. It is used for hut construction and manufacture of household articles.

4) Rosha grass (*Cymbopogon martini*): The species distributed mainly in Narnala in Akola ranges. The total division is divided into 1units. The revenue earned out of the sale proceeds of the Rosha grass is very meager. Other non-wood forest produce like Mohaflowers and seeds, Charoli, Biba, and Behada seeds apart from the fruits of Tendu, Char, Jamun, Aonla, Imli etc. have good demand in the market. However, the production of these forest produce are very limited. The details of the NTFP units are given in **Appendix-XXIII**.

5) Dhawda Gum: Dhawdagum is highly demanded as edible gum in the market. For collection purposes of Dhawda gum the entire division is divided into 9units viz. Akola, Chikhalal, Marsul, Akola Range, Chondhi, Alegaon Range, Lohagadh, Pinjar, Barshitakali Range and Patur, Malrajura in Patur Range, which are sold through open auction. The collection of Dhawdagum ranges from 45 quintals to 200 quintals. The quantity and revenue realized by sale of gum is mentioned in the table below.

Table No.7.4: Quantity of gum auctioned and revenue realized

Sr.No.	Year	Gum (Qt.)	Revenue (Rs.)
1	2009-10	NA	619500
2	2010-11	NA	688000
3	2011-12	NA	421100
4	2012-13	NA	636000
5	2013-14	NA	478100
6	2014-15	NA	50367
7	2015-16	NA	719200
8	2016-17	NA	61200
9	2017-18	NA	392000
10	2018-19	0	0

6) Other Forest Produce: The other forest produce which the villagers take from the forest are, edible flowers and fruits, fibres from bark and roots, gum, herbs, thorns and leaves. The main species of edible flowers and fruits are Moha, Charoli and Tendu. Fibers are extracted from Palas, Palasbel. Thorns of Bharati, Hiwar, Yeroni, Chilati, Ghoti, Bor and Babool are used. Cordage

and lashings are made out from the bark of the Kuda, Palas and sometimes Piwarbel. Besides, murum and stones are also removed for building and roads.

7.5.2: OCCUPATION AND INDUSTRIES:

Besides agriculture, there are small occupations/industries in the villages and urban areas which are interlinked with forests and few of them are given below

i) **Cattle Breeding:** It is especially carried out overall the Division. It adds substantially to livelihood of people of these Talukas for sustainable forestry.

ii) **Orange Garden:** These occur all over the District. Small poles and bamboos are in great demand for supporting the fruit laden branches of orange trees. Bamboo baskets and soft wood packing cases are required for packing the oranges.

iii) **Saw mills:** There are saw mills in the Akola district which depend on the supply of wood from the forests as well as private areas.

iv) **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 carpenter provides job opportunities' to the hundreds of skilled carpenters engaged in furniture making joinery works 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.

v) **Manufacture of bidis:** Tendu leaves are used for preparing bidis by wrapping Tobbaco in these leaves. It is carried out on in a small scale in the district.

vi) **Collection of minor forest produce:** The poor class of villagers when not engaged on agricultural works collect moha flowers and fruits, charoli, gum, honey, wax, bark, roots and 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 on or from Akola the produce that is produced from Akola is generally locally consumed.

7.7: IMORT 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 Akola. 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 Govt. of Maharashtra and cost of living allowance (Rahniman Bhatta) are also taken into consideration.

NON WOOD FOREST PRODUCES (NWFP)

1) Grass: Grass from grass birs, closed coupes and a plantation is available on cutting basis. As per existing Government orders annual lease of grass birs for removal of grass on cutting basis, is first offered to Gram Panchayats, Co-operative milk societies and other public bodies at a price fixed by the forest department, considering current market trend and availability of grass. The lease of those areas which could not be disposed off in this way is sold by auction. The grass from the area which remains 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 be found that most of the grass bids remain unsold. In the sold areas very little grass is removed. Most of the time the influential people of the village purchase the grass bids and allow grazing in those areas by taking money from the cattle owners. Due to excessive cattle pressure the site conditions of grass bids 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. The quantity and the revenue generated in the sale of the above products are given below. It may be seen that the quantity of grass and gum is not much and the collection is very regular. There is 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 THEM

Akola 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. Akola forest division has a total of 56 JFM committees in the forest fringe villages. The total area allotted for these committees is 9108.68 ha. This covers around 55% of the total area of the division. JFM committees have taken up plantation activities to the extent of 460 ha. during the previous plan period.

- JFM micro plans are to be dovetailed 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

State's 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 are67and all these villages are covered under JFM and JFM Committees are in place. The total numbers 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 work 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, boundary pillars repairs, fire line cuttings and all other works of the Department are involved through the JFM members wherever Committee exists.

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

8.4: USE OF INDIGENOUS KNOWLEDGE

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

8.5: EXTENT OF CULTURAL/SACRED GROVES

There are no sacred groves in this division. There are sites of cultural significance in the division. One is **Rudrayani Devi** Temple which is 35 km away from Akola & second is **Malrajura Ecotourism** which is 40 kms away from Akola and 8 km away from Patur. The flow of tourists and devotees to these areas are seasonal and days-specific.

8.6: ECOTOURISM AREAS AND ACTIVITIES:

Various important ecotourism sites have been identified in the division. Some of the sites have been developed while there is a need to develop other sites. A separate chapter is given for the ecotourism.

8.7: SOCIAL CUSTOMS:

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

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

The 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:

(I) **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 Tribes 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 regimes;

(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, un-surveyed 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 recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribal's 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):** Notwithstanding 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 up-gradation or vocational training centres;

(l) Roads; and

(m) Community centres;

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(1):** 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, then, 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 and 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 authorised 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: The status of implementation of this Act (up to March 2018) is summarized in the table below.

TABLE NO. 8.2 STATUS OF IMPLEMENTATION OF FRA 2006

Type of claim	No of cases received by gramsabha	No of cases rejected by gramsabha	No of cases rejected by SDLC	No of cases rejected by DLC	No of cases finally accepted by DLC	No of cases pending for decision at DLC
Individual	767	491	231	0	48	0
Community	69	13	52	1	10	0
Total	**836**	**504**	**283**	**1**	**58**	**0**

8.9: OTHER RIGHTS AND CONCESSIONS:

As per Forest Policy of 1988, the first charge on the forest produce is that of tribal and other villagers living in and around the forest. Accordingly, the forest produce obtained from the forest will first be supplied to the people living in the villages notified for nistar purposes at the rate fixed by the Deputy Conservator of Forests in consultation with the District Collector. Only the surplus forest produce, which is not required by the local people, will be sold in open auction. Small timber and poles required for agricultural purpose and repairs to houses as well as firewood for domestic use will be supplied from the depots at concessional rates to the villagers living near the forests, depending upon the availability of these produce. Depots will be opened at suitable places, throughout the division, so that people have to traverse minimum possible distance to procure these produce. Range, Round or Beat headquarters can be used for this purpose, so that supervision and maintenance of these depots become convenient.

In Akola forest division the Reserved Forests are not burdened with any adverse rights and concessions however Protected Forests are heavily burdened by grazing concessions.

The Grazing concessions are allowed as per "Grazing Policy" of Maharashtra State depending upon the cattle unit and carrying capacity of forests. The Grazing Rules have been framed vide Government Resolution No.MFP-1365/132211-Y, dated 6th December, 1968 and Grazing Rules issued vide No.MFP-1371/237035-Z, dated November3, 1973. However, no grazing beyond carrying capacity shall be permitted.

8.10: DEPENDENCY OF LOCAL PEOPLE ON NTFPs:

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

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

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CHAPTER 9

ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.

9.1. EXISTING POLICY AND LEGAL FRAMEWORK AND THEIR COMPLIANCE

The existing policy and laws in the country and the State are invoked for the management of the forests 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 forest in the Division. The plan is further guided by guidelines like.

9.1.1: National Wildlife Action Plan (2002-2016)

Ministry of Environment and Forest, Govt. of India has formulated National Wildlife Action Plan (2002-2006), 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 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 Peoples Participation in Wildlife Conservation
vi. Conservation Awareness and Education Which are partly being followed in this Plan.

9.1.2 : National Forestry Action Plan

Introduction: Having about 2.5% of worlds geographic areas, India at present is supporting 16% of worlds human population and 18% of cattle population. About 41% of the forest cover of the country has been degraded and dense forests are losing their crown density and productivity continuously. A large number of India's livestock population graze in the forest causing serious damage to soil, ground flora, including regeneration, and productivity of the forests. The use of forests beyond it 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 programmed. These programs 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 forest to be improved through suitable silvicultural practices.
iii. Efforts to be made to bring one-third of the geographic area of the country under forest and tree cover by plantations on all categories of wastelands and agroforestry.
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 " Godavarman Thirumalkpad" V/s Union of India. The order speaks about the felling of trees in all forests is to remain suspended except in accordance with the working plans of the State government, as approved by Central government.

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

Following the directions of Hon'ble apex court in their order dated 22.09.2000 in IA No. 424; a core group was constituted to decide the extent of felling. As per these Orders, feeling is to be carried out by the State Government only after obtaining the permission from core group constituted by the Ministry of Environment and Forests, New Delhi, which is complied with by the Department.

9.1.4 : Forest Right 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 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 parliament of India and the assent to this Act was received from the President of India on 29" 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 were further amended by the Central Government vide notification dated 6th September, 2012.

In Akola Division the number of claims received were836 out of which 51 were accepted. Of these 51 cases 48 are of individual claims covering an area of 128.92 ha. And 3 claims are of community rights which cover an area of 4.363 ha. There is a need to guide and train the villagers on how best to use the forest land to meet all their needs and wewan them away from their dependency on the forest.

9.1.5: The Biological Diversity Act 2002

The Biological Diversity Act 2002 came into existence in February 2003. The Act provides 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.

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 and 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 there with or incidental there to. 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 biodiversity.

As of now 233 Biodiversity Management Committees have been formed in the District of Akola. There is a need to establish Village Biodiversity Management Committees at least in all Gram Panchayats where JFM is being implemented.

9.1.6 : GOI Orders/GOM Resolutions, Circulars etc.

Joint Forest Management approach was degraded forest area of the State vide GR dated 16 March 1992. The programme was extended to Good Forest areas vide Govt. Resolution dated 25/4/2003. The latest revision in GR has been made

on 5th October 2011 and 10th July 2012. All JFM activities should be in consonance with the board 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

The 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 received.

9.3 : NUMBER OF FOREST OFFENCES

The number of forest offences that have been registered under the last ten years are given below.

Table No.9.1

The Extent of damage due to fire, illicit cutting, and other offences

Year	Fire		Grazing		Illicit cutting					Other offences		Total	
	No. of Cases	Loss in Rs.	No. of Cases	Loss in Rs.	No. of Cases	Illicit cut tree (No.S)		Loss in Rs.	Amount of Material seized (Rs)	No. of Cases	Loss in Rs.	No. of Cases	Loss in Rs.
						Teak	Non Teak						
2009-10	29		12		397	2564	235	1003402	598774	147	-	585	1003402
2010-11	31		7		404	2885	242	941759	522061	114	-	556	941759
2011-12	12		8		583	2128	239	715928	542289	203	-	806	715928
2012-13	32		11		455	2616	285	939524	669607	242	-	740	939524
2013-14	29		3		269	2187	360	1249010	1117485	252	-	553	1249010
2014-15	45		2		297	1237	265	933028	430320	253	-	597	933028
2015-16	05		9		439	1217	309	780959	526989	276	-	728	780959
2016-17	11		8		395	1163	205	768758	425805	137	-	551	768758
2017-18	42		10		510	1579	240	1068674	534223	191	-	743	1068674
2018-19	22		9		514	1317	223	802154	522369	164	-	709	802154
Total	**258**		**79**		**4263**	**8893**	**2603**	**9203196**	**5889922**		**-**	**6568**	**9203196**

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 BULDING EFFORTS

The Staff of the Division is trained as per 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 for the staff is as follows.

1. Training for GIS and GPS – Surveyor 1, Forester 13, and Forest Guard 77.
2. Facilities of personal Digital Assistants are given to all guards with applications like Offence cases, Fire, Encroachment, Grazing etc. As per the table below, a Total PDAs have been distributed to the staff of the Division.

Table No.9.2

Distribution of PDAs

Sr. No.	Range	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	Total PDA NOs.
	Year	2009 -10	2010 -11	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19	
1	Akola	-	-	-	-	-	-	12	-	-	-	12
2	BarshiTakli	-	-	-	-	-	-	03	-	-	-	03
3	Patur	-	-	-	-	-	-	04	-	-	-	04
4	Aalegaon	-	-	-	-	-	-	07	-	-	-	07
Total								26				26

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 forest. The value of the timber and firewood has been fully accounted for in the last plan and projected for the period of this plan **Appendix No**. **XXIV**. The quantity and the value of the NTFPs collected in the last ten years have been duly provided in Appendix **No. XXV.**

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 NVP by the Kanchan Chopra Committee and accepted by the Hon. Supreme Court order dated 28.03.2008 is taken as 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 (NTFPs)
iii. Value of fodder
iv. Value of Eco-tourism
v. Value of bioprospecting
vi. Value of Ecological services of forest
vii. Value of Flagship Species
viii. Value of Sequestration Value.

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

Eco class - I	Consisting of Tropical Wet Evergreen Forest, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forests
Eco class - II	Consisting of Littoral and Swamp Forests
Eco class - III	Consisting of Tropical Dry Deciduous Forests
Eco class - IV	Consisting of Sub-Tropical Broad Leaved Hill Forests, Sub-Tropical Pine Forests and Dry Evergreen Forests
Eco class - V	Consisting of Tropical
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 forest of Akola comes under Eco-Class III and the value attached it this area is given below as pre the canopy density. The average value of the forests stands at Rs. 800000/- and varies with the type of forest and its attributes. This value has further been revised the Indian Institute of Forest Management, Bhopal and is yet to be approved. The IIFM study is more comprehensive and considers all aspects of the intangible benefits that the forest eco-system provides.

Below is given the value of the forest of Akola as per the current and proposed NPV value which considers the tangible and some components of the intangible benefits.

Table No.9.3

Calculation of Forest Worth Based on NPV

Sr.No	Area of Akola under different canopy density		Current rate of NPV (Rs lakh/ha)	Value of Forest as current rate (Rs lakhs)	Proposed rate of NPV (Rs lakh/ha)	Value of Forest as Proposed rate (Rs lakhs)
	Category	Area (ha.)				
1	VDF	1100	8.87	9757	26.08	28688
2	MDF	11000	8.03	88330	18.62	204820
3	OF	21800	6.26	136468	11.17	245686
Total		**33900**	**23.16**	**234555**	**55.87**	**479194**

The value of the forest of Akola comes to 2345.55/- crores as per the current NPV rates and Rs. 4791.94/- crores as per the proposed NPV rates which has considered all the ecosystem services and functions of the forests.

Thus, the value of the Forests of when computed holistically considering 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 : BUDGERARY ALLOCATIONS TO THE FORESTRY SECTOR

Table No.9.4

Statement Showing the Revenue, Expenditure and Surplus

Year	Revenue (Rs in lakh)	Expenditure (Rs in lakh)			Total Expenditure (Col. 3+4+5)	Surplus (+) Deficit (-) (Rs)
		Conservancy and Works (Rs in lakh)	Establishment (Rs in lakh)	Plan (Rs in lakh)		
2009-10	177.67	241.15	604.05	422.00	1267.20	-1089.53
2010-11	108.22	230.13	617.06	437.17	1284.36	-1176.14
2011-12	163.21	218.70	755.08	981.61	1955.39	-1792.18
2012-13	225.40	211.35	829.73	1008.63	2049.71	-1824.31
2013-14	224.90	221.61	1089.98	1214.66	2526.25	-2301.35
2014-15	168.94	198.38	1083.36	1389.60	2671.34	-2502.40
2015-16	68.97	485.91	1209.26	1403.70	3098.87	-3029.90
2016-17	107.03	526.31	1207.55	1448.87	3182.73	-3075.70
2017-18	97.92	366.89	1225.94	1395.88	2988.71	-2890.79
2018-19	115.65	534.56	1066.80	2495.27	4096.63	-3980.98
Total	**1457.91**	**3234.99**	**9688.81**	**12197.39**	**25121.19**	**-23663.3**

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 Plantation, SMCs, MPCAs, Building and Constructions etc. The evaluations guide by the evaluation code.

9.8: EXISTENCE OF MONITORING, ASSESSMENT AND REPORTING MECHANISM

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

Akola Division has sanctioned strength of 129 posts in total, including 129 permanent posts and 0temporary posts ranging from the Deputy Conservator of Forest to the Van Majoor. 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 Akola Division

Sr. No	Designation	Pay Scale in Rs.	Permanent Posts	Temporary Posts	Total	Statement Showing Santioned, Filled up and Vacant post in Akola Division		
						Santioned	Filled up	Vacant post
Group – A (Class I)								
1	Deputy. Conservator of Forest.	As per 7 th pay	1	0	1	1	1	0
2	Assistant Conservator of Forest.	--00--	2	0	2	2	2	0
Group – B (Class II)								
3	Range Forest Officer	--00--	6	0	6	6	6	0
4	Office superintendent	--00--	1	0	1	1	1	0
Group – C (Class III)								
5	Forester	--00--	15	0	15	15	13	2
6	Forest Guards		78	0	78	78	77	1
7	Chief Accountant		1	0	0	1	0	1

8	Accountant		06	0	06	06	06	0
9	Clerks		09	0	09	09	07	2
10	Surveyor		1	0	1	1	1	0
11	Driver		2	0	2	2	2	0
12	Police Constable		2	0	2	2	1	1
Group – D (Class IV)								
13	Peon		2	0	2	2	2	0
14	Daftari		1	0	1	1	0	1
15	Sta. Asstt.							
16	Chowkidar		1	0	1	1	1	0
17	Nike		1	0	1	1	0	1
18	Forest Labour							
Total Staff			**129**	**0**	**129**	**129**	**119**	**10**

Table no.9.6

The distribution of jeeps is as under

Sr. no.	**To whom the Vehicle is allotted**	**No. of vehicle**	**Vehicle No.**
1	Deputy Conservator of Forest Akola Division	1	MH-30-0418
2	Ass. Conservator of Forest(vane)	1	MH-30-0431
3	Ass. Conservator of Forest (bhavka)	1	MH-30-0587
4	Range forest officer Akola (Mobile squad)	1	MH-30-H-0362
5	Range forest officer Akola (Territorial) Barshitakli	1	MH-30-H-5319
6	Range forest officer Akola (Territorial) Alegaon	1	MH-30-H-5318
7	Range forest officer Akola (Territorial)Akola	1	MH-30-H-0351 (write off)
8	Range forest officer Akola (Territorial)Akola	1	MH-30-H-5335
9	Range forest officer Akola (Territorial)Patur	1	MH-30-H-5336

Table 9.7

The distribution of Pistol is as under

Sr.no	Designation	No. of pistol	Weapon no
1	Deputy Conservator of Forest Akola Division	1	16448954 (pistol)
2	Ass. Conservator of Forest(vane)	1	16711872 (pistol)
3	Ass. Conservator of Forest (bhavaka)	1	-
4	Range forest officer Akola (Mobile squad)	1	16448939 (pistol)
5	Range forest officer Akola (Territorial) Barshitakli	1	18504448 (pistol)
6	Range forest officer Akola (Territorial) Alegaon	1	16711874 (pistol)
7	Range forest officer Akola (Territorial)Akola	1	16448942 (pistol)
8	Range forest officer Akola (Territorial)Patur	1	16524957 (pistol)

Sr.no	Designation	Range	Weapon no
1	Round officer	Patur	16255746
2	Round officer	Barshitakli	16044486
3	Round officer	Akola	CJ-2947
4	Forest Guard	Patur	15167902
5	Forest Guard	Barshitakli	CW-2109

LABOUR SUPPLY

Population density is good in the Division. The main occupation is agriculture, hence during agricultural season there is a decline in manpower availability, for the forestry works. Departmental works such as marking of coupes, Cut Back Operations, 1/5th boundary demarcation, road repairs, plantation works are carried out by engaging local labors both on by-job and daily wages. The laborers of some of the villages are skillful at carrying out various forestry operations as they have been carrying these operations since ages. A statement showing village wise population, agricultural labors population, casual labors population and marginal labors population is given in **Appendix No. II-C**. of Vol. II**.**

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. Regular year around programmes are held In these schools and all important days related to the Environment and Forests are celebrated enthusiastically. Regular field visits and projects are also taken up. Seed Banks are established in each of schools.

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

9.10 : ADEQUATE MANPOWER IN FOREST DIVISION.

9.10.1 : Staff

The headquarters of Akola Forest Division is at Akola. This Division is headed by the Dy. Conservator of Forests and the Dy. Conservator of Forests is assisted by 2 Assistant Conservator of Forests, 6 Range Forest Officers for protection, management, development, and administration of the forests of Akola Forest Division. There are 15 sanctioned posts of Foresters and 78 sanctioned posts of Forest Guards. The position of the staff and administrative setup are given in the above-mentioned table:

Accommodation: The office of Dy. Conservator of Forests is in the accommodation of the building which belongs to the B and C department. The range officers are having their offices in Government buildings are belongs to forest department. In this division accommodation required and available as per Govt. norms is as below.

REST HOUSE:- There are two Forest Rest Houses (FRH) one is at Akola and other is at Patur. In addition to these Forest Rest Houses, there are 4 Inspection Huts and 8 Labour Sheds.

The maintenance of accommodation of the staff, offices, Forest Rest Houses, Labour Sheds and other govt. buildings is not upto the mark due to scarcity of funds.

FOREST COMMUNICATION: - In this division both railway and road network are available for transportation. Mumbai-Calcutta railway line runs West to East through this Division from Murtizapur and Central Railway broad gauge line, Khandwa – Akola meter gauge and Akola to Washim broad gauge branch rail line crosses Central Railway broad gauge line at Akola and passes through Akot, Akola, Washim tehsils in the North-South direction.

Internal transport by the network of fair-weather roads. The total length of fair-weather road is 198 kms. Bus transportation is adequate whereas train transport is to the extent of some stations only. Telephone communication is connected to all Range headquarters.

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CHAPTER – 10

FIVE YEARS PLANS

10.1. The forest was a subject of State List till 42nd Amendments to the Constitution of India in 1976. The State Government used to exercise its power in protection, development and management of state forest resources and earn revenue to the government. The forest management was on scientific lines even before independence to the country and it was in consonance with the Working Plans prepared in the light of scientific management. Before Independence the emphasis in the management of forest was given to the improvement of forest and harvesting of matured and valuable timber species for the production of timber. The Ex-Propriatory forest was also brought under the purview of management after independence for improvement of forest, silvicultural operations were given top priority to achieve healthy forest and these silvicultural operations, timber extraction and afforestation works were carried out with the funds made available under non-plan budget in the early independence period. Till late 70's in the last century, no Plan fund was allocated to forest sector in this area during this period. During this period forest sector was considered as major source of providing employment to the people. The fund under the Non Plan budget provided was also made to meet the expenditure for carrying out various operations of forest management. The funds of the EGS could not be utilized because most of the forestry operations were not identified as part of EGS works. Subsequently Plan funds of this state allocated under District and State Plan with the introduction of Plan and lots of developmental activities have been taken up for management of forests.

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6. Fourth Plan (1969-1974)	-	--do--
7. Fifth Plan (1974-1979)	-	--do--

8. Annual Plan (1979-1980)	-	--do--
9. Sixth Plan (1980-1985)	-	--do--
10. Seventh Plan (1985-1990)	-	--do--
11. Eighth Plan (1992-1997)	-	Thengdi's Plan (1992-1997)
12. Ninth Plan (1997-2002)	-	--do--
13. Tenth Plan (2002-2007)	-	--do--
14. Eleventh Plan (2009-2010 to 2018-19)	-	G.Rama Krishna Rao

10.2. FIRST FIVE-YEAR PLAN (1951-1956)

The first Five Year Plan aimed at rehabilitation of degraded forests, introduction of economic species, survey and demarcation of forest area. During this period Akola Forest division was a part of West- Berar Forest Division and the Working Plan prepared by S.A. Cornelius for West Berar Division was under implementation in this area. The impact of first Five Year Plan is not noticeable, as the flow of funds was never made available to this tract, for requisite achievement of management prescribed in the Working Plan.

10.3 . SECOND FIVE-YEAR PLAN (1957-1960)

In the Second Five Year Plan the management of forest aimed at rehabilitation of degraded forests, introduction of economic species, survey and demarcation. During this period lot of forest land was diverted for agriculture. Silvicultural operations were given priority for the improvement of forest crop. The management was aimed at production of timber. Cornelius Working Plan was under implementation during this period. Plan funds were not allocated for any operation of the forest management.

10.4 . THIRD FIVE-YEAR PLAN (1961-1966)

The Third Five Year Plan aimed at increase in productivity of forest through introduction of fast growing species in plantation, scientific assessment of forest and introduction of modern logging system. During this period Cornelius Working Plan was introduced for the forest management. The process of reservation of left over Protected Forest was initiated. The forest lands were allowed to be given to

villagers for cultivation for getting the agriculture crop. Silvicultural operations and protection were given top priority; therefore, some improvement works in the forest was taken place. No plan funds were allocated to forestry operations. Management was revenue oriented.

10.5. . POST THIRD-FIVE YEAR PLAN (1966-1969)

During this period S.S. Parasnis Working Plan was under implementation. During this period there was a severe drought in this area. The local people were living under the poverty due to complete failure of agriculture crops, resulted in lack of employment of agricultural labourers has put the government in hardship to provide employment to agricultural labourers. Therefore the government has given thrust to provide employment to the agricultural labourers and civil facilities to the people. The foresters were compelled to follow the orders of government to provide employment to the local people in forestry operations. During this period no plan funds were allocated and the thrust of forest management was revenue oriented.

10.6 . FOURTH FIVE-YEAR PLAN (1969 -1974)

During this plan just like 3rd Five Year plan the forest management was aimed at increasing productivity of forest, through introduction of fast growing species in forest, scientific assessment and introduction of modern logging system. S.S. Parasnis's Working Plan was under implementation. During this plan the administration of forest villages brought under Revenue Department and development of these forest villages was entrusted to Revenue Department. After the local people began to alienate from Forest Department and perception of local people changed and kind of apathy started in the minds of local people towards Forest Department and local people started thinking that Forest Department was an obstacle for the development of local area, therefore people resorted to new encroachments upon forest lands for non-forestry purposes. During this period a new approach in the field of forest sector emerged in the form of timber boards to divert revenue for the development of forests resulted in formation of Forest

Development Board in 1969 and subsequently re-shaped into Forest Development Corporation in 1974.

10.7 . FIFTH FIVE-YEAR PLAN (1974-1979)

The forest sector during this plan was aimed at large scale plantations, social forestry to bring about people's participation in raising plantation on community lands and forest conservation. Social Forestry wing was established during this period to involve people in raising plantation and the lands outside forest area that is community land, government Waste land etc. The State Government introduced Employment Guarantee Scheme to provide employment to local people by which creating assets to the community. During this plan period Teak plantations under General Utility of Timber was introduced and Bamboo and other plantations were taken up under various schemes. No Plan fund was made available during this period.

10.8 . ANNUAL PLAN (1979-1980) and SIXTH-FIVE YEAR PLAN (1980-1985)

The aim of the 6th Five Year Plan was social forestry and fuel to save natural forests. The regularization of encroachment was taken by the government on forest land of those land which was encroached by forest dwellers from 1/4/17972 to 31/3/1978. This decision was further aggravated the problem of encroachment and many forest dwellers resulted to large scale encroachment keeping in mind that these encroachments could be regularized in future. During this period S.S.Parasnis's Working Plan was under implementation as the period of plan was extended. Some Teak plantations were taken up for timber production during this period. The better delegation under plan scheme was given but the total budget allocation was even more than 1% of the district budget.

10.9 . SEVENTH-FIVE YEAR PLAN (1985-1990)

The basic aim of 7th Five Year Plan regarding to forest management was forest conservation, massive afforestation and waste land development. During this period the clear felling of natural grown trees banned by Government of India, massive afforestation was taken up under EGS scheme and various other

plantations were taken up under District Plan Schemes. Infra-structural facilities like communication, transportation and building etc. were improved. The implementation of the Forest Act gained momentum and the forest dwellers were of the opinion and the Forest Act for Conservation of Forest for hurdling the process of development in the forest area. Plan funds were allocated for the developmental activities under District and State Plan. The Government of India formulated new Forest Policy in 1988.

10.10. EIGHTH FIRST-FIVE YEAR PLAN (1992-1997)

The 8th Five Year Plan aimed at protection of forest against fire, oriented in utilization of Waste land for forestry activity. Creation of awareness among the people for forestry through Joint Forest Management (JFM) and conservation of bio- diversity. The World-Bank project was implemented which helped in improving infrastructural facilities in the Forest Department i.e. root-trainer nursery, clonal nurseries, Germ-Plasm bank etc. For implementation of JFM the Government of India and State Government have issued various Government Resolutions (G.R.) from time to time. During this period the impact of overall development in the forest sector was noticed. DPDC funds were allocated for development of various activities like plantations, roads, buildings etc. Under EGS lots of funds were allocated for taking up plantation, soil and moisture conservation works etc. During this period Thengdi's Working Plan came into existence. The areas of Narnala and Katepurna Sanctuaries were transferred to wildlife wing.

10.11 . NINETH-FIVE YEAR PLAN (1997-2002)

The aim of 8th Five Year Plan was carried forward to 9th Five Year Plan. As far as the Forest Department was concerned the State Government has initiated different developmental scheme in consonance with the Central Government schemes. The period of the World Bank project came to an end during this period. Plantations of both teak and miscellaneous species were taken up under various schemes. The Plan funds were allocated for various developmental activities of the

forest under D.P.D.C. as well as under State Government. During this period Thengdi's Working Plan was under implementation.

10.12 . TENTH-FIVE YEAR PLAN (2002-2007)

Thengdi's Working Plan was under implementation. During this plan lot of emphasis was given to implementation of JFM through Forest Development Agency of Government of India. In Thengdi's Working Plan emphasis was given on soil and moisture conservation works and accordingly some of the soil and moisture conservation works were taken up. Many developmental activities were taken up under EGS, Jawahar Rojgar Yojana etc. The flow of Plan funds has come down drastically resulted in slowing down of developmental activities under Plan in forestry sector. The National Forestry Action Programme was formulated to establish linkage between National Forest Policy and National Five Year Plan. In the past there has not been a comprehensive and constant programme structured, therefore it was difficult to get linkages and establish trends. The budget outlay for forestry sector was hardly 0.032% of total outlay in 5th Five Year Plan and increased to 0.94% in 8th Five Year Plan. The forestry sector was given higher allocation was in the 7th Five Year Plan 1.09%. The forest sector is one of the most important sectors of the government, which provides tangible and intangible benefits to the community by conserving and maintaining bio-diversity. Such an important sector needs sustainable development and this cannot be achieved through meager budget allocation to the forest sector, therefore the budget outlay of the country for forests should be raised 4 to 5 %. Similarly for this Forest Division also, the Plan allocation must be inconformity with the national perspective to achieve the objectives of the nations as well as forests.

10.13: 11th five year plan (2007-2012):

The monitorable target of the 11th five year plan was to increase the forest cover by 5% of the total geographical area. This would require an additional cover of about 16 million ha. Out of this, 5 million ha could be brought under the tree cover within the recorded forest area while the rest would be added through agro forestry and social forestry. However, the policy target is to have 33% forest and tree cover which will require an additional coverage of about 10–11 million ha. This will have to be done mainly outside the recorded forest area. The target of 33% forest and

tree cover reflects the tree component without accounting for other vibrant non-tree natural biomes like grasslands.

The amendment of the target of the 1952 policy, of one-third area under forests, to forest/tree cover resulted in a shift of focus from ecological habitat to tree cover. Further, recognition of biodiversity characteristics and ecological services rendered by habitat like grasslands, natural desert ecosystems, alpine, and riparian habitat suggests that several biomes, even if devoid of tree component, can be recognized as 'green cover' and accounted. Recognizing these facts, the following strategic principles will be adopted for dealing with the green cover.

The policy objective of 33% tree/forest cover should be revisited for its definition on ecological considerations. The green cover should include the existing natural ecosystems within which the tree cover constitutes a sub-set. Enabling environment for social and participatory regimes should be the aim of Central efforts, as is being done through JFM mode under the National Afforestation Programme. Implementation of the Central programmes has met with difficulties on fund flow management at the State level. It is advisable to undertake activities in project mode with earmarked funding, as is done in the externally aided projects.

The status of green cover is an indicator of status of productivity of forests. The following strategies have been evolving in the sector for improving the status of green cover.

Participatory Forest Management or Joint Forest Management (JFM):

Initiated with the circular of the MoEF on 1st June 1990 on people's involvement in forest conservation and management, the JFM regime has evolved gradually and at present 106479 such committees (22 million participants) are functioning in 28 States covering 22.02 million ha of forests. This participatory regime is seen as a potential strength of forest management for the forest fringes. The challenge now is to effectively empower the local communities with appropriate rights and responsibilities, and ensure that substantial benefits from forest conservation accrue to them.

A similar approach has been attempted in wildlife management also. In Project Tiger, India, eco-development project was implemented during 1995-2005 under Global Environment Facility (GEF) with focus on village eco-development through optimum use of local resources and involvement of local people in

conservation of protected areas. Integration of this approach to protected area management through shared decision-making and full integration of conservation and livelihoods across the landscape are yet to be realized. Also, the recognition of a large range and diversity of community traditions or new initiatives towards conservation is very weak.

The 1st five year plan, as far back as 1951, indicated the scope for establishment of village plantations. Subsequently, a series of externally aided social forestry projects during the 1980s and allocation of 25% of District Rural Development Agency funds under National Rural Employment Programme, Rural Landless Employment Guarantee Programme, and so on, for social afforestation provided impetus to social forestry. This provision was not pursued since the Eighth Plan. Regeneration of forests and growing of trees being a long-term activity, did not receive due focus in the rural development programmes. Even the Watershed Management Programme aims more at equitable sharing and caring of watershed benefits, and afforestation remains a latent component. The cost norms of these programmes are not able to support substantial afforestation activities requiring strong wage contribution.

Agro and Farm Forestry: The social forestry programmes also include extension and promotion of agro and farm forestry in the farm sector. The farmers of the States like Punjab, Haryana, Himachal Pradesh, Uttar Pradesh, Karnataka, and Tamil Nadu have adopted agro forestry. However, the forward linkages with the user industry and facilitation by the State agencies have not existed. Thus, the sector suffers from problems of unorganized markets driven by middlemen, depriving the farmers of optimum prices for their produce.

Biodiversity: Habitat conversion or land use changes, land degradation, and pollution result in the decline of ecological goods and services needed for human welfare. The Biological Diversity Act, 2002 and Rules, 2004 provide for constitution of State Boards (SBBs) and Management Committees (BMCs) for conservation, documentation and sustainable utilization of biodiversity and for building up capacities of these bodies. Chronicling in the form of People's Biodiversity Registers will be the only way we can identify changes happening due to climate change. There is a need to develop appropriate methodology and models for conducting such

an exercise. Documentation of traditional knowledge should also include adaptation of such knowledge in line with the present needs of conservation.

Conservation of natural resources and ecosystems: Inland aquatic systems (excluding paddy fields) cover 5.3% of the country's land area but harbour 15% and 20% of India's floral and faunal diversities, respectively. There are wide gaps in knowledge relating to hydrological parameters, ecosystem processes, and aquatic life forms in these systems. Information on the physio-chemical aspects of water quality in rivers and lakes has become available largely because of the support from the National River Conservation Directorate (NRCD) and the CPCB, but that on aspects such as area, depth, hydrology, and Environment and Climate Change 203 ecosystem processes (functions) is practically non-existent. The existing programmes on conservation accordingly need a revamp.

The Scheme on Conservation and Management of Mangroves, Coral Reefs, and Wetlands has been too small to make an impact on the conservation of these ecosystems. Mangroves and coral reefs are mainly found on government lands. Development of appropriate institutions to motivate people to co-operate in the conservation efforts of these systems will be a priority area. More protected areas are needed for the conservation of coral reefs. Restoration and plantation programmes for mangroves are necessary to make these eco-systems function as effective barriers against invasion of land by sea. The existing programmes on wetlands, mangroves, and coral reefs will be extended to mountains, grasslands, and alpine ecosystems. Initiatives on conservation need to be more effectively integrated with development and poverty reduction. The principles of Community Reserves under the Wild Life (Protection) Act may be useful in such efforts. Long-term plans for conservation of such habitats will be important. Wetlands will be part of NLCP and the objectives will cover conservation of life forms apart from mitigating pollution and augmenting catchments. An information system will be set up for islands, coral reefs, mangroves, and wetlands by developing a consolidated and easily accessible database of all recorded species. Support activities will include participatory research for inventory and valuation of freshwater ecosystems, measures to tackle serious threats to them and ensure conservation, as also the livelihood security of dependent communities. With regard to linkage between biodiversity and climate change, it should be recognized that biodiversity is an

important tool to find solutions for tackling the impact of climate change on rural populations that depend on biomass for their livelihood. There is a need to recognize the potential of biodiversity to provide solutions for adaptation in the form of traditional crop varieties and donors for creating GMOs.

National agro biodiversity hotspot mapping and identification of important agro biodiversity landscapes will be undertaken for conservation with the participation of farmers and pastoralist groups. Regions with high concentration of genetic diversity on major and important crops may be declared as 'gene sanctuaries' for conservation and enrichment of diversity, involving communities through diversity based income generation and incentives. The regulatory mechanism for trials and adoption of GMOs will be required to be based on scientific, socio-economic, and EIA in the long as well as short term. The process of a regulatory regime, therefore, should be consultative and transparent, based on the prescribed scientific, logical, and progressive norms, taking into account factors of human health and environmental health. Awareness generation will be important for ensuring effective outreach of the prescribed process for promotion of appropriately and adequately tested GMOs, mechanisms for enforcement of procedures, and processes for safeguarding ecological and health safety will be established.

10.14: 12thfive year plan (2012-2017):

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

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

Environment and Climate Change:

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

Forests and Livelihood:

- Greening 5 million ha under GIM including 1.5 million ha of degraded lands, afforestation and eco-restoration of 0.9 million ha. of ecologically sensitive areas.
- 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.
- Engagement of Village Green Guards/Community Foresters for every Joint Forest Management (JFM) village by 2016.
- Establish forestry seed bank in forest circles and Model Nursery in every district with information on public portal by 2014.

Wildlife, Ecotourism and Animal Welfare:

- Twenty per cent of veterinary professionals in the country will be trained in treating wildlife.

- Integrated Ecotourism District Plans covering 10 per cent of all potential Protected Areas (PAs) by 2017.
- Promoting participation of private sector, civil societies, NGOs and philanthropists in animal welfare.

Ecosystem and Biodiversity:

- Restore 0.1 ha. of wetlands/inland lakes/water bodies by 2017.
- 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.

Besides, 14 Goals have also been identified in the Plan Document, which would receive focus and special attention, *inter alia*, through the Annual Plans of the Ministry. These 14 Goals are set out below:

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 Environmental Impact Assessment (EIA).
4. Ensure ecological flows in all rivers by regulating abstractions so as to allow conservation of riverine 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.
6. Improve forest productivity, production and sustainable management of biodiversity (equity in access to benefit sharing with local people).
7. Restore and intensify forest-rangelands/ grazing-land management and establish community grazing land around forest fringe villages.
8. Build capacity of Village Forest Committees/ Joint Forest Management Committees (JFMCs) for management of forest resources including ecotourism.

9. Revive seed orchards and silviculture plots for various forest types of the country, as well as for enlisted species under Minor Forest Produce (MFP)/ Non Timber Forest Produce (NTFP), including genetic improvement, and establishment, of clonal orchards.
10. Reducing and managing human–wildlife conflict.
11. Commercialisation of permissible marine products rich in poly unsaturated fatty acids (PUFAs), vitamins and so on.
12. Promotion of ecotourism and participatory eco-development support livelihood of local population.
13. 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.
14. Assess coastal biodiversity resources, ensure sustainable management, restoration of mangroves, coral reefs and wetlands and support livelihood.

The progress made under the various schemes implemented by the forest department under the 12th plan is given below.

Table No.10.1: Progress under various schemes in 12thfive year plan

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
(2406 Forestry and wildlife) (State)						
1	Strengthening of check nakas	0.00	1.16	6.46	9.98	0.00
2	Strengthening of existing wireless network	0.00	6.8	0.00	3.52	0.00
3	Supply of cooking gas	3.33	3.74	12.31	22.64	34.20
4	Joint Forest management	14.17	14.32	10.00	14.00	16.00
	Total	17.50	26.02	28.77	50.14	50.20
Centrally sponsored scheme						
1	Modern Forest fire control and management (IFPC)	23.20	5.49	8.82	0.00	0.00
2	National Afforestation programme	77.07	0.00	0.00	0.00	0.00
	Total	100.27	5.49	8.82	0	0
Total (2406 Forestry and wildlife) (State)						
1	Supply of cooking gas	11.77	19.24	6.05	29.10	80.24
2	Vidarbhvikas	15.45	12.32	11.26	11.00	0.00
	Total	27.22	31.56	17.31	40.10	80.24

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
(2406 Forestry and wildlife) (State)						
1	Soil and moisture conservation on forests areas	0.00	28.02	0.00	0.00	11.95
2	Establishment of central nursery	0.00	0.00	0.00	0.00	10.65
3	Forest protection from fire	0.00	0.00	0.00	0.00	0.00
4	Reforestation of degraded forest (RDF)	37.17	68.28	55.30	24.35	48.59
5	Development of Forest Tourism	0.00	0.00	0.00	0.00	14.00
6	Compensation to the formers for losses caused by wildlife	0.00	0.00	0.00	5.00	0.00
	Total	37.17	96.30	55.30	29.35	85.19

(2406 Forestry and wildlife) (State)						
1	Joint forest management	49.71	53.62	22.39	20.00	25.00
2	Plantation of general use	0.00	0.00	0.00	0.00	29.69
	Total	49.71	53.62	22.39	20.00	54.69

	(2406 Forestry and wildlife) (State)					
1	Construction of Van Talao	0.00	0.00	0.00	22.34	24.40
2	Massive Afforestation programme	20.05	12.00	8.82	8.54	81.15
3	Afforestation for soil conservation	0.00	0.00	0.00	3.07	0.00
	Total	20.05	12.00	8.82	33.95	105.55

4406 Forestry and wildlife						
1	Forest Building (Repairs)	0.00	0.00	0.00	0.00	7.00
2	Soil and water conservation on forests areas	50.46	0.00	41.10	0.00	0.00
3	Forest roads & bridges (4406-4415)	0.00	0.00	0.00	20.63	26.91
4	Forest Protection from fire	0.00	0.00	0.00	0.00	0.00
5	Wildlife & nature conservation	0.00	0.00	26.42	0.00	0.00
6	Development of Forest Tourism	0.00	0.00	97.03	0.00	0.00
	Total	50.46	0.00	164.55	20.63	33.91

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CHAPTER –11

PAST SYSTEM OF MANAGEMENT

11.1: GENERAL HISTORY OF FORESTS:-

- **11 .1.1.** In the second half of 19th century, after assigning of Berar, the forests of Akola and Buldhana divisions were grouped into a single forest administrative unit. The forests of Akola were in a very much under developed condition, when the Berar was assigned to British in 1853. Unscrupulous felling, shifting cultivation, illegal hunting by the villagers of the forest and neighboring areas were in practice, resulted in degradation of forests and reduction in forest area. A regular forest administration was initiated by the Govt. after appointing of Assistant Conservator of Forests for the Berar in 1865. Initially for the first few years selection and demarcation of various reserves was carried out, for future management. Later on the Berar was split up into Northern and Southern Berar Divisions. The Northern Division was headed by Dy.C.F, whereas Southern Division headed by A.C.F. subsequently. The forest management was further systematized by the notification issued by the Revenue and Agriculture Department of the Govt. of India. The notification established the following classification of forests:-

- Demarcated State Forests.
- District Reserved Forests – Defined as land not to be assigned for cultivation.
- District unreserved forests – All other lands which were neither cultivated nor assigned for village purposes, nor included in Izara or Jagir.

In 1881 the Berar became a Conservatorship and the provincial branch of service was organized and staff was strengthened. The forests were reclassified and the classification was legally recognized in 1892 by notification under Sec. 40 (c) of Berar Forest Law. As per this classification the forest were classified into the following categories:-

A. 1. Reserves :- These areas were primarily intended for production of fuel wood and timber.

2. Woods :- Areas suitable for growing Babul.

B.1. Grass Lands :- Areas set aside for production of Grass.

C.1. Grazing Lands :- Areas reserved for pasture.

2. Open Forests :-Lands awaiting excision and until then to be treated as grazing lands.

11.1.2. This classification fairly worked well till 1900. When after famine land cost was increased and cotton prices were boosted, therefore more and more lands were brought under cultivation, resulted in reduction of grazing lands. The 'C' class grazing land could not sustain increased pressure of cattle population which compelled transfer of some of the areas either from 'A' class or from 'E' class. Some of the forest lands fit for cultivation were disforested and waste lands were afforested, and some new 'A' class reserves were formed out of 'C' class. In November 1913 'B' class reserves were transferred to 'A' class.

11.1.3. The following territorial and internal changes were taken place in the history of these forests: -

11.1.3.1. In the year of 1870 Akola forest born as a part of Southern Berar Division and A.C.F. was in charge of the Division. Later, the Southern Berar Division was divided into Wani, Washim and Purna Forest Divisions, when Buldhana forests was included in Purna Forest Division. Whereas Akola forest formed part of Wani and Washim forest divisions. Further reorganization of these forests was taken place in 1885-86 and constitutes as separate forest divisions i.e. Akola and Buldhana. In 1890 Amba-Barwa reserve was constituted. Since then large tracts of forests from the districts adjoining to Buldhana Division are transferred to Amba-barwa reserve with a view to distribute the workload and at the same time develop the area transferred and to work to the fullest capacity. These objects were not being fulfilled and resulted in transferring the restored area to their concerned divisions. Thus in 1901 the forests of Akola Division were included in Buldhana Forest Division, but restored to Akola Forest Division in 1901 and Akola Division was reformed. So much so 5139.16ha of land from Nimar forest division was transferred to Buldhana Division in March 1924. But again it was restored to Nimar Division in 1926.

11.1.3.2. In November 1929, the Forests of Barhanpur range of Nimar Division was transferred to Buldhana Division and restored the same to Nimar Division in December 1931. Such kinds of forest of Murtizapur taluka of Akola district which were a part of Amravati Forest Division in 1906 were also transferred to Akola Forest Division when it was reborn. In 1925 an internal change was effected in the division resulted in transferring the area of Palodi sub- range of Pangara range to Murtizapur range. In 1931 Pangara range was abolished and its forest distributed among the three remaining ranges Balapur, Murtizapur and Morna of Akola Forest Division. On the 1st April 1932 the Buldhana and Akola Forest Divisions were amalgamated to form West-Berar Division, having head quarter at Akola. Consequently the old Buldhana division became sub-division of the newly formed West-Berar Division. Internal changes of old Buldhana Division were effected. The Purna range of Buldhana Forest Division was split up into Jalgaon, Chikhali and Mehkar ranges. The Mohda reserve and Risod C – Class forests both were situated in Washim taluqa and Akola district were transferred to Buldhana Sub – Division in 1936 and 1938 respectively.

11.1.3.3. The area of 9382.41 ha of Jagir Forest of Bhingara, Anaya, Rohan Khindki, Salvan of Jalgaon range & Asola, Bhanosa, Shekapur of Mehkar range were abolished and declared as Protected forests on 4th June 1957 and presently they are the parts of concerned ranges. In 1957 Protected Forest of Andheri and Adan 190.39 of Aurangabad division were transferred to West – Berar Division and formed part of Chikhalwal range. In December – 1959 Washim range was newly created by splitting into the Murtizapur, Morna and Balapur ranges, which formed part of Akola Sub-Division.

11.1.3.4 In the year 1964, Akola and Buldhana Forest Division were reconstituted as per the resolution of the Govt. of Maharashtra Revenue and Forests DepartmentNo.FDM1363/5718II-J,Dated 3rd Feb- 1964.

11.1.3.5. In the year 2018 , Washim Forest Division was newly created separated from Akola Forest Division as per the resolution of the Govt. of Maharashtra Revenue and Forests Department GR WLP-0718/CR/268/F-1, Dated 4/12/2018.

Table 11.1: List of Working Plans for Akola Forest Division

S.N	Working plans in chronological order	Plan period
1	Hunt's Working Plan	1912-13 to 1941-42
2	S.A. Cornelius's Working Plan	1942-43 to 1951-52
3	S.S. Parasins's Working Plan	1965-66 to 1979-80
4	L.H. Benakatti's Working Plan	1972-73 to 1986-87
5	Thengdi's Working Plan	1994-95 to 2008-09
6	G.Rama Krishna Rao Working Plan	2009-10 to 2018-19

Chronology the working plan by which the forests of Akola Forest division were managed in the past: -

1898 to 1912 – A provisional working scheme was approved by Conservator for timber and fuel reserves.

1912-13 to 1941-42 – A Working Plan for Akola forest was prepared by Hunt.

1942-43 to 1951-52 – A Working Plan for Akola Forest of the West Berar Division was prepared by S.A. Cornelius.

1965-66 to 1979-80 – A Working Plan for Akola and Buldhana Forest Division was prepared by S.S. Parasins. Extension up to 87-88 was granted.

1972-73 to 1986-87 – Watershed Management plan for Katerpurna Catchment by L.H. Benakatti. Extension upto 89-90 was granted.

1994-95 to 2008-09 - A Working Plan for Akola forest Shri. Thengdi.

2009 to 2018-19-A Working Plan for Akola and Washim Forest Division was prepared G.Rama Krishna Rao

Working Plan prescriptions were only given to 'A' class Reserved Forests, 'C' class Reserved Forests, Protected Forests 'E' class forests acquired by department were not given any treatment in the Plan. Afforestation works in a few forest areas have been carried out outside the purview of the past plans.

11.2: PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS:-

A. Pre Working Plan period : (1865 - 1912)

11.2.1. The forests of Akola were a part and parcel of old forests of Berar. The information regarding forest of Berar is meagre before 1865, though these forests were assigned to British in 1853. During this period the importance in relation to both tangible and intangible benefits were not that much realised by the Govt. prior to 1865. Forests of Akola suffered badly from heavy illicit felling, shifting cultivation, heavy unregulated grazing, and repeated fires damaged forests to a large extent. The forests were not managed systematically up to 1865, though the forests were assigned to British in 1853. A regular and systematic working was started in the year 1865, with an object of management to give a complete rest to the forest from felling and to ensure protection against fire and grazing.

11.2.1.1. Prior to 1865 these forests suffered badly from heavy illicit felling, over grazing and uncontrolled grazing. A regular and systematic working started in the year of 1865 with an object of management to give complete rest to the forest from felling and to ensure protection against fire and grazing. 'C' class Reserve Forests suffered to a great extent than that of 'A' class forests. In 1891 departmental fellings were carried out in some of the regions in order to improve the crop conditions. In 1896 it was thought necessary to manage these forests on silvicultural lines to meet the increased demand of timber and firewood. Accordingly in 1898 simple Provisional Working Schemes for period of 5, 10 and 15 years were approved by the Conservator of Forests and were introduced in greater portions of the timber and fuel wood reserves. The system of treatment adopted in the Provisional Working Scheme was **"Coppice - With - Standard"**. 15 felling series were formed under the Schemes and an area of 42 Sq. miles was exploited by 1912 with fairly satisfactory result. In 1902 – 1903 some of the Babul bans of Murtizapur and Morna ranges were clear felled under the provisions of Annual Plan of Operations. Regeneration was done by sowing and broadcasting, without soil preparation after clear felling resulted in a very little success. Subsequently Agri-Silvi method was adopted to regenerate these areas, in which sowing of forest crops in lines together with field crops as it was practiced in Brushwood Working Circle of Amaravati Forest Division under its Working Plan

1902-03 was adopted for these areas of Babul forest 1903-04 and considerable success was achieved. Under this system land was given to cultivators free of cost for raising Babul plantation along with agriculture crop. Under this agri-silvi method forest crops was sown after two years of cultivation. Two lines of Babul were sown six feet apart and in between cotton and tuar were field crops. Regular weddings were carried out for healthy growth of Babul crop. The system has given very good results in raising Babul plantations.

B. Post Working plan period (1912-2009): -

The regular working plan period was started from 1912 and continued till 2009.

11.2.2. WORKING PLAN FOR AKOLA FOREST BY HUNT (1912-13to1941-42)

A systematic working plan for Akola forest was drawn by Hunt in 1912 and according to Hunt's Working Plan the following working circles were formed :-

1. Coppice Working Circle: - It covered all the 'A' class forest expect Narnala, Babul bans and Grass reserves. Treatment adopted was Coppice with Standard with a rotation period of 30 years. Cut Back Operation was prescribed. Coupes after felling were closed for grazing for 5 year and strict fire protection was introduced.

Results: - It was mentioned that the overall condition of the forest was improved due to systematic management of the forest included in this working circle. The system of Coppice With Standard resulted mainly in the increase of teak percentage and teak reproduction and spread up of teak in forest in the growing stock and some of the species like Salai forest being benefited in that direction by factors such as fire protection, regular grazing. Protection and preferential treatment given to the species. It was judged from the standing parent trees. The condition and quality of the crop was improved.

2. Improvement Working Circle: - Narnala reserve was placed in this working circle. A single felling series was formed for the entire working circle. It was worked on a cycle of 10 years. The system of treatment adopted was improvement fellings. Coupes were closed for 5 years after felling against grazing.

Results: - The regular working in this working circle on scientific lines resulted in the improvement of the crop both in composition and condition. The crop was mostly middle aged with teak as dominating species. Stringent fire protection and regulated grazing created conducive atmosphere for healthy growth of crop.

3. Babul Working Circle: - Babul forest of the entire division were placed under this working circle. The system adopted was clear felling followed by artificial regeneration of Babul on Agri-Silvicultural method. Rotation adopted was 30 years. Thinning's were prescribed in 13th, 18th and 24th years.

Results: - The system of raising Babul plantation by means of Agri-Silvi method proved successful.

4. Fodder reserves: - In order to supply grass, fodder reserves were ear-marked and set aside. Grazing of cattle was also permitted under the orders of Divisional Forest Officer from the 1st February to the 31st of May.

11.2.3. WORKING PLAN BY CORNELIUS FOR AKOLA FORESTS OF WEST BERAR DIVISION (1942-43 to 1951-52)

Hunt's plan for Akola Forest Division was replaced by the Working Plan of S.A.Cornelius in 1942-43. Before preparation of plan inspections of the area were carried out and stock mapping was done in 1939-40 by the Working Plan party. As per Cornelius Working Plan the following Working Circles were formed: -

I. Coppice With Reserves Working Circle: - All the workable forest for timber and fuel wood were included except Babul reserves. In this Working Circle the Silviculture system adopted was **"Coppice with Reserve".** Rotation period was fixed at 40 yrs. The method of treatment prescribed was clear felling in fully stocked and well stocked patches of low quality. All under stocked and open patches were excluded from felling except removal of dead and dying trees departmentally. Thinning's were prescribed in well grown patches and in better quality areas. Subsidiary silvicultural operations such as removal of brush wood and Lantana

interfering with coppice growth. Cut Back Operations were prescribed to remove damaged coppice and broken trees, felling of unfelled, unreserved trees, climber cutting, etc. Mid-rotation thinning's were prescribed for suitable areas for all Felling Series except Nimbhi, Chahogaon, Wagha, Rui and Palodi. A double grazing closure was prescribed one after main felling and the other after mid-rotation thinning.

Results: - During the implementation of the Plan overall crop condition was improved. Advance fellings in Coppice with Reserve Working Circle were carried out to meet the over requirement due to over supplies and increased demand of timber for building construction and industries. Timber prices shoot up appreciably in the market.

II. Babul Working Circle: - All the Babul bans of the entire division were included. In this Working Circle system adopted was clear felling followed by sowing of seeds in rows 18 feet apart under Agri-Silvi method. In 3rd year after permitting the raising of agriculture crop in the 1st two years was prescribed. Rotation period was fixed at 30 years. Thinning prescribed in 6th, 11th and 21st year from the year of lease. To induce natural regeneration in coupes, which were not purchased by contractors, departmental strip felling in strips on a chain width were prescribed. Restricted grazing i.e. one cow unit per acre was permitted in the first seven years. Sheep and goats were not permitted.

Results: - In Babul Working Circle the system adopted to manage Babul bans proved successful. Overall condition of the crop was improved.

III. Bamboo Working Circle (Partly Overlapping):- Annual coupes of Bamboo Working Circle were managed on 4 years cutting cycle and accordingly Bamboos were cut and extracted from annual coupes.

IV. Miscellaneous Working Circle:- Enumeration, thinning of Sandal trees were prescribed on 5 year circle. This prescription seems to have been followed during early years of the period of the plan.

V. Pasture Forests:- Very open unworkable areas mainly of the mixed Anjan (*Hardwickiabinata*) type was included in this working circle. Total forest included in this Working Circle was divided into different grazing series and each grazing series was divided into 4 grazing groups which were to be closed on rotations. Closers were fixed for 3 years. Thinnings were prescribed to open up canopy in dense patches for improving the grass crop.

VI. Supply to Defense Department :- Due to Second World War lot of advance fellings were carried out in the forest of this division. For supply of war material between 1941 –42 to 1945-46 only teak bullies and Salai wood was supplied to Defense Department. These advance felling were carried out mainly in the coupes of Coppice with Reserve Working Circle. The material supplied to Defense Department year wise is given below.

TABLE NO. – 11.2

THE MATERIAL SUPPLIED TO DEFENCE DEPARTMENT YEAR WISE

Sr. No.	Kind of Timber	1941-42	1942-43	1943-44	1944-45	1945-46
1	Teak Ballies	900	15,125	18,875	10,500	2,000
2	Round Salai logs cft	Nil	4,602.8	2,591.7	Nil	Nil
3	Round Babul log cft	Nil	Nil	Nil	603.4	Nil
	Total : -	900	197278	21446.7	11103.4	2,000

The demand for timber was multifold due to war supply, building, construction, and industries resulted in shortage of timber in the market, consequently prices rose appreciably.

Results:- Closer to grazing was effectively carried out but thinning was not done anywhere as prescribed in the working plan.

11.2.4. WORKING PLAN FOR AKOLA AND BULDHANA FOREST DIVISIONS BY SHRI. S.S. PARASNIS (1965-66 to 1979-80) (EXTENDED UPTO 1987-88):-

In this plan 'A' class Reserve Forests were dealt with. These forests were Stock mapped. Enumeration, Stem analysis and Stump analysis were carried out in Buldhana Division. The 'A' class forests of 56831.61 Ha of Akola Division were included. As per the Working Plan of Shri. S. S. Parsnis the following Working Circles were formed: -

I. Coppice with Reserve Working Circle: - All the Miscellaneous forests with inferior teak forests capable of producing timber and fuel wood were included in this working circle. Small patches of better-quality teak areas, which could not be conveniently separated and put under separate working circle have also been included. Rotation period was fixed at 40 years and harvestable girth was kept at 61 cms. 26 felling series were formed. The Silviculture system adopted was "**Coppice with Reserve System**". Total area included in this working circle was 44737.35 Ha. Regulation of yield by area. Under this system protection and unworkable areas form improvement fellings and thinning's. In better stocked area heavy fellings were prescribed. Prescriptions were made to reserve some of the trees i.e. 1) Trees required for protection purpose, 2) Trees required for seeds and other silviculture purpose, 3) Healthy edible fruit and flower bearing such as Mahua, Tendu, Char, etc., 4) Sandal trees. For treatment purposes the entire coupe area was divided into A,B,C and D. Subsidiary silvicultural operations like Cut Back in the year after main felling of the coupe. Cleaning in the 6th year of main felling, mid rotation thinning i.e. 20 years

after main felling and other operations like any growth badly affected by fires will be cutback.

Results: - Due to improper implementation of prescriptions the CWR forests have suffered from deterioration. Deterioration of quality and quantity of forest is mainly due to heavy illicit felling, uncontrolled grazing, and negligence in coupe closer fire line burning. In addition, the coppice regeneration was not up to mark due to faulty implementation of prescription and biotic pressure. In Chinchkheda, Patur part, Shedana part, Palodi part, Wagha, Rui, Karanja and Khowsdri Felling Series most of the forests reduced to malformed and crooked young pole crop. Teak maintains to be principal species constituting upto 80% of the crop. The crop is young to middle aged, old crop can also be seen in remote parts of Chikhalwal and Palodi Felling Series. Most of the area being worked under coppice system approximately since last 100 years therefore the coppice growth was unsatisfactory which resulted in further deterioration of crop.

II. Babul Working Circle: - All the Babul bans of Akola and Karanja ranges were included in this Working Circle. Total area included in this working circle was 2266.14 Ha. 5 felling series were formed. Principal species of the crop is Babul (Acacia Nilotica). The system of regeneration adopted was clear felling followed by A.R. through Agri-Silvi method. Rotation was fixed at 30 years. Telia verity of Babul was preferred in plantations. Other species prescribed in regeneration was Prosopis, Khair, Shivan, Neem and Sirus. Yield was regulated by area. Subsidiary silvicultural operations prescribed were three weeding in 1st year, two in 2nd year, two in 3rd year. Thinning's were prescribed at 6th, 11th and 21st year.

Result: - Babul bans are located nearby villages or during Agriculture fields. These forests have been subjected to heavy biotic pressure since their locations are near to habitations. The scientific management of the Babul bans has been discontinued

since 1974-75 due to repeated failures of Babul plantations. Most of the Babul bans are reduced to shruby forests. Natural regeneration of Palas, Khair, Bharati, Babul can be seen. These areas have been subjected to heavy grazing and illicit felling.

III. Open Pasture Working Circle: - All open forests of Akola Sub Division which are not capable of producing of timber and fire wood and where the demand of grazing is heavy are included in this Working Circle. Total area included in this working circle is 1659.65 Ha. These areas were treated under rotational grazing system for improvement of palatable grasses and introduction of superior fodder grass species and leaf fodder species. Grass coupes were closed to grazing and sold on rated passes. After removal of grass. Limited numbers of cattle were permitted from 1st December to the discretion of Divisional Forest Officer in times of scarcity.

Results: - In this Working Circle no noteworthy improvement in the quality and quantity of stocking observed. Areas were subjected to heavy grazing pressure. Some of the areas planted with misc. species in the past but most of the plantations failed. The prescriptions of Working Plan such as periodic coupe closure, fire control, grazing control, protections were not followed scrupulously.

IV. Fodder Working Circle: - All the fodder reserves which are locally known as *Ramanas*, included in this Working Circle. Total area included 6354.21 Ha. These areas set apart for production of fodder grass both in quality and quantity. The main object of management is to improve grazing and providing periodic rest to these areas. 1) To achieve improved quality and quantity of fodder grass. Periodic burning of grass ramana's once in 5 year was prescribed. 2) It was also prescribed to sow the seeds of high fodder yielding grasses such as Paunya, Sheda, Mushan, Marvel. 3) Heavy opening of the growth interfering with growth of grass, 4) eradication weeds and climbers, 5) Introduction of leafy fodder species such as Anjan, Moyen, Pipal etc.

Method of harvesting prescribed was cutting and removal of grass based on leases sold in open auction annually to Gram-panchayat or public bodies as per the rules prescribed by the Government.

Results: - The areas are further deteriorated due to heavy biotic pressure. The prescriptions of Working Plan were not followed in toto. Misc. plantations were taken up in some of the areas but their results were unsatisfactory. The deterioration of these areas is mainly due to biotic pressure and adverse climatic conditions.

V. Bamboo (Overlapping) Working Circle: - All the important and workable Bamboo bearing areas were included in this Working Circle and comprises of 13 felling series. Natural Bamboo areas mostly confined to Narnala reserves of Akola range. Main species of Bamboo occurring Dendrocalamus Strict us, some of the successful old plantations were also included. Method of treatment adopted was periodic thinning's to obtain maximum yield without considering the vigour of Bamboo clumps and allow their future development. 4 year cutting cycle was adopted. Bamboo plantation up to 5 Acres in suitable areas was prescribed in all ranges.

Results: - Natural Bamboo is on the verge of disappearance. The plantations are very young and they have not put on growth as per their age. Post planting operations of Bamboo were neglected due to this proper clump formation was not taken place.

VI. Sandal (Overlapping) Working Circle: - Areas of old Sandal plantations and some of the suitable areas for raising Sandal were included in this Working Circle. Total 10 Felling Series were formed in Akola division. Each Felling Series was divided into 5 coupes A, B.C.D and E to be worked on a 5-year cycle. Tending of young crop and harvesting of dead trees were prescribed. Plantation of at least 2 Acres in each coupe was prescribed. Artificial regeneration by means of dribbling of Sandal seed on suitable localities where the host plants are available. Cultural operations such as 1) Removal of dead and seriously diseased trees, 2) Cleaning and lopping of branches of other trees in favors of Sandal growth, 3) Heavy thinning's in natural Sandal reproduction areas, 4) Climber cuttings over entire Sandal bearing areas.

Results: - These trees were subjected to heavy illicit felling. The prescriptions of Working Plan were not followed scrupulously.

VII. Miscellaneous Working Circle: - Forest villages and a few such compartments which were not allotted to any Working Circles included in this area. Narnala forest area in Akola range was maintained as conditional game sanctuary was included in this Working Circle. Area of Misc. Working Circle was 1168.10 Ha.

11.2.5. WATERSHED MANAGEMENT PLAN BY SHRI. L.H.BENNAKATTI (1972 - 73 to 1986 - 87)

This special plan includes 3080.71 Ha of 'A' class forest in the catchment of Katepurna river valley project. 4 Felling Series were constituted i.e. portion of Ansing, Pangra, Shakharvira and Chohogaon. The total area covered in this plan was 10978.24 Ha. including 279.66 Ha. of 'C' class Reserved Forests. The treatments prescribed (in this plan) for various areas of the plan are as follows: -

I. Improvement Working Circle: - Total area included in this Working Circle is 10551.48 Ha. The 'A' class Reserve Forests capable of producing timber and fuel wood were included in this Working Circle. 15 Felling Series were constituted out of this Working Circle. Each felling series was divided into 15 coupes. Plantation works were proposed after clear felling at suitable areas. Intensive soil conservation measures along with afforestation works were proposed. Subsidiary silvicultural operations prescribed were CBO, Cleaning, etc. Closers of coupe was prescribed for 7 years.

II. Pasture Working Circle: - Compartment number 400 of 'A' class Reserve Forests and the remaining 'C' class area were included in this Working Circle. Preventive measures against soil erosion such as soil working, broadcasting of seeds of soil binders, fertilizer application, grazing closure, etc. were prescribed for improvement.

11.2.6. REGULATION OF GRAZING: - In the past unrestricted grazing have always allowed in 'C' class forests where as in A and B class forest controlled grazing was permitted up to 1912 – 1913. Grazing was prohibited in all 'A' class forests when first constituted as State Reserves but in 1884-85 light grazing excluding sheep and goats was allowed and it continued up to 1888 – 89. Due to famine in the year 1899 – 1900 all reserves were thrown open to grazing and it was continued up to 1904 – 05. Since 1907 steps were taken to gradually reduce, number of cows and bullocks admitted to the extent of permissible limit i.e. 1 cow or 1 bullock to every 1.5 acres of area of 'A' and 'B' class forest. Buffaloes, goats and sheep were totally excluded from grazing in forest. Exploited coupes of all felling series were closed for 10 years. In Babul Working Circle under regeneration prior to Hunt's Plan of 1912, cows and bullocks were allowed to grazing @ 1 animal for every 2 acres.

Prescriptions regarding grazing in Cornelius Working Plan introduced from 1942-43 for Akola Forest Division.

11.2.6.1. The following clauses to grazing were prescribed: -

(i) **Coppice with Reserve Working circle:** As per the prescriptions of Cornelius working plan all the parts of this Working Circle were closed for grazing for five years after main felling, and for another five years after thinning at mid rotation.

(ii) **Babul Working circle:** Restricted grazing was allowed for a period of 7 years in all the coupes after first felling. The incidence of grazing was permitted one cattle per head for a hectare. Other than cows and bullocks were not permitted.

(iii) **Grazing regulation in Pasture Forests: -** Pasture forests which contained very open forests, unfit for regular felling of timber and fuel trees were worked in the interest of grass production and grazing. In order to improve the pasture the areas were given a periodic rest from grazing. Each Pasture Series was divided into each of four coupes, each of which was closed for grazing for three years.

The Divisional Forests Officer was permitted to open any time the following closed areas to grazing within the periods mentioned below: -

(a) Unregenerated coupes closed to grazing (after mid- rotation) from 1st December to 15th June with a restriction in which buffaloes were not permitted.

(b) Fodder reserves not leased for cutting for grass or grazing from 1st April to 15th June.

(c) Pasture coupes closed to grazing from 1st December to 15th June.

All the A – class reserves of Akola were divided into 96 grazing units. The maximum number of cattle to be allowed in each grazing units were fixed and the number were not be exceeded without the prior permission of the Conservator. The numbers of cattle were fixed village wise and list was published. In filling vacancies preference was given to cattle coming for daily grazing from the adjoining villages. Goats and sheep were not allowed to graze in any of the above mentioned Working Circles.

The forest areas were categorized as per the guidelines for grazing control in Madhya Pradesh Government Memorandum No.605-284-XV- of 19th July 1933 under the Plan prepared by S.A. Cornelius for Buldhana and Akola Forest. The classification was as below: -

TABLE NO. – 11.3

Range	**Tree Forests**		**Scrub forests**		**Other forests**	**Total**
	A (i)	**A (ii)**	**B(i)**	**B (ii)**		
	Moist type	Dry type	Pasture	Open Pasture		
Medsi	--	42,578	4,072	897	2,469	50,016
Akola	--	15,224	5,228	--	9,286	29,738
Karnja	--	14,619	--	1,802	12,400	28,821
Washim	--	24,496	4,322	1,402	1,636	31,856
Total	**--**	**96,917**	**13,622**	**4,101**	**25,791**	**1,40,431**

11.2.7. WORKING PLAN FOR AKOLA FOREST DIVISION BY SHRI. THENGDI (1994-95 to 2008-09) :-

The forest of Akola Division was divided into 6 Working Circles in Thengdi's plan.

1. Conversion to High Forest W.C. (17694.80 ha)
2. Afforestation W.C. (33552.48 ha.)
3. Catchment W.C. (18878.64 ha)
4. Babul W.C. (21807.71 ha)
5. Fodder W.C. (7702.64 ha)

The prescriptions for different working circle and their impact are given below.

1. Conversion to High Forest W.C.: - In this Working Circle the forest earlier worked under Coppice with Reserve system, having density more than 0.4, with general site quality IVa and IVb were included. The crop is dominated by Teak with minimum 60%, sometimes up to 80% with its natural associates like Anjan, Salai, Moyen, Ain, Dhawada, Lendiya, Kalam, etc. In general the crop was young to middle age. Natural regeneration was inadequate but fairly satisfactory in some patches of forests and the crop had stunted growth because of loss in coppice vigour due to repeated management under coppice system. The felling cycle was fixed at 15 years and the harvestable girth was fixed at 75 cm GBH. Total area allotted to this working circle was 17694.80 ha which was approximately 17.75 % of total area. This working circle was divided into 17 felling series with 15 coupes of each felling series. Yield was regulated by area. For working, coupes were divided into **A)** Protection Area, **B)** Understocked or blank area, **C)** Pole crop and Old plantation area, **D)** Well stocked areas. 50% of total teak trees above harvestable girth were to be marked for felling. Intensive soil and moisture conservation works based on watershed management were suggested like Nalbinding, Contour trenches, Check dams etc. Natural regeneration and improvement operations followed by artificial generation were prescribed.

Results: - Out of 17 coupes due in every year and the majority of coupes were not worked during the prescribed year therefore the prescriptions were not properly followed. The reconnaissance survey reveals that there is no considerable change or improvement in crop quality and composition.

2. Babul Working Circle: - In this Working Circle 1987.39 ha. area scattered in 100 small patches ranging from 2 ha to 50 ha, previously managed under Babul working circle has been included in this working circle. Main species was Babul (Acacia Nilotica) the crop was young to middle aged and in many patches the natural regeneration is almost absent. 5 Felling Series with 15 coupes each were formed. Rotation period was fixed at 30 years and expected girth aimed at 60 cms at G.B.H. Yield was expected in good patches of Babul crop. Silviculture system adopted was improvement felling supplemented by A.R. Cutting Back Operations, cleaning and thinning operations were prescribed in subsidiary silvicultural operations. Soil and moisture conservation measures with AR were prescribed.

Results: - 1. These areas were very much subjected to biotic pressure such as illicit felling, grazing, encroachment and other human interference as these patches are situated in the midst of agriculture fields or adjoining to villages.

2. Most of the Babul ban patches were not at all worked as per the prescriptions of Working Plan. Therefore the prescriptions were not followed. In some of the Babul bans patches plantation activities were taken up with Prosopis and other misc. species rather than babul, which clearly indicates about total deviation of prescriptions.

3. This Working Circle has been neglected from the management point of view, which resulted in further degradation of Babul ban patches.

3. Afforestation Working Circle :- In this Working Circle the under stocked patches of less than 0.4 density of forest having site quality IVb with adverse soil conditions without any organic material have been included. The forests were previously managed under CWR and some of the 'C' class forests were included. Areas with blank and degraded forest deficient of natural regeneration were included. 33552.48

ha. and about 43.57% of the total area was included in this Working Circle. Intensive soil and moisture conservation measures and plantation activities were prescribed.

Results:- It is observed in the field that Afforestation works were not taken up as per schedule given in the Working Plan and the method of Ecological Index was not at all applied to decide number of plants in plantation. Therefore the prescriptions had not been implemented properly. The subsidiary silvicultural operations were not given required attention. The field visits show that most of the plantations in the Division do not come to the level of expected success due to grazing, fire and wrong selection of site and species.

4. Catchment Working Circle:- In this working circle forest areas previously managed under CWR were included. The forest areas falling in the catchments of irrigation projects had been allotted to this working circle. The site quality was IVb. The crop density varies from 0.4 to 0.6, at some places is above 0.6. In this 18878.64 ha area that constitutes 21.25% of area of the Division had been included. 16 Working Series with 15 coupes each were formed. No felling was prescribed. Drainage treatment and intensive soil and moisture conservation measures on the basis of watershed management were prescribed. Improvement of natural regeneration supported by artificial regeneration wherever necessary. Subsidiary silvicultural operation like thinning, cleaning were prescribed.

Results :- 16 coupes became due for working every year and the majority of these coupes could not be worked as per the prescribed schedule. It is observed during the field visits that many coupes were declared as unworkable as there is no yield was prescribed. It is interesting to note that other prescriptions given were also neglected without paying any attention.

5. Fodder Working Circle: - The grass lands previously managed under the same system were included in this Working Circle. The areas are open with grasses such as Kushal, Burbushi, Sheda, Paunya, Marvel, Mushan, etc. 7702.64 ha area was included with 69 Ramnans. Treatment prescribed was effective protection from grazing with wire fencing or trenches. Extensive soil and moisture conservation measures were also prescribed and the whole area was to be covered in 20 years.

Results: - No area was fenced with barbed wire. There was no working done as per the prescriptions in coupe, due every year. Cut and carry of grass were not followed as stall feeding is not common in this area. The area was subjected to frequent fires and unregulated grazing which further deteriorated the grass reserves.

11.2.8. WORKING PLAN FOR AKOLA FOREST DIVISION BY G. RAMA KRISHNA RAO (2009 to 2018-19): -

The forest of Akola Division was divided into 6 Working Circles in G.RAMA KRISHNA RAO's plan.

1. Selection-cum-Improvement W.C.**:**17694.80 ha)
2. Afforestation W.C. : (33552.48 ha.)
3. Catchment W.C. :(18878.64 ha)
4. Babul W.C. :(21807.71 ha)
5. Fodder Improvement W.C. :(7702.64 ha)

The prescriptions for different working circle and their impact are given below.

SELECTION CUM IMPROVEMENT WORKING CIRCLE

- Majority of these areas were managed under Coppice with Reserve Working Circle (CWR), SCI Working Circle, Miscellaneous Working Circle, Plantation Working Circle, Fodder Reserve Working Circle and Pasture Working Circle in the previous management plan. These forests were characterized by both good quality as well as degraded forests mixed. These forests were capable of yielding good quality of timber, small timber and fuel wood. The basic aim of management was to improve the condition of the crop by tending natural regeneration and supplemented it by artificial regeneration where ever necessary. In good quality patches, matured trees were to be harvested (above exploitable girth) if the trees were available silviculturally. Therefore, the harvestable girth was kept at 75 cm at breast height in the teak trees for site quality IV. Subsidiary silvicultural operations like CBO,

cleaning and thinning were also prescribed. Suitable soil and moisture conservation works were advocated to improve the site quality and crop condition.

- A total of 114compartments were allotted to this working circle and these compartments were divided into 23 felling series having 20 coupes in each one of them. The average coupe area was around 84 ha.

RESULTS:

It is seen that the prescriptions were exhaustive and conservation oriented. Though there is considerable quantity of seed origin crop, Working plan did not differentiate between seed origin and coppice origin teak, prescribing same harvestable girth for both seed origin and coppice origin teak trees. Seedling origin teak trees will be retained as seed bearers.

- Predominantly area consists of teak forests (about 60%). The other tree species include Dhawda *(Anogeissuslatifolia)*, Ain (*Terminaliatomentosa)*, Lendia (*Lagerstroemia parviflora)*.
- Natural regeneration is very poor.
- Soil and moisture conservation works were carried out which helped in survival of the planted seedlings.
- The survival percentage of the last five year plantation is about 65%.
- Out of total 190 coupes, due for felling only 103 coupes worked, and 48 Coupes were not worked due to sparse growth and 39 coupes could not be worked as they fall within 10km. radius of protected areas.
- Sequence and distribution of coupes in a felling series is haphazard, scattered in different compartment and without taking into account practical aspects of implementation.

AFFORESTATION WORKING CIRCLE

This working circle consisted of major portion of 'C' class reserve forests which were previously managed under various working circles, CWR, Miscellaneous, Pasture and Plantation working circles. In Gupta's plan these areas were under the treatment afforestation working circle. The governing aim was to improve the

vegetation cover both in quality and quantity and to meet local demands of small timber, fuel wood, fodder and other forest produces by undertaking plantations in degraded under stocked and blank areas.

RESULTS:

Teak, Khair, Bamboo, Neem, Awala, Behada, Karanj etc. were planted in these plantations. Though, most of the plantations are good in survival but growth of plants not satisfactory. It is also observed that considering the pressure from grazing, percentage of teak and non-browsable species have to be increased to achieve success in respect of survival and growth. Bamboo plantations have suffered greatly due to wild boar. Deep planting coupled with judicious and timely SMC works would ensure good growth.

CATCHMENT AREA TREATMENT WORKING CIRCLE

The forest areas falling in the catchment areas of irrigation, drinking water projects and directly draining into water bodies or reservoirs were included in this working circle. These areas were previously managed under Coppice with Reserve, Miscellaneous, Plantation, Fodder and Pasture Improvement Working Circles. The idea of creating this working circle was to prolong the life of irrigation as well as drinking water projects by controlling soil erosion and siltation in the reservoirs. Treatment of catchments included soil and moisture conservation measures, drainage treatment and improving vegetation cover to prevent soil erosion and to check run off in the catchment areas. The density of the forest varied from 0.1 to 0.6 and the crop mostly young to middle aged. The site quality in general confirmed to IV B. The special objects of management were -

- 1. Intensive soil and moisture conservation works to check the soil erosion and to arrest the runoff in the forest catchment areas.
- 2. Effective drainage treatment to check the silt flow into the water reservoirs. To preserve and increase vegetal cover through appropriate treatment to enhance the ground water table. A total of 76compartments were allotted to this working circle and these compartments were divided into 13 felling series.

RESULTS:

- Out of 60 coupes felling in 04 coupes could not be carried out as they fall within 10 km radius of protected area.
- Out of balance 56 coupes only 2 coupes were worked, 54 coupes remained unworked.
- Soil and Moisture Conservation works were carried out as prescribed in Working Plan.

BABUL WORKING CIRCLE

- All couples were subjected to restricted grazing for a period of seven years, after the first felling and the grazing incidence kept one head per acre. Cattle other than cows, bulls and bullocks were not permitted.
- **RESULTS:**
- Prescriptions given were not followed strictly but efforts were made to plant the fire wood species.

FODDER IMPROVEMENT WORKING CIRCLE

- This working circle included open and sparsely stocked areas not capable of yielding timber. These areas were managed under Miscellaneous, Plantation, Pasture Improvement, in the previous plans. In Gupta's plan these areas were allotted to fodder reserve working circle. The extent of area allotted to this working circle was 1680.90 ha. The basic aim to constitute this working circle was to raise good fodder species to meet the fodder demand for cattle population of local people.

RESULTS:

- Prescriptions given were not followed strictly but efforts were made to plant the palatable grasses.

11.3: SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN:

Some special works of improvement in the management of forests have been taken in the last few years. Notable among these are GR No.FDM2011/C.No.100/F2, dt.05/10/2011 implicating the Tendu Contractor in case of a fire happening in his jurisdiction which has resulted in the dramatic decrease in incidences of fire.

11.3.1: Information technology:- Maharashtra Forest department has been deploying information and communication technologies for better forestry management. The main objective is to systematically organize planning, implementation and monitoring of forestry and other related operations by systematic collection, storage and retrieval of MIS and Geospatial data through a computer based communication network. This will not only bring transparency, responsibility and accountability but will also enhance efficiency. These initiatives plans to achieve its objective by using ICT to set up e-Governance framework for information availability and tracking of forestry related activities across the supply chain while involving citizens, villagers and other stakeholders in the entire process. Maharashtra Government has taken decision of computerisation of state's Forest department vide Resolution dated 05.10.2011. Accordingly, infrastructure was developed to connect all offices from beat guard to head quarter of Maharashtra Forest department, Nagpur and Mantralaya, Mumbai by LAN and internet connectivity. IT cell has been developed at headquarters in Nagpur equipped with computers and independent server farms. A consultant has been appointed to bridge the technical component and IT savvy personnel have been appointed to develop various applications required for forestry activity and services.

11.3.2: PDA (Personal Digital Assistant):- In Akola forest division a total of 26 PDAs were distributed to the staff of the division pre-loaded with applications on offence reporting, fire incidences, beat checking, etc. in which incidences of fire and other illicit activities can be tracked more accurately with geo-tagged photos and Lat-Long details. This helps in capturing real time data and monitoring forestry activities. The application enables registration of offence, taking photograph of seized material and also of offender, if any.

11.3.3: Plantation using PMIS/NMIS:- Plantation Management Information System (PMIS) captures district-wise, taluka-wise, and village-wise data for registration of plantation sites. Most of these sites are geo-tagged. These sites are tagged with the department's existing Nursery Management Information System (NMIS) to support adequate seedling stock. The application has also been integrated with the department's existing plantation management application system to address future monitoring of plantation activity.

11.3.4: Greening of Maharashtra (50 crore plantation programme): Maharashtra Government has started the 50 crore plantation programme from 2015-16 to 2019-20. During the implementation of this programme, lot of emphasis has been given for involving the public across all walks of life and also other line departments have been involved in addition to Forest department. This programme has created a big people movement for Greening of Maharashtra. Lot of enthusiasm is seen among all stake holders in this mission.

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

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

11.3.7: Soil and moisture conservation works: Maharashtra Government also started the Jalyukta-Shivar programme for taking up intensive soil and moisture conservation works. Under this programme, lot of SMC works have been taken in this forest division. These works will definitely help in improving the soil-moisture regime of the area in long run.

11.3.8: Improvement in Communication Roads: - Forests are fairly well connected to main metalled roads by cart tracks and fair whether roads. For the improvement of

communications short lengths of *ghat* roads have been constructed in some of the reserves in the past. Minor repairs to roads maintained by Forest Department are carried out annually.

11.4: PAST YIELD AND REVENUE:

The details of yield and revenue realized during the past ten years are given in the table below.

Table No.11.4: Past yield and revenue realized.

Sr. No.	Year	Timber		Firewood	
		Quantity (m^3)	Revenue (Rs.)	Quantity (m^3)	Revenue (Rs.)
1	2009-	620.251	11625330	21.500	56600
2	2010-	99.036	3918000	18.019	96300
3	2011-	792.272	21005140	36.203	70500
4	2012-	681.062	18283150	26.400	62300
5	2013-	758.937	22650130	22.470	58200
6	2014-	375.375	10064150	15.600	52200
7	2015-	560.05	15772250	22.176	118900
8	2016-	275.313	8509950	17.500	40300
9	2017-	427.069	14853000	13.500	32500
10	2018-	346.220	10398545	14.600	11000
Total		**4935.585**	**137079645**	**207.968**	**598800**

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CHAPTER-12

STATISTICS OF GROWTH AND YIELD

The main species in Akola Forest Division is Teak. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of previous Plan in 2009is given below.

TABLE NO. 12.1

Local Volume Table (Round Timber) For Teak (All India Teak Site Quality IV)

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.280
6	90/105	0.435
7	105-120	0.555

12.1: 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 Akola 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

Sr. No.	Working Circle	Total Area in Ha.	Avg. Growing Stock per ha(m3/ha.)	Total Growing Stock (m3)	Total Carbon Stock (Metric tonnes)
1	Improvement Working Circle	15120.27	59.17	894666.376	268400.181
2	Afforestation Working Circle	17445.41	80.20	1399121.882	419736.984
3	Fodder Improvement Working Circle	5173.36	14.30	73979.048	22193.737
Total		**37739.04**	**51.22**	**2367767.306**	**710330.902**

CARBON SEQUESTRATION AND MITIGATION:

In this plan an area of17520.26ha. is proposed under AFFORESTATION Working Circle which is to be implemented during the plan period. This will add to the forest cover of the division and contribute to the carbon sequestration. of the forest. Natural regeneration prescribed in the plan will also add biomass and carbon in the form of vegetation.

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 (50) and they were analysed for Soil Carbon. The range of soil carbon varied from 0.4% to 4.4%.

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 Akola District taking the C-values of the Tropical Dry Deciduous Forests for the state of Maharashtra were extrapolated for this calculation.

12.1.1: 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 stores in rocks, sediments, swamps, wetlands, forests, forest soil, grassland and agricultural. 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 serous 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 (giga tonnes of carbon per year) and are still increasing.

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 it 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 CO2fertilization 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 windstorm 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.

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, defaults 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 sub-categories 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.

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.

Table No. 12.3: Three IPCC tiers and data requirements

Tier	Data needs /examples of appropriate biomass data
Tier 1	IPCC default factors: Default MAI (for degradation) and/or forest biomass stock (for deforestation) values for broad continental forest types – default values given for all vegetation – based pools.
Tier 2	Country specific data for key factors: MAI and/or forest biomass values from existing forest inventories and/or ecological studies. Defaults values provided for all non-tree pools. Newly-collected Forest biomass data is required.
Tier 3	Detailed national inventory of key C stocks, repeated measurements of key stocks through time or modelling: Repeated measurement of trees from permanent plots and/or calibrated process models. Can use default data for other pools stratified by in-county regions and forest type or estimated from process module.

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 factors 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 IPCC Guidelines (Workbook), Tier 1 methodologies usually use activity data that are spatially coarse, such as nationally or globally available estimates of deforestation rates, and 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 appropriates 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	Dead wood	Includes all non-living woody biomass not contained in the litter, either standing or lying on the ground. Dead wood also includes dead roots and stumps larger than or equal to 10 cm. in diameter or any other diameter used by the country.
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.), lying dead, in various states of decomposition above the mineral or organic soil.
Soil	Soil organic matter	Includes 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.

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. 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 is stratified into homogenous strata and samples are selected from each stratum randomly. This provides precise estimates for different strata and population. Once sample sites have been selected, established methods of biomass inventory are employed for different pools.

12.1.2: 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).

(ii)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 data have been formulated which predict root biomass based on above-ground biomass carbon (Brown, 2002; Cairns et al., 1997)

(iii) Dead Organic Matter (wood):

The DOM wood carbon pools include all non-living woody biomass and includes standing and fallen trees, roots and stumps with diameter over 10 cm.

(iv)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 cm. diameter. This pool comprises biomass in various states of decomposition prior to completer fragmentation and decomposition where it is transformed to SOM.

(v)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.

12.1.3: Forest Carbon Stock of Tropical Dry Deciduous Forests in Akola:

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:

TABLE NO. 12.5: FOREST CARBON STOCK OF TROPICAL DRY DECIDUOUS FORESTS IN MAHARASHTRA

(In '000 tonnes)

Forest type stratum	Den sity	Area in sq.km	ABG	BGB	Dead wood	Litter	SOM	Total	C Stock /ha. (tonnes)
Tropical Dry Deciduous Forests	VDF	4707.9	29331.3	11517.2	215.7	3134.0	27713.2	71911.5	152.75
Tropical Dry Deciduous Forests	MDF	10351.4	61047.4	23970.9	152.6	773.5	57679.5	143623.9	138.75
Tropical Dry Deciduous Forests	OF	10804.3	12816.5	5032.5	142.1	343.0	49471.8	67805.9	62.76
Total		**25863.6**	**103195.2**	**40520.6**	**510.4**	**4250.5**	**134864.5**	**283341.3**	**118.08**

The Forests of Akola Division mainly falls in Tropical Dry Deciduous Forests. Based on above data for forest type of Tropical Dry Deciduous Forests in Maharashtra, the Carbon Stock in Akola Forest Division is calculated to be as under:

TABLE NO. 12.6: FOREST CARBON STOCK IN AKOLA FOREST DIVISION

(In 253220'000 tonnes)

Forest type stratum	Den sity	Area in sq.km.	ABG	BGB	Dead wood	Leaf Litter	SOM	Total	C Stock /ha. (tonnes)
Tropical Dry Deciduous Forests	VDF	11.00	28.32	11.90	0.37	5.66	45.66	91.91	83.55
Tropical Dry Deciduous Forests	MDF	108.44	204.98	86.10	1.50	4.69	346.87	644.14	59.40
Tropical Dry Deciduous Forests	OF	220.93	397.85	167.20	2.85	13.35	1214.90	1796.15	81.30
Total		340.37	631.15	265.20	4.72	23.70	1607.43	2532.20	74.75

Thus, the Akola Forest Division holds/ stores 2532.2 tonnes of Carbon in its forests at an average of 74.75 tonnes/hectare. This data can be used as the baseline data for the future monitoring of the Carbon stock in the District/Division.

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CHAPTER - 1

THE TRACT DEALT WITH

1.1. NAME AND SITUATION:

1.1.1. LOCATION

Akola Forest Division is confined to Akola district of Maharashtra State and administratively under Amravati Forest Circle, since Dated 04/12/2018. Earlier Akola Division was under administrative control of Yavatmal Forest Circle. The Washim Forest Division was created and separated from Akola Forest Division by GR WLP-0718/CR/268/F-1, Dated 4/12/2018. Akola Forest Division situated between latitude 19^0 – 51' N to 21^0 – 17' N and Longitude -76^0 -7' E to 77^0 – 44' East. The details of Toposheet are given in **Appendix No. XIII** of Volume II.

1.1.2. BOUNDARIES.

The District of Akola is surrounded by Amravati District and Satpuda hill ranges in the North and North-East; Washim district is in the South; Buldhana District on the West.

1.1.3. AREA

The Forest area of Akola Forest Division is 377.87 sq. km., out of this 367.75 sq. km is Reserve Forest, 8.75 sq. km. is Protected Forest, 1.37 sq. km. is Un-classed Forest. The forest area of about 9.45 sq. km is transferred to Wildlife.

TABLE NO.1.1

TABLE SHOWING COMPARISON OF AREA UNDER PREVIOUS PLANAND NEW PLAN

(AREA IN HA)

Sr. No.	Forest Category	Previous Plan Area	New Plan Area
1	Reserved Forests	37457.91	36775.26
2	Protected Forests	1235.60	874.83
3	Un-classed Forests	398.44	136.93
Total		**39091.95**	**37787.02**

TABLE SHOWING DIFFERENCE IN AREA OF PREVIOUS WP AND NEW WP

TABLE NO. 1.2

Sr. No.	Item	Area in Ha.
1	Area as per old working Plan	39091.95
2	C.A. Land Received	(+)139.86
3	Area Transfer to Wildlife Division (After Unified Control)	(-)945.30
4	Area Transfer to Washim Forest Division	(-)499.49
Area Dealt for New Working Plan		**37787.02**

TABLE SHOWING AREA OF NEW WORKING PLAN

TABLE NO. 1.3

Sr. No.	Name of Range	No of Round	No. of Beat	Old Compt	New Compt	Area in Ha.			
						RF	PF	UF	Total
1	**Akola**	3	9	212	120	5433.33	55.18	75.81	5564.32
2	**Barshi takali**	4	15	121	113	11620.19	117.9	1.65	11739.74
3	**Patur**	4	17	42	38	8874.24	0	0	8874.24
4	**Alegaon**	4	23	51	46	10847.50	701.75	59.47	11608.72
		15	**64**	**426**	**317**	**36775.26**	**874.83**	**136.93**	**37787.02**

The details of the area transferred to Wildlife Division are given in **Appendix No. XIV** of Volume II.

1.1.4. The area of Akola district is 5845.31 sq. km. The forest area of Akola Division is 377.87 sq.km. area of the district, whereas total forest area is approximately 6.47 % of geographical area of the district.

TABLE NO.1.4

TABLE SHOWING % OF FOREST AREA WITH RESPECT TO GEOGRAPHICAL AREA

	Area in Sq. Km.		
Division/ Sanctuary	**Forest area in**	**Geographical area of District**	**Forest area as % of geographical area**
Akola Division	377.87	5845.31	6.47
Washim Division	4.99		0.08
Narnala Wildlife Sanctuary	21.81		0.37
Katepurna Wildlife Sanctuary	17.70		0.30
Total	**422.37**	**5845.31**	**7.23**

1.2. CONFIGURATION OF THE GROUND:

1.2.1. The Division is the part of *Ajanta* System towards South & *Satpudas* in the North. The *Balaghat* plateau situated on the *Ajanta* hills covers the southern half of the Akola Forest division. The area of Akola Forest Division is situated between the plains of Penganga, Man and the Purna Rivers which known as Payanghat. The average elevation of this plateau in Division is about 396.34m to 548.78 m. above Mean Sea Level (MSL) and Narnala Forest is the highest point is 930m. above Mean Sea Level (MSL). On slopes and ridges of the plateau and in the valleys intervening lie the main blocks of forest.

1.2.2. The vast fertile plain of *Purna* and Penganga rivers known as *Payanghat* extends north of *Balaghat* Plateau; this covers the greater part of the northern half of the Division. As The tract is quite monotonous with undulations just enough to maintain a natural system of drainage.

1.2.3. Towards north of *Paynghat* an elevated natural feature situated in the ranges of *Satpuda* hills. Which is popularly known as *Melghat*. Only a small part of these hills falls in Akola Forest Division.

1.3. GEOLOGY, ROCK, AND SOIL:

1.3.1. Only two geological formations are known to occur in this Division viz. *Purna* alluvium and *Deccan* trap. The *Purna* alluvium is restricted to *Purna* valley and occurs in considerable deposits over trap, which is sometimes mixed up with a calcareous conglomerate. Efflorescence of soda salts occur in some of the Babul bans (now *Prosopis* Forests) situated on the *Purna* alluvium.

1.3.2. The *Deccan* trap, which covers almost the entire Division belongs to the cretaceous period, when sheets of semi-molten trap break through the cretaceous strata and is found in this area in horizontal layers. The underlying rock over the entire Division consists of hard grey basalt, and numerous samples of amygdaloidal with zeolitic vesicles may be seen everywhere. The *Lonar* Lake falls within this region of trap. It is a large hollow, very nearly circular, more than 1.6 km in diameter, with sides almost precipitous. It resembles a crater but is not one. There are, however, no dykes and no trace of ash bed or lava flows, thus there is a total absence of everything that would characterize a volcano. On the other hand, the trap beds around its rim are found to dip away from it, eliminating any chance of its being considered the result of sinking. It is probably an explosion crater.

1.3.3. The soil over the entire trap area varies from a light reddish sandy loam, on the ridges and hillsides, to black cotton soil in valleys and depressions, and on some plateaus. The reddish sandy loam of varying consistency interned with the rounded fragments of the underlying rock covers most of the forest areas. This varies in suitability for the tree growth according to its depth and to the physical characteristics and the structure of the underlying rock.

1.3.4. The soil on the *Balaghat* is in general poor and shallow. Alluvium occurs in some of the large valleys in narrow strips and black cotton soil 0.5 to 1 m in

depth on some parts of the plateau. On slopes, soil varies from Murum to light black. Usually, the hill slopes flanking ravines area covered with boulders strewn over the surface. Teak especially grows well in such localities as these afford a safe lodgment for seeds and a good foothold for tree growth. Basalt, whenever in the form of hard impenetrable rock lies very near the surface, the soil is dry and shallow and quite unsuited to tree growth. In some localities there occur granular laterite beds, which are lacking in moisture and are almost impenetrable by the roots of the trees. The growth on such soils is invariably scanty, stunted, and malformed.

1.3.5. The *Purna* alluvium overlies *Deccan* trap. It consists of black cotton soil with calcareous conglomerate which lies immediately below it. It is invariably found along the river courses along with a soil of light brown in colour, called *Kunkery*, which contains a high percentage of soda salts. The depth of these alluvial deposits exceeds in places to 45 m. In breadth it extends roughly 25 km to the north and 16 km to the south of *Purna* River. In these fertile plains of *Purna*lie the patches of Prosopis Forests.

1.4. CLIMATE PARAMETERS:

1.4.1. Temperature: The climate of *Akola* district in general is dry & hot, the maximum and minimum temperature recorded in *Akola* District is 47°C and 8°C respectively. The temperature rises rapidly after February and continues till May. In the month of May, the mean daily maximum temperature at Akola is 47°C and mean daily minimum temperature is 30°C.

The winter in the Division is moderate. The average daily mean temperature rarely goes below 8°C. It is of short duration i.e., from November to January. The increase in temperature is noticeable during February and the hot season seems to be extending from the beginning of March to the end of June, the hottest months being May and June. In general, it is hotter over the *Payanghat* than on the *Balaghat*. The year wise temperature data for the period from 2008-09 to 2019-20 is shown in **Appendix No. XV** of Volume II.

1.4.2. Rainfall: The average annual rainfall in the district varies from 159mm to 697mm. The bulk of the rainfall is received from the South-West monsoons, which usually break in the latter half of June, continues for nearly three months, and usually ends in the latter half of September. The year wise rain-fall data for the period of 2008 to 2019 is shown in **Appendix No. XVI** of Volume II gives *Tahsil* wise rainfall data of Akola District.

1.4.3. Humidity: In general, the weather condition are dry and hot in this region During the South-West monsoon, The relative humidity is between 60% to 80% where as in summer season the humidity drops down to 20% even less. which is the driest part of the year.

1.5. WATER SUPPLY:

1.5.1. The tract is drained by one main river namely, the *Purna*. The *Purna* which rises near *Bhaisdehi*, in *Betul* district of M.P. flows due West across Amravati and Akola district into Akola. The *Balaghat* plateau is drained north-wards by the *Nalganga*, the *Biswa*; and the *Gyan* in *Akola* district. The *Kate* or Lower *Purna*rises in the *Ajanta* hills to the West of *Akola* district and runs through them paralleled to and south of the *Penganga*. Lower *Purna*dry up during summer leaving only few pools; so also, the nalas and streams running through the forests. Most of the wells are, however, perennial. Wells sunk in *Purna* valley hold brackish water.

1.5.2. Ground Water Status: In the northern portion of the valley, belt an East-West stretch extending for over 30 km, with average width of 6 km, is the potable freshwater belt with a discharge of 8 to 12 liters per second within a depth range of 40 meters. In the southern part of the valley south of river *Purna* there is acute scarcity with the river's alluvium, but the major part of the alluvial portion of the district is generally free from it.

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CHAPTER – 2

MAINTENANCE/INCREASE IN THE EXTENT OF FOREST AND TREE COVER

2.1: AREA OF FORESTS UNDER DIFFERENT LEGAL CLASSES (RF, PF, UF AND OTHERS) DISTRIBUTION OF THE AREA

2.1.1. The total area of Akola Forest Division is 377.87Sq.km. Out of this, 9.45 Sq. Km. is handed over to Wildlife wing. Hence, the net area in charge of Akola Forest Division is 377.87Sq.Km. This Working Plan covers management prescriptions for 377.87Sq.Km.

Table No. 2.1:

Range wise distribution of the forest area (ha)

Sr No	Name of Range	No of Round	No. of Beat	Old Compt	New Compt	Area in Ha.			
						RF	PF	UF	Total
1	**Akola**	3	9	212	120	5433.33	55.18	75.81	5564.32
2	**Barshitakali**	4	15	121	113	11620.19	117.9	1.65	11739.74
3	**Patur**	4	17	42	38	8874.24	0.00	0.00	8874.24
4	**Alegaon**	4	23	51	46	10847.50	701.75	59.47	11608.72
Total		**15**	**64**	**426**	**317**	**36775.26**	**874.83**	**136.93**	**37787.02**

2.1.2: ADMINISTRATIVE UNITS:

For administrative convenience, the ranges, rounds, and beats were reorganised in the year 2018-19 and the entire division has been divided into 4 Ranges, 15 Rounds and 64 Beats.

2.1.3 LEGAL POSITION

The Government forests of originally notified whereas state forest under the Berar Forest (Amendment) Law of 1891 or lands declared as unoccupied Government waste lands. In 1911 the Indian Forest Act, VII of 1878 was applied to Berar because of Government of India's notification No. 2197- I-B, all the State Forests which were notified under Berar Forest Law. Later on, additions and alterations in the Govt. Reserved Forest have been notified under Indian Forest Act XVI of 1927 and was

applied to Berar Forest vide Government of India's notification number 719 – I of 13th December 1927. All the Reserved Forests of West Berar Division was notified and defined as 'A' or 'C' class forest depending upon their constitution of area and the classifications were notified under Indian Forest Act. The changes in 'A' and 'C' class areas were affected by executive orders. The Akola Forest Division has **36775.26 ha** Reserved Forest and 874.83 ha Protected Forest, under the Indian Forest Act 1927, and 136.93 ha. Unclassed forest.

List of notifications of Reserved Forest / Protected Forest is given in **Appendix No. XVII.**

Several alterations and adjustments affecting the area of the Reserve and Protected Forests have subsequently taken place.

2.1.4 RIGHT AND CONCESSIONS:

RESERVED FOREST

There are no rights in the Reserved Forest except the right to way and access to water. There is no commutation of *nistar or paidawar* in the Akola Forest Division. Various concessions have been granted from time to time to the agriculturists and others by the erstwhile Government of Madhya Pradesh and Government of Maharashtra. The following concessions have been permitted:

- The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of the Reserved Forests, in accordance with, the grazing rules in force.
- Agriculturists of villages in the vicinity of the Reserved Forest are given certain quantity of bamboo and firewood for their bona fide domestic use at concessional rates. None of these concessions is a legal right.

The inhabitants of the forest villages were allowed to cultivate the lands allotted to them on payment of nominal rent. They were also permitted to graze their cattle and to obtain timber and other forest produce for their bona fide domestic use as per the rules laid down in MP Forest manual. Since, the transfer of these villages to Revenue Department, they are treated at par with other villages.

PROTECTED FOREST:

Before abolition of the proprietary rights all lands belonged to the proprietors. A village administration paper called "Wazib-ul-arz," was prepared for every settlement; and plots of land were separately recorded, showing the Khasara number and area which was set apart for a particular purpose. Under section 202 of the Central Province Land Revenue Act, 1917, a provision was also made for punishing the violation of any of these customs. Under the provision of the Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahala, Alienated Lands) Act, 1950 (Act I of 1951), all communal and other wastelands became property of the Government while occupied lands continued to be private. To distinguish between the rights existing on the government wastelands and on the other lands, a provision was made in the Madhya Pradesh Land Revenue code, 1957 prescribing the preparation of the Nistar Patrak and Wazib-ul-arz for every village. The Nistar Patrak deals exclusively with management and use of the government land while the Wazib-ul-arz deals with community and customs use over private land.

The nistar officers have formed grazing and nistar zones by clubbing together surplus villages with deficit villages, while self-sufficient villages had been treated as individual zones. Villages assigned to particular zone can exercise their nistar rights within that zone.

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

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

2.2: FOREST AREA UNDER DIFFERENT WORKING CIRCLE:

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

Table No. 2.2: Area allocation to different working circles.

Sr. No.	Proposed Working Circles	Area (ha.)	Percentage
1.	Improvement Working Circle	15120.27	40.01%
2.	Afforestation Working Circle	17468.57	46.23%
3.	Fodder Working Circle	5198.18	13.76%
4.	NTFP Chapter	-	Entire area
5.	JFM Chapter	-	Entire area
6.	Wildlife Management Chapter	-	Entire area
7.	Forest Protection Chapter	-	Entire area
Total		**37787.02**	**100%**

2.2.1: The range-wise allocation of area under the different working circles is given in the following table.

Table No. 2.3: Range-wise area allocation to different working circles

Sr. No.	Range	IWC WC	AWC	Fodder Improvement WC	Total
1	**Akola**	0.00	2700.00	2864.32	5564.32
2	**Barshitakali**	2750.26	7383.62	1605.86	11739.74
3	**Patur**	4418.83	4090.41	365.00	8874.24
4	**Alegaon**	7951.18	3294.54	363.00	11608.72
Total		**15120.27**	**17468.57**	**9198.18**	**37787.02**

2.3: PERCENTAGE OF FOREST WITH SECURED BOUNDARIES:

The forests were clearly demarcated in the past and the boundaries of the forest areas are maintained. The total length of the external boundary Akola Forest Division is 1530.142 kms, out of which 1493.222 kms is artificial boundary and 36.92kms is natural boundary.

The boundary demarcation adjoining to private lands is not properly maintained. The demarcation of Reserved Forests is well maintained as compared to the demarcations of Protected and Un-classed Forests. The precast pillars are not

erected in the field. Proper boundary demarcation and maintenance of boundaries is the need of the hour; encroachments are increasing day by day, specially on those forests which are adjoining to private lands.

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

The total geographical area of the district is 5673 sq. km. of which 387.89 sq. km. is forest. The condition of the forests and forest cover over the last decade during the implementation of the Plan based on the FSI satellite data is as follows:

TABLE NO. 2.4: FOREST COVER OVER THE LAST DECADE DURING THE IMPLEMENTATION OF THE PLAN

SFR Year	Geographical area in sq.km.	Very Dense Forest	Mod. Dense Forest	Open Forest	Scrub	Total
2017	5673	11	110	218	16	339
2019	5673	11	108.44	220.93	16	340.37

There is a decrease in the Moderate Dense Forest in the District but overall, there is an increase of the forest area by1.37**sq.kms**.

The threats to the forests from land use and land 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.

2.4.1: DISFORESTATION PRIOR TO 1980

In this division, the total area disforested is 853.62 ha. Details are given in **Appendix No. XIX.** of Volume II.

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

The Department has received **139.86 ha** compensatory land for various projects. These lands are notified under RF.

The total area of **29.053 ha.** forest land diverted for non-forestry purposes in last 10 years in the division.
The total area of **139.86 ha**. has received as compensatory land in the last 10 years in the division. (2.67 ha. Land is pending for section 20)

The details of the forest area received for compensatory afforestation against FCA 1980 is given in **Appendix No. VII A** of Volume II.

The details of the forest area diverted for non-forestry purposes under FCA 1980 is given in **Appendix No. VII B** of Volume II.

The details of area "Identified Forest" as per Supreme Court's order is given in **Appendix No. XX** of Volume II.

2.4.2 : Area diverted for non-forestry purposes under Forest Rights Act 2006 :

The status of implementation of FRA 2006 in Akola Forest Division (up to March 2020) is as below.

TABLE NO. 2.4.1: THE STATUS OF IMPLEMENTATION OF FRA 2006 IN Akola FOREST DIVISION

Type of Claim	No. of cases received by Gram Sabha	No. of cases rejected by Gram Sabha	No. of cases rejected by SDLC	No. of cases rejected by DLC	No. of cases finally accepted by DLC	No. of cases pending for decision at DLC
Individual	767	491	231	0	48	0
Community	69	13	52	0	10	0
Total	**836**	**504**	**283**	**51**	**58**	**0**

The diversion of forest land to the Traditional Forest Dwellers has fragmented the area of the division. The details are given in **Appendix-V**. of Volume II.

2.5: THREATS TO THE FOREST:

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

2.6: DISTRIBUTION OF DIFFERENT FORESTTYPES:

2.6.1: The majority of the important forests are confined to the hilly region and fall under the "Southern Tropical Dry Deciduous Forests". Dry Teak i.e., 5A/C1 of Champion and Seth's classification. These forests lie on soil derived from trap and are characterized by the presence of Teak of varying quality depending on the configuration of the ground and the depth of soil. The rest of less important forests such as *Prosopis* Forests occur in a few big and numerous small, isolated blocks scattered over fertile plains of "*Purna*" rivers. Areas under "Anjan (*Hardwickiabinata*) are quite extensive where in "*Anjan*" occurs in pure patches or mixed with *Teak* and is representative of the E-3-*Hardwickia* forests of Champion's classification.
For management purpose the following local types can be distinguished: -

TABLE NO. 2.5: FOREST TYPE OF AKOLA FOREST DIVISION

Type	Notation	Type description
I	5A/C1	Dry Teak Forests
II	5A/C3	Open Mixed Forests
III	5A/E2	Salai Forests
IV	5A/E3	Anjan forests
V	5D/S4	Grass lands with brushwood
VI		Prosopis forests

2.7: TREE COVER OUTSIDE FOREST AREA:

The total geographical area of the district is 5845.31 sq. km. of which 422.37 sq. km. is forest. The Plantation/ Tree outside Forests (TOF) for State of Maharashtra according to the State of Forest Report 2021 is 12108 sq. kms adding 3.93% 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 as 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 the years of 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 road-side plantations. It is interesting to note that the Department has also carried out an assessment of the success and survival of these plantations in 2021 and the results are very encouraging.

TREES OUTSIDE FORESTS PLANTED UNDER SOCIAL FORESTRY AKOLA DIVISION DURING THE PERIOD 2008 TO 2018

Between 2008 to 2018, the Social Forestry Akola Division carried out Block plantation for a total of 459 beneficiaries and planted 596 ha. Area. The total number of seedlings planted was 12.42 lakhs of which the total number of seedlings surviving at the time of handing over the scheme was 8 lakhs During this period, roadside plantation of length of 738 km. with 12.42 lakhs planted seedlings was carried out of which the total of 8 lakhs seedlings survived at the time of handling.

The Growing Stock of TOF cannot be assessed due to inadequate data from the SFD. The potential area for extension of Tree outside forest, yet to explored by SFD. Thus, there is a need for proper assessment of Tree Outside Forest should be done by the Social Forestry Division of the District. 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 arrive.

2.8. SHIFTING CULTIVATION (JHUMMING).

Shifting cultivation is not practiced in this forest division.

2.9. COMMITTEE FOR IDENTIFICATION OF COMPENSATORY AFFORESTATION

A Committee for identification of land banks for Compensatory Afforestation was constituted as per Ministry guidelines. The total area of **139.86 ha**. has received compensatory afforestation in last 10 years in the Division. The prescription for compensatory afforestation land is allotted to concerned working circles adjoining to the area. For example, if the CA land is adjoining to Afforestation working circle, then CA land allotted to Afforestation working circle.

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CHAPTER 3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

3.1. FOREST COMPOSITION AND DISTRIBUTION.

The forest of Akola forest division falls under the category of "Tropical Dry Deciduous Forest "of Champion and Seth's revised survey of Forest types of India and belongs to sub group 5A/C1 "Southern Tropical Dry Deciduous Forests". These forests lie on soils derived from trap and are characterized by the presence of Teak of varying quality depending on the configuration of the ground and the depth of soil. The rest of less important forests such as Babul (Prosopis) Forests occur in a few big and numerous small isolated blocks scattered over fertile plains of "Purna" rivers. Areas under "Anjan (Hardwickia binata) are quite extensive where in "Anjan" occurs in pure patches or mixed with Teak and is representative of the E-3-Hardwickia forests of Champion's classification. 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 fires. The illegal fellings are often concentrated on the species most valued for various purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stages, are resistant ones, that can stand to grazing and fires. These species are often of low utility.

a] Dry Teak bearing forests - 5A/C1 :-

In this type superior Teak forest are found which are confined to area crop, better rainfall, its soil condition and area of favourable climatic conditions. These forests are mainly occur in valleys and gently sloping areas with Northern aspects.

These forests are extended on the plateau surrounding the forest villages of Ambabarwa and Chunkhadi continuing upto mangeri village in Ambabarwa reserve. The site quality varies from IVA to IV B. The crop condition is generally well on sheltered lower slopes of hills and valleys of alluvium soils. The crop density varies form 0.4 to 0.6 with some blank and under stocked patches. The Teak (Tectona grandis) is a dominating species,

which constitutes upto 80 % in some of the patches. The crop with its natural associates of Ain (Terminalia alata),. Dhawda (Anogeissus latifolia), Lendia (Lagerstroemia parviflora) shiwan(Gmelina aoborea), Kalamb(Mitragyna paoviflora),Telia,Shisham (Dalbergia latifolia), Bija (Pterocarpus marsupium) etc. The crop is mainly young to middle aged dominating with malformed crop. In some of the patches, the status of natural regeneration is satisfactory.

The Sandal (Santalum album) trees are noticed in Chikalwal round and Narnala forest area. The status of natural regeneration of Sandal is poor. Teak is the most dominating species and with its associates in this forest. The constitution of various species of the crop is given as below :-

Upper Storey: - Teak (Tectona grandis) is principal species and main associates are Dhawada (Anogeissus latifolia), Ain (Terminalia alata), Tiwas (Ougenia oogeinessis), Lendia (Lagerstroemia parviflora) and Tendu (Disopyros melanoxylon). Some of the other associates are Satpudi (Dalbergia paniculata), Bhirra (Chloroxylon swietenia), Kalamb (Mitragyna parviflora), Rohan (Soymida febrifuga), Salai (Boswellia serrata), Semal (Bombax ceiba), Beheda (Terminalia bellerica). Shisham (Dalbergia latifolia), Bija (Pterocarpus marsupium) and Bel (Aegle marmelos).

Under Storey:- The understorey consists of trees shrubs, grasses and climbers. The major species are-

Trees:- Amaltas (Cassia fistula), Aonla (Emblica officinalis), Char (Buchanania lanzan), Dudhi (Wrightia tinctoria), Ghoti (Zizyphus xylocarpa), Palas (Butea monosperma), Dhaman (Grewia tiliaefolia), Moyen (Lannea grandis), Bartondi (Morinda tinctoria), Lokhandi (Ixora parviflora).

Shrubs:- Bharati (Gymnosporia montana), Parijatak (Nyctanthes arbortristis), Mororphali – (Helicteres isora), Dhayati (Woodfordia fructicosa), Raimunia (Lantana camara), Tendu (Diospyros melanoxylon).

Grasses:- Bhurbhusi (Eragrostis tenella), Kodmor (Apluda varia), Marvel (Dilabthium annulatus), Dub (Cynodon dactylon), Paonya (Ischoemum sulcatum).

Climbers:- Palasvel (Butea superba), Mahul (Bauhinia vahlii), Pivervel (Combretum ovalifolium), Chilati (Acacia pinnata), Iruni (Zizyphus oenoplia) Gunj (Abrus precatorious), Ran kand (Dioscorea bulbifera) Ran draksh (Vitex tenuifolia)

All these forests have been worked at least once under some or other form of felling in the past, and as such some sort of age gradations are noticed. The bulk of the crop is young between 15-60 cm. girth classes. The crop has suffered from fire at many places, which have eliminated much of the re-growth of miscellaneous species where fires have been frequent and severe, open stands of Teak poles which are stunted and malformed are visible. Trees of bigger dimensions are rare and are confined to valley portions with better soil.

b] Dry mixed deciduous forests - 5A/C3

These forests formed as the most important common type, situated generally in dry exposed localities where the layer of soil is superficial and the soil moisture is low with heavy grazing and frequent fires. Majority of this forest conformed to site quality IV B however at a very few places it is found patches of site quality III and IV A, which are confined mostly in sheltered pockets, Nala banks and gentle slope plateau, where soils having a considerable depth. Teak occurs in gregarious patches forming 60 to 80% of over wood. At some places Salai becomes a dominating species and on exposed spurs Dhawda comes under Salai. On many sites of old cultivation and open areas Palas, Ain, Lendia and thorny species appear first and Teak follows rapidly. The natural regeneration of teak is sporadic on lower gentle slopes and decreases along the steeper slopes and very sparse on hill tops. Most of the regeneration of teak is of coppice origin. Due to its endurance against fires and other damaging effects.

Trees:- Salai (Boswellia serrata), Dhaora (Anogiesus latifolia), Aonla (Emblica officinalis), Palas (Butea monosperma), Ber (Zizyphus jujuba), Ghont (Zizyphus xylopyra), Ain (Terminalia tomentosa), Ahl (Morinda tinctoria), Jamrasi (Elaeodendron glaucum), Khair (Acacia catechu), Hiwar (Acacia leucophloea), Achar (Buchanania latifolia), Tendu (Diospyros melanoxylon), Amaltas (Cassia fistula), Kalamb (Mitragyna parviflora), Gongal (Cochlospermum gossypium), Mahua (Madhuca latifolia), Moyen (Lannea grandis) and Behera (Terminalia bellerica). Koha (Terminalia arjuna) is common along most of the bigger nallas and streams. Other less common associates are :- Bija (Pterocarpus marsupium), Tiwas (Ougenia dalbergioides), Dhaman (Grewia tiliaefolia), Mokha (Schrebera swietenioides),

Kullu (Sterculia urens), Kusum (Schleichera oleosa), Reproduction of Teak is often quite good and among other species Dhaora, Palas, Lendia, Ain and Kulu regenerate well. Teak and most other species coppice well. Undergrowth is not dense, except in moist valleys or along nala banks where Nirgudi (Vitex negundo), Marorphal (Helicteres isora), and Bhandar (Colebrookia oppositifolia), Bharati (Gymnosporia montana) are found in dense patches. In dry localities Bharati (Gymnosporia montana), Chilati (Mimosa rubicaulis), stunted Khair (Acacia catechu) occur, and at very few places Lantana (Lantana camara) and Kharasi (Byctanthes arobortristis) are found. The principal grasses are Sheda (Schima nervosum), Ghonad (Themeda quadrivalvis), Kusal (Heterpogon contortus), Rusa (Cymbopogon martini) and Bhurbhusi (Eragrostis tenella).

Climbers :- Chilati-choti (Acacia pennata), Malkangni (Celastrus paniculata), Piwarbel (Combretum decandrum), Nagbel (Cryptolepis buchanani), Dudhi (Hemedesmus indicus), Dhimarbel (Ichnocarpus frutescens), Mahul (Bauhinia vahlii), Ironi (Zizyphus oenoplia).

c] Boswellia Forest - 5A/E2

This type of forest covers many reserves in Ambabarwa, Hamdari, Cidona, etc. It occurs almost as a pure crop on dry and exposed soils at mixture with a few scattered Khair, Rohan, Ghont, Chilati, etc. These forests are dominated by Salai and representing of degraded forests. The site quality of Teak is IV B. In many areas Salai crop is mostly malformed and unsound. The reproduction Salai is fairly good whereas natural regeneration of Teak and other species is scanty.

d] Babul Forest - 5A/E3

Babul bans found in water logged areas in some of the broader valleys mainly of Morna reserve of Akola Range. In this area Babul bans are found along streams and nalas.

Most of these forest are situated in the Payanghat however some scattered blocks of forest found on the Northen part of Balaghat plateau commonly known as Babul bans. Three main varieties of Babul have been identified – 1) Telia, 2) Kauria, 3) Ramkati. Ramkati appears like broom with ascending cupressi formed branches. This variety grows faster but occurs in sporadic

form of forest and found adjoining to cultivations. Religious sentiment is attached against the felling of this variety.

The other two verieties can be identified with following features :-

Telia	Kauria
1. Bark relatively smooth and lightly cracked	1. Bark rough and fissured
2. Colour of shoots bright brown spines short slender and few	2. Colour of shoots grey spines long, stouter and numerous
3. Pods monoli form	3. Pods flat but little constricted between the seeds.

Both Telia and Kauria prefer deep moist soils. Telia variety grows faster and long lived. Based on economical value Telia variety is considered as much superior for the purpose of timber used for various agricultural implements. The wood of Telia variety is compact, closed grained, durable and seasons well whereas timber of Kauria variety is coarse, brittle and seasons badly and cracks during the process and it is used rarely. Both the varieties have almost equal fuel value.

Babul (Acacia nilotica) is a strong light demander and it is not a good coppicer, Karuia variety is much more susceptible to fungus attack. Majority of Babul bans consists of Kauria variety and seeds are being disbursed by floods along streams. The growth of Babul is good on deep soil and well drained alluvium along the bank of rivers and Nalas. Kauria grows well on light black soil and poor on shallow and hard soils, slow stunted growth, hardly achieve 20 feet in height. It germinates well and grows faster.

Babul forests occur almost pure. However, at places following species are found scattered in them:-

Apta (Bauhinia racemosa), Ahl (Morinda tinctoria), Amaltas (Cassia fistula), Bahera (Terminalia belerica) Rarely noticed, Chandan (Santalum album), Ghont (Zizyphus xylopyra), Lasora (Cordia myxa), Umbar (Ficus glomerata), Chinch (Tamrindus indica), Jamun (Eugenia jambolana) along nala banks, Kawit or Kith (Feronia elephantum), Katbor (Canthium parviflorum), Kalam (Stephegyne parvifolia), Koha or Arjun (Terminalia arjuna), Lendia (Lagerstroemia parviflora), Maharukh (Ailanthus excelsa), Palas (Butea monosperma), Ain (Terminalia tomentosa), Pakar (Ficus infectoria), Panjra

(Erythrina suberosa), Lokhandi (Ixora pariviflora) and Sitaphal (Anona squamosa).

The undergrowth generally consists of Chilati (Mimosa rubicaulis), Ber (Zisyphus jujuba), Bharati (Gymnosporea montana), Nirgudi (Vitex negundo), Tarwad (Cassia auriculata), Tarota (Cassia tora), Pachara (Capparis grandis), Yelati (Dichrostachys cinerea), Takal (Clerodendron phlomoids) and a few herbs.

The climbers are Chilati- Choti (Acacia pennata), Gunj (Abrus precatorius), Ironi (Zyzyphus oenoplia), Piwarbel (Combretum decandrum), Wassanbel (Cocculus villosus), and Kanchkhuri (Mucuna pruriens).

The common grasses are :- Bhurbusi (Eragrostis tenella), Sheda (Ischaemum laxum), Ghonad (Anthistiria ciliata), Kunda (Ischaemum pilosum), Kushal (Andropogon contortus), Marvel (Dichanthium annulatum), Paunya (Ischeomum sulcatum), Tikhari (Cymbopogon martini), Harali (Cynoodon dactylon), Kusli (Aristida funicalata), Musrut (Iseilma laxum), Nandbar (Panicum javanicum), Pakli (Apluda-varia) and Seprut (Panicum isachme).

e] OPEN MIXED FORESTS: These forests occur intermixed with Teak and Anjan types. Along with the miscellaneous species Teak occurs in strips or patches in areas adjoining Teak forests in all large reserves. Dense patches of better quality of mixed crop are met within the moist valleys along banks of water courses only. Generally these are open formation of very poor quality below site quality IV and are usually situated on soils varying from murum mixed with light black cotton to deep black cotton soils situated on the plateau or on similar water logged areas in some of the broader valleys. The undergrowth is usually dense along banks of streams and in pockets of the hill sides and sheltered slopes but sparse elsewhere. Climbers are found on the banks of the streams. Reproduction of most of the species is inadequate.

The tree species commonly found in the Mixed type of forests are Dhawda (Anogeissus latifolia), Salai (Boswellia serrata), Khair (Acacia catechu), Ghot (Zizyphus xylopyra), Palas (Butea monosperma), Lendia (Lagerstromia parviflora), Amaltas (Cassia fistula), Jamrasi (Cassine glauca), Gongal (Cochlospermum religiosa), Kulu (Sterculia urens), Ain (Terminalia tomentosa), Dudhi (Writia tinctoria), Kalam (Mitragyna parviflora), Tendu

(Diospyros melanoxylon), Achar or Charoli (Buchanania lanzan), Semal (Bombax ceiba), Apta (Bauhinia racemosa), Aola (Emblica officinalis), Mokha (Schrebera swietenioides), Moha (Madhuka latifolia), Kala-shirish (Albizzia lebbek), Chichwa (Albizzia odoratissima), Bija (Pterocarpus marsupium), Shivan (Gmelina arborea), Dhoban (Dalburgia paniculata), Dhaman (Grewia tiliaefolia), Kasai (Bridelia retusa), Pangra (Erythrina indica), Kusum (Schleichera oleosa), Movai (Lannea grandis), Rohan (Soymida febrifuga), Tiwas (Ougenia oojeinesis), Koha (Terminalia arjuna).

The under growth consists of species like Bharati (Gymnosporia montana), Tarota (Cassia tora), Nirgudi (Vitex negundo).

The climbers noticed are Dudhi (Ichnocarpus frutescence), Piwarbel (Combratum decandrum), Malkanguni (Celestrus paniculate), Kanch Khuari (Mucuna pruriens).

Some of the main grass species are- Kusal (Heteropogan contortus), Sheda (Sehima nurvosum), Ghonal (Themada trianora), Rusa (Cymbopogan martini) Bhurbhusi (Erogvostis tenella), Paoniya (Ischoemum sulcatum), Barru (Sorghum halepense)

f] GRASS LANDS WITH BRUSH WOOD type 5D/S4

This type of forest consist of Grass Ramnas or fodder reserves. The woody species occur scattered and principally with Bharati (Gymnosporium montana), Khair (Acacia catechu), Amaltas, Palas, Tendu, etc. The grasses generally found are Kusal (Aristida funicalata), Sheda (Ischaemum laxum), Paonia (Ischeomum sulcatum), Bhurbhusi (Eragrostis tenella), Ghonad (Anthistiria ciliata), Kunda (ischaemum pilosum), etc.

3.2. PLANT SPECIES DIVERSITY

As mentioned above the first exhaustive work was published by the Botanical Survey of India in a document named Flora of Akola District by S. Y. Kamble, Sudhir Gajanan Pradhan, which describes 91 tree species, 97 Shrubs, 255 Herbs, 60 Grass species and 64 Climber/Twiners. They have recorded 16 endemic or rare plants from the district.

FLORISTIC DISTRIBUTION:

Trees:

Teak (Tectona grandis) is the most dominant species. It surpasses all other component species in frequency and density. It is seen mixed in various proportions with other species. Even most valuable species like Chandan (Santalum album) have its appearance in the area. It is because of the efforts by our predecessors of sowing of Chandan seeds in bushes in large areas but this species is again disappearing rapidly. Anjan (Hardwikia binata) is again another dominant species of this area, but it is lopped heavily for fodders. Even illicit cutting of Anjan is common for firewood. Therefore Anjan Forest has a rarely good appearance. Salai (Boswellia serrata) also have presence in large scale. But in the most of the area it is crooked or stunted. Most of Babul (Acacia nilotica) bans were situated in the Payanghat in scattered blocks. But in most of the places this species is replaced by Prosopis juliflora. Ain (Terminalia crenulata), Lendia (Lagerstronia parviflora), Kalam (Mitragyra parviflora), Kulu (Sterculia urens),Dhawda (Anogeissus latifolia), are a most another common tree species. Bija (Pterocarpus marsupium), Shisham (Dalburgia latifolia) have rare appearance.

Bamboos:

Bamboo (Dendrocalanus strictus) very rarely occur with the territory of this Division.

Climbers:

There are as many as 64 climbers/twinners recorded in the district. Mahulvel (Bauhinia valhii),Chilati (Acacia pinnata), and Palasvel (Butea superba) are the main woody climbers. Malkanguni (Celastrus paniculata), Gunj (Abrus precatorius), Kach kuyari (Mucuna pruriens), Gulvel (Tinospora cardifolia), are of medicinal importance. Moist places of the forest abounds in a variety of woody climbers.

Shurbs :

There are 97 shrubs that exists in the area. Raimunia (Lantana camara), Bharati (Meytenius emarginata), Nirgudi (Vitex negundo), Tarota (Cassia tora) are most common Shrubs.

Herbs:

There are as many as 255 species of herbs recorded in the district. Most of the herbs have medicinal value. But herbs like Rantulsi (Hyptis suveolens) and Chatak chandani (Paothenium hysterophorus) are found on large area.

Grasses:

There are few grass lands or fodder reserves in this Division. In most of the grassy blanks, soil depth is less. They are associated with brush wood or stunted tree growth. The most common grass species are Kusali (Heteropogan contortis), Pochati (Apluda mutica), Gondel (Themade triandra), Mothi kusal (Aristida setacea) and Thikhadi (Cympopogan martinii), Marvel (Dicanthian annulatum).

Plant parasite:

The flowering plant parasites occurring in the forests of this Division are Bandgul (Cuscuta chinensis) and Amar vel (Cascuta reflexa), It is noticed that these species are gradually spreading in Ghatbori forest range, away from the human habitations.

Exotics:

The exotic species found in this Division are Eucalyptus hybrid, Eucalyptus camaldulensis, Grevillea robusta etc.

3.3: STATUS OF BIODIVERSITY CONSERVATION IN FORESTS:

The forests of Akola are rich in Biodiversity and areas close to the Narnala and Katepurna Wildlife Sanctuary are particularly noteworthy. However, in view of the presence of large areas under teak, the repeated fires 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.

Assessment of status of plant and faunal species and their periodic monitoring can be helpful in formulating strategies for conservation, maintenance and enhancement of overall biodiversity through sustainable

management and use practices. Assessment of biodiversity especially the lower forms of life (algae, fungi, lichen, epiphytes, parasites, etc.) of a forest division must be made an on-going programme with the support from State Biodiversity Board. All these assessment will help in updating and enriching the Peoples Biodiversity Register(PBR) as provided in Biodiversity Act,2002.

There were 535 Biodiversity Committees formed in Akola Division. Preparation of People's Biodiversity Register (PBR) is under procees in the Division.

The in-situ and ex-situ conservation efforts should be undertaken for sensitive/RET/ IUCN Red List species and their habitats in the Division.

Among the important Schedule I species found in the area of the Division are Panther, Sloth bear,Black buck,Pangolin, Indian White Backed Vulture and Peafowl.

3.4: STATUS OF SPECIES PRONE TO OVER EXPLOITATION

There has been no study with relation to species being overexploited.

3.5: CONSERVATION OF GENETIC RESOURCES

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

(1) There is no identified Fodder resource plot in Akola Forest Division.
(2) There is no identified Preservation plots in Akola Forest Division .
(3) There is no identified Medicinal Plant Conservation Area in Akola Forest Division.

3.6: FAUNA AND THEIR HABITATS.

3.6.1: Distribution of the wildlife

Akola division has a fairly good distribution of wildlife especially around areas adjoining Narnala and Katepurna wildlife sanctuary. Top Carnivore Panther is present. Nilgai, sambhar and cheetal as well as wild

boars are found all over the tract. Jackal, jungle cat and hyaena are also common. Large avifauna can be seen in the tract. Migratory birds near tanks are common during the season. Barking deer, sloth bear, langur and monkeys are also common mammals. Common wild birds include painted sand grouse, common sand grouse, pea fowl, grey jungle fowl, red jungle fowl, red spur fowl, painted partridge, grey partridge, jungle bush quail, black breasted quail, indian bustard quail, common or grey quail, pigeon, crane, dove, cotton teal, whistling teal and comb duck are found in the tract.

The wildlife in the tract dealt with is seriously depleted due to the indiscriminateshooting during the jamindari 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.

3.6.2: DESCRIPTION OF THE WILDLIFE

The division is rich in wildlife. Almost all the forest areas of the division have a good distribution of wild animals, but population density varies with the availability of habitat conditions 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 (Panthera pardus) (ii) Hyaena (Hyaena hyaena) (iii) Jungle Cat (Felis chaus) (iv) Wild Dog (Cuon alpinus) (v) Jackal (Canis aureus) (vi) Common Fox (Vulpes bengalensis) (vii) Leopard Cat (Felis bengalensis)

Herbivora: (i) Bison-Gaur (Bos gaurus) (ii) Sambhar (Cervus unicolor) (iii) Cheetal (Axis axis) (iv) Nilgai (Boselaphus tragocamelus) (v) Barking Deer (Muntiacus muntjak) (vi) Wild pig (Sus scrofa) (vii) Sloth bear (Melursus ursinus) (viii) Black Buck (Antilope cervicapra) (ix) Four horned antelope

(Tetraceros quadricornis) (x) Chinkara or Indian gazelle (Gazella gazella bennettil).

Rodents: (i) Three striped palm squirrel (Funambulus palmarun) (ii) Porcupine.

Reptillia: (i) Softshell Turtle (Lissymis) (ii) Brook's Gecko (Hemidactylus cf. brooki) (iii) Bark Gecko (Hemidactylus leschenaultia) (iv) Square Spotted Gecko (Hemidactylus gracilis) (v) Termite Hill Gecko(Hemidactylus triedus)(vi) Kollegal Ground Gecko (Geckoella collegalensis) (vii) Nebulosus Ground Gecko (Geckoella nebulosi) (viii) Common Garden Lizard (Calotes versicolor) (ix) Forest Rock Lizard (Psamophilus blanfordianus) (x) Fan Throated Lizard (Sitana spinaecephalus) (xi) Common Brhamhiny Skink (Eutropis Carinata) (xii) Littile Skink(Eutropis macularia) (xiii) Little Skink (Eutropis innotata) (xiv) Snake Skink (Lagosoma punctate) (xv) Lined suppled Skink (Lygosoma guntheri) (xvi) Gunther's Snake Skink (Lygosoma guntheri) (xvii) Snake Skink (Lygosoma punctate) (xviii) jerdons Snake-eyed Lizard (Ophisops jerdoni) (xix) Bengal Monitor Lizard(Varanus bengalensis) (xx) Indian Chameleon Lizard (Chameleon zelanicus)(xxi) Bramhiny Blind Snake (Indotyphlops braminus) (xxii) Beacked Worm Snake (Grypotyphlops acutus) (xxiii) Red Sand Boa (Eryx johnii) (xxiv) Common Sand Boa (Eryx conicus) (xxv) Indian Rock Python (Python molurus) (xxvi) Indian Rat Snake (Ptyas mucosa) (xxvii) Common Trinket Snake (Coelognathus Helena) (xxviii) Common Wolf Snake (Lycodon aulicus) (xxix) Barred Wolf Snake (Lycodon striatus) (xxx) Common Kukari Snake (Oligodon arnensis) (xxxi) Russell's Kukari Snake (Oligodon taeniolatus) (xxxii) Common Cat Snake (Boiga tristis) (xxxiii) Forstein's Cat Snake (Boiga forsteni) (xxxiv) Bronze Back Tree Snake (Dendrelaphis tristis) (xxxv) Banded Racer (Argyrogena fasciolata) (xxxvi) Gunthers racer (Coluber ventromaculatus) (xxxvii) Green Keelback Snake (Macropistodon plumbicolor) (xxxviii) Buffstriped Keelback (Amphiesma stolatum) (xxxix) Checkered Keelback Snake (Xenocrophis piscator)(xl) Olive Keelback Snake (Antretium nastus) (xli) Green Vine Snake (Ahaetulla nastus) (xlii) Indian Smooth Snake (Coronella brachyra) (xliii) Indian egg eater snake (Elachistodon westermanni) (xliv) Spectacled Cobra (Naja naja) (xlv) Common Krait (Bungarus ceruleus) (xlvi) Slender Coral Snake (Calliophis melanurus) (xlvii) Saw Scaled Viper (Echis carinata) (xlviii) Russell's Viper (Daboia russelli)

Birds: (i) Painted sand grouse (Pterocles indicus) (ii) Common sand grouse (Pterocles exustus) (iii) Pea fowl (Pavo cristatus) (iv) Grey jungle fowl (Gallus sonne ratil) (v) Painted partridges (Francolinus pictus) (vi) Grey partridges (Francolinus pondicerianus) (vii) Jungle bush quail (Pardicula aisstics) (viii) Black breasted Rain quail (Cturnix coronandelicus) (ix) Indian Bustard quail (Turnix suscitator) (x) Indian or yellow legged button quail (Turnix tanki) (xi) Red spur fowl (Galloperdix spadices) (xii) Crane (Grus antigone) (xiii) Spotted bill duck (Anas poecilorhyncha) (xiv) Pigeon (Treron phoonicoptera) (xv) Dove (Streptpotia spps) (xvi) Cotton teal (Nettapus coromandelianus) (xvii) Whistling teal (Dendrocugnajavanica).

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, when the number of such water holes is drastically reduced and water in a water hole recedes to minimum.

One of the dangerous methods of poaching through poisoning of drinking water by mixing urea in large concentration has been devised by the poachers. When an animal drinks such water, it dies within hours due to intense gas formation in the stomach and choking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets and traps for catching birds, hares and sometimes small animals like deer has been employed in the past but of late the poachers have been found using the improvised traps for killing the large animals like tigers very effectively.

Electrocuting the animals including tigers 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 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) diseases are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (Haemorrhagic Septicaemia) (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 the health of the herbivore population. Outbreaks of contagious diseases like Foot and Mouth Disease drastically reduce the herbivore population.

Fire and habitat damage: Frequent fires damage wildlife habitats, and animals become vulnerable to poaching. Similarly, habitat disturbances of different types create diverse kinds of stress having adverse impact on the wildlife.

Fires are major culprit reducing food availability for the herbivores very drastically. Thus, wild animal habitats are very adversely affected due to recurrence of fires 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.

3.8.1: 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 ex-proprietary forests prior to the abolition of their rights, which was followed by the shooting block system and the licenses similar to the Reserved Forests. Presently, the law does not permit sport hunting of wild animals. The wildlife is threatened by habitat damage caused by factors like increasing human and cattle population, encroachment for cultivation, poaching facilitated by the improved road network and efficient weapons. The poaching problem has attained a menacing proportion as

evident from large seizures all over the country. Greater attention to wildlife management, however, is a heartening trend. The wildlife and the territorial divisions at Akola are 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.

From time immemorial the wild animals have occupied a place of pride in the folklore of Indian culture. They were respected and protected by the tribal's who never used to kill the animals for fun or pleasure. However, hunting became an important pastime for the Rajas and Maharajas who used to hunt and kill the animals for meat as well as for preparing trophies. In the Reserved Forests, hunting was restricted, and licenses were used to be issued for small game, big game, etc. and shooting blocks were set apart, where the animals specified in the license only could be hunted.

Prior to the abolition of proprietary rights, hunting in the malgujari forests was done with the permission of the malgujars. Consequent to the vesting of these forests in the government as Protected Forests, hunting in these forests was also regulated by fixing shooting blocks and by issuing licenses.

However, after the enactment of the Wildlife (Protection) Act, 1972 and subsequent amendments to 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 purposes but only in exceptional circumstances. This act also enjoins on us the responsibility for wildlife conservation outside the protected areas.

The wildlife, which used to flourish in the forests of the division, is threatened due to various factors like population explosion, encroachments, improved network of roads and availability of sophisticated weapons. Due to the increase in demand for wildlife products all overthe world, poaching problems have increased over the years and hence special protection measures are necessary to protect wildlife.

3.8.2: INJURIES DUE TO WILDLIFE

The carnivores, tigers and panthers particularly sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. The villagers sometimes indulge in poisoning the carcass to take revenge and cases of electrocution of wild animals by the villagers to kill the animal suspected to have killed the cattle have also been reported. In such cases the people 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 summarised 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 SA)) due to attack of a Tiger, Panther or any other wild animal. The present rates of compensation as per the GR No.WLP-100S/C.No.2701F-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

Sr.No.	Particulars	Amount to be paid
1	Cow, Buffalo, Bullock	75% of the market price or Rs.10000/- whichever is less;
2	Sheep, Goat, other livestock	75% of the market price or Rs.3000/- whichever is less;
3	Cow, Buffalo, Bullock became permanently handicapped	50% of the market price or Rs.3000/- and whichever is less;
4	Injury to Cow, Buffalo, Bullock, Goat	Treatment cost. (Govt. or ZP Hospital) 25% of the market price or Rs.1000/- whichever is less.

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

1. Death to be reported within 48 hours.

2. The carcass is not to be removed before the 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 under DCF.
6. No compensation in case the livestock was grazing illegally.

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/C.No.337/F-l, dt.30/03/2013 and 16/1/2015. These are as follows:

TABLE NO. 3.5: COMPENSATION FOR THE INJURY AND LOSS OF HUMAN LIFE

S.N.	Particulars	Amount to be Paid
1	Death	Rs.8.00 lakhs.
2	Permanent disability.	Rs.4.00 lakhs.
3	Major injury	Rs.1.00 Lakh.
4	Minor injury	Upto Rs.15000
Note: Cost of medication, preferably in govt. hospital, but in case of unavoidability, private medication.		

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

1. Such an 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.

3.8.3: LEGAL POSITION

The first step towards the protection of wildlife was taken by including certain provisions, in this regard, in the Berar Forest Act of 1886. Under Section (3) sub section 7, the definition of forest produce incorporated the 'skins, tusks, bones, and horns' and as per Section 10, sub section 4, 'The residency by orders may regulate any part of the State Forests for hunting, shooting, fishing, poisoning water and setting up traps or snares."

The Berar Forest Act, 1886 amended in 1891 provided under section 7(b) that Forest Produce includes the following when found in or brought from a forest: "Wild animals, skins, tusks, horns, bones, silk cocoons, honey and wax and all other parts or produce of animal." Section 7 (2)(b) of this act after this amendment provided that anyone who hunts, shoots, fishes, poisons water or sets traps or snares, shall be punishable with the fine which may extend up to fifty rupees or, when the damage resulting from the offence amounts to more than twenty-five rupees, to double the amount of such damage. Section 1 0(4)(iii) of this act empowered the resident to frame the rules regarding regulation of hunting, shooting, fishing, poisoning water and setting traps and snares.

Vide Notification G.LF.D. No. 2197-1-B, dated 13th October 1911, the Indian Forest Act, 1878 was also made applicable. Section 2(b)(iii) included wildlife in its definition of the forest produce. Section 25 (i) provided that any person in contravention of any rules, which the local Government may from time to time prescribe, kills or catches elephants, hunts or shoots fishes, poisons water or sets traps or snares shall be punishable with imprisonment for a term which may extend to six months or with fme not exceeding five hundred rupees or with both in addition to compensation for damage done to the forests.

After the promulgation of the Indian Forest Act 1927, rules relating to wildlife regulations were framed under section 26(I) and 76(d). These were

essentially to regulate hunting of wild animals. The 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 Vidarbha 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 were also applicable outside the Reserve and the Protected Forests.
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 games into four categories, viz. small game, big game, special big game, and pet animals.
4. It also sought to control transactions in trophies and other wildlife products.
5. Wildlife Advisory Board was constituted under this act to advise the government on various important 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-ordinated 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 regarding 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 1 st 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. The 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 III 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 Recognition of Zoos Rules, 1992.
7. 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 PAs.

MANAGEMENT OF WILDLIFE: Wildlife and its management in Akola Forest division have been discussed in detail in part 2 of Volume I of this working plan, under Wildlife Management Chapter. 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 Management Chapter 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 was collected by SOFR unit Amravati during collection of enumeration data. The seedlings were enumerated in the following three categories as R1 upto1 m height, R2 with 1 to 2 m height and R3 above 3 m height. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The status of natural regeneration is extremely poor. The natural regeneration of teak and its associates is very poor and restricted to a few patches of selected sites. Whatever regeneration occurs in the rainy season, fails to establish owing to climatic as well as biotic factors. Heavy grazing, fire incidences, trampling due to cattle movement, human population pressure to meet their demands like firewood and small timber, poor site quality and erratic rainfall are major factors that influence the establishment of regeneration in this forest area. The regeneration data shows that there are 5313 seedlings of upto 1 m height, 2256 seedlings between 1 to 2 m height and 1912 seedlings above 3 m height in a hectare in these forests. The total number of seedlings is 3160/ha. The table of regeneration is given below.

Table No.4.1: Regeneration status

Sr. No.	Range	No. of sample	No of seedlings/ha			Total
			R1	R2	R3	
1	Akola	116	3250	855	245	1450.00
2	Barshitakli	232	5105	2882	2980	3655.67
3	Patur	184	4030	1468	1630	2376.00
4	Alegaon	227	8867	3818	2792	5159.00
Total		**759**	**5313**	**2255.75**	**1911.75**	**3160.17**

4.2: AREA AFFECTED BY FOREST FIRE:

The area of Akola Forest Division is prone to fires due to deciduous nature and the dry climate. Fire is one of the most destructive agencies of forest development which takes place during the dry season that starts from February continuous up to June. The details of forest fire are given in **Annexure-XII.** During this period the forests are very vulnerable to fires and the fires that take very end of winter and at the beginning of summer are not that much damaging. Most of the fires that are taking place in these forests are manmade and accidental which hamper the establishment of natural regeneration. The leaf litter on the ground and highly combustible undergrowth of grasses catch fire immediately and spread instantly. The damage is very severe when freshly felled material is lying in the coupe and fire takes place in the plantation. Young regeneration suffers a lot mainly of teak and other species get damaged or killed due to die back. In this area fires are put by grazers, intentionally or unintentionally, villagers who go for Mohua collection to forest. Repeated fires in the forest areas of this dry zone during the dry season cause extensive damage to the tree growth and reproduction. Late fires in the grassy areas or in closed coupes result in fire calamity. In this area fires are generally ground and creeping fires. Fire causes extensive damage to the forests especially forest growth, regeneration, ground flora, soil micro-organisms and soil productivity.

4.3: AREA DAMAGED BY NATURAL CALAMITIES:

4.3.1. By Drought: The erratic and scanty rainfall in every year caused drought like conditions in the recent past. The drought affects the growth of plantation, establishment of regeneration and growth of forest crops as soil moisture and water are vital ingredients of growth and regeneration.

4.3.2. By Frost: Injury due to frost is not seen in this area.

4.3.3. Damage by Wind and storms: No considerable damage is noticed due to windstorms in this area.

4.3.4. Soil erosion: Soil erosion is noticed in this area especially along the river Purna and its tributaries. Sheet erosion is common in the entire area.

Gully formation takes place due to erosion along the riverbanks. In some of the areas the roots of trees are exposed due to excessive erosion of soil leading to windfall of trees.

4.4: AREA PROTECTED FROM GRAZING:

Grazing by domestic animal's damages forests by destroying young regeneration, plantation due to trampling of the areas and excessive movement of cattle population leads to compaction of soil resulting in the less porosity of the soil which is less conducive for the establishment of young regeneration. Uncontrolled cattle movement is common in the forests around the villages. The incidences of grazing are high in and around the forest areas where villages are situated. Continuous, unlimited grazing is very much harmful for tree growth and for the establishment of regeneration. The forest will establish in the areas where there is regulated grazing or no grazing, while considerable damage has been noticed in the areas where there is excessive grazing more than the carrying capacity of the forests. Grazing in the forests is not uniform as cattle population is restricted to village areas and villages in turn are nearer to water spots. The grazing pressure is high in the forests, especially in the summer season *i.e.,* February to June. During this period the forests go dry, and, in some areas, the grazers indulge in lopping of trees to feed their cattle. The sheep and goats are not allowed to graze in the forests which are meant for production of timber. However, the forests are still suffering from grazing of sheep and goats in this region.

4.5: LOPPING PRACTICES:

Lopping is seen mostly in forest areas adjacent to the villages. Grazers also do lopping while grazing their cattle.

4.6: AREA INFESTED BY INVASIVE WEED SPECIES IN FORESTS:

Damage by climbers is mostly confined to the forests along the riverbank of Purna and along the nalla banks in this area. Cheelati, Ironi are the main climbers which cause harm to the forest in this area. Sometimes damage by Lantana is also noticed affecting both regeneration and growth by covering forest growth and competing for spaces.

4.7: INCIDENCES OF PEST AND DISEASES:

When Plants are injured may be due to Fire lopping, Felling of Trees during harvesting and such other reasons they start becoming vulnerable to diseases and pests. softwood species like Salai, Mowai, Bhera are attacked by wood borer in sect all species are susceptible to attack of Fungi and Mould, such tree starts decaying and tree quality deteriorates.

4.8: FOREST DEGRADATION AND ITS DRIVERS:

The forests of Akola Forest Division mostly suffer from unregulated grazing, illicit felling, encroachments, and repeated fires significant damage caused by these agencies coupled with erratic rainfall. The other agencies which caused injury to the forests such as droughts, frost, floods, plants, and insects are negligible.

Degraded scrub forests: These forests are highly degraded with malformed stunted teak growth. These forests are characterized by a very little tree growth and in some patches without any tree growth. Some of these forests are managed under pasture, under fodder reserved in the previous Working Plans. The “C” class Reserved Forests of this division falls in this category of the forests. The floristic composition is like that of good quality and crooked quality teak forests except that they have a very few trees and mainly contained scrub and grasses. Most of these areas situated adjoining to the villages bearing heavy biotic pressure for a long time and degradation has taken place over the years due to unregulated grazing, frequent fires, and heavy illicit felling. The soil is generally murumy, very dry, highly compact open without any humus. The degradation of the soil takes place over the years and due to that the moisture content and the absorption capacity of most of these forests are very low.

Illegal Cutting: Illegal Cutting is common and increasing day by day both for commercial and domestic purposes. Local people in and around the forest area of the division may indulge in Illegal Cutting for meeting their domestic needs such as requirement of fuel, small timber, firewood as there is a huge gap between demand and supply of forest produce. People generally indulge in Illegal Cutting due to unemployment, higher prices of some of the forest products in the market like teak. These social causes make the people to indulge in Illegal Cutting. Lopping of trees and shrubs for rab burning of field

has further deteriorated the situation. In general, Illegal Cutting, lopping, and pollarding of forest species has further deteriorated the forest crop in terms of quality and quantity of the forests.

Table No. 4.3: List of Offence Cases

Year	Fire	Grazing	Illicit felling	Others	Total
2009-2010	29	12	397	147	585
2010-2011	31	7	404	114	556
2011-2012	12	8	583	203	806
2012-2013	32	11	455	242	740
2013-2014	29	3	269	252	553
2014-2015	45	2	297	253	597
2015-2016	05	9	439	276	729
2016-2017	11	8	395	137	551
2017-2018	42	10	510	191	753
2018-2019	22	9	514	164	709
Total	**258**	**79**	**4263**	**1979**	**6579**

Encroachments:

Encroachment is not so serious in this area but forest areas adjoining agricultural fields of farmers are being encroached especially during the month of monsoon. Some of the forest areas have been cleared, denuded, and utilized for agricultural purposes. The total area under encroachment in the division is 52.139 ha. The details of encroachment are given in **Appendix-XXI.**

Damage by wild animals:

In this area Nilgai, Sambar and Chital cause lot of damage to the young regeneration due to grazing by these animals. Also, wild pigs, hares, and porcupines cause damage to the plantation. Wild pigs' damage is noticed in bamboo plantation at the young stage. The porcupines usually eat the rhizome, bark of Haldu, Moha and Amaltas near the base of the tree, which hampers the proper establishment of the tree. Monkeys cause considerable damage to flowers and fruits of the trees. Chital cause damage to the bark of the Shivan at the base thereby girdling the tree, which results in the death of the tree. The damage caused by wild animals is not that serious when compared to damage caused by the other domestic animals. Moreover, the wild animals' damage to the forests is compensated both in the form of propagation of regeneration activities and maintaining the health of forests by removing excess of certain trees and hence maintaining biodiversity.

Mining: Mining is prohibited in the forest areas by the Act. There is no report of illegal mining/quarrying in the forest area.

4.9: POLLUTION CONTROL AND PROTECTION OF ENVIRONMENT:

Environmental pollution is the introduction of contaminants into the natural environment that causes adverse changes. Pollution can take the form of chemical substances or energy, such as noise, heat, or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution. Pollution control is a term used in environmental management. It means the control of emissions and effluents into air, water, or soil. Without pollution control, the waste products from overconsumption, heating, agriculture, mining, manufacturing, transportation, and other human activities, whether they accumulate or disperse, will degrade the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control.

Pollution is the outcome of human activities, particularly carried out in connection with industrial development. As such pollution is a recent phenomenon. Nevertheless, some of the pollutant substances such as smoke, ash, lava and toxic gases that have come to be categorized as air pollution

were already being produced by jungle fire and volcanic eruptions long before man came on this earth. Problem of environment pollution became serious when man arrived on the scene a million years ago. As the activities of human beings have increased, problems of environment pollution too have become acute.

Though there is no severe pollution in forest areas of Akola division, incidences of water pollution due to heavy usage of fertilizers for agricultural crops in fields adjacent to forest areas are noticed. Air pollution occurs due to vehicular traffic on roads and brick kilns operating in the areas adjacent to forest areas. There is no heavy pollution caused by industries in this division.

Law relating to environment protection:

In the Constitution of India there was no entry on environment protection in the legislative lists. In 1976 the Indian Parliament through 42nd amendment to the Constitution of India incorporated two articles. 48-A and 51-A(g) relating to the environment. Article 48-A directs the State to endeavor to protect and improve the environment in the forest and wildlife field of the country. Article 51-A (g) imposes on the citizens of India, a fundamental duty to protect and improve the natural environment.

In 1992, by way of the seventy fourth amendment, article 343-W and the Twelfth Schedule entry of 8 were incorporated in the Constitution of India. Accordingly, a state legislature can pass legislation on Urban Forestry, protection of the environment and promotion of ecological aspects.

1. The environment (Protection) Act 1986 (EPA) was passed under the provisions of Article 253 of the Constitution to achieve the following objectives.
2. To implement the decisions taken at the UN conference on the Human Environment held in Stockholm in June 1972.
3. To enact general laws on environmental protection which could cover gaps in the areas of major environmental hazards as the existing laws generally focused on specific types of pollution.

4. To coordinate activities of the various regulatory agencies under the existing laws and creation of an authority or authorities for environment protection.
5. To provide a deterrent punishment to those who endanger human environment safety and health.

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CHAPTER-5

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

5.1: AREA TREATED UNDER SOIL AND WATER CONSERVATION MEASURES SOIL EROSION

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. Similarily, reducing erosion will usually involve preventing splash erosion, or formation of crusts, 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 Dams in and near Forest 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.

A large proportion of area is adjoining to various protected areas. Hence, deep CCTs should be avoided to damage obstruction to wildlife. 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.

2. SOIL CONSERVATION AS PART OF COUPE WORK

(i) Nala Bunding and Check Dams : The primary objectives 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 loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.

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 variation 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 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.

Soil erosion adversely affects the fertility status and land use. National Bureau of Soil Science and Land-Use Planning have grouped into different erosion classes, their areal extent and expected soil loss is given below:

TABLE NO. 5.1: DIFFERENT SOIL EROSION CLASSES

Erosion class	Area		Expected soil loss (tonnes ha -1yr-1
	Ha	(%) TGA*	
Slight	440.78	0.12	5-10
Moderate	0	0	0
Severe	976.35	0.56	10-15
Water bodies	82.03	0.55	10-15

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 level and water holding capacity of the soil.

The exact area treated under soil conservation cannot be assessed as no special work for soil conservation alone is carried out but SMC works form part of the plantations works.

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

There are one main rivers flow in this division, this is the Purna. Katepurna, Shahanur, Morna, Mun, Nod, Uma, Vidrupa are the tributaries of the Purna river. The villages which are situated on the banks of these river and their tributaries are generally better placed for drinking water. The other villages have a lot of problem of drinking water especially during the months of summer. Eratic rainfall in the past few years has aggravated the situation of drinking water in this division. In the year 2005 there was lot of scarcity for drinking water in Akola town and a special train was arranged for drinking water supply to Akola city by the district administration. The ground water potential is very poor especially in Akola and Akot tahsils which is aggravated by salt water availability in the ground water. Precipitation is received mainly through South-West monsoon and it is harvested in dams, tanks and wells.

The drainage system in the division includes one major river i.e. The Purna. The other minor rivers are tributaries of the above rivers. They are the Katepurna, Shahanur, Morna, Mun, Man, Nod and Uma which are the tributaries of the Purna river.

1. **Purna River :** It is a perennial stream of the Payanghat plain which rises in the South facing scarps of Gavilgad hill range in the districts of Amravati. It flows towards the West of the district, forming Northern boundary of the tahsils Murtizapur, Akola and Balapur and the Southern boundary of Akot tahsil. The Purna river is not navigable though it is a perennial river because of siltation at many places. At many places, its channel is 30 meter deep and 200 meter wide. The bank of the river is generally of soft alluvium. A large number of streams rising in the scarp to its North and to its South, joining the river forming a fairly dense drainage network in this region. Most of the tributaries of the river Purna look like water pools during hot weather and developing swirling floods during rainy season. The river has length of 100 Km in the Division and its banks are badly broken and dissected by a strong rill erosion undercutting of bank. The valley of Purna has many streams developing into a sub - parallel drainage system to the main river before their confluence with the main river. The Katepurna tributary is the most significant out of all the tributaries of the river Purna.

2. **Katepurna River :** The Katepurna is the most significant tributary, which rises in the Northern slopes of the Ajanta hill ranges about 7 Km. North of Washim at an elevation of approximately 320 meter from MSL. The flow of the river is Northern in a non- perennial channel, having overall turn by sharp bend Westwards and Northwards and the banks are mostly liable for erosion.

3. **Uma River :** It rises in the extreme Southern parts of Murtizapur tahsil near the village Poho and flows to the North. The river is almost perennial and it has a fairly straight course, braided in section and crossed at many points by fords. It confluence the Purna river near the village Durgavad about 10 Km upstream of the river Katepurna confluence after flowing sub-parallel to main river on its left bank for about 10 Km. The river has low banks throughout the length having a

narrow channel and is liable to flooding during the rains. The river has got length of about 60 Km. entirely flows within the division.

4. **Morna River** : The river Morna takes its birth in the of Malegaon tahsil of Washim district near Shirpur village and flows through an open and flat country of the plateau, before crossing to the large village of Medsi on the edge plateau. The river goes through the ghats in a romantically picturesque country. Its sharp bends in between interlocking spurs developing a deep valley with a cliff face on the outer bank and wide deep alluvial flats on the inner bank before entering into Payanghat plain. In this section, the Purna – Akola -Khandwa railway line closely passes the river and sticks to the narrow edge adjoining the valley side and crosses the river at no less than four different places to gain foothold from one side of the deep valley to other. Descending down from the scarp the river flows through a fairly gentle sloping country with a perennial channel on its bed. It forms a kind of cut of Akola town just after it will join on its right bank by the tributary, Indrupa. In Its lower course the river has developed extensively meander and cut off loops unlike many other left bank tributaries of the Purna. It develops a sub - parallel course for nearly 20 Km before joining the main river near the village Andura. The total length of the river is approximately 120 Km.

5. **Mun River :** It rises in the Northern Ajanta scarps of Chikhali tahsil of Buldhana district and flows East through the Ghatbori Reserved Forest area to enter the district of Akola. Another tributary rising the Uttavli scarps in Buldhana District and joining the Mun at foot of scarp near the village Pimpalkura after which the river flows Northerned is cut by another stream the Vishwamitri rising and a similar scarp within the district and flows in Northward direction and confluence North. The river flows through a flat alluvial country making curves and graceful meander. The river Mun flows through Balapur township, and it is joined by a small tributary the Mas River and flows downstream where the river Nirguna and its tributaries join Mun river. Both the Nirguna and Its tributary the Bordi river which rise in the Medsi and Patur Reserved Forests of the ghat country and flow North. After its confluence with the Bhuikund the Mun river is crossed by the Mumbai - Nagpur railway line over a bridge which is South- East of Nagzari railway station. The Mun river has got a fragile bank which are highly gullied very much

liable for soil erosion which confluence the Purna river near the village of Khajikhed on it left bank. It forms a for quite distance the boundary between the Buldhana, Akola and Washim district.

6. The tributaries of Purna joining at the right bank from the North are comparatively smaller hill torrents draining the foothill slopes of Melghat. Out of these the Nagzari, the Gautami, the Witruba and the Shahanur are the most important tributaries. The river Shahanur was diverted at Dahihanda at the end of last century in the South-East of the Akot tahsil, so that it joins the Purna immediately enter in the districts with new channel carries the water so rapidly, that it always remains dry except during the short intervals of floods. The total length of this river is 120 km. All these tributaries of Purna by and large are dry in the lower courses and their banks are fragile which are subjected to heavy gully erosion in thick deposits of alluvium therefore the villages located on the bank of these tributaries are subjected to floods during rainy season. Many villages and larger township are located along the banks of these tributaries and these townships mostly depend upon for drinking water. The left bank tributaries of Mun river are much more important than the right one and the main river itself flows closer to the Northern scarp's slopes than the Southern one.

7. **Lakes and Tanks :** There are many perennial tanks and lakes especially in the Payanghat plains of the division have a few tanks are found around the villages of Mardi, Punda situated in the foothills of Akot tahsil. The villages Banbada- budruk, Kutasa both are in Shahanur valley and Ghusar and Akhatwada which are in minor tributaries on the left bank of the Purna. A few perennial tanks are found in the trap country of the Washim plateau around Mohaja, Bhat, Wakad, and Risod all these are mostly small basins like depressions collecting the rain water from Amphitheatre like basin and supplemented springs. They provide locally drainage system, which are around tanks and lakes.

8 **Springs :** A number of springs occur on the Southern slope of Balaghat plateau descending down to the Godavari valley. These springs occur at 500 meters MSL formed probably good exposure and intra –trapper aquiver. These springs are uncommon and the Northern scarp slope.

Table No. 5.2: Major Dams in or in the Vicinity of the Forest Areas

Sr. No	Name of the Dam	Range
1	Morna	Patur
2	Nirguna	Patur
3	Mahan	Barshitakli
4	wan	Akola

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 avi-faunal documentation of the areas. 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 no records of the water levels of the wells within its jurisdiction and some villages. 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. is implemented for whose Micro plan have been prepared. Records can also be obtained from the Groundwater Surveys Development Agency. This information needs to be submitted and to be formed as part of the Plan.

IRRIGATION

Irrigation is one of the most important inputs for development of agriculture. The main sources of water supply are open well irrigation canal, river. Lift irrigation is also quite common in these areas.

There are more than 35 Irrigation projects , 4 medium and the remaining are minor projects.

Medium Projects 1. Katepurna 2. Uma 3. Morna 4. Nirguna **Minor Projects** 01. Januna 02.Pimpalgaon Hande 03. Pimpalgaon Ch. 04. Sisa Udegaon 05. Borgaon Manju 06. Wathod 07.Amdari	08. Singdoha 09. Tuljapur 10. Nagri 11. Sawerkheda 12. Ghota 13. Mahan 14. Ridhora 15. Sonkhas 16. Pimpri Kh. 17. Dharur 18. Nandkhed 19. Bhilkhed 20. Ghonga	21. Hiwerkhed 22. Zodga 23. Khondala 24. Karhal 25. Aslola Ghana 26. Jawla 27. Waghi 28. Kolambi 29. Koyali Tank 30. Borgaon 31. Mohagaon

The network of canals from dam is to point of utilization of water and lifting of water from dams and wells with the help of electric and diesel pumps are the major sources of irrigation. There is a need to collect the data for the whole 5 km radius from the forest vicinity and to monitor the rise and fall of the levels over the seasons and the years.

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 sustentative 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 facts, 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. This is predominantly due to decrease in recharge due to water conservation structures. During the field visit it was observed that the water conservation structures are not being de-silted annually throughout the State. This has directly reflected in reduction of recharge due to water conservation structures. Thus there is dire need to carry out the de-silting of water conservation structures in programme or movement mode.

5.5.2: Effect of Rainfall on Groundwater Availability

The rainfall is the primary source for the yearly replenishable groundwater 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.

Table No. 5.4: Assessment of Dynamic Ground Water Resources of the Maharashtra Administrative Unit wise Categorization 2011-12

Sr. No.	District	Admin-iterative Unit	Stage of Ground Wate Development %	Pre-monsoon		Post-monsoon		Category
				Water level Trend	Is there a significant decline	Water level Trend	Is there a significant decline	
15	Akola	Akola	43.23	-5.02	No	-8.94	No	Safe
16	Akola	Akot	72.40	-10.57	No	-13.70	No	Safe
17	Akola	Balapur	42.78	2.56	No	0.29	No	Safe
18	Akola	Barshitakli	37.00	-0.19	No	-3.58	No	Safe
19	Akola	Murtijapur	47.17	-5.04	No	-10.37	No	Safe
20	Akola	Patur	45.43	0.10	No	-0.29	No	Safe
21	Akola	Telhara	35.83	-20.33	No	-20.84	No	Safe

5.5.4: Aquifer Parameters

According to the pumping tests conducted on wells piercing Alluvium and Deccan Trap Basalt in the district of Akola have revealed that transmissivity for

Alluvial formation range from 0.89 to 1475.96 m2/day and Pumping tests conducted on exploratory wells piercing Deccan Trap Basalt have revealed that transmissivity varies from 8.35 to 395.85 m2/day whereas storability ranges from 8 x10-8 to 4.2 x 10-2.

5.5.5: Ground Water Resources

As per the Ground Water Information Akola District of the CGWB Report of 2013, Central Ground Water Board and Groundwater Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Akola district based on GEC-97 methodology as on 2009. Ground Water Resources estimation was carried out for 5119.45 sq. km area of which **47.29** sq. km is under command and **4313.08** sq. km. is non-command. About **760** sq. km. area has poor quality of ground water. Taluka wise ground water resources are shown below:

Table No. 5.5: Taluka wise Ground Water Resources of Akola 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 (%)
1	2	3	4	5	6	7	8	9
Akola	Command	962.55	367.94	20.40	388.34			
	Non-Command	3980.89	1525.91	222.69	1748.59			
	Total	**4943.45**	**1893.85**	**243.09**	**2136.94**	**489.24**	**2562.24**	**43.23**
Akot	Command	878.39	717.85	17.46	735.31			
	Non Command	3870.95	2640.07	63.25	2703.33			
	Total	**4749.34**	**3357.92**	**80.71**	**3438.64**	**161.28**	**1265.45**	**72.40**
Balapur	Command	386.61	277.06	17.26	294.33			
	Non Command	4160.83	1519.67	131.38	1651.05			
	Total	**4547.43**	**1796.74**	**148.65**	**1945.38**	**297.29**	**2453.41**	**42.78**
Barshitakli	Command	744.10	210.40	23.87	234.26			
	Non Command	6218.56	2127.31	214.28	2341.59			
	Total	**6962.66**	**2337.71**	**238.14**	**2575.85**	**473.45**	**4138.46**	**37.00**

1	2	3	4	5	6	7	8	9
Murtijapur	Command	580.55	481.93	40.22	522.15			
	Non Command	4739.75	1779.95	207.27	1987.22			
	Total	**5320.30**	**2261.89**	**247.49**	**2509.37**	**494.86**	**2565.96**	**47.17**
Patur	Command	1029.97	714.54	51.60	766.14			
	Non Command	4749.99	1778.60	81.02	1859.63			
	Total	**5779.96**	**2493.14**	**132.62**	**2625.76**	**265.24**	**3021.58**	**45.43**
Telhara	Command	3809.76	1047.69	38.06	1085.76			
	Non Command	3866.57	1596.53	68.32	1664.85			
	Total	**7676.33**	**2644.22**	**106.38**	**2750.60**	**212.80**	**4792.75**	**35.83**
Total	Command	8391.93	3817.41	208.87	4026.29			
	Non Command	31587.54	12968.04	988.21	13956.26			
	Total	**39979.47**	**16785.45**	**1197.08**	**17982.55**	**2394.16**	**20799.85**	**44.98**

As per the estimation the total annual ground water recharge is (3997.94) MCM with the natural discharge of 57.10 MCM, thus the net annual ground water availability comes to be (3997.94) MCM. The gross draft for all uses is estimated at (179.82) MCM with irrigation sector being the major consumer having a draft of (167.85) MCM. The domestic and industrial water requirements are worked at (23.94) MCM. The net ground water availability for future irrigation is estimated at (207.99) MCM. Stage of ground water development varies from 35.83% (Telhara) to 72.40% (Akot). The overall stage of ground water development for the district is 44.98%. In general, the level of ground water development in the district is quite low and all the Talukas fall in “Safe” Category.

5.5.6: Ground Water Development

Almost entire district is underlain by the Deccan Trap Basalt formation. Isolated areas in the northern and central part of the district are hilly and have poor ground water development potential. The ground water development potential is low in the northern part, along the hills. The ground water in areas underlain by Deccan Trap Basalt may be developed through dug wells and dug-cum-bored wells (DCB). Borewells may be suitable at locations where fractured Basalt or inter-low zones form the deeper aquifer, particularly the area with high development potential. However, the sites for borewells may be located after proper scientific investigations.

Alluvial aquifers in the district are restricted to small areas along the rivers and do not form significant aquifer. The ground water in these areas may be developed through dug wells and dug-cum-bored wells.

Table No. 5.6: Nature and Yield Potential of Aquifers

Sr. No.	Taluka	Main Aquifer	Yield Potential	Type of Wells Suitable
1	Akola	Basalt	Low	Dug Well,DCB
2	Akot	Basalt	Low	Dug Well,DCB
3	Balapur	Basalt	Low	Dug Well,DCB
4	Barshitakli	Basalt Alluvium	Low to High	Dug Well,DCB, Borewell
5	Murtijapur	Basalt	Low to Mediam	Dug Well,DCB, Borewell
6	Patur	Basalt &Alluvium	Low to Mediam	Dug Well,DCB,Borewell
7	Telhara	Basalt	Low to High	Dug Well,DCB,Borewell

5.5.7: Water Conservation and Artificial Recharge

In Basaltic area, the artificial recharge structures feasible are check dams, gully plugs, percolation tanks, nalla bunds, etc. Structures like gully plugs and contour bunds are most favorable in hilly areas, particularly in parts of Akot, Patur talukas. Existing dug wells can also be used for artificial recharge; however, the source water should be properly filtered before being put in the wells. The most feasible artificial recharge structures suitable for Alluvial areas are Percolation tanks and recharge wells. The ground water in a part of the alluvial area is saline. In such areas, quality of ground water needs to be considered before selecting the site. In the areas with poor ground water quality, water conservation structures are more feasible.

The sites for artificial recharge structures 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.

5.5.8: Recommendations

1. The major part of the district is underlain by Deccan Trap Basalt, where dug wells are the most feasible structures for ground water development. The sites for bore wells need to be selected only after proper scientific investigation.

2. Bore wells generally tap deeper fractures and inter flow zones, which may not be sustainable. Besides, the bore wells should only be used for drinking water supply and not for irrigation.
3. Ground water quality is adversely affected by nitrate contamination in 57% of the samples collected in May 2011. Thus all the wells used for water supply should be first analysed for nitrate contents and if the nitrate content is found beyond permissible limit the ground water may be used for other purposes than drinking. Adequate sanitary protection to the wells may be provided to control the nitrate contamination.
4. The overall stage of ground water development for the district is only 44.98%, thus a lot of scope for further development exists.
5. The scope exists for construction of suitable artificial recharge structures in the district. The structures recommended for the hilly-Basaltic area in the northern part are: contour bunds, gully plugs, nala bunds and check dams. For other Basaltic areas, the nala bunds, check dams and KT weirs are suggested. The existing dug wells may also be used for artificial recharge of ground water provided source water is free of silt and dissolved impurities.
6. The most feasible artificial recharge structure suitable for alluvial areas restricted along the banks of Purna River and its tributaries are shallow recharge wells on the river bed of the tributaries. Percolation tanks are also suitable, wherever source water availability is there.
7. The existing village ponds need to be rejuvenated to act both as water conservation and artificial recharge structures.

CONCLUSION:

Aquifers are an important resource for the District and the forests in particular which need to be recharged and enhanced. The papers/reports from which extract is reproduced above, reveals that Akola aquifers are still safe and not overexploited. Yet given the recommendations above, the DCF shall make all efforts to implement them for the betterment of the water regime in the forest areas and the District as well.

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CHAPTER – 6

MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

6.1: GROWING STOCK OF WOOD:

Mostly site quality IV is found in Akola Division. Very few patches of site quality III are found. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of previous Plan is given in the table

LOCAL VOLUME TABLE (ROUND TIMBER) FOR TEAK

(ALL INDIA TEAK SITE QUALITY IV) TABLE NO. 6.1

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.183
6	90/105	0.435
7	105-120	0.555

6.2: GROWING STOCK OF BAMBOO:

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

6.3: INCREMENT IN VOLUME OF IDENTIFIED TIMBER SPECIES:

The stem analysis of Teak (Tectona grandis) carried out by selecting representative teak trees of site quality IV with different origin i.e., teak trees of seedling origin from Alegaon range compartment No.12 and the number of trees selected were 4 and Patur range compartment No. 47, one tree and compartment No. 48 two teak trees were selected as representative samples and total number of seedling origin trees selected were seven. For coppice origin the representative samples were selected from Alegaon range compartment No. 20, and number of trees selected were four and from Patur range one teak tree was selected from compartment No. 47 of Akola Forest Division. The total numbers of trees selected for stem analysis were twelve from four compartments. The results obtained out of stem analysis have been computed and the following curves were drowned.

A. Age/ Diameter curve at breast height over bark.

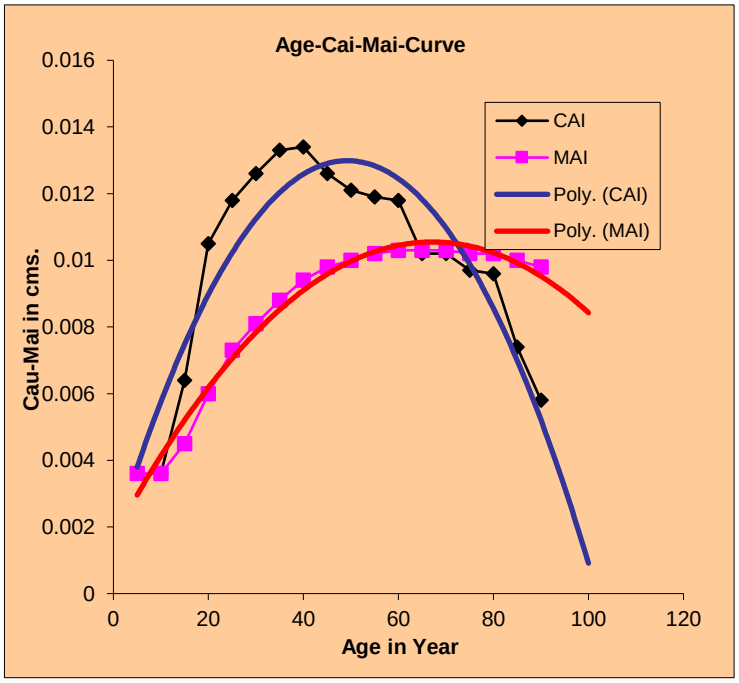
B. Height/ Age curve

C. Age/ Volume curve

STEM ANALYSIS FOR TEAK OF SITE QUALITY IV (seedling ORIGIN)

In case of seedling origin, the stem analysis reveals that the C.A.I. and the M.A.I. culminate at the age of 69 years, represents the girth of 105 Cms at the breast height.

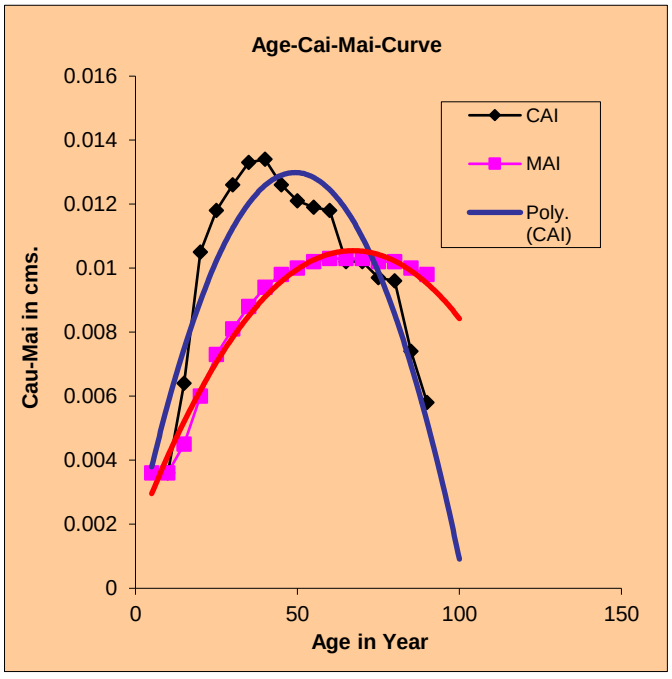
SR. NO.	AGE	HEIGHT	DBH(O.B)	GBH(OB)	VOLUME	CAI	MAI
1	5	3.30	2.80	8.80	0.0180		0.0036
2	10	6.00	5.70	17.91	0.0360	0.0036	0.0036
3	15	8.70	8.50	26.71	0.0680	0.0064	0.0045
4	20	10.80	11.80	37.08	0.1206	0.0105	0.0060
5	25	12.40	15.40	48.40	0.1840	0.0118	0.0073
6	30	13.70	18.70	58.77	0.2432	0.0126	0.0081
7	35	14.80	21.60	67.88	0.3100	0.0133	0.0088
8	40	15.60	24.10	75.75	0.3772	0.0134	0.0094
9	45	16.40	26.20	82.34	0.4400	0.0126	0.0098
10	50	17.10	28.20	88.63	0.5007	0.0121	0.0100
11	55	17.50	29.70	93.35	0.5600	0.0119	0.0102
12	60	18.00	31.10	97.75	0.6191	0.0118	0.0103
13	65	18.40	32.40	101.83	0.6700	0.0102	0.0103
14	70	18.90	33.70	105.92	0.7215	0.0102	0.0103
15	75	19.30	34.70	109.06	0.7700	0.0097	0.0102
16	80	19.70	35.50	111.57	0.8182	0.0096	0.0102
17	85	20.00	35.90	112.83	0.8550	0.0074	0.0100
18	90	20.30	36.40	114.40	0.8840	0.0058	0.0098
19	95	20.50	36.80	115.66			
20	100	20.80	37.00	116.29			



STEM ANALYSIS FOR TEAK OF SITE QUALITY IV (COPPICE ORIGIN)

In case of coppice origin, the stem analysis reveals that the C.A.I. and the M.A.I. culminate at the age of 69 years, represents the girth of 105 Cms at the breast height.

SR. NO.	AGE	HEIGHT	DBH(O.B)	GBH(OB)	VOLUME	CAI	MAI
1	5	3.30	2.80	8.80	0.0180		0.0036
2	10	6.00	5.70	17.91	0.0360	0.0036	0.0036
3	15	8.70	8.50	26.71	0.0680	0.0064	0.0045
4	20	10.80	11.80	37.08	0.1206	0.0105	0.0060
5	25	12.40	15.40	48.40	0.1840	0.0118	0.0073
6	30	13.70	18.70	58.77	0.2432	0.0126	0.0081
7	35	14.80	21.60	67.88	0.3100	0.0133	0.0088
8	40	15.60	24.10	75.75	0.3772	0.0134	0.0094
9	45	16.40	26.20	82.34	0.4400	0.0126	0.0098
10	50	17.10	28.20	88.63	0.5007	0.0121	0.0100
11	55	17.50	29.70	93.35	0.5600	0.0119	0.0102
12	60	18.00	31.10	97.75	0.6191	0.0118	0.0103
13	65	18.40	32.40	101.83	0.6700	0.0102	0.0103
14	70	18.90	33.70	105.92	0.7215	0.0102	0.0103
15	75	19.30	34.70	109.06	0.7700	0.0097	0.0102
16	80	19.70	35.50	111.57	0.8182	0.0096	0.0102
17	85	20.00	35.90	112.83	0.8550	0.0074	0.0100
18	90	20.30	36.40	114.40	0.8840	0.0058	0.0098
19	95	20.50	36.80	115.66			
20	100	20.80	37.00	116.29			



6.4: EFFORTS TOWARDS ENHANCEMENT OF FOREST PRODUCTIVITYTHROUGH QUALITY PLANTATION ACTIVITIES:

In Akola Forest Division plantation activities have been carried out in the past ten years is given in **Appendix- XXII**. A total of 3709.32 hectares of plantation has been done during the plan period. Plantations include teak and miscellaneous species. The summary of plantations is given in the table below.

Table No.6.4: Plantation carried out by forest department.

Sr. No.	Year	Area (ha)	No. of Plants
1	2010	0	0
2	2011	1106.30	537840
3	2012	566.70	504271
4	2013	365	188675
5	2014	419.10	337185
6	2015	25	39750
7	2016	213.73	89352
8	2017	436	265758
9	2018	577.49	506974
10	2019	0.00	0.00
Total		**3709.32**	**2469805**

6.5: CARBON STOCK:

Forests play an important role in combating climate change. In addition, it has the potential to provide ecosystem services, such as carbon storage. In forest ecosystem, enormous carbon is stored which is classified in five pools by GPG. The living ecosystems Ems of biomass carbon is classified in two pools; the 'above ground biomass' (AGB) and 'below ground biomass' which are stores of significant amount of carbon. The 'dead organic matter' (DOM) is also classified into two pools: 'dead wood' and 'litter'. The fifth pool is 'Soil organic matter' (SOM) which contains substantial amount of organic carbon. Carbon sequestered in the forests of Akola Forest Division has been derived by extrapolating from the growing stock calculated from the enumeration data. The various working circle wise estimation of Carbon Stock in Akola Division is given below.

Table No. 6.5: Carbon stock in different working circles

Sr. No.	Working Circle	Total Area (ha)	Average growing stock (m^3/ha)	Total growing stock (m^3)	Total carbon stock (metric tonnes)
1	Improvement Working Circle	15120.27	59.17	894666.38	268400.20
2	Afforestation Working Circle	17445.41	80.20	1399121.88	419736.98
3	Fodder Improvement Working Circle	5173.36	14.30	73979.05	22193.74
Total		37739.04	00	2367767.31	710330.90

6.6: SOIL ANALYSIS:

Quantum of soil carbon is a good indicator of nutrient status of soil. During the enumeration exercise, SOFR unit collected soil samples (50) and they were analysed for Soil Carbon. The range of soil carbon varied from 0.4% to 4.4%.

The details are given in Digital Maps.

6.7: CARBON SEQUESTRATION AND MITIGATION:

Forest and wood products can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon so efficiently that about half the dry weight of a tree is carbon. This carbon remains locked up in the form of wood and wood products. Sustainably grown and harvested wood (and other biomass) also provides a renewable alternative to fossil fuels and enhances carbon storage. Enhanced carbon sequestration through recognized and innovative silvicultural practices, eco-restoration of degraded/mined out forestlands, improved biomass productivity, etc. will help in improving forest health and vitality. Forest soil must be kept healthy and fertile. The growth of forest crops must be kept vigorous to attain the most desirable level of biomass production within an optional time scale.

In this plan an area of **17445.41** ha.is proposed under Afforestation WC which is to be implemented during the plan period. This will add to the forest cover of the division and contribute to the carbon sequestration of the forest.

Natural regeneration prescribed in the plan will also add biomass and carbon in the form of vegetation.

Further detailed studies for carbon sequestration potential of Akola forests need to be carried out. It must include values of two wildlife sanctuaries- NARNALA AND KATEPURNA Wildlife sanctuary which fall in Akola district but are outside jurisdiction of Akola Territorial Division.

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CHAPTER – 7

OPTIMIZATION OF FOREST RESOURCE UTILIZATION

7.1: RECORDED REMOVAL OF TIMBER:

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

Table No.7.1: Timber auctioned and revenue realized

Sr.No.	Year	Timber (m^3)	Revenue (Rs.)
1	2009-	620.251	11625330
2	2010-	99.036	3918000
3	2011-	792.272	21005140
4	2012-	681.062	18283150
5	2013-	758.937	22650130
6	2014-	375.375	10064150
7	2015-	560.05	15772250
8	2016-	275.313	8509950
9	2017-	427.069	14853000
10	2018-	346.220	10398545

7.2: RECORDED REMOVAL OF FUEL WOOD:

With the introduction of modern cooking fuels like LPG gas, electric implements dependence on fuelwood has decreased. But still firewood is the main cooking fuel for most of the villagers as well as people of Akola, Barshitakali, akot, Telhara, Balapur, Patur and Murtizapur towns. Dhawda as fuel wood is the most sought after species for fuel wood. The other hard wood species like Khair, Ain, Babuletc. are also preferred over some of the soft wood species like Salai, Moyen, Behada. As the demand exceeds supply, illicit lopping of the trees and carrying of head loads of lopped branches mostly by the women is frequently noticed in this area. Majority of the ginning mills and processing factories of the area use alternatives such as coal and oil than firewood.

Table No.7.2: Firewood auctioned and revenue realized

Sr. No.	Year	Quantity (m^3)	Revenue (Rs.)
1	2009-2010	21.500	56600
2	2010-2011	18.019	96300
3	2011-2012	36.203	70500
4	2012-2013	26.400	62300
5	2013-2014	22.470	58200
6	2014-2015	15.600	52200
7	2015-2016	22.176	118900
8	2016-2017	17.500	40300
9	2017-2018	13.500	32500
10	2018-2019	14.600	11000

7.3: RECORDED REMOVAL OF BAMBOO/RATTANS:

Availability of bamboo is very scarce hence there is no record of recorded removal of bamboo or rattans.

7.4: RECORDED REMOVAL OF LOCALLY IMPORTANT NTFPs INCLUDING MAPs:

7.4.1: Non timber forest produce: Tendu perhaps is one of the major revenues earning forest produce of non-timber forest produce. There are 4 Tendu units in Akola forest division. The trade of Tendu units is fluctuating. The quantum of revenue realized has increased over the years. The scattered distribution of tendu leaves, lesser areas available for collection and quality of tendu leaves determine the price of the tendu leaves. The detail of sale of tendu leaves is given in the table below.

7.4.1.1: MANAGEMENT OF TENDU:

Collection of Tendu Leaves: Tendu is the prominent revenue generating NTFP of this tract. Tendu leaves are used for manufacturing Bidis. Tendu trade has been 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 criterion for Bidi manufacturers. The quality depends on the colour textures 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 government in conjunction with various laws presently I 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 centimeters collar diameter shall not be pruned. However, felling of Tendu trees or branch lopping for leaf collection should be dealt with firmly.

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.

Table No.7.3: Tendu units auctioned, standard bags collected and revenue realized

Sr. No.	Year	Unit Auctioned	Target (Std Bags)	Actual Yield (Std Bags)	Revenue (Rs.) (Actual)
1	2010	Akola Division	5600	4856.74	3910992
2	2011		5600	4935.98	5241091
3	2012		5000	11912.66	4289391
4	2013		1000	874.87	357000
5	2014		3400	3114.091	933982
6	2015		7550	6190.328	2137973
7	2016		11750	6307.967	3603973
8	2017		4100	3429.986	8000973
9	2018		3800	1512.087	5129973
10	2019		1800	1709.072	1709982

7.4.1.2: MANAGEMENT OF BEHDA, AOLA, CHAR, AND OTHER NTFPS:

Collection of Behda, Aonla, Char and Other NTFPs: Fruits of Behada, Aonla and Char are marketable items. Similarly fruits, flowers and leaves of certain shrubs and trees are used for variety of purposes. Current level of collection is quite erratic and, therefore poor indicator of their potential in the tract.

Collection of species, which are not covered under the monopoly procurement by govt. agencies, should be allowed by the joint forest management committees or village panchayat for better protection of Behda, Aonla, Char trees and to increase its stock, few of the above trees be numbered and these trees be allotted to members of JFM committee. The members of committees who have been assigned with job of protection and nurture of above trees, they should protect them from fire. Range forest officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

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.

Regeneration of *Behda, Aonla, and Char:* Required tending is prescribed where saplings of *Behda, 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. *Behda, Aonla*and *Char* are prescribed 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

Akola is the district of the state having geographical area extending over to 5428.00 sq. km forming about percent of the total area of the state. As per 2011 census, the total population of Akola district is 14,11,281 lakhs.

The main forest produce that are harvested from the forests of Akola division and those which support the livelihood of people, are given as under.

1) Timber: Teak is the most valuable timber of the Division. It is used for construction, furniture and various other articles. But due to its prohibitive prices and non-availability in sufficient quantity other species such as Ain, Dhaora, Bhirra, Lendia, Kalam, Dhaman, and Bamboos are used. The demand is heaviest in the intensively cultivated and rich plains. For the manufacture of the carts, Teak is preferred for the body; Tiwas, Ain, Dhaman, Tendu for shaft; Dhaora for axles; Tiwas, Kusum or Kahu for naves; Teak for spokes and Shivan for yokes. For agricultural implements, such as plough; Tiwas, Khair and Babul are preferred in that order. Dhaora and Dhaman are used for axe handles and Semal for dug outs.

2) Firewood: There is a great demand for firewood throughout the Division. Dhaora, Khair, Bhirra and Ain are valued as firewood. Due to heavy demand inferior firewood of softwood species like Salai and Mowai is also extracted. Due to increase in small dhabas of the on the highways and in small township the overall demand for firewood has increased.

3) Bamboo: Bamboo are in general is in degraded position. It is used for hut construction and manufacture of household articles.

4) Rosha grass (*Cymbopogon martini*): The species distributed mainly in Narnala in Akola ranges. The total division is divided into 1units. The revenue earned out of the sale proceeds of the Rosha grass is very meager. Other non-wood forest produce like Mohaflowers and seeds, Charoli, Biba, and Behada seeds apart from the fruits of Tendu, Char, Jamun, Aonla, Imli etc. have good demand in the market. However, the production of these forest produce are very limited. The details of the NTFP units are given in **Appendix-XXIII**.

5) Dhawda Gum: Dhawdagum is highly demanded as edible gum in the market. For collection purposes of Dhawda gum the entire division is divided into 9units viz. Akola, Chikhalal, Marsul, Akola Range, Chondhi, Alegaon Range, Lohagadh, Pinjar, Barshitakali Range and Patur, Malrajura in Patur Range, which are sold through open auction. The collection of Dhawdagum ranges from 45 quintals to 200 quintals. The quantity and revenue realized by sale of gum is mentioned in the table below.

Table No.7.4: Quantity of gum auctioned and revenue realized

Sr.No.	Year	Gum (Qt.)	Revenue (Rs.)
1	2009-10	NA	619500
2	2010-11	NA	688000
3	2011-12	NA	421100
4	2012-13	NA	636000
5	2013-14	NA	478100
6	2014-15	NA	50367
7	2015-16	NA	719200
8	2016-17	NA	61200
9	2017-18	NA	392000
10	2018-19	0	0

6) Other Forest Produce: The other forest produce which the villagers take from the forest are, edible flowers and fruits, fibres from bark and roots, gum, herbs, thorns and leaves. The main species of edible flowers and fruits are Moha, Charoli and Tendu. Fibers are extracted from Palas, Palasbel. Thorns of Bharati, Hiwar, Yeroni, Chilati, Ghoti, Bor and Babool are used. Cordage

and lashings are made out from the bark of the Kuda, Palas and sometimes Piwarbel. Besides, murum and stones are also removed for building and roads.

7.5.2: OCCUPATION AND INDUSTRIES:

Besides agriculture, there are small occupations/industries in the villages and urban areas which are interlinked with forests and few of them are given below

i) **Cattle Breeding:** It is especially carried out overall the Division. It adds substantially to livelihood of people of these Talukas for sustainable forestry.

ii) **Orange Garden:** These occur all over the District. Small poles and bamboos are in great demand for supporting the fruit laden branches of orange trees. Bamboo baskets and soft wood packing cases are required for packing the oranges.

iii) **Saw mills:** There are saw mills in the Akola district which depend on the supply of wood from the forests as well as private areas.

iv) **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 carpenter provides job opportunities' to the hundreds of skilled carpenters engaged in furniture making joinery works 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.

v) **Manufacture of bidis:** Tendu leaves are used for preparing bidis by wrapping Tobbaco in these leaves. It is carried out on in a small scale in the district.

vi) **Collection of minor forest produce:** The poor class of villagers when not engaged on agricultural works collect moha flowers and fruits, charoli, gum, honey, wax, bark, roots and 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 on or from Akola the produce that is produced from Akola is generally locally consumed.

7.7: IMORT 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 Akola. 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 Govt. of Maharashtra and cost of living allowance (Rahniman Bhatta) are also taken into consideration.

NON WOOD FOREST PRODUCES (NWFP)

1) Grass: Grass from grass birs, closed coupes and a plantation is available on cutting basis. As per existing Government orders annual lease of grass birs for removal of grass on cutting basis, is first offered to Gram Panchayats, Co-operative milk societies and other public bodies at a price fixed by the forest department, considering current market trend and availability of grass. The lease of those areas which could not be disposed off in this way is sold by auction. The grass from the area which remains 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 be found that most of the grass bids remain unsold. In the sold areas very little grass is removed. Most of the time the influential people of the village purchase the grass bids and allow grazing in those areas by taking money from the cattle owners. Due to excessive cattle pressure the site conditions of grass bids 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. The quantity and the revenue generated in the sale of the above products are given below. It may be seen that the quantity of grass and gum is not much and the collection is very regular. There is 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 THEM

Akola 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. Akola forest division has a total of 56 JFM committees in the forest fringe villages. The total area allotted for these committees is 9108.68 ha. This covers around 55% of the total area of the division. JFM committees have taken up plantation activities to the extent of 460 ha. during the previous plan period.

- JFM micro plans are to be dovetailed 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

State's 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 are67and all these villages are covered under JFM and JFM Committees are in place. The total numbers 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 work 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, boundary pillars repairs, fire line cuttings and all other works of the Department are involved through the JFM members wherever Committee exists.

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

8.4: USE OF INDIGENOUS KNOWLEDGE

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

8.5: EXTENT OF CULTURAL/SACRED GROVES

There are no sacred groves in this division. There are sites of cultural significance in the division. One is **Rudrayani Devi** Temple which is 35 km away from Akola & second is **Malrajura Ecotourism** which is 40 kms away from Akola and 8 km away from Patur. The flow of tourists and devotees to these areas are seasonal and days-specific.

8.6: ECOTOURISM AREAS AND ACTIVITIES:

Various important ecotourism sites have been identified in the division. Some of the sites have been developed while there is a need to develop other sites. A separate chapter is given for the ecotourism.

8.7: SOCIAL CUSTOMS:

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

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

The 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:

(I) **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 Tribes 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 regimes;

(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, un-surveyed 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 recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribal's 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):** Notwithstanding 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 up-gradation or vocational training centres;

(l) Roads; and

(m) Community centres;

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(1):** 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, then, 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 and 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 authorised 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: The status of implementation of this Act (up to March 2018) is summarized in the table below.

TABLE NO. 8.2 STATUS OF IMPLEMENTATION OF FRA 2006

Type of claim	No of cases received by gramsabha	No of cases rejected by gramsabha	No of cases rejected by SDLC	No of cases rejected by DLC	No of cases finally accepted by DLC	No of cases pending for decision at DLC
Individual	767	491	231	0	48	0
Community	69	13	52	1	10	0
Total	**836**	**504**	**283**	**1**	**58**	**0**

8.9: OTHER RIGHTS AND CONCESSIONS:

As per Forest Policy of 1988, the first charge on the forest produce is that of tribal and other villagers living in and around the forest. Accordingly, the forest produce obtained from the forest will first be supplied to the people living in the villages notified for nistar purposes at the rate fixed by the Deputy Conservator of Forests in consultation with the District Collector. Only the surplus forest produce, which is not required by the local people, will be sold in open auction. Small timber and poles required for agricultural purpose and repairs to houses as well as firewood for domestic use will be supplied from the depots at concessional rates to the villagers living near the forests, depending upon the availability of these produce. Depots will be opened at suitable places, throughout the division, so that people have to traverse minimum possible distance to procure these produce. Range, Round or Beat headquarters can be used for this purpose, so that supervision and maintenance of these depots become convenient.

In Akola forest division the Reserved Forests are not burdened with any adverse rights and concessions however Protected Forests are heavily burdened by grazing concessions.

The Grazing concessions are allowed as per "Grazing Policy" of Maharashtra State depending upon the cattle unit and carrying capacity of forests. The Grazing Rules have been framed vide Government Resolution No.MFP-1365/132211-Y, dated 6th December, 1968 and Grazing Rules issued vide No.MFP-1371/237035-Z, dated November3, 1973. However, no grazing beyond carrying capacity shall be permitted.

8.10: DEPENDENCY OF LOCAL PEOPLE ON NTFPs:

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

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

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CHAPTER 9

ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.

9.1. EXISTING POLICY AND LEGAL FRAMEWORK AND THEIR COMPLIANCE

The existing policy and laws in the country and the State are invoked for the management of the forests 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 forest in the Division. The plan is further guided by guidelines like.

9.1.1: National Wildlife Action Plan (2002-2016)

Ministry of Environment and Forest, Govt. of India has formulated National Wildlife Action Plan (2002-2006), 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 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 Peoples Participation in Wildlife Conservation
vi. Conservation Awareness and Education Which are partly being followed in this Plan.

9.1.2 : National Forestry Action Plan

Introduction: Having about 2.5% of worlds geographic areas, India at present is supporting 16% of worlds human population and 18% of cattle population. About 41% of the forest cover of the country has been degraded and dense forests are losing their crown density and productivity continuously. A large number of India's livestock population graze in the forest causing serious damage to soil, ground flora, including regeneration, and productivity of the forests. The use of forests beyond it 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 programmed. These programs 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 forest to be improved through suitable silvicultural practices.
iii. Efforts to be made to bring one-third of the geographic area of the country under forest and tree cover by plantations on all categories of wastelands and agroforestry.
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 " Godavarman Thirumalkpad" V/s Union of India. The order speaks about the felling of trees in all forests is to remain suspended except in accordance with the working plans of the State government, as approved by Central government.

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

Following the directions of Hon'ble apex court in their order dated 22.09.2000 in IA No. 424; a core group was constituted to decide the extent of felling. As per these Orders, feeling is to be carried out by the State Government only after obtaining the permission from core group constituted by the Ministry of Environment and Forests, New Delhi, which is complied with by the Department.

9.1.4 : Forest Right 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 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 parliament of India and the assent to this Act was received from the President of India on 29" 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 were further amended by the Central Government vide notification dated 6th September, 2012.

In Akola Division the number of claims received were836 out of which 51 were accepted. Of these 51 cases 48 are of individual claims covering an area of 128.92 ha. And 3 claims are of community rights which cover an area of 4.363 ha. There is a need to guide and train the villagers on how best to use the forest land to meet all their needs and wewan them away from their dependency on the forest.

9.1.5: The Biological Diversity Act 2002

The Biological Diversity Act 2002 came into existence in February 2003. The Act provides 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.

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 and 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 there with or incidental there to. 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 biodiversity.

As of now 233 Biodiversity Management Committees have been formed in the District of Akola. There is a need to establish Village Biodiversity Management Committees at least in all Gram Panchayats where JFM is being implemented.

9.1.6 : GOI Orders/GOM Resolutions, Circulars etc.

Joint Forest Management approach was degraded forest area of the State vide GR dated 16 March 1992. The programme was extended to Good Forest areas vide Govt. Resolution dated 25/4/2003. The latest revision in GR has been made

on 5th October 2011 and 10th July 2012. All JFM activities should be in consonance with the board 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

The 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 received.

9.3 : NUMBER OF FOREST OFFENCES

The number of forest offences that have been registered under the last ten years are given below.

Table No.9.1

The Extent of damage due to fire, illicit cutting, and other offences

Year	Fire		Grazing		Illicit cutting					Other offences		Total	
	No. of Cases	Loss in Rs.	No. of Cases	Loss in Rs.	No. of Cases	Illicit cut tree (No.S)		Loss in Rs.	Amount of Material seized (Rs)	No. of Cases	Loss in Rs.	No. of Cases	Loss in Rs.
						Teak	Non Teak						
2009-10	29		12		397	2564	235	1003402	598774	147	-	585	1003402
2010-11	31		7		404	2885	242	941759	522061	114	-	556	941759
2011-12	12		8		583	2128	239	715928	542289	203	-	806	715928
2012-13	32		11		455	2616	285	939524	669607	242	-	740	939524
2013-14	29		3		269	2187	360	1249010	1117485	252	-	553	1249010
2014-15	45		2		297	1237	265	933028	430320	253	-	597	933028
2015-16	05		9		439	1217	309	780959	526989	276	-	728	780959
2016-17	11		8		395	1163	205	768758	425805	137	-	551	768758
2017-18	42		10		510	1579	240	1068674	534223	191	-	743	1068674
2018-19	22		9		514	1317	223	802154	522369	164	-	709	802154
Total	**258**		**79**		**4263**	**8893**	**2603**	**9203196**	**5889922**		**-**	**6568**	**9203196**

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 BULDING EFFORTS

The Staff of the Division is trained as per 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 for the staff is as follows.

1. Training for GIS and GPS – Surveyor 1, Forester 13, and Forest Guard 77.
2. Facilities of personal Digital Assistants are given to all guards with applications like Offence cases, Fire, Encroachment, Grazing etc. As per the table below, a Total PDAs have been distributed to the staff of the Division.

Table No.9.2

Distribution of PDAs

Sr. No.	Range	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	PDA NOs.	Total PDA NOs.
	Year	2009 -10	2010 -11	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19	
1	Akola	-	-	-	-	-	-	12	-	-	-	12
2	BarshiTakli	-	-	-	-	-	-	03	-	-	-	03
3	Patur	-	-	-	-	-	-	04	-	-	-	04
4	Aalegaon	-	-	-	-	-	-	07	-	-	-	07
Total								26				26

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 forest. The value of the timber and firewood has been fully accounted for in the last plan and projected for the period of this plan **Appendix No**. **XXIV**. The quantity and the value of the NTFPs collected in the last ten years have been duly provided in Appendix **No. XXV.**

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 NVP by the Kanchan Chopra Committee and accepted by the Hon. Supreme Court order dated 28.03.2008 is taken as 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 (NTFPs)
iii. Value of fodder
iv. Value of Eco-tourism
v. Value of bioprospecting
vi. Value of Ecological services of forest
vii. Value of Flagship Species
viii. Value of Sequestration Value.

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

Eco class - I	Consisting of Tropical Wet Evergreen Forest, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forests
Eco class - II	Consisting of Littoral and Swamp Forests
Eco class - III	Consisting of Tropical Dry Deciduous Forests
Eco class - IV	Consisting of Sub-Tropical Broad Leaved Hill Forests, Sub-Tropical Pine Forests and Dry Evergreen Forests
Eco class - V	Consisting of Tropical
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 forest of Akola comes under Eco-Class III and the value attached it this area is given below as pre the canopy density. The average value of the forests stands at Rs. 800000/- and varies with the type of forest and its attributes. This value has further been revised the Indian Institute of Forest Management, Bhopal and is yet to be approved. The IIFM study is more comprehensive and considers all aspects of the intangible benefits that the forest eco-system provides.

Below is given the value of the forest of Akola as per the current and proposed NPV value which considers the tangible and some components of the intangible benefits.

Table No.9.3

Calculation of Forest Worth Based on NPV

Sr.No	Area of Akola under different canopy density		Current rate of NPV (Rs lakh/ha)	Value of Forest as current rate (Rs lakhs)	Proposed rate of NPV (Rs lakh/ha)	Value of Forest as Proposed rate (Rs lakhs)
	Category	Area (ha.)				
1	VDF	1100	8.87	9757	26.08	28688
2	MDF	11000	8.03	88330	18.62	204820
3	OF	21800	6.26	136468	11.17	245686
Total		**33900**	**23.16**	**234555**	**55.87**	**479194**

The value of the forest of Akola comes to 2345.55/- crores as per the current NPV rates and Rs. 4791.94/- crores as per the proposed NPV rates which has considered all the ecosystem services and functions of the forests.

Thus, the value of the Forests of when computed holistically considering 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 : BUDGERARY ALLOCATIONS TO THE FORESTRY SECTOR

Table No.9.4

Statement Showing the Revenue, Expenditure and Surplus

Year	Revenue (Rs in lakh)	Expenditure (Rs in lakh)			Total Expenditure (Col. 3+4+5)	Surplus (+) Deficit (-) (Rs)
		Conservancy and Works (Rs in lakh)	Establishment (Rs in lakh)	Plan (Rs in lakh)		
2009-10	177.67	241.15	604.05	422.00	1267.20	-1089.53
2010-11	108.22	230.13	617.06	437.17	1284.36	-1176.14
2011-12	163.21	218.70	755.08	981.61	1955.39	-1792.18
2012-13	225.40	211.35	829.73	1008.63	2049.71	-1824.31
2013-14	224.90	221.61	1089.98	1214.66	2526.25	-2301.35
2014-15	168.94	198.38	1083.36	1389.60	2671.34	-2502.40
2015-16	68.97	485.91	1209.26	1403.70	3098.87	-3029.90
2016-17	107.03	526.31	1207.55	1448.87	3182.73	-3075.70
2017-18	97.92	366.89	1225.94	1395.88	2988.71	-2890.79
2018-19	115.65	534.56	1066.80	2495.27	4096.63	-3980.98
Total	**1457.91**	**3234.99**	**9688.81**	**12197.39**	**25121.19**	**-23663.3**

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 Plantation, SMCs, MPCAs, Building and Constructions etc. The evaluations guide by the evaluation code.

9.8: EXISTENCE OF MONITORING, ASSESSMENT AND REPORTING MECHANISM

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

Akola Division has sanctioned strength of 129 posts in total, including 129 permanent posts and 0temporary posts ranging from the Deputy Conservator of Forest to the Van Majoor. 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 Akola Division

Sr. No	Designation	Pay Scale in Rs.	Permanent Posts	Temporary Posts	Total	Statement Showing Santioned, Filled up and Vacant post in Akola Division		
						Santioned	Filled up	Vacant post
Group – A (Class I)								
1	Deputy. Conservator of Forest.	As per 7 th pay	1	0	1	1	1	0
2	Assistant Conservator of Forest.	--00--	2	0	2	2	2	0
Group – B (Class II)								
3	Range Forest Officer	--00--	6	0	6	6	6	0
4	Office superintendent	--00--	1	0	1	1	1	0
Group – C (Class III)								
5	Forester	--00--	15	0	15	15	13	2
6	Forest Guards		78	0	78	78	77	1
7	Chief Accountant		1	0	0	1	0	1

8	Accountant		06	0	06	06	06	0
9	Clerks		09	0	09	09	07	2
10	Surveyor		1	0	1	1	1	0
11	Driver		2	0	2	2	2	0
12	Police Constable		2	0	2	2	1	1
Group – D (Class IV)								
13	Peon		2	0	2	2	2	0
14	Daftari		1	0	1	1	0	1
15	Sta. Asstt.							
16	Chowkidar		1	0	1	1	1	0
17	Nike		1	0	1	1	0	1
18	Forest Labour							
Total Staff			**129**	**0**	**129**	**129**	**119**	**10**

Table no.9.6

The distribution of jeeps is as under

Sr. no.	**To whom the Vehicle is allotted**	**No. of vehicle**	**Vehicle No.**
1	Deputy Conservator of Forest Akola Division	1	MH-30-0418
2	Ass. Conservator of Forest(vane)	1	MH-30-0431
3	Ass. Conservator of Forest (bhavka)	1	MH-30-0587
4	Range forest officer Akola (Mobile squad)	1	MH-30-H-0362
5	Range forest officer Akola (Territorial) Barshitakli	1	MH-30-H-5319
6	Range forest officer Akola (Territorial) Alegaon	1	MH-30-H-5318
7	Range forest officer Akola (Territorial)Akola	1	MH-30-H-0351 (write off)
8	Range forest officer Akola (Territorial)Akola	1	MH-30-H-5335
9	Range forest officer Akola (Territorial)Patur	1	MH-30-H-5336

Table 9.7

The distribution of Pistol is as under

Sr.no	Designation	No. of pistol	Weapon no
1	Deputy Conservator of Forest Akola Division	1	16448954 (pistol)
2	Ass. Conservator of Forest(vane)	1	16711872 (pistol)
3	Ass. Conservator of Forest (bhavaka)	1	-
4	Range forest officer Akola (Mobile squad)	1	16448939 (pistol)
5	Range forest officer Akola (Territorial) Barshitakli	1	18504448 (pistol)
6	Range forest officer Akola (Territorial) Alegaon	1	16711874 (pistol)
7	Range forest officer Akola (Territorial)Akola	1	16448942 (pistol)
8	Range forest officer Akola (Territorial)Patur	1	16524957 (pistol)

Sr.no	Designation	Range	Weapon no
1	Round officer	Patur	16255746
2	Round officer	Barshitakli	16044486
3	Round officer	Akola	CJ-2947
4	Forest Guard	Patur	15167902
5	Forest Guard	Barshitakli	CW-2109

LABOUR SUPPLY

Population density is good in the Division. The main occupation is agriculture, hence during agricultural season there is a decline in manpower availability, for the forestry works. Departmental works such as marking of coupes, Cut Back Operations, 1/5th boundary demarcation, road repairs, plantation works are carried out by engaging local labors both on by-job and daily wages. The laborers of some of the villages are skillful at carrying out various forestry operations as they have been carrying these operations since ages. A statement showing village wise population, agricultural labors population, casual labors population and marginal labors population is given in **Appendix No. II-C**. of Vol. II**.**

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. Regular year around programmes are held In these schools and all important days related to the Environment and Forests are celebrated enthusiastically. Regular field visits and projects are also taken up. Seed Banks are established in each of schools.

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

9.10 : ADEQUATE MANPOWER IN FOREST DIVISION.

9.10.1 : Staff

The headquarters of Akola Forest Division is at Akola. This Division is headed by the Dy. Conservator of Forests and the Dy. Conservator of Forests is assisted by 2 Assistant Conservator of Forests, 6 Range Forest Officers for protection, management, development, and administration of the forests of Akola Forest Division. There are 15 sanctioned posts of Foresters and 78 sanctioned posts of Forest Guards. The position of the staff and administrative setup are given in the above-mentioned table:

Accommodation: The office of Dy. Conservator of Forests is in the accommodation of the building which belongs to the B and C department. The range officers are having their offices in Government buildings are belongs to forest department. In this division accommodation required and available as per Govt. norms is as below.

REST HOUSE:- There are two Forest Rest Houses (FRH) one is at Akola and other is at Patur. In addition to these Forest Rest Houses, there are 4 Inspection Huts and 8 Labour Sheds.

The maintenance of accommodation of the staff, offices, Forest Rest Houses, Labour Sheds and other govt. buildings is not upto the mark due to scarcity of funds.

FOREST COMMUNICATION: - In this division both railway and road network are available for transportation. Mumbai-Calcutta railway line runs West to East through this Division from Murtizapur and Central Railway broad gauge line, Khandwa – Akola meter gauge and Akola to Washim broad gauge branch rail line crosses Central Railway broad gauge line at Akola and passes through Akot, Akola, Washim tehsils in the North-South direction.

Internal transport by the network of fair-weather roads. The total length of fair-weather road is 198 kms. Bus transportation is adequate whereas train transport is to the extent of some stations only. Telephone communication is connected to all Range headquarters.

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CHAPTER – 10

FIVE YEARS PLANS

10.1. The forest was a subject of State List till 42nd Amendments to the Constitution of India in 1976. The State Government used to exercise its power in protection, development and management of state forest resources and earn revenue to the government. The forest management was on scientific lines even before independence to the country and it was in consonance with the Working Plans prepared in the light of scientific management. Before Independence the emphasis in the management of forest was given to the improvement of forest and harvesting of matured and valuable timber species for the production of timber. The Ex-Propriatory forest was also brought under the purview of management after independence for improvement of forest, silvicultural operations were given top priority to achieve healthy forest and these silvicultural operations, timber extraction and afforestation works were carried out with the funds made available under non-plan budget in the early independence period. Till late 70's in the last century, no Plan fund was allocated to forest sector in this area during this period. During this period forest sector was considered as major source of providing employment to the people. The fund under the Non Plan budget provided was also made to meet the expenditure for carrying out various operations of forest management. The funds of the EGS could not be utilized because most of the forestry operations were not identified as part of EGS works. Subsequently Plan funds of this state allocated under District and State Plan with the introduction of Plan and lots of developmental activities have been taken up for management of forests.

Contents

1. History	-	S.A.Cornelius's Working Plan (1951-1956)
2. First Plan (1951-1956)	-	--do--
3. Second Plan (1957-1960)	-	--do--
4. Third Plan (1961-1966)	-	--do--
5.Post Third Plan (1966-1969	)-	S.S.Parasnis's Working Plan
6. Fourth Plan (1969-1974)	-	--do--
7. Fifth Plan (1974-1979)	-	--do--

8. Annual Plan (1979-1980)	-	--do--
9. Sixth Plan (1980-1985)	-	--do--
10. Seventh Plan (1985-1990)	-	--do--
11. Eighth Plan (1992-1997)	-	Thengdi's Plan (1992-1997)
12. Ninth Plan (1997-2002)	-	--do--
13. Tenth Plan (2002-2007)	-	--do--
14. Eleventh Plan (2009-2010 to 2018-19)	-	G.Rama Krishna Rao

10.2. FIRST FIVE-YEAR PLAN (1951-1956)

The first Five Year Plan aimed at rehabilitation of degraded forests, introduction of economic species, survey and demarcation of forest area. During this period Akola Forest division was a part of West- Berar Forest Division and the Working Plan prepared by S.A. Cornelius for West Berar Division was under implementation in this area. The impact of first Five Year Plan is not noticeable, as the flow of funds was never made available to this tract, for requisite achievement of management prescribed in the Working Plan.

10.3 . SECOND FIVE-YEAR PLAN (1957-1960)

In the Second Five Year Plan the management of forest aimed at rehabilitation of degraded forests, introduction of economic species, survey and demarcation. During this period lot of forest land was diverted for agriculture. Silvicultural operations were given priority for the improvement of forest crop. The management was aimed at production of timber. Cornelius Working Plan was under implementation during this period. Plan funds were not allocated for any operation of the forest management.

10.4 . THIRD FIVE-YEAR PLAN (1961-1966)

The Third Five Year Plan aimed at increase in productivity of forest through introduction of fast growing species in plantation, scientific assessment of forest and introduction of modern logging system. During this period Cornelius Working Plan was introduced for the forest management. The process of reservation of left over Protected Forest was initiated. The forest lands were allowed to be given to

villagers for cultivation for getting the agriculture crop. Silvicultural operations and protection were given top priority; therefore, some improvement works in the forest was taken place. No plan funds were allocated to forestry operations. Management was revenue oriented.

10.5. . POST THIRD-FIVE YEAR PLAN (1966-1969)

During this period S.S. Parasnis Working Plan was under implementation. During this period there was a severe drought in this area. The local people were living under the poverty due to complete failure of agriculture crops, resulted in lack of employment of agricultural labourers has put the government in hardship to provide employment to agricultural labourers. Therefore the government has given thrust to provide employment to the agricultural labourers and civil facilities to the people. The foresters were compelled to follow the orders of government to provide employment to the local people in forestry operations. During this period no plan funds were allocated and the thrust of forest management was revenue oriented.

10.6 . FOURTH FIVE-YEAR PLAN (1969 -1974)

During this plan just like 3rd Five Year plan the forest management was aimed at increasing productivity of forest, through introduction of fast growing species in forest, scientific assessment and introduction of modern logging system. S.S. Parasnis's Working Plan was under implementation. During this plan the administration of forest villages brought under Revenue Department and development of these forest villages was entrusted to Revenue Department. After the local people began to alienate from Forest Department and perception of local people changed and kind of apathy started in the minds of local people towards Forest Department and local people started thinking that Forest Department was an obstacle for the development of local area, therefore people resorted to new encroachments upon forest lands for non-forestry purposes. During this period a new approach in the field of forest sector emerged in the form of timber boards to divert revenue for the development of forests resulted in formation of Forest

Development Board in 1969 and subsequently re-shaped into Forest Development Corporation in 1974.

10.7 . FIFTH FIVE-YEAR PLAN (1974-1979)

The forest sector during this plan was aimed at large scale plantations, social forestry to bring about people's participation in raising plantation on community lands and forest conservation. Social Forestry wing was established during this period to involve people in raising plantation and the lands outside forest area that is community land, government Waste land etc. The State Government introduced Employment Guarantee Scheme to provide employment to local people by which creating assets to the community. During this plan period Teak plantations under General Utility of Timber was introduced and Bamboo and other plantations were taken up under various schemes. No Plan fund was made available during this period.

10.8 . ANNUAL PLAN (1979-1980) and SIXTH-FIVE YEAR PLAN (1980-1985)

The aim of the 6th Five Year Plan was social forestry and fuel to save natural forests. The regularization of encroachment was taken by the government on forest land of those land which was encroached by forest dwellers from 1/4/17972 to 31/3/1978. This decision was further aggravated the problem of encroachment and many forest dwellers resulted to large scale encroachment keeping in mind that these encroachments could be regularized in future. During this period S.S.Parasnis's Working Plan was under implementation as the period of plan was extended. Some Teak plantations were taken up for timber production during this period. The better delegation under plan scheme was given but the total budget allocation was even more than 1% of the district budget.

10.9 . SEVENTH-FIVE YEAR PLAN (1985-1990)

The basic aim of 7th Five Year Plan regarding to forest management was forest conservation, massive afforestation and waste land development. During this period the clear felling of natural grown trees banned by Government of India, massive afforestation was taken up under EGS scheme and various other

plantations were taken up under District Plan Schemes. Infra-structural facilities like communication, transportation and building etc. were improved. The implementation of the Forest Act gained momentum and the forest dwellers were of the opinion and the Forest Act for Conservation of Forest for hurdling the process of development in the forest area. Plan funds were allocated for the developmental activities under District and State Plan. The Government of India formulated new Forest Policy in 1988.

10.10. EIGHTH FIRST-FIVE YEAR PLAN (1992-1997)

The 8th Five Year Plan aimed at protection of forest against fire, oriented in utilization of Waste land for forestry activity. Creation of awareness among the people for forestry through Joint Forest Management (JFM) and conservation of bio- diversity. The World-Bank project was implemented which helped in improving infrastructural facilities in the Forest Department i.e. root-trainer nursery, clonal nurseries, Germ-Plasm bank etc. For implementation of JFM the Government of India and State Government have issued various Government Resolutions (G.R.) from time to time. During this period the impact of overall development in the forest sector was noticed. DPDC funds were allocated for development of various activities like plantations, roads, buildings etc. Under EGS lots of funds were allocated for taking up plantation, soil and moisture conservation works etc. During this period Thengdi's Working Plan came into existence. The areas of Narnala and Katepurna Sanctuaries were transferred to wildlife wing.

10.11 . NINETH-FIVE YEAR PLAN (1997-2002)

The aim of 8th Five Year Plan was carried forward to 9th Five Year Plan. As far as the Forest Department was concerned the State Government has initiated different developmental scheme in consonance with the Central Government schemes. The period of the World Bank project came to an end during this period. Plantations of both teak and miscellaneous species were taken up under various schemes. The Plan funds were allocated for various developmental activities of the

forest under D.P.D.C. as well as under State Government. During this period Thengdi's Working Plan was under implementation.

10.12 . TENTH-FIVE YEAR PLAN (2002-2007)

Thengdi's Working Plan was under implementation. During this plan lot of emphasis was given to implementation of JFM through Forest Development Agency of Government of India. In Thengdi's Working Plan emphasis was given on soil and moisture conservation works and accordingly some of the soil and moisture conservation works were taken up. Many developmental activities were taken up under EGS, Jawahar Rojgar Yojana etc. The flow of Plan funds has come down drastically resulted in slowing down of developmental activities under Plan in forestry sector. The National Forestry Action Programme was formulated to establish linkage between National Forest Policy and National Five Year Plan. In the past there has not been a comprehensive and constant programme structured, therefore it was difficult to get linkages and establish trends. The budget outlay for forestry sector was hardly 0.032% of total outlay in 5th Five Year Plan and increased to 0.94% in 8th Five Year Plan. The forestry sector was given higher allocation was in the 7th Five Year Plan 1.09%. The forest sector is one of the most important sectors of the government, which provides tangible and intangible benefits to the community by conserving and maintaining bio-diversity. Such an important sector needs sustainable development and this cannot be achieved through meager budget allocation to the forest sector, therefore the budget outlay of the country for forests should be raised 4 to 5 %. Similarly for this Forest Division also, the Plan allocation must be inconformity with the national perspective to achieve the objectives of the nations as well as forests.

10.13: 11th five year plan (2007-2012):

The monitorable target of the 11th five year plan was to increase the forest cover by 5% of the total geographical area. This would require an additional cover of about 16 million ha. Out of this, 5 million ha could be brought under the tree cover within the recorded forest area while the rest would be added through agro forestry and social forestry. However, the policy target is to have 33% forest and tree cover which will require an additional coverage of about 10–11 million ha. This will have to be done mainly outside the recorded forest area. The target of 33% forest and

tree cover reflects the tree component without accounting for other vibrant non-tree natural biomes like grasslands.

The amendment of the target of the 1952 policy, of one-third area under forests, to forest/tree cover resulted in a shift of focus from ecological habitat to tree cover. Further, recognition of biodiversity characteristics and ecological services rendered by habitat like grasslands, natural desert ecosystems, alpine, and riparian habitat suggests that several biomes, even if devoid of tree component, can be recognized as 'green cover' and accounted. Recognizing these facts, the following strategic principles will be adopted for dealing with the green cover.

The policy objective of 33% tree/forest cover should be revisited for its definition on ecological considerations. The green cover should include the existing natural ecosystems within which the tree cover constitutes a sub-set. Enabling environment for social and participatory regimes should be the aim of Central efforts, as is being done through JFM mode under the National Afforestation Programme. Implementation of the Central programmes has met with difficulties on fund flow management at the State level. It is advisable to undertake activities in project mode with earmarked funding, as is done in the externally aided projects.

The status of green cover is an indicator of status of productivity of forests. The following strategies have been evolving in the sector for improving the status of green cover.

Participatory Forest Management or Joint Forest Management (JFM):

Initiated with the circular of the MoEF on 1st June 1990 on people's involvement in forest conservation and management, the JFM regime has evolved gradually and at present 106479 such committees (22 million participants) are functioning in 28 States covering 22.02 million ha of forests. This participatory regime is seen as a potential strength of forest management for the forest fringes. The challenge now is to effectively empower the local communities with appropriate rights and responsibilities, and ensure that substantial benefits from forest conservation accrue to them.

A similar approach has been attempted in wildlife management also. In Project Tiger, India, eco-development project was implemented during 1995-2005 under Global Environment Facility (GEF) with focus on village eco-development through optimum use of local resources and involvement of local people in

conservation of protected areas. Integration of this approach to protected area management through shared decision-making and full integration of conservation and livelihoods across the landscape are yet to be realized. Also, the recognition of a large range and diversity of community traditions or new initiatives towards conservation is very weak.

The 1st five year plan, as far back as 1951, indicated the scope for establishment of village plantations. Subsequently, a series of externally aided social forestry projects during the 1980s and allocation of 25% of District Rural Development Agency funds under National Rural Employment Programme, Rural Landless Employment Guarantee Programme, and so on, for social afforestation provided impetus to social forestry. This provision was not pursued since the Eighth Plan. Regeneration of forests and growing of trees being a long-term activity, did not receive due focus in the rural development programmes. Even the Watershed Management Programme aims more at equitable sharing and caring of watershed benefits, and afforestation remains a latent component. The cost norms of these programmes are not able to support substantial afforestation activities requiring strong wage contribution.

Agro and Farm Forestry: The social forestry programmes also include extension and promotion of agro and farm forestry in the farm sector. The farmers of the States like Punjab, Haryana, Himachal Pradesh, Uttar Pradesh, Karnataka, and Tamil Nadu have adopted agro forestry. However, the forward linkages with the user industry and facilitation by the State agencies have not existed. Thus, the sector suffers from problems of unorganized markets driven by middlemen, depriving the farmers of optimum prices for their produce.

Biodiversity: Habitat conversion or land use changes, land degradation, and pollution result in the decline of ecological goods and services needed for human welfare. The Biological Diversity Act, 2002 and Rules, 2004 provide for constitution of State Boards (SBBs) and Management Committees (BMCs) for conservation, documentation and sustainable utilization of biodiversity and for building up capacities of these bodies. Chronicling in the form of People's Biodiversity Registers will be the only way we can identify changes happening due to climate change. There is a need to develop appropriate methodology and models for conducting such

an exercise. Documentation of traditional knowledge should also include adaptation of such knowledge in line with the present needs of conservation.

Conservation of natural resources and ecosystems: Inland aquatic systems (excluding paddy fields) cover 5.3% of the country's land area but harbour 15% and 20% of India's floral and faunal diversities, respectively. There are wide gaps in knowledge relating to hydrological parameters, ecosystem processes, and aquatic life forms in these systems. Information on the physio-chemical aspects of water quality in rivers and lakes has become available largely because of the support from the National River Conservation Directorate (NRCD) and the CPCB, but that on aspects such as area, depth, hydrology, and Environment and Climate Change 203 ecosystem processes (functions) is practically non-existent. The existing programmes on conservation accordingly need a revamp.

The Scheme on Conservation and Management of Mangroves, Coral Reefs, and Wetlands has been too small to make an impact on the conservation of these ecosystems. Mangroves and coral reefs are mainly found on government lands. Development of appropriate institutions to motivate people to co-operate in the conservation efforts of these systems will be a priority area. More protected areas are needed for the conservation of coral reefs. Restoration and plantation programmes for mangroves are necessary to make these eco-systems function as effective barriers against invasion of land by sea. The existing programmes on wetlands, mangroves, and coral reefs will be extended to mountains, grasslands, and alpine ecosystems. Initiatives on conservation need to be more effectively integrated with development and poverty reduction. The principles of Community Reserves under the Wild Life (Protection) Act may be useful in such efforts. Long-term plans for conservation of such habitats will be important. Wetlands will be part of NLCP and the objectives will cover conservation of life forms apart from mitigating pollution and augmenting catchments. An information system will be set up for islands, coral reefs, mangroves, and wetlands by developing a consolidated and easily accessible database of all recorded species. Support activities will include participatory research for inventory and valuation of freshwater ecosystems, measures to tackle serious threats to them and ensure conservation, as also the livelihood security of dependent communities. With regard to linkage between biodiversity and climate change, it should be recognized that biodiversity is an

important tool to find solutions for tackling the impact of climate change on rural populations that depend on biomass for their livelihood. There is a need to recognize the potential of biodiversity to provide solutions for adaptation in the form of traditional crop varieties and donors for creating GMOs.

National agro biodiversity hotspot mapping and identification of important agro biodiversity landscapes will be undertaken for conservation with the participation of farmers and pastoralist groups. Regions with high concentration of genetic diversity on major and important crops may be declared as 'gene sanctuaries' for conservation and enrichment of diversity, involving communities through diversity based income generation and incentives. The regulatory mechanism for trials and adoption of GMOs will be required to be based on scientific, socio-economic, and EIA in the long as well as short term. The process of a regulatory regime, therefore, should be consultative and transparent, based on the prescribed scientific, logical, and progressive norms, taking into account factors of human health and environmental health. Awareness generation will be important for ensuring effective outreach of the prescribed process for promotion of appropriately and adequately tested GMOs, mechanisms for enforcement of procedures, and processes for safeguarding ecological and health safety will be established.

10.14: 12thfive year plan (2012-2017):

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

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

Environment and Climate Change:

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

Forests and Livelihood:

- Greening 5 million ha under GIM including 1.5 million ha of degraded lands, afforestation and eco-restoration of 0.9 million ha. of ecologically sensitive areas.
- 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.
- Engagement of Village Green Guards/Community Foresters for every Joint Forest Management (JFM) village by 2016.
- Establish forestry seed bank in forest circles and Model Nursery in every district with information on public portal by 2014.

Wildlife, Ecotourism and Animal Welfare:

- Twenty per cent of veterinary professionals in the country will be trained in treating wildlife.

- Integrated Ecotourism District Plans covering 10 per cent of all potential Protected Areas (PAs) by 2017.
- Promoting participation of private sector, civil societies, NGOs and philanthropists in animal welfare.

Ecosystem and Biodiversity:

- Restore 0.1 ha. of wetlands/inland lakes/water bodies by 2017.
- 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.

Besides, 14 Goals have also been identified in the Plan Document, which would receive focus and special attention, *inter alia*, through the Annual Plans of the Ministry. These 14 Goals are set out below:

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 Environmental Impact Assessment (EIA).
4. Ensure ecological flows in all rivers by regulating abstractions so as to allow conservation of riverine 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.
6. Improve forest productivity, production and sustainable management of biodiversity (equity in access to benefit sharing with local people).
7. Restore and intensify forest-rangelands/ grazing-land management and establish community grazing land around forest fringe villages.
8. Build capacity of Village Forest Committees/ Joint Forest Management Committees (JFMCs) for management of forest resources including ecotourism.

9. Revive seed orchards and silviculture plots for various forest types of the country, as well as for enlisted species under Minor Forest Produce (MFP)/ Non Timber Forest Produce (NTFP), including genetic improvement, and establishment, of clonal orchards.
10. Reducing and managing human–wildlife conflict.
11. Commercialisation of permissible marine products rich in poly unsaturated fatty acids (PUFAs), vitamins and so on.
12. Promotion of ecotourism and participatory eco-development support livelihood of local population.
13. 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.
14. Assess coastal biodiversity resources, ensure sustainable management, restoration of mangroves, coral reefs and wetlands and support livelihood.

The progress made under the various schemes implemented by the forest department under the 12th plan is given below.

Table No.10.1: Progress under various schemes in 12thfive year plan

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
(2406 Forestry and wildlife) (State)						
1	Strengthening of check nakas	0.00	1.16	6.46	9.98	0.00
2	Strengthening of existing wireless network	0.00	6.8	0.00	3.52	0.00
3	Supply of cooking gas	3.33	3.74	12.31	22.64	34.20
4	Joint Forest management	14.17	14.32	10.00	14.00	16.00
	Total	17.50	26.02	28.77	50.14	50.20
Centrally sponsored scheme						
1	Modern Forest fire control and management (IFPC)	23.20	5.49	8.82	0.00	0.00
2	National Afforestation programme	77.07	0.00	0.00	0.00	0.00
	Total	100.27	5.49	8.82	0	0
Total (2406 Forestry and wildlife) (State)						
1	Supply of cooking gas	11.77	19.24	6.05	29.10	80.24
2	Vidarbhvikas	15.45	12.32	11.26	11.00	0.00
	Total	27.22	31.56	17.31	40.10	80.24

Sr. No.	Name of scheme	Financial (Rs in lakhs)				
		2012-13	2013-14	2014-15	2015-16	2016-17
(2406 Forestry and wildlife) (State)						
1	Soil and moisture conservation on forests areas	0.00	28.02	0.00	0.00	11.95
2	Establishment of central nursery	0.00	0.00	0.00	0.00	10.65
3	Forest protection from fire	0.00	0.00	0.00	0.00	0.00
4	Reforestation of degraded forest (RDF)	37.17	68.28	55.30	24.35	48.59
5	Development of Forest Tourism	0.00	0.00	0.00	0.00	14.00
6	Compensation to the formers for losses caused by wildlife	0.00	0.00	0.00	5.00	0.00
	Total	37.17	96.30	55.30	29.35	85.19

(2406 Forestry and wildlife) (State)						
1	Joint forest management	49.71	53.62	22.39	20.00	25.00
2	Plantation of general use	0.00	0.00	0.00	0.00	29.69
	Total	49.71	53.62	22.39	20.00	54.69

	(2406 Forestry and wildlife) (State)					
1	Construction of Van Talao	0.00	0.00	0.00	22.34	24.40
2	Massive Afforestation programme	20.05	12.00	8.82	8.54	81.15
3	Afforestation for soil conservation	0.00	0.00	0.00	3.07	0.00
	Total	20.05	12.00	8.82	33.95	105.55

4406 Forestry and wildlife						
1	Forest Building (Repairs)	0.00	0.00	0.00	0.00	7.00
2	Soil and water conservation on forests areas	50.46	0.00	41.10	0.00	0.00
3	Forest roads & bridges (4406-4415)	0.00	0.00	0.00	20.63	26.91
4	Forest Protection from fire	0.00	0.00	0.00	0.00	0.00
5	Wildlife & nature conservation	0.00	0.00	26.42	0.00	0.00
6	Development of Forest Tourism	0.00	0.00	97.03	0.00	0.00
	Total	50.46	0.00	164.55	20.63	33.91

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CHAPTER –11

PAST SYSTEM OF MANAGEMENT

11.1: GENERAL HISTORY OF FORESTS:-

- **11 .1.1.** In the second half of 19th century, after assigning of Berar, the forests of Akola and Buldhana divisions were grouped into a single forest administrative unit. The forests of Akola were in a very much under developed condition, when the Berar was assigned to British in 1853. Unscrupulous felling, shifting cultivation, illegal hunting by the villagers of the forest and neighboring areas were in practice, resulted in degradation of forests and reduction in forest area. A regular forest administration was initiated by the Govt. after appointing of Assistant Conservator of Forests for the Berar in 1865. Initially for the first few years selection and demarcation of various reserves was carried out, for future management. Later on the Berar was split up into Northern and Southern Berar Divisions. The Northern Division was headed by Dy.C.F, whereas Southern Division headed by A.C.F. subsequently. The forest management was further systematized by the notification issued by the Revenue and Agriculture Department of the Govt. of India. The notification established the following classification of forests:-

- Demarcated State Forests.
- District Reserved Forests – Defined as land not to be assigned for cultivation.
- District unreserved forests – All other lands which were neither cultivated nor assigned for village purposes, nor included in Izara or Jagir.

In 1881 the Berar became a Conservatorship and the provincial branch of service was organized and staff was strengthened. The forests were reclassified and the classification was legally recognized in 1892 by notification under Sec. 40 (c) of Berar Forest Law. As per this classification the forest were classified into the following categories:-

A. 1. Reserves :- These areas were primarily intended for production of fuel wood and timber.

2. Woods :- Areas suitable for growing Babul.

B.1. Grass Lands :- Areas set aside for production of Grass.

C.1. Grazing Lands :- Areas reserved for pasture.

2. Open Forests :-Lands awaiting excision and until then to be treated as grazing lands.

11.1.2. This classification fairly worked well till 1900. When after famine land cost was increased and cotton prices were boosted, therefore more and more lands were brought under cultivation, resulted in reduction of grazing lands. The 'C' class grazing land could not sustain increased pressure of cattle population which compelled transfer of some of the areas either from 'A' class or from 'E' class. Some of the forest lands fit for cultivation were disforested and waste lands were afforested, and some new 'A' class reserves were formed out of 'C' class. In November 1913 'B' class reserves were transferred to 'A' class.

11.1.3. The following territorial and internal changes were taken place in the history of these forests: -

11.1.3.1. In the year of 1870 Akola forest born as a part of Southern Berar Division and A.C.F. was in charge of the Division. Later, the Southern Berar Division was divided into Wani, Washim and Purna Forest Divisions, when Buldhana forests was included in Purna Forest Division. Whereas Akola forest formed part of Wani and Washim forest divisions. Further reorganization of these forests was taken place in 1885-86 and constitutes as separate forest divisions i.e. Akola and Buldhana. In 1890 Amba-Barwa reserve was constituted. Since then large tracts of forests from the districts adjoining to Buldhana Division are transferred to Amba-barwa reserve with a view to distribute the workload and at the same time develop the area transferred and to work to the fullest capacity. These objects were not being fulfilled and resulted in transferring the restored area to their concerned divisions. Thus in 1901 the forests of Akola Division were included in Buldhana Forest Division, but restored to Akola Forest Division in 1901 and Akola Division was reformed. So much so 5139.16ha of land from Nimar forest division was transferred to Buldhana Division in March 1924. But again it was restored to Nimar Division in 1926.

11.1.3.2. In November 1929, the Forests of Barhanpur range of Nimar Division was transferred to Buldhana Division and restored the same to Nimar Division in December 1931. Such kinds of forest of Murtizapur taluka of Akola district which were a part of Amravati Forest Division in 1906 were also transferred to Akola Forest Division when it was reborn. In 1925 an internal change was effected in the division resulted in transferring the area of Palodi sub- range of Pangara range to Murtizapur range. In 1931 Pangara range was abolished and its forest distributed among the three remaining ranges Balapur, Murtizapur and Morna of Akola Forest Division. On the 1st April 1932 the Buldhana and Akola Forest Divisions were amalgamated to form West-Berar Division, having head quarter at Akola. Consequently the old Buldhana division became sub-division of the newly formed West-Berar Division. Internal changes of old Buldhana Division were effected. The Purna range of Buldhana Forest Division was split up into Jalgaon, Chikhali and Mehkar ranges. The Mohda reserve and Risod C – Class forests both were situated in Washim taluqa and Akola district were transferred to Buldhana Sub – Division in 1936 and 1938 respectively.

11.1.3.3. The area of 9382.41 ha of Jagir Forest of Bhingara, Anaya, Rohan Khindki, Salvan of Jalgaon range & Asola, Bhanosa, Shekapur of Mehkar range were abolished and declared as Protected forests on 4th June 1957 and presently they are the parts of concerned ranges. In 1957 Protected Forest of Andheri and Adan 190.39 of Aurangabad division were transferred to West – Berar Division and formed part of Chikhalwal range. In December – 1959 Washim range was newly created by splitting into the Murtizapur, Morna and Balapur ranges, which formed part of Akola Sub-Division.

11.1.3.4 In the year 1964, Akola and Buldhana Forest Division were reconstituted as per the resolution of the Govt. of Maharashtra Revenue and Forests DepartmentNo.FDM1363/5718II-J,Dated 3rd Feb- 1964.

11.1.3.5. In the year 2018 , Washim Forest Division was newly created separated from Akola Forest Division as per the resolution of the Govt. of Maharashtra Revenue and Forests Department GR WLP-0718/CR/268/F-1, Dated 4/12/2018.

Table 11.1: List of Working Plans for Akola Forest Division

S.N	Working plans in chronological order	Plan period
1	Hunt's Working Plan	1912-13 to 1941-42
2	S.A. Cornelius's Working Plan	1942-43 to 1951-52
3	S.S. Parasins's Working Plan	1965-66 to 1979-80
4	L.H. Benakatti's Working Plan	1972-73 to 1986-87
5	Thengdi's Working Plan	1994-95 to 2008-09
6	G.Rama Krishna Rao Working Plan	2009-10 to 2018-19

Chronology the working plan by which the forests of Akola Forest division were managed in the past: -

1898 to 1912 – A provisional working scheme was approved by Conservator for timber and fuel reserves.

1912-13 to 1941-42 – A Working Plan for Akola forest was prepared by Hunt.

1942-43 to 1951-52 – A Working Plan for Akola Forest of the West Berar Division was prepared by S.A. Cornelius.

1965-66 to 1979-80 – A Working Plan for Akola and Buldhana Forest Division was prepared by S.S. Parasins. Extension up to 87-88 was granted.

1972-73 to 1986-87 – Watershed Management plan for Katerpurna Catchment by L.H. Benakatti. Extension upto 89-90 was granted.

1994-95 to 2008-09 - A Working Plan for Akola forest Shri. Thengdi.

2009 to 2018-19-A Working Plan for Akola and Washim Forest Division was prepared G.Rama Krishna Rao

Working Plan prescriptions were only given to 'A' class Reserved Forests, 'C' class Reserved Forests, Protected Forests 'E' class forests acquired by department were not given any treatment in the Plan. Afforestation works in a few forest areas have been carried out outside the purview of the past plans.

11.2: PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS:-

A. Pre Working Plan period : (1865 - 1912)

11.2.1. The forests of Akola were a part and parcel of old forests of Berar. The information regarding forest of Berar is meagre before 1865, though these forests were assigned to British in 1853. During this period the importance in relation to both tangible and intangible benefits were not that much realised by the Govt. prior to 1865. Forests of Akola suffered badly from heavy illicit felling, shifting cultivation, heavy unregulated grazing, and repeated fires damaged forests to a large extent. The forests were not managed systematically up to 1865, though the forests were assigned to British in 1853. A regular and systematic working was started in the year 1865, with an object of management to give a complete rest to the forest from felling and to ensure protection against fire and grazing.

11.2.1.1. Prior to 1865 these forests suffered badly from heavy illicit felling, over grazing and uncontrolled grazing. A regular and systematic working started in the year of 1865 with an object of management to give complete rest to the forest from felling and to ensure protection against fire and grazing. 'C' class Reserve Forests suffered to a great extent than that of 'A' class forests. In 1891 departmental fellings were carried out in some of the regions in order to improve the crop conditions. In 1896 it was thought necessary to manage these forests on silvicultural lines to meet the increased demand of timber and firewood. Accordingly in 1898 simple Provisional Working Schemes for period of 5, 10 and 15 years were approved by the Conservator of Forests and were introduced in greater portions of the timber and fuel wood reserves. The system of treatment adopted in the Provisional Working Scheme was **"Coppice - With - Standard"**. 15 felling series were formed under the Schemes and an area of 42 Sq. miles was exploited by 1912 with fairly satisfactory result. In 1902 – 1903 some of the Babul bans of Murtizapur and Morna ranges were clear felled under the provisions of Annual Plan of Operations. Regeneration was done by sowing and broadcasting, without soil preparation after clear felling resulted in a very little success. Subsequently Agri-Silvi method was adopted to regenerate these areas, in which sowing of forest crops in lines together with field crops as it was practiced in Brushwood Working Circle of Amaravati Forest Division under its Working Plan

1902-03 was adopted for these areas of Babul forest 1903-04 and considerable success was achieved. Under this system land was given to cultivators free of cost for raising Babul plantation along with agriculture crop. Under this agri-silvi method forest crops was sown after two years of cultivation. Two lines of Babul were sown six feet apart and in between cotton and tuar were field crops. Regular weddings were carried out for healthy growth of Babul crop. The system has given very good results in raising Babul plantations.

B. Post Working plan period (1912-2009): -

The regular working plan period was started from 1912 and continued till 2009.

11.2.2. WORKING PLAN FOR AKOLA FOREST BY HUNT (1912-13to1941-42)

A systematic working plan for Akola forest was drawn by Hunt in 1912 and according to Hunt's Working Plan the following working circles were formed :-

1. Coppice Working Circle: - It covered all the 'A' class forest expect Narnala, Babul bans and Grass reserves. Treatment adopted was Coppice with Standard with a rotation period of 30 years. Cut Back Operation was prescribed. Coupes after felling were closed for grazing for 5 year and strict fire protection was introduced.

Results: - It was mentioned that the overall condition of the forest was improved due to systematic management of the forest included in this working circle. The system of Coppice With Standard resulted mainly in the increase of teak percentage and teak reproduction and spread up of teak in forest in the growing stock and some of the species like Salai forest being benefited in that direction by factors such as fire protection, regular grazing. Protection and preferential treatment given to the species. It was judged from the standing parent trees. The condition and quality of the crop was improved.

2. Improvement Working Circle: - Narnala reserve was placed in this working circle. A single felling series was formed for the entire working circle. It was worked on a cycle of 10 years. The system of treatment adopted was improvement fellings. Coupes were closed for 5 years after felling against grazing.

Results: - The regular working in this working circle on scientific lines resulted in the improvement of the crop both in composition and condition. The crop was mostly middle aged with teak as dominating species. Stringent fire protection and regulated grazing created conducive atmosphere for healthy growth of crop.

3. Babul Working Circle: - Babul forest of the entire division were placed under this working circle. The system adopted was clear felling followed by artificial regeneration of Babul on Agri-Silvicultural method. Rotation adopted was 30 years. Thinning's were prescribed in 13th, 18th and 24th years.

Results: - The system of raising Babul plantation by means of Agri-Silvi method proved successful.

4. Fodder reserves: - In order to supply grass, fodder reserves were ear-marked and set aside. Grazing of cattle was also permitted under the orders of Divisional Forest Officer from the 1st February to the 31st of May.

11.2.3. WORKING PLAN BY CORNELIUS FOR AKOLA FORESTS OF WEST BERAR DIVISION (1942-43 to 1951-52)

Hunt's plan for Akola Forest Division was replaced by the Working Plan of S.A.Cornelius in 1942-43. Before preparation of plan inspections of the area were carried out and stock mapping was done in 1939-40 by the Working Plan party. As per Cornelius Working Plan the following Working Circles were formed: -

I. Coppice With Reserves Working Circle: - All the workable forest for timber and fuel wood were included except Babul reserves. In this Working Circle the Silviculture system adopted was **"Coppice with Reserve".** Rotation period was fixed at 40 yrs. The method of treatment prescribed was clear felling in fully stocked and well stocked patches of low quality. All under stocked and open patches were excluded from felling except removal of dead and dying trees departmentally. Thinning's were prescribed in well grown patches and in better quality areas. Subsidiary silvicultural operations such as removal of brush wood and Lantana

interfering with coppice growth. Cut Back Operations were prescribed to remove damaged coppice and broken trees, felling of unfelled, unreserved trees, climber cutting, etc. Mid-rotation thinning's were prescribed for suitable areas for all Felling Series except Nimbhi, Chahogaon, Wagha, Rui and Palodi. A double grazing closure was prescribed one after main felling and the other after mid-rotation thinning.

Results: - During the implementation of the Plan overall crop condition was improved. Advance fellings in Coppice with Reserve Working Circle were carried out to meet the over requirement due to over supplies and increased demand of timber for building construction and industries. Timber prices shoot up appreciably in the market.

II. Babul Working Circle: - All the Babul bans of the entire division were included. In this Working Circle system adopted was clear felling followed by sowing of seeds in rows 18 feet apart under Agri-Silvi method. In 3rd year after permitting the raising of agriculture crop in the 1st two years was prescribed. Rotation period was fixed at 30 years. Thinning prescribed in 6th, 11th and 21st year from the year of lease. To induce natural regeneration in coupes, which were not purchased by contractors, departmental strip felling in strips on a chain width were prescribed. Restricted grazing i.e. one cow unit per acre was permitted in the first seven years. Sheep and goats were not permitted.

Results: - In Babul Working Circle the system adopted to manage Babul bans proved successful. Overall condition of the crop was improved.

III. Bamboo Working Circle (Partly Overlapping):- Annual coupes of Bamboo Working Circle were managed on 4 years cutting cycle and accordingly Bamboos were cut and extracted from annual coupes.

IV. Miscellaneous Working Circle:- Enumeration, thinning of Sandal trees were prescribed on 5 year circle. This prescription seems to have been followed during early years of the period of the plan.

V. Pasture Forests:- Very open unworkable areas mainly of the mixed Anjan (*Hardwickiabinata*) type was included in this working circle. Total forest included in this Working Circle was divided into different grazing series and each grazing series was divided into 4 grazing groups which were to be closed on rotations. Closers were fixed for 3 years. Thinnings were prescribed to open up canopy in dense patches for improving the grass crop.

VI. Supply to Defense Department :- Due to Second World War lot of advance fellings were carried out in the forest of this division. For supply of war material between 1941 –42 to 1945-46 only teak bullies and Salai wood was supplied to Defense Department. These advance felling were carried out mainly in the coupes of Coppice with Reserve Working Circle. The material supplied to Defense Department year wise is given below.

TABLE NO. – 11.2

THE MATERIAL SUPPLIED TO DEFENCE DEPARTMENT YEAR WISE

Sr. No.	Kind of Timber	1941-42	1942-43	1943-44	1944-45	1945-46
1	Teak Ballies	900	15,125	18,875	10,500	2,000
2	Round Salai logs cft	Nil	4,602.8	2,591.7	Nil	Nil
3	Round Babul log cft	Nil	Nil	Nil	603.4	Nil
	Total : -	900	197278	21446.7	11103.4	2,000

The demand for timber was multifold due to war supply, building, construction, and industries resulted in shortage of timber in the market, consequently prices rose appreciably.

Results:- Closer to grazing was effectively carried out but thinning was not done anywhere as prescribed in the working plan.

11.2.4. WORKING PLAN FOR AKOLA AND BULDHANA FOREST DIVISIONS BY SHRI. S.S. PARASNIS (1965-66 to 1979-80) (EXTENDED UPTO 1987-88):-

In this plan 'A' class Reserve Forests were dealt with. These forests were Stock mapped. Enumeration, Stem analysis and Stump analysis were carried out in Buldhana Division. The 'A' class forests of 56831.61 Ha of Akola Division were included. As per the Working Plan of Shri. S. S. Parsnis the following Working Circles were formed: -

I. Coppice with Reserve Working Circle: - All the Miscellaneous forests with inferior teak forests capable of producing timber and fuel wood were included in this working circle. Small patches of better-quality teak areas, which could not be conveniently separated and put under separate working circle have also been included. Rotation period was fixed at 40 years and harvestable girth was kept at 61 cms. 26 felling series were formed. The Silviculture system adopted was "**Coppice with Reserve System**". Total area included in this working circle was 44737.35 Ha. Regulation of yield by area. Under this system protection and unworkable areas form improvement fellings and thinning's. In better stocked area heavy fellings were prescribed. Prescriptions were made to reserve some of the trees i.e. 1) Trees required for protection purpose, 2) Trees required for seeds and other silviculture purpose, 3) Healthy edible fruit and flower bearing such as Mahua, Tendu, Char, etc., 4) Sandal trees. For treatment purposes the entire coupe area was divided into A,B,C and D. Subsidiary silvicultural operations like Cut Back in the year after main felling of the coupe. Cleaning in the 6th year of main felling, mid rotation thinning i.e. 20 years

after main felling and other operations like any growth badly affected by fires will be cutback.

Results: - Due to improper implementation of prescriptions the CWR forests have suffered from deterioration. Deterioration of quality and quantity of forest is mainly due to heavy illicit felling, uncontrolled grazing, and negligence in coupe closer fire line burning. In addition, the coppice regeneration was not up to mark due to faulty implementation of prescription and biotic pressure. In Chinchkheda, Patur part, Shedana part, Palodi part, Wagha, Rui, Karanja and Khowsdri Felling Series most of the forests reduced to malformed and crooked young pole crop. Teak maintains to be principal species constituting upto 80% of the crop. The crop is young to middle aged, old crop can also be seen in remote parts of Chikhalwal and Palodi Felling Series. Most of the area being worked under coppice system approximately since last 100 years therefore the coppice growth was unsatisfactory which resulted in further deterioration of crop.

II. Babul Working Circle: - All the Babul bans of Akola and Karanja ranges were included in this Working Circle. Total area included in this working circle was 2266.14 Ha. 5 felling series were formed. Principal species of the crop is Babul (Acacia Nilotica). The system of regeneration adopted was clear felling followed by A.R. through Agri-Silvi method. Rotation was fixed at 30 years. Telia verity of Babul was preferred in plantations. Other species prescribed in regeneration was Prosopis, Khair, Shivan, Neem and Sirus. Yield was regulated by area. Subsidiary silvicultural operations prescribed were three weeding in 1st year, two in 2nd year, two in 3rd year. Thinning's were prescribed at 6th, 11th and 21st year.

Result: - Babul bans are located nearby villages or during Agriculture fields. These forests have been subjected to heavy biotic pressure since their locations are near to habitations. The scientific management of the Babul bans has been discontinued

since 1974-75 due to repeated failures of Babul plantations. Most of the Babul bans are reduced to shruby forests. Natural regeneration of Palas, Khair, Bharati, Babul can be seen. These areas have been subjected to heavy grazing and illicit felling.

III. Open Pasture Working Circle: - All open forests of Akola Sub Division which are not capable of producing of timber and fire wood and where the demand of grazing is heavy are included in this Working Circle. Total area included in this working circle is 1659.65 Ha. These areas were treated under rotational grazing system for improvement of palatable grasses and introduction of superior fodder grass species and leaf fodder species. Grass coupes were closed to grazing and sold on rated passes. After removal of grass. Limited numbers of cattle were permitted from 1st December to the discretion of Divisional Forest Officer in times of scarcity.

Results: - In this Working Circle no noteworthy improvement in the quality and quantity of stocking observed. Areas were subjected to heavy grazing pressure. Some of the areas planted with misc. species in the past but most of the plantations failed. The prescriptions of Working Plan such as periodic coupe closure, fire control, grazing control, protections were not followed scrupulously.

IV. Fodder Working Circle: - All the fodder reserves which are locally known as *Ramanas*, included in this Working Circle. Total area included 6354.21 Ha. These areas set apart for production of fodder grass both in quality and quantity. The main object of management is to improve grazing and providing periodic rest to these areas. 1) To achieve improved quality and quantity of fodder grass. Periodic burning of grass ramana's once in 5 year was prescribed. 2) It was also prescribed to sow the seeds of high fodder yielding grasses such as Paunya, Sheda, Mushan, Marvel. 3) Heavy opening of the growth interfering with growth of grass, 4) eradication weeds and climbers, 5) Introduction of leafy fodder species such as Anjan, Moyen, Pipal etc.

Method of harvesting prescribed was cutting and removal of grass based on leases sold in open auction annually to Gram-panchayat or public bodies as per the rules prescribed by the Government.

Results: - The areas are further deteriorated due to heavy biotic pressure. The prescriptions of Working Plan were not followed in toto. Misc. plantations were taken up in some of the areas but their results were unsatisfactory. The deterioration of these areas is mainly due to biotic pressure and adverse climatic conditions.

V. Bamboo (Overlapping) Working Circle: - All the important and workable Bamboo bearing areas were included in this Working Circle and comprises of 13 felling series. Natural Bamboo areas mostly confined to Narnala reserves of Akola range. Main species of Bamboo occurring Dendrocalamus Strict us, some of the successful old plantations were also included. Method of treatment adopted was periodic thinning's to obtain maximum yield without considering the vigour of Bamboo clumps and allow their future development. 4 year cutting cycle was adopted. Bamboo plantation up to 5 Acres in suitable areas was prescribed in all ranges.

Results: - Natural Bamboo is on the verge of disappearance. The plantations are very young and they have not put on growth as per their age. Post planting operations of Bamboo were neglected due to this proper clump formation was not taken place.

VI. Sandal (Overlapping) Working Circle: - Areas of old Sandal plantations and some of the suitable areas for raising Sandal were included in this Working Circle. Total 10 Felling Series were formed in Akola division. Each Felling Series was divided into 5 coupes A, B.C.D and E to be worked on a 5-year cycle. Tending of young crop and harvesting of dead trees were prescribed. Plantation of at least 2 Acres in each coupe was prescribed. Artificial regeneration by means of dribbling of Sandal seed on suitable localities where the host plants are available. Cultural operations such as 1) Removal of dead and seriously diseased trees, 2) Cleaning and lopping of branches of other trees in favors of Sandal growth, 3) Heavy thinning's in natural Sandal reproduction areas, 4) Climber cuttings over entire Sandal bearing areas.

Results: - These trees were subjected to heavy illicit felling. The prescriptions of Working Plan were not followed scrupulously.

VII. Miscellaneous Working Circle: - Forest villages and a few such compartments which were not allotted to any Working Circles included in this area. Narnala forest area in Akola range was maintained as conditional game sanctuary was included in this Working Circle. Area of Misc. Working Circle was 1168.10 Ha.

11.2.5. WATERSHED MANAGEMENT PLAN BY SHRI. L.H.BENNAKATTI (1972 - 73 to 1986 - 87)

This special plan includes 3080.71 Ha of 'A' class forest in the catchment of Katepurna river valley project. 4 Felling Series were constituted i.e. portion of Ansing, Pangra, Shakharvira and Chohogaon. The total area covered in this plan was 10978.24 Ha. including 279.66 Ha. of 'C' class Reserved Forests. The treatments prescribed (in this plan) for various areas of the plan are as follows: -

I. Improvement Working Circle: - Total area included in this Working Circle is 10551.48 Ha. The 'A' class Reserve Forests capable of producing timber and fuel wood were included in this Working Circle. 15 Felling Series were constituted out of this Working Circle. Each felling series was divided into 15 coupes. Plantation works were proposed after clear felling at suitable areas. Intensive soil conservation measures along with afforestation works were proposed. Subsidiary silvicultural operations prescribed were CBO, Cleaning, etc. Closers of coupe was prescribed for 7 years.

II. Pasture Working Circle: - Compartment number 400 of 'A' class Reserve Forests and the remaining 'C' class area were included in this Working Circle. Preventive measures against soil erosion such as soil working, broadcasting of seeds of soil binders, fertilizer application, grazing closure, etc. were prescribed for improvement.

11.2.6. REGULATION OF GRAZING: - In the past unrestricted grazing have always allowed in 'C' class forests where as in A and B class forest controlled grazing was permitted up to 1912 – 1913. Grazing was prohibited in all 'A' class forests when first constituted as State Reserves but in 1884-85 light grazing excluding sheep and goats was allowed and it continued up to 1888 – 89. Due to famine in the year 1899 – 1900 all reserves were thrown open to grazing and it was continued up to 1904 – 05. Since 1907 steps were taken to gradually reduce, number of cows and bullocks admitted to the extent of permissible limit i.e. 1 cow or 1 bullock to every 1.5 acres of area of 'A' and 'B' class forest. Buffaloes, goats and sheep were totally excluded from grazing in forest. Exploited coupes of all felling series were closed for 10 years. In Babul Working Circle under regeneration prior to Hunt's Plan of 1912, cows and bullocks were allowed to grazing @ 1 animal for every 2 acres.

Prescriptions regarding grazing in Cornelius Working Plan introduced from 1942-43 for Akola Forest Division.

11.2.6.1. The following clauses to grazing were prescribed: -

(i) **Coppice with Reserve Working circle:** As per the prescriptions of Cornelius working plan all the parts of this Working Circle were closed for grazing for five years after main felling, and for another five years after thinning at mid rotation.

(ii) **Babul Working circle:** Restricted grazing was allowed for a period of 7 years in all the coupes after first felling. The incidence of grazing was permitted one cattle per head for a hectare. Other than cows and bullocks were not permitted.

(iii) **Grazing regulation in Pasture Forests: -** Pasture forests which contained very open forests, unfit for regular felling of timber and fuel trees were worked in the interest of grass production and grazing. In order to improve the pasture the areas were given a periodic rest from grazing. Each Pasture Series was divided into each of four coupes, each of which was closed for grazing for three years.

The Divisional Forests Officer was permitted to open any time the following closed areas to grazing within the periods mentioned below: -

(a) Unregenerated coupes closed to grazing (after mid- rotation) from 1st December to 15th June with a restriction in which buffaloes were not permitted.

(b) Fodder reserves not leased for cutting for grass or grazing from 1st April to 15th June.

(c) Pasture coupes closed to grazing from 1st December to 15th June.

All the A – class reserves of Akola were divided into 96 grazing units. The maximum number of cattle to be allowed in each grazing units were fixed and the number were not be exceeded without the prior permission of the Conservator. The numbers of cattle were fixed village wise and list was published. In filling vacancies preference was given to cattle coming for daily grazing from the adjoining villages. Goats and sheep were not allowed to graze in any of the above mentioned Working Circles.

The forest areas were categorized as per the guidelines for grazing control in Madhya Pradesh Government Memorandum No.605-284-XV- of 19th July 1933 under the Plan prepared by S.A. Cornelius for Buldhana and Akola Forest. The classification was as below: -

TABLE NO. – 11.3

Range	**Tree Forests**		**Scrub forests**		**Other forests**	**Total**
	A (i)	**A (ii)**	**B(i)**	**B (ii)**		
	Moist type	Dry type	Pasture	Open Pasture		
Medsi	--	42,578	4,072	897	2,469	50,016
Akola	--	15,224	5,228	--	9,286	29,738
Karnja	--	14,619	--	1,802	12,400	28,821
Washim	--	24,496	4,322	1,402	1,636	31,856
Total	**--**	**96,917**	**13,622**	**4,101**	**25,791**	**1,40,431**

11.2.7. WORKING PLAN FOR AKOLA FOREST DIVISION BY SHRI. THENGDI (1994-95 to 2008-09) :-

The forest of Akola Division was divided into 6 Working Circles in Thengdi's plan.

1. Conversion to High Forest W.C. (17694.80 ha)
2. Afforestation W.C. (33552.48 ha.)
3. Catchment W.C. (18878.64 ha)
4. Babul W.C. (21807.71 ha)
5. Fodder W.C. (7702.64 ha)

The prescriptions for different working circle and their impact are given below.

1. Conversion to High Forest W.C.: - In this Working Circle the forest earlier worked under Coppice with Reserve system, having density more than 0.4, with general site quality IVa and IVb were included. The crop is dominated by Teak with minimum 60%, sometimes up to 80% with its natural associates like Anjan, Salai, Moyen, Ain, Dhawada, Lendiya, Kalam, etc. In general the crop was young to middle age. Natural regeneration was inadequate but fairly satisfactory in some patches of forests and the crop had stunted growth because of loss in coppice vigour due to repeated management under coppice system. The felling cycle was fixed at 15 years and the harvestable girth was fixed at 75 cm GBH. Total area allotted to this working circle was 17694.80 ha which was approximately 17.75 % of total area. This working circle was divided into 17 felling series with 15 coupes of each felling series. Yield was regulated by area. For working, coupes were divided into **A)** Protection Area, **B)** Understocked or blank area, **C)** Pole crop and Old plantation area, **D)** Well stocked areas. 50% of total teak trees above harvestable girth were to be marked for felling. Intensive soil and moisture conservation works based on watershed management were suggested like Nalbinding, Contour trenches, Check dams etc. Natural regeneration and improvement operations followed by artificial generation were prescribed.

Results: - Out of 17 coupes due in every year and the majority of coupes were not worked during the prescribed year therefore the prescriptions were not properly followed. The reconnaissance survey reveals that there is no considerable change or improvement in crop quality and composition.

2. Babul Working Circle: - In this Working Circle 1987.39 ha. area scattered in 100 small patches ranging from 2 ha to 50 ha, previously managed under Babul working circle has been included in this working circle. Main species was Babul (Acacia Nilotica) the crop was young to middle aged and in many patches the natural regeneration is almost absent. 5 Felling Series with 15 coupes each were formed. Rotation period was fixed at 30 years and expected girth aimed at 60 cms at G.B.H. Yield was expected in good patches of Babul crop. Silviculture system adopted was improvement felling supplemented by A.R. Cutting Back Operations, cleaning and thinning operations were prescribed in subsidiary silvicultural operations. Soil and moisture conservation measures with AR were prescribed.

Results: - 1. These areas were very much subjected to biotic pressure such as illicit felling, grazing, encroachment and other human interference as these patches are situated in the midst of agriculture fields or adjoining to villages.

2. Most of the Babul ban patches were not at all worked as per the prescriptions of Working Plan. Therefore the prescriptions were not followed. In some of the Babul bans patches plantation activities were taken up with Prosopis and other misc. species rather than babul, which clearly indicates about total deviation of prescriptions.

3. This Working Circle has been neglected from the management point of view, which resulted in further degradation of Babul ban patches.

3. Afforestation Working Circle :- In this Working Circle the under stocked patches of less than 0.4 density of forest having site quality IVb with adverse soil conditions without any organic material have been included. The forests were previously managed under CWR and some of the 'C' class forests were included. Areas with blank and degraded forest deficient of natural regeneration were included. 33552.48

ha. and about 43.57% of the total area was included in this Working Circle. Intensive soil and moisture conservation measures and plantation activities were prescribed.

Results:- It is observed in the field that Afforestation works were not taken up as per schedule given in the Working Plan and the method of Ecological Index was not at all applied to decide number of plants in plantation. Therefore the prescriptions had not been implemented properly. The subsidiary silvicultural operations were not given required attention. The field visits show that most of the plantations in the Division do not come to the level of expected success due to grazing, fire and wrong selection of site and species.

4. Catchment Working Circle:- In this working circle forest areas previously managed under CWR were included. The forest areas falling in the catchments of irrigation projects had been allotted to this working circle. The site quality was IVb. The crop density varies from 0.4 to 0.6, at some places is above 0.6. In this 18878.64 ha area that constitutes 21.25% of area of the Division had been included. 16 Working Series with 15 coupes each were formed. No felling was prescribed. Drainage treatment and intensive soil and moisture conservation measures on the basis of watershed management were prescribed. Improvement of natural regeneration supported by artificial regeneration wherever necessary. Subsidiary silvicultural operation like thinning, cleaning were prescribed.

Results :- 16 coupes became due for working every year and the majority of these coupes could not be worked as per the prescribed schedule. It is observed during the field visits that many coupes were declared as unworkable as there is no yield was prescribed. It is interesting to note that other prescriptions given were also neglected without paying any attention.

5. Fodder Working Circle: - The grass lands previously managed under the same system were included in this Working Circle. The areas are open with grasses such as Kushal, Burbushi, Sheda, Paunya, Marvel, Mushan, etc. 7702.64 ha area was included with 69 Ramnans. Treatment prescribed was effective protection from grazing with wire fencing or trenches. Extensive soil and moisture conservation measures were also prescribed and the whole area was to be covered in 20 years.

Results: - No area was fenced with barbed wire. There was no working done as per the prescriptions in coupe, due every year. Cut and carry of grass were not followed as stall feeding is not common in this area. The area was subjected to frequent fires and unregulated grazing which further deteriorated the grass reserves.

11.2.8. WORKING PLAN FOR AKOLA FOREST DIVISION BY G. RAMA KRISHNA RAO (2009 to 2018-19): -

The forest of Akola Division was divided into 6 Working Circles in G.RAMA KRISHNA RAO's plan.

1. Selection-cum-Improvement W.C.**:**17694.80 ha)
2. Afforestation W.C. : (33552.48 ha.)
3. Catchment W.C. :(18878.64 ha)
4. Babul W.C. :(21807.71 ha)
5. Fodder Improvement W.C. :(7702.64 ha)

The prescriptions for different working circle and their impact are given below.

SELECTION CUM IMPROVEMENT WORKING CIRCLE

- Majority of these areas were managed under Coppice with Reserve Working Circle (CWR), SCI Working Circle, Miscellaneous Working Circle, Plantation Working Circle, Fodder Reserve Working Circle and Pasture Working Circle in the previous management plan. These forests were characterized by both good quality as well as degraded forests mixed. These forests were capable of yielding good quality of timber, small timber and fuel wood. The basic aim of management was to improve the condition of the crop by tending natural regeneration and supplemented it by artificial regeneration where ever necessary. In good quality patches, matured trees were to be harvested (above exploitable girth) if the trees were available silviculturally. Therefore, the harvestable girth was kept at 75 cm at breast height in the teak trees for site quality IV. Subsidiary silvicultural operations like CBO,

cleaning and thinning were also prescribed. Suitable soil and moisture conservation works were advocated to improve the site quality and crop condition.

- A total of 114compartments were allotted to this working circle and these compartments were divided into 23 felling series having 20 coupes in each one of them. The average coupe area was around 84 ha.

RESULTS:

It is seen that the prescriptions were exhaustive and conservation oriented. Though there is considerable quantity of seed origin crop, Working plan did not differentiate between seed origin and coppice origin teak, prescribing same harvestable girth for both seed origin and coppice origin teak trees. Seedling origin teak trees will be retained as seed bearers.

- Predominantly area consists of teak forests (about 60%). The other tree species include Dhawda *(Anogeissuslatifolia)*, Ain (*Terminaliatomentosa)*, Lendia (*Lagerstroemia parviflora)*.
- Natural regeneration is very poor.
- Soil and moisture conservation works were carried out which helped in survival of the planted seedlings.
- The survival percentage of the last five year plantation is about 65%.
- Out of total 190 coupes, due for felling only 103 coupes worked, and 48 Coupes were not worked due to sparse growth and 39 coupes could not be worked as they fall within 10km. radius of protected areas.
- Sequence and distribution of coupes in a felling series is haphazard, scattered in different compartment and without taking into account practical aspects of implementation.

AFFORESTATION WORKING CIRCLE

This working circle consisted of major portion of 'C' class reserve forests which were previously managed under various working circles, CWR, Miscellaneous, Pasture and Plantation working circles. In Gupta's plan these areas were under the treatment afforestation working circle. The governing aim was to improve the

vegetation cover both in quality and quantity and to meet local demands of small timber, fuel wood, fodder and other forest produces by undertaking plantations in degraded under stocked and blank areas.

RESULTS:

Teak, Khair, Bamboo, Neem, Awala, Behada, Karanj etc. were planted in these plantations. Though, most of the plantations are good in survival but growth of plants not satisfactory. It is also observed that considering the pressure from grazing, percentage of teak and non-browsable species have to be increased to achieve success in respect of survival and growth. Bamboo plantations have suffered greatly due to wild boar. Deep planting coupled with judicious and timely SMC works would ensure good growth.

CATCHMENT AREA TREATMENT WORKING CIRCLE

The forest areas falling in the catchment areas of irrigation, drinking water projects and directly draining into water bodies or reservoirs were included in this working circle. These areas were previously managed under Coppice with Reserve, Miscellaneous, Plantation, Fodder and Pasture Improvement Working Circles. The idea of creating this working circle was to prolong the life of irrigation as well as drinking water projects by controlling soil erosion and siltation in the reservoirs. Treatment of catchments included soil and moisture conservation measures, drainage treatment and improving vegetation cover to prevent soil erosion and to check run off in the catchment areas. The density of the forest varied from 0.1 to 0.6 and the crop mostly young to middle aged. The site quality in general confirmed to IV B. The special objects of management were -

- 1. Intensive soil and moisture conservation works to check the soil erosion and to arrest the runoff in the forest catchment areas.
- 2. Effective drainage treatment to check the silt flow into the water reservoirs. To preserve and increase vegetal cover through appropriate treatment to enhance the ground water table. A total of 76compartments were allotted to this working circle and these compartments were divided into 13 felling series.

RESULTS:

- Out of 60 coupes felling in 04 coupes could not be carried out as they fall within 10 km radius of protected area.
- Out of balance 56 coupes only 2 coupes were worked, 54 coupes remained unworked.
- Soil and Moisture Conservation works were carried out as prescribed in Working Plan.

BABUL WORKING CIRCLE

- All couples were subjected to restricted grazing for a period of seven years, after the first felling and the grazing incidence kept one head per acre. Cattle other than cows, bulls and bullocks were not permitted.
- **RESULTS:**
- Prescriptions given were not followed strictly but efforts were made to plant the fire wood species.

FODDER IMPROVEMENT WORKING CIRCLE

- This working circle included open and sparsely stocked areas not capable of yielding timber. These areas were managed under Miscellaneous, Plantation, Pasture Improvement, in the previous plans. In Gupta's plan these areas were allotted to fodder reserve working circle. The extent of area allotted to this working circle was 1680.90 ha. The basic aim to constitute this working circle was to raise good fodder species to meet the fodder demand for cattle population of local people.

RESULTS:

- Prescriptions given were not followed strictly but efforts were made to plant the palatable grasses.

11.3: SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN:

Some special works of improvement in the management of forests have been taken in the last few years. Notable among these are GR No.FDM2011/C.No.100/F2, dt.05/10/2011 implicating the Tendu Contractor in case of a fire happening in his jurisdiction which has resulted in the dramatic decrease in incidences of fire.

11.3.1: Information technology:- Maharashtra Forest department has been deploying information and communication technologies for better forestry management. The main objective is to systematically organize planning, implementation and monitoring of forestry and other related operations by systematic collection, storage and retrieval of MIS and Geospatial data through a computer based communication network. This will not only bring transparency, responsibility and accountability but will also enhance efficiency. These initiatives plans to achieve its objective by using ICT to set up e-Governance framework for information availability and tracking of forestry related activities across the supply chain while involving citizens, villagers and other stakeholders in the entire process. Maharashtra Government has taken decision of computerisation of state's Forest department vide Resolution dated 05.10.2011. Accordingly, infrastructure was developed to connect all offices from beat guard to head quarter of Maharashtra Forest department, Nagpur and Mantralaya, Mumbai by LAN and internet connectivity. IT cell has been developed at headquarters in Nagpur equipped with computers and independent server farms. A consultant has been appointed to bridge the technical component and IT savvy personnel have been appointed to develop various applications required for forestry activity and services.

11.3.2: PDA (Personal Digital Assistant):- In Akola forest division a total of 26 PDAs were distributed to the staff of the division pre-loaded with applications on offence reporting, fire incidences, beat checking, etc. in which incidences of fire and other illicit activities can be tracked more accurately with geo-tagged photos and Lat-Long details. This helps in capturing real time data and monitoring forestry activities. The application enables registration of offence, taking photograph of seized material and also of offender, if any.

11.3.3: Plantation using PMIS/NMIS:- Plantation Management Information System (PMIS) captures district-wise, taluka-wise, and village-wise data for registration of plantation sites. Most of these sites are geo-tagged. These sites are tagged with the department's existing Nursery Management Information System (NMIS) to support adequate seedling stock. The application has also been integrated with the department's existing plantation management application system to address future monitoring of plantation activity.

11.3.4: Greening of Maharashtra (50 crore plantation programme): Maharashtra Government has started the 50 crore plantation programme from 2015-16 to 2019-20. During the implementation of this programme, lot of emphasis has been given for involving the public across all walks of life and also other line departments have been involved in addition to Forest department. This programme has created a big people movement for Greening of Maharashtra. Lot of enthusiasm is seen among all stake holders in this mission.

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

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

11.3.7: Soil and moisture conservation works: Maharashtra Government also started the Jalyukta-Shivar programme for taking up intensive soil and moisture conservation works. Under this programme, lot of SMC works have been taken in this forest division. These works will definitely help in improving the soil-moisture regime of the area in long run.

11.3.8: Improvement in Communication Roads: - Forests are fairly well connected to main metalled roads by cart tracks and fair whether roads. For the improvement of

communications short lengths of *ghat* roads have been constructed in some of the reserves in the past. Minor repairs to roads maintained by Forest Department are carried out annually.

11.4: PAST YIELD AND REVENUE:

The details of yield and revenue realized during the past ten years are given in the table below.

Table No.11.4: Past yield and revenue realized.

Sr. No.	Year	Timber		Firewood	
		Quantity (m^3)	Revenue (Rs.)	Quantity (m^3)	Revenue (Rs.)
1	2009-	620.251	11625330	21.500	56600
2	2010-	99.036	3918000	18.019	96300
3	2011-	792.272	21005140	36.203	70500
4	2012-	681.062	18283150	26.400	62300
5	2013-	758.937	22650130	22.470	58200
6	2014-	375.375	10064150	15.600	52200
7	2015-	560.05	15772250	22.176	118900
8	2016-	275.313	8509950	17.500	40300
9	2017-	427.069	14853000	13.500	32500
10	2018-	346.220	10398545	14.600	11000
Total		**4935.585**	**137079645**	**207.968**	**598800**

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CHAPTER-12

STATISTICS OF GROWTH AND YIELD

The main species in Akola Forest Division is Teak. The Local Volume Table (Round Timber) for Teak site quality IV as prepared during stem analysis, which was carried out for preparation of previous Plan in 2009is given below.

TABLE NO. 12.1

Local Volume Table (Round Timber) For Teak (All India Teak Site Quality IV)

Sr. No.	Girth Class cm	Volume in cum
1	15/30	0.014
2	30/45	0.055
3	45/60	0.095
4	60/75	0.165
5	75/90	0.280
6	90/105	0.435
7	105-120	0.555

12.1: 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 Akola 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

Sr. No.	Working Circle	Total Area in Ha.	Avg. Growing Stock per ha(m3/ha.)	Total Growing Stock (m3)	Total Carbon Stock (Metric tonnes)
1	Improvement Working Circle	15120.27	59.17	894666.376	268400.181
2	Afforestation Working Circle	17445.41	80.20	1399121.882	419736.984
3	Fodder Improvement Working Circle	5173.36	14.30	73979.048	22193.737
Total		**37739.04**	**51.22**	**2367767.306**	**710330.902**

CARBON SEQUESTRATION AND MITIGATION:

In this plan an area of17520.26ha. is proposed under AFFORESTATION Working Circle which is to be implemented during the plan period. This will add to the forest cover of the division and contribute to the carbon sequestration. of the forest. Natural regeneration prescribed in the plan will also add biomass and carbon in the form of vegetation.

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 (50) and they were analysed for Soil Carbon. The range of soil carbon varied from 0.4% to 4.4%.

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 Akola District taking the C-values of the Tropical Dry Deciduous Forests for the state of Maharashtra were extrapolated for this calculation.

12.1.1: 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 stores in rocks, sediments, swamps, wetlands, forests, forest soil, grassland and agricultural. 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 serous 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 (giga tonnes of carbon per year) and are still increasing.

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 it 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 CO2fertilization 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 windstorm 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.

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, defaults 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 sub-categories 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.

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.

Table No. 12.3: Three IPCC tiers and data requirements

Tier	Data needs /examples of appropriate biomass data
Tier 1	IPCC default factors: Default MAI (for degradation) and/or forest biomass stock (for deforestation) values for broad continental forest types – default values given for all vegetation – based pools.
Tier 2	Country specific data for key factors: MAI and/or forest biomass values from existing forest inventories and/or ecological studies. Defaults values provided for all non-tree pools. Newly-collected Forest biomass data is required.
Tier 3	Detailed national inventory of key C stocks, repeated measurements of key stocks through time or modelling: Repeated measurement of trees from permanent plots and/or calibrated process models. Can use default data for other pools stratified by in-county regions and forest type or estimated from process module.

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 factors 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 IPCC Guidelines (Workbook), Tier 1 methodologies usually use activity data that are spatially coarse, such as nationally or globally available estimates of deforestation rates, and 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 appropriates 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	Dead wood	Includes all non-living woody biomass not contained in the litter, either standing or lying on the ground. Dead wood also includes dead roots and stumps larger than or equal to 10 cm. in diameter or any other diameter used by the country.
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.), lying dead, in various states of decomposition above the mineral or organic soil.
Soil	Soil organic matter	Includes 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.

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. 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 is stratified into homogenous strata and samples are selected from each stratum randomly. This provides precise estimates for different strata and population. Once sample sites have been selected, established methods of biomass inventory are employed for different pools.

12.1.2: 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).

(ii)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 data have been formulated which predict root biomass based on above-ground biomass carbon (Brown, 2002; Cairns et al., 1997)

(iii) Dead Organic Matter (wood):

The DOM wood carbon pools include all non-living woody biomass and includes standing and fallen trees, roots and stumps with diameter over 10 cm.

(iv)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 cm. diameter. This pool comprises biomass in various states of decomposition prior to completer fragmentation and decomposition where it is transformed to SOM.

(v)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.

12.1.3: Forest Carbon Stock of Tropical Dry Deciduous Forests in Akola:

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:

TABLE NO. 12.5: FOREST CARBON STOCK OF TROPICAL DRY DECIDUOUS FORESTS IN MAHARASHTRA

(In '000 tonnes)

Forest type stratum	Den sity	Area in sq.km	ABG	BGB	Dead wood	Litter	SOM	Total	C Stock /ha. (tonnes)
Tropical Dry Deciduous Forests	VDF	4707.9	29331.3	11517.2	215.7	3134.0	27713.2	71911.5	152.75
Tropical Dry Deciduous Forests	MDF	10351.4	61047.4	23970.9	152.6	773.5	57679.5	143623.9	138.75
Tropical Dry Deciduous Forests	OF	10804.3	12816.5	5032.5	142.1	343.0	49471.8	67805.9	62.76
Total		**25863.6**	**103195.2**	**40520.6**	**510.4**	**4250.5**	**134864.5**	**283341.3**	**118.08**

The Forests of Akola Division mainly falls in Tropical Dry Deciduous Forests. Based on above data for forest type of Tropical Dry Deciduous Forests in Maharashtra, the Carbon Stock in Akola Forest Division is calculated to be as under:

TABLE NO. 12.6: FOREST CARBON STOCK IN AKOLA FOREST DIVISION

(In 253220'000 tonnes)

Forest type stratum	Den sity	Area in sq.km.	ABG	BGB	Dead wood	Leaf Litter	SOM	Total	C Stock /ha. (tonnes)
Tropical Dry Deciduous Forests	VDF	11.00	28.32	11.90	0.37	5.66	45.66	91.91	83.55
Tropical Dry Deciduous Forests	MDF	108.44	204.98	86.10	1.50	4.69	346.87	644.14	59.40
Tropical Dry Deciduous Forests	OF	220.93	397.85	167.20	2.85	13.35	1214.90	1796.15	81.30
Total		340.37	631.15	265.20	4.72	23.70	1607.43	2532.20	74.75

Thus, the Akola Forest Division holds/ stores 2532.2 tonnes of Carbon in its forests at an average of 74.75 tonnes/hectare. This data can be used as the baseline data for the future monitoring of the Carbon stock in the District/Division.

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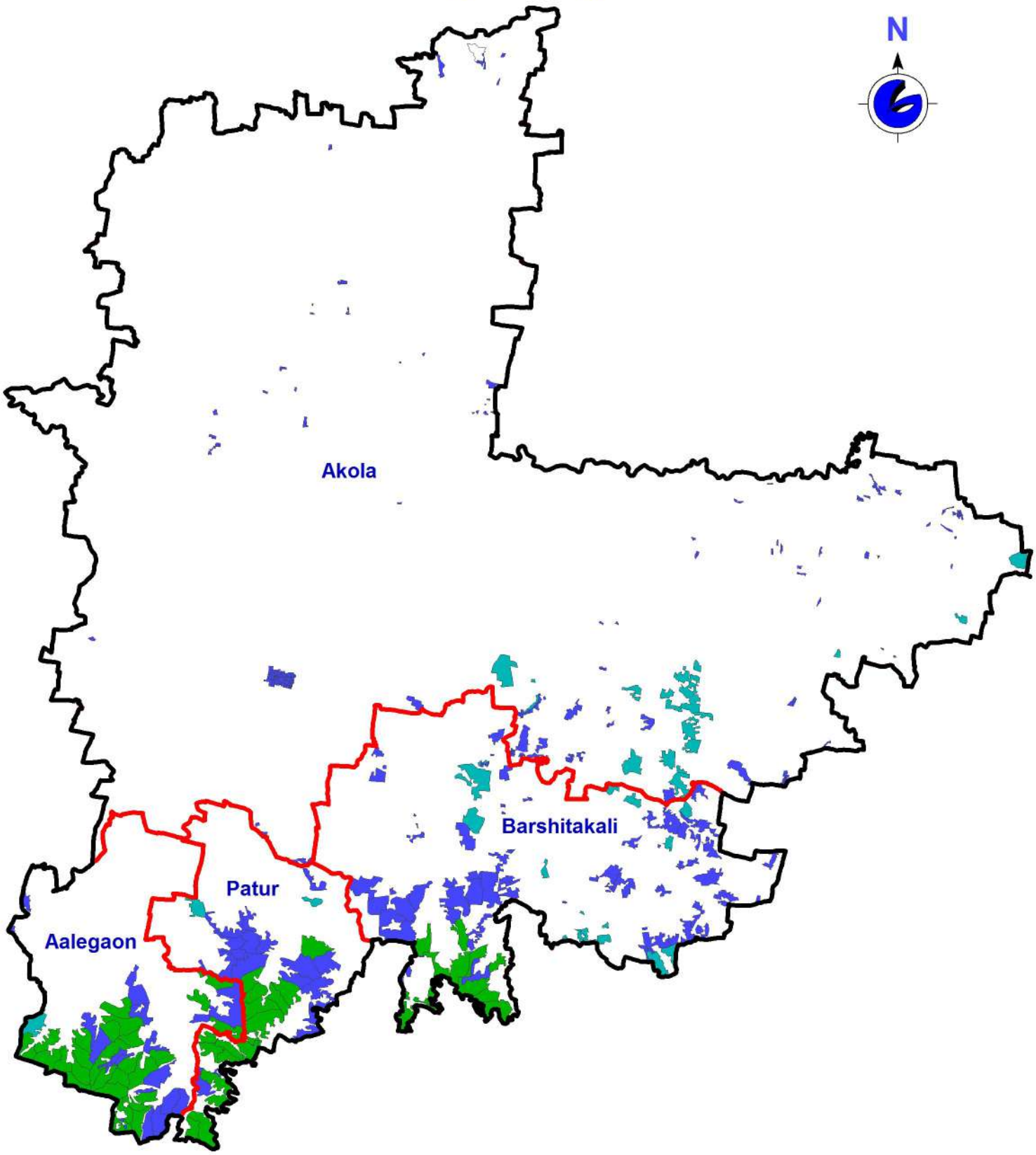
Part - II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

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Akola Forest Division, Akola

Showing Working Circle



Legend

- Division Boundary
- Range Boundary
- Patur — Range Name
- Compartment Boundary

Working Circle

- Selection Cum Improvement W.C.
- Afforestation W.C.
- Fodder Improvement W.C.

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

CHAPTER -1

BASIS OF PROPOSALS

1.1: OBJECTIVE OF MANAGEMENT

INTRODUCTION:

This Working Plan is prepared for the scientific management of the forests and Wildlife of Akola Forest Division which is co-terminus with Akola District. The primary management objective for the forests of Akola Division is to treat forests as per the requirement of site so as to optimise Growing Stock and in a manner as mentioned in the Introduction.

1.1.1: FACTORS INFLUENCING THE GENERAL OBJECTIVES OF MANAGEMENT:

Working Plans are technical documents prepared to manage a particular area of forest land on a sustainable basis, with an objective to conserve the biodiversity, soil, and water regime, optimise production of forest products to meet the market needs and also bonafide needs of local people. Various standard scientific treatments, suitable for a particular area, are prescribed to conserve and improve the quality and productivity of the forest to meet the national and global needs in general and the bonafide needs of the local people in a 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.

1.1.2: 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 the shape of the National Forest Policy 1988, which is, presently, in force.

The basis 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 ecological the 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 interests of the soil and water conservation for mitigation 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 programmes, 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 people's movement with the involvement of women, for achieving these objectivities and to minimize pressure on the existing forests.

The principal aim of the forest policy is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, humans, animals and plants. The deviation of direct economic benefit is secondary to this principal aim.

Essential of Forest Management embodied in the National Forest Policy 1988 are mentioned below:

- Existing forests and forest lands should be fully protected, and their productivity improved. Forests and vegetative cover should be increased rapidly on hill slopes, in catchment of the rivers, lakes, and 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 and around the forests. Such produce should be protected, improved and their production should be enhanced with due regard to generation of employment and income.
- Schemes and projects which interfere with forests on the steep slopes, catchment of rivers, lakes and reservoirs, geologically unstable terrain and other ecologically sensitive areas should be severely restricted.
- No forests should be permitted to be built without the approved Working Plan, which should be in keeping with the National Forest Policy and directions of the Hon'ble 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 interest in forests and make them conscious of the value of forests, 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 Government Resolution No. MRF-1365/132211-Y, dated December 6, 1968, issued by the Government of Maharashtra following functional classes have been recognized by the state: -

a) Protection Forests: It include forests on steep slopes (25 degree & above), along riverbanks and the forests that have become depleted through maltreatment and further exploitation of which will accentuate soil erosion and adversely affect the productivity of agricultural lands in the region. The

management should aim at conserving these forests, through soil and moisture conservation measures, so that they may exert beneficial influence on the soil, water regime and the physical and climatic factors of the locality.

b) Tree forests: These forests are situated in remote tracts that are mainly capable of growing large sized timber and other products of commercial value.

c) Minor Forests: It includes forests that are interspersed with cultivated lands and are capable of producing small timber and fuel wood and providing grazing which are indispensable needs of adjoining agricultural population.

d) Pasture Lands: These are openly stocked forests or scrub lands that have ceased to yield even the small timber but are conveniently situated for providing grazing to the cattle used for agricultural works

e) Miscellaneous Forests:

- **Grass Reserves:** These are small blocks of forests situated amidst cultivated tracts carrying scrubby growth and capable of producing good fodder grasses.
- **Remaining Areas** needed for other purposes. Based on the functional classification of forests, the various types of forests will be treated as follows:

A. Protection Forests: This type of forest includes the forest found on steep slopes (more than 25 degrees), 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 forests 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 works. 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 of site quality IV A and IV B. The density varies from 0 to 0.4 and natural regeneration is deficient in open areas. These forests have been worked under Afforestation Working Circle in the previous plans. Large scale soil and moisture conservation works are proposed to be taken in open and eroded areas. Natural regeneration and rootstock will be tended and supplemented with artificial regeneration of suitable species. The forests will be managed under the Afforestation Working Circle, where only hygienic fellings are prescribed.

D. Pastureland: This area includes forests which are adjoining to villages with heavy biotic interference. They are not capable of producing even small timber and firewood 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.

E. Identified Forest (Miscellaneous Forests): These include the small, scattered patches which are yet to be handed over by the Revenue Department which are unsuitable for any type of working described earlier and areas earmarked for other purposes. These patches are not demarcated on ground. Hence, it is prescribed to demarcate these areas and ensure territorial integrity.

TREATMENTS PRESCRIBED:

i. Management treatments will depend upon requirements of environmental stability, protection of topography, Bio-diversity conservation, and characteristics of growing stock in the forest and the objectives of the management.

ii. Existing protected forests will be preserved. Soil and moisture conservation works should improve the moisture content and prevent soil erosion and siltation of the water bodies.

iii. Suitable tending and soil working operations will be carried out to stimulate the growth of the naturally regenerated seedlings and rootstock.

iv. Timber, if silviculturally available, will be extracted from the dense tree forests capable of producing medium to large – sized timber and poles on sustained basis.

v. Open forest areas and traditional pastures will be managed with active participation of tribal and village communities for improving the productivity of the land to meet the local domestic needs of fodder and firewood.

vi. Uncontrolled grazing, fire, poaching, illicit cutting and uncontrolled encroachment, the major threats for sustainable growth of forest, shall be curbed.

1.2.2: 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 side of streams and water courses 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 logs shall be sufficiently protected, to meet the habitat requirement of birds and small animals. Wildlife requirements shall be the most important consideration for water body management in forest areas.

iii. The forest of Akola Division is extremely important from a wildlife management point of view as they intersperse with *Katepurna* & *Wan, Narnala* wildlife Sanctuary.

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. Due to poor natural regeneration, Aided NR had to be carried out. Areas treated under natural regeneration shall be protected from fire and grazing. Artificial regeneration will be used as supplementary activity, at places where natural regeneration is inadequate or is not likely to succeed.

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 protection, plantations, and development of natural resources in the village. Management of forests 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 forest management.

vii. Sustainable use of forest resources will remain the guiding principle for managing the demands of forest produce and services. Various govt. and non-government agencies will be engaged in the identification and promotion of ecologically sound and economically feasible alternatives like wood saving technology stall feeding, population control of cattle and livestock improvement.

viii. Involving local people in managing forests and generating awareness in rural and tribal areas is considered indispensable for forest conservation.

ix. Reducing biotic pressure on forests, particularly illicit felling, unsustainable grazing, fire and encroachment near villages will be considered on priority basis.

x. Forests capable of producing medium to large sized timber will be harvested under the Selection-cum-improvement management system.

xi. Boundary demarcation will be carried out in a time bound manner for ensuring territorial integrity of forests.

xii. Action will be taken to convert all the Identified Forest adjoining the Reserved Forests and large patches, away from villages into Reserved Forests.

1.3: CONSTITUTION OF WORKING CIRCLES:

1.3.1: ANALYSIS AND VALUATION OF THE CROP:

The analysis of forest crops 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 Akola Division has been used for preparing this Working Plan.

Compartments capable of producing medium to large-sized timber but not considered fit for harvesting due to preponderance of young to middle aged crop has been included in Improvement.

Compartments and areas close to the habitations which are unsuitable for raising timber crops due to their refractory nature, heavy biotic pressure and grass birds have been proposed to be managed under Pasture. Management Working Circle to cater to the needs of wildlife and also local people.

Compartments having precipitous slopes are managed under Protection. Soil and Water conservation treatment to these forests& preserving the steep and precipitous slopes and reducing silt load to the major dams or water bodies should be taken as utmost priority.

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 compartment is based on preponderance of suitability to specific working circle. Three exclusive and four over lapping working circles are prescribed. (Abstract of allotment of compartment to various working circles and felling series is given in **Appendix No. XXVI)**

Distribution of Area to Various Working Circles: The allocation of forest areas under various working circle of the current Working Plan has been given in

TABLE NO 1.1:

AREA ALLOCATION TO DIFFERENT WORKING CIRCLES

Sr. No.	Proposed Working Circles	Area (ha.)	Percentage
1.	Improvement Working Circle	15120.27	40.01%
2.	Afforestation Working Circle	17468.57	46.23%
3.	Fodder Improvement Working Circle	5198.18	13.76%
4.	NTFP Chapter	-	Entire area
5.	JFM Chapter	-	Entire area
6.	Wildlife Management Chapter	-	Entire area
7.	Forest Protection Chapter	-	Entire area
Total		**37787.02**	**100%**

TABLE NO. 1.2: TABLE OF COMPARISON BETWEEN EARLIER AND PRESENT PLAN WORKING CIRCLE WISE DISTRIBUTION

Sr. No.	Previous Working Circles	Area (ha.)	Percen-tage	Proposed Working Circles	Area (ha.)	Percentage
1	Selection cum Improvement Working Circle	30779.54	38.90%	Improvement Working Circle	15120.27	40.01 %
2	Afforestation Working Circle	27067.06	34.21%	Afforestation Working Circle	17468.57	46.23 %
3	Catchment working circle	9254.49	11.69%			
4	Babulban working circle	1962.59	2.51%			
5	Fodder Improvement Working Circle	10039.37	12.69%	Fodder Improvement Working Circle	5198.18	13.76 %
Total		**79106.05**	**100%**	**--**	**37787.02**	**100 %**

1.4: PERIOD OF WORKING PLAN AND NECESSITY FORINTERMENDIATE REVISION:

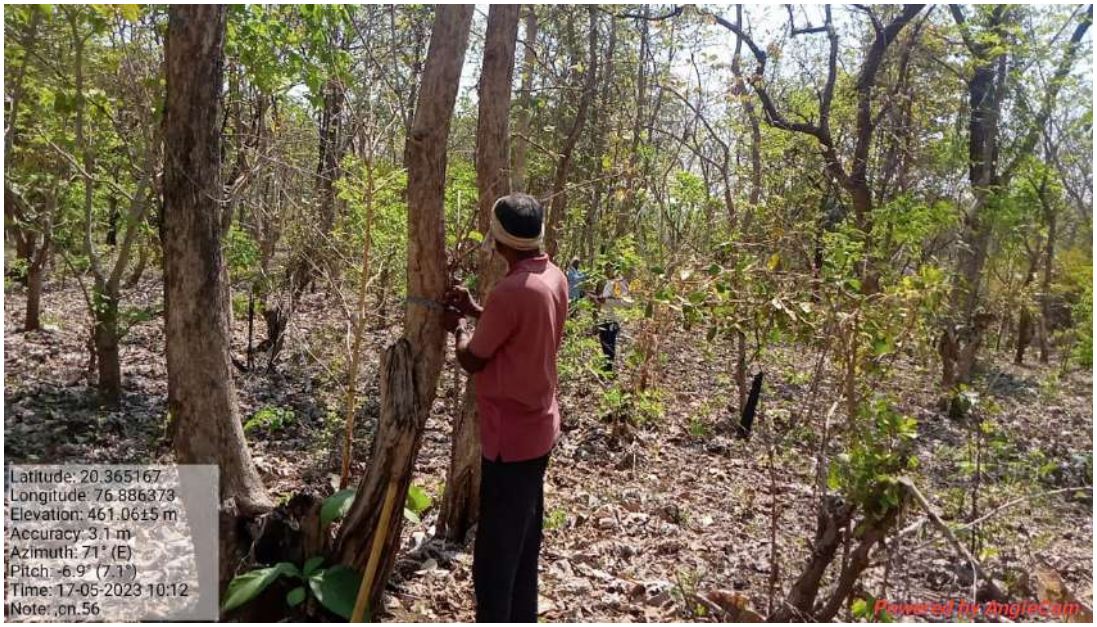
Period of the Plan: This plan will be implemented for a period of 10 (Ten) years from the year 2021 – 22 to 2030 – 31. However, the midterm review shall be carried out as per SCC Meeting Minutes No. Desk-14/WPE/ACF/741/21-22 Nagpur Dated 31/01/2022. Concerned Chief Conservator of Forests (Territorial) should come forward with a proposal for review.

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IMPROVEMENT WORKING CIRCLE



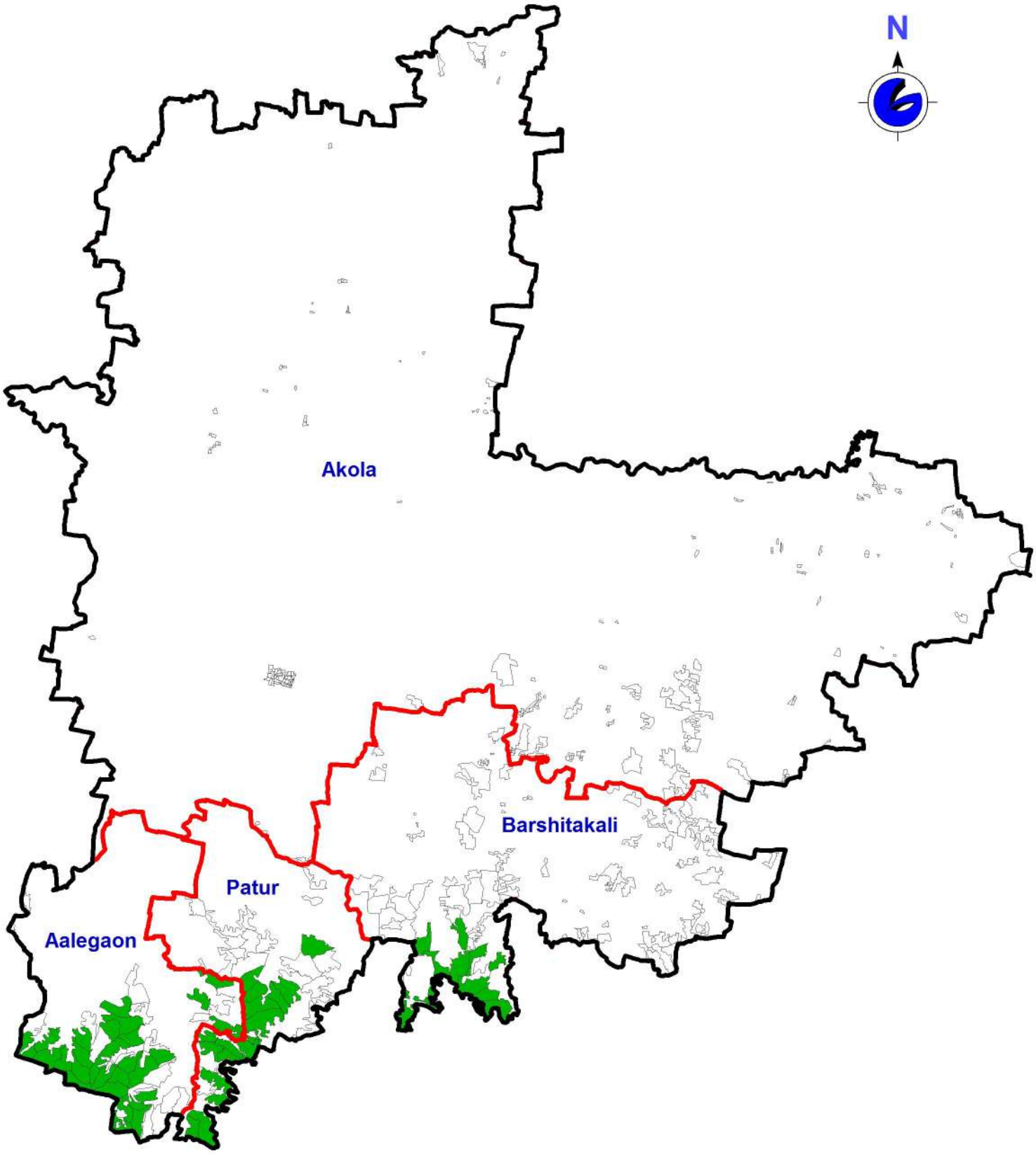
TEAK FORESTS IN AALEGAON RANGE



MIX FORESTS IN AALEGAON RANGE

Akola Forest Division, Akola

Showing Selection cum Improvement Working Circle



Legend

- Division Boundary
- Range Boundary
- Patur — Range Name
- Compartment Boundary

Working Circle

- Selection Cum Improvement W.C.

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

CHAPTER – 2

IMPROVEMENT WORKING CIRCLE

2.1. 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.

2.2. GENERAL CONSTITUTION OF WORKING CIRCLE

This working circle is expected to serve as transition to Selection cum Improvement. Forest areas capable of producing medium to large-sized timber but not considered fit for harvesting due to preponderance of young to middle aged crop has been included in this working circle.

The areas, which are deficient in stocking and require improvement through silvicultural operations and artificial regeneration, have been included in this Working Circle. The main aim is to rehabilitate and improve the status of the degraded crop and site. Therefore, obtaining produce of any kind is neither expected nor desired. However, through silvicultural operations, poles and firewood may be obtained in some quantities.

Following criteria have been used for allocation of compartments to the IWC.

- ☑ Areas having basal area from 4 to 8 Sq.mt per ha. are included.
- ☑ Areas having preponderance of middle aged crop are included.

Table 2.1: Compartments allocation to Improvement Working Circle

Sr. No.	Range	Total	Old Comptt.	New Comptt.	IWC WC	Percentage
1	**Akola**	5564.32	0	0	0.00	0.00 %
2	**Barshitakali**	11739.74	12	12	2750.26	23.43 %
3	**Patur**	8874.24	19	20	4418.83	49.79 %
4	**Alegaon**	11608.72	33	30	7951.18	68.49 %
		37787.02	**64**	**62**	**15120.27**	**40.01 %**

2.3. GENERAL CHARACTER OF VEGETATION

Better quality Teak Forest are included in this working circle in which Teak constitutes about **59.84%** of the crop. In general site quality confirmed to IVb with some patches of site quality IVa. A very few patches of site quality of III and IVa are noticed mostly in sheltered pockets, along nala banks or frequently on gentle sloping

plateau which have retained black cotton soil to a considerable depth. The natural associates of Teak are *Dhaoda, Moha, Ain, Lendia, Salai, Bhirra, Kalam, Char, Hiwar, Tendu, Khair, Palas, Aonla, Ghont* etc. Another associate *Arjuna* spreads along nalas, of some streams. The other less common associates are *Dhaman, Mokha, Kulu, Tiwas, Kusum. etc.*

Generally these are open formations of Site quality IV or below IV. In inferior quality *Teak* Forests, the bulk of the crop is young. The stands are stunted and malformed. Trees of bigger dimensions are rare. Some C class RFs, devoid of much vegetation (scrub forests) are also included in this Working Circle.

2.4: FELLING SERIES, CUTTING SECTIONS (with JFM AREAS)

Felling Series and Annual Coupes: The entire area of this working circle has been divided into **10 felling Series** with an average area of **1297** ha and each felling series is further divided into **20 coupes** with an average area of **75 ha.** Felling cycle is fixed at 20 years. The details of annual coupes are given in **Appendix-XXVII and XXVIII.**

2.5: BLOCKS, COMPARTMENTS (with JFM AREAS) (MARKED ON GIS MAPS): A total of 61 compartment is allotted to this working circle. The details of compartment wise area distribution are given in the **Appendix-XXVII and XXVIII.**

COMPARTMENTS AND FELLING SERIES:

II.3.1. The compartments allotted to this working circle and various felling series are given in **Appendix-XXVII.**

2.6. SPECIAL OBJECTIVES OF MANAGEMENT

The special objects of management of the forests are:

i) To increase the proportion of valuable species in the growing stock.

ii) To improve the condition of the growing stock by appropriate tending.

iii) To preserve and improve the composition and density of the crop for progressively increasing yield of timber

iv) To check the soil erosion by creating and maintaining vegetative cover.

v) To conserve soil moisture, essential for creating conditions conducive for rejuvenation and growth of NR and rootstock.

2.6.1: ANALYSIS OF THE CROP

Stock mapping: The conventional stock mapping has been replaced by the extensive enumeration exercise and crown density mapping through image analysis of satellite imageries has been done.

Age and density: The crop is mostly young to middle aged with scattered mature trees having density 0.2 to 0.6.

Site Quality: Site quality governs the harvestable girth. However, site quality does not change much in time span of 20 years and hence the information from the previous plan has been used to delineate and digitize the various site quality classes.

Enumeration: Enumeration was carried out by SOFR unit of Gadchiroli and Amravati by following the procedure laid down in National Working Plan Code 2014.

TABLE NO. – 2.2

ENUMERATION DATA (GIRTH CLASSWISE) IN SELECTION CUM IMPROVEMENT WORKING CIRCLE

Sr. No	Girth Class in Cm	Teak			Others			Total	
		No.	% age wrt Total Teak spp.	% age wrt Total stock	No.	% age wrt Total Misc. spp.	% age wrt Total stock	No.	% age wrt Total stock
1	15-30	29	14.22	8.53	30	22.06	8.82	59	17.35
2	31-45	63	30.88	18.53	42	30.88	12.35	105	30.88
3	46-60	53	25.98	15.59	26	19.12	7.65	79	23.24
4	61-75	36	17.65	10.59	15	11.03	4.41	51	15.00
5	76-90	16	7.84	4.71	10	7.35	2.94	26	7.65
6	91-105	6	2.94	1.77	6	4.40	1.77	12	3.54
7	106-120	1	0.49	0.29	4	2.94	1.18	5	1.47
8	121-135	0	0	0	1	0.74	0.29	1	0.29
9	136-150	0	0	0	1	0.74	0.29	1	0.29
10	151 above	0	0	0	1	0.74	0.29	1	0.29
Total		**204**	**100%**	**60.00%**	**136**	**100%**	**39.99%**	**340**	**100%**

Regeneration: Average numbers of seedlings and saplings per hectare in the IWC areas are found out from regeneration survey carried out along with the enumeration of the crop. The table is below clearly shows that the regeneration seems to be moderately good.

Table No. 2.3

Sr. No.	Range	No. of sample	No of seedlings/ha			Total
			R1	R2	R3	
1	Akola	17	192	32	2	226
2	Barshiktakli	50	1733	776	756	3265
3	Patur	97	2337	823	970	4130
4	Alegoan	164	5814	2319	1597	9730
	Total	**228**	**10074**	**3950**	**3325**	**17351**

It is necessary to find out in some of the ranges (Akola and Barshitakli) records average performance. The causes may be;

* Extensive and Repeated fire.
* Soil Condition.
* Illegal grazing which reduces the productivity by repeated attack on the fodder plant and not allowing them to grow.
* This also is responsible for compaction of soil coupled with trampling of regeneration.

2.6.2. SILVICULTURAL SYSTEM

The growing stock consists mostly of *Teak* and miscellaneous species. Very few matured trees are available in the growing stock for harvesting. Hence there is a need to reserve all the trees of higher girth classes till the trees of lower girth classes graduate into higher girth classes. To facilitate this, improvement felling's are suggested.

2.6.3. ROTATION PERIOD

Since we are resorting to improvement felling only, there is no need for fixing the rotation period.

2.6.4. HARVESTABLE DIAMETERS

There is no need for fixing the harvestable girth.

2.6.5. REDUCING FACTORS AND REDUCED AREAS: Not Applicable

2.6.6. FELLING CYCLE.

Felling cycle is fixed as 20 years. Only marking for improvement of the crop shall be carried out.

2.6.7. DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB)

Not Applicable

2.6.8. CALCULATION OF THE YIELD

As the felling is meant for improvement of the crop, it is not necessary to prescribe yield regulation.

2.6.9. TABLE OF FELLING

The detailed of the Felling schedule is given in **Appendix No. XXIX.** of Volume II

2.6.10: METHOD OF EXECUTING THE TREATMENT

2.6.10.1: COUPE DEMARCATION, TREATMENT MAP:

The coupe demarcation of annual coupes shall be carried out one year in advance of main working as per prescriptions described in the Chapter of Miscellaneous Regulations.

Treatment Map shall be prepared by the RFO and verified by the ACF. All the treatment type areas shall be shown distinctively on the map, including the areas suitable for planting and areas having adequate promising NR and rootstock

Treatment Prescribed: The treatment proposed for various treatment type areas marked on treatment map shall be, as follows:

A-Type Areas: **Protection Areas**

They will include –

i. A_1 type areas, which have slope more than 25°.
ii. A_2 type areas i.e., 20 m wide strip on both sides of streams.
iii. A_3 type areas; which are susceptible to excessive erosion

1. Soil and moisture conservation works/measures, as described in the Chapter on Miscellaneous Regulations are prescribed.
2. No harvesting is prescribed in these areas.

B-Type Areas: Under-stocked Areas

1. Soil and moisture conservation works/measures, as prescribed in the Chapter of Miscellaneous Regulations.
2. Site with clear open patch and found suitable for plantation will be taken up for afforestation works.

C-Type Areas: Congested pole crop

1. Areas with sufficient pole crops of valuable species which can be retained as a future crop.
2. No planting shall be done in these areas.
3. Thinning shall be carried out in young pole crop to bring down stems numbers and spacing, matching with the yield table, as prescribed under the Thinning Guidelines.

D -Type Areas: Well-stocked Areas

Areas having density 0.4 or over showing adequate regeneration 400 or above established seedlings are considered as well stocked areas. The following operations are carried out.

i) Tending of natural regeneration:

Singling and spacing out will be carried out among saplings of teak and other valuable species. Spacing operations should leave nearly 400 seedling/saplings per hectare. The natural regeneration shall be encouraged by soil working and mulching around them in accordance with the guidelines for the rootstock management.

ii) Singling of coppice shoots to retain one or two promising shoots is prescribed.

iii) No plantation should be carried out in these areas.

2.6.10.2: Marking Rules and Prescriptions:

Marking technique and prescriptions described in the Chapter of the Miscellaneous Regulations shall be followed.

Marking shall be carried out under the close supervision of the RFO and under guidance of ACF concerned. DCF shall himself inspect majority of coupes to ensure proper marking and to guard against excessive marking, if any.

The following rules are proposed to be observed strictly for marking in various treatments type areas;

A Type Areas: Protection Areas: No tree shall be marked for felling.

B Type Areas: Under stocked Areas:

1 All dead trees, retaining 2 trees / ha as snags and dens for nesting and resting of wildlife.
2. All live high stumps shall be marked.
3. All multiple coppice poles; retaining one or two promising pole / stool, shall be marked.

C Type Areas: Groups of young poles:

1. The congested pole crop shall be marked for thinning to maintain spacing equal to 1/3rd of the crop height and/or to bring down stem number as per the yield table.
2. Unwanted undergrowth interfering or likely to interfere with the seed-based NR of teak and other valuable species shall be removed.

D Type Areas: Well-stocked Areas:

1. All fruit bearing species, such as, *Moha, Achar, Tendu, Anola, Chinch, Bel* and minor forest produce yielding species, *Kullu, Semal and Salai* shall be reserved.
2. All dead and malformed trees, retaining 2 trees per hectare and all live high stumps shall be marked for felling.
3. Mature trees that have developed hollowness and show visual sign of decay will be marked for felling.
4. All, but one or two, vigorously, growing coppice pole per stool shall be marked for felling.
5. However, in this working circle no commercial felling except for improvement felling shall be carried out.

2.6.11. SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

SUBSIDIARY SILVICULTURAL OPERATIONS:

The following Subsidiary Silvicultural Operations shall be carried out departmentally;

- **Natural Regeneration:** The main purpose of improvement felling carried out in Improvement Working Circle (D areas) is to improve the crop. Operation like identification of Natural Regeneration and keeping proper spacing, soil working, soil working around the seedlings, etc should, wherever possible, be carried out in D-areas after improvement felling.
- **Cleaning**: In the 6th year commencing from main felling following operation shall be carried out:
  - i) All climbers except of NTFP importance in the plantation area shall be cut out.
  - ii) Weeds interfering or likely to interfere with the reproduction of teak and other valuable species will be cut and removed.
  - iii) Coppice shoots of teak will be removed if NR and AR are successful; otherwise shoots will be cut and reduced to one well grown shoot.
  - iv) The established advanced growth of teak and other valuable species will be spaced out suitably.
- **Thinning:** Thinning is proposed to be carried out in patches of dense pole crop by maintaining average spacing of 1/3rd of the crop height as prescribed in C-Type areas. The post-thinning crop should have basal area and number as close to the relevant stand table or yield table for that site quality as possible.

Poles of vigorously growing non-teak trees should be preferred for retention, particularly those of Group 2 species and Group 3species.

2.6.12. REGENERATION

Natural Regeneration: The NR will be protected against fire and cattle grazing. TCM or other kind of fencing may be established. Root stock management and tending of natural regeneration shall be carried out in B1 areas.

Artificial Regeneration: Artificial regeneration shall be carried out in B2 areas in 2nd year of main felling. It means PYO/PPO works will be taken up in the immediate year of main felling. The choice of species will be *Teak, Anjan, Saja, Khair, Shiwan, Dhaora, Salai, Bhilawa* etc. and other fruit trees .

Method of Planting: The planting model & pre-planting and planting operations approved by the competent authority will be implemented.

2.6.13. 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 remains sufficiently away from the stems of the trees and burning do 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 and 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 24hour duty on suitable area basis.

GUIDELINES FOR THE ROOTSTOCK MANAGEMENT: In view of tending the available natural rootstock to grow as a prominent constituent of the future crop, the rootstock management guidelines are prescribed, as follows.

(a) Singling of coppice shoots: One healthy and promising coppice shoot will be retained on the stump and the rest be removed. However, coppice shoots interfering with promising saplings of seed origin should be removed. Such coppice shoots should also be close enough to the ground so that it would not topple after gaining volume and weight and would be able to develop root system of its own subsequently.

(b) Coppice management of damaged and malformed saplings: The saplings and poles of up to 30 cm GBH having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, cause erosion and lead to soil loss.

(c) Tending of natural regeneration: All seedlings and saplings of valuable species more than 60 centimeters in height will be tended to leave nearly 400 saplings/seedlings per hectare at an average of 5 meter spacing. The natural regeneration present shall be assisted and encouraged. Order of priority among desirable species for retention is prescribed as: *Aola, Bhilawa, Kusum, Shisham, Shivan, Ahl, Salai, Charoli, Khair, Bel, Beheda, Sajad, Tendu, Dhaora, Teak and Lendia.*

Grazing Control: - The areas of main felling shall remain closed to grazing for **a period of 5 years**. 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 shall be followed. 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: CCT/ DCT, WATs, Gully plugging and Nala Bunding works will be taken up. Cement plugs or earthen *bandhara* be taken up on a large scale to preserve moisture for a longer period simultaneously the catchments areas of the cement plugs/ earthen *bandhara* be treated with loose boulder structures so as to

prevent siltation in the dams. In addition to this contour stone bunding 60 cm x 30 cm size will be taken up on the slopes to prevent soil erosion, where boulders are not available agave suckers in 2 rows will be planted.

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 wellbeing 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 milk 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 wellbeing and sustenance of forests along with people is ensured.

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AFFORESTATION WORKING CIRCLE.



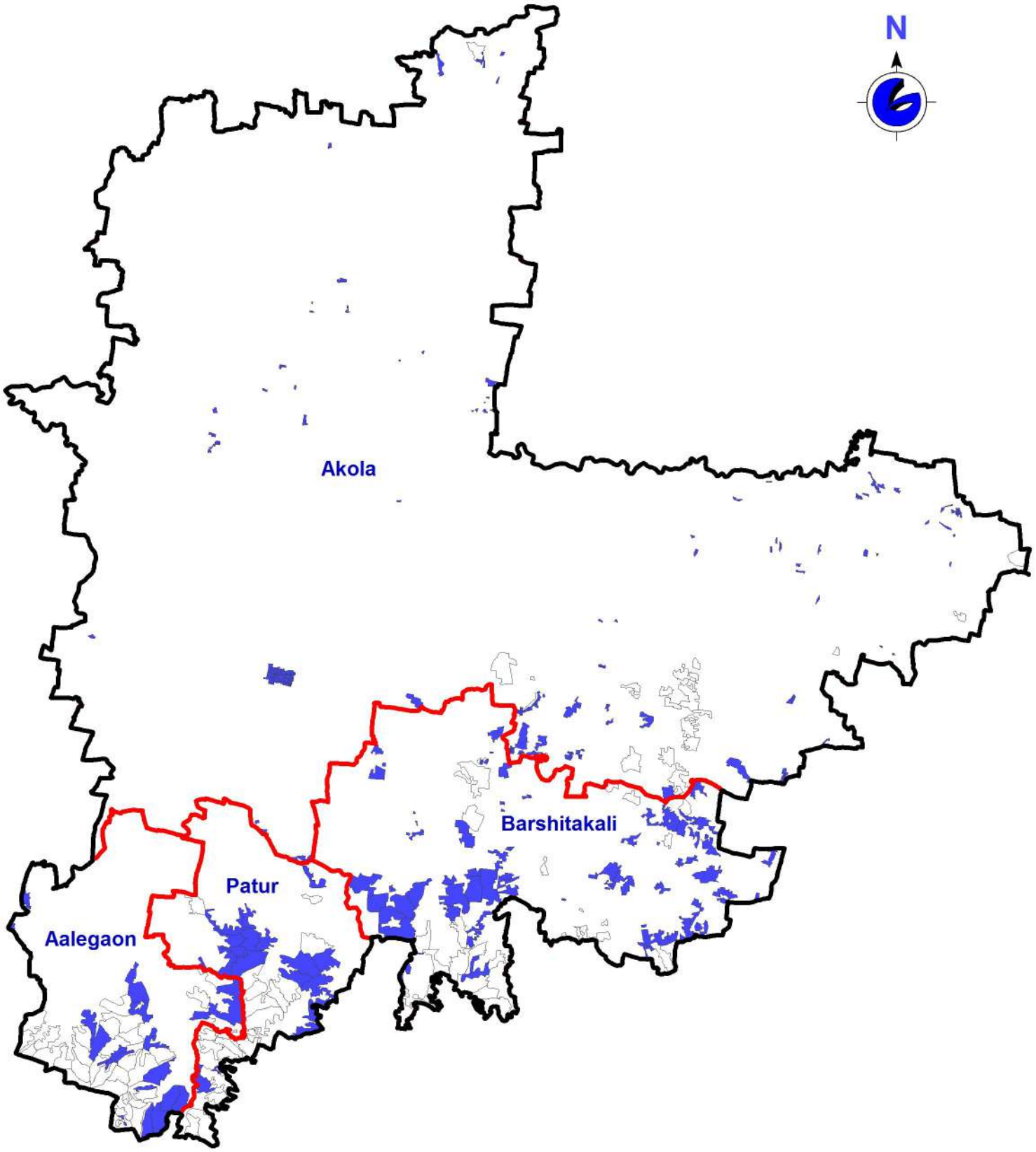
C CLASS FORETS IN BARSHI-TAKALI RANGE



C CLASS FORETS IN AKOLA RANGE

Akola Forest Division, Akola

Showing Afforestation Working Circle



Legend

- Division Boundary
- Range Boundary
- Patur — Range Name
- Compartment Boundary

Working Circle

- Afforestation W.C.

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

CHAPTER-3

AFFORESTATION WORKING CIRCLE

3.1: AFFORESTATION WORKING CIRCLE: The area of this Working Circle has been clearly marked on the GIS based map of 1:50000 which is appended and a copy of the same is given on a smaller scale on A4 size here.

3.2: GENERAL CONSTITUTION OF WORKING CIRCLE

The open forest areas having density less than 0.4 with sparse vegetation and inadequate natural regeneration and shrubby growth have been included in this Working Circle.

The Afforestation Working Circle forms about 46.23 %of the entire forest area of the division. This includes 17468.57 ha. of the forest area. The areas which were managed under Babul working circle and Catchment working circle of previous Working Plan (G. R. K. Rao's working plan) were included in the Afforestation Working Circle.

The following criteria have been applied for allocation of compartments to the Afforestation Working Circle:

- Compartments have a large proportion of area under forest blanks.
- Compartments having poor quality open forests, which need to be afforested.

The allotment of these compartments has been done based on the Forest Cover map of the latest Forest Survey of India reports and based on the ground-survey/verifications. This is a very important Working Circle in which the forest areas that are in the possession of the Forest Department will be reclaimed to enhance the forest cover in the Division and the District.

Table 3.1: Compartments allocation to Afforestation Working Circle

Sr. No.	Range	Total	Old Comptt.	New Comptt.	Aff. WC	Percentage
1	**Akola**	5564.32	188	100	2700.00	48.52 %
2	**Barshitakali**	11739.74	98	83	7383.62	62.89 %
3	**Patur**	8874.24	21	18	4090.41	46.09 %
4	**Alegaon**	11608.72	17	16	3294.54	28.38 %
		37787.02	**324**	**217**	**17468.57**	**46.23 %**

3.3: 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 Bahira.

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. Most of the PF areas allotted to this working circle, especially, those near the villages are highly degraded and lays bare without any significant tree crop.

The crop consists mainly of scattered trees or patches of open forests. Girth-class wise distribution of species is depicted in table below:

TableNo.3.2: Species and Girth Distribution in the AWC areas per ha

Sr No	Species	15-30	31 - 45	46 - 60	61 - 75	76 - 90	91 - 105	106-120	121 135	136 - 150	151 up	Total
1	Ain/ Sajad	0.69	1.79	0.77	0.2	0.08	0.17	0	0.04	0	0	**3.74**
2	Apata	0.16	0.16	0.08	0	0	0	0	0	0	0	**0.4**
3	Aran	0	0	0	0	0	0	0	0	0	0	**0**
4	Bhera	0	0.04	0.04	0	0	0	0	0	0	0	**0.08**
5	Biba	0	0.08	0	0	0	0	0	0	0	0	**0.08**
6	Bor	0	0.24	0.04	0	0	0	0	0	0	0	**0.28**

7	Dhaman	0.08	0.04	0	0	0	0	0	0	0	0	**0.12**
8	Dhaora/ Dhawada	3.86	4.22	1.96	0.65	0.12	0.12	0.08	0	0	0	**11.01**
9	Ghoti	0	0	0	0	0	0	0	0	0	0	**0**
10	Kalamb	0.16	0.04	0.04	0.16	0	0.04	0.08	0.04	0	0.04	**0.60**
11	Khair	0.45	1.17	0.16	0.04	0	0.09	0	0	0	0	**1.91**
12	Kharasi	0	0	0	0	0	0	0	0	0	0	**0**
13	Lendia	0.97	0.45	0.08	0	0.04	0	0	0	0	0	**1.54**
14	Medsing	0	0.04	0	0	0	0	0	0	0	0	**0.04**
15	Mowai/ moien	0.33	0.85	0.69	0.81	0.45	0.12	0.2	0	0.04	0	**3.49**
16	Pakad	0	0	0	0	0	0	0	0	0	0	**0**
17	Palas	6.91	10.61	4.03	2.03	0.69	0.12	0.12	0.04	0	0.04	**24.59**
18	Rohan	0.04	0	0	0.04	0	0	0	0	0	0	**0.08**
19	Salai	0.41	0.37	0.29	0.32	0.28	0.16	0.24	0.2	0.04	0.04	**2.35**
20	Teak	8.05	15.53	9.92	5.2	1.83	0.81	0.24	0.2	0	0	**41.78**
21	Tendu	2.32	1.95	0.77	0.45	0.08	0.04	0.04	0	0	0	**5.65**
22	Waghati	0	0	0	0	0	0	0	0	0	0	**0**
	Total	**24.43**	**37.58**	**18.87**	**9.90**	**3.57**	**1.67**	**1.00**	**0.52**	**0.08**	**0.12**	**97.74**

The site quality varies between IVb and IVa. The canopy density of the vegetation varies from 0.0 to 0.3. Natural regeneration of common species is present, but its extent is far from being adequate **(Table 3.2)** Heavy grazing pressure has resulted in compaction of the soil with little sub-soil moisture. Young recruits of species like Ain, Dhaoda, Bhirra and Teak, etc. are found in many compartments. Due to excessive grazing, fires, and refractory nature of areas, so establishment of Natural Regeneration is limited.

Table No.3.3: Natural Regeneration per ha. Recorded in the Afforestation Working Circle

Range	No of Plots	R1 per ha.	R2 per ha.	R3 per ha.	Total per ha.
Akola	33	213.03	67.88	37.27	318.18
Barshitakli	147	204.15	116.87	128.64	449.66
Patur	31	144.51	60.00	96.13	300.64
Alegaon	29	376.20	229.31	196.21	801.72
Total	**240**	**218.46**	**116.37**	**120.04**	**454.87**

3.4: FELLING SERIES, CUTTING SECTIONS (with JFM AREAS)

Felling series and annual coupes: The entire area of this working circle has been divided into 13 felling series. Each felling series has been further divided into 10 annual coupes. The details are given in the **Appendix XXVIII-B** of volume –II.

3.5: BLOCKS, COMPARTMENTS (with JFM AREAS) (MARKED ON GIS MAPS)

Details of the 320 compartments in the working circle have been given in **Appendix XXVIII-B.** of volume –II.

3.6: SPECIAL OBJECTIVES OF MANAGEMENT

1. To restore the vegetative cover and of degraded and open areas and increase their productivity by site protection and tending of natural regeneration and rootstock, supplementing it with plantations, wherever, necessary.
2. To check the loss of topsoil by adopting suitable soil and moisture conservation measures and to increase the water absorption capacity of the soil.
3. To actively involve Gram Panchayats and other village institutions like JFM committees in re-vegetating degraded areas.
4. To improve the quantity and quality of fodder by planting fodder tree species and introducing superior and high yielding fodder grasses and legumes.

3.6.1: ANALYSIS OF THE CROP

Stock mapping: The stock maps were prepared by territorial staff and were correlated with the enumeration results of SOFR Unit and Satellite imagery classified data obtained from Forest Survey of India, Nagpur.

Age and density: The crop of forest areas under this working circle is mostly young to middle aged with occasional mature trees having density below 0.4 which were reflected by stock mapping and satellite imageries.

Enumeration: Enumeration work was conducted by SOFR unit, Amravati as per the National Working Plan Code 2014.

3.6.2: SILVICULTURAL SYSTEM

The area will be regenerated with suitable tree species depending on the site conditions. Tending of existing rootstock viz. the saplings, coppice shoots and poles, supplemented by plantations have been proposed as the main activities in this working circle. Yield removal is not prescribed except for removal of wind fallen, dead trees.

In view of the vicinity of these areas to habitations, fuel wood and fodder availability will be expanded through plantation of fuel wood and fodder species and by involving JFM committees.

The areas of this working circle are, primarily, in bad shape. Inadequate sub-soil moisture, highly compact soil structure and heavy biotic pressure are the main limiting factors for the establishment of seedling in this area. Topsoil has been washed away and as a result vast areas do not have even adequate soil-depth to support tree crops. Consequently, a large chunk of these areas lay bare without any significant vegetation. Hence, intensive soil and moisture conservation measures and tending of existing rootstock should go hand in hand with the efforts of artificial regeneration.

3.6.3: ROTATION PERIOD: No rotation period is fixed.

3.6.4: HARVESTABLE DIAMETERS: Not Applicable.

3.6.5: REDUCING FACTORS AND REDUCED AREAS: Not Applicable

3.6.6: FELLING CYCLE: Treatment cycle is fixed as Ten years. The entire area of this working circle will be covered in a period of Ten years.

3.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODICBLOCK (PB): Not Applicable.

3.6.8: CALCULATION OF THE YIELD

Regulation of yield: No yield is prescribed for this working circle. Only removal of dead trees (after retaining 2 dead trees/ha as snags) are prescribed.

3.6.9: TABLE OF FELLING: Not Applicable.

3.6.10: METHOD OF EXECUTING THE TREATMENT:

3.6.10.1: Demarcation, Treatment Map and Treatment Prescription: The coupe Demarcation, preparation of treatment maps and marking will abide by the prescriptions mentioned in the chapter of Miscellaneous Regulations. (Note: In the case of Zudpi Jungle, the boundary demarcation will precede the coupe demarcation for the coupes falling on the first year.)

Treatment Map: Treatment map shall be prepared in detail well in advance to facilitate effective planning for raising nursery stock and also to mobilised financial resources to execute the work.

Treatment Prescribed: Treatment map shall be prepared for each working coupe on the basis of treatment prescribed for various areas. Treatment map should invariably be verified by ACF before estimates are technically approved by the DCF.

Area specific treatment is as below:

A -Type Areas (Protection Areas)

They will include-

- ☑ A1 type areas, which have slope more than 25°,
- ☑ A2 type areas, i.e., 30 m wide strip on both sides of streams,

B -Type Areas (Under-stocked Areas)

- The open forests with root stock as well as without root stock shall be shown in the treatment map.
- The areas which were planted earlier but the plantations have failed.

C -Type Areas (pole crop)

Areas with sufficient pole crop of valuable species which can be retained as future crop shall be marked separately.

D - Type Areas: Well-stocked Areas

Well stocked areas shall be separately shown on the treatment map.

Extent of plantation: Requirement of site would be the prime consideration for deciding the extent of plantation. However, in each coupe, not more than 50 ha be taken up for plantation. While taking plantations under special schemes such as NREGA, FDA, DPDC etc. the areas under due coupes should invariably be considered.

3.6.10.2: Marking Rules and Prescriptions

Marking technique and prescriptions described in the Chapter of the Miscellaneous Regulations shall be followed, with modifications, proposed in the following paragraphs.

Marking shall be carried out under the close supervision of the RFO and under the guidance of ACF concerned. DCF shall himself inspect most coupes to ensure proper marking and to guard against excessive marking, if any.

The following rules shall be observed strictly for marking the trees in different areas.

A-Type Areas: Protection Areas:

1. No tree shall be marked for felling.

B- Type Areas: Under stocked Areas:

1. No standing tree shall be marked for felling except dead trees retaining at least 2 trees/ha as snags.
2. All live high stumps shall be marked.
3. In case of Coppice regeneration, 1 or 2 of the most promising shoots will be retained and rest marked for removal.
4. Areas which do not contain sufficient natural regeneration or rootstock will be artificially regenerated by suitable local species if the site is suitable for afforestation works. In case the areas selected contain old unsuccessful plantations, such areas shall be treated only after examining the factors responsible for failure and upon taking prior approval from the CCF (T).

C -Type Areas: Groups of young poles:

1. The congested pole crop shall be marked for thinning to maintain spacing equal to 1/3rd of the crop height. Poles of seedling origin shall be preferred for retention over the poles of coppice origin.
2. Dead poles shall be marked for thinning.
3. Multiple poles shall be thinned to regain one promising pole per stump/stool.

D - Type Areas: Well-stocked Areas:

1. All dead trees shall be marked for felling except two trees per hectare which shall be retained as snags.
2. All live high stumps shall be cut back to the ground level.
3. All but one or two promising coppice pole per stool shall be marked for felling.

Sequence of Working: Demarcation of coupe, preparation of treatment map, marking, felling (dead trees), PPO works will be done in the sequence of operations as depicted in **Appendix No. XXIX.**

3.6.11: SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not Applicable.

3.6.12: REGENERATION:

Natural regeneration:

Natural regeneration of teak and other species, through noticed in same patches at certain place usually die before getting established due to highly compact soil structure coupled with bad drainage, aeration, high incidence of cattle grazing and recurrent fires. To help young recruits of teak and other species to establish develop natural regeneration, the following prescriptions shall be adopted:

1. Identification of the areas containing promising natural regeneration shall be done inside the coupe.
2. The undesirable undergrowth which is preventing or likely to prevent the development of natural regeneration of the desired species shall be removed.
3. Identification of patches of natural growth and shall rigidly protected from the fire and grazing and suitable thinning and tending will be carried out coppice shoots which interfering with the development young natural seedlings shall be removed. A little opening up of the top of canopy by felling of marked trees and the ground cover at some places shall boost in establishment of natural regeneration of teak and other species by providing better light and aeration.
4. Natural regeneration should be cleared of weeds within the diameter of one meter and these weeds, grasses, leaf litter, twigs, leaves and branches shall be spread in 15 cm. high layer all around the seedlings within the cleared

area to provide organic mulch. Two or three spread full of earth shall be thrown to the mulch in place. Therefore, it will keep the soil around the plants free from weeds as well as help securing the loosening and aeration of the soil by worms and insects. In addition, stone mulching shall be done around the current year recruits in the areas where surface stones are available. Small stones shall be arranged in a circle closed around the very young seedlings which will help in retention of surface moisture as well as avoid accidental trampling by cattle or others.

5. These areas shall be protected from biotic interference as well as from recurring fires. Natural regeneration shall be supplemented with artificial regeneration in the understocked areas.

Artificial regeneration:

In areas where natural regeneration is not sufficient, open, or blank areas, plantations with suitable species shall be taken up under artificial regeneration. The number of seedlings to be planted is to be decided based on soil conditions, rainfall, and temperature. The choice of species to be planted will depend on the suitability of site.

Pre-planting operations:

PPO will be carried out one year before actual planting work is to be taken up. The planting stock in nurseries should be in good condition. The planting stock must have different species and should be healthy with sufficient height and hardy enough to be planted. The seeds for raising nursery stock shall be from known sources preferably from plus trees of high forests and certified seeds.

Choice of species:

The choice of species will be based on climatic and edaphic conditions and the preference of local community. The native species that occur naturally, and of proven fodder grasses, fruit, non-wood forest produce and some of the timber species shall be preferred. Some of the species like Teak, Neem, Dhawda, Arjun, Babul, Khair, Nilgiri, Glyricidia, Jamun, Bel, Apta, Anjan, Biba, Bamboo, Behada, Hirda etc. can be planted. Palatable grass species like Sheda, Paunya and Marvel shall be preferred. Bamboo can be planted along the nalas. Better planting stock shall be ensured, and the area of plantation is closed either by TCM or fencing. It is advisable that on the mound of TCM a row of suitable fast growing thorny species shall be planted along with Agave bulbils. As Sandalwood is not grown naturally in these regions, a study should be taken by DCF Akola, whether Sandalwood is suitable or not for species selection.

First year operations:

Planting shall be completed within a fortnight from the outbreak of monsoons. The teak seedlings or stumps shall be planted after the first monsoon showers. Polybag plantation will be taken in case of miscellaneous species.

Weeding and casualty replacement:

The weeding shall be done in the first year as per the following schedule.

1st weeding : by end of July

2nd weeding : by beginning of September

3rd weeding : by mid of October

Casualty replacement shall be carried out along with 1st weeding.

Second Year Operations and Third Year Operations:

In the SYO plantation casualty replacement and two weeding will be done as per following schedule.

1st weeding : by end of August

2nd weeding : by end of October

Casualty replacement shall be done by mid-July. Mulching and hoeing will be carried out along with the 2nd weeding. In the third-year operation only one weeding will be done during the month of September followed by thorough soil working in the month of October.

3.6.13: ASSOCIATED REGULATIONS AND MEASURES:

All annual coupes and plantation sites shall be provided with fire protection. Effective protection against fire must be ensured during the fire seasons so that the survival and establishment of the seedlings for development into future growing stock can be achieved. Fire protection can be achieved through Joint Forest Management Committees. A comprehensive fire management plan shall be prepared every year.

The coupe shall remain close to grazing for a period of 5 years after main felling. At the time of planting the under stocked area in each coupe, the seeds fodder grass like Paunya, Sheda, etc shall be shown to have enough fodder of good quality.

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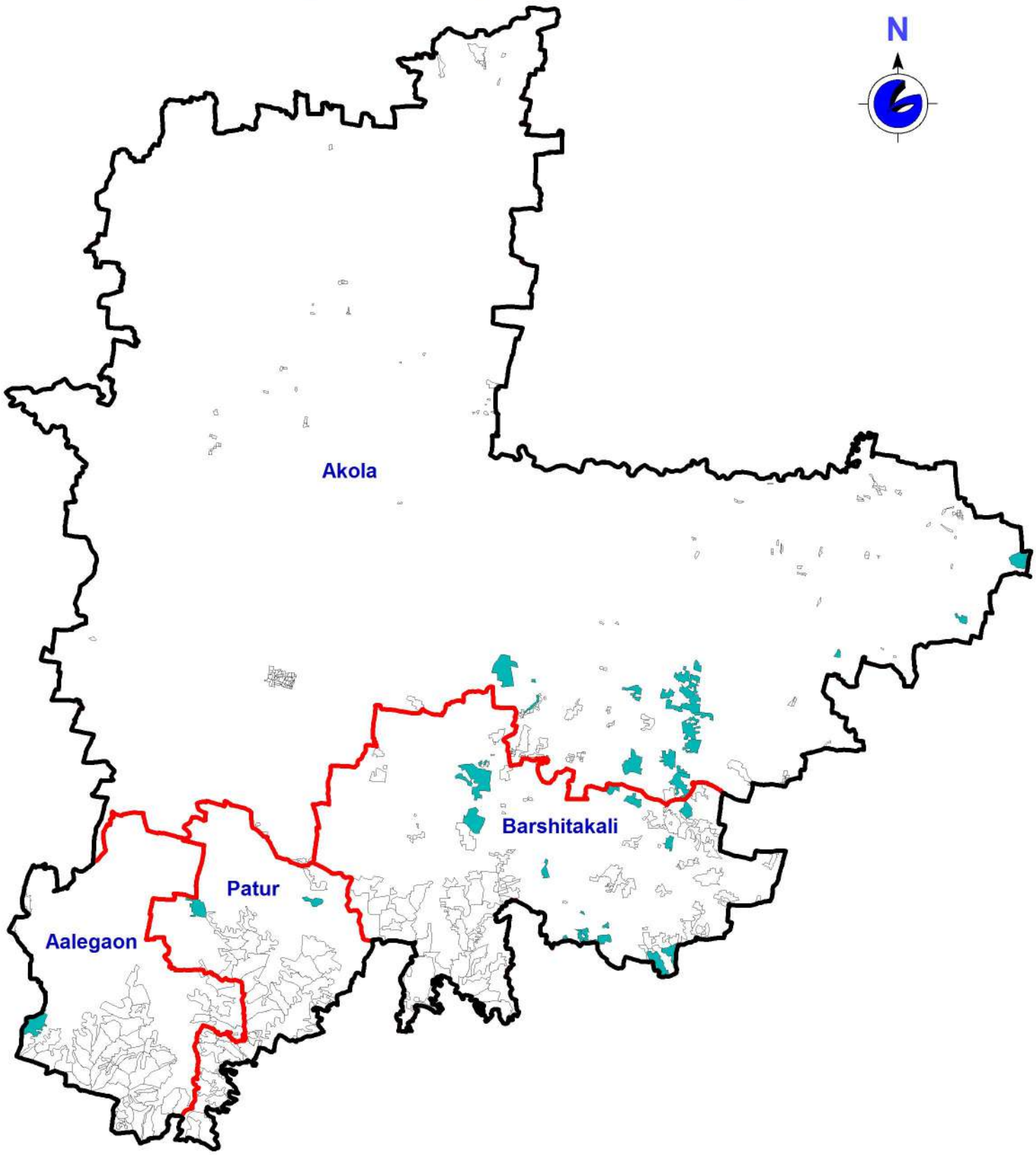
FODDER IMPROVEMENT WORKING CIRCLE





Akola Forest Division, Akola

Showing Fodder Improvement Working Circle



Legend

- Division Boundary
- Range Boundary
- Patur — Range Name
- Compartment Boundary

Working Circle

- Fodder Improvement W.C.

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

CHAPTER – 4

FODDER IMPROVEMENT WORKING CIRCLE

4.1: WORKING CIRCLE (CLEARLY MARKED ON GIS MAPS (1:50,000): The area of this Working Circle has been clearly marked on the GIS based map of 1:50000 which is appended and a copy of the same is given on a smaller scale on A4 size here.

4.2: GENERAL CONSTITUTION OF WORKING CIRCLE

1.The forests included under this working circle are-

i. Areas which were under this Working Circle in the previous plan

ii. Areas which are in the vicinity of villages and hence under severe biotic pressure

2.Area allocation: Range-wise allocation of area is shown in table below:

TABLE NO.4.1.
TABLE SHOWING RANGE WISE DISTRIBUTION OF AREA ALLOTTED TO FODDER IMPROVEMENTWORKING CIRCLE
(Area in Ha.)

Sr. No.	Range	Total	Old Comptt.	New Comptt.	Fodder Improvement WC	Percentage
1	**Akola**	5564.32	23	20	2864.32	51.48 %
2	**Barshitakali**	11739.74	12	12	1605.86	13.68 %
3	**Patur**	8874.24	2	5	365.00	4.11 %
4	**Alegaon**	11608.72	1	1	363.00	3.13 %
Total		**37787.02**	**38**	**38**	**5198.18**	13.76 %

4.3. GENERAL CHARACTER OF VEGETATION

This Working Circle includes “C” class Reserved Forests area, which comprises of Scrub Forest, not capable of producing timber or firewood to any appreciable extent. These areas contain degraded soils and are with heavy biotic pressure. They are therefore open (density ranges from 0.1 to 0.3) containing brushwood and bushes along with the grasses. Trees are stunted, malformed and hacked and are found scattered throughout.

Tree species found are Teak, Palas, Anjan, Hiwar, Neem, Tendu, Lendia, Bhirra, Ain, Bor, Dhawda, Movai, Salai, Char, Moha, etc. Thorny and bushy species like Bor, Khair, Bharrati, Eruni, Ghot, Chilati, Phetraare also common. Grass species are Kusal, Bhurbhushi, Ghonad, Sheda, Marvel are common.

The existing stock map has been updated the stock is assessed with the help of satellite imageries with appropriate ground truth verification. The Period of Enumeration is from April 2019 to March 2020.The area of sampling is 5.60 hectares and Intensity of Sampling (%) is 0.11.

TABLE NO.4.2

Fodder Improvement Working Circle Tree Enumeration Data Per ha.												
Sr No	**Name of Species**	**Girth classwise classification in cms**										
		15 to 30	**31 to 45**	**46 to 60**	**61 to 75**	**76 to 90**	**91 to105**	**106 to120**	**121 to 135**	**136 to150**	**above 150**	**Total**
1	Teak	15.17	18.03	9.286	3.39	2.14	0.17	0	0	0	0	**48.21**
2	Hiwar	1.07	6.96	3.75	1.25	0.35	0	0.17	0	0	0	**13.57**
3	Neem	0.53	1.96	0.71	0.71	0	0	0	0	0	0	**3.92**
4	Palas	8.39	10.00	5.53	1.78	0.53	0	0	0	0	0	**26.25**
5	Anjan	0	0.35	0	0.35	1.25	0.53	0	0	0	0	**2.50**
6	Tendu	0.53	0.71	0	0	0	0	0	0	0	0	**1.25**
7	Others	3.06	13.42	5.19	4.12	2.16	1.44	0.90	0	0	0	**30.29**
Grand Total		**28.75**	**51.43**	**24.46**	**11.60**	**6.43**	**2.14**	**1.07**	**0**	**0**	**0**	**125.88**

4.4: FELLING SERIES, CUTTING SECTIONS (with JFM AREAS)

Grazing series and annual coupe - The working circle has been divided into 4Grazing series with average area of fodder series 1300.00 ha.As all the pastures and grass lands are proposed to be managed on a 3 years rotation, each such series will have 3 coupes (A, B, C) with average area of coupe 433.30 ha **(Appendix XXVIII-C).**

4.5: BLOCKS, COMPARTMENTS (with JFM AREA) (MARKED ON GIS MAPS)

A total of 38 compartments are allotted to this Working Circle. There are four grazing series (S1 to S4). Each grazing series is divided into three coupes, namely A, B & C. Rotational grazing is prescribed. A statement

showing allotment of compartments by ranges and grazing series is given in the Appendix **No.V – B** of Volume II.

4.6: SPECIAL OBJECTIVES OF MANAGEMENT

1. To augment the demand for good palatable fodder requirement of villages.
2. Introduction of suitable palatable indigenous varieties of grasses.
3. Introduction of fodder trees and legumes in selected areas.
4. To make the judicial use of sub soil moisture by planting poly pot grass seedlings.
5. To make the ranges self-sufficient in grass seeds and root slips.
6. To restore the site through Soil and Moisture conservation works.

4.6.1: ANALYSIS OF THE CROP:

(i) Stock mapping – Conventional Stock Mapping has been done by the territorial staff. Satellite imagery was used for verification of stock maps.

(ii) Age and Density - Areas are mostly open and blank and density ranges between 0.1 to 0.3

(iii) Site Quality: Mostly, the site quality is IVb.

(iv) Enumeration – Enumeration has been done by the SOFR unit of Amravati as per the procedure laid down in National Working Plan Code, 2014.

(v) Regeneration: Regeneration status of the tree crop in the forests allocated to this working Circle is given in Table 6.3 below:

Table No.4.3:

Average seedlings and saplings per ha

Fodder Improvement Working Circle. (Natural Regeneration Data) Range Wise Data. (Year- 2019-20)					
Name of Range	**Number of Plots**	**R-1**	**R-2**	**R-3**	**Total**
Akola	49	321.84	93.06	21.43	**436.33**
Barshitakli	30	101.00	125.67	111.00	**337.67**
Patur	5	128.00	72.00	96.00	**296.00**
Alegaon	6	626.67	306.67	466.66	**1400.00**
Average	**90**	**257.78**	**117.00**	**85.11**	**459.89**

(vi) Analysis and Valuation of Grass and Fodder Resources

The proper management of grass and fodder resources and for their further development, different valuation methods are required to be used. It should include valuation of soil type suitable for grassland management and its moisture content. This will help in deciding the grass species most suitable for a site to give optimum production. Extent of grazing and other biotic pressures as well as their effect on grass composition and yield shall also be considered as factors for such valuation.

4.6.2: SILVICULTURAL SYSTEM

Based on the grass and forest resources of the site as well as the objectives of the management, the silvicultural systems to be followed as under:

1. Regulated and rotational grazing in pasture areas.
2. Regulating seeding, grass cutting and complete closure to grazing in identified Grass land.

- **Method of Treatment:** The method of treatment to improve grasses shall be two pronged i.e. (a) Rotational grazing in pasture areas and (b) Augmenting natural grasses in grasslands through closure to grazing.

(1) Rotational Grazing in Pasture Lands

The areas shall be regulated for controlled grazing as per prevailing grazing rules. Pasture lands have been divided into pasture series and each series will have 3 coupes, namely A, B, C. Each coupe shall remain closed to grazing for two years. The coupe will be demarcated one year before the due date of closure and the period of the closure will be prominently displayed at the convenient places. In the closed coupe, works for facilitating improvement in grass and fodder productivity such as removal of weeds will be taken up. All obnoxious weeds and thorny shrubs and bushes shall be uprooted. The non-palatable grasses, such as Kusal, Bhurbhushi, etc. shall be eradicated in the pre-flowering stage only. Soil and moisture conservation works may be taken up extensively for improving the site, such as CCTs, Nalla-bunding and gully plugging etc.

(2) Augmenting Natural Grasses in Grass Land

Areas containing palatable natural grasses shall be closed to grazing and the work of removal of weeds to facilitate these grasses to come up naturally will be taken up. It has been seen that because of protection to grasslands, a lot of shrubs invade the area as weeds resulting in reduction in grass production. Hence, only the removal of such weeds manually/ mechanically is suggested. It will require complete and permanent closure from grazing but with a provision of drawing fodder resources from it on 'cut and carry-away' basis. They are to be cut only after grass seeding. Grasslands developed as grass birs (permanent grasslands) are therefore to be allowed for grass cutting on rotational basis, and 3 years after their establishment. The Methods to improve grassland are given below:

(3) Methods for Improving Grassland:

1. Controlled burning to avoid spreading fire during summer season.
2. Eradication of weeds and thorny shrubs-By controlled burning and uprooting.
3. Soil and moisture conservation methods:

3.1-Area Treatment: Digging of Deep continuous Contour trench (Deep CCT) 200 cubic meter in 400 Running meter per hectare. Size of Deep CCT 20.00-meter long x1.00-meter-wide X 0.50 meter depth, at 20 meter vertical distance.

Planting of palatable, nutritious, perennial and rain fed grass seedlings approx. 5000 seedlings per Ha. is prescribed.

On' V' shape furrow 3800 grass seedlings &on mount of Deep CCT 1200 grass seedlings is prescribed. (60 seedlings per Deep CCT mount in staggered method in three rows is prescribed).

If Deep CCT is not dug, then make the 5000 Rmt 'V' shape furrow at 2 meter distance is prescribed.

Sehimanervosum (Sheda), Chrysopogonfulvus (Dongri), Cenchrusciliaris (Madras Anjan), Cenchrussetigerus (Kala Dhaman), Dichanthiumannulatum (Marvel), Panicum maximum (Guinea grass) are mostly suitable.

Pennisetum purpurium (Dinanath) is an annual grass that is profuse seeder and occupies grassland very quickly.

Importance of Fertilizers: Grasses are very difficult to establish. In addition to weeding and soil working, application of chemical fertilizers is advisable. 20kg Nitrogen and Phosphorus per ha is suggested. For three years no grazing should be allowed. In the month of June, planting of grass seedling should be done.

3.2 Nala Treatment: To reduce the velocity of the water, Gully plugging, and loose Boulder Structure should be undertaken.

3.3 To Store the water by Earthen Nala Bund (ENB) and Cement Nala Bunds (CNB) should be undertaken at appropriate site.

Some additional measures should be carried out to improve the fodder requirement:

1) ESTABLISHMENT OF SEED PLOTS:

- To get sustained seed availability for the entire meadow and nursery in future years, a seed plot of around 1.00 ha. was selected at each village site. The area will be gradually increased.
- Rooted stock and perennial grasses shall be planted in the rain.
- The seed plots will be made permanent by chain link fencing.
- The seeds collected from the plots will be used for development of meadows and in nursery.

2) ESTABLISHMENT OF NURSERY:

To become self-sufficient in Grass seeds, every range should prepare mother nursery of grasses in one hectare area. The seeds should be collected from forest area and also purchased from known source.300 to 350 gm grass seeds are sufficient for making 1000 poly pot grass seedlings. Grass seeds are very tiny and counts lakhs in one kg. For example (Sehimanervosum - 977900/kg). So mix an equal amount of saw dust in grass seeds before sowing for equal distribution of grass seeds. Poly bag should be of size of 10x15 cm or 10x20 cm or 5X6 inches.

Grass seed collection should be done after Dasshera i.e., in October-November. In the month of February start filling polybags with Soil+FYM+ Sand 2:1:1 proportion. Sow the grass seeds in month of March and it will be

start germinating within one week. After that, maintenance work should be carried out till the month of June.

3) Introduction of leguminous plants:

- Leguminous plants playing following important roles in Grasslands:
- Biological Nitrogen Fixation.
- Increases % of Nitrogen in soil of grasslands.
- Changes the texture and also improves the soil fertility of soil.
- Association with grasses increases the palatability of the grasses.

For Example: Arachisglabrata (Chara Bhuimug) 20 kg per ha., Clitoreaternatea (Gokarna) 1.50 to 2.00 Kg. per Ha., Dolichusbiflorus (Horse gram /Kulith) 40 Kg.per ha., Macropteliumatropurpurium (Seratro)2 kg per ha, Desmanthusvirgatus (Dashrath Grass)20 kg per Ha.

4) REMOVAL OF EXOTIC/ INVASIVE SPECIES:

- Invasive species are weed, non-palatable.
- Invasive species change the species diversity index.
- Invasive species shows the dominance as compared to indigenous species.
- Direct effect on the growth of the grassland.
- E.g.- Ageratum, Celosia, Wild basil

5) Introduction of SILVI-PASTURE method:

In the forest all wildlife is not grazers but there are browsers like black bucks, Nilgai, and chinkaras. So silvi-pasture model of planting will also become fruitful to the site. 5000 grass seedlings plus legume sowing in between two V shape furrows and 200 tree species per hectare shall be prescribed.

At every 25-meter distance CCT of the size of 60X30 CM should be dug. Fill in the CCT in the month of May. Plant the fodder giving trees at two-meter distance.

Tree Species: Acacia nilotica, Acacia catechu, Albizialebbeck, Albiziaprocera, Bauhinia racemosa, Azadirachtaindica, Bauhinia variegata, Bamboos species, Brideliaretusa, Dichrostachys cineraria, Hardwickiabinnta, Ficusracemosa, Ficushispida, Grewiatiliafolia, Madhucalongifolia, Gmelinaarborea, Meliadubia, Terminaliabellerica, Zizyphus jujube, Zizyphusmauritiana.

This tree planting will become an additional source of food in the form of leaves and fruits to the animals. Even dried leaves provide nutrition to the animals. It will also give shade in the scorching sun.

4.6.3: ROTATIONPERIOD: Rotational grazing is practiced in coupes; subsequently it will be closed for grazing to period of next two years.

4.6.4: HARVESTABLE DIAMETERS: Not applicable.

4.6.5: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

4.7.6: FELLING CYCLE: Pasture cycle is fixed as 3 years.

4.8.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB): Not applicable.

4.6.8: CALCULATION OF THE YIELD: The yield is fixed by area.

4.6.9: TABLE OF FELLING: Not applicable.

4.6.10: METHOD OF EXECUTING THE FELLING/CUTTING: The grass is to be cut by "Cut & Carry away basis" to be regulated by the Department through the JFMCs, whenever exists.

4.6.11: SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

Demarcation and Treatment Prescription:

Demarcation: The coupe due for closure to grazing will be demarcated one year in advance, by cutting 3 meter wide lines and erecting pillars at suitable intervals.

Treatment prescribed: Each year about 500 ha. area suitable for fodder development will be selected from out of the coupes and developed for fodder either by removal of obnoxious weeds and unwanted grasses or through ploughing and seeding of suitable grasses. Depending on the requirement of site, suitable options for fencing can be taken up by DCF.

4.6.12. REGENERATION

The work of Augmenting of Natural Grass in grass land will be carried out. DCF shall however take up ploughing followed by seeding of indigenous palatable grass on small scale for the purpose of experimentation and proper records should be kept and proper protection (Fencing) should be provided.

Wherever ANR/ enrichment plantation required to be carried out in existing forest stands, species to be planted should be primarily fodder species, like, Hardwickiabinata (Anjan), Soymidafebrifuga (Rohan), Accacianilotica (Babul), Accasialeucophloea (Hiwar), Zizyphusmauritiana (Ber), Ficusglomerata (Umbar), Terminaliabellerica (Beheda) etc. and other fruit bearing and other miscellaneous species. No teak should be planted in these areas.

4.6.13. ASSOCIATED REGULATIONS AND MEASURES

(1) Grazing Regulations:

(1) While permitting sheep grazing, sheep shall be considered as 1 Cattle unit.
(2) Permission for sheep grazing shall be granted after considering permissible grazing limit as per functional classification of the forests given in the Working Plan i.e. 1 Cattle unit in 0.4 ha
(3) The grazing season will be from 15th September to 15th May.
(4) The system of rotational grazing shall be followed. The rotation shall be three years. All the coupes of grazing series shall be closed for grazing for a period of two years after the year in which it was open for grazing.
(5) The grazing fee shall be charged as per the rates approved by the State Government.
(6) The grazing permission to sheep outside the district shall not be given.
(7) Permission to put up camps in the forest area shall not be granted.

(8) Identification marks shall be put up on sheep's permitted for grazing in the forest.

(9) The name of the person accompanying sheep shall be registered with the concerned Beat Guard.

(10) The Range Forest Officer shall keep control of the issuing of grazing permits.

(11) All other regulations in the Grazing Settlement Report shall be strictly followed.

2)MEASURES TO BE TAKEN:

The grazing shall be regulated as per guidelines of Grazing Policy 1968 of Maharashtra State issued vide Resolution No. MFP-1365/132211-Y dated December 6, 1968, and Grazing Rules issued vide no. MFP-1371/237035-Z dated November3, 1973. However, no grazing beyond carrying capacity shall be permitted.

Heavy cattle pressure adversely affects the forest regeneration and soil condition. The present political economy of domestic animals in the area throws up strong challenges, and implementation of the grazing regulations in its current form. Therefore, special efforts need to be taken up to ensure that no grazing is allowed beyond carrying capacity.

The situation may be substantially improved by establishing effective communication with the local people, awareness generation and an efficient animal husbandry program. The forest officers should take up these preventive measures in co-ordination with the Animal Husbandry Officers.

The carrying capacity and period of closure should be calculated for the forest area adjoining each village. The grazing passes, free or otherwise to individual families are proposed to be distributed on the calculated carrying capacity basis. Village bodies should also be actively engaged in the implementation of grazing regulations.

The surplus cattle should be kept under regular watch, and villagers should be encouraged to adopt stall-feeding or other means to address mismatch between cattle-heads and fodder availability.

Fodder development on the community lands and translocation of surplus cattle may be encouraged.

The sheep grazing problem is so high, therefore captive sheep grazing should be encouraged.

Animal husbandry and Dairy Development Agencies should be motivated and influenced to take up breed improvement program. Fodder in the plantation areas should be made available free of cost on cut-and-carry basis.

The DCF shall carry out cattle census of each village during the winter season at the beginning of the plan period to find out the local cattle once for all and maintain record and passes shall be issued limited to those cattle subject to the availability of carrying capacity.

The passes shall show the compartment numbers meant for the grazing by writing clearly.

Hacking and felling of young plants and big trees be dealt seriously and offenders shall be prosecuted.

The misuse of transit passes of cattle for grazing be strictly checked and if found their passes be cancelled and be dealt according to law.

OTHER REGULATIONS:

Seeding of grasses: In order to allow seeding of fodder grasses, the coupe shall be closed to cutting of grass and will be prohibited from first June to 30thNovember, after which the grass will be allowed to be removed by cutting. Data on such removals should be kept with JFMCs.

Fire Protection: The areas will be protected from fire with the involvement of local people or JFM Committees.

Inspections: The area closed to grazing will be inspected frequently by the Officers in charge to see that the closure is adequately enforced.

Source of Grass seeds:

a) Indian Grassland and Fodder Research Institute (IGFRI) at Jhansi,Dharwad(for Sheda,Dongri,Marvel,Guinea, Signal grasses).

b) Central Arid Zone Reaserch Institute (CAZRI) for KalaDhaman.

c) *Forest* Training *Station at*Jalna,JalgaonprovidesGrass seeds

d) Mahatma PhuleKrishiVidyapeeth (MPKV) Rahurifor Grass seeds and Root slips.

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NON TIMBER FOREST PRODUCE OF AKOLA DIVISION



MOHA



GUM



KALLAVI



TENDU PATTA



SITAFAL



BIBBA/GODAMBI

CHAPTER 5

NON- TIMBER FOREST PRODUCE CHAPTER

5.1 NON – TIMBER FOREST PRODUCE WORKING CIRCLE:

The area of this Working Circle covers the whole division, hence not specifically marked on the GIS based map.

5.2: GENERAL CONSTITUTION OF WORKING CIRCLE:

This working circle covers the entire forest area of the Akola Forest Division. Non- Timber Forest Produce (NTFP) plays a key role in the life and economy of communities living in and around forest. NTFP is mostly collected by the economically backward people living in and around forest area. The tribal people have been conserving plant and crop genetic resources as well as the knowledge on their utility. The people living in forest mostly supplement their food with leaves, tubers, flowers and fruits all year around. The medicinal plants play a key role in the health support systems in remote villages.

5.3: GENERAL CHARACTERISTICS OF VEGETATION:

The forest falls under the category of "Tropical, dry deciduous forest" of Champion and Seth's revised survey of forest types of India and belongs to subgroup 5A/C if "Southern Tropical dry, deciduous" and climax sub types are categorized based on various local factors like soil-texture, depth, soil-moisture, topography and also environmental conditions. Most of these forests suffer from biotic factors like uncontrolled and heavy grazing, illicit felling, and repeated fire incidences and to some extent encroachments. The forests of Akola Division is situated under soils derived from underlying trap characterized by presence of Teak of different qualities depending upon the configuration of ground, soil depth, structure and moisture contents of the soil. Majority forest area is represented by site quality IVa and IVb.

5.4: FELLING SERIES, CUTTING SECTIONS AND JFM AREAS: Not Applicable.

5.5: BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAPS):

Entire Forest Area of the division.

5.6: SPECIAL OBJECTIVES OF MANAGEMENT:

As per the National Forest Policy, 1988 and 'The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006', the development of Non-Timber Forest Produce (NTFP) has been one of the most important objectives in forest management. Therefore, consistent with the above policy and law, the special objects of management are enunciated as below:

i. To protect and manage Non timber Forest Produce and to utilize the existing potential optimally and to enhance the productivity.
ii. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques.
iii. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division.
iv. To generate employment and improve the economy of the local people and thereby improving their socio-economic conditions.

5.6.1: Analysis of the crop:

The species of non-timber forest produce are available throughout the tract with varying degrees. These largely contribute to meet the non-wood forest produce demand of local forest dwellers directly or indirectly. They play an important role in generating employment for the local people. The important non wood forest produces Moha flower, Moha seed, Tendu, Hirda, Behada, Aonla, Charoli, Kulu, Dhawda, Bel and Honey.

Medicinal Plants:

In this tract variety of medicinal plants are available which yield different types of medicines and are as used for curing different diseases by the local people. Medicinal plants occupying an important position in the socio-economic, cultural, spiritual and the medicinal arena of local people. Their sustainable management and harvesting can preserve and conserve biodiversity retaining human and environmental health, generate employment and earn foreign exchange by promoting exports.

It is a world-wide felt need of community about the importance of medicinal plants and their uses in the modern society. These plans are not only necessary for maintaining the environmental balance and biodiversity, but also they are considered as future source of Medicare of human. In medicinal plants arena the resources are still to be explored and their appropriate uses are to be brought to the knowledge domain of people at grass root and acceptable level. This division is considered as very important treasure for future as far as the medicinal plants are concerned. At present the knowledge about the use of various products of medicinal is meagre. The knowledge and the method of extraction of medicinal plants are not favourable for future conservation of medicinal plants. In this area, many people do not know the methods of scientific and non destructive harvesting of products from medicinal plants.

Some of the medicinal plants in the division are not identified which requires intensified surveys and studies at micro level do not give proper picture about most of the medicinal plants. Many medicinal plants appear during rainy season and if the survey is not carried out in that season, many species of medicinal plants may not appear in the survey report of SOFR because of their life cycle. Mere identification of species of medicinal plants is not sufficient for better understanding, and in this direction intensive surveys and

studies need to be carried out during the season before completion of their life cycles. Moreover, most of the field staff do not have appropriate knowledge to identify with the phenological characters and study these medicinal plants. The subject of medicinal plants is one of the neglected aspects among the foresters. The field staff are required to oriented themselves towards medicinal plants in identification, conservation, harvesting, uses and knowledge about lifecycle of medicinal plants. It is necessary to impart appropriate training to the field staff about such aspects of medicinal plants. Some of the important medicinal plants identified along with the produces and uses given in the following table :-

5.6.2: Silvicultural system: Not Applicable.

5.6.3: Rotation period: Not Applicable.

5.6.4: Harvestable diameters: Not Applicable.

5.6.5: **Reducing factors and reduced areas:** Not Applicable.

5.6.6: Felling cycle: Not Applicable.

5.6.7: Division into periods and allotment to periodic block (PB): Not Applicable**.**

5.6.8: Calculation of the yield: Not Applicable**.**

5.6.9: TABLE OF FELLING: Not Applicable**.**

5.6.10: Method of executing the felling/cutting: 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 measures: -

5.6.13.1: Ownership of NTFP:

The statutory provisions have vested ownership rights over the listed NTFPS species in the village communities in the Scheduled Areas without granting such rights over the trees and the land. Till recently, this list did not include Tendu, gum the prominent NTFP species in this tract. But after the enactment of 'The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006', even these forest produces have been included in the category of NTFP.

The Seventy-third Amendment of the Constitution of India has brought the NTFPs under the management of the Village Panchayat. NTFPs (MFPs) in the state and its sale procedure can be categorised into two parts:

1. 33 NTFPs (MFPs) in scheduled areas.
2. Other NTFPs (MFPs) excluding 33 NTFPs in Scheduled Area and NTFPs in Non Scheduled Areas**.**

A) 33 Minor Forest Produce in Scheduled Areas:

1) "Government of India passed the Provisions of the Panchayat Extension to the Scheduled Areas in 1996". In pursuance to this, Government of Maharashtra passed Maharashtra Act No. XLV of 1997, "Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act 1997."

2) As per 1997 amendment, 33 Minor Forest Produce found on Government land in Scheduled Areas; ownership lies with Gram Sabha.

B) Other Non-Timber Forest Produce (excluding 33 NTFPs in Scheduled Area) and NTFPs in Non-Scheduled Areas:

1. Revenue and Forest Department, Government of Maharashtra, Government Resolution dated 5th October 2011, confers the rights of NTFP collection, processing, and sale to the JFMCs. Therefore, capacity building of JFMCs is crucial for realising the potential of harnessing employment generation to JFMC members and additional income to the committee to further invest in the development of NTFPs.

2. Forest Rights Act, 2006 confers the rights over NTFPs to the community right holders. Therefore, in areas where the CFRs (involving NTFPs) have been vested with village community, in such areas, the process of NTFP collection, processing and sale must be initiated by that community.
3. Excluding the above-mentioned areas, DCF can form NTFP units and put for auction. However, mechanism must be evolved to regulate excess harvesting.

5.6.13.2: NTFP Collection:

The details of NTFP collection are given in **Appendix-III, XXIII and XXV**. Though a few species are identified there is huge lacuna in the quantum of availability, collection, and sale of the products. There may be many other forest species which yield various products or leaves, flowers, fruits etc. of such trees are of some use or the other including medicinal uses. However, systematic information in this respect is not available at present. But such NTFPs should also ideally find their due place in the JFM micro-plan. Proper grading, value addition and exploring new markets for the traditional NTFPs (such as gum), shall be included under the JFM programme of the division.

5.6.13.3: Methods of treatment:

Documentation of NTFP Collection: The beat guards will send monthly reports to the Range Forest Officer on the quantity of NTFPs collected in their beats. The Range Forest Officer will compile and send the detail report, mentioning the quantity as well as the market price, to the division office. The division office will compile the figures for each species for division with the view to monitor the collection and to improve the productivity of these NTFP to sustainable limit. Involving JFMCs in this exercise would be beneficial as they are the major stakeholders in collecting, processing and sale of NTFPs. To capture such information with uniformity, suitable printed registers be supplied to all JFMCs through the division office.

Fire Protection Measures: Collection of NTFPs is often associated with forest fires because the villagers set fire around the NTFP yielding trees for clearance of leaf litter and undergrowth. Fires are also caused by agents of Tendu

contractors under the belief to get better flush of Tendu leaves. If it is left unattended, such fires spread into forests as forest fires.

- The Village Panchayats and FPCs shall be involved in awareness generation programme to help control forest fires.
- In case of forest fire, legal action should be taken against the defaulters. Strict vigilance is necessary during the months of February-April to check the spread of fires specially during the Tendu and Mahua flower season.
- Jandhan Vandhan shops:- Jandhan Vandhan shops can be opened in Akola Forest Division and produces of NTFP species can be sold through these shops. JFM Committees shall be actively involved in collection, processing, and sale of NTFPs.

The treatment to be given will be different for different types of NTFPs. Therefore, each NTFP will have separate treatment as follows.

5.6.13.4: Management of Tendu:

Collection of Tendu Leaves: Tendu is the prominent revenue generating NTFP of this tract. Tendu leaves are used for manufacturing bidis. Tendu trade has been nationalised by the Government of Maharashtra Act No. LVII of 1969. Tendu leaves were collected by the department through agents till 1990 season. 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 criterion for bidi manufacturers. The quality depends on the colour, texture and presence of nodules and veins. The best quality leaves are those ranging from ashy to palest hue; Almond colour is also prized shade. Leaves with leathery texture either too thick or thin are good quality for making Bidi. The leaves are collected at various collection centres called phadies. The leaves (pudas) are dried and then packed in gunny bags. The quantity is measured in standard bags.

- Tendu leaf collection is governed by the policy of the State Government in conjunction with various laws presently in force.
- Tendu leaf collection is an income generating activity for most local and tribal villages in the region. The local village communities shall be engaged in Tendu collection in the division to support their livelihood.

- Pruning of young Tendu plants does help in increasing leaf yield. Saplings having more than 5 centimetres collar diameter shall not be pruned. However, felling of Tendu trees or branch lopping for lip collection should be dealt with firmly.

Tendu Regeneration: In view of importance of Tendu to support the livelihood of forest dwelling communities and its economic value for the region, sustainable management, and use of Tendu is prescribed to be given added focus.

- Maintenance and improvement of Tendu in the forest crop composition is prescribed by ensuring regeneration of Tendu and its subsequent protection.
- Singling of shoots and soil working around Tendu seedlings is prescribed in the plantation and rootstock areas to promote growth of Tendu seedlings along with the annual coupes in area-specific working circles.
- Tendu regenerates through root suckers. Hence, young root suckers should be identified and aided for creation of congenial growth conditions such as cleaning of bushes, protection from fire etc.

Year wise production of revenue obtained for the last 10 years is given in **Appendix-XXIV.** To increase the production of Tendu, pruning and pollarding of tendu trees are carried out every year to get good flush of tendu leaves. No other scientific efforts are made to improve the production of tendu. Sometimes local people ignite fire to forest to get good flush of tendu leaves which causes adverse impact on regeneration.

Formation of units:

The entire division is divided into 6tendu units, and which are constituted for the purpose of regulation of trade of tendu leaves under its Forest Produce (Regulation of Trade) Act 1969 vide its No. MFP 2182/240911/F-1, dt.19th November 1983 of Government of Maharashtra.

3. GUM :- **a)** Dhawda Gum (Anogiessuslatifolia) is the main source of gum in this area. This gum is mainly used for Medicine, Chemical, Cosmetic and Food Industries. For disposal of Dhawda gum, range area is constituted as one unit

and these units are sold in public auction at the Divisional, head-quarter at Akola.

b) Yield :- Year wise production of Dhawda gum is given in **Appendix No. III and XXV.** of Volume II. For the collection of Dhawda gum the entire division is divided into eight gum units which are sold by auction. In this area the tapping of gum is through traditional methods as scientific tapping or nondestructive method of tapping is not in practice.

Tapping rules:

The tapping rules of gum derived by the FRI Dehradun are as follows:

The tapping season will commence from November to the end of May each year. No tree below 90 cm in girth will be tapped.

1. Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which the first branch is given off.
2. Only trees above 90 cm in girth at breast height will be tapped.
3. Each tree will be tapped continuously for 3 years and will be given rest for 3 years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.
4. The initial blaze of 20 cm width and 30 cm in length or height may be made on trees in the month of November. The blaze is made 0.6 cm deep in the bark. Blaze may be made horizontally leaving equal space between two blazes.
5. The gum starts oozing out soon after the blaze is made and may be collected after a month, *i.e.,* about December. Subsequent collection and freshening may be done fortnightly up to May. Thus 12 freshening may be required to be made during the year.
6. The lowest row of blaze will be 1 m above the ground level. The next row of blaze will be made at the height of 60 cm from the lower *i.e.,* at a total height of 1.6 m from the ground level, the vertical portion of the blaze of upper row will alternate with similar portion of the row and no 2 blazes of the two rows will be directly one above the other.

7. The number of blazes to be made on each tree will depend on its girth at breast height as given in the following table.

Table No.5.1:

Number of blazes on tree for gum

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

No fresh blaze will be made on the partially healed up surface or old wounds. Each blaze will be in the shape of a parabola with a 2.5 cm side base. The curved side of parabola will be upwards and of height not more than 7.5 cm and depth of the blaze will not be exceeding 0.6 cm in the wood. At the end of the season, the height of the blaze shall not be greater than 12.5 cm. Maximum permissible dimension of each blaze shall be 10X12.5X0.6 cm in width, height and depth respectively.

Since the tapping is to be done continuously for 3 years the total height of blaze at end of 3 years of tapping will be 37.5 cm the width and depth remaining the same. In the second cycle, *i.e.,* in the 7th year (after 3 years rest) new blazes will be made in the same way in the un-blazed portion, in between the blazed portion of the first cycle. This blazing will continue for another 3 years in the manner described above and the operation will be repeated till un-blazed is fully covered.

The "Drill method" for gum extraction can also be done for better gum production. The methodology is as follows.

- The tapping season will commence from November to end of May each year.
- No tree below 90 cm in girth will be tapped.
- Drills of 2 to 3 cm depth (slightly slanting towards base) are made at a spacing of 20 cm at breast height. A tree of 120 cm will have 6 drill holes.
- 1 ml of ethephon (39%) will be injected in each hole.

- Within 4 to 5 hours of ethephon injection, Gum oozing commences.
- Gum can be harvested as clumps every 15 days.

5.6.13.5: Management of Hirda, Beheda, Aonla, Char and Other NTFPs:

Collection of Hirda, Beheda, Aonla, Char and other NTFPs: Fruits of Hirda, Beheda, Aonla and Char are marketable items. Similarly, fruits, flowers, and leaves of certain shrubs and trees are used for variety of purposes. Current level of collection is quite erratic and therefore, poor indicator of their potential in the tract.

Collection of species, which are not covered under the monopoly procurement by government agencies, should be allowed by the Joint Forest Management Committees or Village Panchayats for better protection of Hirda, Beheda, Aonla, Char trees and to increase its stock, few of the above trees be numbered and these trees be allotted to members of JFM committee**.** The members of committees who have been assigned should protect and nurture these trees. Range Forest Officer is supposed to monitor this activity of JFM committee regularly and make proper documentation.

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

Regeneration of Hirda, Beheda, Aonla and Char: Required tending is prescribed where saplings of Beheda, Aonla and Charare found in worked coupes, to remove congestion. Soil working and mulching are prescribed along with planted seedlings and to be done during coupe operations of various areas

in working circles. At least 10% of species taken up for plantations shall be of NTFP species. Hirda, Beheda, Aonla and Char are prescribed for plantations.

MAHUA :-

1) Mahua flower is a rich source of food for forest dwellers which contain Sugar, Vitamins and Calcium. In some of the areas local people also prepare Mahua spirit out of Mahua flowers. The Mahua flower, in its ripe form, has almost 73% of sugar. Mahua flowers are eaten in raw or cooked form and eaten after frying or baking into cakes. In general, 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 like a jelly. It is often eaten with rice, tamarind, Sai seeds, grains, or other food as sweet meat. Dried Mahua flower is also boiled with rice and mixed with wheat, and this provides a total food for local people.

Mahua spirit is prepared by local people by distillation of liquid containing fermented Moha flowers is the most important alcoholic drink in the tribal pockets of this division. The flowers are also used for preparation of certain kinds of non-alcoholic food and drinks by some tribes. The flowers are used for the preparation of vinegar. Mahua flowers are rich in proteins, vitamins, sugar etc. which is one of the highly nutritious foods for local tribal.

2) Mahua Fruit is cream in colour and edible which is eaten either raw or cooked. The seed of mahua are rich in oil content. Oil is extracted by local people for their domestic consumption as well as for sale. The Mahua fruits are also eaten by cattle, sheep, goats, monkeys, and parrots. These fruits have medicinal value, and these are easily attacked by insects and ants, once they are fallen on the ground which become unfit for human consumption. Mahua oil extracted from seeds, is light yellow in colour used for cooking, for light in place of kerosene and for applying to hair purpose by the local people. It is also used in the manufacture of soaps, especially in laundry chips. In some places it is

adopted in place of 'Ghee'. The crude oil of Mahua has a deep colour, highly acidic, unpleasant odour and bitter taste. After treatment it is used for cooking oil and some of the lubricants are also extracted from this oil. The oil is also used for candles, as a batching oil in Jute Industry and as a raw material for the production of stearic acid. 20 to 30% oil out of weight of the Kernels can be extracted depending upon the efficiency of the equipment used for crushing them. The Mahua cake which is a product of Mahua seed after extraction of oil, has got highly nutritive value and it is being exported to foreign countries as cattle feed specially to European countries.

3) Agency for collection of seeds: It is observed that the collection of Mahua flowers and seeds is presently being done by individuals in each village. Mahua seeds and flower collection is limited to vicinity of the villages and almost total collection of Mahua flower and seed available in the forest are collected by local people and there is no need to have a separate agency for collection.

4) Market: Local people after collecting Mahua flowers and seeds, majority of the collection is consumed locally, and excess quantity is sold in the market to private purchasers as the Tribal Development Corporation (TDC) is not operating in this area under Monopoly Act.

5) Grass: There is heavy demand for grass and fodder in this area. Grass is used for stall feeding whereas thatching grass is used for cattle sheds, huts and houses of the villagers.

6) Regulations:

1) The demand for grass and thatching grass should be assessed yearly and the production of these grasses should be recorded in separate registers and these records are maintained at beat, round, range level.

2) For collection of grass each range is considered as one unit.
3) The collection and disposal are as per the procedure laid down by the government from time to time.

7) Rosha Grass (Tikhadi): Rosha grass is available in workable quantity in many reserves such as Palodhi in Karanja range, around Narnala in Akola range and Rui in Washim range.

5.6.13.6: Future Interventions:

The NTFP management on sustainable basis has remained a complex process for the last several decades but in the present scenario, there is a need to adopt multipronged strategy, as under, to build up an environment to strengthen community-based management and trade of NTFPs which in turn would strengthen the livelihood of poor forest dependant population.

Resource Augmentation:

Due to unrestricted and unscientific collection and over-use of products NTFP resources have greatly been depleted in past years while their regeneration has gone down. Special effort is required for reducing the pressure on forest by cultivating selected species and undertaking intensive conservation of existing forests supported by Natural Regeneration and other conservation activities. One of the important strategies for resource generation is conservation, development, and harvesting (CDH) methods which is an integrated approach from conservation and production to the end use.

Undertaking *in situ* conservation measures for NTFPs including protection and Assisted Natural Regeneration (ANR) to reduce resource depletion and reviving endangered NTFPs is required. Conservation of all genotypes including RET species, development, and sustainable harvesting with locally feasible models of community participation. Additionally, cultivation and plantations of NTFP can be promoted in private lands, lands with gram panchayat to reduce the gap in demand and supply. Special efforts need to be taken for all activities of NR, ANR, nursery raising, plantations and tissue culture etc.

Detailed inventory and prioritization:

NTFP sector is still unorganized. There is no comprehensive detail available on most of the NTFPs. Hundreds of NTFP species are of medicinal value and are in active trade. Only few species are recognized and traded while no or a little data is available at the division level. Since NTFP collections are seasonal and may vary from year to year it is difficult to provide demand and supply data until a dedicated system prevails. The first priority would be to prepare a base line data. A first-hand knowledge towards the identification of species should be available at a beat level. Hence a compartment wise inventory of the species, quantity, mature trees available, their production potential and quantum collected needs to be documented. Attributes such as species wise availability, season of harvest, economic part, cultivation status, quantity which is self-consumed, value added and traded also needs to be documented. Range wise species prioritization and selection for conservation, development and harvesting of important NTFP species, demand, and supply for NTFPs needs to be determined. All these information needs to be developed in on GIS platform for better management.

Forward and backward linkages:

Traditionally the whole NTFP sector, particularly its collection, trade and local value addition are managed in an unsystematic and unorganized manner. JFM committees, Gram sabhas and Panchayats were given some responsibilities for NTFP management but are still not able to handle the overall management of NTFP independently and successfully. Most NTFPs are biological and seasonal products where several produces are perishable and require immediate disposal. In most places the primary collectors do not have proper storage facilities. Hence, primary collector is vulnerable to sale at a low price.

In this division a few species can be identified based on the availability. For each prioritized species, value chain analysis and development need to be carried out followed by need based infrastructure development, processing facilities, standardization, certification, enterprise development, purchase and selling, arrangements for working capital/loans etc. Importance should be given to those species which come under RET (rare, endangered and threatened)

categories. There is a need to involve financial institutions to promote community based micro-enterprises with clear benefit sharing mechanisms. Involve financial institutions like public sector banks in NTFP enterprise development. Apart from these the following aspects can be considered for NTFPs.

1. Minimum support price (MSP) for NTFPs: Ministry of Tribal Affairs, Government of India has announced MSP for 24 NTFPs namely, Karanj Seed, Mahua Seed, Sal Leaf, Sal Seed, Lac (Rangini and Kusumi), Chironjee, Wild Honey, Myrobalan, Tamarind, Gums (Gum Karaya), Kusum Seed, Neem Seed, Puwad Seed, Baheda, Hill Broom Grass, Shikakai, Guggul (exudate), Bael (dried and without crust), Nagarmotha, Palash Kesuda (flower), Shatavari (dried), Madhunashini, Kalmegh, Tamarind (de-seeded).

2. Mechanism for market intelligence and information system.

3. Efficient Certification system for improved trade.

4. Revolving Fund or similar financial support to primary collectors through JFM committees.

5. Better access and benefit sharing mechanism with necessary legal provisions needs to be ensured.

6. Value chain development by aggregation, primary processing, grading, branding, and certification. Works initiated by some of the divisions like Gadchiroli can be taken as a reference.

Capacity Building:

Skill/capacity development is very important for the foresters (particularly the field staff) to successfully face the emerging challenges of accommodating community rights in forest conservation, ensuring biodiversity conservation and managing climate change. At the same time, complimentary facilitation should be made for forest protecting JFM committees too in the form of NTFP

management protocols. The following aspects need to be taken up for capacity building.

1) Formation and strengthening of local institutions-JFM committees, Self Help Groups.
2) Special training of front-line staff and members of JFM.
3) Strengthen and restructure existing institutions, particularly public sector procurement and marketing agencies.
4) Modular training for NTFP collector, growers, entrepreneurs, and traders.
5) Local, state, and national level exposure visits of relevant stakeholders.

Income generation:

For empowerment of community and sustainable forests a symbiotic relationship between forests and forest dwellers must be maintained to provide income for the poor population. Women are mostly dependent on NTFPs due to the nature of its production, quantity, collection procedure, processing, and local selling.

Research and Development:

Research and Development activities in the past were, more or less timber centric. Except for few NTFPs like lac, resin, tendu most have been ignored even though they are highly exploited. There is a need of action-oriented R and D in areas of developing new/alternate marketability particularly for low value and high volume NTFPs on the basis of a special drive, post harvesting, semi processing, genetics, management, nursery, plantation, collection, storage, chemical analysis for useful contents, etc. Research is required on biological, social, trade and market and economic dimensions.

Research and Development focus is also necessary to develop NTFP silviculture, sustainable harvesting protocols, low-cost and user-friendly (preferably women-friendly) valueaddition techniques and processing machines, eco-friendly and safe storage methods. To develop the NTFP sector in a holistic way a co-ordinated effort between various Government sponsored programmes is necessary.

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JFM ACTIVITIES CARRIED OUT IN AKOLA DIVISION.





CHAPTER – 6

JOINT FOREST MANAGEMENT CHAPTER

6.1: JOINT FOREST MANAGEMENT WORKING CIRCLE (1:50,000):

The area of this Working Circle covers the whole Division and hence not specifically marked on the GIS based map.

6.2: GENERAL CONSTITUTION OF WORKING CIRCLE:

This Working Circle extends to the entire area of the Akola Forest division which is co-terminus with the area of Akola district. Villages that are adjoining to the forest areas are the focal areas for practicing Joint Forest Management. The details of JFM committee wise area distribution are given in the **Appendix - XI.**

6.3: GENERAL CHARACTERISTICS OF VEGETATION:

The forests of Akola 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 Akola Forest Division are Deccan traps, but the soil varies. Geology, soil type and depth play an important role in determining the composition and quality of the crop.

As the number of villages is more in this Division, naturally, heavy biotic pressure in this Division resulted in degradation of forests, specially adjoining habitations. Those forests are required to be regenerated through intensive protection and development of rooted stock and Natural Regeneration. If necessary, the natural regeneration will be supplemented with Artificial Regeneration with the active involvement and cooperation of the members of JFM Committees. Such areas generally degraded with density less than 0.4, open forest with eroded soils and non-conducive conditions for Natural Regeneration.

6.4: FELLING SERIES, CUTTING SECTIONS IN JFM AREAS:

Not Applicable

6.5: BLOCKS, COMPARTMENTS IN JFM AREA (MARKED ON GIS BASED MAPS):

Entire Forest Area of the Division.

6.6: SPECIAL OBJECTIVES OF MANAGEMENT:

1. To develop the degraded forest resources by promoting natural and artificial regeneration along with site specific Soil and moisture conservation works with the active participation of the villagers. It also aims to provide effective protection.
2. To strengthen and empower local institutions for protection and conservation of forest and wildlife resources through people's participation.
3. To explore and evolve strategies to generate sustainable employment to local people.
4. To rehabilitate and regenerate the forest areas.
5. To check soil erosion
6. To protect the forests and to utilize the degraded forest areas for productive purpose to meet the fuel, fodder, and timber requirements of the people.

6.6.1: ANALYSIS OF THE CROP:

The spread of JFM in the division is large. All the villages that are adjoining forest areas have been brought under the ambit of Joint Forest Management. A total of 56 JFMCs are MoU with Forest Department approximately areas allotted to JFMCs 9108.68 ha for protection and management.

Table No.6.1: Range wise Area Distribution under JFM Committees

Sr No	Range	No of villages adjoining to forests	No of JFM Committees formed	Area allotted to the committees (ha)	Plantation undertaken		
					Name of scheme	No of JFMCs	Area Planted
1	**Akola**	22	12	2378.00	State JFM	2	45
					Campa	1	20
					FDA	1	30
					Vidharbh Vikas	1	50
2	**Barshitakli**	11	11	2380.34	State JFM	-	-
					FDA	-	-
					Vidharbh Vikas	-	-
3	**Patur**	18	18	3398.82	State JFM	3	80
					FDA	0	0
					Vidharbh Vikas	3	150
					Campa	2	40
4	**Aalegaon**	16	15	951.52	State JFM	2	45
					Campa	-	-
					FDA	-	-
					Vidharbh Vikas	-	-
Total		**67**	**56**	**9108.68**		**15**	**460**

6.6.2: SILVICULTURAL SYSTEM: Not Applicable.

6.6.3: ROTATION PERIOD: Not Applicable.

6.6.4: HARVESTABLE DIAMETERS: Not Applicable.

6.6.5: **REDUCING FACTORS AND REDUCED AREAS**: Not Applicable.

6.6.6: FELLING CYCLE: Not Applicable.

6.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB): Not Applicable.

6.6.8: CALCULATION OF THE YIELD: Not Applicable.

6.6.9: TABLE OF FELLING: Not Applicable.

6.6.10: METHOD OF EXECUTING THE FELLING/CUTTING: Not Applicable**.**

6.6.11: SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING:

Not Applicable.

6.6.12: REGENERATION:

Regeneration and protection of NTFP areas and collection, grading, value addition and marketability of various NTFPs in the division are proposed to be given focus for working under JFM program.

6.6.13: **ASSOCIATED REGULATION & MEASURES:**

6.6.13.1: BACKGROUND OF THE JOINT FOREST MANAGEMENT

Degradation of forests is a reality due to various factors such as over exploitation of forest resources due to heavy biotic pressure such as illegal removals from forest, overgrazing, forest fires, loss of topsoil due to excessive erosion etc. Rate and magnitude of degradation is directly proportional to the involvement of rural communities in the protection and management of forest resources. In the past, local communities enjoyed free access to the forests. With the bringing of forests under Govt. control through the process of reservation the access to forest resources were substantially regulated. Thus, Forest reservation policy came in

conflict with the interest of local communities dependent on these forests to meet their basic needs of forest produce for *bonafide* requirements. The forests were managed as govt. property in larger national interest as provided for in the National Forest Policy 1952 which stated that the use of forests by village communities in their neighborhood should in no event be permitted at the cost of national interest. Such policy of managing forests only in larger national interests, overlooking the basic needs of local communities did not succeed and forests were degraded as a result of overuse.

Forest resources being common property resource entails participation of communities in protection and management so that, the belongingness of the community acts as a catalyst for long term forest and wildlife conservation. Therefore, the National Forest Policy, 1988 accordingly provided for creating a massive people's movement for the conservation of forest resources.

The National Forest Policy, 1988 emphasized that domestic requirements of the tribal and other poor people living within and near the forest for fuel wood, fodder, NTFP and construction timber should be the first charge on forest produce and the holders of customary rights and concession in forest areas should be motivated to identify themselves with the protection and development of forest from which they derive benefits. In pursuance to the National Forest Policy, the Ministry of Environment and Forests advised the State Governments to adopt the Joint Forest Management (JFM) approach for the protection and rehabilitation of degraded forests. The Govt. of Maharashtra vide Resolution No.SIF-1091/199/F-11, dt.16th. March 1992 adopted JFM approach for degraded forest areas. Thereafter, the State Government vide Resolution dt. 25/4/2003, expanded the scope of JFM to Good quality forests also. On 5th October 2011, the JFMCs were provided legal backing by bringing them under the umbrella of Mumbai Gram Panchayat Act 1959. Similarly, to further strengthen the institution of JFM, special schemes have been introduced to reduce the biotic pressure on forest and to improve the success of plantations viz., Distribution of LPG/Biogas, Distribution of improved cattle in lieu of scrub cattle, protection of plantations.

JFM is a concept under which the Forest Department and village committee jointly protect and manage the forest. The starting point of JFM must be the realization of the need of JFM both by the Forest Department and the local people. Generally, the scarcity of forest products such as fuel wood, fodder etc. because of degradation of forest on which the local communities depended, forces the people to think of steps for the protection and improvement of degraded forests. People are usually reluctant to participate in JFM where sufficient forest areas are still available to meet their requirements. On the part of the Forest Department, the challenge to effectively protect forests with limited resources is enormous. The JFM program succeeds where the initiative comes from the people's side, and it usually fails where it is forced from FD side as it would only be a Govt. driven and target oriented program. Villagers themselves are required voluntarily to participate in the program. The Forest Protection Committee (FPC) is to be formed in each village through the resolution of Gram Sabha. Each Forest Protection Committee constitutes a Managing Committee consisting of members elected from the general body and with the local Forest Guard /Forester as the member secretary. The managing committee is responsible for implementing the decisions of the general body about the execution of JFM works in partnership with Forest Department. Memorandum of Understanding (MOU) is signed between Forest Department. and the managing committee clearly specifying the duties and responsibilities of both parties. Entitlement of FPC members to the share in forest produce is subject to the fulfillment of conditions of MoU.

The members of the FPC will help in protection and development of forests and in turn they will receive a share in the usufructs from the forest areas assigned to such committee. The JFM area will be managed as per the Micro plan prepared by the JFMC and approved by the DCF. These micro plans shall contain the details of forest and village development works. This must be sustainable, should cater to needs of local communities and the same time, the silvicultural requirements of the forest are to be factored properly.

Govt. of Maharashtra vide Resolution dated 5th October 2011 and 10th July 2012 has issued revised guidelines for implementation of JFM programme. Important provisions of these Govt. Orders are summarized below:

i) JFMC will be constituted by the Gram Sabha through a Resolution under the provisions of Section 49 of Mumbai Gram Panchayat Act, 1958. It would consist of 12 to 24 members, of which, at least 50% are women. Representation to SC, ST, VJNT will be as per prevailing Govt. norms.

ii) The ex-officio member secretary of JFMC would be Forest Guard/Forester if the village population is less than 1000 or more than 1000 respectively.

iii) The forest area to be assigned to JFMC would be decided based on parameters such as production potential, available eco-tourist sites etc. through consultative process. In general, forest areas within 3 KM of *Gaothan* would be identified for assignment. Apart from degraded forest areas, even dense forest areas can also be assigned to JFMCs.

iv) Memorandum of Understanding (MoU) will be signed in prescribed format by DCF (T) and JFMC.

v) Microplan will be prepared by the JFMC and would be approved by the DCF. All JFM activities should be taken up as per the approved Microplan. The Microplans are to be dovetailed with the broad prescriptions of the approved Working Plan of the division.

vi) JFMC is authorized to promote Eco-tourism activities in their assigned areas and can levy Entry Fee & Nuisance Tax from eco-tourists to preserve these sites sustainably and generate livelihoods to local people.

vii) JFMC is authorized to impose penalties on persons involved in forest and wildlife crimes.

viii) RFO and JFMC must submit an annual performance report jointly to the DCF w.r.t. the responsibilities assigned and achievements of the committee.

ix) The JFMC would be eligible for usufruct sharing from intermediate and final fellings as per working plan if the responsibilities thrust on the committee are executed for a period of five years. However, in case of Bamboo, yield from dense areas/degraded areas, the same would be available to JFMC soon after execution of MoU and upon protection of Bamboo for 3 years respectively. All removals would be as per the provisions of the approved Working Plan.

x) In case the JFMCs do not perform the responsibilities assigned to them, DCF is authorized to dissolve such committees by applying the principles of natural justice.

xi) Non forest land available in the village can be included in the JFM programme if the Gram Panchayat agrees to do so.

xii) To reduce the biotic pressure on forests for fuelwood, Govt. of Maharashtra vide Resolution dated 10th July 2012 has launched schemes for distribution of LPG/Biogas connections on 75% subsidy. Similarly, to reduce grazing pressure, distribution of improved breed of cattle in lieu of disposal of scrub cattle has been introduced on 50% subsidy. To improve the performance of plantations, a scheme for plantation protection through financial incentive has been launched.

6.6.13.2: POTENTIAL AREAS FOR JFM:

The following areas will be suitable for JFM program.

- Areas prescribed under the Afforestation Working Circle.
- Areas under miscellaneous management, especially the Zudpi jungles suitable for afforestation, are proposed to be covered under JFM.
- Areas under Grass & Fodder resource management Working Circle are also proposed to be included in JFM.
- Regeneration and protection of NTFP areas and collection, grading, value addition and marketability of various NTFPs in the division are proposed to be given focus for working under JFM program.
- Villages which are adjoining to potential Eco-tourism sites are proposed to be included in the JFM programme.
- All potential wildlife areas are to be included in either the JFM or EDC programme as per provisions contained in Govt. Resolution.

6.6.13.3: AREA COVERED AND COMMITTEES FORMED UNDER FDA:

The Government of India started direct funding to the circle in charge for the developmental works in the forest with the participation of the Villagers under the

JFM programme. So far, only 8 JFMCs are covered under the FDA Scheme. Therefore, special efforts need to be made to bring more JFMCs under this scheme.

6.6.13.4: VILLAGE FORESTS:

Introduction: "Village forests" or "*Gram Van"* means such part of reserved forests or protected forests in the village as assigned to the Village Panchayat under the Indian Forest Act, 1927 and the Village Forest Rules 2014 and under the Maharashtra Village Panchayats Act 1959 for management through Joint Forest Management Committee. The JFMC shall manage its village forests on behalf of the Village Panchayat with due reference to the relevant provisions of the Panchayats (Extension to the Scheduled Area) Act, 1996, the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Act, 2006, the Indian Forest Act, 1927, the Wildlife (Protection) Act, 1972, the Biological Diversity Act, 2002, the Maharashtra Village Panchayats Act and rules made thereunder and any other law in force as applicable to the State of Maharashtra.

Maharashtra Village Forest Rules, 2014: In exercise of the powers conferred by sections 26, 28, 30, 32, 34 and 76 of the Indian Forests Act, 1927 (Act No. XVI of 1927), and all other powers enabling it in that behalf, the Government of Maharashtra has notified the Village Forest Rules on 13th May 2014. The salient aspect of these rules is mentioned below:

(a) JFMCs fulfilling the criteria of Zero encroachment, Positive rate of Natural regeneration, effective control of forest fire (area burnt not more than 5 % in last three years), Over 60% survival in plantations raised in the said area at the end of fifth year, effective implementation of "charaibandi" and "kurhadbandi" are eligible for assignment of Village Forests if at least three criteria are fulfilled.

(b) The village forests assigned to the village community, or the Village Panchayat shall be managed by a committee called as the "Van Vyavasthapan Samiti*"* or the Village Forest Management Committee.

(c) "Van Vyavasthan Samiti" must prepare "Ten Year Microplan" by dovetailing with the Working Plan of the landscape and, an "Annual Implementation Plan" every year for managing the village forests and place the Microplan

before the Gram Sabha for ratification and its approval by the ACF or Sub-DFO in charge of independent sub-division and revise it periodically.

6.6.13.5: GENERAL PRESCRIPTIONS:

- JFM Micro-plans will be prepared for each village through the process of participatory rural approach. Microplans are to be dovetailed with the prescriptions of the approved Working Plan.
- Silvicultural management, maintenance of forest boundary, removal of forest encroachment and control over illicit cutting, illicit grazing and fire should receive high priority.
- Forest protection cannot be viewed in isolation. The works depicted in the Microplans should be reflected in the planning process of the Gram Panchayat.
- Wherever required, NGOs are involved in creating awareness programmes.
- Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
- JFM programme should be implemented with complete transparency. The accounts of JFMCs shall be annually audited as per 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.
- As far as possible, all work is to be executed by JFM members only. Monitoring of JFM activities by supervisory cadres (ACF to CCF) is the key for effective implementation of the JFM programme. Periodic reviews at various levels will aid in good implementation.
- Often, there is thinking in the grassroots level functionaries that JFM must be implemented only if funds are allotted to a village. This notion is

detrimental to the core values of JFM. Therefore, the supervisory officers should strive to bring suitable awareness among the grassroot functionaries (FG to RFO) to change attitudes and mindset.

- Dedicated NGOs/Civil society groups can aid the village communities in strengthening JFM institution. Their services can be utilized by the FD in areas of capacity building of JFMCs in microplanning, community motivation, eco-tourism initiatives, evolving models for enhancing livelihoods etc.
- Periodic evaluation of JFMCs should be done to identify Performers and Non-Performers. While Performing JFMCs should be rewarded, the non-performers should be given an opportunity for improvement.
- One of the important reasons for forest degradation is the dependence of local people for firewood from forests. Therefore, to reduce such dependence, GoM vide resolution of 10th July 2012 decided to distribute LPG connections to forest fringe villages. JFMC's have played a key role in implementing this scheme. In the division, 938 families spread over 61 JFM villages have benefitted from LPG connections. Efforts should be made to extend this scheme to all JFM villages.
- The JFM villages should also be covered with other sources of efficient fuel management like Improved Chulhas with help from the Maharashtra Biodiversity Board.
- 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.

6.7 ACTIVE PARTICIPATION

It is the proper duty and responsibility of forest officials to create awareness among the members of Forest Protection Committee as well as villagers about the importance of forest, its intangible benefits and protection of the forest from fire, illicit felling, encroachment, grazing, etc. The active participation of local people must be encouraged in management, protection and developmental activities of the forest assigned to them. For achieving effective results in this regard, it is required

to take up regular efforts like taking of meeting, conducting workshops and visit to successful areas shall be arranged to explain about the protection of forests and achievements by other villagers. A comprehensive fire protection scheme shall be prepared and explained to JFM members for prevention and protection of forests from fire. The Forest Protection Committee members shall be made to aware of their duties and responsibilities to have their active participation in the protection and management of the forests, therefore, increased the products will be obtained from the assigned areas which will ultimately play an important role for the improvement of economy of JFM members as well as restoration and improvement of the forest areas.

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WILDLIFE OFAKOLA DIVISION



Leopard



Sloth Bear



Chital



Wild Dog



Nilgai



Fox



Wild Boar



Hyena

BIRDS OF AKOLA DIVISION



White Browed Bulbul



Common Buzzard



Common Quail



Grey Jungalfowl



Woodkeeper



Indian Peafowl



Lesser Whistling Teal



Wood Owl

CHAPTER-7

WILDLIFE MANAGEMENT CHAPTER.

7.1: WILDLIFE WORKING CIRCLE:

The area covers the whole Division and is therefore not specifically marked on GIS based map.

7.2: GENERAL CONSTITUTION OF WORKING CIRCLE:

National Forest Policy 1988 and National Wildlife Action Plan 2002 aims at conserving and preserving the valuable natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country. The action plan emphasizes the necessity for the restoration of degraded wildlife habitats outside the Protected Areas in the following terms "**Forest management should take special care of the needs of wildlife conservation and forest management plans should include prescriptions for this purpose. It is especially essential to provide for 'corridor' linking with the protected area in order to maintain genetic continuity between artificially separated sub sections of migrant wildlife".** The Wildlife (Protection) Act 1972 also emphasizes protection of wildlife in general and rare and endangered species in particular.

7.2.1. Further the areas outside the designated Protected Areas also harbivors valuable and major wildlife populations and rare endemic and endangered flora and fauna, which are many a times valuable storehouse of biodiversity and gene pools. These areas are required to be managed with the specific focus on conservation and augmentation of the valuable wildlife resources.

7.2.2. Akola Forest Division is not very much rich in wild life due to scattered nature of forest, shrinkage of habitat, breaking of corridors for wild life movement and the forest patches surrounded by human habitations. Most of the wild life is restricted to remote parts of the forest such as Alegaon, Patur, etc. Due to nature and occurrence of forest the wild life is very much subjected to biotic pressure of indiscriminate shooting, poaching resulted in dwindling of wild life. Some of the herbivore species like Nilgai, Black bucks seen in

agriculture fields due to disturbances in their original habitat. It is interesting to note that at some places these species made agriculture fields as their abode.

7.2.3. The tract dealt with areas around Narnala Wildlife Sanctuary in the North & Katepurna Wildlife Sanctuary in the South. Most of the wild animal resides in these Sanctuaries.

7.3: GENERAL CHARACTERISTICS OF VEGETATION:

The forests of Akola 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, and 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 Akola Forest Division are Deccan trap, but the soil varies. Geology, soil type and depth play an important role in determining the composition and quality of the crop.

7.4: FELLING SERIES, CUTTING SECTIONS AND JFM AREAS: Not Applicable

7.5: BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAPS): Entire Forest area of the Division.

7.6: SPECIAL OBJECTIVES OF MANAGEMENT:

1) To ensure wildlife (animals & plants found in wild) protection and conservation in the managed forests of this Division.
2) To ensure scientific management of wildlife in the managed forests by undertaking measures like habitat management, waterhole development and monitoring population of the wild animals.
3) To provide extra space for spill over population from adjoining protected areas.

4) To ensure protection of ecologically sensitive and special habitat sites for wildlife conservation, such as riparian zones, mesic sites (natural water seepage sites), perennial water holes, natural grasslands, natural wallows, salt licks, natural resting, breeding and nesting sites (caves snags, overhangs, groves of old Ficus trees, thick Bamboo groves).
5) To check wildlife trade and smuggling.
6) To promote and encourage ecotourism without disturbing and damaging wildlife.
7) To generate awareness among local communities towards the need for biodiversity conservation.
8) To protect the wild animals from various diseases.
9) To explore the possibility of engineering habitat to reduce man-animal conflict.

7.6.1: ANALYSIS OF THE CROP:

The tract comprises of geographical area adjoining to Narnala Wildlife Sanctuary & Katepurna Wildlife Sanctuary. Now-a -days these forests areas are in proximity to human settlements and the forests area are also close to agricultural areas and also the approaches to these forests areas have become more convenient due to network of roads. Therefore, it is observed that the species which have less tolerance for human beings are becoming extinct or are on the verge of extinction and the species which have human tolerance are flourishing. And other general observation is that predatory species are less tolerant to human being are becoming rare resulting in the great increase in prey species like Black buck (*Antelope cervicapra*), Blue bull (*Boselephus-tragocamelous*). They graze in agriculture field causing great damage to agricultural crops.

The wild animals noticed in the tracts are:

A) Carnivora:- Panther *(Pantherapardus),* Hyaena *(Hyaenahyaena),* Jackal *(Canisaureus),* Indian Fox, *(Vulpesbengalensis),* Jungle Cat *(Felischaus),* Wild Dog *(Cuonalpinus),* Mongoose (*Herpestesedwardsii*) etc.

B) Herbivora:- Four Horned Antelope *(Tetracerusquadricornis),* Spotted Deer *(Axis axis),* Blue Bull *(Boselaphustragocamelus),* Common Langur *(Presbytis entellus),* Resus Macaque *(Macacamulatta),* Barking Deer (*Muntiacusmuntjack*), Black Napped Hare (*Lepusnigricollus*), Black buck (Antelope cervicapra) etc.

C) Omnivora:- Small Indian Civet (*Veverriculaindica*), Sloth Bear (*Melursusursinus*), Wild Boar (*Susscrofa*), Porcupine (*Hystrixindica*) etc.

D) Rodents: (i) Three striped palm squirrel *(Funambuluspalmarun)* (ii) Jungle striped squirrel *(Funambulussublineatus)* (iii) Porcupine *(Hystrixindica)* (iv)Hare *(Lepusruficaudatus)* and (v) Jungle Rats and Moles.

E) Snakes: Kadu *(Tyhplopsbraminus),* Kawda *(Lycodonaulicus),* Gavtya snake *(Macropisthodnplumbicolor),* Dhondya *(Natrixpiscator),* Dhaman or Common Rat-snake *(Ptyasmucosus*), Indian Rock Python-Ajgar *(Python molurus.)*, India Cobra or Nag *(Najanaja),* Dandekas *(Bugaruscaerulues),* Russel's Viper or Ghunus *(Viperarusselli).* Checkered keel back *(Xenochrophispiscator)*

F) Birds: (i) Painted sand grouse *(Pteroclesindicus)* (ii) Common sand grouse *(Pteroclesexustus)* (iii) Pea fowl *(Pavocristatus*) (iv) Grey jungle fowl *(Gallus sonneratil)* (v) Red junglefowl *(Gallus gallus)* (vi) Red spur fowl *(Gallus spadicea*) (vii) Painted partridges *(Francolinuspictus)* (viii) Grey partridges *(Francolinuspondicerianus)* (ix) Jungle bush quail *(Perdiculaasiatica*) (x) Black breasted quail *(Coturnixcoronandelicus*) (xi) Indian Bustard quill *(Turnixsuscitator)* (xii) Common or grey quail *(Coturnixspp*), (xiii) Pigeon *(Treronphoenicoptera)* (xiv) Crane *(Grusantigone)* (xv) Dove *(Streptpotiaspps)* (xvi) Cotton teal *(Nettapuscoromandelianus)* (xvii) Whistling teal *(Dendrocugnajavanica)* (xviii) Comb duck *(Sarkidiornismelanotus). (*xxix)Little Grebe *(Podicepsruficollis* (xxx) Cormorant *(Phalacrocoraxcarbo*) (xxxi) Grey Heron *(Ardeacinera)* (xxxii) Large Egret *(Ardea alba*) (xxxiv) Black ibis *(Pseudibispapillos)* (xxxv) Pariah Kite *(Milvusmigrunsgovinda)* (xxxvi) Shikra *(Accipiter badiues)* (xxxvii) India Whitebacked Vulture *(Typsbengalensis).*

7.6.2: SILVICULTURAL SYSTEM: Not Applicable.

7.6.3: ROTATION PERIOD: Not Applicable.

7.6.4: HARVESTABLE DIAMETERS: Not Applicable.

7.6.5: REDUCING FACTORS AND REDUCED AREAS: Not Applicable.

7.6.6: FELLING CYCLE: Not Applicable.

7.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB): Not Applicable.

7.6.8: CALCULATION OF THE YIELD: Not Applicable.

7.6.9: TABLE OF FELLING: Not Applicable.

7.6. 10: METHOD OF EXECUTING THE FELLING: Not Applicable.

7.6.11: SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not Applicable.

7.6.12: REGENERATION: Not Applicable.

7.6.13: ASSOCIATED REGULATIONS AND MEASURES:

7.6.13.1: HISTORY OF WILDLIFE MANAGEMENT IN GENERAL:

From time immemorial the wild animals have occupied a place of pride in the folklore of Indian culture. They were respected and protected by the tribal's who never used to kill the animals for fun or pleasure. However, hunting became an important pastime for the Rajas and Maharajas who used to hunt and kill the animals for meat as well as for preparing trophies. In the Reserved Forests, hunting was restricted and licenses were used to be issued for small game, big game, etc. and shooting blocks were set apart, where the animals specified in the license only could be hunted.

Prior to the abolition of the proprietary rights, hunting in the *malguzari* forests was done with the permission of the *malguzars*. Consequent to the vesting of these forests in the Government as Protected Forests, hunting in these forests was also regulated by fixing shooting blocks and by issuing licenses.

However, after the enactment of the Wildlife (Protection) Act, 1972, the hunting and trading of wild animals and its trophies were strictly monitored and subsequent amendments in this Act in 1991 and 2002, hunting of any animal included in the Schedules of Wildlife (Protection)Act 1972, (other than vermin),

as game or sport, has been completely banned.. Hunting of wild animals however can be allowed for special purposes but only in exceptional circumstances. The maintenance of biological diversity is the new mandate of National Forest Policy, 1988. Restriction of degraded habitats outside the protected areas is one of the strategies for action listed in National Wildlife Action Plan (2002-2016). Therefore, primacies of environmental concerns and biodiversity conservation have been dealt in this chapter.

The wildlife, which used to flourish in the forests of the Division, is threatened due to various factors like population explosion, encroachments, over grazing, regular forest fires, improved network of roads and availability of sophisticated weapons. Due to increase in demand for wildlife products all over the world, poaching problems have increased. Hence, special efforts are required to be made by the Division to protect the wildlife in the region.

There are many endangered insects and plants included in the schedule of wildlife protection act 1972. They silently play a very important role in the ecology but information about such species is scanty. Hence, division should make efforts to build database on such species by instituting special studies involving research organizations.

Existence of Wildlife in Forest: Existence of particular wild animals in a particular forest can be identified from the following observations.

1. **By Actual Sighting:** In the early morning or evening, near water holes, grazing sites or on the roads, we can see the wild animals.
2. **Pug Marks:** By keen observation of these pug/hoof marks we can identify the category of wild animals, theirs sex and age.
3. **By Excreta:** By the examination of excreta we can know the category of wild life, their numbers, way of walking and, quantity of food etc.
4. **Antlers Marks (on the stem of tree):** Before falling of antlers, Spotted Deer and Sambars rub their antler
5. **By Salt Licking Places:** In forest some soil contains more percentage of salt and minerals and wild animals use to lick this soil to get the necessary amount of salt.

6. **By Sound:** In forest we can hear different types of sounds of wild animals. Some wild animals give signal of danger to other animals with the help of different sounds.
7. **By Wallowing Sights:** Sambar, Wild Boars etc like mud and they wallow in mud. By this they clean their skin and protect it from insects.
8. **Nail Marks:** Tiger and bear with the help of their Claws/Nails scratch the bark of some trees.
9. **Grazing Marks:** The method of grazing of different herbivores is different. We can identify the category of herbivore by the nature of grazing and browsing.

7.6.13.2: INJURIES TO WILD ANIMALS:

Poaching: In spite of stringent provisions in the wildlife and forest laws, poaching for skin, bones, pets and flesh, continues to be the most important reason for destruction of wildlife in the Division. Poachers use various methods to kill wild animals. Vulnerability to poaching increases during summer (pinch period) when number of water holes reduce drastically and also water in a water hole recedes to minimum.

It has been noticed that poisoning of drinking water by mixing urea in large concentration can kill wild animals instantaneously. When an animal drinks such water, it dies within hours due to intense gas formation in stomach and chocking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets, snares and traps for catching birds, hares and sometimes small animals like deer has been recorded in the past but of late the poachers have been found using the improvised spring steel traps for killing the large animals, like Tigers and Panthers, very effectively. This method is often used by Baheliya gangs for killing tiger.

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

Degradation of Habitat: Due to various human activities the habitat of various wild animals are degrading very fast and is manifested in the form of reduced population of many animal and bird species. The main factors adversely affecting the wild habitat are:

- Heavy biotic pressures, like over grazing, encroachments on forest lands, large scale human and cattle movement in the forest areas, forest fires etc. are responsible for the general degradation of these habitats.
- Large scale diversion of Forest Land for projects like, irrigation dams and canals are also adversely affecting the wildlife habitat by fragmenting the forest areas and creating barriers for the movement of wild animals on one hand and risk to their lives, specially for the young ones, on the other hand. Suitable mitigating measures should be included in the sanction orders.

Diseases: The livestock from the villages in the forests regularly frequent the forests and share the water holes used by wild animals. Therefore various diseases common in domestic cattle, and which spread through contact and are water borne (contagious diseases) are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (4) FMD (5) Canine distemper. FMD has a potential to wipe out large populations, while rinderpest, anthrax and rabies are highly infectious and lead to certain death. Therefore, co-ordinated efforts with Animal Husbandry Department to vaccinate domestic animals in wildlife rich areas is a must to safeguard wildlife.

Fires: Forest fires are of common occurrence these days. The fires in the interior of the forests, besides destroying the natural habitat of the forest fauna, drive them to take shelter near the human habitation and make them easy targets of poacher's guns or local villager's weapons. Due to fire even the young ones of big and strong animals may perish, besides other animals, reptiles and birds, which live on ground and cannot, escape the fire and its heat. In case they survive, their food, grasses, herbs and shrubs are destroyed though is already insufficient to meet the requirements of cattle as well as the wild animals. The whole tract experiences water scarcity in summer. These fires aggravate the already existing

water scarcity and expose these animals to above mentioned risks. It increases the man animal conflict.

7.6.13.3: DAMAGES TO CROP, LIVESTOCK AND HUMANS:

Damages to the Crops: Incidences of crop damages by herbivores have been reported predominantly in forest fringe villages. This is leading to economic losses to farmers. Statistics of Crop damage by wildlife is given in **Volume II, Appendix No. XXX - A**. Farmers are compensated for the losses as per the Govt. orders issued from time to time.

Injuries to Cattle and Human: The carnivores, Panther sometimes kill domestic cattle grazing in the forests. There are also cases of human injury and even death due to attacks from wild animals. The villagers sometimes indulge in poisoning the carcass to take revenge and cases of electrocution of wild animals by the villagers to kill the animal suspected to have killed the cattle have also been reported. In such cases the persons involved in illegal killings of the wild animals do not have any intention of poaching or trade but such activities on the part of local people pose grave danger to animal populations in the forests. Statistics of damage to livestock and humans is given in **Appendix No. XXX – B and XXX - C**. The Govt. of Maharashtra, has therefore has evolved a policy of compensating for the loss of livestock as well as for the injury or loss of human life.

7.6.14: RECOMMENDATIONS FOR FUTURE MANAGEMENT:

7.6.14.1: Standing Order (Wildlife) No. 001.

The PCCF (WL) MS, Nagpur has issued a standing order (Wildlife) No.001. This order prescribes duties and lists measures for the protection and conservation of the wildlife outside PAs. Following are the general prescriptions, majority of which are based on the guidelines under this Standing Order, for the protection of wildlife in the areas outside the Protected Areas. The territorial staff of the Nagpur Division shall scrupulously implement these prescriptions.

Duties of Forest Guard, Forester, RFO and ACF include-

- Keeping information of waterholes, particularly in summer and watch on the same, that is, special vigilance at all the water holes in the Division is prescribed.
- Keeping a watch on the electric lines passing through forests.
- Ensuring registration of arms licenses as required under Wildlife (Protection) Act 1972.
- Cognizance of cases of injury due to wild animals as per Govt. Orders from time to time with speedy and transparent disposal of cases.
- Keeping a track of animals like Tiger, particularly Tigress with cubs and a watch on such vulnerable animals.
- Proper disposal of carcass of wild animals found dead or killed.
- Local staff shall maintain record of sensitive wildlife areas such as areas with heavy wild animal concentration.
- Establishing a network of informers with the aid of Secret Service Fund.
- There shall be regular short-term training/ workshops in anti-poaching activities and legal requirements in dealing with wildlife offence cases.
- Cases of Man-animal conflict should be handled swiftly and efficiently. Keeping in view the vast area of the division, at least two Rapid Response teams shall be operationalized 24 x 7. Such team should be given need based training. Every Range HQ should contain the equipment necessary to handle conflict situations.
- Nature education programme in the villages adjoining forests and in schools and colleges shall be arranged.
- Ecologically sensitive habitats shall be identified and protected.
- Antler trade is now banned; hence, no collection of shed antlers is to be allowed.
- The involvement of Honorary Wildlife Warden and serious NGOs be encouraged for nature education programme.
- It will be ensured that cattle grazing in forests near the important wildlife habitats are inoculated against contagious diseases.

7.6.14.2: CREATION OF DATA BASE:

The Division will carry out survey of *riparian zones, mesic sites, perennial water holes, saltlicks, natural wallows, resting places, breeding and nesting sites, etc.* and map them (with GIS) for the purpose of their protection and management. The staff will also identify the areas where these sites are under potential threat. The Division will also maintain a meticulous record of these sites on a register the "Register of the Special Wildlife Habitat" and update it annually by an officer not below the Range Forest Officer.

The Division will undertake annual population estimation of the wildlife, including the migratory and other rare birds, in addition to All India Tiger and Panther population estimation. Special note should be taken if any nesting site of endangered birds like Vultures is noticed. Concurrent monitoring of top carnivores through camera trapping shall be made.

7.6.14.3: DELINEATION AND MAPPING OF SPECIAL HABITAT AREAS: Delineation of the special wildlife habitat sites including natural water seepage sites (mesic sites), water holes, natural wallows and saltlicks used by the wildlife, breeding sites, dens or nesting sites of animals and birds appearing in the Schedules of the Wildlife (Protection) Act, 1972 shall be carried out and marked on the Divisional/range maps. For instance, the Mango and Jamun groves on moist sites are generally the mesic sites. A strip of 50-meter around special habitat sites shall also be delineated and mapped to serve as buffer for the site.

While preparation of treatment map of coupe for working in the area-specific working circles the special wildlife habitat sites given above shall be identified and marked on the map along with its buffer of 50 metre width strip around.

7.6.14.4: **HABITAT DEVELOPMENT WORKS:** Due to continuous biotic pressure, the wild life habitat has also deteriorated and today it has reached a critical condition. The most important factors in the habitat are water, food, safe places for resting, breeding, and nesting. Wallows and salt licks are other factors. To meet the minimum requirement of the wild animals the following activities are recommended:

A. Water Hole Development: Water availability, or the scarcity of it, is one of the major factors that decide the health of the habitat. Its non-availability at sufficient places in the forests also increases probability of animals being found on the limited water holes or near villages and thereby increases their susceptibility to poaching. Water is a major limiting factor during the summers in these forests. The water hole density shall be commensurate with the density of wild animals found in the area and as per the wildlife management regulations. To meet the requirement the following steps may be taken:

i. All the perennial and ephemeral water holes will be identified, recorded and marked on Divisional/range maps.
ii. De-silting, if required, shall be carried out during summer to provide adequate drinking water.
iii. Creation of additional water holes (permanent and temporary) is prescribed so that undisturbed water holes are available.
iv. Small nalla-bunds, underground bunds and other technically sound small water harvesting structures may be constructed across the streams to create water holes and habitat development.
v. Small water harvesting structures with submergence area less than 1/2 hectare shall be taken up. However, creation of water holes or water harvesting structure should not damage the riparian ecosystem.
vi. Small cement concrete saucer shaped water holes shall be constructed at suitable and safe places and be linked with Solar Powered pumps fitted to bore wells.

D. Food/Prey Base: Whether the prey base is adequate or not shall be ascertained from regular herbivore count. Supplements of cattle kill should be taken into account while computing existing herbivore population. Any downward trend should be looked into seriously and possible reasons for its downslide must be found out and rectifying steps must be taken.

To improve the prey base, care of herbivores should be taken by improving the assured fodder availability in the forest, especially during the summer season, when the forest grasslands are burnt. The open areas in wildlife rich zones should be developed into meadows for the herbivores.

E. Development of Nesting Sites: To provide suitable nesting places to these birds, seed sowing of species like Babul and stake planting of species like Banyan and other Ficus spp. should be done near waterbodies and in the riparian areas.

7.6.14.5: PROTECTION MEASURES FOR WILDLIFE:

There are many villages within and nearby the forest. They are dependent on agricultural, and forestry works. These villages, with large number of livestock, are threat to the wild animals as they share the same water bodies and grazing grounds. Due to common grazing and drinking water at same places, many contagious diseases may spread in the wild animals. To protect the wild animals from such contagious diseases, forest department with the help of Veterinary doctors, should take the following preventive measures in such villages:

Vaccination of Village Cattle: All cattle of adjoining villages within 5 KM from the boundary of Protected Areas should be vaccinated every year for important diseases. This activity shall be monitored by the PA manager and also DCF (Territorial).

Regular Health Checkup for Cattle: Forest staff, with the help of veterinary doctor of the area, should organize annual cattle health checkup camps in villages. Required vaccination should be done and if required, proper treatment to sick animal should be given.

Proper Sensitization of Staff: The field staffs of the Division should be trained in day-to-day wildlife management and protection works. They should work in close cooperation with the Wildlife wing.

Protection from Poaching and Trade: The forest staff shall develop an intelligence system with the help of local people, especially with Joint Forest Management Committee, to gather information about any activities related to poachers and traders of wildlife.

- Regular patrolling by the staff shall be carried out in the areas where the population of wildlife is more, especially during summer when these animals become more vulnerable due to shortage of water in the forest areas.

- The forest staff shall also be vigilant in the towns' market where at times birds like Parakeets, Partridges, Quails, Waterbirds, Monitor lizards, Tortoise, Turtles etc. are brought for sale.

Protection of Forest from Over-grazing and Fire: After poaching, uncontrolled grazing and fire are the most important factors, adversely affecting the wildlife. To restrict illegal grazing, by cattle including goat, sheep etc., and during the fire season, to prevent the forest fires, patrolling parties should carry out regular patrolling in the sensitive areas of the forest.

Capacity building: Books related to Wild animals' disease, treatment, tranquilization, wildlife management etc. should be supplied to the field staffs to improve their management skills. Short duration training for tranquilization of wild animals, to the forest staff and Veterinary Doctors, shall be imparted.

Tiger corridor: The Wildlife Institute of India (WII) should carry out study on tiger corridor connectivity from Melghat wildlife sanctuary to Yawal wildlife sanctuary. Already WWI has carried out study on tiger corridor connectivity on Eastern Vidarbha landscape.

7.6.14.6: MARKING RESERVATIONS, OTHER RESTRICTIONS: The following, prescriptions have been made for implementation along with coupe operations and other treatment prescriptions, in the wildlife area-specific coupes.

- No felling of trees or harvesting of any sort shall be allowed in riparian zone.
- While marking of dead, wind fallen and malformed trees in annual coupes, 2 trees per hectare shall be kept reserved, as snags and dens to provide for nesting and resting of wildlife. No fruit tree of wildlife importance shall be marked for felling in the annual coupes.
- While harvesting at least 2 down hollow logs of low commercial value, per hectare shall be reserved for shelter of wildlife.
- Tendu collection centres or labour camps shall not be allowed near water holes frequented by the large mammals or other important wildlife species. The labour camps shall be established away from areas of high wildlife density.

7.6.14.7: DEVELOPMENT OF FODDER

- The carrying capacity for grazing is determined after excluding the forest area required to meet fodder requirements of the wild animals and ecologically sensitive sites and special habitat sites for wildlife in the area.
- Habitat improvement is proposed at places having high density of wildlife and the areas frequented by both domestic animals and wildlife. Special efforts are to be initiated to develop meadows.
- Plantations prescribed in various working circles shall include at least 10 percent of fodder and fruit species of wildlife importance. Ficus spp. (*Vad*, *Gullar, Umbar), Ber, Anjan, etc.* are recommended for this purpose.
- In the areas falling within the FTL 2-4 metre level of major and medium irrigation projects, planting of good fodder grass shall be taken to increase the grazing facilities for the wildlife.

The Dy. C.F. Akola will take special care to motivate and orient the field staff in favour of Wildlife through regular meetings, guidance, and workshops. Some of the RFOs and Foresters shall be sent to short term training in the Wildlife Institute of India. Besides this help of trained officers and staff of wildlife Divisions may also be taken.

To start the work of habitat improvement some demonstration works and visits to wildlife areas should be carried out to expose the field staff to the technical aspects of Wildlife Management.

7.6.14.8: ECO-DEVELOPMENT, AWARENESS GENERATION AND ECO-TOURISM:

- Effective protection and management of sensitive ecological and special habitat sites/areas is not possible without active involvement and support of village communities in the vicinity. Their help and support can only be ensured if their genuine needs and concern are given due consideration by the department. If the people living around are poor and anguished, the objective in question cannot be achieved. Thus, to seek their willing support and goodwill it is proposed to undertake eco-development works by the Division in villages around these sites. It is also proposed to

promote and encourage eco-tourism in the Division by extending and developing camping and nature interpretation facilities at sites/spots, rich and unique in natural and cultural beauty and diversity. It is, in accordance with, the current policy focus of the State and Government of India on eco-tourism. The forest department should be in touch with the MTDC for the development of such sites.

- The prominent waterbodies and specific habitat sites in the Division are proposed as sites for creation of Eco-centres with facilities of nature interpretation and eco-tourism and to serve as centres for awareness generation and dissemination of issues and concerns of forestry and wildlife.
- The villages adjoining sensitive sites are proposed to be taken up under eco-development program for their overall development. Eco-development plans shall be prepared with the help of local communities.
- It is also prescribed to delineate sacred sites/grooves and worship sites, including, sites for tribal deities with involvement of the local village communities. They are marked on the Division/range maps.
- Archeologically important sites identified as such by the Archaeological Survey of India or the State Department of Culture shall be delineated to serve as focal sites for eco-tourism.
- The Division will maintain record of sacred and cultural sites on a register the *"Register of the Cultural Sites*" and verified and update it annually by an officer not below the Range Forest Officer.
- Awareness generation campaign be taken up to involve local villagers in the wildlife conservation programme. *Village Panchayats* and *JFMCs* shall be involved actively to further the cause of wildlife protection.
- Teaching institutions viz. schools, colleges, etc. and NGOs shall be involved through nature camps, wildlife film shows, exhibitions, seminars, competition, etc.

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CHAPTER – 8

FOREST PROTECTION CHAPTER

8.1. FOREST PROTECTION CIRCLE

The area of this Working Circle, covers the whole Division and hence not specifically marked on the GIS based map.

8.2. GENERAL CONSTITUTION OF WORKING CIRCLE

This working circle covers the entire forest area of the Akola Forest Division. The forests of Akola Division are burdened with heavy biotic interferences, hence addressing these problems in a systematic manner necessitated incorporation of this Working Circle. The main objectives of the management of this working circle were to enforce the Indian Forest Act, 1927, Wildlife Protection Act 1972 for the effective control of illicit felling, grazing, encroachment, fire, poaching and to develop the database to monitor various offence cases in a systematic manner.

8.3. GENERAL CHARACTER OF VEGETATION

The forests of Akola 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, and 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 Akola Forest Division are Deccan traps, but the soil varies. Geology, soil type and depth play an important role in determining the composition and quality of the crop.

8.4. FELLING SERIES AND CUTTING SECTIONS (with JFM AREAS): Not Applicable

8.5. BLOCKS AND COMPARTMENTS (with JFM AREA) (MARKED ON GIS MAPS)

Entire Forest Area of the Division.

8.6. SPECIAL OBJECTIVES OF MANAGEMENT

The forests of the division are blank to scrubby, and the quality is IV b. The soil condition is alarming and the depth of soil in most of the areas is below 30 cm. The soil erosion is excessive due to the rocks having been exposed in most of the cases. Therefore, intensive protection works are required to save the area from desertification.

The following objects have been proposed for the plan period: -

(i) To stop soil erosion and improve the soil depth.
(ii) To stop illicit cutting of trees and to improve Natural Regeneration.
(iii) To stop illegal grazing to improve natural regeneration and soil quality.
(iv) To protect the area from fire and encroachments.
(v) To protect the forest and wildlife with the co-operation of local villagers through JFM.

8.6.1. ANALYSIS OF THE CROP: Not Applicable

8.6.2. SILVICULTURAL SYSTEM: Not Applicable

8.6.3. ROTATION PERIOD: Not Applicable

8.6.4. HARVESTABLE DIAMETERS: Not Applicable

8.6.5. REDUCING FACTORS AND REDUCED AREAS: Not Applicable

8.6.6. FELLING CYCLE: Not Applicable

8.6.7. DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB): Not Applicable

8.6.8. CALCULATION OF THE YIELD: Not Applicable

8.6.9. TABLE OF FELLING: Not Applicable

8.6.10. METHOD OF EXECUTING THE FELLING: Not Applicable

8.6.11. SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not Applicable

8.6.12. REGENERATION: Not Applicable

8.6.13. ASSOCIATED REGULATIONS AND MEASURES

FOREST PROTECTION:

Forest Protection emphasis on prevention and control of damage to forest by natural or manmade causes. (Example - fire, animals, insect, fungi, injurious plants, and adverse climatic conditions). The major causes for the damage of the forests in this division are illicit felling, grazing, encroachments, poaching and fires.

ILLICIT FELLING:

It is the major problem in this division. The forest area of range is very sensitive from the point of illicit felling. To have effective protection regular patrolling needs to be undertaken by the field staff and the members of the joint Forest Management Committee as "Shramdan" In order to control the illicit felling in trancit new check nakas to be established part of existing Check Nakas at sensitive and hypersensitive places. The vehicle and enforcing staff shall always be kept ready for contingent situations. The early detection of illicit felling cases, prosecution in the court of law and making list of habitual offenders.

There is a need to create a local network system for information by providing cash incentive to the staff as well as local people those who help in providing information for nabbing offenders and seizing the illicitly felled material.

Presently there are 4 Check Nakas established at various strategic points to control the transportation of illicit forest produce and one more Naka is proposed to be established.

There is no wireless system in the Akola division.

The Check Nakas must be duly notified by competent authority and published for the benefit of public as well as law enforcing authorities.

The Check Nakas are manned by Forest Guard and Vanmajur and they do not have modern systems of communication like Walky-Talky or Wireless connection. It is required to strengthen existing Check Nakas with effective controlling force i.e., manpower and modern communication system.

The Division has only 9 vehicles available for protection

Sr. no.	To Whom the Vehicle is allotted	No. of vehicle	Vehicle No.
1	Dy.C.F.Akola division	1	MH-30-0418
2	A.C.F.Akola division (Vane)	1	MH-30-0431
3	A.C.F.Akola division (Bhavka)	1	MH-30-0587
4	R.F.O.Akola (Mobile Squad)	1	MH-30-H-0362
5	R.F.O.Akola (T.)	1	MH-30-H- 0351
6	R.F.O.Akola (T.)	1	MH-30-H- 5335
7	R.F.O.Barshitakli (T.)	1	MH-30-H-5319
8	R.F.O.Patur (T.)	1	MH-30-H-5336
9	R.F.O.Alegaon (T.)	1	MH-30-H- 5318

There are 4 Forest Check Posts in Akola Division-namely at –Bodkha, Babulgaon-1 in patur range and Rajgad and Pandhura in Alegaon Range.

The Akola Division consists of 64 beats out of which 18 are Normal, 13 are Sensitive and 33 are Hypersensitive.

- Faster communication including vehicle facilities, adequate defence capabilities, frequent training, and establishment of forest stations at strategic places are recommended to control illicit felling and wildlife offences. Establishing intelligence network for this purpose is strongly recommended. In addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should be taken up like efficient wood

utilization and energy efficient alternatives like Community Kitchens of Hindustan Petroleum, Biogas, solar cookers, etc.

The following general Strategies are prescribed for the effective protection of the forest.

- Review the offence cases beat wise, every month.
- Review the varas, bevaras offence cases monthly; efforts are made to find out the offenders in each bevaras case.
- Every varas case having more than Rs.10,000/- worth forest produce/loss to the forest invariably is submitted to the court within the prescribed time.
- Delay in the submission of Complaint case in the courts is viewed seriously.
- Use IPC provisions, for the effective control of illicit felling.
- The data related to offence cases shall be analyzed with the help of the computers using the available software.
- Monitor the occurrence of all the offence cases daily through wireless.
- Reorganize the beats in such a way so that the average beat area shall be 500 ha.
- Identify and list all the paths used for the transportation of illicit material.
- Place effective patrolling squads at all-important routes to prevent the transportation of illicit material.
- Emphasis shall be made to arrest and prosecute the offenders rather than seizing the material.
- Use the provisions of rewards for gathering information.
- Provide regular training to the staff in submitting the Complaint case preparation of panchanamas etc.
- Plan in such a way to have young guards in the hypersensitive areas.
- Patrolling squads shall be not less than 10 in number to overcome the group of offenders.
- History sheets of all the offenders along with their photo and biodata are maintained at Round Level, Range and Division Level.
- Prepare a list of offenders, showing the offence cases registered against each offender.
- Use Cr. P. C. 110 provisions with respect to habitual offenders.

- Provisions of IPC 395 shall be used by registering the complaint in the police station for the offences wherein five or more than five offenders are involved. The DCF shall co-ordinate with the S.P. to see that stringent sections of IPC will be used in the F.I.R.
- Sufficient funds for patrolling and honorarium of advocates be made available as top priority.
- Efforts are made to appoint the forest counsel as directed by PCCF office.
- Every stump in the forest is numbered with digit nails set both on the top of the stump as well as on the base.
- Every beat guard shall maintain a register of stumps in the following Proforma. Every stump is registered by a serial number followed by/ and year, for example, if tree number is 198/05. Here 198- is tree no. and 05- is year.
- Every year from January 1st, onwards start the new series.
- After one year all the high stumps be dressed to ground level to obtain good coppice.
- The supervisory officers, during the beat inspection, verify the registered stumps and unregistered stumps. The beat guard shall be held responsible for non-registering the illicit stumps.
- Every Range and Division office shall maintain the Xerox copies of the judgments of all forest cases for guidance and improvement purposes.
- Sections of IPC having the trial jurisdiction of District Court be used in the complaints and in the FIR.
- Court Guard duties be assigned to a special duty guard for each Range office and as well as Division office to monitor the dates and for timely communication to the witnesses.
- Proposals for the wireless network shall be prepared in such a way that every part of the division area becomes communicable.
- Interstate co-ordination meetings with the authorities of M.P. Govt. shall be made, to arrest and prosecute the offenders of M.P who are involved in the offences of Maharashtra state.
- Obtain the support of the local villagers in catching the offenders (JFM Committees)

The RFO shall collect the beat khairiyat report from each forest guard and round officer monthly and shall submit Range khairiyat report to the DCF every month.

All cases of violation of the Forest Conservation Act, 1980 shall be referred to the regional CCF, Bhopal through Nodal Officer for prosecution purposes with respect to the government officers involved in the cases.

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 forest development. The division officials and local people shall be sensitized about the need for effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

Fires are a common occurrence. With long-standing fire protection measures and vigilance of the staff, the forests, in general, have been protected against fires in spite of the handicaps.

CLASSIFICATION OF FIRE CONTROL AREAS:

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

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

Class-III (General vigilance): The remaining forest areas of Pasture Working Circle (that is, areas not included in the above two classes) are identified as the Class-III fire control areas. Special measures for fire protection are not undertaken, but deliberate setting of fire and burning the forest is prohibited.

Fire control measures:

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

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

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

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

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

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

The fire lines shall be kept clear of all growth and combustible material during the season. Leaf litter and other dry material on the fire lines shall be collected periodically along the edge and burnt before the fire season starts. Firewatchers engaged for this purpose will have a duty to sweep the fire lines continuously and keep them clean of any debris or leaf litter.

Depending upon the watchmen and other manpower available in the area, suitable blocks may be identified around which regular clearing of the fire lines should be ensured.

The cutting of fire lines shall be completed by December. Fire tracing (burning) shall be completed by February15, and thereafter burning should require permission of the Deputy Conservator of Forests and physical presence of a gazetted officer.

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

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

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

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

Three rows of agave suckers in 1.5 m. wide strip along the contours shall be planted during the monsoon season at the foothills of steep slopes to prevent the spread of fire, as agave acts as a fire barrier. This activity shall be carried out along with regular coupe work.

Standard widths of fire lines are prescribed in Table 8.1.

TABLE SHOWING STANDARD WIDTHS OF VARIOUS TYPES OF FIRE LINES:

Sr. No.	Characteristics of the area	Width of fire line in meters
1	External boundaries of the forest Division	12
2	Naturally or artificially regenerated areas (For 5 years) (coupes)	6
3	Remaining coupe boundary	6
4	Both sides of road and cart tracks through the forests	6
5	Timber, bamboo, and firewood depots	40

Daily monitoring of fire incidences and the areas burnt, and the efforts made by the staff to control the fire shall be monitored through wireless on day-to-day basis by D.C.F. and D.F.O. vigilance under the supervision of CCF Territorial.

GRAZING REGULATIONS:

The entire forests are liable to damage from grazing. The 'C' class forest is heavily grazed and is now earmarked for sheep grazing. In fact, there is hardly any grass left in this block.

The forests are heavily grazed during the few months of rainy season after which most of the cattle are shifted to lower ranges on account of the shortage of grass and water on the plateau.

The grazing incidence figures are misleading as village cattle are grazed in the immediate vicinity of the villages. The true grazing incidence in the areas adjoining the villages is therefore heavier than estimated.

During this hot weather grazing after the depletion of grasses, grazers start lopping green foliage, especially of Anjan (Hardwickia binata). The lopping and hacking of trees has led to degeneration of the forests. The seedlings are grazed, and saplings of these fodder tree species have been hacked to provide fodder to the cattle. Continuous and heavy grazing not only prevents regeneration of tree species but also the young regeneration obtained during the period of closure, is lost soon after the area is opened for grazing. In areas with clayey soil, 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. The grazing on undulating lands loosens the soil, which results in soil erosion.

It is not uncommon to see goats grazing in timber forests. Goat grazing is prohibited because of their close level grazing in which the seedling or grass rhizome is uprooted.

The grazing shall be regulated as per guidelines of Grazing Policy 1968 of Maharashtra State issued vide Resolution No. MFP-1365/132211-Y dated December 6, 1968, and Grazing Rules issued vide no. MFP-1371/237035-Z dated November3, 1973. However, no grazing beyond carrying capacity shall be permitted.

Heavy cattle pressure adversely affects the forest regeneration and soil condition. The present political economy of domestic animals in the area throws up strong challenges, and implementation of the grazing regulations in its current form. Therefore, special efforts need to be made to ensure that no grazing is allowed beyond carrying capacity.

The situation may be substantially improved by establishing effective communication with the local people, awareness generation and an efficient animal husbandry program. The forest officers should take up these preventive measures in co-ordination with the Animal Husbandry Officers.

Maximum admissible grazing incidence according to the current policy has been shown for various working circles in **Table 8.2.** A systematic survey of fodder availability is recommended during the plan period in each round.

The carrying capacity and period of closure should be calculated for the forest area adjoining each village. The grazing passes, free or otherwise to individual families are proposed to be distributed on the calculated carrying capacity basis. Village bodies should also be actively engaged in the implementation of grazing regulations.

The surplus cattle should be kept under regular watch, and villagers should be encouraged to adopt stall-feeding or other means to address the mismatch between cattle-heads and fodder availability.

Fodder development on the community lands and translocation of surplus cattle may be encouraged.

Animal husbandry and Dairy Development Agencies should be motivated and influenced to take up breed improvement program. Fodder in the plantation areas should be made available free of cost on a cut-and-carry basis.

The DCF shall carry out cattle census of each village during the winter season at the beginning of the plan period to find out the local cattle once for all and maintain record and passes shall be issued limited to those cattle subject to the availability of carrying capacity.

The passes shall show the compartment numbers meant for the grazing by writing clearly.

The hacking and felling of young plants and big trees be dealt with seriously and offenders shall be prosecuted.

The misuse of transit passes of cattle for grazing be strictly checked and if found their passes be cancelled and be dealt with according to law.

The cattle population (except goat and sheep) of Akola District is approx. 6 lakhs (19th livestock census 2012). The Sheep & Goat population of Akola District is approximately 5528 as per 2020 Census Report. Hence it requires some urgent measures to tackle growing livestock population to save the regeneration of the forests.

The State Government vide GR No. MFP-2103/CR 135 /F-1 dated 21.3.2005 appointed ACF Shri Rajendra Dhongde as Grazing Settlement Officer for deciding availability of forest area for sheep grazing. The Grazing Settlement Officer proposed 29977.46 ha C class RF area for sheep grazing. These areas are divided into 10 grazing units (S-1 to S-10) and 3 years rotational grazing has been proposed with one-year open period and two year closed period.

The Grazing Settlement Report has been accepted and sanctioned by the State government vide GR No. MFP-2103/CR 135 /F-1dated 29.10.2007 and 6.5.2008 subject to following conditions:

(1) The grazing settlement Report shall be in accordance with Bombay Forest Manual Volume III, Government Resolution dated 6.12.1968 and Working Plan of the concerned Division.

(2) The carrying capacity shall be worked out as per functional classification of forests into Protection Forest, Tree Forest, Minor Forest, and Pastureland.

(3) Andle permitting sheep grazing, sheep shall be considered as 1 Cattle unit and as per Bombay Forest Manual Volume III grazing shall be permitted from 15th September to 15th May.

The permissible carrying capacity for sheep grazing, as per functional classification of the forests given in the Working Plan (i.e., 1 Cattle unit in 0.4 ha) works out to 15018 cattle unit. The details are given in **Appendix No. V-A,B,C** of Volume II.

FOREST ENCROACHMENT:

The problem of encroachment on forest land has existed since the 1970s. In recent past tendency for encroaching forestland for cultivation has increased. The actual encroached area is higher than the recorded one. The eligible encroachers' encroachment is yet to be finalized at the time of the preparation of the plan. The area under dispute is not clearly demarcated.

The encroachment problem is more prevalent in the Akola Range, mostly made for agricultural purposes. The eviction operations led to animosity between the villagers and foresters.

The causes of forest encroachment shall 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 to control encroachment.

The state government should be urged to finalize and complete the land grant in all identified cases of encroachments to be regularized in accordance with the government resolutions issued before 1980. Renewed and concentrated efforts on the part of division staff for eviction of encroachment is proposed on priority basis.

Small, isolated patches of the forestland are often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.

The civil powers of eviction are entrusted with ACF and DCF vide Govt. Res. No. R and F.D/PWR/1196/296/CR.No.17/LII, dated 30-1-97. The procedures laid out in the Land Revenue Code shall be followed before the execution of eviction.

- Habitual encroachers shall be prosecuted as per Indian Forest Act.

- All external boundaries shall be demarcated with concrete pillars.

- All sensitive and important boundaries and wherever disputes are there, be surveyed with DILR and concrete pillars be laid immediately.

- All encroachments be listed with their names, age, residence, profession whether belongs to SC, ST, OBC/NT, extent of encroachment, S. No. and location of encroachment, village/block.

- A Detailed report of the case be prepared for each encroacher and be submitted to ACF to obtain summary eviction orders, in a time bound program.

- This is subject to the provisions of The Scheduled Tribes and Other Traditional Forests Dwellers (Recognitions of Forests Rights) Act, 2006 and the Rules made there under.

- After the completion of the due procedure of Land Revenue code and after giving a reasonable opportunity of being heard to the encroacher, the ACF shall pass a summary eviction order if he satisfies so, quoting the findings.

- The concerned RFO shall execute the eviction order.

- If the encroachments in a village are more in number police protection be obtained for the operation.

- Use of Cr. P. C. provisions like section 106 and 110 be used to obtain good character of offenders before Tahsildar and SDO respectively to smoothen the eviction operations as well as to prevent the tendency of future encroachments.

- For the encroachments on the un-classed forests (though 7/12 shows clear possession of the departments) FIR shall be lodged in the concerned police station for prosecution.

- Regularization of the encroachments made earlier to 1980 be settled as early as possible and proposals to that extent be submitted to the Central Govt.

- After the listing of all encroachments, sample verification shall be carried out by all supervisory officers to detect unregistered encroachments.

- In the month of May, a drive for encroachment prevention be taken up in all the sensitive areas by arranging meetings in the villages by Dawandi and distribution of leaflets and posters.

- Keep a watch on all the sites meant for debris cleaning, ploughing etc., in the month of May, so that encroachments are removed even before the sowings.

- A total of 20.69 ha of encroachment area have been registered by the Akola Division up to (31/3/20).

Govt. of India vide enactment dated 2 December 2006, called the SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNISATION 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.

The position of individual and community Forest Right claims in Akola division (up to March 2021) is as below.

Sr. no.	Particulars	Received claims	Area in ha.
1	Individual claims	767	128.92
2	Community claims	69	4.363
3	Section 3(2) claims	836	133.283

POACHING:

The issues related to poaching have been dealt with in detail under Wildlife Management Chapter no 7.

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CHAPTER-9

MANAGEMENT FOR CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

9.1: INTRODUCTION: This chapter on Maintenance, Conservation and Enhancement of Biodiversity deals with the importance threats and steps to mitigate those threats to biodiversity in the District of Akola.

Biodiversity is defined as variability and variety in life forms including genes, species and ecosystems. Biodiversity conservation seeks to maintain life support systems provided by nature. Adding to the impact of natural processes, human intervention has had an adverse effect on these life support systems and thereby on biodiversity.

India, a mega-diverse nation, is one of the richest nations in terms of biological diversity. India owes this to its position in the tropical and subtropical latitudes. India has a great diversity of natural ecosystems ranging from the cold and high Himalayan regions to the sea coasts; from the wet north-eastern green forests to the dry north-western arid deserts; with different types of forests, wetlands, islands and the oceans. India consists of fertile river plains and high plateaus and several major rivers, including the Ganges, Brahmaputra and Indus. The diverse physical features and climatic situations have formed ecological habitats like forests, grasslands, wetlands, coastal and marine ecosystems and desert ecosystems, which harbor and sustain immense biodiversity. The country is also one of the 12 primary centers of origin of cultivated plants and domesticated animals.

9.2: GENERAL CONSTITUTION OF AREA:- Forest area of whole Akola division is important from the biodiversity conservation point of view.

9.3: GENERAL CHARACTERISTICS OF VEGETATION AND BIODIVERSITY:-

The forests of Akola 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 subtypes considerable local variations in the crop depending mainly upon climatic condition,

topography, rainfall, frost treatment of the crop. However, aspect plays an important part in determining the character of the vegetation in hilly area. These forests are mainly occurred in valleys and gently sloping areas with Northern aspects. The rocks throughout the Akola Forest Division are Deccan trap, but the soil varies. Geology, soil type and depth play important role in determining the composition and quality of the crop. The biodiversity of the forest is highly eroded in most parts of the Division due to selective treatments in favour of commercially important species over the years.

Documentation of the biodiversity is very important. An effort made by this Office to find out available documents of the biodiversity of the Division and District has shown that for many years though we have noted only species, the same has been increased to species. The same is with the reptilian species, where for the first time the Division has a record of species were recorded. It can be argued that the species listed are not specifically of the forest areas of the Division. However, considering the mobile nature of the wildlife and the lack of much diversity of neither ecosystems nor altitudinal change, it can be safely presumed that such species are also spread across the forests. This gives all the more reason for the documentation study of the biodiversity of the Forest Division specifically as prescribed.

9.4: BLOCKS, COMPARTMENTS (with JFM AREA) (MARKED ON GIS MAPS) :- Entire Forest area in the division.

9.5: SPECIAL OBJECTIVES OF MANAGEMENT:-

1. Document, protect and replenish indigenous vegetation and local ecosystems of the Division.
2. Protect and restore freshwater ecosystems
3. Document and control invasive species
4. Minimize impacts of human interference and other disturbance like fire, grazing, etc. on biodiversity
5. Maintain and record indigenous peoples' ethno-biological knowledge
6. Improve scientific knowledge and access to information about biodiversity
7. Introduce institutional reforms.
8. Sensitize the staff on the issues of Biodiversity for better appreciation and interpretation of the area they work in.

9.6: ANALYSIS OF THE CROP/BIODIVERSITY:-

9.6.1: The analysis of forest crop of Akola Forest Division is done in this plan in each Working Circles and also in Part-I, Chapter-VI. (Maintenance and Enhancement of Forest Resource Productivity) In the view of the Biodiversity of Akola forest division is not Healthy.

To add to this, biotic interference like excessive grazing, illicit felling, overdependence on forest for fuel wood, weed infestation and frequent fires has resulted in the further degradation of the forests. The illegal fellings are often concentrated on the species most valued for various purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stages are resistant ones, which can stand to 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 Akola Forest Division is 37844.900 ha. As per Akola FSI report 2020, Inventory of Forest Resources of Akola District of Maharashtra was brought out by Forest Survey of India, Central Zone, Nagpur in the year 2020. The salient features of the survey can be summarized as under.

The forests of the district can be classified into two strata viz, Teak and Miscellaneous, Teak forest which contains percentage of teak as 40% occupies the area whereas miscellaneous forest is contains 60% of area.

9.6.2: Facts - As per this FSI report 'Inventory of Forest Resources of Akola District' (1997) the findings about the forests of the District shows the condition of the crop and biodiversity status in poor condition.

(i) Dense forest is in the district and the forest area is gradually converting into open and scrub forests due to heavy biotic pressure. Heavy grazing and soil erosion have been noticed in considerable area.

(ii) Regeneration is inadequate in 60% of forest area due to biotic interference. Proper steps should be taken to minimize such interference.

(iii) About 40% of the forest crop is pole crop, big timber is almost absent and only the small to medium sized trees are predominantly occurring in the forests. The crop needs protection so that it could grow well.

(iv) About one fifth 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 Akola it is seen that there is a great need for the restoration of the forests and the replenishment of the biodiversity in the whole Division.

9.6.3: THE SPECIES PRONE TO EXPLOITATION:

During the last 10 years, the Forest Division Akola has booked offence on the killing/trapping of the following species: Blue bull (Nilgai), Leopard, Sloth Bear (Aswal), Black Buck (Kalvit), Indian Black napped hare (Sasa), Snake (Sap), Peafowl (Mor), Laughing dove. However, there is often a neglected part, the hunting for the quail and partridges in places inhabited by Paridhi's which is very essential to be curbed. Hunting of animals in any form needs to be curbed. Unlike tigers and leopards etc., which get national and international attention for their presence and threats, the nondescript animals are often neglected by the Department and the public in general. This makes them all the more vulnerable to all forms of overexploitation.

9.6.4: As per the IUCN status the following animals and birds are classified as Endangered (EN) – Panther (Pantheraparus), Sloth bear (Melursusursinus), Wild dog *(Cuonalpinus).*

Birds species which are listed as Critically Endangered in IUCN red list version 2013.2 are White backed Vulture (*Gyps bengalensis),* Red-headed Vulture (*Sarcogypscalvus*) and other endangered species like Indian longbilled Vulture (*Gyps indicus*) and Steppe Eagle *(Aquila nepalensis).*

9.7: 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 folk, 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 Akola as well.

The benefits that we derive from the biodiversity are many and a few of them are noted below:

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's 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.

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 possible without the presence of genetic diversity.

Biological control agents: Some species of living things help us control invasive species without the use of poisons. Epidemics in forests and agricultural crop are perpetuated by monocultures and vast plantations. Diversity however, serves to balance nature on its own.

Natural products: Many of the medicines, fertilizers, and pesticides we use are derived from plants and animals. We also get products such as oils, adhesives, and silk from natural sources.

Environmental services: We rely on plants and animals for important processes such as soil aeration, fertilization, and pollination.

Enjoyment: Biodiversity and wildlife are often the subject of aesthetic interest. In India and Akola 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.

Scientific interest: The diversity of plants and animals inspires scientific inquiry in many different realms.

Future potential: With new discoveries to come, there will be many more practical reasons to appreciate biodiversity!

9.8: PRESCRIPTION FOR THE MAINTENANCE & ENHANCEMENT OF BIODIVERSITY

i. Medicinal Plants Conservation Area (MPCA) should be identified in the Akola Division. MPCA is important for development for the biodiversity conservation. The DCF should endeavour to involve the people, the Local medicinal practitioners, institutions, field botanists etc., to get the documentation of not only the medicinal plants available, the parts and method of use but also the local traditions involved with the practice and the folklore that goes with them so that this can become an integral part of the indigenous technical knowledge documentation.

ii. 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.

iii. Sensitization of the staff of Akola 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.

iv. The field functionaries of Akola forest division shall identify areas of significant biodiversity value and take lead in In-situ conservation and Ex-situ conservation.

v. Identification of area of Birds presence in the Division is a must. Gyanganga Dam is known to be rich in avid-fauna and needs to be studied for further protection. It should be the endeavour of the Division to explore potential sites/areas that would qualify as IBAs.

vi. Identification and documentations of local practices, indigenous technical knowledge and other ethno-biological should be carried by the department.

vii. Identification and Conservation of rare /endangered indigenous species of plants in the division.

viii. All efforts should be made to control fire and grazing in the forests as these are among the biggest enemies of biodiversity.

ix. As per biodiversity Act 2002, Biodiversity Management Committee through the gram panchayat as per the norms decided by the Government needs to be established in all the JFM's 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.

x. Capacity building for local communities, forest personnel at all levels, elected representatives, decision makers, and bureaucrats needs to include the provision of technical skills.

xi. 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.

xii. 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.
- Medicinal plants & practices documentation along with other indigenous technical knowledge.

In all the above studies, proper documentation with distribution of species, the abundance and threats to the species may be included.

ADDENDUM: A NOTE ON THE BIODIVERSITY ACT 2002

INTRODUCTION:

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.

IMPORTANT PROVISIONS OF THE ACT:

(a) Section 2(a) defines the term "Benefit Claimers" 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 term "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 term "Biological resources" as; Plants, animals and micro-organisms or parts thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value, but do not include human genetic material.

(d) Section 2(o) defines the term “Sustainable use “as the use of components of biological diversity in such manner and at such rate that does not lead to the long-term decline of the biological diversity thereby maintaining 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 persons 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 a 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 in force which has any non-Indian 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 for 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 approval is 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 applications and knowledge relating thereto in accordance with mutually agreed terms and conditions between the person applying for such approval, local bodies concerned and the benefit claimers.

(l) **Section 21(4):** NBA shall in consultation with the Central Government frame guidelines for operationalizing 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 to 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 become extinct in the near future as a threatened species and prohibit 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, domesticated stocks and 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 provisions 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-10

MANAGEMENT OF FOREST HEALTH AND VITALITY

10.1: INTRODUCTION: This Chapter on Maintenance and Enhancement of Forest Health and Vitality deals with the general condition of the health and vigour of the forests and steps that are needed to be taken in order to maintain and improve it.

Healthy 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 causes 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, fire, insects and diseases, overexploitation 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 (FAO).

10.2: GENERAL CONSTITUTION OF AREA: Forest area of whole division.

10.3: GENERAL CHARACTERISTICS OF VEGETATION:

The forests of Akola 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 variations in the altitude are not much, it does not influence the distribution of various forest species, and 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 Akola Forest Division are Deccan trap, but the soil varies. Geology, soil type and depth play an important role in determining the composition and quality of the crop.

10.4: SPECIAL OBJECTIVES 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) Improving 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 skeletenises 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 Akola have been worked for over 105 years under the Coppice with Reserve and Coppice standard system. The Teak Coppice being third-fourth generation coppice has lost its vigor. To revitalize the forest the following needs to be done.

1) Wherever, regeneration comes up priority for retention and nurturing should be given to seedling- origin regeneration.
2) Whenever, NR is done after felling in 'D' areas and afforestation in 'B2' areas, the seedlings under NR and the species under AR should be of miscellaneous species keeping Teak to a maximum of 20 %.
3) The choice of species for afforestation and other plantation should be of miscellaneous and fruit bearing species keeping in barest minimum teak seedlings/stumps.

10.5: ANALYSIS OF THE CROP:

The analysis of forest crop of Akola Forest Division is done in this plan in each Working Circles and also in Part-I, Chapter-VI. (Maintenance and Enhancement of Forest Resource Productivity)

To add to this, biotic interference like excessive grazing, illicit felling, overdependence on forest for fuel wood, weed infestation and frequent fires has resulted in the further degradation of the forests. The illegal fellings are often concentrated on the species most valued for various purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stages are resistant ones, which can stand

to 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 Akola Forest Division is 37844.900 ha. As per Akola FSI report 1997, Inventory of Forest Resources of Akola District of Maharashtra was brought out by Forest Survey of India, Central Zone, Nagpur in the year 1997. The salient features of the survey can be summarized as under.

The forests of the district can be classified into two strata viz, Teak and Miscellaneous, Teak forest which contains percentage of teak as 40% occupies the area whereas miscellaneous forest is contains 60% of area.

There is a considerable biotic pressure on the forests. 34% of the forests are subjected to injury due to girding and illicit felling and fire incidence was noticed in 38% of the forest area. About 70% of the forest area is subjected to grazing of different intensities out of which 20.39% of the area is heavily grazed. 78% of the tree forest area is teak forest in which percentage of teak tree is more than 20%. Rest of the area is covered by miscellaneous forest.

10.5.1.: Facts - As per this FSI report 'Inventory of Forest Resources of Akola District' (1997) the findings about the forests of the district shows the condition of the crop and health status in poor condition and the forest of Akola is not healthy. 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. The details of the findings area summarised below:

(i) Dense forest is 900.43 ha. in the Akola district and the other forest area is 31422 ha. which is gradually converting into open and scrub forests due to heavy biotic pressure. Heavy grazing and soil erosion have been noticed in considerable area.

(ii) Regeneration is inadequate in 60% of forest area due to biotic interference. Proper steps should be taken to minimize such interference.

(iii) About 40% of the forest crop is pole crop, big timber is almost absent and only the small sized trees are predominantly occurring in the forests. The crop needs protection so that it could grow well.

(iv) About one fifth 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 Akola it is seen that there is a great need for the restoration of the forests and the improvement of the forest health and vitality in the whole Division.

An important indicator of 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 Akola Division seems to be moderately good. A details analysis of the same is given in Chapter 4. The average number of seedlings across the Division is recorded about 260/ha. 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.

10.6: REGULATIONS AND MEASURES: The biotic factors which have resulted in the degradation of the forests are excessive grazing, frequent fires, illicit felling, over dependence on forest for fuel wood and weed infestation. The illegal fellings are often concentrated on the species most valued for various purposes. Seedling stages are particularly exposed to extermination due to excessive grazing and fires. The species surviving during degradation stages are resistant ones that can stand to grazing and fires. These species are often of low utility. The following factors are discussed individually and special steps to combat and 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 brings with it many menaces like competition with the wild animals for food, destruction of the cover of birds and pheasants, weeds dispersal, possible infections 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 support of the field officers/staff are very important for the success of containing grazing.

Closing of the area of Natural Regeneration from grazing should be strictly followed. This is a neglected part but with the compulsory Aided Natural

Regeneration prescribed for post-harvest areas, DCF should take extra steps to ensure total closure of grazing.

2) Fire: 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, bhirra, 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. 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) **Fire lines:** The creation and maintenance of fire lines as traditionally done, and described here in details under Miscellaneous Regulations, 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 improvements and/or modifications.

(ii) **Fire Blower:** The Fire 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 fire fighting 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.

(iii) **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.

(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. The oft-repeated repeating is "*Leaf, litter is burnt. No loss to 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 to the government.

(v) **Fire-fighting Squad:** It is said that desperate times call for desperate measures. The critical condition of the forests of Akola necessitates taking up radical steps to revitalise 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 the squads deployed in the wildlife areas. These squads shall be concentrated in areas where Natural regeneration is being nurtured in the felled coupes and elsewhere in the Division. This measure is independent of the fire-watchers etc that area engaged in plantations areas. The squads shall ensure that no fire incident occurs anywhere in the Division particularly in areas of NR.

3) Aided Natural 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 Akola which provides for soil working on 400 seedlings/ha in a coupe is being modified. In the forests of Akola, **Aided Natural Regeneration is a must** and a provision for the same is given.

Hence, wherever NR is prescribed (B1 or D areas) and the number of seedlings/saplings 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 seedlings 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 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.

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 Annexure V (No.21) in order to project cost calculation but actual estimate should be as per actual field condition decided after due survey and evaluation.

4) Illegal Felling: 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. 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 and1979 to regularize all encroachments 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 by reducing the percentage of teak in the forests. Teak wherever planted should be from certified seed and seedlings of known source. As maximum area is under teak, the gap planting in such areas should be done with miscellaneous species only. In this Plan it has also been recommended to put the percentage of teak to bare minimum while taking up plantation under Afforestation Working Circle and in other coupes where artificial plantation is carried out.

7) Diseases and Pests: As discussed in Hollowness, etc. the Conservator of Forest, Working Plan, has initiated study on the content of the hollowness and the same is given in detail in Para 4.7. This is attributed to many factors like silvicultural systems of CWR and CWS, third-fourth generation coppice crop hence no vigour is left on the teak crop and many factors. The hollowness may also be due to fungal attack. These reasons may be true, but a scientific

investigation is necessary which the DCF should undertake in collaboration with the institutions like ICFRE, and Research Wing of the Department etc.

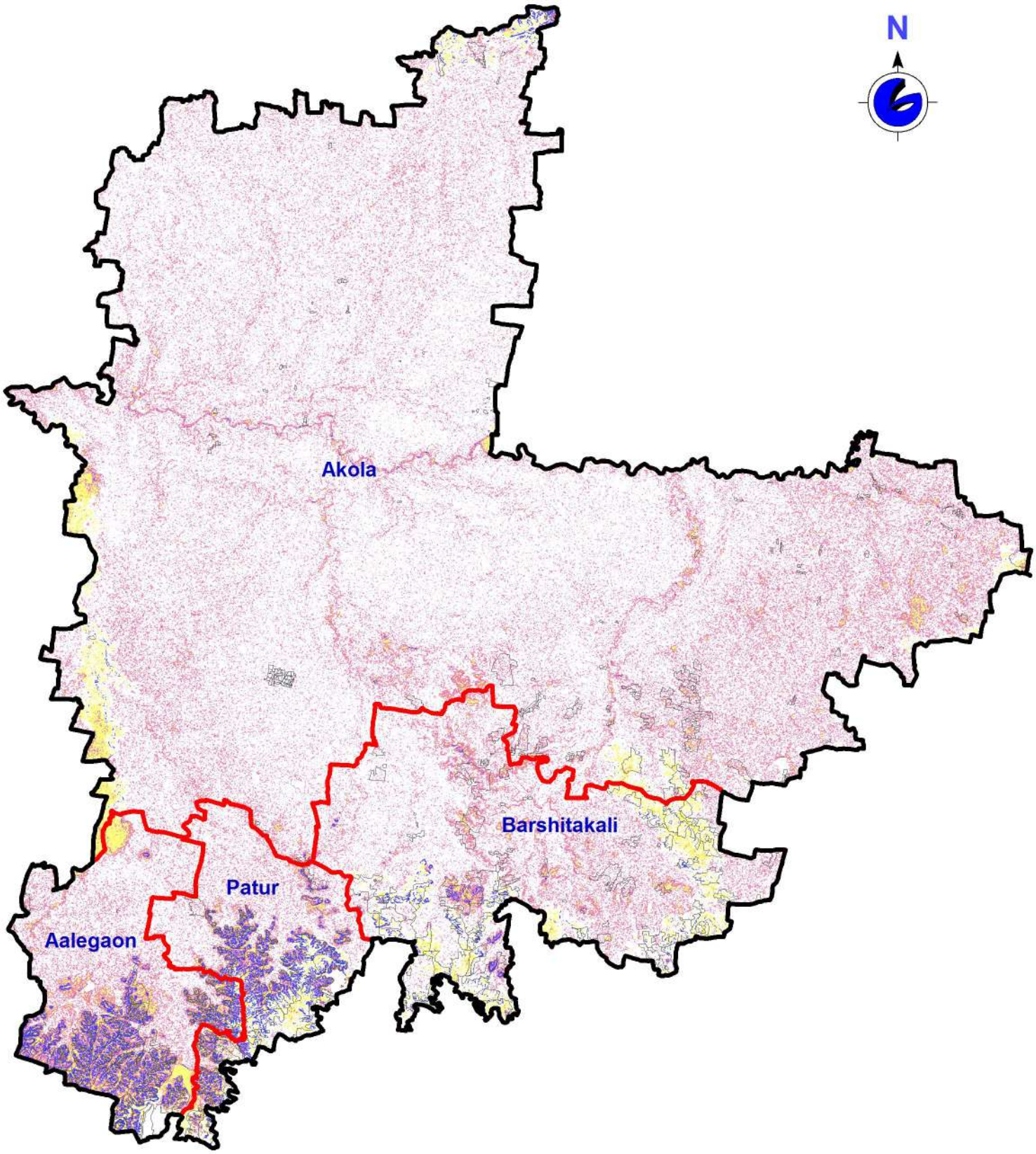
Eutectonagrandis (Skeletenizer) and Hybleapeura (Defoliator) are also commonly observed to affect the teak plants of the Division. Considering that most of the area is dominated by teak, it is necessary that the means of controlling these pests be done as mentioned above for hollowness.

General: Field staff should be made aware of the diseases and their remedial steps wherever possible. Any deceases or pest seem to have adverse impact on the forest, should be recorded and documented. Photographs 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 steps. 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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Akola Forest Division, Akola

Showing Slope (Flat to Steep Slope)



Legend

- Division Boundary
- Range Boundary
- Patur — Range Name
- Compartment Boundary

Slope (Flat to Steep Slope)

- Flat 0 to 3 D
- Undulating 3 to 8 Degree
- Rolling 8 to 16 Degree
- Moderately Steep 16 to 25 Degree
- Steep greater than 25 Degree

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

CHAPTER 11

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCE

11.1: 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 not 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 other beings including humans and forests.

11.2: GENERAL CONSTITUTION OF AREA: Soil and moisture is important in the area of whole division.

11.3: GENERAL CHARACTERISTICS OF SOIL AND WATER RESOURCE IN AKOLA:

The Akola Forest Division is bounded by the Southern foothills of Gawilgad range of the Satpuda range of hills on the North, and Ajanta and Satmala hills on the South. The entire division is having more or less fertile alluvial tract drained by the Purna, Katepurna rivers. A team from Geological Survey of India studied about ground water problem and total built up of dam site. A brief reference to the geology of the district is made by Blanford (1869) in his publication “On the geology of the Taptee and Narmada valleys and some adjoining districts”. Where in the salient features of the Southern parts of the Gawilgad range and the Purna plan are outlined. Engineering geology and ground water problems of specific area have been dealt with in the unpublished reports of the Geological Survey of India by Jhingran 1950-1951-1952, Krishna swamy (1958-1959), Roy (1951) and Vaidyanathan (1961,1961-62)

But for a small patch of the upper Gondwana sandstones reported by Vaidyanathan (1961) the entire Division is occupied by Deccan basalt flows with

inter trapping beds at places river alluvia and soils. The stratigraphic sequence of these rocks is tabulated below: -

TABLE NO. – 11.1

Formation	Age
Soil, river, calcareous kanker and sand etc. Conglomerates Trap dykes Deccan basalt flows with intertrapping beds ash beds	Recent Sub – recent Cretaceous to Eocene

In this division there are two geological formations are known to occur viz. Purna alluvium and Deccan trap. The Purna alluvium is confined to Purna valley and occurs in considerable deposits over trap which contains mixed with calcareous conglomerates a efflorescance of soda salt occur in some of the patches where Babul forest (Acacia nilotica) are situated on the Purna alluvium. The Deccan trap almost covers the entire Division belongs to the creataceious period when sheets of semi-molten trap broke through the creataceious strata and found in this area is more or less horizontal layers fashion. The underlaying rock of the entire division comprises hot gray basalt and numerous samples of amygdaloid's with zeolitic vesicles may be noticed everywhere. There are no dykes and no traces of Ash beds of lava flows. Thus, there is a total absence of everything that would characterize as a volcano.

The soil over the entire trap area varies from light reddish sandy loam on the ridges and hill sides to black cotton soil in valley depressions. The reddish sandy loam is characterized by the presence of fragments of the under lying rock in most of the forest area, which cause variations in suitability for the tree growth according to its depth, critical characters and the structure of underlying rock.

In general the soils on the Balaghat plateau are poor and shallow. The alluvium occurs in some of the large valleys in dyno strip having 2 to 3 feet depth on some of the parts of the plateau. The soil varies from murum to light black on slopes and the hill slope flanking are covered with straightening over the surface, and such a condition is very much suitable for the growth of these localities. Basalt is whenever in the form of hard impenetrable rock lies very near the surface, soil is dry shallow quite unsuited to tree growth.

In some of the patches granular late rite beds are noticed which are divide of moisture and almost impenetrable by the roots of tree. On such soils the tree growth is scanty stunted and malformed. The Purna alluvium overlies the Deccan trap, which consists of black cotton soil in the calcareous conglomerates that lies immediately below it. The soil of light brown is found along the course of river called kankary, which contains high percentage of soda salt having depth of 150 feet and more. The width of this belt is roughly 26 Kilometers to the North and 16 kms to the South of Purna river these fertile plains of Purna support good patches of Babul bans or Acacia nilotica forests.

11.4: 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 rates.
- Supply and securing of clean and sufficient drinking water for the population
- To minimize the risks of floods, droughts and landslides.

11.5: SOIL

The soil of the entire tract varies from a light reddish sandy loam on the ridges and hill sides to black cotton soil in valleys and depression. The reddish sandy loam of varying consistency intervent with the rounded fragments underlying rock covers most of the forest area. This varies in suitability for tree growth according to its depth and physical characteristic and the structure of underlying rock. The soils of Balaghat plateau in general are poor and shallow and the alluvium occur in some of the large valleys in narrow strips and the black cotton soil 3 to 4 feet in depth on some parts of plateau. The soil on hilltop and slopes has shallow and medium depth whereas in the low lying areas and depression the soil in general are deep as a result of depression from layers usually, the hills slopes flanking revent are covered with boulders, strewen over the surface which facilitates better growth of tree as these soils accord a sage ligament for seeds and a good food hold for tree growth.

Wherever, the basalt is in the form of hard impenetrable rock lies near the surface soil is bright and shallow and quite unsuited for tree growth and in such areas the tree growth is poor and open which is witness natural gaps of tree growth.

In some localities because of the presence of granular Latic belts the soils are almost impenetrable and locum in moisture which does not support proper tree growth and on such soil in the tree growth is invariably scanty stunted, malformed.

11.5.1: SOIL EROSION: -

Soil erosion is noticed in this area especially along the river Purna and its tributaries. Sheet erosion is quite common in this area and gully formation takes place due to erosion along the riverbanks. Soil erosion in some of the areas exposes the roots of trees and leads to wind fall of the trees. The intensity of the soil erosion is given compartment -wise in **Appendix no. LVI** of volume II of this plan.

11.6 : GROUND WATER

The study of hydrology in the Purna part of valley basin revealed that the Division could be divided into two categories of tracts i.e.

(i) Fresh water tract

(ii) The Saline tract

(i) FRESH WATER TRACT: - This tract is extended in the Northern part of the Division nearer to the Gawilgad range covered by the boulders and debris. In these areas fresh water is available at a depth of 3 to 5 meters from the surface. Roy – (1951) studied freshwater availability in this area and has estimated the annual rate of replenishment of ground water of this freshwater tract to the extent of 20 million cubic feet per Sq. mile. (0.22 to million cubic meter per Sq. kilometer) The ground water in potable with chloride contents varying from 8 to 50 parts per million.

(ii) THE SALINE WATER: - The salinity map of the area indicates that the chloride content increases in general towards the Purna river from both edges of the Purna valley. The chloride contents varies between 2000 and 5000 P.P.M. in the inner regions of the valley and the maximum chloride contains is estimated to the extent of 12,917 P.P.M. (Roy – 1951) In general the upper clay does not contain

appreciable salt, however at some places brakish water is encountered in shallow wells also. Occasionally the carbonate of soda forms and an efflorescence upon it, but chloride of sodium is obtained from the beds below the graval and calcareous conglomerates. As interpreted by Blanford – 1869 the salt being stratum is to be **"**something distinct from the upper freshwater alluvium and it belongs to comparatively older geological age in the formation. The presence of common salt in large quantity may also indicate that the clays containing it are of marine origin. But the absence of marine remains is opposed to the idea of these plains having been delta accumulations on a sea coast. Wells are sunk on both sides of the Purna river for obtaining brine**".**

In this division there is no sufficient annual precipitation which may vary between 750 and 1000 mm. and because of insufficient rain fall most of the small stream go dry in summer. The dams are constructed across various rivers might be helpful in partly meeting the requirements of irrigation and drinking water of the population. In general, the contacts of successive flows are those with dykes with the country basalt having discordant relationship may be more suitable sites for tapping underground water.

11.7 : WATER SUPPLY

There is one main river flow in this division, the Purna. Katepurna, Morna, Mun, Vidrupa, Nirguna, Uma are the tributaries of the Purna river and, the villages which are situated on the banks of these river and their tributaries are generally better placed for drinking water. The other villages have a lot of problem of drinking water especially during the months of summer. Eratic rainfall in the past few years has aggravated the situation of drinking water in this division. In the year 2005 there was lot of scarcity for drinking water in Akola town and a special train was arranged for drinking water supply to Akola city by the district administration. The ground water potential is very poor especially in Akola and Akot tehsils which is aggravated by salt water availability in the ground water. Precipitation is received mainly through South-West monsoon and it is harvested in dams, tanks and wells.

11.8. DRAINAGE

The drainage system in the division includes two major rivers i.e. The Purna and the Penganga. The other minor rivers are tributaries of the above rivers. They are the Katepurna, Shahanur, Morna, Mun, Man, Nod and Uma which are the tributaries of the Purna river. The tributaries of Penganga are the Adan, the Aran, Arunawati and the Pus.

1. **Purna river:** It is a perennial stream of the Payanghat plain which rises in the South facing scarps of Gavilgad hill range in the districts of Amaravati. It flows towards the West of the district, forming Northern boundary of the tehsils Murtizapur, Akola and Balapur and the Southern boundary of Akot tehsil. The Purna river is not navigable though it is a perennial river because of siltation at many places. At many places, its channel is 30 meter deep and 200 meter wide. The bank of the river is generally of soft alluvium. A large number of streams rising in the scarp to its North and to its South, joining the river forming a fairly dense drainage network in this region. Most of the tributaries of the river Purna look like water pools during hot weather and developing swirling floods during rainy season. The river has length of 100 Km in the Division and its banks are badly broken and dissected by a strong rill erosion undercutting of bank. The valley of Purna has many streams developing into a sub - parallel drainage system to the main river before their confluence with the main river. The Katepurna tributary is the most significant out of all the tributaries of the river Purna.

2. **Katepurna river :** The Katepurna is the most significant tributary, which rises in the Northern slopes of the Ajanta hill ranges about 7 Km. North of Washim at an elevation of approximately 320 meter from MSL. The flow of the river is Northern in a non- perennial channel, having overall turn by sharp bend Westwards and Northwards and the banks are mostly liable for erosion.

3. **Uma river :** It rises in the extreme Southern parts of Murtizapur tehsil near the village Poho and flows to the North. The river is almost perennial and it has a fairly straight course, braided in section and crossed at many points by fords. It confluence the Purna river near the village Durgavad about 10 Km upstream of the river Katepurna confluence after flowing sub - parallel to main river on its left bank for about 10 Km. The river has low banks throughout the length having a narrow channel and is liable to flooding during the rains. The river has got length of about 60 Km. entirely flows within the division.

4. **Morna river :** The river Morna takes its birth in the of Malegaon tehsil of Washim district near Shirpur village and flows through an open and flat country of the plateau, before crossing to the large village of Medsi on the edge plateau. The river goes through the ghats in a romantically picturesque country. Its sharp bends in between interlocking spurs developing a deep valley with a cliff face on the outer bank and wide deep alluvial flats on the inner bank before entering into Payanghat plain. In this section, the Purna – Akola -Khandwa railway line closely passes the river and sticks to the narrow edge adjoining the valley side and crosses the river at no less than four different places to gain foothold from one side of the deep valley to other. Descending down from the scarp the river flows through a fairly gentle sloping country with a perennial channel on its bed. It forms a kind of cut of Akola town just after it will join on its right bank by the tributary, Indrupa. In Its lower course the river has developed extensively meander and cut off loops unlike many other left bank tributaries of the Purna. It develops a sub - parallel course for nearly 20 Km before joining the main river near the village Andura. The total length of the river is approximately 120 Km.

5. **Mun river:** It rises in the Northern Ajanta scarps of Chikhali tehsil of Buldhana district and flows East through the Ghatbori Reserved Forest area to enter the district of Akola. Another tributary rising the Uttavli

scarps in Buldhana District and joining the Mun at foot of scarp near the village Pimpalkura after which the river flows Northerned is cut by another stream the Vishwamitri rising and a similar scarp within the district and flows in Northward direction and confluence North. The river flows through a flat alluvial country making curves and graceful meander. The river Mun flows through Balapur township, and it is joined by a small tributary the Mas River and flows downstream where the river Nirguna and its tributaries join Mun river. Both the Nirguna and Its tributary the Bordi river which rise in the Medsi and Patur Reserved Forests of the ghat country and flow North. After its confluence with the Bhuikund the Mun river is crossed by the Mumbai - Nagpur railway line over a bridge which is South- East of Nagzari railway station. The Mun river has got a fragile bank which are highly gullied very much liable for soil erosion which confluence the Purna river near the village of Khajikhed on it left bank. It forms a for quite distance the boundary between the Buldhana, Akola and Washim district.

The tributaries of Purna joining at the right bank from the North are comparatively smaller hill torrents draining the foothill slopes of Melghat. Out of these the Nagzari, the Gautami, the Witruba and the Shahanur are the most important tributaries. The river Shahanur was diverted at Dahihanda at the end of last century in the South-East of the Akot tehsil, So that it joins the Purna immediately enter in the districts with new channel carries the water so rapidly, that it always remains dry except during the short intervals of floods. The total length of this river is 120 km. All these tributaries of Purna by and large are dry in the lower courses and their banks are fragile which are subjected to heavy gully erosion in thick deposits of alluvium therefore the villages located on the bank of these tributaries are subjected to floods during rainy season. Many villages and larger township are located along the banks of these tributaries and these townships mostly depend upon for drinking water. The left bank tributaries of Mun river are much more important than the

right one and the main river itself flows closer to the Northern scarp's slopes than the Southern one.

6. **Lakes and Tanks :** There are many perennial tanks and lakes especially in the Payanghat plains of the division have a few tanks are found around the villages of Mardi, Punda situated in the foot-hills of Akot tehsil. The villages Banbada- budruk, Kutasa both are in Shahanur valley and Ghusar and Akhatwada which are in minor tributaries on the left bank of the Purna. A few perennial tanks are found in the trap country of the Washim plateau around Mohaja, Bhat, Wakad, and Risod all these are mostly small basins like depressions collecting the rain water from Amphitheatre like basin and supplemented springs. They provide locally drainage system, which are around tanks and lakes.

7. **Springs :** A number of springs occur on the Southern slope of Balaghat plateau descending down to the Godavari valley. These springs occur at 500 meters MSL formed probably good exposure and intra–trappen equiter. These springs are uncommon and the Northern scarp slope.

11.9: IRRIGATION

Irrigation is one of the most important inputs for development of agriculture. The main sources of water supply are open well irrigation canal, river. Lift irrigation is also quite common in these areas.

There are more than 35 irrigation projects, 4 medium and the remaining 31 are minor projects.

Medium Projects	08. Singdoha	21. Hiwerkhed
1. Katepurna	09. Tuljapur	22. Zodga
2. Uma	10. Nagri	23. Khondala
3. Morna	11. Sawerkheda	24. Karhal
4. Nirguna	12. Ghota	25. Aslola Ghana
Minor Projects	13. Mahan	26. Jawla
01. Januna	14. Ridhora	27. Waghi
02. Pimpalgaon Hande	15. Sonkhas	28. Kolambi
03. Pimpalgaon Ch.	16. Pimpri Kh.	29. Koyali Tank
04. Sisa Udegaon	17. Dharur	30. Borgaon
05. Borgaon Manju	18. Nandkhed	31. Mohagaon
06. Wathod	19. Bhilkhed	
07. Amdari	20. Ghonga	

The network of canals from dam is to point of utilization of water and lifting of water from dams and wells with the help of electric and diesel pumps are the major sources of irrigation.

11.10: 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 Dams in and near Forest 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.

A large proportion of area is adjoining to various protected areas. Hence, deep CCTs should be avoided to avoid damage obstruction to wildlife. 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.

2. SOIL CONSERVATION AS PART OF COUPE WORK

(i) 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, locally availability of suitable materials.

However, to narrow the wide variations in implementation, the norm for gully plugging or nala bunding is proposed as 5 meter^3/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 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 Akola Forest Division, the catchment areas of 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, Wandoha, Cement plug, Earthen Nala Bund etc. can be taken as per site specification.

TABLE NO.11.2: DETAILS OF CCT MODELS AS GIVEN BELOW:

Sr. No	Mo-del No	Slope %	Dista-nce Betwe en CCT	Lengt h of CCT	CCT / Ha.	Excess water Drain out from CCT (gap)	Length of CCT includi ng Gap (Mtr)	Unit of peac hing Sqmt	Gully plugg ing (Unit m^3)	Seed Kg.	Agav e
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 to 15	6	30	1514	3	1666	-	20	15.14	1700
4	8	15to 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.

(ii) 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, the 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 resists the soil erosion. Therefore, areas as prescribed in the various Working Circle for raising plantations should be taken in right earnest.

(iii) Other Measures: These include:

(i) Gully control: To check the formation or widening of gullies by constructing bunds, dams, drains or diversions through which excess run off water is channeled.

(ii) Stream bank protection: To grow vegetation alongside the riverbank, to construct drains, concrete or stone pitching etc. For checking the cutting and caving of river banks.

11.10.1: Implementation of other schemes: Soil& moisture conservation work under Jalayukta Shivar and other scheme may be taken up in the division. The norms for the SMC work may differ for scheme to scheme. Whenever possible, the norms as given in the above CCT models above should be followed.

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CHAPTER-12

MANATGMENT OF THE SPIRITUAL, CULTURALASPECT OF FORESTS AND ECOTOURISM

12.1: 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 Upanishad, 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-form 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.

The oldest visual image of the human fascination, love, and reverence for nature in India can be found in the 10000 year-old cave paintings at Bhimbetka in Central India depicting birds, animals, and human beings living in harmony. The Indus Valley civilization provides evidence of human interest in wildlife, as seen in seals depicting images of rhino, elephant, bull, etc. Historically, conservation of nature and natural resources was an innate aspect of the Indian psyche and faith, reflected in religious practices, folklore, art, and culture permeating every aspect of the daily lives of people. Scriptures and preachings that exhort reverence for nature and relate to conservation can be found in most of the religions that have flourished in the Indian subcontinent. Hinduism, Buddhism, Jainism, Christianity, Islam; and others place great emphasis on the values, beliefs, and attitudes that relate to the cross-cultural universality of respect for nature and the elements that constitute the universe. The concept of sinning against nature existed in various religious systems. Classical Indian myth is replete with similes of man in unison with the environment. Many of the rituals which to modern society may seem meaningless and superstitious were traditional strategies to preserve the intrinsic relationship between man and nature. The worship of trees, animals, forests, rivers, and the sun, and considering the earth itself as

Mother Goddess, were part of the Indian tradition (SM Nair, http://ccrtindia.gov.in/readingroom/nscd/ch/ch11.php)

SACRED GROVES

One of the finest examples of traditional practices in India based on religious faith which has made a profound contribution to nature conservation has been the maintenance of certain patches of land or forests as "sacred groves' dedicated to a deity or a village God, protected, and worshipped. While sacred groves are found elsewhere in Maharashtra, no sacred grove is recorded in Akola District.

SACRED PLANTS AND ANIMALS

Many plants and animals have from historical times been considered sacred in India by various communities. The most outstanding examples are the peepal tree (Ficusreligiosa) and largely the banyan tree (Ficus 'bengelensis) have been traditionally revered and therefore never cut. There are several other trees and plants considered sacred and grown in temple premises and are protected in other localities. Locally Apta (Bauhinia racemosa) is used for Dasserah festivals as exchange of gold though the tree itself is not considered sacred. Likewise, many plants and animals area considered auspicious.

12.2: 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 US and the most international of the ecotourism organizations, 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 nature-based tourism that involves education and interpretation of the 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 the world.

Ecotourism is also recognized as an important industry by UNWTO (United Nations World Tourism Organization). The World Tourism Day celebration started by UNWTO in 1980 to make 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 guests.

PRINCIPLES OF ECOTOURISM:

Ecotourism is about uniting conservation, communities, and sustainable travel. This means that those who implement, participate in and market ecotourism activities should adopt the following ecotourism principles:

- Minimize physical, social, behavioural, and psychological impacts.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Generate financial benefits for both local people and private industry.
- Deliver memorable interpretative experiences to visitors that help raise sensitivity to the sites' environmental and social importance.
- Design, construct and operate low-impact facilities.
- Recognize the rights and spiritual beliefs of the local/indigenous People in the community and work in partnership with them to create empowerment.

ECOTOURISM POLICY:

i) Ministry of Tourism, in Government of India has declared "Eco-tourism in India Policy and guidelines, 1998". This policy has underlined the activities of tourism ought to be environment-friendly having no adverse impact on ecosystem.

ii) The UNWTO came into force in 1970 on 27th September. To aware the people about the role and impact of tourism on society, the UNWTO started celebrating World Tourism Day on 27th 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, 1997, 2008, 2010, and 2014 respectively.

iii) Government of Maharashtra, in Tourism and cultural affairs vide Resolution No. MTC-2005/2/CR-172/ Tourism, Mumbai dated - 2006, declared Tourism Policy-2006 having tourism vision 2025. This policy has identified "Ecotourism" sector. Infrastructure development, public-private partnership, capacity building, creating awareness etc. are high lights 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 2008". This policy illustrates the role of stake holders, capacity building of stake 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 the 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 a 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 and food facilities, home-stay facilities, capacity building of local people and staff, identification of various types of tourism etc. are important provisions in eco-tourism policy 2008.

12.3: POTENTIALECO-TOURISM SITES IN AKOLA FOREST DIVISION.

Akola Forest Division has its varied flora and fauna ranging from the grasslands, the wetland to the thick forests and has quite a few ecotourism sites of potential. They are not properly developed and require immediate attention.

Places of ecotourism attractions are few, but they have great potential. Forests of this Division have origins of many rivers. All these places need to be given specialized attention to ensuring preservation of their originality and potential in wildlife conservation as well as from eco- tourism point of view.

Some of the sites are 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 other cultures and the chance to educate others about one's 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. There are many places of ecotourism importance. Some of them are listed below:

❖ **EXISTING ECOTOURISM SITES :**

1) **Rudrayani Devi**- Famous for the temple of Lord Rudrayani Devi temple. Adjoining to this temple Rudrayani Tank which is famous for water birds and very attractive spot.

2) **Malrajura Ecotourism** (Range - Patur Round -Malrajura) Malrajura Ecotourism Site located 10 km from Patur taluk. It is a beautiful landscape having good quality forest floral & faunal diversity. The Malrajura Ecotourism adds beauty to the site. Malrajura Ecotourism which is an irrigation project having a fascinating scenic beauty with water all-round the year.

❖ **PROPOSED ECOTOURISM SITES**

1. Shivapur (Range - Akola , Round –Akola, Beat- Loni)

Shivapur is located near to Akola and is the only forest area in Akola Muncipal corporation. The area is 101.15 ha. This can be developed as an urban forest.

2. Loni (Range - Akola Round -Akola Beat- Loni)

Loni is located very near to Akola. This site can be developed as a place for Medicinal & Aromatic plants of rare &Endangered species. To create awareness among the visitors.

3. Dahikhed Futker (Range- Akola, Round–Akola, Beat-shahnur)

Dahikhed Futker site is located near the entry area Melghat Tiger Reserve in Akola Round of Akola range. Popatked dam adds beauty to the area on the way to Melghat.

4. Borgaon Manju (Range -Akola, Round -Akola, Beat-Borgaon manju)

To Protect & conserve for the Lesser Florican. Have great variety of Bird species & Reptiles. This could be developed as an area of grasslands.

5. Pandhurna Ecotourism Site (Range Aalegaon)

The Ecotourism Site is located on Chandilake surrounded by forest area. Pagoda, Nature trail, water tower can be an added advantage to the Ecotourism Site.

6. Kutasa Ecotourism Site (Range - Akola, Round -Akola, Beat-Bordi)

Kutasa is located 30 km away from Akola. Koteshwar temple is a religious place located here. This Ecotourism site can be a model site for soil

& moisture conservation in saline soil areas. The forest comprises 17th century (Nizam era lakes.) The lakes can be developed as the Ecotourim site as well a model of soil & moisture conservation.

The principles of Eco-tourism stated above should be the guide for all such developments.

- Biodiversity garden, Medicinal Plants garden, Nakshatra van etc.
- Nature interpretation centers,
- Adventure Sports,
- Tent camping,
- Nature Trail,
- Observation towers,
- Camping,
- Homestay development,
- Boating,
- Observation tower,
- Bird watching,
- Protection hut.

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 an Eco-tourism 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 stage.
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 Dos and Don'ts for such tourists.

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 ecotourism sites should go hand in hand with the conservation of the biodiversity, the nurture of environment and the appreciation of nature by the tourists.

While designing the Plan the interests of the forests and wildlife should be of prime importance. The different actors/stakeholders like the community, visitors, businesses, NGOs should no doubt be taken into consideration. A common phenomenon is that ecotourism can generate both symbiosis and conflict between the actors. The potential for ecotourism to result in symbiosis 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 – 13

FINANCIAL FORECAST

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 prescription of the plan, it is seen that the implementation of this plan will incur an average amount of Rs. 1502.32 lakh annually in the first three years and Rs. 2944.89 lakh annually for the next seven years that is from the fourth year onwards. The total expenditure will come to Rs. 25121.19 lakh. The expected revenue from the implementation of the plan is Rs. 2512.12 lakh annually. The expenditure and revenue of the division during the last ten years is given below:

TABLE NO. 13.1: STATEMENT SHOWING THE REVENUE, EXPENDITURE AND SURPLUS

Year	Revenue (Rs in Lakh)	Expenditure (Rs in Lakh)			Total expenditure (Col. 3+4+5)
		Conservancy & Work (Rs. In Lakh)	Establishment (Rs in lakh)	Plan (Rs in Lakh)	
1	2	3	4	5	6
2009-10	177.67	241.15	604.05	422.00	**1267.20**
2010-11	108.22	230.13	617.06	437.17	**1284.36**
2011-12	163.21	218.70	755.08	981.61	**1955.39**
2012-13	225.40	211.35	829.73	1008.63	**2049.71**
2013-14	224.90	221.61	1089.98	1214.66	**2526.25**
2014-15	168.94	198.38	1083.36	1389.60	**2671.34**
2015-16	68.97	485.91	1209.26	1403.70	**3098.87**
2016-17	107.03	526.31	1207.55	1448.87	**3182.73**
2017-18	97.92	366.89	1225.94	1395.88	**2988.71**
2018-19	115.65	534.56	1066.80	2495.27	**4096.63**
Total	**1457.91**	**3234.99**	**9688.81**	**12197.39**	**25121.19**

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 jalyuktshivar, etc. The implementation of the plan is going to cost the division an amount of Rs.25121.19 lakh.

PLAN FUNDS: from the plan expenditure statement, as provided by the DCF, for the last 3 years average, the annual plan funding is Rs.1780.00 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 division in the last three years under the Non plan averages approximately Rs.475.92 lakh per year. This needs to be enhanced If the plan is to be implemented in full.

CAMPA: The CAMPA is an important source of funding. In the Akola division, the campa fund between 2016-17 to 2018-19 was Rs. 517.48 lakhs. This can be increased for the core forestry operation for the implementation of the plan.

District plan: The District plan funding for the upgradation 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 this is a good source of funding. EGC, which is the original scheme started for employment guarantee as the first such scheme in the country by the government of Maharashtra, should be tapped into as done in the past.

NAP (FDA): The national afforestation program implemented all over the country with emphasis on people participation should be made use of for the implementation of the working plan prescriptions.

Special projects: State specific and district and district-specific projects like jalyuktshivar 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.

*** TANGIBLE BENEFITS:** The tangible benefits accruing from forests can be computed in economic terms from various goods and services ensuring from forests. The estimation / forecast of timber, poles, fuel wood, Tendu, Gum and other non-wood forest produce accruing from forests can be made with reasonable accuracy with the help of yield regulating formulae and the available market trends.

The abstract of benefits and costs because of this plan is given as follows:

Annual estimated average expenditure for the prescribed operations.	= 1670.09 lakhs
Annual tangible benefit from the forest	= 298.80 lakhs
Annual intangible benefit as calculated above	= 227409.68 lakhs
Total benefit (both tangible and intangible) from the Forests	= 227708.48 lakhs

Social Cost- Benefit Ratio is 1670.09 Lakhs: 227708.48 lakhs or 1:136.35

Thus, the above Cost-Benefit Ratio favor's the scientific management of forests, as prescribed, in the Working Plan.

BENEFIT COST RATIO: The benefit cost ratio for the implementation of this plan taking the figures of the ten years average is 1:136.35 Thus 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 table placed below.

As discussed under the chapter 9 in 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.227708.48 lakhs as per the current rate of NPV value for the Akola Forest. As the NPV rate is taken for the benefits acquirable over the period of 20 years the annual benefit comes to Rs.11470.48 lakhs. This figure as per the new NPV rate proposed is Rs. 1:136 lakh but the annual period is variable for various forest types and situation. Hence it is difficult to find the annual benefits.

If this figure of current NPV is taken for the B.C. Ratio calculation, the math's works out as under:

1:136.35 say, 1:136 as per current rate of NPV,

i.e., for every rupee that is invested the returns are Six Hundred sixty-five Times.

FINANCIAL FORECAST

Estimated Annual Expenditure (details) for the Working plan implementation in Akola Division.

Selection–cum-Improvement Working Circle

Expected expenditure during the plan period

Sr. No	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)
1	Demarcation and marking	755.00	Ha.	4.50	1698.75	12.825	12.825	12.825	12.825	12.825	12.825	12.825	12.825	12.825	12.825	12.825	12.825
2	Coupe working																
2a	Timber harvesting	350.00	Cu m.	8.40	3171.00	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100
2b	Firewood extraction	400.00	Stacks	1.63	615.32	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460
3	Natural Regeneration																
	Nursing of naturally occurring seedlings and coppice management etc. in "D" area+B1 area NR	370.00	Ha.	10.00	3775.00	13.960	13.960	13.960	13.960	13.960	13.960	13.960	13.960	13.960	13.960	13.960	13.960
3a	PPO/PYO (Pre-planting work)	370.00	Ha.	207.38	78285.95	289.660	289.660	289.660	289.660	289.660	289.660	289.660	289.660	289.660	289.660	289.660	289.660
3b	FYO(First Year Operation)	370.00	Ha.	91.60	34579.00	127.940	0.000	127.940	127.940	127.940	127.940	127.940	127.940	127.940	127.940	127.940	127.940
3c	SYO(Second Year Operation)	370.00	Ha.	57.49	21702.47	80.300	0.000	0.000	80.300	80.300	80.300	80.300	80.300	80.300	80.300	80.300	80.300
3d	TYO (Third Year Operation)	370.00	Ha.	58.88	22227.20	82.240	0.000	0.000	0.000	82.240	82.240	82.240	82.240	82.240	82.240	82.240	82.240
4	Soil and Moisture Conservation work100 cum/ Coupe	755.00	Cu m.	0.92	347.30	2.620	2.620	2.620	2.620	2.620	2.620	2.620	2.620	2.620	2.620	2.620	2.620

5	Cutback Operation	755.00	Ha.	11.50	4341.25	32.780	32.780	32.780	32.780	32.780	32.780	32.780	32.780	32.780	32.780	32.780	32.780
6	Plantation (Teak/Mix) B2																
6a	PPO/PYO (Pre-planting work)	200.00	Ha.	51.93	19603.58	39.210	39.210	39.210	39.210	39.210	39.210	39.210	39.210	39.210	39.210	39.210	39.210
6b	FYO(First Year Operation)	200.00	Ha.	158.70	59909.25	119.820	0.000	119.820	119.820	119.820	119.820	119.820	119.820	119.820	119.820	119.820	119.820
6C	SYO(Second Year Operation)	200.00	Ha.	103.00	38882.50	77.760	0.000	0.000	77.760	77.760	77.760	77.760	77.760	77.760	77.760	77.760	77.760
6d	TYO (Third Year Operation)	200.00	Ha.	76.00	28690.00	57.380	0.000	0.000	0.000	57.380	57.380	57.380	57.380	57.380	57.380	57.380	57.380
6e	4th YO (FourthYear Operation)	200.00	Ha.	38.50	14533.75	29.070	0.000	0.000	0.000	0.000	29.070	29.070	29.070	29.070	29.070	29.070	29.070
6f	5th YO(Fifth Year Operation)	200.00	Ha.	38.50	14533.75	29.070	0.000	0.000	0.000	0.000	0.000	29.070	29.070	29.070	29.070	29.070	29.070
7	Cleaning	755.00	Ha.	8.00	3020.00	22.800	0.000	0.000	0.000	0.000	0.000	22.800	22.800	22.800	22.800	22.800	22.800
8	Fire Protection	755.00	Ha.	1.00	377.50	2.850	2.850	2.850	2.850	2.850	2.850	2.850	2.850	2.850	2.850	2.850	2.850
	Total-	**7575.00**		**927.93**	**350293.57**	**1033.845**	**407.465**	**655.225**	**813.285**	**952.905**	**981.975**	**1033.845**	**1033.845**	**1033.845**	**1033.845**	**1033.845**	**1033.845**

Note:-

1. The mandays approved for Demarcation & Marking is for 'D' type areas. However, mandays for 'B' type and 'C' type areas be decided by territorial Dy. CF as per crop condition.
2. Mandays for fire protection will be sanctioned after preparing "fire protection Plan" for the entire division.
3. The fund requirement will vary as per the prevailing wage rate.
4. The above items are only indicative and not exhaustive. DCF can change the quantity shown as per site requirements.

Estimated Annual Expenditure (details) for the Working plan implementation in Akola Division

Afforestation Working Circle

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)
1	Demarcation and marking	1751.91	Ha.	1.50	566.25	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92
2	Coupe working (Hygienic Felling)																
2a	Timber harvesting	325	Cum.	8.40	3171.00	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31
2b	Firewood extraction	400	Stacks	3.50	1321.25	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29
3	Natural Regeneration																
	Nursing of naturally occurring seedlings and coppice management etc. in understocked patches.	195	Ha.	10.00	3775.00	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58
3a	PPO/FYO	195	Ha.	207.40	78293.50	152.67	152.67	152.67	152.67	152.67	152.67	152.67	152.67	152.67	152.67	152.67	152.67
3b	FYO (First Year operations)	195	Ha.	91.60	34579.00	67.43	0.00	67.43	67.43	67.43	67.43	67.43	67.43	67.43	67.43	67.43	67.43
3c	SYO(Second Year Operation)	195	Ha.	57.49	47156.94	91.96	0.00	0.00	91.96	91.96	91.96	91.96	91.96	91.96	91.96	91.96	91.96
3d	TYO (Third Year Operation)	195	Ha.	58.88	22227.20	43.34	0.00	0.00	0.00	43.34	43.34	43.34	43.34	43.34	43.34	43.34	43.34
4	Soil & Moisture Conservation work																

	2000 cum/ Coupe SMC in whole coupe including Plantation area.	500	Cum.	0.92	347.30	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
5	Plantation (Teak/Mix) B2																
5a	PPO/PYO (Pre-planting work)	200	Ha.	51.93	19603.58	39.21	39.21	39.21	39.21	39.21	39.21	39.21	39.21	39.21	39.21	39.21	39.21
5b	FYO(First Year Operation)	200	Ha.	158.70	59909.25	119.82	0.00	119.82	119.82	119.82	119.82	119.82	119.82	119.82	119.82	119.82	119.82
5c	SYO(Second Year Operation)	200	Ha.	103.00	38882.50	77.76	0.00	0.00	77.76	77.76	77.76	77.76	77.76	77.76	77.76	77.76	77.76
5d	TYO (Third Year Operation)	200	Ha.	76.00	28690.00	57.38	0.00	0.00	0.00	57.38	57.38	57.38	57.38	57.38	57.38	57.38	57.38
5e	4th YO (Fourth Year Operation)	200	Ha.	38.50	14533.75	29.07	0.00	0.00	0.00	0.00	29.07	29.07	29.07	29.07	29.07	29.07	29.07
5f	5th YO(Fifth Year Operation)	200	Ha.	38.50	14533.75	29.07	0.00	0.00	0.00	0.00	0.00	29.07	29.07	29.07	29.07	29.07	29.07
	Total-			**906.32**	**367590.27**	**741.55**	**225.72**	**412.97**	**582.69**	**683.41**	**712.48**	**741.55**	**741.55**	**741.55**	**741.55**	**741.55**	**741.55**

Estimated Annual Expenditure (details) for the Working plan implementation in Akola Division.

Fodder Improvement Working Circle

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)
1	Demarcation of coupe	556	Ha.	0.50	188.75	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
2	Deep Ploughing in 10 ha. area suitable for grass land	40	Ha.	0.00	2500.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	Seed broadcasting in July	40	Ha.	2.50	943.75	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
4	Enclosure	40	Ha.	0.00	40000.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
5	Removal of shrub growth and weeds	50	Ha.	5.00	1887.50	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	Total				**45520.00**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**	**19.37**

Estimated Annual Expenditure (details) for the Working plan implementation in Akola Division.

Boundary Demarcation

Sr. No.	Particulars of work	Avg. Quantum of work	Unit	Man days/ unit	Rate/unit (Rupees)	Annual (Rs. In Lakh)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average (Rs. In Lakh)
1a	Fixing boundary pillars(Artificial and Natural RF Boundary)	200	Pillar	7	377.50	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28
1b	Fixing boundary pillars(Artificial and Natural PF Boundary)	4000	Pillar	1	377.50	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10	15.10
1c	New Demarcation of Non Forest Land For C.A. And undemarcated Protected Forest	346	Ha./yr	10 Pillar /Ha.	15000.00	51.90	51.90	51.90	51.90	51.90	51.90	51.90	51.90	51.90	51.90	51.90	51.90
	Total					**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**

Estimated Annual Expenditure (details) for the working Plan Implementation in Akola Division Wildlife Chapter.

Sr No	Particulars	Arg. Quantum of work	Unit / No. of water hole	Man days/ unit	Rate/ unit (Rupees)	Annual (lakh Rs.)	Year 1		Year 2		Year 3		Year 4	
							No of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh
1	Preparation of water hole	50	50		2.75	137.50	5	13.75	5	13.75	5	13.75	5	13.75

Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh	No. of water hole	Amount Rs. In lakh
5	13.75	5	13.75	5	13.75	5	13.75	5	13.75	5	13.75

Abstract of Year wise Requirement of Funds for Implementation of Working Plan (Rs. In Lakh)											
Sr. No.	Working Circle /Activity	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
1	Selection-cum-Improvement	407.47	655.23	813.29	952.91	981.98	1033.85	1033.85	1033.85	1033.85	1033.85
2	Afforestation	225.72	412.97	582.69	683.41	712.48	741.55	741.55	741.55	741.55	741.55
3	Fodder Improvement	19.37	19.37	19.37	19.37	19.37	19.37	19.37	19.37	19.37	19.37
4	Boundary Demarcation	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**	**72.28**
5	Wildlife (Overlapping) W.C. (Water Hole management)	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75
	Grand Total	**738.59**	**1173.60**	**1501.38**	**1741.72**	**1799.86**	**1880.80**	**1880.80**	**1880.80**	**1880.80**	**1880.80**

Note: - The requirement for funds will vary according to the prevailing wage rate.

REVENUE FORECAST OF AKOLA FOREST DIVISION.

Sr. No.	Working Circle	Approximate Expected yield (Annual)						Avg. Unit Price in Rupees (As per Schedule of Rates)						Approximate Annual Revenue (Rs. In Lakh)						Grand Total
		Timber		Beat		Poles		Timber		Beat		Poles		Timber		Beat		Poles		
		Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	Teak	Non-Teak	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
1	SCI	350	0	400	0	2000	0	40000	5000	3000	1200	200	50	140	0	12	0	4	0	156.00
2	AWC	325	0	400	400	0	0	40000	5000	3000	1200	200	50	130	0	12	0.8	0	0	142.80
	Total	**675**	**0**	**800**	**400**	**2000**	**0**	**80000**	**10000**	**6000**	**2400**	**400**	**100**	**270**	**0**	**24**	**0.8**	**4**	**0**	**298.80**

Note: The expected annual revenue would vary as per the prevailing market price.

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BOUNDARY DEMARCATION





CHAPTER 14

MISCELLANEOUS REGULATION

14.1: 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 forestlands 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.

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 No XXXI.** and this needs to be carried out in the first 3 years 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. The Identified forests areas should be taken over by the division, with due verification of records and demarcation on the site. Hence, examination of record, collection of authentic maps and demarcation of the area is essential for the entire Identified forest within three years. Entire area under Identified forest should be demarcated on priority within a period of 3 years from the start of this plan. The Identified forest areas which are situated in the boundary municipal corporation

or Nagar Parishad are vulnerable for non-forestry activities and hence, depending on the vulnerability, suitable method of demarcation should be adopted.

3. Fixing Boundary of the Erstwhile Forest villages.

14.2: 1/5 BOUNDARY DEMARCATION: It 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. XXXI.**

14.3: ROUTINE BOUNDARY MAINTENANCE:

1. The Beat Guard after personal inspection of the entire compartment must submit the 'Compartment Inspection Certificates' every month. The certificate must record forest encroachments, illicit cutting and condition of forest boundaries including pillar numbers and inter-pillar visibility condition. Separate certificate should be submitted for each compartment.
2. The Round Officer should submit similar certificate 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 month. 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 at 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 officer 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 Officer and Range Forest Officer as well as ACFs shall be applied along with directives issued for the forest protection.

14.4: SPECIFICATION OF BOUNDARY PILLARS:

The prescribed design must be followed to carry out the task of fixing the boundary pillars as prescribed. According to provisions contained in the BFM vol. III, Chief Conservator of forests is empowered to give sanction to the design of the pillars. However, May 2001 instructions referred to as above have given uniform specification for his purpose. Accordingly 1.40-meter long cement concrete pillars at roughly 50 meters interval on the external forest boundaries will be erected. Wherever the external boundary is shared with other government land, the interval should be increased to 100-150 meters and intermediate pillars may be 0.90 meter long. Both types of pillars should be embedded to 0.40-meter depth in the cement-concrete base. The prescribed tapering cross-section of the 1.40-meter pillar is 0.10 x 0.15 meter at the top and 0.15 x 0.23 meter at the base. The 0.90-meter pillars are parallel pipe with 0.15-meter width and thickness. 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.

14.5: SPECIFICATION OF A BOUNDARY CAIRN:

Artificial boundaries should be marked with a series of boundary cairns. A cairn should be made of loose stones upon excavated foundation to a depth of 30 (thirty) centimeters 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) or a timber stake projecting ½ (half) meter in the center will be fixed

firmly on the top of the cairn, and marked with cairn serial number. Each boundary marks (cairn) must be visible from its neighboring 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 center. Such cairns can be made of earthen mass, where stone boulders are not available.

14.6: RECORDING LOCATION 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 top-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.

14.7: CLEARANCE FOR THE BOUNDARY LINE:

Boundary line clearance on the artificial boundaries will follow the standard width as described in the directives on the subject. Trees should not be felled for the boundary line, but shrubby undergrowth should be cleared. Norm for the external boundary is 12 meters. The internal compartment boundary lines should be 3 meter wide.

14.8: COMPARTMENT PLATES:

Metal plates on the boundary trees at a height of 2.5 to 3.0 meters will be fixed on the corners and roughly at half-kilometer 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 less than 15cm and 10cm, respectively. Strokes should be at least 2 cm wide.

14.9: 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 our sample checking of the report in the manner decided by the range forest officer. Only material cost should be admissible for the purpose.

14.10: 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 Akola 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 Dy. CF, working plan on a quarterly basis. CCF(T), shall review the progress every quarter and instruct for course corrections.

14.11: MANAGEMENT OF PRIVATE ACQUIRED FORESTS: Not applicable

14.12: MANAGEMENT OF AREA OF NON FOREST LAND TAKEN OVER FOR COMPENSATORY AFFORESTATION:

In Akola forest division a total of 225.625 ha. Non forest land has been taken over by the Forest Department for Compensatory Afforestation. Boundaries of this area are to be demarcated and secured on priority within 3 years. This area is included in Working Circle adjoining to them for the management purpose.

14.13: 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 coupes after demarcation and issue 'Coupe Demarcation Certificate' in the prescribed format, given in the following paragraph, which is to be verified by the concerned assistant conservator of forests.

2. Format for the coupe demarcation certificate is prescribed, as follows, in form no. 1:

Form No. 1

"I.....R.F.O.

.....certify that I have personally inspected the demarcation of the coupe no.....in compartment no.....of F.S. ..... of W.C.....on dated .....and found that the coupe has been demarcated as prescribed in the working plan. The area of the coupe is .....hectares.

Date: Signature of the RFO

3. Demarcation of coupes: Annual coupes have been prescribed to be demarcated by cutting and clearing bushy undergrowth on 3 (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 45cm (girth breast height), at suitable intervals standing on the periphery of the coupe will be given two coal tar bands and a geru band in between after scrapping the loose dead bark. The lower coal tar band will be at B.H. and the other coal tar band will be 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, form no. 14.2.

Form No. 2:

List Of trees on the coupe boundary

Sr. No.	Name of species	GBH (OB)	Remarks
1			
2			
3			

5. No trees, bearing the coupe demarcation bands, is proposed to be marked for felling.

6. Demarcation of section: 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 meter wide cut lines by clearing brushwood, unless the section line runs along a permanent features.

7. Trees above 45 cm growth, selected at suitable intervals on the inner edge of the 1.5m wide cleared section line will be given two coal tar bands 15 cm apart, the lower coal tar band being at breast height. Just below the lower coal tar band section number will be given on the side away from the area they would denote.

8. Demarcation of other areas given in the treatment map: The other categories of areas shown in the treatment map will be marked by giving one geru band at B.H. and one coal tar band 5 cm 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 para9.21(iii) to(v) should be followed.

14.14: 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. The concerned ACF will

verify the treatment map and make corrections, if necessary, before submission to the DCF Akola 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.

14.15: 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. Marking is prescribed to be done by the forester concerned under the close supervision of RFO and constant guidance of ACF concerned. The DCF shall himself inspect majority of 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 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 BH (breast height) as well as at the base on the blazes of sizes 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 tress in addition will bear digit serial numbers both at BH (breast height) and at the base.

a) All trees of Teak, Bija, Shisham, Ain, Tiwas, Haldu, Kalam, Dhaora and other timber yielding trees of 45cm and above, girth at breast height (o.b.)

b) Trees of all other species, of and above, 60cm girth at breast height.

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 an under:

For Tree no. 195

XX (HAMMER MARK)
1
9
5

7. All trees bearing serial numbers will be individually recorded in marking (recording) book in, the following, for no.14.3 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. 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

14.16: FOREST PROTECTION

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.

Routine monitoring: The Deputy Conservator of Forests 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.

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.

Awards and Rewards: Staff who has performed exemplarily in forest protection should be nominated for state and national awards.

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.

14.17: FIRE PROTECTION

Fire adversely effects 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 sensitized about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

CLASSIFICATION OF THE FIRE CONTROL

Class-I (complete fire protection): The class-I fire control areas include all felling coupes, thinning coupes (six years), plantations (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) Amravati.

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) Amravati.

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*7) 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) Amravati will be excluded from the fire protection scheme. 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 dividing the forest area into convenient blocks. The class-I areas will also have cut 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 crop.
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 Fire-Fighting tools should be used for extinguishing the fire. The supervising officials should mobilise reinforcement in case of large fire. Utmost care will be taken to quench the smouldering material. Providing a thick layer of soil over such material is generally effective.

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 Forests and physical presence of a gazetted officer.
9. The division office 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. Standards widths of fire lines are prescribed in the table 14.2. The supervising officer will decide the width unit for carrying out the fire line work on the shared boundary.
11. Establishment of 24*7 control room at range and division office by pooling of resources is necessary to swiftly deploy the teams for dousing fires.
12. Fire line cutting and burning works are to be done with the close cooperation of JFMCs. This approach 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.

TABLE NO. 14.2: STANDARD WIDTH OF VARIOUS TYPES OF FIRE LINES

Sr. no	Characteristics of the area	Width of fire line
1	External reserved and protected forests boundary	12 meter
2	Naturally or artificially regenerated areas (for 5 years)	6 meter
3	Remaining coupe boundary	6 meter
4	Both sides of roads and cart tracks passing through the forests.	6 meter
5	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 05number of fire blowers for extinguish 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 fire-fighting 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 Dehradun 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 of the lack of knowledge on the harm of fire on the forests. The oft-repeating is “leaf, litter is burnt. No loss to 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 and small animals, no forest officer should say that there is no loss to the government.

17. Firefighting Squad: The critical condition of the forests of Akola 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 the squads deployed in the wildlife areas. This is in line with what is given inputs. 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.

14.18: ILLICIT CUTTING

Illicit felling in the forest area is growing at alarming rate. Since the subject is dealt separately according to a series of directives for the purpose, recommendation 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 Government of Maharashtra should be used to control illicit tree fellings.

In 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.

14.19: FOREST ENCROACHMENT

The causes of forest encroachment should be examined thoroughly and addressed in a comprehensive manner. All the necessary support should be provide, 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 are 848.95 ha. in the division. 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 are often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.

Prescription for post eviction encroachment:-

1) Soil & Moisture conservation works shall be undertaken in these areas.
2) Plantation activities should be taken in these areas.
3) Boundary pillars should be erected for boundary demarcation.
4) CCT/DCT works should be taken in these areas.

14.20: SOIL AND MOISTURE CONSERVATION:

The areas adjoining the human habitations, especially, the protected forests 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 condition as well as water regime of a given tract. Moreover, extensive silvicultural works have been prescribed in this working plan to regenerate the forests primarily assisting and tending the exciting nr and the available rootstock. To ensure the success of these operations 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 condition, 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 meters/hectare of loose rubble filling or earthwork unless otherwise prescribed in the specific scheme.

The streams beds 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 building, and therefore, such bunds should not be considered as parts of the quantity prescribed here. Each of such nala bunds, if required should be treated as an independent project.

The forest tank is proposed to be taken up in suitable sites without causing damage to the tree crop either during construction or due to submergence.

14.21: GUIDELINES FOR REGENERATION

Plantation should be taken up on selective basis and only in the areas having good soils depth and which are well drained. Also the areas selected should have no or negligible grazing pressure. If the areas was already planted and resulted in failure, the causes 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), AMRAVATI. B2 types 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 regeneration.

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 naturals Regeneration exists, it will be given preference to artificial regeneration. It is necessary to encourage natural regeneration considering the existing 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 seedlings and saplings (those having attained a height of 60 cm and occurring roughly at a spacement of 5 m, that is, about 400 seedlings per ha of valuable species. Growth of these seedlings sapling 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 seedlings /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 stock (as indicated by enumeration results) shall however be given preference.

iii. As it has been observed that there is hardly any regeneration in the forest of the division, the norm of soil working in the forests of Akola which provides for soil working on 400 seedlings/ha in a coupe is being modified. In the forest of Akola, **aided natural regeneration is a must.**

iv. Hence, wherever NR is prescribed (B1 or D areas) and the number of seedlings/saplings 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 seedlings and prescribed to be nurtured through this process in such 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 is 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 estimates of 100 NR seedlings and 525 ANR seedlings is attached in the plan as Annexure V. in order to project cost calculation but actual estimate should be as per annual field condition decided after due survey and evaluation.

Artificial plantations: Only the areas neither having sufficient seedlings/saplings of seed origin nor sufficient rook 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 plantation.

Roads, cart, tracks and culvers:

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.

Unwanted up-gradation of the forest roads should be discouraged, but required culverts may be constructed in trenches useful for the forest protection, in no case provisions of forest conservation act, 1980 violated.

14.22: HARVESTING AND DISPOSAL:

Agency for harvesting: The Deputy Conservator of Forests, Akola shall decide the agency for harvesting in accordance with the applicable policies and regulation present policy prohibits the sale of standing trees. Estimation of bamboo yield should be based on actual enumeration carried out a year prior to the beginning of bamboo harvesting.

Disposal at timber depots: Harvested timber and firewood are proposed to be transported to the established forest depots for sale by auction or allocation according to the prevailing policies and guidelines. Bamboos are also sold at these depots. The national forest policy, 1988 acknowledges the first charge on the forest produce in the local tribal and village community living in and around the forest areas. Hence, decision for the disposal of the forest produce should be guided by the philosophy of the first right of the local village communities, which is also recognized in the Nistar patraks. For facilitating nistar distribution, temporary depots can be created at convenient places.

Stacking for the nistar supply: Each established or temporary depots is prescribed to have designated areas for stacking small timber, poles, firewood, and bamboo for the nistar supply at the special low sanctioned rates to local people including agriculturists and artisans. The Deputy Conservator of Forest can approve additional nistar depots at suitable places in the division, preferably the round or beat headquarters, so that villagers may not be required to traverse large distance to procure the nistar materials.

14.23: IRREGULAR HARVESTING:

Restriction on irregular harvesting: Irregular harvesting of timber, firewood and other NTFPs is prohibited, except in the following cases:

Harvesting for the fire lines and the transmission line: The Deputy Conservator of Forests may permit felling of trees within the prescribed width of the established fire lines and the approved power transmission line. The prescribed width in the guidelines for the Forest (Conservation) Act, 1980 and rules, there under, will be applicable to the transmission lines. Creation of new fire lines shall require prior permission of the Chief Conservator of Forests.

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 proposal for the use of forest land for non-forest purposes are approved by the government of India under the provisions of the forest conservation act, 1980 and as per latest guidelines issued by GOI. From time to time for specific projects. The Deputy Conservator of Forest 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.

Harvesting of dead, fallen and uprooted trees in the storm: Removal of dead, fallen firewood and trees uprooted by wind or storm from all parts of the forests, except the coupes due for working, will be done in the following manner. Every year in the month of October each beat guard will report the availability of dead fallen firewood and trees uprooted by wind or storm to the concerned Range Office. The Range Forest Officer will estimate availability for such material in each Compartment and concerned ACF will verify the same. If more than two such trees per hectare is estimated, proper marking will be carried out. Two dead and fallen trees are required for retention from wildlife conservation. Wood removal will be carried out from the compartment after approval of the Deputy Conservator of Forests. The details of material obtained from each Compartment and revenue realized from it will be entered in the respective compartment history form. Harvesting of dead and fallen firewood is governed by the Nistar rights and privileges as admitted in the Nistar patraks or directed by the government from time to time. The nistar holders are proposed to be allowed to collect such material directly from the forests on rated passes or in the manner determined by the DCF Akola through the written directives.

No irregular harvesting for the purpose of undertaking plantation/afforestation works under schemes outside the scope of this working plan will be taken up in any of the areas under the working plan.

14.24: MAINTENANCE OF THE FOREST LAND RECORDS:

Maintenance of the land record and forest maps: The forest land records and the forest maps will be brought up to date, and maintained as such. A certificate to this affect will be recorded annually in the form no 1- register during the month of June.

Forest notification: Identified Forest, acquired private forests and non-forest areas transferred for the compensatory afforestation shall be immediately, proposed for notification as the protected forests, and the reservation process shall be initiated with the section 4 notification under the provisions of Indian forest act 1927.

14.25: Recondition 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 Akola Forest Division to mark completion of the process.

Along with reconciliation, the details of land (patta) issued on the forestland will also be made available to the Akola Division. The collector and the Deputy Conservator of Forest shall send the details of all grants or occupancy rights issued since 1980 to the Nodal Officer at Akola.

14.26: 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 15

SCIENCE AND RESEARCH

During the process of writing of this Plan various papers, articles, reports, and documents were referred from these sources and used for the writing of the Plan.

- Annual administration report of Maharashtra Forest Department, 2017-18
- Carbon Statistics of India
- Control Ground Water Board (CGWB)
- Geological Survey of India (GSI)
- Ground water survey and Development Agency (GSDA)
- Indian Forester
- Indian Institute of Forest Management, Bhopal (IIFM)
- Maharashtra Remote Sensing Application Centre (MRSAC)
- National Bureau of Soil Survey and Land use Planning (NBSSLUP)
- Social Forestry, Agriculture, Animal husbandry, Water resources departments, Amravati
- State of Forest Report 2005, 2009, 2017
- Supreme Court Orders
- Survey of Forest Resources (SOFR), Amravati
- Twelfth Five year plan document under Environment, Forestry and Wildlife 2009
- Maharashtra Forest manual

RESEARCH GAPS

Because of the lack of any research works/paper related to the Division and the Vidarbha region, the many chapters that involve specific information on the Forest Division of Akola 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 investigated the new aspects that the need of our present times requires, 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. However, areas in which the research gap is felt most area.

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. It is clear that a Biodiversity Assessment study is very much required for the documentation of the richness of forests. This is also a prescription for the Biodiversity WC.

CARBON SEQUESTRATION: Carbon sequestration is an important aspect of the contribution of forests 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. The research that will be required for the Tier-III level measurements of the key C-stock components over time.

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 verity of species than we ever know. There is a need for research to be done for the documentation of all the species that are being used by the people and to devise the best method for the harvest of the species through experimentation.

15.1: PRESERVATION PLOTS:

The following are the excerpts from the paper 'An account of Preservation Plots in Central India' by B. N. Gupta and N G Totey, Indian Forester, 1994 relevant for the subject in discussion.

15.1.1: 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 3rdAll 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 seral types was generated (Anon, 1939). In 1961, during the Xth All India Silvicultural Conference emphasis was laid on preservation of fine specimens of forests i.e., groups of out-standing trees, rare types of forests of botanical curiosity and patches of relict vegetation, specimens of managed forests (stable sub-climax stages) and climax forests.

15.1.2: PRESERVATION PLOTS IN MAHARASHTRA

Preservation plots in Maharashtra have been established as early as 1955and 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 forests, 30% in moist deciduous forests 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 in 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. The following points are recommended for creation of preservation plots.

1) The division should be surveyed to identify the area under specific forest types to be made as preservation plot. The plot size shall be of not less than 4.0 ha and to a maximum of 20 ha.
2) 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.

3) These plots shall be spared from all human interference including harvesting operations, if prescribed in the Plan. Activities shall be limited to those that would ensure protection and maintenance.
4) A total enumeration of the plot shall be taken up considering all the tree species of the forests (Species, age-class distribution, height, etc.)
5) The forests shall also be described in a proper manner as to its species composition, condition of the crop, health and vitality, presence of pests etc.
6) The shrubs and herbs present in the plot should be well-documented. This shall include the lower life-forms.
7) The fauna available in the area should also be surveyed and documented.

There is no Preservation Plot was made in Akola Forest Division.

15.2: SAMPLE PLOTS:

For the preparation of this Working Plan a total of 752 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.

Selection of Plots: As the forests of Akola 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 forest 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 a 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. The Enumeration result of the Sample

plots is given in **Appendix No. II** of Volume II These plots shall be monitored and data collected by FRSS (SOFR) unit Amravati. The normal prescriptions that are prescribed in the Plan area allowed to be carried out in these plots and the impact of the implementation of such prescriptions should be recorded and monitored.

15.3: REGENERATION PLOTS:

Selection of Plots: The 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 mycorrhizae 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. Data related regeneration is given in **Appendix No. II** of Volume II.

15.4: NTFP PLOTS

There is numerous Non- Timber Forest Produce available in this tract and are found in almost all ranges with varying extent. These natural produces contribute revenue to the State exchequers as well as generate employment to local people during their lean season. These natural produces play an important role in the rural economy of local population and help maintain their health. The important Non-Timber Forest Produce, found in this tract are *Moha* flower and seeds, *Tendu*, *Kulu* gum, *Salai* gum and *Dhaoda* gum, *lac*, *Charoli, Bel, Neem seeds, Karanj seeds, Biba, Sitaphal,* etc. Survey should be exhaustive and at the appropriate time with respect to NTFP species, which are annual and have short life cycle. This needs to be done by the territorial field staff. There is no NTFP plots has been established in the Akola Division.

MEDICINAL PLANT CONSERVATION AREA

The tract is rich in variety of medicinal plants which are used for curing various ailments by the local people. Medicinal plants occupy an important position in the socio- cultural, spiritual, and medicinal arena or local villagers. Their sustainable management and harvesting can conserve biodiversity, sustain human and environmental health, generate employment, and earn foreign exchange by promoting exports. The importance of medicinal plants and their uses are now worldwide felt need of humanity. Even World Health Organization (WHO) is concerned about this. These plants are not only necessary for maintaining the environmental balance and biodiversity, but also, they are looked upon as the future source of medicare of humanity. As most of the resources are still to be

explored and their proper uses are yet to be brought to the knowledge domain of the people at grass roots and acceptable level. But the present methods of extraction of medicinal plants in the tract are not conducive for future conservation. For sustainable and ecological development of medicinal plants it has been realized that medicinal plants conservation in the tract need to be intensified. Field surveys and studies are required at micro level for in situ conservation. The present inventory of Forest Resources Survey Scheme (FRSS) Units is at macro level and does not give true picture. The timing of surveys of resources by FRSS is after rainy season. It is not appropriate for NTFP survey. By the time surveys are conducted most of the herbaceous plants disappear due to their life cycle. This needs to be done by the territorial field staff.

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.

15.5: OTHER RESEARCH AND EXPERIMENTAL PLOT

There are no seed orchards, clonal seed orchards established in the Division till date. As mentioned earlier in the Plan the Akola Division has an overabundance of Teak of coppice origin because of its long history of working under Coppice with Reserve and Coppice with Standards. The area of the whole Division, however, may be surveyed for the possible establishment of Seed Orchards.

Improved nurseries are already being established throughout the state. It may be mentioned that as of the time of writing of this Plan the polybags are being replaced with root trainers in almost all nurseries. Also, mist chambers, polyhouse, shade nets, compost sheds, vermin-compost 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 the forest Department.

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CHAPTER -16

SUMMARY OF PRESCRIPTIONS

16.1: INTRODUCTION:

Akola Forest Division is situated between 19^0-51' N to 21^0-17'North latitude and between 76^0-7"E to 77^0-44' East longitude. The boundary of the Akola Division is conterminous with the boundary of the AkolaDistrict. The forest areas of Akola Division occur in compact blocks and some scattered patches. The forest type belongs to the Subgroup Southern Tropical Dry Deciduous Forest . The District of Akola is surrounded by Amravati District and Satpuda hill ranges in the North and North-East; Washim District is in the South; Buldhana District on the West.

For Administrative convenience the Ranges, Rounds and Beats were reorganized in year 2019-2020 and the entire division has been divided into 4 Ranges, 15 Rounds and 64 Beats.

16.2: DISTRIBUTION OF AREA: The total area of the division covered under this working plan is **37787.02** Ha. extended over 7tahsils in 1 Districts. The Akola Forest Division has been administratively divided into 4 ranges and the range wise distribution of the area is given as under.

Table No.16.1:

RANGEWISE DISTRIBUTION OF THE FOREST AREA

Sr. No.	Range	Round	Beat	Old Compt.	New Compt.	RF	PF	UF	Total
1	**Akola**	3	9	212	120	5433.33	55.18	75.81	5564.32
2	**Barshitakali**	4	15	121	113	11620.19	117.90	1.65	11739.74
3	**Patur**	4	17	42	38	8874.24	0	0	8874.24
4	**Alegaon**	4	23	51	46	10847.50	701.75	59.47	11608.72
		15	**64**	**426**	**317**	**36775.26**	**874.83**	**136.93**	**37787.02**

16.3: DISTRIBUTION OF AREA TO VARIOUS WORKING CIRCLES: The allocation of forest areas under various working circles of the proposed working plan is given below.

Table No.16.2:

AREA ALLOCATION TO DIFFERENT WORKING CIRCLES

Sr. No.	Proposed Working Circles	Area (ha.)	Percentage
1.	Improvement Working Circle	15120.27	40.01%
2.	Afforestation Working Circle	17468.57	46.23%
3.	Fodder Improvement Working Circle	5198.18	13.76%
4.	NTFP Chapter	-	Entire area
5.	JFM Chapter	-	Entire area
6.	Wildlife Management Chapter	-	Entire area
7.	Forest Protection Chapter	-	Entire area
Total		**37787.02**	**100%**

16.4: WORKING CIRCLE WISE SUMMARY OF PRESCRIPTIONS:

1. IMPROVEMENT WORKING CIRCLE:

Coupe demarcation and treatment Map:

1. Demarcation and Marking: One year in advance
2. Treatment map to be prepared.
3. A type: Protection area
4. B-type: Understocked and Blank areas (density <0.4)
5. C-type: Congested Pole crop
6. D-type: Well stocked areas (density >0.4)

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 stump 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 of seed origin of valuable species to be preferred and managed through cultural operations in D areas and B1 areas.
2. Artificial Regeneration in B2 type area if site is suitable.
3. Strict protection from fire and grazing
4. Tending operation for Natural regeneration in the 'D' type area & Root stock management in the 'B' type shall be taken up.

SMC Works: To be done on watershed basis.

1. SMC works, as described in the chapter of Miscellaneous Regulations are, Prescribed in A & B type area.
2. SMC Works are to be based on the requirement of site.

Subsidiary Operation:

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.

2. AFFORESTATION WORKING CIRCLE:

Coupe demarcation and treatment map:

1. Demarcation and treatment map will be prepared one year in advance.
2. Treatment map would show A,B,C,D areas.
3. A type: Protection area (Steep slopes, 30 m wide strips on both side of streams).

4. B-type: Understocked areas (density <0.4)
5. C-type: Congested Pole crop
6. D-type: Well stocked areas (density >0.4)

Silvicultural System:

1. Restorative phase – one year and productive phase – 5years
2. Removal of dead, live high stumps.
3. Plantation work in A, B type areas.
4. JFMCs to be actively involved.

Regeneration:

1. Tending of natural regeneration and existing root stock is prescribed to be given preference over plantation.

SMC Works:

1. SMC works will be done as prescribed in miscellaneous regulations.

3. FODDER IMPROVEMENT WORKING CIRCLE:

Coupe Demarcation:

The coupe due for closure to grazing will be demarcated one year in advance.

Treatment:

1. Removal of invasive weeds.
2. SMC work as per site requirement.
3. In suitable blank areas, regeneration of grass through seed broadcasting, area closure through enclosures is prescribed.
4. JFMCs to be actively involved.

4. NON-TIMBER FOREST PRODUCE CHAPTER:

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.

5. JOINT FOREST MANAGEMENT CHAPTER:

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, and fire and wildlife offences shall receive priority apart from regularly undertaken works such as SMC & Plantations.
3. Transparency in programme must be ensured through transparent payment mechanisms.
4. Villages which have not received funds should also be accorded importance.

6. WILDLIFE MANAGEMENT CHAPTER:

Prescription:

1. Standing Order of PCCF (WL) to be scrupulously implemented.
2. Habitat improvement works like waterhole development, meadow development to be taken up in suitable areas.
3. Creation of database w.r.t. riparian zones, saltlicks, 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 ha 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 or JFMCs in wildlife rich areas.
14. Massive awareness creation in village communities, schools, colleges, civil society, public representatives etc.

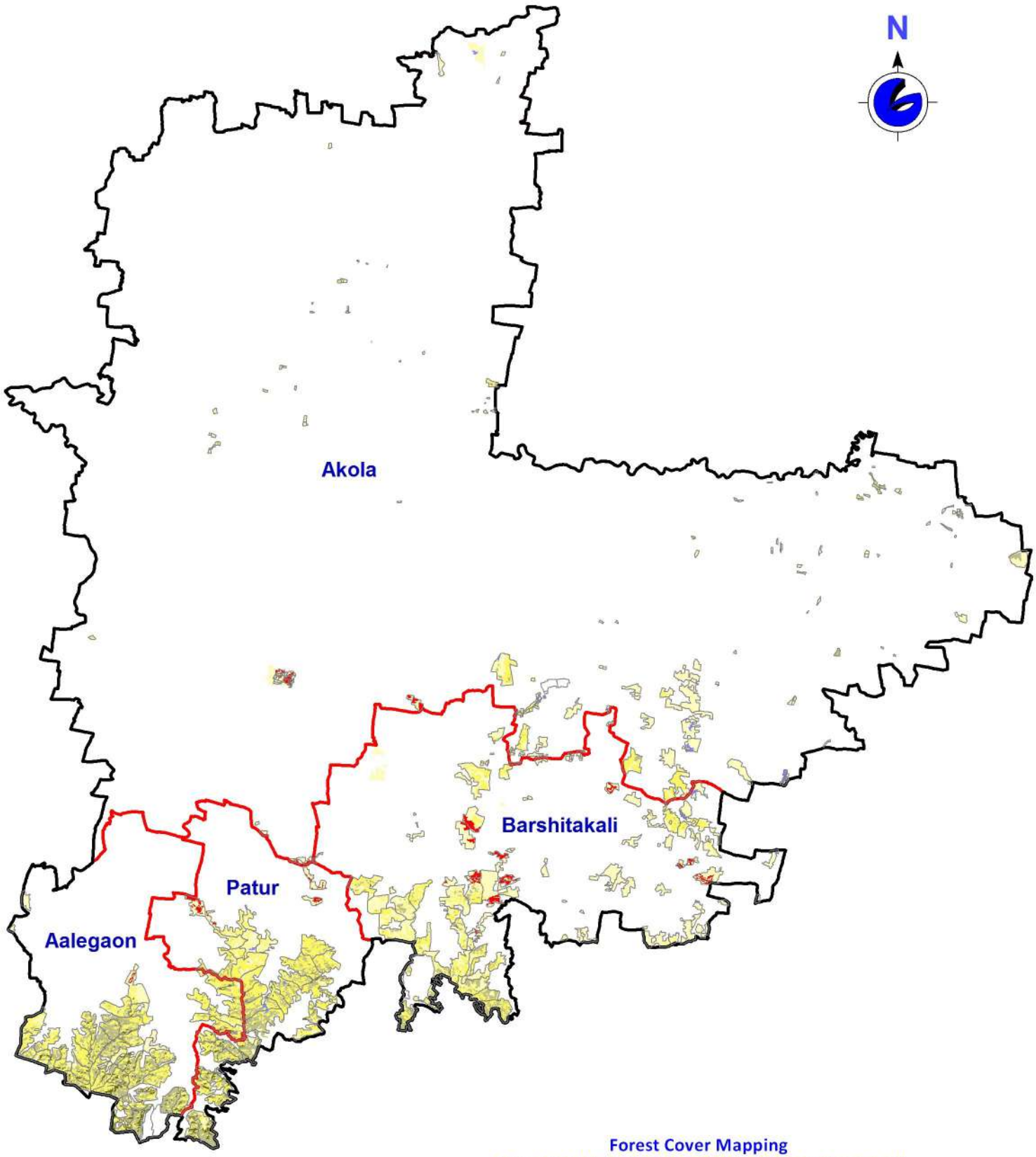
7. MISCELLENEOUS REGULATION:

1. Boundary demarcation of all un-demarcated areas 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 Programme
4. Boundary demarcation is necessary due to honeycombing.
5. Updating of area registers
6. Where claims are finally rejected, removal of such encroachments.

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Akola Forest Division, Akola

Showing Forest Cover



Forest Cover Mapping
Using Liss III Data 2017 (23.50 X 23.50 Metre Resulation)

Legend

- Division Boundary
- Range Boundary
- Patur — Range Name
- Compartment Boundary

Forest Cover

- Very Dense Forest
- Moderate Dense Forest
- Open Forest
- Scrub
- Non Forest
- Water Body

Prepared by S.R.Mohakar Forest Surveyor, W.P.Dn,Amravati.

CHAPTER-17

TREES OUTSIDE FOREST

17.1: INTRODUCTION:

An accurate assessment of forest and tree resources in the country is essential for formulating a sound strategy for the forestry sector. Precise data and latest information on forest cover and volume of growing stock of forests/trees and trends of changes therein are basic ingredients for policy and planning purposes. Generally, extensive tree wealth exists outside continuous forested areas in every country. Termed as 'Trees Outside Forests" (TOF), these are in the form of small woodlots and block plantations, trees along linear features, such as roads, canals bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas. Traditionally, these were not inventoried, and little quantitative information existed about TOF. However, lately a lot of interest has been generated worldwide in TOF. Besides providing support to rural economy, these trees are now a source of substantial forest produce in every country. Tree population along avenues has been taken up extensively since early 1950s mainly along roads, railway tracks, bunds, canals, riverbanks, in parks, in blocks and other blank areas. Farm forestry, agro-forestry and wasteland afforestation activities have subsequently increased the tree wealth of the state.

TOF Area: All lands (rural and urban) outside the Recorded Forest Area.

TOF Area (rural): The TOF area includes all areas outside the traditional /notified Reserved and Protected Forests but excludes areas of Municipality, Corporation, Cantonment Board, or a notified area Committee etc. which has population more than 5000 and more than 75% male working population are engaged in non-agricultural occupation.

Trees outside forest (urban) Area: The definition of urban area followed in this survey is same as followed in the decennial Population Census of Urban areas in 1991 Census and consist of:

I. All places with a Municipality, Corporation, and Cantonment Board or Notified Town area Committee etc.

II. All other places which satisfy the following criteria: A minimum population of 5000 At least 75% of male working population being

engaged in non-agricultural (and allied) activities; and A population density of at least 400 persons per sq.km (or 1,000 per sq. mile)

III. Places having distinct urban characteristics such as major project colonies, areas of intensive industrial development, railway colonies, important tourist centres - even though such places may not strictly satisfy the criteria of (a) & (b) under (ii).

The total geographical area of the district is 5845.31 sq. km. of which 422.37 sq. km. is forest. The Plantation/ Tree outside Forests (TOF) for State of Maharashtra according to the State of Forest Report 2021 is 12108 sq. kms adding 3.93% 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 as 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 the years of 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 road-side plantations. It is interesting to note that the Department has also carried out an assessment of the success and survival of these plantations in 2021 and the results are very encouraging.

Between 2008 to 2018, the Social Forestry Akola Division carried out Block plantation for a total of 459 beneficiaries and planted 596 ha. Area. The total number of seedlings planted was 12.42 lakhs of which the total number of seedlings surviving at the time of handing over the scheme was 8 lakhs During this period, roadside plantation of length of 738 km. with 12.42 lakhs planted seedlings was carried out of which the total of 8 lakhs seedlings survived at the time of handling.

17.2: TO INCREASE FOREST/TREE COVER:

In tune with the objectives of our National Forest Policy 1988 we must achieve a national target of bringing **33%** of landmass of our country under forest and tree cover for ensuring ecological security and environmental balance. However, forest cover and tree cover in India has over the years stabilized at

around **23%** of geographical area and Akola Forest division has about **25%** of the total geographical area under forest cover. The area under forest and forest land is difficult to increase.

The only way left for the increase of forest cover and tree cover must be through afforestation activities in non-forest areas. The area outside forests comprises mainly of private farm forestry, canal bank areas, roadside strips, railway line side strip, blank and degraded land, wasteland etc. Apart from increasing the tree cover, extension of forestry in non-forest areas especially as agro-forestry and farm forestry has tremendous potential to increase production of timber and other wood products and reduce the pressure on natural forests. The options for increasing Trees outside Forest have been mentioned below.

17.3: AGROFORESTRY:

Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components. Agroforestry can also be defined as a dynamic, 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. Agroforestry is crucial to smallholder farmers and other rural people because it can enhance their food supply, income, and health. Agroforestry is a low-input system which combines trees with crops in various combinations or sequences.

Agroforestry also has the potential to reduce risk through diversification of a variety of products, including food, fuelwood, and animal fodder. Agroforestry combines agriculture and forestry technologies to create more integrated, diverse, productive, profitable, healthy, and sustainable land-use systems Agroforestry systems are multifunctional systems that can provide a wide range of economic, socio-cultural, and environmental benefits. The three main types of agroforestry systems are -

Agri silvicultural system is a combination of crops and trees, such as alley cropping or home gardens.

Silvopastoral system combines forestry and grazing of domesticated animals on pastures, range lands or on-farm.

Agrosylvopastoral system includes an integrated approach of trees, animals, and crops.

17.4: ROADSIDE/ CANAL-SIDE PLANTATIONS: This is an important component of the work of Social Forestry Department. During the past ten years social forestry Akola division has done 738 kms of roadside plantations.

17.5: BLOCK PLANTATIONS: During the past ten years social forestry Akola division has done 596hectares of block plantation.

17.6: OTHER MODELS AND PLANTATIONS: The following types of Agroforestry possibilities should also be explored as per the site conditions and the requirement of the people.

a. Boundary/Bunds Plantation: Trees on boundary + crops
b. Energy plantation: Trees + crops during initial year
c. Alley cropping: Shrubs + crops
d. Agri horticulture: Fruit trees + crops
e. Agri hortisilviculture: Trees + fruit trees + crops
f. Hortipasture: Fruit trees + pasture/animals
g. Shelterbelts: Trees +/- crops
h. Windbreaks: Trees +/- crops
i. Homesteads: Multiple combination of trees, fruit trees etc.

17.7: SUGGESTIVE STEPS FOR INCREASE IN TREES OUTSIDE FORESTS:

1. 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.

2. 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.

3. Farmers must be encouraged and motivated by way providing them technical assistance and cooperation by forest department and SFD for taking up planting trees.

4. Land laws, if any, should be so modified wherever necessary to facilitate and motivate individuals and institutions to undertake tree-farming and grow fodder plants, grasses and legumes on their own land.

5. Schemes like “Kanya Van Samruddhi” should be undertaken which promotes planting trees on birth of girl child in lands outside forest area.

6. Wherever possible, degraded lands should be made available for this purpose either on lease or based on 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.

7. High quality planting stock including clonal planting stock supported with improved silvicultural management practices can usher in a second green revolution in India this time in respect of tree crops for timber and fuelwood / fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality improvements.

8. People’s support in forest conservation is to be recognized by the state forest departments. Appropriate extension programmes 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.

9. 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 buy back arrangements.

10. Preferred tree and bamboo species under agro forestry by farmers and not naturally available in neighbouring forests may be exempted from the transit permit and felling regulations.

11. The possibility of a Public-Private Partnership in regenerating the culturable wasteland and barren un culturable wastelands should be explored. This can also be explored for raising the improved planting material for supply to the farmers.

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CHAPTER – 18

CONTROL AND RECORDS

18.1: CONTROL & RECORDS:

The following Records will be maintained in the Akola Forest Division Office:

- Control Forms
- Compartment History
- Plantations Registers
- Nursery Registers
- Divisional Note Book
- Boundary Registers

Control Forms: All control forms and Compartment histories shall be maintained as per the formats prescribed in the volume II of Working Plan.

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 APPENDIXNO. XLVIII of Volume II.

The control forms (e-Flying Copy) should be Online submitted by the DFO territorial Akola to the CCF, territorial Amravati circle up to October each year. and the e-mail/latter should be sent to the WPO (Amravati). After checking, if it is correct, forward online to the WPO (Amravati) up to December each year.

18.1.1 : Deviation

The DFO territorial Akola will annually make entries in his copy of the control forms and send them together with the deviation statement in triplicate to the CCF, territorial Amravati circle. After the entries have been checked and approved, the Head, territorial circle will first get his copies completed and then send it in two copies to the concerned WPO. The later will then complete his copy and finally return the DFO's set for deposit in the latter's office till next year. The WPO will send the deviation statement with appropriate justification in four copies to the PCCF (HoFF) for sanction. After the sanction, one copy each will be sent to the WPO; Head, territorial circle and the DFO territorial for their record and the CCF/ APCCF (WP) as

the case may be, will retain the fourth copy for his set of control forms. Formats are given in APPENDIX NO. XLVII of Working Plan.

18.2: COMPARTMENT HISTORY:

Compartment Histories i.e., the records of various forestry activities and observation made in the past year will be maintained in Forms prescribed Formats are given in APPENDIX NO. XLIX of Working Plan.

Each Compartment must have a separate file for its records. Compartment history must be maintained in the office of Akola 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. Akola 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 CF, Working Plan for scrutiny.

18.3: PLANTATION AND NURSERY REGISTERS:

Plantation registers will be maintained for all the areas regenerated artificially as per established departmental procedures. Formats are given in APPENDIX NO. L and LI of Working Plan.

18.4: DIVISIONAL NOTE BOOK:

At Division level all important matters will be recorded by the DCF 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 are given in APPENDIX NO. LII of Working Plan.

18.5: FIRE RECORDS:

They should be maintained as per the latest orders from state government from time to time.

18.6: OTHER RECORDS:

List of amendments to the working plan and list of area changes will be maintained in prescribed forms.

At Division level all important matters will be recorded by the DCF every year on Dated 31st march. As per working Plan Coad-2014. They should be Suggested reporting Formats for Sustainable Management of Forests are given in Appendix No. LIV of Volume II.

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Office of The Conservator of Forests
(Working Plan-East), Nagpur

Near C.P. & Berar School, Ravi Nagar, Civil Lines, Nagpur
Telephone No. (0712-2565059) Fax No. (0712) 2565059

By email

No. Desk-14/WP/SCC/Meeting/ 826 /2020-21
Nagpur 444 001, Dated 31 /03/2021

Sub :- Minutes of the Standing Consultative Committee meeting held on 27/04/2020 for Approval of DWPR / PWPR.

The minutes of the Standing Consultative Committee meeting held at Command Control Room, Van Bhavan, Nagpur dated 25/03/2021 and 26/03/2021 for approval of DWPR of Kolhapur, Sangamner, Akola and Washim Forest Division, and approval of PWPR of East Nashik, Sangali, Ratnagiri, Gondia and Wadasa Forest Division in enclosed herewith for information and necessary action.

Member Secretary
Standing Consultative Committee
&
Conservator of Forests
(Working Plan – East) Nagpur

To,
1.Chief Conservator of Forests (T) Nashik,Kolhapur,Nagpur and Gadchiroli
2.Dy. Coservator of Forests (Working Plan) Kolhapur, Nashik, Amravati and Yavatmal

Copy submitted with compliments along with enclosure to :,
1. The Principal Chief Conservator of Forests (HoFF) M.S. Nagpur & Chairman, SCC.
2. The Principal Chief Conservator of Forests (Wildlife) M.S.
3. The Principal Chief Conservator of Forests (Production & Management) M.S.
4. The Principal Chief Conservator of Forests and Member Secretary, State Biodiversity Board, Nagpur
5. The Principal Chief Conservator of Forests (Information Technology & Policy) M.S.
6. The Principal Chief Conservator of Forests (Budget, Planning & Development) M.S.
7. The Additional Principal Chief Conservator of Forests (Central) Regional Office, Nagpur

8. The Additional Principal Chief Conservator of Forests (Conservation) M.S.
9. The Additional Principal Chief Conservator of Forests (H.Q.) Social Forestry M.S. Pune (Guardian APPCCF of Kolhapur Circle).
10. The Additional Principal Chief Conservator of Forests (Protection) M.S. (Guardian APPCCF of Nagpur Circle).
11. The Conservator of Forests (Working Plan-West) Pune
12. The Regional Director Forest Survey of India, Nagpur
13. Director, Tropical Forest Research Institute, Dakghar, T.F.R.C. Mandala Road Jabalpur.

Minutes of Meeting of the Standing Consultative Committee for the State of Maharashtra held on Dt. 25/03/2021 and 26/03/2021 for Approval of DWPR & PWPR

Government of Maharashtra, vide G.R.No. FDM-2015/CR-95/F-2 dated 29/04/2015 has constituted a Standing Consultative Committee (S.C.C.) for approval of Draft Working Plan Reports (DWPR) and Preliminary Working Plan Reports (PWPR) of various Forest Division of Forest Department in Maharashtra, before its submission to Government of India for approval.

In this connection, a video conference meeting of Standing Consultative Committee was organized on 25/03/2021and 26/03/2021 at Command Control Room, Van Bhavan, Nagpur Shri. G. Saiprakash, PCCF (HoFF), M.S. Nagpur chaired the meeting. The following members of the Committee were present in the video conference meeting.

Sr. No.	Name	Designation
1	Shri. G.Saiprakash	PCCF (HoFF), Maharashtra State, Nagpur
2	Shri. Pravin Shrivastava	PCCF (P & M), Maharashtra State, Nagpur
3	Shri. Nitin Kakodkar	PCCF (Wildlife), Maharashtra State, Nagpur
4	Shri. Pradip Kumar	PCCF (Budget, Planning and Development), M.S. Nagpur
5	Shri. M.K.Rao	PCCF (ITP) , Maharashtra State, Nagpur
6	Shri. A.N.Ambade	DDGF (Central) Nagpur (Joined by way of VC)
7	Dr. Nanita Berry	TFRI Jabalpur (Joined by way of VC)
8	Shri. B.H. Naik	Director FSI, Nagpur (Joined by way of VC)
9	Shri. S.G.Tembhurnikar	APCCF (Conservation) , Maharashtra State, Nagpur
10	Shri. Maheep Gupta	APCCF (Personnel), Maharashtra State, Nagpur
11	Shri. Vivek Khandekar	APCCF (SFD) Pune (Joined by way of VC)
12	Shri. Ramarao	CCF(T) Yavatmal (Joined by way of VC)
13	Shri. Clement Ben	CCF (T) Kolhapur (Joined by way of VC)
14	Shri. Pravin Chavhan	CCF(T) Amravati (Joined by way of VC)
15	Shri. Gudge	CCF (T) Nashik (Joined by way of VC)
16	Shri. P. Kalyankumar	CCF(T)N agpur
17	Shri. S.N. Mali	Member Secretary & CF, Working Plan (East), Nagpur
18	Shri. Tahsildar	ADGF(Central) Nagpur (Joined by way of VC)
19	Dr.Kishor Mankar	CF(T) Gadchiroli (Joined by way of VC)
20	Shri. N. S. Ladkat	CF, Working Plan (West) Pune (Joined by way of VC)
21	Shri. V.N. Suryavanshi	DyCF WP Kolhapur (Joined by way of VC)
22	Shri.Kesakar	DyCF WP Nashik (Joined by way of VC)
23	Shri. Madhavraj	DyCF WP Amravati (Joined by way of VC)
24	Shri. Kamlakar Dhamgaye	DyCF WP Yavtmal
25	Shri. R.R. Kale	DyCF (T) Kolhapur (Joined by way of VC)
26	Shri. Mallikarjun	SGNP Boriwali (Joined by way of VC)

27	Shri. P. B. Dhakane	Dy. CF (T) Sangali (Joined by way of VC)
28	Shri. Tushar Chavhan	Dy. CF (T) East- Nashik(Joined by way of VC)
29	Shri. Niranjan Vivrekar	Dy. CF (T) Wadsa (Joined by way of VC)
30	Shri. Kulrajsingh	Dy. CF (T) Gondia
31	Shri. Solanke	Dy. CF (T) Washim (Joined by way of VC)
32	Shri. Arjuna	Dy. CF (T) Akola (Joined by way of VC)
33	Shri. Deepak Khade	Dy. CF (T) Chipalun (Joined by way of VC)

Shri. Praveen Shrivastava, PCCF, (P&M) M.S. Nagpur welcomed all the committee members and briefly introduced the agenda of the meeting..

After detail discussion on the DWPRs/PWPRs following Suggestion / Correction were suggested by the committee members.

			Nagpur	planting, agro forestry measures should be added. 4. Value addition and market linkage of NTFP i.e. Sitaphal.		
			Shri. Praveen Shrivastava, PCCF (P&M)	1. Outcome of previous WP should be in figures with GIS maps. 2. Man-Animal conflict measures taken documented with wildlife wing.	Dy. C. F. (WP) Nashik	
			Shri. Gudge, CCF (T) Nashik	1. Size of trench 2x0.60x0.45 cub. Mtr. should be kept.	Dy. C. F. (WP) Nashik	
Amaravati	Akola	Shri. Madhavraj, IFS	Shri. V.N.Ambade, DDGF (Central) Nagpur	1. Three Working Circles mentioned in Working Plan has very low density than expected standard density. 2. Land proposed under Afforastation W. C. may be marked as land bank for compensatory afforestation. 3. Details of crop damage Man-Animal conflict may be included. 4. Carbon sequestration measures be elaborated. 5. Proper sequence as per Working Plan Code 2014 to be followed.	Dy. C. F. (WP) Amravati	Within 15 days.
			Mr. Naik, FSI, Nagpur	1. Carbon sequestration data will be made available.	Dy. C. F. (WP) Amravati	
			Dr. Nanita Berry, Director TFRI, Jabalpur	1. Introduction of fast growing species like Gmelina arborea, Melia dubia, Sandal wood and also introduce bamboo species.	Dy. C. F. (WP) Amravati	
			Shri. Praveen Shrivastava, PCCF (P&M)	1. DyCF Working Plan to collect TOF and carbon sequestration measures from FSI and GIS Cell Nagpur.	Dy. C. F. (WP) Amravati	
			DyCF Akola	1. Clarify that the issue of TOF, Agro Forestry have been incorporated in DWPRs.	Dy. C. F. (WP) Amravati	
			CCF T Amaravati	1. Clarified that area not suitable for Sandal Wood Plantation.	Dy. C. F. (WP) Amravati	
Yavatmal	Washim	Shri. Kamalakar Dhamge, DyCF WP Yavatmal	Shri. V.N.Ambade, DDGF (Central) Nagpur	1. Involvement of JFM Committee in resolving Man-Animal conflict. 2. Carbon stock methodology to be added. 3. TOF methodology not satisfactory. 4. SMC Jalyukt Shivar Programme to be implemented technically and scientifically.	CCF(T) Yavatmal & Dy. C. F. (WP) Yavatmal	Within 15 days.
			Shri. Ramarao, CCF T Yavatmal	1. Coupes of Poharadevi eco-tourism area included in IWC. 2. Thinning as per stand table and yield table.	CCF(T) Yavatmal & Dy. C. F. (WP) Yavatmal	
			Shri. Praveen Shrivastava, PCCF (P&M)	1. Year wise status of land to reduce anomaly. 2. Replacement of obnoxious weed by invasive alien species.	Dy. C. F. (WP) Yavatmal	

Dy. CONSERVATOR OF FORESTS
WORKING PLAN, AMRAVATI.
Upper Wardha Colony Road,Camp Amravati-444 602
Tel.No.0721-2662641, Fax.:2665844
E-mail:cfwp_amt@rediffmail.com

सत्यमेव जयते
महाराष्ट्र शासन

उप वा संरक्षक.
कार्य आयोजा अमरावती.
अपर वर्धा प्रकल्प वसाहत मार्ग, कॅम्प रोड,
अमरावती ४४४ ६०२.
दूरध्वनी क्र.०७२१-२६६२६४१ फॅक्स-२६६५८४४.
ई मेल- cfwp_amt@rediffmail.com

NO.Desk-02/Rs/WP/Amt/ Akola/ 132 /20-21
Amravati 444602 ,Date 28-07-2021

To,
The Member Secretary,
Standing Consultative Comittee &
Chief Conservator of Forest,
Workining Plan-East, Nagpur.

Ref- Letter of the CCf, WP, East, Nagpur No-Desk-14/WP/SSC/Meeting/826/20-21
Dated. 31/03/2021
Sub-Minutes of the Standing Consultative Comittee meeting held on 25/03/2021 & 26/03/2021 for Approval of DWPR / PWPR

	Queries	Compliance
10.1	**Shri. V.N. Ambade, DDGF (Central) Nagpur**	
1	Three Working Circles mentioned in Working Plan has very low density than expected standard density.	It has been rectified and corrected in three working circles chapters in of DWPR Akola Division
2	Land proposed under Afforestation W.C. may be marked as land bank for Compensatory Afforestation.	It has been complied in Volume –I,Part-II,Chapter No 2 ,Para No 2.9 ,Page No.14
3	Details of crop damage, Man-Animal conflict may be included.	It has been complied in Volume –I,Part-II,Chapter No7, Para No 7.6.13.3, Page No.220-221
4	Carbon sequestrataion measures be elaborated.	It has been complied in Volume –I,Part-I,Chapter No 12, Para No 12.1 , Page No.135-144
5	Proper sequence as per	It has been complied in Volume

	Working Plan Code 2014 to be followed.	–I & Volume –II of DWPR of Akola
10.2	**Mr. Naik, FSI, Nagpur**	
1	Carbon sequestration data will be made available.	It has been complied in Volume –I,Part-I,Chapter No12,Para No 12.1, Page No.135-144
10.3	**Dr.Nanita Berry, Director TFRI, Jabalpur**	
1	Introduction of fast growing species like Gmelina arbores, Melia dubia, Sandal wood and also introduce bamboo species.	It has been complied in Volume –I,Part-II,Chapter No4, Para No 4.6.2 , Page No.181
10.4	**Shri. Praveen Shrivastava, PCCF(P&M)**	
1	DyCF Working Plan to Collect TOF and carbon sequestration measures from FSI and GIS Cell ,Nagpur.	It has been complied in Volume –I,Part-17.5 II,Chapter No 17, Para No17.4, Page No 336&Volume –I,Part-II,Chapter No 12, Para No12.1 , Page No 135 to 144 respectively
10.5	**DyCF Akola**	
1	Clarify that in TOF, Agro Forestry have been incorporated in DWPR.	It has been complied in Volume –I,Part-II,Chapter No 17, Para No 17.3 , Page No.336
10.6	**CCF Amravati**	
1	Clarify that area not suitable for Sandal Wood Plantation.	It has been complied in Volume –I,Part-II,Chapter No 3,Para No 3.6.12 ,Page No.173

(G.R.Madhavaraj)
Dy.Conservator of Forest
Working Plan, Amravati

उप–वनसंरक्षक
कार्य आयोजना विभाग,
अमरावती यांचे कार्यालय
आवक क्र....106.....
दि.....06/09/2021

वनसंरक्षक (कार्य आयोजना-पूर्व), नागपूर यांचे कार्यालय.

सि.पी.ॲन्ड बेरार शाळेजवळ, रविनगर, सिव्हिल लाईन्स, नागपूर
दूरध्वनी क्र. (०७१२) २५६५०५९ फॅक्स क्र. (०७१२) २५६५०५९

RS
31/08/2021

Dy. Conservator of Forests,
Working Plan, Amravati

विषय- अकोला वनविभागाचा DWPR सादर करणेबाबत.
क्रमांक कक्ष-१४/काआ/सवंस/ ४९२ /२०२१-२२
नागपूर-४४० ००१, दिनांक ३१/०८/२०२१

संदर्भ :- १. आपले कार्यालयीन पत्र क्रमांक/कक्ष-२/आरएस/काआ/अमरावती/अकोला/१३२,दिनांक-२८/०७/२०२१
२. या कार्यालयाचे पत्र क्रमांक/कक्ष-१४/काआ/सवंस/२५५,दिनांक-०३/०८/२०२१
३. या कार्यालयाचे पत्र क्रमांक/कक्ष-१४/काआ/सवंस/२७०,दिनांक-१०/०८/२०२१

विषयांकीत प्रकरणी स्थाई सल्लागार समितीच्या दिनांक २५/०३/२०२१ रोजी झालेल्या सभेत अकोला वनविभागाच्या DWPR मध्ये समितीने सुचविलेल्या प्रमाणे दुरुस्ती करावी या अटींवर समितीने सदर DWPR ला मंजुरी प्रदान केलेली आहे.

तथापी संदर्भिय पत्र क्र.१ अन्वये समितीने सुचविलेल्या दुरुस्ती प्रमाणे अकोला वनविभागाचा DWPR खंड क्रमांक १ या कार्यालयास सादर केलेला आहे. उक्त DWPR ची तपासणी केली असता त्यात खालील प्रमाणे माहिती अपुर्ण असल्याचे निर्दशनात येते. त्याचा तपशील पुढील प्रमाणे

१. Table of contents मध्ये IV.List of fauna (Animals, Birds, Reptiles) V. others (list of algae fingi, Bryophytes, Pteridophytes found in Akola Forest Division) याचा समावेश केलेला नाही.
२. (८.११) Other aspect समाविष्ट केलेले नाही.
३. Mention the details name of the chapter as of the spiritual,cultural aspect of forests and ecotourism instead of "Ecotourism" on page no.२७९
४. Chapter-११
(१) Mention the detail name of the chapter as "Conservation and maintenance of soil and water resource" instead of "Soil & Water" on page no.२६२
(२) Mention about following things in above chapter (a) Introduction (b) General Constitution of area resources in Akola (c) soil and water resources in Akola (d) Special objectives of management (e) Regulations & measures.

५. संदर्भिय पत्र क्रमांक १ अन्वये प्राप्त त्रृटीपूर्तता अहवालात त्रृटीपूर्तता क्रमांक १ मध्ये पान क्रमांक नमुद केले नाही.

तरी वरील प्रमाणे खंड क्रमांक-१ मध्ये तात्काळ दुरस्ती करून या कार्यालयास दिनांक ३१/०८/२०२१ पर्यन्त खंड १ व २ दोन प्रतीत सादर करावा, जेणेकरुन सदर DWPR केंन्द्रशासनाकडे मंजूरीसाठी वेळेत सादर करणे शक्य होईल.

(महीप गुप्ता)
वनसंरक्षक
कार्य आयोजना-पूर्व, नागपूर

प्रति,
उपवनसंरक्षक,
(कार्य आयोजना विभाग), अमरावती

प्रतिलिपी-प्रधान मुख्य वनसंरक्षक (उत्पादन व व्यवस्थापन) महाराष्ट्र राज्य यांना माहीतीस सविनय सादर.

DEPUTY CONSERVATOR OF FORESTS,
WORKING PLAN, AMRAVATI.
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Tel.No.- 0721-2662641
E-mail:cfwp_amt@rediffmail.com

महाराष्ट्र शासन

सत्यमेव जयते

उपवनसंरक्षक.
कार्य आयोजना, अमरावती.
अपर वर्धा प्रकल्प वसाहत मार्ग,
कॅम्प रोड, अमरावती -४४४ ६०२.
दूरध्वनी क्र.०७२१-२६६२६४१
ई मेल- cfwp_amt@rediffmail.com

विषय :- अकोला वनविभागाचा DWPR सादर करणे बाबत.
क्रमांक - कक्ष-०२/उवसं/काआ/अम./रेस/ १५८ /२०२१-२२.
अमरावती दिनांक - ०९/०९/२०२१.

प्रति,

वनसंरक्षक,
कार्य अयोजना (पुर्व)
नागपुर.

संदर्भ :- १ आपले कार्यालयीन पत्र क्र कक्ष -१४ /काआ/सवस / २९२/२०२१-२२ नागपुर, दिनांक. १८/०८/२०२१
२. आपले कार्यलयीन पत्र क्र कक्ष- १४ /काआ/सवस / २७०/२०२१-२२ नागपुर, दिनांक. १०/०८/२०२१
3 या कार्यालयाचे पत्र क्र कक्ष -२ /काआ/ रेस /उवस / १३२/२०२१-२२ नागपुर, दिनांक. २८/०७/२०२१

उपरोक्त संदर्भिय पत्रान्वये दिनांक २५/०३/२०२१ रोजी झालेल्या स्थाई सल्लागार समितीच्या सभेत अकोला वनविभागाच्या DWPR मध्ये समितेने सुचवील्या प्रमाणे दुरुस्त्या करुन अकोला वनविभागाचा खंड क्र. १ व २ दिनांक ३१/०८/२०२१ चे आत आपल्या कार्यालयास सादर करण्याच्या सुचना या कार्यालयास प्राप्त झाल्या होत्या.

तथापी संदर्भिय पत्र क्र १ अन्वये सुचीत केल्या प्रमाणे त्रुटींची पुर्तता खालील प्रमाणे करण्यात येत असुन सुधारीत कार्य आयोजना भाग-१ व भाग -२ (व्दिप्रतीत) यासोबत सादर करण्यात येत आहे.

अ.क्र	त्रृटी	पुर्तता
1	Table of contents मध्ये (IV) List of fauna (Animal, Birds, Reptiles)(V.) others (List of algae, fungi, Bryophytes, Pteridophytes found in Akola Forest Division) याचा सामावेश केलेला नाही.	It has been complied
2	(8.11) Other aspect सामाविष्ट केलेले नाही.	It has been complied, in Volume I, Part I Chapter 8, Para No. 8.11, Page No. 29
3	Mention the detail name of the chapter as of the Spiritual, cultural aspect of forests and ecotourism instead of "Ecotourism" on page no. 279	It has been complied, in Volume I, Part II, Chapter 12, Page No. 279

उपवनसंरक्षक
कार्य आयोजना विभाग
कार्यालय, नागपूर

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4	Chapter-11 १) Mention the detail name of the chapter as "Conservation and maintenance of soil and water resource" instead of "Soil & Water" on page no.262 २) Mention about following things in above chapter (a) Introduction (b) General Constitution of area resources in Akola (c) Soil and Water resources in Akola (d) Special objectives of management (e) Regulations & measures.	It has been complied, in Volume I, Part II, Chapter 11, Page No. 265 to 277
5	संदर्भिय पत्र क्र. १ अन्वये प्राप्त त्रृटी पुर्तता अहवालात त्रृटी पुर्तता क्रमांक १ मध्ये पान क्रमांक नमुद केले नाही.	It has been complied

त्या अनुषंगाने अकोला वनविभाकडुन प्राप्त झालेल्या माहितीच्या आधारे अकोला वनविभागाचा खंड क्र. १ व २ तयार करण्यात आलेला आहे. करीता पुढील कार्यवाहिस सविनय सादर.

सहपत्र :- खंड क्र. १ व २ च्या दोन प्रती.

(जी. आर. माधवराज)
उपवनसंरक्षक,
कार्य आयोजन

O/C

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(310)

वनसंरक्षक (कार्य आयोजना-पूर्व), नागपूर यांचे कार्यालय.

सि.पी.ॲन्ड बेरार शाळेजवळ, रविनगर, सिव्हिल लाईन्स, नागपूर
दूरध्वनी क्र. (०७१२) २५६५०५९ फॅक्स क्र. (०७१२) २५६५०५९

कक्ष-१४ /काआपू /सवसं/ 741 /२१-२२ नागपूर-४४०००१, दिनांक 31/०१/२०२२

विषय :- अकोला वनविभागाच्या सन २०२१-२२ ते २०३०-३१ पर्यंत या कालावधीच्या प्रारूप कार्य आयोजनेस अंतिम मंजूरी बाबत.

संदर्भ- केंद्र शासनाचे पत्र क्रमांक WP-७८/RON/२०२१-NGP/९१४० दिनांक ३१/१२/२०२१

उपवनसंरक्षक,कार्य आयोजना विभाग, अमरावती यांना कळविण्यात येते कि, उपरोक्त संदर्भिय पत्रान्वये केंद्र शासनाने अकोला वनविभाग कार्य आयोजनेस सन २०२१-२२ ते २०३०-३१ पर्यंत नमुद पत्रातील अट क्र. १ ते ३७ या अटीचे अधिन राहून मान्यता प्रदान केलेली आहे. सोबत संदर्भिय पत्रांच्या छायांकित प्रती सहपत्रित करण्यात येत आहे.

मान्यता पत्रात केंद्र शासनाने उपस्थित केलेल्या मुद्दयांची पुर्तता कार्य आयोजना खंड १ व २ मध्ये करण्यात येवून पुर्तता अहवाल केंद्र शासनास ६ महिण्याच्या आत सादर करण्याच्या दृष्टिने या कार्यालयास विहीत कालावधीच्या आत सादर करावा.

संदर्भिय पत्रात नमुद केलेल्या अटिच्या अधिन राहुन दिलेल्या निर्देशाप्रमाणे सदर कार्य आयोजनेस तातडीने अमलात आणावे.

सहपत्र - वरिल प्रमाणे

RS 11/01/2022

(डॉ. विनीता व्यास)
वनसंरक्षक
कार्य आयोजना-पूर्व, नागपूर

Dy. Conservator of Forests,
Working Plan, Amravati

प्रति,
उपवनसंरक्षक,
कार्य आयोजना विभाग,
अमरावती

प्रतिलीपी :- प्रधान मुख्य वनसंरक्षक (वनबल प्रमुख) म.रा.नागपूर यांना माहीतीस्तव सविनय सादर.
प्रतिलीपी :- प्रधान मुख्य वनसंरक्षक (उ व व्य) म.रा.नागपूर यांना माहीतीस्तव सविनय सादर.
प्रतिलीपी :- मुख्य वनसंरक्षक (प्रा) अमरावती यांना सहपत्रासह माहिती व तात्काळ आवश्यक कार्यवाहीस्तव सविनय सादर.
प्रतिलीपी :- उपवनसंरक्षक (प्रा) अकोला यांना तात्काळ आवश्यक कार्यवाहीस्तव.

(डॉ. विनीता व्यास)
वनसंरक्षक
कार्य आयोजना-पूर्व, नागपूर

उप-वनसंरक्षक
कार्य आयोजना विभाग,
अमरावती यांचे कार्यालय
दि. 25/1/22

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मुख्य वनसंरक्षक
कार्य आयोजना मंडळे कार्यालय
नागपूर
क्रमांक क्र. 1397
दिनांक 25/01/2022

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE

Regional Office (WCZ)
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
E-mail: apccfcentral-ngp-mef@gov.in

F.No. WP-78/RON/2021-NGP /9140 **Date: 31.12.2021**

मु.व.संरक्षक कार्य. नागपूर-४४० 20 JAN 2022 22696 14

To,

The Principal Chief Conservator of Forests (P & M)
Maharashtra State,
Van Bhawan, Ramgiri Road, Civil Lines,
Nagpur – 440001.

Subject - Working Plan of Akola Forest Division, Maharashtra for the period 2021-22 to 2030-31– Regarding.

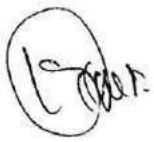
Sir,

I am directed to refer to the PCCF (P&M), Maharashtra office letter No. Desk-14/WP-E/358/21-22 dated 16/09/2021 on the above subject seeking prior approval of the Central Government under Forest (Conservation) Act, 1980 and to say that DWPR of Akola Forest Division has been examined in the Regional Office in light of relevant provisions of the Forest (Conservation) Act, 1980, Rules and Guidelines framed there under.

After careful examination of the DWPR of Akola Forest Division written by Shri G. R. Madhavraj, IFS; the Central Government hereby accords approval to the said Working Plan for the period of 2021-22 to 2030-31 in accordance with the powers vested under Forest (Conservation) Act, 1980 and subject to the following conditions:

1. The currency of Working Plan shall be for a period of 10 years i.e. from the year 2021-22 to 2030-31. Period of last Working Plan was up to the year 2018-19, the present Working Plan is approved from the year 2021-22. Intervening period i.e. 2019-20 will be considered as per the prescription of last working plan and whatever work has been carried out may be got regularized/will be considered as part of last working plan, after taking approval of the competent authority wherever needed. In case there has been any work carried out in intervening period; State Government has to submit proposal for regularization of same.
2. The orders of Hon'ble Supreme Court in the matter of Godavarman Thirumulkpad Vs Union of India in W.P. (Civil) No. 202/95 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
3. Further, in compliance with order to Hon'ble Supreme Court's Order dated 22.09.2000, the Government of Maharashtra shall ensure that regeneration of forests is commensurate with felling carried out under this Working Plan.
4. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with felling. In the events of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/ shortfall is made up.

5. Following the directions issued by MoEF&CC vide letter dated 23.02.2018, Regional Offices of MoEF&CC under the chairmanship of Deputy Director General of Forests (Central) of the Regional Office of this Ministry will be competent authority for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with felling. Instruction/ directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling is to be done by State Government only after seeking permission from REC, RO (WCZ), Nagpur.
6. Fruits bearing naturally grown trees shall not be clear felled for any purpose whatsoever.
7. Standard thinning and silvicultural operations under the strict supervision of Assistant Conservator of Forests and above will be allowed as per norms to improve the health of growing stock while executing the prescriptions of the Working Plan.
8. Prescriptions of micro plans for JFM (if made) should not deviate from the broad framework/guidelines of the Working Plan and shall be in accordance with various orders of Hon'ble Supreme Court.
9. Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/ future years to compensate this removal.
10. No deviations shall be made from the prescriptions of Working Plan without prior approval of the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. voluntary plantations carried out outside the working area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government from time to time.
11. The exploitable girth of tree species and period of felling cycle shall not be lower than what was approved in previous working plan.
12. In the vicinity of Nalas and water bodies felling shall not be undertaken. Further felling shall not be undertaken near the known resting/nesting places of wild animals and birds.
13. No commercial felling shall be carried out along the 2 km strip of all perennial Rivers of Maharashtra State as recommended by REC in its meeting dated 24.02.2020 viz; Bhima, Godavari, Kanhan, Koyna, Krishna, Manjara, Mula, Nira, Panchganga, Pench, Penganga, Pranhita, Purna, Tapi, Vaitarna and Wainganga; further, no commercial felling shall be carried out along the strip of 500 meters of all seasonal Rivers; only eco-restoration work shall be carried out.
14. Removal of dead and diseased trees will be undertaken under the supervision of an officer not below the rank of Assistant Conservator of forests.
15. Volume details of all kinds of fellings viz; dead and diseased trees, grants of right and concession and all illicit felling should be compiled along with the estimation of their standing volumes as per the same volume table used for the assessment of growing stock. This report shall be prepared annually working circle and compartment wise by the territorial Sub- DFO and shall be submitted to the CF, Working Plan for this purpose within 02 months of the end of control year. Such removal shall be accounted vis-a-vis prescribed felling yield of the relevant yea.
16. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the



prescription of Working Plan. Proper mechanism has to be in place for the collection of NTFPs in sustainable manner

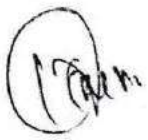
17. Status of rare, endangered and near extinct species shall be monitored closely and adequate measures will be taken for their protection and conservation.
18. Execution of Working Plan shall be in conformity with the National Forest Policies, 1988.
19. No regularization of existing encroachment should be done without following due procedure. And an appendix may be added giving details of the encroachment of the forest area in the division. A definite plan has to be made to remove encroachment and vacated area shall be planted with suitable local species as per Government of India and Hon'ble Supreme Court Orders/Guidelines in the matter.
20. Eco-tourism shall/may be undertaken on sustainable basis. No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed for public. Such sites will be declared as Plastic Free Zones. These eco-tourisms sites will be managed by the forest department as per the prescriptions of the working plan and after taking prior approval of Central Government under Section-2 of Forest (Conservation) Act, 1980.
21. Demarcation and consolidation of Forest Boundaries will be done adequately. Identification of Land Bank in the form of degraded forest areas/ Non-forest land in the Division to be explored for CA plantations.
22. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.
23. Proper mechanism has to be put in place to control illegal felling, grazing and fire. Proper fire management plan shall be prepared and executed meticulously.
24. Only 50% of normal yield, if silviculturally available, will be allowed for removal in case of Teak, Dhawada, Bhirra, Lendia, Chichawa, Mowai, Rohan, Shiwan, Shisham, Surya, Karai, Mokha, Palas, Dhaman, Bhilawa, etc. In case of Haldu, Ain, Bija, Tiwas, Kalam, Salai, Garadi, Khair it shall be 20% if silviculturally available.
25. Efforts should be made to undertake artificial regeneration of local species along with 10-15% RET species in such a way that it serves the purpose of biodiversity conservation as well as meeting the demand of fuel wood, fodder and the timber. Planting of exotic species should be avoided.
26. Lac cultivation, if any, will be practiced as per the provisions of Forest (Conservation) Act, 1980.
27. Documents and appendices mandated in National Working Plan, 2014 Code will be incorporated in the Working Plan.
28. Attempts shall be made to grow trees outside forest areas to meet the local demand of small timber, fuel wood and fodder as well as to achieve the 33% forest cover as envisaged in National Forest Policy, 1988.
29. Socio-economic survey is to be conducted within first year of implementation of plan and the same be appended with the Working Plan.
30. Cutback operation shall be undertaken as per standard norms and grassland will not be expanded at the expense of natural tree cover.
31. While managing forests, provisions of the Biological Diversity Act, 2002 and Wildlife Protection Act, 1972 shall be fully complied.



32. Prescriptions on Wildlife Management should be vetted by the CWLW and a certificate of the same be attached to the plan at the time of final printing.
33. Grazing to be properly regulated and grazing fee should be levied.
34. Annual Plan of Operations under Compensatory Afforestation Fund Act, 2016 and Compensatory Afforestation Fund Rules, 2018 shall be in conformity with Working Plan prescriptions.
35. All the Unclassed Forest, acquired CA areas and acquired Private Forests should be notified as RF/ PF in time-bound manner at the earliest.
36. Midterm review of Working Plan shall be undertaken after five years so as to review the compliance of conditions as laid down in this approval. Modification/addition in some conditions may be made to meet the objectives, with the approval of Regional Office, Nagpur.
37. The Central Government reserves the right to review, modify, withdraw, this approval at any time if any of the conditions of approval are not implemented. Relevant modifications in the working plan are required to be carried out so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy from time to time.

NOTE: The above mentioned approval is subject to attending shortcomings as below and submitting complete working plan to IRO Nagpur within 6 months:

1) Reason for reduction in area of Working Plan from previous Working Plan is not mentioned. The same may be submitted and also mentioned in the Working Plan.
2) In the Part-I of Working Plan, before Chapter-I, a section entitled Executive Summary wherein, constraints faced during writing of the plan need to be written.
3) Minutes of meetings of PWPR has not been submitted along with Working Plan.
4) It is mentioned in the Working Plan that 51 cases of forest rights has been settled under FRA, 2006. Details of forest land diverted cases and under different categories need to be submitted.
5) Examination of Working Plan in line with provisions of the National Working Plan Code (NWPC), 2014 following Chapters/sub-chapters found incomplete/unsatisfactory:
   a. Part-I, Sub-chapter- 2.7; *Tree cover outside forest area.* Sub-chapter should include detail note on *assessment of the growing stock and the potential area for extension of forestry outside forests and sustainable land use management within the geographical area of the forest division.*
   b. Part-I, Chapter-3; *Maintenance, Conservation and Enhancement of Biodiversity*; Chapter and all of its eight sub-chapters need to be revised strictly as per NWPC, 2014. Under sub-chapter 3.2 complete *Biodiversity assessments in terms of density, frequency, total basal cover, dominance, IVI etc.* of Forest division need to be done.
   c. Part-II, Sub chapter 1.3.2; sum of previous working Circle as mention in table no. 1.2 is incorrect need to revise.



d. Part-I, Sub-chapter 12.1; *Statistic of forest carbon stock.* Calculation of the Carbon Stock in division to be corrected.

6) Working Circle marked on GIS based maps at scale of 1:50,000 have not been provided along with Working Plan. Stock map of the division is not submitted along with the Working Plan.
7) Soft copy of KML/ Shape files w.r.t. boundary of the division is not submitted.
8) Compliance report w.r.t suggestions/ recommendations made by Standing Consultative Committee is not submitted along with the Working Plan.

This issues with the approval of DDGF (Central), Regional Office (WCZ), MoEF & CC, Nagpur.

Yours faithfully,

Sd/-

(N. K. Dimri)
Technical Officer (Grade-I)

Copy to:

1. The Additional Director General of Forests (FC) Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi-110003.
2. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
3. Guard File.

(N. K. Dimri)
Technical Officer (Grade-I)

DY. CONSERVATOR OF FORESTS,
WORKING PLAN, AMRAVATI.
Uppar Wardha Colony Road,
Camp Amravati-444 602
Tel.No.0721-2662641, Fax.2665844
E-mail:- cfwp_amt@rediffmail.com

सत्यमेव जयते
महाराष्ट्र शासन

उपवनसंरक्षक,
कार्य आयोजना विभाग, अमरावती.
उर्ध्व अपर वर्धा प्रकल्प वसाहत मार्ग,
कॅम्प रोड, अमरावती -444 602.
दूरध्वनी:-.0721-2662641 फॅक्स-2665844.
ई मेल- cfwp_amt@rediffmail.com

NO.Desk-02/Rs/WP/Amt/ Akola/ 372 /21-22
Amravati 444602 ,Date: 4 / 03/ 2022

To,

The Member Secretary,
Standing Consultative Comittee &
Chief Conservator of Forest,
Workining Plan-East, Nagpur.

Ref :- 1) Letter of the CCf, WP, East, Nagpur No-Desk-14/WPE/ACF/741/ 21-22 Dated. 31/01/2022.
2) Letter of the Government of India Ministry of Environment, Forest & Climate Change ,Regional Office (WCZ) Nagpur F.No. WP-78/ RON /2021-NGP/9140 Date 31/12/2021.

Sub :- Approval of DWPR Working Plan of Akola Forest Division Period 2021-22 to 2030-31 Regarding.

******

Sr.	Queries	Compliance
1	Reason for reduction in area of Working Plan from previous Working Plan is not mentioned. The same may be submitted and also mentioned in the Working Plan	Reason for reduction in area of Working Plan from previous Working Plan is mentioned in Volume –I,Part-I,Chapter No 1, TABLE NO: 1.2 ,Page No.2
2	In the part-I of Working Plan, before Chapter-I, a section entitled Executive Summary Wherein, constraints faced during Writing of the plan need to be written.	It has been complied.
3	Minutes of meetings of PWPR has not been submitted along with Working Plan	Minutes of meetings of PWPR is submitted along with Working Plan.
4	It is mentioned in the Working Plan that 51 cases of forest right has been settled under FRA,2006. Detail of forest land diverted cases and under different categories need to be submitted.	It has been complied in Volume –I,Part-I,Chapter No 2 ,Para No 2.4.3 ,Page No 12.

5	Examination of Working Plan in line with provisions of the National Working Plan Code (NWPC), 2014 following Chapters/sub-chapters found incomplete/unsatisfactory:	
a)	Part-I sub-chapters- 2.7., Tree cover outside forest area. Sub chapter should include detail note on assessment of the growing stock and the potential area for extension of forestry outside forests and sustainable land use management within the geographical area of the forest division.	It has been complied in Volume –I,Part-I,Chapter No 2 ,Para No 2.7 ,Page No.14.
b)	Part-I, Chapter-3 Maintenance, Conservation and Enhancement of Biodiversity, Chapter and all of its eight sub-chapters need to be revised strictly as per NWPC, 2014.Under sub-chapters 3.2 complete Biodiversity assessment in terms of density, frequency, total basal cover, dominance, IVI etc. of Forest division need to be done.	It has been complied in Volume –I,Part-I,Chapter No 3, Page No.16 to 35.
c)	Part-II sub-chapters 1.3.2., sum of previous Working Plan Circle as mention in table no.1.2 is incorrect need to revise.	It has been complied in Volume –I,Part-II,Chapter No 1, Para No 1.3.2, Table NO: 1.3,Page No.154
d)	Part-I sub-chapters12.1, Statistic of forest carbon stock. Calculation of the Carbon Stock in division to be corrected.	It has been complied in Volume -I,Part I,Chapter No 12,Para No 12.1.3 ,Page No.144
6	Working Circle marked on GIS based maps at scale of 1:50,000 have not been provided along with Working Plan. Stock map of the division is not submitted along the Working Plan .	Working Circle marked on GIS based maps at scale of 1:50,000 will be submitted in 2 months .Stock map of the division is submitted along the Working Plan
7	Soft copy of KML/Shape files w.r.t boundary of the division is not submitted.	Soft copy of KML/Shape files w.r.t boundary of the division is submitted along with the Working Plan.
8	Compliance report w.r.t suggestion/ recommendation made by Standing Consultative Committee is not submitted along with the Working Plan.	Compliance report w.r.t suggestion/ recommendation made by Standing Consultative Committee is submitted along with the Working Plan.

Enclose :- DWPR of Akola Division (Volume I & II).

(G.R.Madhavaraj)
Dy. Conservator of Forest
Working Plan, Amravati.