



सत्यमेव जयते

**GOVERNMENT OF MAHARASHTRA**

**WORKING PLAN  
for  
Buldhana Forest Division  
AMRAVATI CIRCLE**

For the Period  
2020-21 to 2029-30

**VOLUME – I**



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## **PREFACE**

This Working Plan of Buldhana Forest Division replaces the Working Plan of Shri. VirendraTiwari, IFS for the period 2010-11 to 2019-2020. The PWPR-I was prepared by Shri.PravinChavan, IFS, the then C.C.F Amravati Circle and was approved by the State Consultative Committee on 15/06/2018. On the basis of the recommendations made by the State Consultative Committee, the Draft Working Plan has been prepared by Shri G.R.Madhavaraj,IFS, DCF Working Plan, Amravati.

The DWPR for Buldhana was submitted by Shri G. R. Madhavaraj, IFS DCF Working Plan, Amravati in front of Standing Consultative Committee held in Nagpur on 30/4/2020. The queries raised by the committee has been compiled and sent to CCF, Working Plan, Nagpur for further necessary action. The DWPR of Buldhanahas been approved by Regional office, Nagpur on 12/07/2021.

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 Buldhana 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 Buldhana 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 APCCF (Working Plan-East), Nagpur for his 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 Buldhana on time. I could able to present DWPR of Buldhana based on GIS Applications which was appreciated in State Consultative Committee.

My thanks are also due to Shri. Pravin Chavan 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, Smt. Shubhangi Dehankar RFO, Shri. Ashok Bodakhe RFO, Shri. Arun Jadhav Ranger Surveyor, Avinash Naghate Ranger Surveyor, Shri. Ganesh Dabre Surveyor, Shri. Satish Mohakar Surveyor, Shri. Prakash Tayade Surveyor, Shri. Gajanan Gavande 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. S. N. Mali, DCFs, Buldhana Forest Division for providing information required for preparation of this Plan. I am also thankful to the field units of Buldhana 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. Balasaheb Khadse Steno, Dinesh Sambhare Accountant, Shri. Rajendra Ganjare Forester, Shri. Manoj Joshi Peon, Shri. Umesh Gawande, Peon, Shri. Ravi Koram Forest Labour, Shri. Krushna Barbudde Forest Labour, Shri. Milind Wankhede, Driver.

Amravati.

(G.R. MADHAVARAJ IFS)

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## WORKING PLAN OF BULDHANA FOREST DIVISION

### EXECUTIVE SUMMARY

#### 1. THE TRACK DEALT WITH

##### 1.1.1. LOCATION:

*Buldhana* Forest Division is confined to *Buldhana* district of *Maharashtra* State and administratively it is under *Amravati* Forest Circle since 1.5.1999. Earlier *Buldhana* Division was under administrative control of *Yavatmal* Forest Circle. *Buldhana* Forest Division situated between latitude 20°13' to 21°32' North and Longitude 78° 49' to 75° 75' East.

##### 1.1.2. BOUNDARIES:

The District of *Budhana* is surrounded by *Burhanpur* District of *Madhya Pradesh* in the North; *Akola*, *Washim*, and *Amravati* districts on the East; *Parbhani* and *Jalna* districts on the South and *Jalgaon* and *Aurangabad* districts on the west.

##### 1.1.3. AREA:

The Forest area of *Buldhana* Forest Division is 808.16 sq. km., out of this 400.47 sq. km is Reserve Forest, 62.3 sq. km. is Protected Forest and 2.73 sq. km. is Un-classed Forest. The forest area of about 3367.09 ha is transferred to wild life.

**TABLE SHOWING COMPARISON OF AREA UNDER PREVIOUS PLAN & NEW PLAN  
(AREA IN HA)**

| Sr. No.         | Forest Category    | Previous Plan Area | New Plan Area    |
|-----------------|--------------------|--------------------|------------------|
| 1               | Reserved Forests   | 75684.48           | 80165.47         |
| 2               | Protected Forests  | 7765.11            | 623.750          |
| 3               | Un-classed Forests | 349.47             | 27.355           |
| <b>Total :-</b> |                    | <b>83799.06</b>    | <b>80816.575</b> |

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

| Sr. No.                            | Item                                                     | Area in Ha.      |
|------------------------------------|----------------------------------------------------------|------------------|
| 1                                  | Area as per Previous Working Plan                        | 83799.06         |
| 2                                  | Excess Area in Previous Working Plan (Exclude)           | (-) 71.82        |
| 3                                  | Excess Area of Kuvardeo & Bhingara                       | 230.65           |
| 4                                  | Compt. No 644, Area should be 392.95 Against area 393.10 | +0.15            |
| 5                                  | C.A. Land Received                                       | 225.625          |
| 6                                  | Area Transfer to Wildlife Division(Unified Control)      | (-) 3367.09      |
| <b>Total Area For Working Plan</b> |                                                          | <b>80816.575</b> |

## **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 Buldhana Forest Division is 841.83 sq km .Out of this, 33.67 Sq. Km is handed over to Wildlife wing. Hence, net area incharge of Buldhana forest division is 808.16 Sq. Km. This Working Plan covers management prescriptions for 808.16 Sq. Km.

| Range          | Round     | Beat      | No.Of Comp. | Area in Ha.      |                |               |                  |
|----------------|-----------|-----------|-------------|------------------|----------------|---------------|------------------|
|                |           |           |             | Reserve Forest   | PF             | UF            | Total            |
| Jalgaon Jamod  | 3         | 18        | 99          | 13335.340        | 230.650        | 22.475        | 13588.465        |
| Khamgaon       | 5         | 18        | 100         | 16559.790        | 393.100        | 0             | 16952.890        |
| Motala         | 3         | 11        | 66          | 10538.550        | 0              | 0             | 10538.550        |
| Buldana        | 5         | 20        | 62          | 14282.810        | 0              | 0             | 14282.810        |
| Ghatbori       | 2         | 8         | 43          | 13024.680        | 0              | 4.88          | 13029.560        |
| Mehkar         | 2         | 5         | 25          | 4206.960         | 0              | 0             | 4206.960         |
| Deulgaon Raja  | 3         | 16        | 49          | 8217.340         | 0              | 0             | 8217.340         |
| <b>Total:-</b> | <b>23</b> | <b>96</b> | <b>444</b>  | <b>80165.470</b> | <b>623.750</b> | <b>27.355</b> | <b>80816.575</b> |

**ADMINISTRATIVE UNITS:** For administrative convenience, the ranges, rounds and beats were reorganised in year 2018-19 and the entire division has been divided into Ranges, 23 Rounds and 96 Beats.

### **LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)**

The total geographical area of the District is 9661 sq. km. of which 80.51 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 | Total | % of G.A. | Scrub |
|----------|-----------------------------|-----------------|-----------------|-------------|-------|-----------|-------|
| 2015     | 9661                        | 23              | 137             | 430         | 590   | 6.11      | 163   |
| 2017     | 9661                        | 25              | 144             | 426         | 595   | 6.16      | 162   |

There is a decrease in the open forest in the District but overall there is an increase of the forest area by **5 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.

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 Buldhana are rich in Biodiversity and areas close to the Ambabara, Dnyanganga and Lonar 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.

#### **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 Buldhana Forest Division.
- (2) There is no identified Preservation plots in Buldhana Forest Division .
- (3) There is no identified Medicinal Plant Conservation Area in Buldhana 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 3 m height and R3 above 3 m height. The health and vitality of the forests depends on the availability of the

regeneration as it ensures the capacity of the forests to rejuvenate in the event of any calamity. This is one of the best indicators of the health of the forests. The data is analysed and used to devise prescriptions for natural and artificial regeneration of forest areas. The table of regeneration is given below

| <b>Range Wise Natural Regeneration (Total 462 Plots)</b><br><b>Per Hectare Data. (Plot Size = 31.62M x 31.62M)</b><br><b>Date &amp; Year of enumeration: April 2018 to March 2019</b> |                      |                        |               |              |              |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------|---------------|--------------|--------------|---------------|
| <b>Sr. No.</b>                                                                                                                                                                        | <b>Name of Range</b> | <b>Number of Plots</b> | <b>R-1</b>    | <b>R-2</b>   | <b>R-3</b>   | <b>Total</b>  |
| 1                                                                                                                                                                                     | Buldhana             | 70                     | 177.14        | 133.14       | 150.14       | <b>460.43</b> |
| 2                                                                                                                                                                                     | Deulgaon Raja        | 42                     | 42.62         | 20.24        | 34.05        | <b>96.90</b>  |
| 3                                                                                                                                                                                     | Ghatbori             | 88                     | 75.11         | 37.16        | 19.55        | <b>131.82</b> |
| 4                                                                                                                                                                                     | Jalgaon Jamod        | 76                     | 293.82        | 127.37       | 62.24        | <b>483.42</b> |
| 5                                                                                                                                                                                     | Khamgaon             | 96                     | 53.85         | 29.48        | 16.25        | <b>99.58</b>  |
| 6                                                                                                                                                                                     | Mehakar              | 29                     | 81.72         | 29.31        | 6.55         | <b>117.59</b> |
| 7                                                                                                                                                                                     | Motala               | 61                     | 271.97        | 89.67        | 12.95        | <b>374.59</b> |
|                                                                                                                                                                                       | <b>Average</b>       | <b>462</b>             | <b>145.58</b> | <b>69.85</b> | <b>45.30</b> | <b>260.74</b> |

The regeneration data show that there are 146 seedlings of upto 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 :**

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).

## **6. MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY**

**GROWING STOCK OF WOOD:** Mostly site quality IV is found in Buldhana 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**

| <b>Sr. No.</b> | <b>Girth Class cm</b> | <b>Volume in cum</b> |
|----------------|-----------------------|----------------------|
| 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:** During revision of the current Plan, stem analysis was carried out in September 2008, by selecting 2 *Teak* trees of seed origin and 2 *Teak* trees of coppice origin for site quality IV in the compartment No.173( *Janona* Beat) and Comptt No.175( *Isvi* Beat ) of *Ghatbori* Range. Stem analysis was also carried out for 2 representative *Teak* tree of seed origin for site quality IV. It is evident from the graphs that the age of culmination at which CAI & MAI curves of Seed Origin teak trees intersect each other is 87 years (+4yrs correction to be made from seedling data). The corresponding girth is 116 cm.

### **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 enhance 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 44184.32 ha. is proposed under Improvement 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:** During the past plan the Division has not harvested any coupes. Hence the average yield per hectare cannot be obtained.

**RECORDED REMOVAL OF FUELWOOD:** During the past plan the division has not harvested any coupes. Hence the average yield per hectare cannot be obtained.

**RECORDED REMOVAL OF BAMBOO / RATTANS:** As the Division is devoid of bamboo or rattans, there is no record of removal of bamboo or rattans.

**RECORDED REMOVAL OF LOCALLY IMPORTANT NTFPS INCLUDING MAPS:** The important non timber forest produce that are removed and recorded from the forests are Tendu, Gum and grass. The other NTFPs and medicinal and aromatic plants that are removed from the forests appear to have not been recorded.

The biggest source of NTFP produce that the Division harvests is Tendu. During the past ten years the quantity of Tendu removed is 37800 standard bags amounting of Rs. 360 lakhs.

The other species of NTFP for the Division is the gum tree which is mostly *Sterculia urens*, *Boswellia serrata*, *Anogeissus latifolia*, *Accacia spp* etc. The total collection of gum was extracted was about 54 quintals.

## **8. MAINTENANCE AND ENHANCEMENT OF SOCIAL, ECONOMIC CULTURAL AND SPIRITUAL BENEFITS**

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

Buldhana Division along with the state has come to embrace the joint forest management as one of the tools of forest management as early as the mid – nineties. Ever since, the people's/ community's participation in conservation and management of forest and wildlife resources has been an integral part of

management. The number of JFMCs formed are 107 and these committees cover an area of 33093 ha.

**STATUS OF EMPOWERMENT OF JFMCs:** State's JFM is guided by the Govt. of Maharashtra resolution dated 16<sup>th</sup> March 1992, 5<sup>th</sup> October 2011 and 10<sup>th</sup> July 2012. The numbers of villages adjoining to forests are 190 and 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 1/3<sup>rd</sup> of the members are to be from the Gram Panchayat. 50 % of the members should be women and 2 members should be from SC/ST and OBC. The performance of committee in the Division has been adequate. The forest Development agency is well established and its working is satisfactory. Efforts to make the functioning and transaction of funds more and more transparent are going on in the FDA.

## **9. ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK**

The management of the forest is done accordingly to the existing policy Acts rules and regulation of the Govt. of India and the State. During the plan period a total number of cases registered are : Fire 146 , Grazing 182, Illicit cutting 2152 (involving 11690 no. of trees) and other offences 571 .

The manpower in place for the implementation of the plan and the enforcement of Acts and rules are through the Sanctioned posts which are 298 in total. In Buldhana Division out of 298 posts, 285 are filled up and 13 post are vacant Among the Range Forest Officer 13 post are sanctioned and 11 post are already filled, Forester 31 post sanctioned and 29 filled and 2 post are vacant, Forest Guard 143 post sanctioned and 137 filled and 6 post are vacant.

## **10. FIVE YEAR PLANS**

Since 1947, the Indian economy has been premised on the concept of planning. This has been carried through the Five-year plans, developed, executed and monitored by planning commission (1951-2014) and NITI Aayog (The National Institution of Transforming India) (2014-2017). With the prime minister as the ex-officio chairman, the commission has a nominated deputy chairman, who holds the rank of a cabinet Minister. Montek singh Ahluwalia is the last deputy chairman of the commission. The Twelfth plan completed its term in March 2017.

The new government led by Narendra Modi, has announced the dissolution of planning commission, and its replacement by a think tank called the NITI Aayog (The National Institution Of Transforming India), established with the aim to achieved Sustainable Development Goals and to enhance cooperative



federalism by fostering the involvement of State Government of India in economic policy making process using a bottom-up approach.

#### **DEVELOPMENT UNDER TWELFTH FIVE YEAR PLAN.**

The year 2015-16 was the fifth year of the XII the Five-year plan. An investment of Rs.1380.391 Lakhs was made on various developmental programmes implemented under forestry and related sectors.

It is observed that there is a more than double increase in Plan expenditure in the Division, which is a very encouraging sign. With the implementation of the Working Plan in right earnest, the goals of the 12<sup>th</sup> plan can be achievable.

#### **11. PAST SYSTEMS OF MANAGEMENT**

The forest of Buldhana have been scientifically managed since the first Working Plan in 1912 onwards as follows:

| <b>S.N.</b> | <b>Working plans in chronological order</b> | <b>Plan period</b>                          |
|-------------|---------------------------------------------|---------------------------------------------|
| 1           | Rao Bahadur Naidu                           | 1912-13 to 1937-38                          |
| 2           | S.A.Cornelius                               | 1938-39 to 1947-48                          |
| 3           | S.S.Parasnis                                | 1966-67 to 1979-80 (Extended up to 1987-88) |
| 4           | B.S.Thengdi                                 | 1995-96 to 2004-05 (Extended up to 2007-08) |
| 5           | V.R.Tiwari                                  | 2010-11 to 2019-20                          |

#### **Fifth Working Plan by V.R. Tiwari from 2010-11 to 2019-20**

**IN THIS PLAN, FOLLOWING INDEPENDENT WORKING CIRCLES WERE PRESCRIBED :**

| <b>Sr.No</b> | <b>Name of Working Circle</b>            |
|--------------|------------------------------------------|
| 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:**

Total 24 compartments have been allotted to this working circle. They are divided into 3 felling series having 20 coupes in each of them. The working cycle was fixed as 20 years from the year of working and the harvestable girth was fixed at 105 cm.

**Result** - However, numbers of trees of harvestable girth class (105 cm) are not available. This is because the degradation of the soil due to over grazing and biotic interference. Hence no work were done in SCI Working Circle

## **II. IMPROVEMENT WORKING CIRCLE:**

The area of this Working Circle is divided into 7 Felling Series in 167 compartments have been allotted to this Working Circle. The felling cycle is fixed as 20 years. The coupes are worked through JFMC.

**Result** - After commencement of the Forest Right Act 2006 large scale of illicit felling and encroachment on the forest area increased. As the tree density is less in this area of working circle, therefore no marking and felling were done, however the works of improvement like plantation works, tending of root stock in plantation areas, soil and moisture, seed dibbling in blank areas have been taken.

## **III. FUEL WOOD WORKING CIRCLE:**

In this Working circle total 122 compartments are allotted. There is only one felling series i.e. Bhongaon which is divided into 10 coupes. The felling series is fixed as 10 years. The all trees of girth above 30 cm at breast height will be harvested.

**Result** - Total 855.07 Ha area proposed for artificial regeneration but natural regeneration works and subsidiary silvicultural operation such as Cut Back Operation, Pruning, Coppice cutting has not been done except Soil and Moisture Conservation works such as Vantalao has taken up which has resulted into the enrichment of moisture regime. As major areas approximately 1030 ha. are likely to be submerged under *Jigaon* Irrigation Project, so the object of management is short term and regeneration work has not been carried.

## **IV. PASTURE WORKING CIRCLE:**

The crop density is generally 0.1. In this Working Circle total 119 compartments are allotted. There are 10 Grazing Series (S<sub>1</sub> to S<sub>10</sub>). The Grazing cycle was fixed for 3 years subsequently it was closed for grazing to the period of next two years with the object of improving the grazing.

**Result:** Grazing closures as envisaged in the scheme have not been followed. As a result percentage of palatable grass did not increase. On the contrary the uncontrolled and heavy grazing in these areas has resulted in further deterioration of the site. The soil and moisture conservation works and fodder improvement works prescribed in the scheme have not been taken up. Due to heavy grazing the soil erosion has increased and the sites have become poorer.

## **V. PROTECTION WORKING CIRCLE:**

The area of Working Circle was divided into 2 Working Series, each containing 20 coupes. The total number of compartment allotted for this Working Circle was 18.

The Working Cycle was fixed for 20 years. All the prescriptions will be carried out with the help of JFMC.

**Result** - No marking and improvement felling were done as all the areas of this working circle falls under protection. The works of improvement like plantation works, soil and moisture conservation, seed dibbling in blank areas have been taken.

No soil and moisture conservation works were carried as there is no availability of funds through DPDC and Jalyukta Shiwar programme.

## 12. STATISTIC OF GROWTH AND YIELD

The main species in Buldhana 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 is given in the table

**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 ton) |
|--------|----------------|-------------------|------------------------------------|--------------------------|---------------------------------|
| 1      | IWC            | 44184.315         | 64.58                              | 2853423.39               | 856027.02                       |
| 2      | Pasture WC     | 29701.31          | 10.18                              | 302359.34                | 90707.80                        |
| 3      | Protection WC  | 6630.79           | 60.15                              | 398842.02                | 119652.61                       |
|        | Total          | 80516.42          |                                    | 3554624.75               | 1066387.43                      |

## **FUTURE MANAGEMENT**

### **1. BASIS OF PROPOSALS**

This Working Plan is prepared for the scientific management of the forests and Wildlife of Buldhana Forest Division which is co-terminus with Buldhana District. The primary management objective for the forests of Buldhana Division is to treat forests as per the requirement of site so as to optimise Growing Stock. The forest of Buldhana Division is extremely important from wildlife management point of view as they intersperse with *Lonar, Dnyanganga & Ambabarwa* wildlife Sanctuary. The existing policy framework of State and Central Government, various legislation governing Forest and Wildlife, Orders of Hon<sup>ble</sup> Supreme Court of India and High Courts, Government Resolutions/Circulars/Notifications of the State Government etc have formed the basis of prescriptions of this Working Plan.

#### **AREA ALLOCATION TO DIFFERENT WORKING CIRCLES**

| <b>Sr. No.</b> | <b>Proposed Working Circles</b> | <b>Area (ha.)</b> | <b>Percentage</b> |
|----------------|---------------------------------|-------------------|-------------------|
| 1              | Improvement Working Circle      | 44070.375         | 54.53%            |
| 2              | Pasture Working Circle          | 29884.760         | 36.97%            |
| 3              | Protection Working Circle       | 6861.440          | 8.49%             |
| 4              | NTFP Chapter                    | -                 | Entire area       |
| 5              | JFM Chapter                     | -                 | Entire area       |
| 6              | Wildlife Management Chapter     | -                 | Entire area       |
| 7              | Forest Protection Chapter       | -                 | Entire area       |
| <b>Total</b>   |                                 | <b>80816.575</b>  | <b>100%</b>       |

### **2. IMPROVEMENT WORKING CIRCLE**

**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. This working circle covers 44070.375 ha. area.

#### **Special Objects of Management:**

- 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 and
- iv) To check the soil erosion by creating and maintaining the vegetative cover.
- v) To conserve soil moisture, essential for creating conditions conducive for rejuvenation and growth of NR and rootstock.

**GENERAL CHARACTERISTICS OF VEGETATION:** In general, the forests of this Working Circle are inferior both in quality and composition. The prevalent quality is IV or below IV. It consists of *Anjan* Forests, Open Mixed Forests and also Inferior *Teak* Forests. In *Anjan* Forests, *Anjan* (*Hardwickia binnata*) is the main crop, wherein stunted *Teak* occurs scattered individually or in small pure patches. The other common associates of *Anjan* are *Salai*, *Dhaora*, *Moyen* and *Saja*. The major portion of the crop is young to middle aged.

#### **SILVICULTURAL SYSTEM**

The growing stock consists mostly of *Teak*, *Anjan* 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 fellings 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 be include –

- i. A<sub>1</sub> type areas, which have slope more than 25°.
  - ii. A<sub>2</sub> type areas i.e. 20 m wide strip on both sides of streams.
  - iii. A<sub>3</sub> 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 crop 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 1/3<sup>rd</sup> of the crop height and/or to bring down stem number as per the yield table.
2. Unwanted undergrowth interfering or likely to interfere 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. 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 6<sup>th</sup> 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  $1/3^{\text{rd}}$  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 3 species.

#### **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 2<sup>nd</sup> 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. 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.

### **3. PASTURE 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

**Area allocation:** Total area allotted to this working circle is **29884.760** ha. Area.



## **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 judicious 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. PROTECTION WORKING CIRCLE**

**GENERAL CONSTITUTION OF WORKING CIRCLE:** This Working Circle includes the area belonging to the precipitous slopes of the *Jalgaon-Jamod* Range. Protection and soil conservation treatment in these forests is necessary for site protection, preserving the steep and precipitous slopes and reducing silt load to the major dams or water bodies in the division. Total area allotted to this working circle is **6861.44** ha. area.

Following criteria have been proposed for the allocation of forest areas or compartments to this working circle:

- The compartments having more than half of its areas on the steep slope or in the stream buffer.
- The compartments which are close to and in the catchments of the major dams and water bodies in the Buldhana district.

## **SPECIAL OBJECTS OF MANAGEMENT**

- To check the soil erosion and to arrest the run off by implementing soil and water conservation measures in the forest catchments so as 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 water regime of the forest tracts.

## **GENERAL CHARACTERISTICS OF VEGETATION**

- The forests composition varies from pure teak to the mixed crop having high proportion of Teak. The common associates of teak are *Ain*, *Dhaora*, *Tiwas*, *Lendia*, *Tendu*, *Moha*, *Bhirra*, *Mowai*, *Salai*, *Rohan*, *Shisham*, *Aonla*,

*Achar, Kulu, Semal and Khair.* Majority of the area supports stunted tree crop. *Teak, Bhirra, Palas and Khair* are found in larger proportions.

- The site quality of the crop varies from IVa to IVb. The quality is generally IVb in the upper slopes and IVa in the lower slopes. The density of crop generally varies from 0.2 to 0.6, having well stocked patches as well as under stocked and open areas.

## **SILVICULTURAL SYSTEM**

Silvicultural system is proposed on the pattern of watershed management viz. ridge to valley treatment approach. Soil and moisture conservation works to prevent soil erosion, siltation of reservoirs and to enhance the vegetation cover and ground water table.

Harvesting of green trees is prohibited. However, removal of dead trees by retaining two dead trees per hectare as snags is permitted. These areas are proposed to receive strict protection from grazing and fire.

**FELLING CYCLE:** The Treatment Cycle is fixed for 20 years.

**CALCULATION OF YIELD:** Not Applicable.

## **DEMARCATON, TREATMENT MAP AND PRESCRIPTION DEMARCATON**

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.

## **TREATMENT PRESCRIPTION:**

The treatments prescribed for various treatment-type areas shall be, as follows:

### **(1) A-Type Areas: Protection Areas**

- i. Soil and moisture conservation: The requirement of site would be the prime consideration while planning for Soil and moisture conservation works.
- ii. Bush sowing: Bush sowing of *Khair, Neem, Maharukh, Babool and other local seeds* (except teak) are to be carried out. Any one species should not constitute more than one-third of the total species.
- iii. Stake planting: In the A3-type areas, stakes of *Ficus* spp., Pangara, Salai or other suitable species will be planted at six-meter interval, and tussocks

of *Khas grass* will be planted on suitable sites. Provided that Stake planting shall be done in the plain areas only and not in high slopes.

- iv. Harvesting prohibited: Harvesting of standing trees (dead or alive) is strictly prohibited in the A-type areas. The marketable down logs of valuable species such as *Teak*, *Shisham* and *Tiwas* may be extracted.

## **(2) B-Type Areas: Under-stocked Areas**

Rootstock Management – Tending of rootstock will be carried out as follows:

- i. **Singling of coppice shoots:** One healthy and promising coppice shoot will be retained on the stumps 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.
- ii. **Coppice management of damaged and malformed saplings:** The saplings and poles of up to 45 cm GBH having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, cause erosion and lead to soil loss. Poles having at least 2.50 meter of clean bole will not be treated as malformed.
- iii. **Tending of natural regeneration:** All seedlings and saplings of valuable species *more than 1 meter in height will be nursed as future crop*. Spacing operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5 metre spacing. The natural regeneration operation should give priority to non-Teak species and Teak of origin and shall be assisted and encouraged by soil working and mulching around them, in the following manner.

**(a) First year operations:** Weeds in one-meter diameter around saplings of valuable species shall be cleared during the first week of July. Uprooted weed, grasses and leaf-litter shall be mixed in the upper layer of soil as the organic mulch and facilitate loosening and aeration of the soil by worms and insects. One soil working will be carried out in October.

**(b) Second year operations:** The soil working in October will be repeated in the following year.

**(c) Third year operations:** Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance shall be repeated as third year operations.

iv. No harvesting in B Type area.

**(3) C-Type Areas: Groups of pole crop**

- i. **Thinning:** Groups of pole crop will be thinned by maintaining average spacing of one-third of the crop height in such patches. Poles of vigorously growing non-teak species should be preferred for retention if teak is more than 50 percent of the crop in stocking.
- ii. No planting shall be done in these areas.

**(4) D-Type Areas: Well-stocked Areas**

- i. No harvesting of green trees is prescribed. However, dead trees after retaining two dead trees per hectare as snags are permitted for harvesting. Similarly, coppice shoots will be tended to retain one or two promising coppice shoots per stump.
- ii. **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 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.
- iii. No plantation is prescribed in these areas.

**REGENERATION:**

**NATURAL REGENERATION:** Identified NR will be rigidly protected from grazing, trampling and fire incidences, by resorting to rigid grazing control and fire protection measures applicable to current coupe of working. The order of priority for retention and protection of NR will be *Anjan, Bija, Shivan, Beheda, Moha, Biba, Kulu, Teak, Ain, Tiwas, Khair, Dhavda, Char, Aaola* and *Lendia*.

**ARTIFICIAL REGENERATION:** Areas, which are deficient in natural regeneration, shall be supplemented with seed sowing of native species. The choice of species will depend upon site suitability. Species like *Anjan, Ain, Lendia, Mowai, Salai, Kusum, Char, Aonla, Beheda*, etc., shall be sown. *Van mazoors* and Beat Guards shall carry out seed sowing.

**ASSOCIATED REGULATIONS AND MEASURES**

**Fire Protection:** The prescriptions given in Miscellaneous Regulation shall be followed.

**Grazing Control:** The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6<sup>th</sup> Dec.1968 according to which the grazing incidence in Protection Forests should not **exceed one cattle unit for 4 hectare**.

## **5. NON TIMEBER FOREST PRODUCE (NTFP) CHAPTER**

### **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 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.

### **SPECIAL OBJECTIVES OF MANAGEMENT**

As per the National Forest Policy- 1988, the development of Non Timber Forest Produce is one of the basic objectives for the forest management. Consistent with the above policy, the special objectives of management are as follows:

1. To manage marketable NTFPs and medicinal plants scientifically and to utilize the existing potential optimally and thereby to enhance the productivity of these species.
2. To take measures for conservation and sustainable use of the species identified as NTFP.
3. To generate employment for providing work to the local people and thereby improving their socio-economic conditions.
4. To provide better and improved quality of life to local population through inclusion of traditions which support and link their life styles into sustainable harvest and use of NTFP.
5. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division identify and conserve the forest areas rich in NTFP and medicinal plants.
6. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques

**Future Interventions :** For building the database on NTFPs it is prescribed that weekly markets will be surveyed extensively to find out the types of NTFPs coming from forest areas, their extent, purpose of utilization, rate, chain and the agency of marketing and final destination. JFMCs being primary stakeholders should be

involved in this important exercise. A suitable printed register be supplied to all the JFMCs by the division so as to collect this information.

It is prescribed that the above information should be used to formulate correct prescriptions at the time of next revision.

## **6. JOINT FOREST MANAGEMENT CHAPTER**

**GENERAL CONSTITUTION OF WORKING CIRCLE:** This overlapping Working circle extends to the entire area of the Buldhana forest division which is co-terminus with the area of Buldhana 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 degraded 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 areas will be suitable for JFM program.

- Plantation of bamboo, fruit trees shall be done through JFMC's so that it will fetch early return and there will be benefit sharing.
- 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 JFM programme.
- All potential wildlife areas are to be included in either JFM or EDC programme as per provisions contained in Govt. Resolution.

**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 Micro-plans should be reflected in the planning process of the Gram Panchayat.
- Wherever required, NGOs be involved for creating awareness programmes.
- Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
- JFM programme should be implemented with complete transparency. The accounts of JFMCs shall be annually audited as per 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 works are to be executed by JFM members only. Monitoring of JFM activities by supervisory cadres (ACF to CCF) is the key for effective implementation of JFM program. Periodic reviews at various levels will aid in good implementation.
- 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 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 10<sup>th</sup> 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 source 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 the 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 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.

## **8. FOREST PROTECTION CHAPTER**

**GENERAL CONSTITUTION OF WORKING CIRCLE:** The entire tract of Buldhana Forest Division is included in this overlapping working circle. The forests of *Buldhana* Division are burdened with heavy biotic interferences, hence addressing of 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 which the rocks have 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.

#### **GENERAL CHARACTER OF VEGETATION:**

The forests of Buldhana 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 Buldhana 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 Buldhana 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 Buldhana 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 Buldhana 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 Buldhana 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 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.

## **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 skeletonisers to all forms of parasites, fungal attacks.
- 4) Ensuring grazing in forest is kept to a minimum.

- 5) Reducing human interference of all forest, from illegal felling, grazing, hunting etc. by enforcing the law & changing moral perception.

**B)** As the forest of Buldhana 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.

**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 is 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 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.

#### **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.

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

**TABLE NO. 11.1: MAJOR DAMS IN OR IN THE VICINITY OF THE  
FOREST AREAS  
DAM PROJECTS (EXISTING)**

| <b>Name of Dam</b> | <b>Type of Dam</b> | <b>Capacity of Dam</b> | <b>River on which Dam is located</b> | <b>Dam Prone villages</b>         | <b>Tahsil</b> |
|--------------------|--------------------|------------------------|--------------------------------------|-----------------------------------|---------------|
| Nalganga           | Major              | 1386 cum               | Nalganga                             | Makodi, Talni, Shelapur, Datala   | Motala        |
| Dhynganga          | Medium             | 4249 cum               | Dhyanganga                           | G. Matergaon, Konti,              | Khamgaon      |
| Paldhag            | Medium             | 1739 cum               | Vishwaganga                          | Tarapur, Kothali, Jaipur, Paldhag | Motala        |
| Mandawa            | Medium             | 850 cum                | Mandawa                              | Mandawa, Bibi                     | Lonar         |
| Mas                | Medium             | 2496 cum               | Mas                                  | Kalegaon, Chitode, K. Mahadeo     | Khamgaon      |
| Koradi             | Medium             | 2436 cum               | Koradi                               | Nagzari, Palaskhed, Hiwara        | Mehkar        |

**ON GOING PROJECTS:**

| <b>Name of Dam</b> | <b>Type of Dam</b> | <b>Capacity of Dam</b> | <b>River on which Dam is located</b> | <b>Dam Prone villages</b> | <b>Tahsil</b> |
|--------------------|--------------------|------------------------|--------------------------------------|---------------------------|---------------|
| Wan                | Major              | 4559 cum               | Wan                                  | Wasadi, wari              | Sangrapur     |
| Khadkpurna         | Major              | 18000 cum              | Khadkpurna                           |                           | Mehkar        |
| Man                | Medium             | 6587 cum               | Man                                  | Ambetakli, Shirla         | Khamgaon      |
| Torna              | Medium             | 2384 cum               | Torna                                | P. Korade, Nimkhed        | Khamgaon      |
| Pentakli           | Medium             | 8562 cum               | Painganga                            | Boradi, Pachla            | Mehkar        |
| Jigaon             | Major              | 91800 cum              | Purna                                | Jigaon, Takli             | Nandura       |
| Utawali            | Medium             | 265 cum                | Utawali                              | D. Sakarsha               | Mehkar        |

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.

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

### **12.3: POTENTIAL ECO-TOURISM SITES IN BULDHANA FOREST DIVISION.**

Buldhana Forest Division has its varied flora and fauna ranging from the grasslands, the wetland to the thick forests and has quite few ecotourism sites of potential. They are not properly developed and require immediate attention.

Places of ecotourism attractions are few but they are having great potentials. Some of them are- *Dnyanganga* Sanctuary, *Ambabarwa* Sanctuary, “*Saptarushi*” (Seven sages) in *Ghatbori* Range. *Lonar* Sanctuary is only crater in basaltic rock formed by the impact of a meteor. Forests of this Division have origins of many rivers. All these places need to be given specialized attention by ensuring preservation of their originality and potential in wild life conservation as well as from eco- tourism point of view.

Some of the sites are actually not in the forest area but are included as they can form a circuit that would be linked with the eco-tourism sites for better packages whenever these sites are developed with proper management plan.

The social aspect of forests in the context of ecotourism is very important as it provides the people with employment. The other important social contribution of ecotourism is the exposure to the other cultures and the chance to educate others about 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.

The principles of Eco-tourism stated above should be the guide for all such developments.



- Biodiversity garden, Medicinal Plants gardens, 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 a 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.

### 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. 1445.42 lakh annually in the first three years and Rs. 2412.25 lakh annually for the next seven years that is from the fourth year onwards. The total expenditure will come to Rs. 21221.64 lakh. The expected revenue from the implementation of the plan is Rs. 212.22 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<br>(Rs in<br>lakh) | Expenditure in (Lakh)                     |                                   |                      | Total<br>Expenditu<br>re (3+4+5) |
|---------|----------------------------|-------------------------------------------|-----------------------------------|----------------------|----------------------------------|
|         |                            | Conserva<br>ncy &<br>Work (Rs<br>in Lakh) | Establish<br>ment (Rs<br>in Lakh) | Plan (Rs in<br>Lakh) |                                  |
| 1       | 2                          | 3                                         | 4                                 | 5                    | 6                                |
| 2010-11 | <b>1.09</b>                | 297.21                                    | 675.32                            | 122.81               | 1095.34                          |
| 2011-12 | <b>5.76</b>                | 264.06                                    | 762.11                            | 434.11               | 1460.28                          |
| 2012-13 | <b>6.37</b>                | 530.92                                    | 809.26                            | 440.47               | 1780.65                          |
| 2013-14 | <b>6.19</b>                | 503.24                                    | 872.61                            | 280.53               | 1656.38                          |
| 2014-15 | <b>1.61</b>                | 646.59                                    | 992.67                            | 186.72               | 1825.98                          |
| 2015-16 | <b>6.91</b>                | 795.21                                    | 1111.00                           | 391.83               | 2298.04                          |
| 2016-17 | <b>2.97</b>                | 1072.47                                   | 1318.34                           | 558.97               | 2949.78                          |
| 2017-18 | <b>1.24</b>                | 985.36                                    | 1599.66                           | 459.91               | 3044.93                          |
| 2018-19 | <b>1.30</b>                | 827.15                                    | 1487.27                           | 2186.91              | 4501.33                          |
| 2019-20 | <b>0.00</b>                | 8.02                                      | 497.50                            | 103.41               | 608.93                           |
| Total   | <b>33.44</b>               | 5930.23                                   | 10125.74                          | 5165.67              | 21221.64                         |

**BENEFIT COST RATIO:** The benefit cost ratio for the implementation of this plan taking the figures of the ten years average is 1:664. Thus the cost of implementing this working plan is expected to be more than the benefit.

## **14. MISCELLANEOUS REGULATION**

### **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 undemarcated 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..
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.

## **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 Km<sup>2</sup> (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 Buldhana Forest Division.

During the process of writing of this Plan the following papers, articles, report and documents were referred 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 Buldhana could not be written with accurate data. The research gap is in almost every aspect of the Working Plan as our writing of the Plans in early years has not looked into the new aspects that the need of our present times require, like Biodiversity and all its components, Climate change and Carbon sequestration, NTFP research, ITK, Trees outside forests, Social and cultural aspects of forests, Ecosystem Services etc. 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 variety of species than we ever know. This is evident from the list of the medicinal plants that have been listed by the vaidyas of Buldhana following the Workshop that was held in the Division. The list is appended at 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 also 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 BN Gupta and NG Totey, Indian Forester, 1994 relevant for the subject in discussion.

**16. SUMMARY OF PRESCRIPTIONS**

For Administrative convenience the Ranges, Rounds and Beats were reorganized in year 2018-19 and the entire division has been divided into 7 Ranges, 24 Rounds and 96 Beats.

## **THE WORKING CIRCLEWISE SUMMARY OF PRESCRIPTION:**

### **1. IMPROVEMENT WORKING CIRCLE:**

#### **Coupe Demarcation & Treatment Map:**

1. Demarcation and Marking: One year in advance
2. Treatment Map to be prepared
3. A type: Protection area (A1: Steep slopes, A2: 20 M wide strips along streams, A3: excessively erosion prone areas)
4. B-type: Under stocked 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 stumps shall be marked for felling. Matured trees that have developed hollowness and show visual sign of decay will be marked for felling.

#### **SILVICULTURAL SYSTEM:**

1. Hygienic operation of improvement felling.
2. Adequate growing space is provided to trees of valuable species.
3. The improvement felling supplemented by tending of naturally generated crop & root stock will aid in transition of middle aged stem to maturity.
4. The species whose population in the 'stand' dynamics is less than 1% shall be retained till they reached the rotation age.

#### **Regeneration:**

1. Natural Regeneration: NR of seed origin of valuable species to be preferred and managed through cultural operations.
2. Artificial Regeneration: Only in B type area if site is suitable.
3. Strict protection from fire and grazing
4. Tending operation for Natural regeneration in the 'D' type area & Root stock management in the 'B' type shall be taken up.

#### **SMC Works:**

SMC works, as described in the chapter of Miscellaneous Regulations are prescribed in A & B type area.

**Subsidiary Operations:**

1. Cleaning operations: 6th Year
2. Thinning is proposed to be carried out in the patches of Dense pole crop  
By maintaining average spacing of one third of the crop height.

**2. PASTURE 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 planting, area closure through enclosures is prescribed.
4. JFMCs to be actively involved.

**3. PROTECTION WORKING CIRCLE:****Coupe Demarcation & Treatment Map:**

1. Demarcation and Marking: One year in advance
2. Treatment Map to be prepared
  - i. A type: Protection area (A1: Steep slopes, A2: 20 M wide strips along streams, A3: excessively erosion prone areas)
  - ii. B-type: Under stocked and Blank areas (density less than 0.3)
  - iii. C-type: Group of naturally green poles.
  - iv. D-type: Well stocked forest patches.

**Treatment:**

1. A type area: Harvesting of standing trees is strictly prohibited.
2. B type: No. harvesting. All seedling & saplings of valuable species more than 1 mtr.in height will be nursed as future crop.
3. C type: Group of pole crop will be thinned by maintaining average spacing. No planting will be done.
4. D type: No harvesting of green trees & Plantation is not prescribed.

**SILVICULTURAL SYSTEM:**

1. Silviculture system is proposed on the pattern of watershed management.
2. Harvesting of green trees is prohibited.
3. Removal of dead trees by retaining two dead trees per ha. as snags is permitted.

**Regeneration:**

1. Natural Regeneration: All seedlings and saplings of valuable species more than 1 meter height will be nursed as future crop.
2. Strict protection from fire and grazing

**SMC Works:**

Soil & Moisture conservation works to prevent soil erosion siltation.

**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 programme has to be ensured through transparent payment mechanisms.
4. Villages which have not received funds should also be accorded importance.

**5. 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.

**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. MISCELLANEOUS 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. Updation of area registers
6. Where claims are finally rejected, removal of such encroachments.

## **17. TREE COVER OUTSIDE FOREST**

This chapter deals with the important aspects of tree presence and its contribution to the tree cover of the district and Forest Division of BULDHANA. Trees outside the Forest are defined by default, as all trees excluded from the definition of forest and other wooded lands. Trees outside the forests are located on other lands mostly on farmlands and built up areas, both in rural and urban areas. A large number of TOF consists of planted or domesticated trees. TOF include trees in agro-forestry systems, orchards and small woodlots. They may grow in meadows, pastoral areas and on farms, or along rivers, canals and roadsides, or in towns, gardens and parks. Some of the land use systems include alley cropping and shifting cultivation, permanent tree cover crops (e. g. coffee, cocoa), windbreaks, hedgerows, home gardens and fruit tree plantations (FAO).

The total geographical area of the BULDHANA District is 9661 sq. km of which 1168.55 sq. km. is forest. The total forest cover works out to be just about 12.1% of the total geographical area. This is way below the targeted 33 % forest cover as per the National Forest Policy.

The Social Forestry Department (SFD) of the state has the mandate for the forestry outside Forest area. Since the early 1980s the SFD has carried innumerable plantation and plantation drives across the state. It has not only conducted such plantations but has backed up with good awareness and extension efforts which have borne fruits in many ways. The SFD has been carrying out plantations in the private areas since in the District which include block plantations, agricultural bund planting and roadside plantation which form a substantial quantity and forest cover in the areas outside the forest. It is interesting to note that the Department has also carried out the assessment of



the success and survival of these plantations in and the results are very encouraging.

Between 2008 to 2018, the Social Forestry Buldhana Division carried out Block plantation for a total of 178 beneficiaries and planted 317 ha. Area. The total number of seedlings planted were 1.43 lakhs of which the total number of seedlings surviving at the time of handing over the scheme was 8.20. During the period of road side plantation of a length planted of 1894 k.m. with 15.66 lakhs planted seedlings was carried out of which the total of 12.57 lakhs seedlings survived at the time of handling.

## **18. CONTROL AND RECORDS**

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

- Control Forms
- Compartment History
- Plantations Registers
- Nursery Registers
- Divisional Note Book
- Boundary Registers

**APPENDIX:** Two sets of control forms will be prepared. One set will be kept in the division office and the other set will be submitted to the Deputy conservator of forests Working Plan Amravati. The forms will be sent annually by the Deputy Conservator Of Forests Buldhana Division to the Deputy Conservator Of Forests Working Plan Amravati not later than, October 1<sup>st</sup> .every year taking the necessary entries. All entries showing the deviations from the prescriptions will be underline in red. The Deputy Conservator of forests, Working Plan, Nagpur will scrutinize it and process 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 in

### **APPENDIX -**

- Each Compartment must have a separate file for its records. Compartment history must be maintained in the office of Buldhana Forest Division since they keep the record of past management practices and their effects on the growing stocks.

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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](http://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 organisation.

### Primary Objectives Sectoral:

- 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.

| <b>STRENGTHS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>WEAKNESSES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Well-regimented administration</li> <li>2. Ability to maintain forest cover</li> <li>3. Well intended course of action in place</li> <li>4. Trained staff and well-manned</li> <li>5. Finance improved over the last three years</li> <li>6. A strong legislation and policy in place</li> <li>7. Area with the forest department is well-spread</li> <li>8. Overall infrastructure of nurseries, depots, quarters in place.</li> <li>9. Greater awareness of conservation than before</li> <li>10. People involved in all forest village through Joint Forest Management.</li> <li>11. Rich flora and fauna</li> <li>12. Well documented Working Plan</li> </ol>                                                                                                | <ol style="list-style-type: none"> <li>1. High red-tapism and resistance to change</li> <li>2. Inability to create/maintain dense forests</li> <li>3. Over-prevalence of degraded Teak forests</li> <li>4. Inability to create good Plantations</li> <li>5. Lack of motivation and innovation</li> <li>6. Lack of working knowledge on Working Plan prescriptions.</li> <li>7. Funds deficient &amp; not released in time</li> <li>8. Lack of legal awareness and implementation</li> <li>9. Area under zudpi jungle are honeycombed</li> <li>10. Inadequate wireless communication, Wi-Fi / internet</li> <li>11. Inability to tap local population Goodwill, most Joint Forest management are not upto the mark.</li> <li>13. Many RET species are untackled</li> </ol> |
| <b>OPPORTUNITIES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>THREATS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <ol style="list-style-type: none"> <li>1. Cooperation from Social Forestry Department, Distt Admin, other Deptt.</li> <li>2. Real time reporting and monitoring using latest technology.</li> <li>3. New zudpi jungle offer new work sites</li> <li>4. Funding for plantations from PSUs, Private Parties</li> <li>5. Training in new tech and exposure visits for staff.</li> <li>6. Funding from outside department</li> <li>7. Creation of legal cell</li> <li>8. Treatment of watersheds through Jalyukt Shivar, etc</li> <li>9. Creation of assets and infrastructure from CAMPA</li> <li>10. Involvement of informed public and NGOs in conservation</li> <li>11. Documentation and Biodiversity Studies involving educational Institutions, research on pathological problems in forests</li> </ol> | <ol style="list-style-type: none"> <li>1. High number of vacancies</li> <li>2. Lack of technology transfer on silvicultural improvements</li> <li>3. Drought conditions</li> <li>4. Forest fire from fields, villages, out of vengeance</li> <li>5. Staff over-burdened with unproductive non-forestry works</li> <li>6. Lack of control over encroachment, Grazing, Illicit felling</li> <li>7. Joint Forest Management villages are divided socially, politically</li> <li>8. Lack of funding</li> <li>9. Spread of disease, epidemics and teak hollowness</li> <li>10. Pressure from influential persons for works outside WP</li> <li>11. Late felling permission</li> </ol>                                                                                          |

#### **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 outcomes that are 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 Buldhana it is seen that out of the geographical area of 9661 sq.kms. only 595 sq.kms. (SFR of FSI 2017) is covered under forests. This works out to be meagre 6.16 % of the geographical area, in order to achieve 33 % forest cover, there is a need to cover the whole area of forests which is 2,593.13 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 12<sup>th</sup> Plan.

- (iii) **Plantations:** It is expected 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 canopy in 44184.32 ha. Due to IWC to be followed by intensive Aided Natural Regeneration works. Also due to better protection from fire and grazing, the area 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 catalyse, 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:**

| <b>Chapter No.<br/>(Vol-I,<br/>Part-II)</b> | <b>Para No/<br/>Sub para<br/>No.</b> | <b>Prescribed Activity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A                                           | B                                    | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Chapter<br/>2IWC</b>                     | <b>2.6.10.1</b>                      | <b>Coupe Demarcation &amp; Treatment Map :</b> <ul style="list-style-type: none"> <li>* Demarcation and Marking: One year in advance</li> <li>* Treatment Map to be prepared</li> <li>* A type: Protection area (A1: Steep slopes, A2: 20 M wide strips along streams, A3: excessively erosion prone areas)</li> <li>* B-type: Understocked areas (density &lt;0.4)</li> <li>* C-type: Congested Pole crop</li> <li>* D-type: Well stocked areas (density &gt;0.4)</li> </ul>                                                          |
|                                             | <b>2.6.10.2</b>                      | <b>Marking :</b> <ul style="list-style-type: none"> <li>* A type area: No marking</li> <li>* B type: All dead trees, live high stumps</li> <li>* C type: The congested pole crop shall be marked for thinning.</li> <li>* D type: All fruit bearing species shall be reserved.</li> <li>* All dead &amp; malformed trees retaining 2 tress per ha. and all live high stumps shall be marked. For felling.</li> <li>* Matured trees that have developed hollowness and show visual sign of decay will be marked for felling.</li> </ul> |
|                                             | <b>2.6.2</b>                         | <b>Silvicultural System :</b> <ul style="list-style-type: none"> <li>* Hygienic operation of improvement felling.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |

|                                           |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           |                                     | <ul style="list-style-type: none"> <li>* Adequate growing space is provided to trees of valuable species.</li> <li>* The improvement felling supplemented by tending of naturally generated crop &amp; root stock will aid in transition of middle aged stem to maturity.</li> <li>* The species whose population in the 'stand' dynamics is less than 1% shall be retained till they reached the rotation age.</li> </ul>                                               |
|                                           | <b>2.6.12</b>                       | <b>Regeneration :</b> <ul style="list-style-type: none"> <li>* Natural Regeneration: NR of seed origin of valuable species to be preferred and managed through cultural operations.</li> <li>* Artificial Regeneration: Only in B type area if site is suitable.</li> <li>* Strict protection from fire and grazing</li> <li>* Tending operation for Natural regeneration in the 'D' type area &amp; Root stock management in the 'B' type shall be taken up.</li> </ul> |
|                                           | <b>2.6.10.1</b>                     | <b>SMC Works :</b> <ul style="list-style-type: none"> <li>* SMC works, as described in the chapter of Miscellaneous Regulations are prescribed in A &amp; B type area.</li> </ul>                                                                                                                                                                                                                                                                                        |
|                                           | <b>2.6.11</b>                       | <b>Subsidiary Operations :</b> <p>Cleaning operations: 6th Year<br/>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.</p>                                                                                                                                                                                                                                                         |
| <b>Chapter 5<br/>NTFP<br/>Chapter</b>     | <b>5.6.13.3<br/>to<br/>5.6.13.9</b> | <b>Prescription :</b> <ul style="list-style-type: none"> <li>* Documentation of NTFP collection.</li> <li>* JFMCs to be actively involved in NTFP collection and processing.</li> <li>* Scientific method for Gum tapping as per rules suggested by FRI to be used.</li> <li>* Regular trainings for JFMCs to be conducted for capacity building in NTFP collection and processing.</li> </ul>                                                                           |
| <b>Chapter 7<br/>Wildlife<br/>Chapter</b> | <b>7.6.14.1<br/>to<br/>7.6.14.4</b> | <b>Prescription :</b> <ul style="list-style-type: none"> <li>* Standing Order of PCCF (WL) to be scrupulously implemented.</li> <li>* Habitat improvement works like waterhole development, meadow development to be taken up in suitable areas.</li> </ul>                                                                                                                                                                                                              |

|                                                |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                      | <ul style="list-style-type: none"> <li>* Creation of database w.r.t. riparian zones, saltlicks, natural wallows, resting places etc to be created.</li> <li>* Vaccination of livestock to be monitored</li> <li>* Intelligence gathering to check wildlife trade</li> <li>* Secret service fund to be effectively used.</li> <li>* Regular Sensitization of staff</li> <li>* During marking, at least 2 dead trees per ha is to be kept as snags.</li> <li>* No fruit tree to be marked.</li> <li>* TenduPhadis / labour camps should not be close to waterholes.</li> <li>* Compensation as per Govt. orders to be dispersed immediately and transparently.</li> <li>* Effective control on forest fires.</li> <li>* Eco-development works to be started either through EDCs or JFMCs in wildlife rich areas</li> <li>* Massive awareness creation in village communities, schools, colleges, civil society, public representatives etc.</li> </ul> |
| <b>Chapter 9<br/>JFM</b>                       | <b>9.6.13.5</b>      | <p><b>Prescription :</b></p> <ul style="list-style-type: none"> <li>* JFM micro plans are to be dovetailed with broad prescriptions of approved working plan.</li> <li>* 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 &amp; Plantations.</li> <li>* Transparency in programme has to be ensured through transparent payment mechanisms.</li> <li>* Villages which have not received funds should also be accorded importance.</li> </ul>                                                                                                                                                                                                                                                                                                                                             |
| <b>Chapter 14<br/>Miscellaneous Regulation</b> | <b>14.1 to 14.16</b> | <p><b>Miscellaneous Regulation:</b></p> <ul style="list-style-type: none"> <li>* Boundary demarcation of all un demarcated areas (Entire Zudpi jungle area, Acquired Private Forest &amp; Non Forest land taken over for C.A.&amp;undemarcated PF) to be accomplished in first three years of the Plan.</li> <li>* Boundary pillar which is not easily vulnerable to damage.</li> <li>* Three years Survey and Demarcation Programme</li> <li>* Boundary demarcation is necessary due to honeycombing.</li> <li>* Updation of area registers</li> <li>* Where claims are finally rejected, removal of such encroachments.</li> </ul>                                                                                                                                                                                                                                                                                                                 |



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

| Chapter No.<br>(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                | Demarcation and marking                                                                                                 | 96                                                          | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 |
|                                 | 2.6.10.2                |                                                                                                                         | 2                                                           | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
|                                 | 2.6.2, 2.6.10.1         | Coupe working (Hygenic Felling) (D+B area)                                                                              | 48                                                          | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
|                                 |                         |                                                                                                                         | 1                                                           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
|                                 | 2.6.12.2                | Natural Regeneration – ANR+Nursing of naturally occurring seedlings and coppice management etc. in Understocked patches | 20                                                          | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                                 |                         | PPO/PYO(Pre-planting works)                                                                                             | 20                                                          | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                                 |                         | FYO (First year operations)                                                                                             | 20                                                          | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                                 |                         | SYO (Second year operations)                                                                                            | 20                                                          | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                                 |                         | TYO (Thired year operations)                                                                                            | 20                                                          | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                                 | 2.6.10.1                | Soil and                                                                                                                | 10                                                          | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
|                                 |                         |                                                                                                                         | 00                                                          | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
|                                 |                         | moisture conservation works                                                                                             | cu                                                          | cu | cu | cu | cu | cu | cu | cu | cu | cu |
|                                 |                         |                                                                                                                         | m                                                           | m  | m  | m  | m  | m  | m  | m  | m  | m  |
|                                 | 2.6.12                  | Plantation (Teak/ Mix) PPO/PYO (Pre - planting works)                                                                   | 10                                                          | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                                 |                         | FYO (First year operations)                                                                                             | 10                                                          | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
|                                 |                         |                                                                                                                         | 0                                                           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |

|                                                        |                        |                                                                                                               |               |               |               |               |               |               |               |               |               |               |
|--------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                                        |                        | SYO (Second year operations)                                                                                  | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           |
|                                                        |                        | TYO (Third year operations)                                                                                   | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           |
|                                                        |                        | 4th YO (Forth year operations)                                                                                | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           |
|                                                        |                        | 5thYO (Fifth year operations)                                                                                 | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           |
| 3-Pasture                                              | 3.6.11                 | Demarcation and marking                                                                                       | 1587          | 1587          | 1587          | 1587          | 1587          | 1587          | 1587          | 1587          | 1587          | 1587          |
|                                                        | 3.6.11, 3.6.12, 3.6.13 | Deep Ploughing                                                                                                | 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                                                                                      | 200           | 200           | 200           | 200           | 200           | 200           | 200           | 200           | 200           | 200           |
| 4-Protec tion                                          | 4.6.11.1               | Demarcation and marking                                                                                       | 616           | 616           | 616           | 616           | 616           | 616           | 616           | 616           | 616           | 616           |
|                                                        | 4.6.11.2               | Soil and moisture conservationw orks                                                                          | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     | 1400 cu m     |
| 7-Wild Life Chapter                                    | 7.6.14.4               | Preparation of Water Holes (Total Water Holes 42)                                                             | 5 Water Holes | 5 Water Holes | 4 Water Holes | 4 Water Holes | 4 Water Holes | 4 Water Holes | 4 Water Holes | 4 Water Holes | 4 Water Holes | 4 Water Holes |
| 10-Misellen eous Regulati ons (Bounda ry demarca tion) | 14.1                   | New Demarcation of Zudpi Jungle, Non forest land taken over for C.A. and Aquired Pvt. Forest &Undemarcated PF | 6807 ha .     | 6807 ha .     | 6807 ha .     | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| 14-Misellen eous Regulati                              | 14.2                   | Fixing Boundary Pillars (Artificial                                                                           | 696 Pillar    | 696 Pillars   | 696 Pillars   | 696 Pillars   | 696 Pillars   | 696 Pillars   | 696 Pillars   | 696 Pillars   | 696 Pillars   | 696 Pillars   |

|                                          |      |                                                                           |                             |                         |                         |                         |                         |                         |                         |                         |                         |                         |
|------------------------------------------|------|---------------------------------------------------------------------------|-----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| ons<br>(Bounda<br>ry<br>demarca<br>tion) |      | &Natural RF<br>Boundary)                                                  | s                           |                         |                         |                         |                         | s                       |                         |                         |                         |                         |
|                                          | 14.2 | Fixing<br>Boundary<br>Pillars<br>(Artificial &<br>Natural PF<br>Boundary) | 44<br>62<br>Pil<br>lar<br>s | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars | 44<br>62<br>Pill<br>ars |

## II. GLOSSARY OF LOCAL TERMS USED IN THE PLAN

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

## III. LIST OF FLORA

### Local and Botanical Names of Plants Occurring in Buldhana Forest Division.

#### A-Trees

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

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

| Local Name                                  | Botanical Names                                                             | Family      | Remarks |
|---------------------------------------------|-----------------------------------------------------------------------------|-------------|---------|
| Semal                                       | <i>Bombax ceiba</i>                                                         | Bambacaceae |         |
| Shisham, H. M.                              | <i>Dalbergia latifolia</i> , Roxb                                           | Fabaceae    | O.      |
| Sisoo, K. M.H.                              | <i>Dalbergia sisoo</i> , Roxb                                               | Fabaceae    |         |
| Sitaphal H. K.                              | <i>Anona squamosa</i> , Linn.                                               | Anonaceae   |         |
| Kasmar, K. Shivan, M                        | <i>Gmelina arborea</i> , Roxb.                                              | Verbenaceae | O.      |
| Tendu, H. Tembru, M. K.<br>Tembhurni, M. K. | <i>Disopyros melanoxylon</i> , Roxb                                         | Ebenaceae   |         |
| Tinsa, H.Tiwas, M.                          | <i>Ougeinia dalbergioides</i> , Benth<br><i>Sym. Ougeinia oogeinensis</i> . | Ebenaceae   |         |

#### B - Shrubs

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

#### C-Climbers

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

#### D- Grasses, Sedges and Bamboos

| Local Name                 | Botanical Names                     | Family  |
|----------------------------|-------------------------------------|---------|
| Bamboo, E. Basa, H. M. K.  | <i>Dendrocalamus strictus</i> nees. | Poaceae |
| Baru, K. Boru, K.          | <i>Sorghum halepense</i> , pers.    | Poaceae |
| Bhurbhui or Bhurbhusi      | <i>Eragrostis tenella</i> , Roem.   | Poaceae |
| Ghonal or Ghonad or Gondel | <i>Themada triandra</i>             | Poaceae |
| Harad hadki                | <i>Aristida hystrix</i> , Linn      | Poaceae |

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

Table showing list of important medicinal plants and their uses

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

| Sr.No. | Local Name        | Botanical Names              | Parts used                                                                                                                                                    |
|--------|-------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8      | Kadu neem         | <i>Azadirachta indica</i>    | 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         | <i>Balanites aegyptiaca</i>  | Fruits decoction is used as fish poison and as detergent.                                                                                                     |
| 10     | -                 | <i>Baliospermum montanum</i> | Seeds are used as drastic purgative. The roots are cathartic.                                                                                                 |
| 11     | Salai             | <i>Boswellia serrata</i>     | Resin is used in preparation of ointment for sores and external eruptions.                                                                                    |
| 12     | Rui               | <i>Calatropis giagantea</i>  | Milky latex is applied for curing tooth-ache.                                                                                                                 |
| 13     | Amaltas or Bahawa | <i>Cassia fistula</i>        | The pulp of fruit is taken as purgative.                                                                                                                      |
| 14     | Malkagni          | <i>Celastrus paniculata</i>  | Oil extracted from the seeds is used as stimulant.                                                                                                            |
| 15     | Tilwan            | <i>Cleome viscosa</i>        | Juice of leaves is put in to ears to cure tooth-aches.                                                                                                        |
| 16     | .Gokharu          | <i>Clitoria ternatea</i>     | Various parts of plants are used medicinally.                                                                                                                 |
| 17     | Vasan-vel         | <i>Cocculus hirsutus</i>     | Roots are used in chronic rheumatism                                                                                                                          |
| 18     | Awla              | <i>Emblica officinalis</i>   | Fruits are the rich source of vitamin C.                                                                                                                      |
| 19     |                   | <i>Evolvulus alsinoides</i>  | Leaves are used in chronic bronchitis and asthma.                                                                                                             |
| 20     | Wad               | <i>Ficus benghalensis</i>    | Barks, roots and leaves are used in medicines.                                                                                                                |
| 21     | Murud-sheng       | <i>Helicteres isora</i>      | Fruits are used against cough.                                                                                                                                |
| 22     | Talim khana       | <i>Hygrophila auriculata</i> | Seeds are used in medicine.                                                                                                                                   |
| 23     | Mahua             | <i>Madhuca longifolia</i>    | 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       | <i>Maerua oblongifolia</i>        | Juice or ash of leaves is used as preventive in dysentery.                                       |
| 25     | -           | <i>Malvastrum coromandelianum</i> | Juice or ash of leaves is used externally by local people for healing wounds and bruises.        |
| 26     | Khaj-khuiri | <i>Mucuna pruriens</i>            | Roots and seeds are medicinal.                                                                   |
| 27     | Chitrak     | <i>Plumbago zeylanica</i>         | Roots are used in rheumatism ,skin diseases and diarrhea.                                        |
| 28     | -           | <i>Polygala arvensis</i>          | Roots are given in fever and dizziness.                                                          |
| 29     | Peru        | <i>Psidium guajava</i>            | Leaf decoction is used to cure pain in teeth.                                                    |
| 30     | Satap       | <i>Ruta graveolens</i>            | Rue is narcotic and stimulant.                                                                   |
| 31     | Jambhul     | <i>Syzygium cumini</i>            | The kernel is used in diabetes.                                                                  |
| 32     | Behada      | <i>Terminalia bellirica</i>       | Fruits are used as tannins and in Triphala churna that is laxative powder.                       |
| 33     | Parpimpal   | <i>Thespesia populnea</i>         | The extract of bark is applied externally for skin diseases.                                     |
| 34     | Gulvel      | <i>Tinospora cordifolia</i>       | Roots are used as antidote in snake bite.                                                        |
| 35     | Gokhru      | <i>Tribulus terrestris</i>        | Roots used as tonic.                                                                             |
| 36     | Dagadipala  | <i>Tridax procumbens</i>          | Juice of leaves used to cure wounds and cuts.                                                    |
| 37     | -           | <i>Tylophora indica</i>           | Leaves are used to cure bronchial asthma, leaves are also used against cold and fever.           |
| 38     | Ashwagandha | <i>Withania somnifera</i>         | Roots are used in treatment of leucoderma, nervous breakdown, leaves in fever and ophthalmities. |
| 39     | -           | <i>Zornia gibbosa</i>             | Roots given to children to induce sleep.                                                         |

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

**A. Mammals**

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

## B. List of Birds in Buldhana District, Maharashtra

(As per Bahar Nature Foundation Document)

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

| Sr. No                                                     | Common Name                   | Scientific Name                 | Marathi Name           |
|------------------------------------------------------------|-------------------------------|---------------------------------|------------------------|
| 22                                                         | Red-crested Pochard           | <i>Netta rufina</i>             | मोठी लालसरी            |
| 23                                                         | Common Pochard                | <i>Aythya ferina</i>            | लालसरी बदक             |
| 24                                                         | Tufted Duck                   | <i>Athya fuligula</i>           | शेंडी बदक              |
| <b>Order: PICIFORMES: Woodpeckers, Barbets</b>             |                               |                                 |                        |
| <b>Family: PICIDAE</b>                                     |                               |                                 |                        |
| 25                                                         | Yellow-crowned Woodpecker     | <i>Dendrocopos mahrattensis</i> | पिवळ्या मुकुटाचा सुतार |
| 26                                                         | Brown-capped pygmy Woodpecker | <i>Dendrocopos nanus</i>        | बुटका सुतार            |
| 27                                                         | Lesser Goldenback             | <i>Dinopium benghalense</i>     | छोटा सोनपाठी सुतार     |
| 28                                                         | White-naped Woodpecker        | <i>Chrysocolaptes festivus</i>  | पांढऱ्या मानेचा सुतार  |
| 29                                                         | Rufous Woodpecker             | <i>Micropternus brachyurus</i>  | तांबूस सुतार           |
| 30                                                         | Eurasian Wryneck              | <i>Jynx torquilla</i>           | मानमोडी                |
| <b>Family:MEGALAIMIDAE</b>                                 |                               |                                 |                        |
| 31                                                         | Coppersmith Barbet            | <i>Megalaima haemacephala</i>   | तांबट                  |
| <b>Order:BUCEROTIFORMES: Hornbills</b>                     |                               |                                 |                        |
| <b>Family:BUCEROTIDAE</b>                                  |                               |                                 |                        |
| 32                                                         | Indian Grey Hornbill          | <i>Ocyrceros birostris</i>      | राखी धनेश              |
| <b>Order:UPEPIFORMES: Hoopoes</b>                          |                               |                                 |                        |
| <b>Family:UPUPIDAE</b>                                     |                               |                                 |                        |
| 33                                                         | Common Hoopoe                 | <i>Upupa epops</i>              | हुदहुद                 |
| <b>Order:CORACIIFORMES: Rollers,Kingfishers,Bee-eaters</b> |                               |                                 |                        |
| <b>Family:CORACIIDAE</b>                                   |                               |                                 |                        |
| 34                                                         | Indian Roller                 | <i>Coracias benghalensis</i>    | भारतीय निलकंठ          |
| <b>Family:ALCEDINIDAE</b>                                  |                               |                                 |                        |
| 35                                                         | Common Kingfisher             | <i>Alcedo atthis</i>            | सामान्य ढिवर           |
| <b>Family:HALCYONIDAE</b>                                  |                               |                                 |                        |
| 36                                                         | White-throated Kingfisher     | <i>Halcyons myrnensis</i>       | पांढऱ्या छातीचा ढिवर   |
| 37                                                         | Stork-billed Kingfisher       | <i>Halcyon capensis</i>         | बलाकचोच ढिवर           |
| <b>Family:CERYLIDAE</b>                                    |                               |                                 |                        |
| 38                                                         | Pied Kingfisher               | <i>Ceryle rudis</i>             | कवड्या ढिवर            |

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| <b>Family:MEROPIDAE</b>             |                             |                                     |                       |
| 39                                  | Green Bee-eater             | <i>Merops orientalis</i>            | वेडा राघू             |
| 40                                  | Blue-tailed Bee-eater       | <i>Merops philippinus</i>           | निळ्या शेपटीचा राघू   |
| 41                                  | Chestnut-headed Bee-eater   | <i>Merops leschenaulti</i>          | बदामी डोक्याचा राघू   |
| <b>Order: CUCULIFORMES: Cuckoos</b> |                             |                                     |                       |
| <b>Family: CUCULIDAE</b>            |                             |                                     |                       |
| 42                                  | Pied Cuckoo/Jacobean Cuckoo | <i>Clamator jacobinus</i>           | चातक                  |
| 43                                  | Common Hawk Cuckoo          | <i>Hierococcyx varius</i>           | पावश्या               |
| 44                                  | Indian Cuckoo               | <i>Cuculus micropterus</i>          | भारतीय कोकीळ          |
| 45                                  | Grey-bellied Cuckoo         | <i>Cacomantis passerinus</i>        | कारूण्य कोकीळ         |
| 46                                  | Asian Koel                  | <i>Eudynamys scolopacea</i>         | कोकीळ                 |
| 47                                  | Sirkeer Malkoha             | <i>Phaenicophaeus leschenaultii</i> | लाल चोचीचा मुंगश्या   |
| <b>Family:CENTROPODIDAE</b>         |                             |                                     |                       |
| 48                                  | Southern Coucal             | <i>Centropus (sinensis) parroti</i> | भारद्वाज              |
| <b>Family:PSITTACIDAE</b>           |                             |                                     |                       |
| 49                                  | Alexandrine Parakeet        | <i>Psittacula eupatria</i>          | करण पोपट              |
| 50                                  | Rose-ringed Parakeet        | <i>Psittacula krameri</i>           | कंठवाला पोपट          |
| 51                                  | Plum-headed Parakeet        | <i>Psittacula cyanocephala</i>      | टोई पोपट              |
| <b>Order: APODIFORMES : Swifts</b>  |                             |                                     |                       |
| <b>Family:APODIDAE</b>              |                             |                                     |                       |
| 52                                  | White-rumped Spinetail      | <i>Zoonavena sylvatica</i>          | पांढऱ्या पाठीची आभोळी |
| 53                                  | Little Swift                | <i>Apus affinis</i>                 | घर पाकोळी             |
| 54                                  | Asian Palm Swift            | <i>Cypsiurus balasiensis</i>        | ताड पाकोळी            |
| <b>Family: HEMIPROCNIDAE</b>        |                             |                                     |                       |
| 55                                  | Crested Tree Swift          | <i>Hemiprocnae coronata</i>         | तुरेवाली पाकोळी       |
|                                     |                             |                                     |                       |

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| <b>Order: STRIGIFORMES : Owls, Nightjars</b> |                            |                                   |                           |
| <b>Family: TYTONIDAE</b>                     |                            |                                   |                           |
| 56                                           | Barn Owl                   | <i>Tyto alba</i>                  | गव्हाणी घुबड              |
| <b>Family: STRIGIDAE</b>                     |                            |                                   |                           |
| 57                                           | Indian Scops Owl           | <i>Otus bakkamoena</i>            | भारतीय पिंगळा घुबड        |
| 58                                           | Indian Eagle-Owl           | <i>Bubo bubo</i>                  | हुमा घुबड                 |
| 59                                           | Brown Fish-Owl             | <i>Ketupa zeylonensis</i>         | मासेमार घुबड              |
| 60                                           | Mottled Wood Owl           | <i>Strix ocellata</i>             | चट्टेरी वन घुबड           |
| 61                                           | Spotted Owlet              | <i>Athene brama</i>               | टिपकेदार पिंगळा           |
| <b>Family: CAPRIMULGIDAE</b>                 |                            |                                   |                           |
| 62                                           | Indian Nightjar            | <i>Caprimulgus asiaticus</i>      | भारतीय रातवा              |
| 63                                           | Savana Nightjar            | <i>Caprimulgus affinis</i>        | फ्रॅक्लीनचा रातवा         |
| <b>Order: COLUMBIFORMES : Pigeons</b>        |                            |                                   |                           |
| <b>Family: COLUMBIDAE</b>                    |                            |                                   |                           |
| 64                                           | Blue Rock Pigeon           | <i>Columbalivia</i>               | पारवा                     |
| 65                                           | Yellow-footed Green Pigeon | <i>Treronphoenicoptera</i>        | पिवळ्या पायाची हरियल      |
| 66                                           | Eurasian Collared -Dove    | <i>Streptopelia decaocto</i>      | कंठवाला होला              |
| 67                                           | Red Collared-Dove          | <i>Streptopelia tranquebarica</i> | लालपंखी होला              |
| 68                                           | Spotted Dove               | <i>Streptopelia chinensis</i>     | टिपकेदार होला             |
| 69                                           | Laughing Dove              | <i>Streptopelia senegalensis</i>  | छोटा तपकिरी होला          |
| <b>Order: GRUIFORMES : Cranes, Crakes</b>    |                            |                                   |                           |
| <b>Family: RALLIDAE</b>                      |                            |                                   |                           |
| 70                                           | Brown Crake                | <i>Amaurornis akool</i>           | तपकिरी फटाकडी             |
| 71                                           | Slaty-breasted Rail        | <i>Gallirallus striatus</i>       | निळ्या छातीची पाणकोंबडी   |
| 72                                           | White-breasted Waterhen    | <i>Amanrornis phoenicurus</i>     | पांढऱ्या छातीची पाणकोंबडी |
| 73                                           | Purple Swampen             | <i>Porphyrio porphyrio</i>        | जांभळी पाणकोंबडी          |
| 74                                           | Common Moorhen             | <i>Gallinula chloropus</i>        | काळी पाणकोंबडी            |
| 75                                           | Common Coot                | <i>Fulica atra</i>                | चांदी बदक                 |

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

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



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

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

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| 165                         | Small Minivet                | <i>Pericrocotus cinnamomeus</i>   | छोटा गोमेट                  |
| 166                         | Black Drongo                 | <i>Dicrurus macrocercus</i>       | कोतवाल                      |
| 167                         | Ashy Drongo                  | <i>Dicrurus leucophaeus</i>       | राखी कोतवाल                 |
| 168                         | White-bellied Drongo         | <i>Edolius caerulescens</i>       | पांढऱ्या पोटाचा कोतवाल      |
| 169                         | Greater Racket-tailed Drongo | <i>Dicrurus paradiseus</i>        | महाभृंगराज कोतवाल           |
| 170                         | White-throated Fantail       | <i>Rhipidura albicollis</i>       | पांढऱ्या कंठाची नाचण        |
| 171                         | White-browed Fantail         | <i>Rhipidura aureola</i>          | पांढऱ्या भुवईची नाचण        |
| 172                         | White-spotted Fantail        | <i>Rhipidura albogularis</i>      | पांढऱ्या टिपक्यांची नाचण    |
| 173                         | Indian Paradise-flycatcher   | <i>Terpsiphone paradisi</i>       | स्वर्गीय नर्तक              |
| 174                         | Common Iora                  | <i>Aegithina tiphia</i>           | सामान्य सुभग                |
| 175                         | Common Woodshrike            | <i>Tephrodormis pondicerianus</i> | रान खाटिक                   |
| 176                         | Black-headed Cuckooshrike    | <i>Coracina melanoptera</i>       | काळ्या डोक्याचा कोकीळ खाटिक |
| <b>Family: MUSCICAPIDAE</b> |                              |                                   |                             |
| 177                         | Blue Rock Thrush             | <i>Monticola solitarius</i>       | निल कस्तुर                  |
| 178                         | Orange-headed Thrush         | <i>Zoothera citrina</i>           | नारंगी डोक्याचा कस्तुर      |
| 179                         | Tickell's Blue Flycatcher    | <i>Cyornis tickelliae</i>         | टिकेलचा निळा मासेमार        |
| 180                         | Verditer Flycatcher          | <i>Eumyias thalassinus</i>        | निलांग मासेमार              |
| 181                         | Taiga Flycatcher             | <i>Ficedula albicilla</i>         | तैगा मासेमार                |
| 182                         | Black-naped Monarch          | <i>Hypothymis azurea</i>          | काळ्या मानेचा आकाशी मासेमार |
| 183                         | Bluethroat                   | <i>Luscinia svecica</i>           | शंकर                        |
| 184                         | Oriental Magpie Robin        | <i>Copsychus saularis</i>         | दयाळ                        |
| 185                         | Indian Robin                 | <i>Saxicoloides fulicatus</i>     | चिरक                        |
| 186                         | Black Redstart               | <i>Phoenicurus ochruros</i>       | काळा थिरथिरा                |
| 187                         | Common stone chat            | <i>Saxicola torquata</i>          | सामान्य गप्पीदास            |
| 188                         | Pied Bush Chat               | <i>Saxicola caprata</i>           | कवड्या गप्पीदास             |
| 189                         | Brown Rock Chat              | <i>Cercomela fusca</i>            | तपकिरी गप्पीदास             |

| Sr. No                      | Common Name               | Scientific Name                | Marathi Name           |
|-----------------------------|---------------------------|--------------------------------|------------------------|
| <b>Family: STURNIDAE</b>    |                           |                                |                        |
| 190                         | Chestnut-tailed Starling  | <i>Sturnia malabaricus</i>     | बदामी शेषटीची मैना     |
| 191                         | Brahminy Starling         | <i>Sturnia pagodarum</i>       | भांगपाडी मैना          |
| 192                         | Rosy starling             | <i>Pastor roseus</i>           | गुलाबी मैना            |
| 193                         | Asian Pied Starling       | <i>Gracupica contra</i>        | कवडी मैना              |
| 194                         | Common Myna               | <i>Acridotheres tristis</i>    | साळुंकी                |
| <b>Family: PARIDAE</b>      |                           |                                |                        |
| 195                         | Great Tit                 | <i>Parus major</i>             | मोठा रामगंगा           |
| <b>Family: DICAEDIDAE</b>   |                           |                                |                        |
| 196                         | Thick billed Flowerpecker | <i>Dicaeum agile</i>           | जाड चोचीचा फुलटोच्या   |
| <b>Family: HIRUNDINIDAE</b> |                           |                                |                        |
| 197                         | Dusky Crag Martin         | <i>Hirundo concolor</i>        | धुसर पंकोळी            |
| 198                         | Barn Swallow              | <i>Hirundo rustica</i>         | माळ भिंगरी             |
| 199                         | Wire-tailed Swallow       | <i>Hirundo smithii</i>         | तार-शेषटी भिंगरी       |
| 200                         | Red-rumped Swallow        | <i>Cecropis daurica</i>        | लालपाटी भिंगरी         |
| 201                         | Streak-throated Swallow   | <i>Petrochelidon fluvicola</i> | रेशाळ कंठी भिंगरी      |
| <b>Family: PYCNONOTIDAE</b> |                           |                                |                        |
| 202                         | Red Vented Bulbul         | <i>Pycnonotus cafer</i>        | लाल बुड्या बुलबुल      |
| 203                         | White-browed Bulbul       | <i>Pycnonotus luteolus</i>     | पांढऱ्या भुवईचा बुलबुल |
| <b>Family: CISTICOLIDAE</b> |                           |                                |                        |
| 204                         | Zitting Cisticola         | <i>Cisticola juncidis</i>      | रेषाळ वटवट्या          |
| 205                         | Ashy Prinia               | <i>Prinia socialis</i>         | राखी वटवट्या           |
| 206                         | Plain Prinia              | <i>Prinia inornata</i>         | वटवट्या                |
| 207                         | Grey Breasted Prinia      | <i>Prinia hodgsonii</i>        | राखी छातीचा वटवट्या    |
| 208                         | Jungle Prinia             | <i>Prinia sylvatica</i>        | रान वटवट्या            |
| <b>Family: ZOSTEROPIDAE</b> |                           |                                |                        |
| 209                         | Oriental White-eye        | <i>Zosterops palpebrosus</i>   | चश्मेवाला              |
| <b>Family: SYLVIIDAE</b>    |                           |                                |                        |
| 210                         | Blyth's Reed Warbler      | <i>Acrocephalus dumetorum</i>  | ब्लीथचा बोरू वटवट्या   |
| 211                         | Clamorous Reed Warbler    | <i>Acrocephalus stentoreus</i> | बडबड्या बोरू वटवट्या   |

| Sr. No                     | Common Name               | Scientific Name                  | Marathi Name                  |
|----------------------------|---------------------------|----------------------------------|-------------------------------|
| 212                        | Booted Warbler            | <i>Hippolais caligata</i>        | पायमोज वटवट्या                |
| 213                        | Greenish Warbler          | <i>Phylloscopus trochiloides</i> | हिवट पर्णवटवट्या              |
| 214                        | Sulpher-bellied Warbler   | <i>Phylloscopus griseolus</i>    | पिवळ्या पोटाचा वटवट्या        |
| 215                        | Common Chieffchaf         | <i>Phylloscopus Callybita</i>    | चिपचिप                        |
| 216                        | Lesser Whitethroat        | <i>Sylvia curruca</i>            | पांढऱ्या गळ्याचा छोटा वटवट्या |
| 217                        | Common Tailor Bird        | <i>Orthobomus sutorius</i>       | शिंपी                         |
| 218                        | Yellow-eyed Babbler       | <i>Chrysomma sinense</i>         | पिवळ्या डोक्याचा सातभाई       |
| 219                        | Common Babbler            | <i>Turdoides caudatus</i>        | सामान्य सातभाई                |
| 220                        | Large Grey Babbler        | <i>Turdoides malcolmi</i>        | राखी सातभाई                   |
| 221                        | Jungle Babbler            | <i>Turdoides striatus</i>        | जंगली सातभाई                  |
| 222                        | Tawny-bellied-Babbler     | <i>Dumetia hyperythra</i>        | पिंगट पोटाचा सातभाई           |
| <b>Family:ALAUDIDAE</b>    |                           |                                  |                               |
| 223                        | Indian Bushlark           | <i>Mirafra erythroptera</i>      | भारतीय चंडोल                  |
| 224                        | Singing Bushlark          | <i>Mirafra cantillanus</i>       | गायक चंडोल                    |
| 225                        | Ashy-crowned Sparrow Lark | <i>Eremopterix grisea</i>        | डोंबारी                       |
| 226                        | Rufous-tailed Lark        | <i>Ammomanes phoenicurus</i>     | तांबूस शेपटीचा चंडोल          |
| 227                        | Sykes's Lark              | <i>Galerida deva</i>             | साईक्सचा चंडोल                |
| 228                        | Crested Lark              | <i>Galerida cristata</i>         | तुरेवाला चंडोल                |
| 229                        | Oriental Skylark          | <i>Alauda gulgula</i>            | गुलगुला चंडोल                 |
| <b>Family:NECTARINIDAE</b> |                           |                                  |                               |
| 230                        | Purple-rumped Sunbird     | <i>Leptocoma zeylonica</i>       | जांभळ्या पाठीचा सुर्यपक्षी    |
| 231                        | Purple Sunbird            | <i>Cinnyris asiatica</i>         | जांभळा सुर्यपक्षी             |
| <b>Family:PASSERIDAE</b>   |                           |                                  |                               |
| 232                        | White Wagtail             | <i>Motacilla alba</i>            | पांढरा धोबी                   |
| 233                        | White browed Wagtail      | <i>Motacilla maderaspatensis</i> | कवड्या धोबी                   |

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

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

| Sr. No. | Common Name        | Zoological Name            |
|---------|--------------------|----------------------------|
| 1.      | Purple wood pigeon | <i>Columba punices</i>     |
| 2.      | Common Crane       | <i>Gru sgrus</i>           |
| 3.      | Sarus crane        | <i>Grus antigone</i>       |
| 4.      | Brown wood Owl     | <i>Strix leptogrammica</i> |

## IUCN Listed Threatened Birds from Buldhana District

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

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

## C - Reptiles of Buldhana District

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



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

1) Preliminary Survey of Reptile Fauna of Vidhabha Region, Maharashtra, (Central India)

Presented By: Parag Dandge & Ashish Tiple.

2) The 8<sup>th</sup> Indian Symposium of Odonatology & Biodiversity 2014 Nagpur.

## **D. OTHERS**

### **List of Algae, Fungi, Bryophytes, pteridophytes found in Buldhana Forest Division**

| Sr.No. | Species                                                                                                                                            |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <b>Algae</b> – Spirogyra, Chara, Oedogonium, Hydrodictyon, Mougotia, Oscillatoria, Nostoc, Naviculla, Scenedesmus, Cosmarium, Pinularia, Cymbella. |
| 2      | <b>Fungi</b> – Aspergillus, Chaetomium, Penicillium, Mucor, Rhizopus, Fusarium, Alternaria, Pyricularia, Curvularia, Helminthosporium.             |
| 3      | <b>Bryophytes</b> – Riccia, Notothallus                                                                                                            |
| 4      | <b>Pteridophytes</b> – Pteris, Nephrolepis, Azolla, Lsoetes.                                                                                       |

**Part- I**

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

## CHAPTER - 1

### THE TRACT DEALT WITH

#### 1.1. NAME AND SITUATION:

##### 1.1.1. LOCATION:

*Buldhana* Forest Division is confined to *Buldhana* district of *Maharashtra* State and administratively it is under *Amravati* Forest Circle since 1.5.1999. Earlier *Buldhana* Division was under administrative control of *Yavatmal* Forest Circle. *Buldhana* Forest Division situated between latitude 20°13' to 21°32' North and Longitude 78° 49' to 75° 75' East.

##### 1.1.2. BOUNDARIES:

The District of Budhana is surrounded by Burhanpur District of Madhya Pradesh in the North; Akola, Washim, and Amravati districts on the East; Parbhani and Jalna districts on the South and Jalgaon and Aurangabad districts on the west.

##### 1.1.3. AREA:

The Forest area of *Buldhana* Forest Division is 808.17 sq. km., out of this 801.65 sq. km is Reserve Forest, 6.24 sq. km. is Protected Forest and 0.27 sq. km. is Un-classed Forest. The forest area of about 3367.09 ha is transferred to Wild life.

**TABLE NO.1.1**  
**TABLE SHOWING COMPARISON OF AREA UNDER PREVIOUS PLAN AND NEW PLAN**  
**(AREA IN HA)**

| <b>Sr. No.</b> | <b>Forest Category</b> | <b>Previous Plan Area</b> | <b>New Plan Area</b> |
|----------------|------------------------|---------------------------|----------------------|
| 1              | Reserved Forests       | 75684.48                  | 80165.47             |
| 2              | Protected Forests      | 7765.11                   | 623.750              |
| 3              | Un-classed Forests     | 349.47                    | 27.355               |
| <b>Total</b>   |                        | <b>83799.06</b>           | <b>80816.575</b>     |

**TABLE SHOWING DIFFERENCE IN AREA OF PREVIOUS WP AND NEW WP**  
**TABLE NO. 1.2**

| <b>Sr. No.</b>                         | <b>Item</b>                                                | <b>(AREA IN HA.)</b> |
|----------------------------------------|------------------------------------------------------------|----------------------|
|                                        |                                                            | <b>Area in Ha.</b>   |
| 1                                      | Area as per Previous Working Plan                          | 83799.06             |
| 2                                      | Excess Area in Previous Working Plan (Exclude)             | (-) 71.82            |
| 3                                      | Excess Area of Kuwardeo & Bhingara                         | (+)230.65            |
| 4                                      | In Compt. No 644 Area should be 392.95 Against area 393.10 | (+)0.15              |
| 5                                      | C.A. Land Received                                         | (+)225.625           |
| 6                                      | Area Transfer to Wildlife Division. (Unified Control)      | (-) 3367.09          |
| <b>Area Dealt For New Working Plan</b> |                                                            | <b>80816.575</b>     |

**TABLE SHOWING AREA OF NEW WORKING PLAN**  
**TABLE NO. 1.3.1**

| <b>Sr. No.</b> | <b>Range</b>  | <b>Round</b> | <b>Beat</b> | <b>No.Of Comp.</b> | <b>Area in Ha.</b>    |                |               |                  |
|----------------|---------------|--------------|-------------|--------------------|-----------------------|----------------|---------------|------------------|
|                |               |              |             |                    | <b>Reserve Forest</b> | <b>PF</b>      | <b>UF</b>     | <b>Total</b>     |
| 1              | Jalgaon Jamod | 3            | 18          | 99                 | 13335.340             | 230.650        | 22.475        | 13588.465        |
| 2              | Khamgaon      | 5            | 18          | 100                | 16559.790             | 393.100        | 0             | 16952.890        |
| 3              | Motala        | 3            | 11          | 66                 | 10538.550             | 0              | 0             | 10538.550        |
| 4              | Buldana       | 5            | 20          | 62                 | 14282.810             | 0              | 0             | 14282.810        |
| 5              | Ghatbori      | 2            | 8           | 43                 | 13024.680             | 0              | 4.88          | 13029.560        |
| 6              | Mehkar        | 2            | 5           | 25                 | 4206.960              | 0              | 0             | 4206.960         |
| 7              | Deulgaon Raja | 3            | 16          | 49                 | 8217.340              | 0              | 0             | 8217.340         |
| <b>Total:-</b> |               | <b>23</b>    | <b>96</b>   | <b>444</b>         | <b>80165.470</b>      | <b>623.750</b> | <b>27.355</b> | <b>80816.575</b> |

The details of area transferred to Wild life Division are given in **Appendix No. IV** of Volume II.

**1.1.4.** The area of Buldhana district is 9661 sq. km. The forest area of Buldhana Division is approximately 8.37 % of geographical area of the District, whereas total forest area is approximately 12.16% of geographical area of the District.

**TABLE NO.1.3.2**  
**TABLE SHOWING % OF FOREST AREA WITH RESPECT TO GEOGRAPHICAL AREA**

| <b>Division/<br/>Sanctuary</b> | <b>Forest area in<br/>Sq. Km.</b> | <b>Geographical<br/>area of District in<br/>Sq. Km.</b> | <b>Forest area as %<br/>of geographical<br/>area</b> |
|--------------------------------|-----------------------------------|---------------------------------------------------------|------------------------------------------------------|
| Buldhana Division              | 808.16                            | 9661.00                                                 | 8.37                                                 |
| Lonar WLS                      | 3.65                              |                                                         | 0.04                                                 |
| Dnyanganga WLS                 | 203.56                            |                                                         | 2.11                                                 |
| Ambabarwa WLS                  | 158.40                            |                                                         | 1.64                                                 |
| <b>Total</b>                   | <b>1173.77</b>                    | <b>9661.00</b>                                          | <b>12.16</b>                                         |

## **1.2. CONFIGURATION OF THE GROUND:**

**1.2.1.** The Division is the parts of *Ajanta* System towards South & *Satpudas* in the North. The *Balaghat* plateau situated on the *Ajanta* hills covers the southern half of the *Buldhana* Forest division. The terrain is undulating & hilly and comprises part of *Satpuda* plateau at different level with fairly steep slopes in between. *Chikhli* and *Buldhana* are important plateau. The average elevation of this plateau in Division is about 610 m and highest point is 737 m above M.S.L. 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* river known as *Payanghat* extends north of *Balaghat* Plateau; this covers the greater part of the northern half of the Division. The country is quite monotonous with undulations just enough to maintain a natural system of drainage.

**1.2.3.** Towards north of *Paynghat* is the third and the last natural feature, the ranges of *Satpuda* hills. They are popularly known as *Melghat*. Only a small part of these hills fall in *Buldhana* District.

## **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 entire Division belongs to the cretaceous period, when sheets of semi-molten trap broke through the cretaceous strata, and is found in this area in more or less 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 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 hill-sides, to black cotton soil in valleys and depressions, and on some plateau. The reddish sandy loam of varying consistency interbedded 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 particular 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 foot-hold for a 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 the 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 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 *Buldhana* district in general is dry & hot, but *Buldhana* town is pleasantly situated at an elevation of 667 m above sea level on the *Balaghat* plateau and has moderate climate. The maximum and minimum temperature recorded in *Buldhana* District is 42.20°C and 10.00°C respectively. Heat is intense over *Khamgaon*, *Malkapur* and *Jalgaon* Talukas of the *Payanghat* region, while it is less so over *Chikhali* and *Mehkar* Talukas situated over *Balaghat* plateau.

The winter in the Division is moderate. The average daily mean temperature rarely goes below 4.4 °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 beginning of March to the end of June, hottest months being May and June. In general it is hotter over the *Payanghat* than on the *Balaghat*.

**1.4.2. Rainfall:** The average annual rainfall in the District varies from 565 mm to 1020 mm. The bulk of the rainfall is received from the South-West monsoons, which usually break in the latter half of the June, continues for nearly three months and usually ends in the latter half of the September. The year wise rainfall data for the period from 2010 to 2018 is shown in **Appendix No. I** of Volume II gives *Tahsil* wise rainfall data of *Buldhana* District.

**1.4.3. Humidity:** The relative humidity is between 25 % and 30 % in the afternoon in the summer season which is driest part of the year.

#### **1.5. WATER SUPPLY:**

**1.5.1.** The tract is drained by three main rivers namely, the *Purna*, the *Penganga* & the *Kate-Purna* on the Lower-*Purna*. The *Purna* which rises near *Bhaisdehi*, *Betul* district of M.P. flows due West across *Amravati* and *Akola* district in to *Buldhana*. The *Balaghat* plateau is drained north-wards by the *Nalganga*, the *Biswa* ; and the *Gyan* in *Buldhana* district. The *Penganga* which rises in the hills



near *Daulghat* runs in south-eastern direction past *Mehkar* and then enters *Washim* district forming its southern boundary. The chief tributaries of the *Penganga* are the *Aran*; the *Arnaoti* and the *Pus*. The *Kate* or Lower *Purna* rises in the *Ajanta* hills to the West of *Buldhana* district and runs through them paralleled to and south of the *Penganga*. The *Penganga* and the 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 fresh water 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 rivers alluvium, but the major part of the alluvial portion of the district is generally free from it.

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## CHAPTER 2

### MAINTAINANCE / 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 Buldhana Forest Division is 841.83 sq km .Out of this, 33.67 Sq. Km is handed over to Wildlife wing. Hence, net area incharge of Buldhana forest division is 808.16 Sq. Km. This Working Plan covers management prescriptions for 808.16 Sq. Km.

**TABLE NO.2.1.**

| Sr. No.      | Range         | Round     | Beat      | No.Of Comp. | Area in Ha.      |                |               |                  |
|--------------|---------------|-----------|-----------|-------------|------------------|----------------|---------------|------------------|
|              |               |           |           |             | Reserve Forest   | PF             | UF            | Total            |
| 1            | Jalgaon Jamod | 3         | 18        | 99          | 13335.340        | 230.650        | 22.475        | 13588.465        |
| 2            | Khamgaon      | 5         | 18        | 100         | 16559.790        | 393.100        | 0             | 16952.890        |
| 3            | Motala        | 3         | 11        | 66          | 10538.550        | 0              | 0             | 10538.550        |
| 4            | Buldana       | 5         | 20        | 62          | 14282.810        | 0              | 0             | 14282.810        |
| 5            | Ghatbori      | 2         | 8         | 43          | 13024.680        | 0              | 4.88          | 13029.560        |
| 6            | Mehkar        | 2         | 5         | 25          | 4206.960         | 0              | 0             | 4206.960         |
| 7            | Deulgaon Raja | 3         | 16        | 49          | 8217.340         | 0              | 0             | 8217.340         |
| <b>Total</b> |               | <b>23</b> | <b>96</b> | <b>444</b>  | <b>80165.470</b> | <b>623.750</b> | <b>27.355</b> | <b>80816.575</b> |

#### 2.1.2: ADMINISTRATIVE UNITS:

For administrative convenience, the ranges, rounds and beats were reorganised in year 2018-19 and the entire division has been divided into Ranges, 23 Rounds and 96 Beats.

#### 2.1.3 LEGAL POSITION

##### RESERVED FOREST

The reserves were originally constituted between 1891 to 1900. These reserves and the remaining blocks of reserves were declared as “State Forest, Class A, Division II” by notifications issued under rule 8 of the *Berar* Forest Rules of 1871 or section 40 © of the *Berar* Forest Law of 1886, as amended by the *Berar*

Forest Law Amendment Law of 1891, as shown below. The C class Reserved Forests have been declared in the year 1892 and 1894.

The forests of villages Chichkhed (301.57 ha) and Itkhed (108.66 ha) are declared as A class Reserved Forest under section 20 of IFA, 1927 vide Notification No. FLD-4158-12671-Y dated 2<sup>nd</sup> June 1964.

### **PROTECTED FOREST**

The area of **9526.18ha** Ex-Jagir Forests declared as Protected Forest under Section 29 of Indian Forest Act, 1927 vide Notification No. 3065 -2171-XI dated 4<sup>th</sup> June 1955 .The PF of Ada-Andhari belongs to Jalna district and the same have been transferred to Buldhana Division for management vide letter no. FDS-1357/138109/J dated 15-11-1957.The copy of notification or said letter is not available.

Protected Forest area of 6836.08 ha notified under section 4, IFA 1927 in which 6529.65 ha area was declared as Reserved Forest under Section 20 of Indian Forest Act, 1927 vide Notification No. Dy.com-Restt-L-R-3-WS-13-2016 Dated 8<sup>th</sup> February 2016.

**NOTE:** In the above notification, the **230.65 ha** area of Protected Forest which was notified under section 4 of Indian Forest Act, 1927, but not declared as RF under Section 20, Indian Forest Act, 1927. The area of **230.65 ha.** was left out by Forest settlement officer due to ambiguity. Further, these forests are unsurveyed block Forests and prone to encroachments. **Hence, these areas must be got surveyed on priority basis.** A special program for survey and demarcation of the area should be conducted is given in **Appendix No. XLII** of Volume II.

The area of **393.1 ha** Ex-Jagir Forests declared as Protected Forest under Section 29 of Indian Forest Act, 1927 vide Notification No. 3065 -2171-XI dated 4<sup>th</sup> June 1955, still the status remain as **Protected Forest.**

The **1148.425 ha** area has been received as Compensatory lands (The details given in **Appendix No. VII** of Vol. II) , out of which **1121.07 ha** has been declared as Reserved Forest under section 20 of IFA 1927. The Un-classed area to the extent **27.355 ha** is yet to be declared as RF or PF under IFA, 1927.

The **225.625 ha** area has been received as Compensatory lands (The details given in **Appendix No. VII** of Vol. II) , out of which **203.15 ha** has been declared as Reserved Forest under section 20 of IFA 1927. The Un-classed area to the extent **22.475 ha** is yet to be declared as RF or PF under IFA, 1927.

List of notifications of Reserved Forest / Protected Forest and also village wise area of Unclassed Forests is given in **Appendix No. VI** of Volume II.

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

### **2.2.2. RIGHT AND CONCESSIONS:**

#### **RESERVED FOREST**

There are no rights in the Reserved Forest except right to way and access to water. There is no commutation of *nistar or paidawar* in the Buldhana Forest Division. Various concessions have been granted from time to time to the agriculturists and other 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. In order 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 tables.

### **AREA ALLOCATION TO DIFFERENT WORKING CIRCLES**

**TABLE NO. 2.2**

| <b>Sr.No.</b> | <b>Proposed Working Circles</b> | <b>Area (ha.)</b> | <b>Percentage</b> |
|---------------|---------------------------------|-------------------|-------------------|
| 1             | Improvement Working Circle      | 44070.375         | 54.53%            |
| 2             | Pasture Working Circle          | 29884.760         | 36.98%            |
| 3             | Protection Working Circle       | 6861.440          | 8.49%             |
| 4             | NTFP Chapter                    | ---               | Entire area       |
| 5             | JFM Chapter                     | ---               | Entire area       |
| 6             | Wildlife Management Chapter     | ---               | Entire area       |
| 7             | Forest Protection Chapter       | ---               | Entire area       |
| <b>Total</b>  |                                 | <b>80816.575</b>  | <b>100%</b>       |

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

**RANGE-WISE AREA ALLOCATION OF DIFFERENT WORKING CIRCLES**  
**TABLE NO.2.3**

| Sr.No.             | Range         | Improvement WC   | Pasture WC       | Protection WC   | Total            |
|--------------------|---------------|------------------|------------------|-----------------|------------------|
| 1                  | Jalgaon Jamod | 6525.515         | 201.51           | 6861.44         | <b>13588.465</b> |
| 2                  | Khamgaon      | 7316.62          | 9636.27          | 0               | <b>16952.890</b> |
| 3                  | Motala        | 5631.20          | 4907.35          | 0               | <b>10538.550</b> |
| 4                  | Buldhana      | 9836.27          | 4446.54          | 0               | <b>14282.810</b> |
| 5                  | Ghatbori      | 11097.41         | 1932.15          | 0               | <b>13029.560</b> |
| 6                  | Mehkar        | 1765.20          | 2441.76          | 0               | <b>4206.960</b>  |
| 7                  | Deulgaon Raja | 1898.16          | 6319.180         | 0               | <b>8217.340</b>  |
| <b>Grand Total</b> |               | <b>44070.375</b> | <b>29884.760</b> | <b>6861.440</b> | <b>80816.575</b> |

## **2.3: PERCENTAGE OF FOREST WITH SECURED BOUNDARIES**

### **STATE OF BOUNDARIES:**

The total length of the external boundary lines of the Reserved Forests and Protected Forest of *Buldhana* Division is 1158.43 Km, out of which 346.87 km. are natural features such as rivers, streams, ridges. The length of the Internal Boundary lines are 2446.69 Km., of which 97.02 Km. are natural features. The external boundary along the State *Madhya Pradesh* is clearly demarcated with 13 meters (40') wide cleared lines with serially numbered pillars of wooden posts embedded in cairn of stones. Ex-*Jagir* forests are not demarcated on ground. New RFs and PFs which are received as compensatory land are demarcated on ground. Since the reserves are spread over different divisions, it would be more appropriate to have demarcated boundaries along Range, Round and Beats. The demarcation was done by pillars. A statement showing the extent of natural and artificial boundaries is given in **Appendix XI**.

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

The total geographical area of the District is 9661 sq. km. of which 80.51 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:

**FOREST COVER OVER THE LAST DECADE DURING THE IMPLEMENTATION OF THE PLAN**

**TABLE NO. 2.4:**

| SFR Year | Geographical area in sq.km. | Very dense area | Mod. dense area | Open forest | Total | % of G.A. | Scrub |
|----------|-----------------------------|-----------------|-----------------|-------------|-------|-----------|-------|
| 2015     | 9661                        | 23              | 137             | 430         | 590   | 6.11      | 163   |
| 2017     | 9661                        | 25              | 144             | 426         | 595   | 6.16      | 162   |

There is a decrease in the open forest in the District but overall there is an increase of the forest area by **5 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.

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.

**2.4.1: DISFORESTATION PRIOR TO 1980**

In this division, the total area disforested is 1159.47 ha. Details are given in **Appendix No. X**

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

The Government of India vide sanction letter No. F. No 8-148/2006-FC dated 12.11.2008 has approved in principle diversion of **1055.64 ha** of forest land for Jigaon Major Irrigation Project in Buldhana district. The Department has received 772.53 ha compensatory land in Yavatmal Division, 104.54 ha land in Akola Division and 178.57 ha land in Buldhana Division. Further, the Department has received **1148.42 ha** compensatory land for various projects. These lands are notified under RF.

The total area of **27.41 ha.** forest land diverted for non forestry purposes in last 10 years in the division.

The total area of **225.625 ha.** has received as compensatory land in last 10 years in the Division.

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

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

The details of area “identified forests” as per Supreme Court’s order is given in **Appendix No. IX** of Volume II.

### **2.4.3: AREAS DIVERTED FOR NON- FORESTRY PURPOSES UNDER FOREST RIGHT ACT, 2006**

Under Section 3(2) of FRA, 20.11 ha involving 50 cases has been diverted for Non-forestry purposes. The status of Implementation of FRA 2006 in Buldhana Forest Division (up to March, 2020) is as below:

#### **THE STATUS OF IMPLEMENTATION OF FRA 2006 IN BULDHANA FOREST DIVISION**

**TABLE NO. 2.4.1**

| 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    | 1435                                | 773                                 | 689                           | 417                          | 266                                  | 0                                        |
| Community     | 233                                 | 0                                   | 233                           | 5                            | 225                                  | 31                                       |
| Total         | <b>1668</b>                         | <b>773</b>                          | <b>922</b>                    | <b>422</b>                   | <b>491</b>                           | <b>31</b>                                |

This diversion of forest land to the traditional forest dwellers has further fragmented the area of the Division. The details are given in the **Appendix No. XIII (E), (F), (G)**. In this, 266 cases of individual claims distributed cover an area of 761.29 ha and the 225 claims of community rights cover an area of 21,087.54 ha.

### **2.5: THREATS TO THE FOREST**

The main threat to the maintenance of forest cover/area in the Division is encroachment and grazing.

### **2.6. DISTRIBUTION OF DIFFERENT FOREST TYPES.**

The majority of the important forests is 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 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 *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.

For management purpose the following local types can be distinguished:-

**TABLE NO. 2.5: FOREST TYPE OF BULDHANA FOREST DIVISION**

| Type | Notation | Type description           |
|------|----------|----------------------------|
| I    | 5A/C1    | Dry Teak Forests           |
| II   | 5A/C3    | Open Mixed Forests         |
| III  | 5A/E2    | Salai Forests              |
| VI   | 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 9661 sq. km. of which 80.51 sq. km. is forest. The Plantation/ Tree outside Forests (TOF) for State of Maharashtra according to the State of Forest Report 2015 is 1,232.17 sq kms adding 2.38% to the forest cover of the State. However no specific figure for the District is available.

The tree outside forests in the state of Maharashtra has not been assessed yet as per the requirement of the Code and 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 the assessment of the success and survival of these plantations in 2015 and the results are very encouraging.

### **TREES OUTSIDE FORESTS PLANTED UNDER SOCIAL FORESTRY BULDHANA DIVISION DURING THE PERIOD 2008 TO 2018**

Between 2008 to 2018, the Social Forestry Buldhana Division carried out Block plantation for a total of 178 beneficiaries and planted 317 ha. Area. The total number of seedlings planted were 1.43 lakhs of which the total number of seedlings surviving at the time of handing over the scheme was 8.20. During this

period, road side plantation of length of 1894 k.m. with 15.66 lakhs planted seedlings was carried out of which the total of 12.57 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 be arrived.

#### **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 **225.625 ha.** has received for 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 Improvement working circle, then CA land allotted to IWC.

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## CHAPTER 3

### MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

#### 3.1. FOREST COMPOSITION AND DISTRIBUTION

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 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 *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.

**3.1.1 DRY “TEAK” BEARING FORESTS:** These Forest in general are composed of a mixture of mostly deciduous species having Teak in high proportion which ranges up to 80 % in some patches. These form the most important common type and include the remainder Teak Forest. They are found in dry exposed localities where the layers of soil are superficial, soil moisture is low, grazing is heavy and fires are frequent. The site quality is generally IV. *Ghatbori* and *Meljanori* are the two main reserves containing these types of forests. *Teak* occurs in gregarious patches forming up to 60 to 80 % of the over wood. It is spreading rapidly into the mixed miscellaneous under stocked patches and is coming up well under *Salai* trees. Where *Teak* finally disappears, *Salai* is dominant in the crop. On exposed spur *Dhaora* (*Anogeissus latifolia*) comes under *Salai* (*Boswellia serrata*) and in less exposed places *Teak* (*Tectona grandis*). On many sites of old cultivation, *Palas* (*Butea monosperma*), *Saja* or *Ain* (*Terminalia tomentosa*), *Lendia* (*Lagerstromia parviflora*) and some thorny species are the first to appear, but they

seem to form only a temporary stage and *Teak* follows rapidly. The seedling regeneration of *Teak* is adequate on lower gently sloping grounds while it decreases along the steeper upper slopes and is sparse on hill tops. *Teak* reproduction of coppice origin is adequate over the major portion of the *Teak* bearing areas. The main reason for the occurrence of the pure crops of *Teak* or its preponderance lies in the inherent quality of *Teak* to withstand the damaging effects of grazing and fire to much greater extent than its usual associates. Common associates of *Teak* are *Salai* (*Boswellia serrata*), *Dhaora* (*Anogeissus latifolia*), *Aola* (*Emblica officinalis*), *Palas* (*Butea monosperma*), *Bor* (*Zizyphus jujuba*), *Ghot* (*Zizyphus xylopyra*), *Ain* (*Terminalia tomentosa*), *Ahl* (*Morinda tinctoria*), *Jamrasi* (*Cassine glauca*), *Khair* (*Acacia catechu*), *Hiwar* (*Acacia leucophloea*), *Achar* or *Charoli* (*Buchanania lanzan*), *Tendu* (*Diospyros melanoxylon*), *Amaltas* (*Cassia fistula*), *Kalam* (*Mitragyna parviflora*), *Moha* (*Madhuca latifolia*), *Movai* (*Lannia grandis*), and *Behada* (*Terminalia bellarica*), *Anjan* (*Hardwickia binata*), is common along most of the nalas and streams. Other less common associates are *Bija* (*Pterocarpus marsupium*), *Tiwas* (*Ougenia oojinesis*), *Dhaman* (*Grewia tiliaefolia*), *Mokha* (*Schrebera switeniodes*), *Kulu* (*Sterculia urens*), *Kusum* (*Schleichera oleosa*). Reproduction of *Teak* is often quite good and among other species *Dhawda*, *Lendia*, *Tendu*, *Ain*, regenerate reasonably. *Teak* and most other species coppices well. Under growth is not dense, except in moist valleys or along nala banks where *Nirgudi* (*Vitex negundo*), *Murad sheng* (*Helecteres isora*), and *Bhander* (*Colebrookia oppositifolia*), *Bharati* (*Gymposporia montana*) are found in dense patches. In dry localities *Bharati* (*Gymnosporia montana*), *Chilati* (*Mimosa hamata*), stunted *Khair* (*Acacia catechu*), occurs and at very few places *Lantana* (*Lantana camara*), and *Parijatak* (*Nyctanthes arbortristis*) are found.

The principal grasses are *Sheda* (*Sehima nervosum*), *Ghonal* (*Themada triandra*), *Kusal* (*Heteropogan contortis*), *Rusa* (*Cymbopogan martini*), and *Bhurbhusi* (*Eragrotis tenella*).

Climbers are not very common except along nala and streams. The more common climbers are *Chilatichoti* (*Acacia pennata*), *Malkangani* (*Celastrus paniculata*), *Piwarbel* (*Combratum ovalifolia*), *Nagbel* (*Cryptolepis buchanani*), *Dudhi* (*Hemidesmus indicus*), *Dhimarbel* (*Ichnocarpus prutescens*), *Mahul* (*Bauhinia vahlii*), *Ironi* (*Zizyphus oenopla*).

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. The major part of the forests has been worked under coppice with standards or Coppice-with-Reserves system in the past.

**3.1.2. ANJAN FORESTS:** These forests occur extensively, in portions of *Amdari*, *Geru-Matergaon*, *Ghatbori* reserves on *Balaghat* and *Raipur* reserve on the *Gawilgarh* hills. The areas covered by Anjan Forests are mostly open. The quality of the crop in majority of portion is poor i.e. IV or below IV. *Anjan* (*Hardwickia binata*) of all sizes forms about 60 percent of the crop. Patches of mixed crop of site quality IV and similar enclaves with *Teak* predomination occur along nala beds. This type on its outer fringes gradually merges into site quality IV *Teak* or Mixed Forests. *Anjan* being a good fodder species is hacked and pollarded and forests do not give a very healthy appearance. Mature trees are mostly malformed while young trees are stunted. On the hill slopes and plateau the trees rarely attains a height greater than 8 meter and girth at breast height more than 90 cm.

Well stocked areas with better quality crop with trees exceeding 10 m in height and 90 cm in girth are met in the valleys with better type of soil. The greater part of these forests is far from adequately stocked. The selection type of forest with an admixture of middle age classes predominates.

The main associates of *Anjan* are *Dhawda* (*Anogeissus latifolia*), *Tendu* (*Diospyros melanoxylon*), *Khair* (*Acacia catechu*), *Kulu* (*Sterculia urens*), *Salai* (*Boswellia serrata*), *Lendia* (*Lagerstromia parviflora*), *Ain* (*Terminalia alata*), etc.

The under growth is composed of *Chilati* (*Mimosa hamata*), *Bharati* (*Gymnosporia montana*) and *Nirgudi* (*Vitex negundo*). *Sheda* (*Sehima nurvosum*), *Kusal* (*Heteropogan contortis*), and *Bhurbhusi* (*Eragrotis tenella*) are the main grasses. Climbers are mainly *Piwarbel* (*Combratum ovalifolia*) and *Chilati-cheti* (*Acacia pinnata*).

In most of the areas *Anjan* is not reproducing satisfactorily. *Teak* reproduction is plentiful in folds of the hills and along nala banks and it is probable that *Teak* may replace *Anjan* in such areas. Un-established *Anjan* regeneration is seen in small patches along nala banks and in remote areas but established regeneration occurs sparsely.

The areas under *Anjan* are heavily grazed and browsed and are badly hacked by graziers, thus killing back whatever reproduction comes up. For getting sufficient reproduction areas have to be well protected from grazing and fire.

The greater part of this type of forests has been very lightly worked or has remained un-worked in the past owing to the open condition of crop and poor reproduction.

**3.1.3. BABUL BAN NOW TURNED AS PROSOPIS BANS:** The title name Babul Bans no more remain relevant because now they are purely turned as *Prosopis* Bans. The majority of these forests are situated in the *Payanghats*. In the past these areas were well stocked with three main varieties of *Babul* viz. *Telia*, *Kauria* and *Ramkathi* and few other species like *Neem*, *Hiwar* and *Chandan*. But the recent enumeration carried out in these areas shows a completely different picture. The whole *Babul* crop is replaced by the new species called as *Prosopis juliflora*. This is exotic species native of African continent but now its appearance is global. This species is so hard and sturdy that it is almost impossible to eradicate. Its manual and even mechanical eradication is very costly. Even if it is eradicated successfully from the certain area, with small negligence, this species again occupies the same area very rapidly.

It is not known how this species appeared in this area. But most probably this species was planted as a hedge plant. Being a very sturdy species which tolerate droughts and fires and not palatable by sheeps and goats and coppices vigorously if cut. It spread out in the fertile areas of *Babul* Ban like a wild fire and *Babul* a very important species for the local people was completely invaded by *Prosopis*.

*Prosopis* is a good firewood species. Charcoal prepared from this species is known for its high calorific value. The thorny branches are used by the local people for temporary fencing. Subtracting all these uses it is a most undesirable species. Every body wants it to be replaced by some better species.

Regeneration of *Prosopis* is natural. It is a very good coppicer and most of the regeneration is of coppice origin.

Growth of *Prosopis* is good in deep black cotton soils (Regur) especially along water courses where moisture content is more. It grows so dense almost becoming impossible for other species to grow. Because of dark shade of *Prosopis*, even grasses do not come up profusely.

*Prosopis* forests occur almost pure. However following species are found in a scattered way:

**Tree species-** *Neem* (*Azadirachta indica*), *Hiwar* (*Acacia leucophoea*), *Chandan* (*Santalum album*), *Hinganbet* (*Balanites aegyptica*), *Babul* (*Acacia nilotica*). The under growth generally consists of *Chilati* (*Mimosa hamata*), *Bharati* (*Gymnosporia montana*), *Nirgudi* (*Vitex negundo*), *Tarwad* (*Cassia auriculata*), *Tarota* (*Cassia tora*), *Pachora* (*Capparis grandis*), *Yelati* (*Dichrostachys cinerea*), *Takal* (*Clerodendron phlomoides*)

The climbers are *Chilati-choli* (*Acacia pinnata*), *Gunj* (*Abrus precatorius*), *Ironi* (*Zizyphus ocnoplica*), *Piwarbel* (*Combratum decandrum*), *Vassan vel* (*Cocculus hirsutus*), *Kanch Khayen* (*Mucuna pruriens*)

The common grasses are *Bhurbhusi* (*Eragrotis tenella*), *Sheda* (*Sehima nurvosum*), *Ghonal* (*Themada trianora*), *Kunda* (*Ischaemum pilosum*), *Kusal* (*Heteropogon contortis*), *Harali* (*Cynodon doctylon*), *Tikhadi* (*Cymbopogon martini*), *Mustul* (*Iseilma laxum*), *Seprut* (*Panicum isachme*), *Pakli* (*Apluda varia*)

**3.1.4. 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* (*Embllica officinalis*), *Mokha* (*Schrebera swietenoides*), *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* (*Eragrostis tenella*), *Paoniya* (*Ischoemum sulcatum*), *Barru* (*Sorghum halepense*)

**3.1.5. SALAI FORESTS:** This type of forests covers extensive areas in many reserves like *Ambabarwa*, *Amdari* & *Gummi*. It occurs almost as pure crop of *Salai* (*Boswellia serrata*) on interior dry and exposed sites with a few scattered *Khair* (*Acacia catechu*), *Rohan* (*Soymida febrifuga*), *Ghot* (*Zizyphus xylopyra*), *Chilatichoti* (*Acacia pennata*). General quality of crop is below IV. On the outskirts of this type, *Teak* of quality IV occurs in open groups of poles or saplings. *Salai* crop is mostly malformed and unsound. Shrubs and climbers are practically absent. *Salai* reproduction is fair but reproduction of *Teak* and other species is scanty.

**3.1.6. GRASS LANDS WITH BRUSH WOOD:** This type comprises grass ramnas or fodder reserves. The woody species in this type occurs scattered are principally *Bharati* (*Gymnosporia montana*), and stunted bushy *Khair* (*Acacia catechu*), *Hinganbet* (*Balanites aegyptica*).



The common grasses are *Kusal* (*Heteropogon contortis*), *Sheda* (*Sehima nurvosum*) and *Paoniya* (*Ischoemum sulcatum*). Other inferior grasses are *Bhurbhusi* (*Eragrotis tenella*), *Ghonal* (*Themada trianora*), *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 Buldhana District by P.G.Diwakar and B.D.Sharma, 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 (*Hardwickia 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 suaveolens*) 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.

Buldhana district is fairly rich in floral diversity. In the year 2000 the Botanical Survey of India has published Flora of Buldhana District. Its abstract is given below:

**TABLE SHOWING SUMMARY OF VARIOUS BOTANICAL SURVEYS CARRIED OUT BY BSI  
IN BULDHANA FORESTS  
TABLE NO. 3.1.1**

| 1                                                        | Tree      | Shrub     | Herbs      | Grasses   | Climber   | Total      |
|----------------------------------------------------------|-----------|-----------|------------|-----------|-----------|------------|
| Flora of Buldhana<br>(By P. G. Diwakar and B. D. Sharma) | 91        | 97        | 255        | 60        | 64        | 567        |
| <b>Total :</b>                                           | <b>91</b> | <b>97</b> | <b>255</b> | <b>60</b> | <b>64</b> | <b>567</b> |

In order to have the precise picture of the flora, the available data may be presented in the following table. The relevant statistical analysis is also appended for ready reference.

**TABLE NO. 3.1.2**

|          | <b>Dicots</b> | <b>%</b> | <b>Monocots</b> | <b>%</b> | <b>Total</b> |
|----------|---------------|----------|-----------------|----------|--------------|
| Families | 89            | 87.3     | 13              | 12.7     | 102          |
| Genera   | 311           | 82.2     | 67              | 17.6     | 378          |
| Species  | 460           | 82.9     | 107             | 17.1     | 567          |

The detailed analysis of life form of indigenous species is as follows:

**TABLE NO. 3.1.3**

| <b>Sr. No.</b> | <b>Life form</b>             | <b>Species</b> | <b>Percentage</b> |
|----------------|------------------------------|----------------|-------------------|
| 1              | Herbs( Erect)                | 315            | 55.60             |
| 2              | Herbaceous climbers, Twiners | 64             | 11.15             |
| 3              | Shrubs                       | 97             | 17.15             |
| 4              | Trees                        | 91             | 16.10             |
|                | <b>Total</b>                 | <b>567</b>     |                   |

Analysis of life form (Herbs, Climbers etc) reveals high percentage (66.75%) of herbaceous members in contrast to 33.25% woody members. The relatively higher proportion of herbaceous members clearly indicates very limited forest in the area under study. Considering the total or about 12500 genera in the whole world only 3.2% are found in the area under study.

Above floral survey contains the species of cultivation also. But there is a addition of more than 500 species which were not collected earlier by Witt.

### **3.3: STATUS OF BIODIVERSITY CONSERVATION IN FORESTS:**

The forests of Buldhana are rich in Biodiversity and areas close to the Ambabara, Dnyanganga and Lonar 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 896 Biodiversity Committees formed in Buldhana Division. Preparation of People's Biodiversity Register (PBR) is completed 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**

The Status of species prone to over exploitation in the Division needs further studies with the help of the conservation experts and subject experts. However, from the information derived through discussion in the field with the forest officers and staff the following species are said to be prone to over exploitation.

**STATUS OF SPECIES PRONE TO OVER EXPLOITATION  
IN THE BULDHANA DIVISION  
TABLE NO. 3.2**

| <b>Sr.No.</b> | <b>Range</b>  | <b>Species</b> | <b>Remarks</b>                 |
|---------------|---------------|----------------|--------------------------------|
| 1             | Buldhana      | Monitor Lizard | In forest and non-forest land  |
| 2             | Khamgaon      | Gum            | In forest and non -forest land |
| 3             | Jalgaon Jamod | Safed Musali   | In forest and non -forest land |
| 4             | Deulgaon Raja | Sandal Wood    | Restricted Distribution        |

The above species are said to be prone to overexploitation in the District. For the other species that are also being exploited in substantial quantity by the locals are Khair, Babul and Mango trees as these have been exempted from Government regulations.

**ABSTRACT OF SPECIES-WISE OFFENCE CASES OF WILDLIFE  
IN BULDHANA FOREST DIVISION.  
TABLE NO. 3.3**

| Sr.<br>No. | Species               |                            | Range            | Total<br>Cases |
|------------|-----------------------|----------------------------|------------------|----------------|
|            | Common Name           | Scientific Name            |                  |                |
| 1          | Peacock               | <i>Pavo cristatus</i>      | Motala           | 4              |
|            |                       |                            | Buldhana         | 1              |
| 2          | Black Buck            | <i>Antilope cervicapra</i> | Jalgaon<br>Jamod | 1              |
|            |                       |                            | Mehakar          | 2              |
|            |                       |                            | Ghatbori         | 1              |
| 3          | Bear                  | <i>Ursus</i>               | Buldhana         | 1              |
| 4          | Leopard               | <i>Panthera pardus</i>     | Buldhana         | 2              |
|            |                       |                            | Khamgaon         | 1              |
|            |                       |                            | D. raja          | 1              |
| 5          | Barking Deer (Bhedki) | <i>Muntiacus vaginalis</i> | Khamgaon         | 1              |
|            |                       |                            | Motala           | 1              |
| 6          | Wild pig              | <i>Sus scrofa</i>          | Mehakar          | 1              |
|            |                       |                            | Jalgaon<br>Jamod | 1              |
|            | <b>Total</b>          |                            | <b>7-Ranges</b>  | <b>18</b>      |

The above table of offence reflects the pressure on species of plants and animals that are being exploited in the division. It is also a matter of concern that not all cases of illicit exploitation are actually detected, considering the covert nature of the crimes. Extra efforts need to be taken to protect species prone to exploitation.

### 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 Buldhana Forest Division.
- (2) There is no identified Preservation plots in Buldhana Forest Division .
- (3) There is no identified Medicinal Plant Conservation Area in Buldhana Forest Division.

### 3.6: FAUNA AND THEIR HABITATS

#### 3.6.1: Distribution of the wildlife

Buldhana division has a fairly good distribution of wildlife especially around areas adjoining to Bor wildlife sanctuary. Top Carnivores Tiger and Panther are 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 indiscriminate shooting during the zamindari regime. Apart from indiscriminate shooting, poaching and hunting, the population explosion and economic developments have led to the severe degradation of natural habitat of wildlife. The food, water and shelter, the basic needs of the wild animals have become scarce in plain, accessible areas.

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

#### 3.6.2: DESCRIPTION OF THE WILDLIFE

The division is rich in wild life. Almost all the forest areas of the division have a fairly 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 (*Antelope cervicapra*) (ix) Four horned antelope (*Tetraceros quadricornis*) (x) Chinkara or Indian gazelle (*Gazella gazella bennettii*).

**Rodents:** (i) Three striped palm squirrel (*Funambulus palmarum*) (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 kollegalensis*) (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) Little 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 brachyura*) (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 sonneratii*) (v) Painted partridges (*Francolinus pictus*) (vi) Grey partridges (*Francolinus pondicerianus*) (vii) Jungle bush quail (*Pardicula aissatics*) (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 (*Streptopelia spp*) (xvi) Cotton teal (*Nettapus coromandelianus*) (xvii) Whistling teal (*Dendrocygna javanica*).

### 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 number of such water holes is drastically reduced and also water in a water hole recedes to minimum.

One of the dangerous method 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 stomach and choking of breathing organs. The poachers then remove 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 the poaching. Nets and traps are used for trapping birds, deer and small mammals.

**Disease:** The livestock from the villages in the forests regularly frequent the forests and share space and resources. Water borne (contagious diseases) disease



are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (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 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 the wildlife habitat, and animals become vulnerable to poaching. Similarly, habitat disturbances of different types create diverse kinds of stress having adverse impact on the wildlife.

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 WILD LIFE 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 damaged caused by factors like increasing human and cattle population, encroachment for cultivation, poaching facilitated by the improved road network and efficient weapons. Poaching problem has attained a menacing proportion as evident from large seizures all over the country. Greater attention to the wildlife management, however, is a heartening trend. The wildlife and the territorial divisions at Buldhana 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 the 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 in this act particularly those in 1991 and 2002, no permission for hunting of wild animals, as game or sport, can be granted. Hunting of wild animals however can be allowed for special 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 increase in demand for wildlife products all over the 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 persons involved in illegal killings of the wild animals do not have any intention of poaching or trade but such activities on the part of local people pose grave danger to animal populations in the forests. (Revenge Killings) The govt. of Maharashtra therefore has evolved a policy of compensating

for the loss of livestock as well as for the injury to and loss of human life. This is 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.

### **THE PRESENT RATES OF COMPENSATION**

**TABLE NO.3.4**

| 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. |

The 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-1 of 02/07/2010. Some the conditions to be fulfilled are as under:

1. Death to be reported within 48 hours.
2. Carcass is not to be removed before case is made.
3. No death of any wild animal within 10 km radius area in the next 6 days.
4. Immediate investigation by forest officers as to the wild animal, which killed the cattle as well as Likely amount of compensation.
5. Compensation to be sanctioned by an officer not below DCF.
6. No compensation in case the livestock was grazing illegally.

### **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-1, dt.30/03/2013 and 16/1/2015. These are as follows:

### **COMPENSATION FOR THE INJURY AND LOSS OF HUMAN LIFE**

**TABLE NO. 3.5**

| <b>S.N.</b>                                                                                                | <b>Particulars</b>    | <b>Amount to be Paid</b> |
|------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|
| 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 unavailability, private medication. |                       |                          |

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

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

### **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 10(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.L.F.D. No. 2197-1-B, dated 13th October 1911, the Indian Forest Act, 1878 was also made applicable. The 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 fine 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. 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 game into four categories, viz. Small game, big game, special big game, and pet animals.
4. It also sought to control transaction in trophies and other wildlife products.

5. Wildlife Advisory Board was constituted under this act to advise the government on various 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 in regard to the constitution and declaration of National Parks and Sanctuaries and formulation of policy for their administration and management. The Parliament then enacted the Wildlife (Protection) Act, 1972, which came into force in the State of Maharashtra with effect from 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. 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 Buldhana Forest division have been discussed in detailed in the 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 (April 2018 to March 2019). The seedlings were enumerated in the following three categories as R1 up to 1 m height, R2 with 1 to 3 m height and R3 above 3 m height. The health and vitality of the forests depends on the availability of the regeneration as it ensures the capacity of the forests to rejuvenate in the event of any calamity. This is one of the best indicators of the health of the forests. The data analyzed and used to devise prescriptions for natural and artificial regeneration of forest areas. The table of regeneration is given below.

**TABLE NO. 4.1.**

**TABLE SHOWING STATUS OF NATURAL REGENERATION  
AND IT'S ESTABLISHMENT**

| <b>Range Wise Natural Regeneration (Total 462 Plots)</b>         |                      |                        |               |              |              |               |
|------------------------------------------------------------------|----------------------|------------------------|---------------|--------------|--------------|---------------|
| <b>Per Hectare Data. (Plot Size = 31.62M x 31.62M)</b>           |                      |                        |               |              |              |               |
| <b>Date &amp; Year of enumeration : April 2018 to March 2019</b> |                      |                        |               |              |              |               |
| <b>Sr. No.</b>                                                   | <b>Name of Range</b> | <b>Number of Plots</b> | <b>R-1</b>    | <b>R-2</b>   | <b>R-3</b>   | <b>Total</b>  |
| 1                                                                | Buldhana             | 70                     | 177.14        | 133.14       | 150.14       | <b>460.43</b> |
| 2                                                                | Deulgaon Raja        | 42                     | 42.62         | 20.24        | 34.05        | <b>96.90</b>  |
| 3                                                                | Ghatbori             | 88                     | 75.11         | 37.16        | 19.55        | <b>131.82</b> |
| 4                                                                | JalgaonJamod         | 76                     | 293.82        | 127.37       | 62.24        | <b>483.42</b> |
| 5                                                                | Khamgaon             | 96                     | 53.85         | 29.48        | 16.25        | <b>99.58</b>  |
| 6                                                                | Mehakar              | 29                     | 81.72         | 29.31        | 6.55         | <b>117.59</b> |
| 7                                                                | Motala               | 61                     | 271.97        | 89.67        | 12.95        | <b>374.59</b> |
|                                                                  | <b>Average</b>       | <b>462</b>             | <b>145.58</b> | <b>69.85</b> | <b>45.30</b> | <b>260.74</b> |



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. 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.

#### **4.2. AREA AFFECTED BY FOREST FIRE -**

Generally the forest near the human habitation is more susceptible for forest fires and the occurrence of annual fires is frequent in this Division. The areas which have less grazing, leaving behind grasses and other combustible material, are more vulnerable to forest fires. Thus adjoining areas of *Dnyanganga* Sanctuary, northern portion of the *Jalgaon Jamod* range and small parts of *Buldhana*, *Motala* and *Khamgaon* ranges are fire prone areas. Fires cause considerable damage to young seedling of *Teak* and other species. *Teak* being a fire hardy species suffers less from fires than its associates. Repeated fires also make soils hard and compact reducing natural regeneration. **APPENDIX NO.XIV** of Volume II gives year wise data of number of offence cases of fire incidences reported in the Division.

#### **4.3. AREA DAMAGED BY NATURAL CALAMITIES -**

**4.3.1. By Drought** – The damage due to drought is rare. Severe drought affecting the forests crops has not been noticed in the past.

**4.3.2. By Frost** – In these areas frosts are not observed.

**4.3.3. Damage by Storms and Winds** - The winds are generally moderate. Occasional storms in the pre-monsoon period are also experienced which sometimes results in

#### **4.4. AREA PROTECTED FROM GRAZING -**

Forest area can sustain certain level of grazing. If that level is crossed then grazing can cause harm. Many times where there is large population of domestic cattle's is the forest adjacent villages freely graze in these areas. When there is

crop in the agricultural fields that time domestic stock graze in the forests and cause harm to the forest in multiple way to regulate grazing and to minimize the adverse effect of grazing on the forest area. Grazing units are formed which determines the maximum numbers of cattle's can be allowed. Recently worked coupe areas, plantations etc. are not open for grazing.

#### **4.5. LOPPING PRACTICES -**

As the grazing area is available to the locals they seldom resort to lopping. Lopping is done for the stall feed cattle's, goats etc. and the lopping of *Anjan* trees is another serious problem that exists in this Division. *Anjan* leaves are good fodder for cattle, especially for milch cattle. Traditionally *Khamgaon* is the main market for *Anjan* leaves. Besides this, it is transported to *Buldhana*, *JalgaonJamod* and *Akola*. Lopped *Anjan*leaves are transported by cycles, Autorikshaws or occasionally by Matador. Till the year 2003-04 Forest Protection Committees were authorized to issue permit for *Anjan* leaves. Now this system has been stopped. Many offences of transportation of *Anjan*leaves are recorded in the forests areas of villages *Khamgaon*, *Matergaon*, *Ganeshpur*, *Pipalgaon Raja*, *Chichpur*, *Undri*, *Jalgaon Jamod*, *Buldana* and *Warwand*. *Anjan* Forests of *Khamgaon* range, western part of *Jalgaon-Jamod* range, eastern part of *Buldhana* range and northern part of *Ghatbori* range are badly damaged due to lopping of *Anjan* leaves.

Some of the important species which are lopped are *Ficus* Species (*Vad*, *Pimpal*, *Umber*, *Chinch*, *Arjun*, *Ain* etc.)

#### **4.6. AREA INFESTED BY INVASIVE WEED SPECIES IN FORESTS -**

##### **4.6.1. PARASITES -**

*Wanda (Loranthes species)* is common parasite in the forest division. It spreads on the branches of tall trees like *Charoli*, *Moha*, *Mango*, *Tendu* etc. *Amarvel (Cuscuta species)* is also seen on the plants like *Hiwar* and *Charoli*. This is generally found near the villages and it can kill the plant if not removed timely and frequently.

##### **4.6.2. OTHER WEEDS AND CLIMBERS**

Weeds like *Lantana*, *Congress Grass*, *Rantulas*, *Tarota* are found in this area. Out of these *Rantulsä*s spreading very fast and some patches of *Lanatana* are slowly occupied by this species. All these species except *Lantana* is growing in open area along the road as well as open patches in the forest also.

Timely removal before seeding coupled with repeated uprooting is the way to keep away these weeds.

Climbers like *Mahurvel*, *Palasvel* and *Gilbili*, *Thorny Aroni* and *Chilatiare* widely spread. Woody climbers like *Palasvel* and *Gilgili* are capable of reaching top of tall tree species and bring down the large trees on the ground. Initially these climbers constrict and kill the trees with their heavy weight trees are grounded. In plantation regular climber cutting is essential.

#### **4.7. INCIDENCES OF PEST AND DISEASES -**

When plants are injured, may be due to Fire, Lopping, Falling 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 insects. All species are susceptible to attack of Fungi and mould, such trees starts decaying and tree quality deteriorates. Hollowness and death is the end result.

#### **4.8. FOREST DEGRADATION AND ITS DRIVERS -**

Buldhana Forest Division is located mostly in the rural area. Most of the surrounding area has got extensive forests and at the same time there are villages where tribals live. These inhabitants are very much dependent on the forests and Natural Resources. So forests are prone to injuries by various factors;

**(1) By Humans**– Two major aspects are;

##### **(a) Encroachment –**

Government has regularised the encroachment in the past. This was mainly for agricultural purposes. This has triggered more encroachments on Government land including forests. People started thinking that if they encroach upon forest land, they will certainly get that land. Poor record keeping, lack of proper survey and demarcations etc. due to various reasons has worsen the situation. After that Forest Right Act came and large chunk of area got diverted to agriculture land and also for community managements.

##### **(b) Illegal Cutting of Timber, Fuel wood and Bamboo –**

Illegal cutting of Small wood, Fuel wood, Bamboo and Timber is done by the locals. This is done mainly for the own consumption. Some quantity is sold by the men-women folk. Bamboo is not predominantly occurs in the division.

## **(2) By Cattle-**

Due to large cattle population the pressure on the forest land is considerable. But most of them are not mulching. Having more numbers of cattle's with oneself is status symbol in the rural area. Forming good society for milk and milk product on cooperate basis and stall feeding can help farmers at a lot.

## **(3) By Wildlife -**

The damage caused to the tree growth by wild animals is negligible as the forests are poor in wild game. However, a certain amount of damage is noticed in the *JalgaonJamod* range, where animals like *Sambhar*, *Blue bulls* and *Wild boars* exists.

## **(4) By Insects -**

Attack by various insects causes degradation in the quality of logs and fuelwood, standing trees are also damaged. On valuable species like Teak, Two species attack they are;

- 1) Teak defoliator- *Hybliapurea*.
- 2) Teak Skeletenizors- *Hapalia* species is seen commonly in the rainy season. Termite attack is also common on standing trees. They eat dead parts. They also kill small plants.

**(5) By fire:** Summers are hot and dry from March to June during which forests are vulnerable to fires. Fires taking place at the end of winter and beginning of summer are not severe. Whereas, a fire in the hot summer is very harmful as it kills the young seedlings and coppice shoots of all major species and plantations. Fire hardy species such as teak, 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.

## **4.9. POLLUTION CONTROL AND PROTECTION OF ENVIRONMENT**

Environmental pollution is the introduction of contaminants into the natural environment that causes adverse change. 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.

Buldhana is a developing District devoid of major industry. The level of protection is negligible except for a small portion in the Buldhana city. In Buldhana the number of Industrial Estate is 2; one is Malkapur M.I.D.C. i.e. Dudhalgaon M.I.D.C. and another one is Khamgaon M.I.D.C. area. Type of industries working here are Engineering, Chemical, Soya, oil mills on smaller scale product.

The branch Hindustan Lever Limited at Khamgaon where 'soap' and Export Qualities are produced and exported.

There are no Hazardous Industries, no hazardous chemical generating Industries so no potentially hazardous locations or pipelines carrying chemicals.

The major industry is said to be in the non-forest areas. There is always a tendency of industries to dump their waste/effluents into open secluded spaces including forest areas. The Buldhana Forest Division should take all cautions against all pollution & disturbance to the forest areas.

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 being have increased, problems of environment pollution too have become acute.

To some extent there is water pollution in Buldhana Forest Division because of heavy fertilizer use in agricultural land also because of use of

bleaching powder and use of explosive in water bodies for fishing purpose. Some air pollution occurs because of vehicle traffic on roads, mines and brick kilns in some part of the division in Akot and Dharni Tahasil places, but as compare to pollution in industrial areas near big cities it is meager and the forest cover is dense so it helps in keeping environment clean to a great extent.

## **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 42<sup>nd</sup> amendment to the Constitution of India incorporated two articles. 48-A and 51-A (g) relating to environment. Article 48-A directs the state endeavor to protect and improve the environment in 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 amendments, 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.

The environment (Protection) Act 1986 (EPA) was passed under the provisions of Article 253 of the Constitution to achieve the following objectives;

- 1) To implement the decisions taken at the UN conference on Human Environment held at Stockholm in June 1972.
- 2) To enact general law on environment protection which could cover gaps in the areas of major environmental hazards as the existing laws generally focused on specific types of pollution.
- 3) To coordinate activities of the various regulatory agencies under the existing laws and creation of an authority or authorities for environment protection.
- 4) To provide for 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.

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) NalaBunding and Check Dams:** The primary objective of nalabunding 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 nalabunding is proposed as 5 meter<sup>3</sup>/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 nalabunding. 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 the soils of Buldhana into different erosion classes. The soils have been grouped into different erosion classes, their areal extent and expected soil loss is given below:

### **DIFFERENT SOIL EROSION CLASSES**

**TABLE NO. 5.1.**

| Erosion class | Area     |          | Expected soil loss<br>(tonnes ha <sup>-1</sup> yr <sup>-1</sup> ) |
|---------------|----------|----------|-------------------------------------------------------------------|
|               | Ha       | (%) TGA* |                                                                   |
| Slight        | 1,06,271 | 11.3     | 5-10                                                              |
| Moderate      | 3,51,660 | 36.4     | 10-15                                                             |
| Severe        | 2,26,067 | 23.4     | 15-20                                                             |
| Water bodies  | 48,305   | 5.1      |                                                                   |

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

The exact area treated under soil conservation cannot be assessed as no special work for soil conservation alone is carried out but SMC works form part of the plantations works. In the Division, in the last 10 years 37786.11 hectares have been taken up for plantation and can safely be presumed that this area is treated for soil conservation. However, in the last two years, in view of the Jalyukt Shivar project, large areas are being treated specifically for soil and water conservation.



## 5.2: DURATION OF WATER FLOW IN THE SELECTED SEASONAL STREAMS.

The Penganga is the principal river of the district; the other important rivers are Purna, Khadakpurna, Nalganga, Vishwaganga, Gyanganga and Banganga and nalas in forest areas hold water up to the end of February with stagnant pools persisting till the break of monsoon. The main source of water supply is through wells. In summer there is acute shortage of water leading to supply of drinking water to some villages by tankers and bullock carts. Data on seasonal streams is not available with the Division.

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

### MAJOR DAMS IN OR IN THE VICINITY OF THE FOREST AREAS DAM PROJECTS (EXISTING)

TABLE NO. 5.2.

| Name of Dam | Type of Dam | Capacity of Dam | River on which Dam is located | Dam Prone villages                | Tahsil   |
|-------------|-------------|-----------------|-------------------------------|-----------------------------------|----------|
| Nalganga    | Major       | 1386 cum        | Nalganga                      | Makodi, Talni, Shelapur, Datala   | Motala   |
| Dhynganga   | Medium      | 4249 cum        | Dhyanganga                    | G. Matergaon, Konti,              | Khamgaon |
| Paldhag     | Medium      | 1739 cum        | Vishwaganga                   | Tarapur, Kothali, Jaipur, Paldhag | Motala   |
| Mandawa     | Medium      | 850 cum         | Mandawa                       | Mandawa, Bibi                     | Lonar    |
| Mas         | Medium      | 2496 cum        | Mas                           | Kalegaon, Chitode, K.Mahadeo      | Khamgaon |
| Koradi      | Medium      | 2436 cum        | Koradi                        | Nagzari, Palaskhed, Hiwara        | Mehkar   |

### ON GOING PROJECTS:

TABLE NO. 5.3

| Name of Dam | Type of Dam | Capacity of Dam | River on which Dam is located | Dam Prone villages | Tahsil    |
|-------------|-------------|-----------------|-------------------------------|--------------------|-----------|
| Wan         | Major       | 4559 cum        | Wan                           | Wasadi, wari       | Sangrapur |
| Khadkpurna  | Major       | 18000 cum       | Khadkpurna                    |                    | Mehkar    |
| Man         | Medium      | 6587 cum        | Man                           | Ambetakli, Shirla  | Khamgaon  |
| Torna       | Medium      | 2384 cum        | Torna                         | P. Korade, Nimkhed | Khamgaon  |
| Pentakli    | Medium      | 8562 cum        | Painganga                     | Boradi, Pachla     | Mehkar    |
| Jigaon      | Major       | 91800 cum       | Purna                         | Jigaon, Takli      | Nandura   |
| Utawali     | Medium      | 265 cum         | Utawali                       | D. Sakarsha        | Mehkar    |

### **5.3: WETLANDS IN FOREST AREAS**

A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. The primary factor that distinguishes wetlands from other land forms or water bodies is the characteristic vegetation of aquatic plants, adapted to the unique hydric soil. Wetlands play a number of roles in the environment, principally water purification, flood control, carbon sink and shoreline stability. Wetlands are also considered the most biologically diverse of all ecosystems, serving as home to a wide range of plant and animal life.

Wetlands occur naturally on every continent except Antarctica, the largest includes the Amazon River basin, the West Siberian Plain and the Pantanal in South America. The water found in wetlands can be freshwater, brackish, or saltwater. The main wetland types include swamps, marshes, bogs, and fens; and sub-types include mangrove, carr, pocosin, and varzea.

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. It may be mentioned that some of the areas are known to be good habitat of birds which may even qualify for Important Bird Area status. The Division may engage field experts to document and study the habitat and the biodiversity of the wetlands to develop base year data for future monitoring and necessary improvements.

### **5.4: WATER LEVEL IN THE WELLS IN THE VICINITY (UP TO 5KM) OF FOREST AREA.**

The Division has records of the water levels of the wells within its jurisdiction and some villages. This is appended in the Volume II as **Appendix No. III**. 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.

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, and 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 substantive number of these are not even onrecord for electricity connections. If actual draft from those borewells/tubewells had been accounted for then the balance position would have certainly emerged as alarming.

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

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

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

#### **5.5.1: GROUND WATER SCENARIO:**

##### **HYDROGEOLOGY OF BULDHANA:**

###### **1) DECCAN TRAP BASALT**

Major part of the district is covered by basaltic lava flows of upper Cretaceous to lower Eocene age. The Deccan lava sequence is grouped under Satpura group in the northern part whereas in southern part it is grouped under Sahyadri group. Deccan Trap Basalt forms an important water bearing formation of the district. The disposition of vesicular unit and massive unit of different lava flows has given rise to multi layered aquifer system. The water bearing capacity of Vesicular Basalt largely depends upon size and shape of vesicles, density of vesicles and the degree of inter connection of vesicles. Massive Basalt generally does not possess primary porosity. However, Massive Basalt, which is fractured, jointed and weathered possesses water bearing capacity. Degree of weathering and topographic setting also plays a major role in respect of productivity. In Basalt, ground water occurs both in Vesicular and Massive Basalt as well as inter flow zones in weathered mantle, fractured zones. In general ground water occurs under water table conditions in shallow aquifer and semi-confined to confined conditions in deeper aquifer. The unconfined aquifer is developed due to the weathering and jointing of upper flow in Basalt down to depth of 15-20 mbgl.

## **2) ALLUVIUM**

The northern part of the district on either side of Purna River is underlain by thick Alluvial deposits of Pleistocene to Recent age and is termed as Purna Alluvium. The Alluvium is also observed in a small patch southwest of Malkapur and east of Khamgaon along the boundaries of district. The Alluvial valley lies in narrow belt and covers roughly about 1800 sq. km. The valley extends about 51 sq.km. in Buldhana district and it tapers towards the western end. In Alluvial deposits, inter pore spaces in sand and gravel renders them a high degree of porosity and permeability to make them a good ground water reservoir. However lithological variation results in variable water yielding capacity depending upon the sand-clay ratio. Purna Alluvium has a proven thickness of more than 300 meters. Based on studies the entire thickness of Alluvium has been divided into younger Alluvium and older Alluvium. The younger Alluvium contains comparatively more sand layers and thus forms good aquifer. The older Alluvium, which is more clayey with thin horizons of sand and silt, forms a comparatively lesser potential aquifer. In younger Alluvium ground water generally occurs in confined to semi-confined conditions in the depth range of 11-40 m bgl, while in older Alluvium it occurs under confined conditions below the depth of 40 m.

### **5.5.2: GROUND WATER EXPLORATION**

The Ground water exploration in the district has been taken up in different phases. The ground water exploration has been done in Buldhana District which is alluvial and Deccan Trap Basalt. A total of 50 Exploratory Wells (EW) and 17 Observation Wells (OW) were constructed till March 2012.

The exploratory drilling programme in Buldhana district started in the year 1984 and continued from time to time and a total of 60 wells have been drilled in the district. Pumping test to determine aquifer parameters were also conducted at 13 sites. The taluka wise salient features of ground water exploration are given in below table.

**SALIENT FEATURES OF GROUND WATER EXPLORATION**  
(As On 2012)

**TABLE NO. 5.4**

| S. N o. | Taluka         | Form a- tion | Wells |     | Depth (mbgl)  | SWL (mbgl)   | Discharg e (lps) | Draw- Down( m) | Zones (mbgl) |
|---------|----------------|--------------|-------|-----|---------------|--------------|------------------|----------------|--------------|
|         |                |              | E W   | O W |               |              |                  |                |              |
| 1.      | Buldhan a      | Basalt       | 02    | 0   | 200.00        | 1.75-42.80   | <0.14-0.38       | -              | 8.00-62.00   |
| 2.      | Chikhli        | Basalt       | 05    | 0   | 40.00-200.00  | 8.10-12.40   | 0.38             | 13.70          | Traces 2.16  |
| 3.      | Deulgao n Raja | Basalt       | 03    | 0   | 200.00        | >50.00       | Traces           | -              | 13.00-183.00 |
| 4.      | JalgaonJ amod  | Alluvi um    | 03    | 02  | 34.40-300.41  | 5.05-9.66    | 0.50-8.30        | 10.89-33.34    | 7.70-103.00  |
|         |                | Basalt       | 01    | 02  | 19.55-135.45  | 10.50-35.64  | 0.38-6.81        | -              | 9.00-70.00   |
| 5.      | Khamga on      | Basalt       | 05    | 0   | 153.75-200.00 | 0.78-5.23    | Traces-0.14      | 20.00-20.31    | 10.00-93.00  |
| 6.      | Lonar          | Basalt       | 03    | 0   | 40.00-200.00  | 8.20         | Traces-0.14      | -              | 15.00-46.00  |
| 7.      | Malkapu r      | Basalt       | 03    | 0   | 40.00-300.30  | 5.66-9.45    | Traces-0.14      | -              | 12.00-17.00  |
| 8.      | Mehkar         | Basalt       | 03    | 01  | 40.00-200.00  | 2.08-6.23    | 0.50-3.77        | 0.60-32.88     | 5.00-163.00  |
| 9.      | Motala         | Basalt       | 05    | 01  | 40.00-200.00  | 1.14-29.07   | 0.14-14.89       | 4.26           | 12.00-125.00 |
| 10.     | Nandura        | Basalt       | 06    | 02  | 26.65-301.00  | 19.03->50.00 | Traces-12.18     | -              | 13.00-168.00 |
| 11.     | Shegaon        | Basalt       | 02    | 03  | 56.15-200.00  | 6.42-7.85    | 0.38-12.18       | 13.90-15.84    | 15.00-158.00 |
| 12.     | Sindkhe d Raja | Basalt       | 02    | 03  | 26.25-200.00  | 3.33-4.83    | 0.38-10.98       | 3.73-6.75      | 7.00-143.00  |
| 13      | Sangram pur    | Alluvi um    | 06    | 02  | 61.50-311.20  | 3.57-18.00   | 0.08-10.00       | 0.55-38.00     | 8.00-302.00  |
|         |                | Basalt       | 01    | 01  | 123.25-160.00 | -            | 5.94             | -              | 33.00-117.00 |
| Total - |                |              | 05    | 17  | 19.55-311.20  | 1.75->50.00  | Traces-14.89     | 0.37-38.00     | 8.00-302.00  |

*\*mbgl (meters below ground level), \*SWL (static water level), \*lps (liter per second), \*m (meter)*

### **5.5.3: AQUIFER PARAMETERS:**

To determine the aquifer parameters, 5 pumping tests in Alluvial area and 8 pumping tests in hard rock area (Basalt) have been conducted in the past on exploratory wells. Based on these tests, it was observed that in Alluvium the transmissivity ranges from 0.89 to 1575.96 m<sup>2</sup>/day and the storativity ranges from  $1.09 \times 10^{-3}$  to  $3.00 \times 10^{-6}$ . The transmissivity in Basalt ranges from 8.35 to 395.85 m<sup>2</sup>/day and the storativity varies between  $8 \times 10^{-8}$  and  $4.2 \times 10^{-2}$ .

### **5.5.4: GROUND WATER RESOURCES:**

Central Ground Water Board and Ground Water Survey and Development Agency (GSDA), Govt of Maharashtra have jointly estimated the ground water resources of Buldhana district based on GEC-97 methodology as on 2009.

The assessment was done for 7709.11 sq. km. area of which 481.09 sq. km. is under command and 6671.01 sq. km. is non-command. About 557 sq. km. area comes under poor ground water quality.

As per the estimation, the net annual ground water availability comes to be 926.52 MCM. The gross draft for all uses is estimated at 648.51 MCM with irrigation sector being the major consumer having a draft of 609.67 MCM. The domestic and industrial water requirements for the next 25 years are worked out at 61.32 MCM. The net ground water availability for future irrigation is estimated at 258.07 MCM.

The stage of ground water development varies from 30.54% (Mlakapur) to 104.60% (Jalgaon). The overall stage of ground water development for the district is 63.4%. As per estimation, Jalgaon (Jamod) taluka falls in “Over-Exploited” category, Motala (75.66%) in “Semi-Critical” category whereas remaining 11 talukas fall in “Safe” category.

### **5.5.5: WATER LEVEL SCENARIO:**

Central Ground Water Board periodically monitors 33 National Hydrograph Network Stations (NHNS) stations in the Buldhana district, four times a year i.e. in January, May (Pre-monsoon), August and November (Post-monsoon). The data on pre-monsoon and post-monsoon water levels 8 along with fluctuation during 2011 and long term water level trend (2002- 2011) is given in below.

### WATER LEVEL DATA (2011) WITH LONG TERM TREND (2002-2011)

| Sr. No. | Location         | Pre monsoon Water Level (m bgl) | Post monsoon Water Level (m bgl) | Fluctuation (m) | Premonsoon Trend |             | Postmonsoon Trend |             |
|---------|------------------|---------------------------------|----------------------------------|-----------------|------------------|-------------|-------------------|-------------|
|         |                  |                                 |                                  |                 | Rise (m/yr)      | Fall (m/yr) | Rise (m/yr)       | Fall (m/yr) |
| 1.      | DeolgaonSakarsha | 6.75                            | 11.6                             | 4.41            | -                | 0.0971      | -                 | 0.2434      |
| 2.      | Deolgaon Raja    | 3.6                             | 2.3                              | 1.3             | 0.5436           | -           | 0.0557            | -           |
| 3.      | JalgaonJamod     | 14.7                            | 14.7                             | -               | -                | -           | -                 | -           |
| 4.      | Khamgaon         | 7.0                             | 2.9                              | 4.1             | -                | 0.0597      | 0.0209            | -           |
| 5.      | Lonar            | 6                               | -                                | -               | 0.0993           | -           | -                 | -           |
| 6.      | Mehkar           | 12.4                            | 9.6                              | 2.8             | -                | 0.1071      | 0.0875            | -           |
| 7.      | Motala           | 4.4                             | 2.2                              | 2.2             | -                | 0.0551      | 0.0230            | -           |
| 8.      | Rohinkhed        | 13                              | 11                               | 2.0             | -                | 0.0612      | 0.0641            | -           |
| 9.      | Shegaon          | 4.4                             | 4.6                              | 0.2             | 0.0950           | 0.1829      | -                 | -           |
| 10.     | Sindkhed Raja    | 3.25                            | 0.55                             | 2.70            | -                | 0.2566      | -                 | 0.0031      |

#### DEPTH TO WATER LEVEL – PRE-MONSOON (MAY-2011)

The depth to water level in the district is between 3.0 to 22.9 mbgl. Shallow water levels within 10 mbgl are seen in major part of the central and southern areas of the district, Water levels of 10-20 mbgl are observed in major northern Alluvial part of the district, and the deeper water levels of more than 20 mbgl are observed in restricted northwestern part of the district, thus water levels throughout the district are within 20 mbgl.

#### DEPTH TO WATER LEVEL – POST-MONSOON (NOV.-2011)

The depth to water level during post monsoon is between 0.55 mbgl to 27.0 mbgl. Shallow water levels within 10 mbgl occupy almost entire district in south and central parts. Water levels between 10 to 20 mbgl are observed in north western Alluvial areas of the district.



## ANALYSIS OF WATER LEVEL TREND (2002-2011)

Analysis of trend indicates that during pre monsoon period, rise in water level has been recorded at 8 stations and it ranges between 0.01 m/year and 0.64 m/year. Fall in water level has been observed at 20 stations and it ranges between 0.09 and 0.52 m/year. During post monsoon period, rise in water levels has been recorded at 12 stations and it ranges from negligible to 0.23 m/year, whereas at 14 stations, fall in water level ranging between negligible and 0.27 m/year is observed. Thus in major part of the district, both during pre and post monsoon periods declining trends of water levels have been observed.

### 5.5.6: GROUND WATER DEVELOPMENT:

Major part of the district, particularly the southern part, is underlain by Deccan Trap Basalt. The development potential of ground water in Deccan Trap Basalt is low in parts of Deulgaon Raja, Sindkhed Raja and Lonar talukas in southern part and Motala, Buldhana, Chikhali and Khamgaon talukas in the central part and Malkapur taluka in north western part of the district. Ground water in these areas can be developed through dug-wells and dug-cum-bored wells (DCB).

#### NATURE AND YIELD POTENTIAL OF AQUIFERS

| S.No | Taluka        | Main Aquifer        | Yield Potential | Type of Wells Suitable  |
|------|---------------|---------------------|-----------------|-------------------------|
| 1.   | Buldhana      | Basalt              | Low             | Dug Well, DCB           |
| 2.   | Chikhali      | Basalt              | Low             | Dug Well, DCB           |
| 3.   | Deulgaon Raja | Basalt              | Low to Medium   | Dug Well, DCB, Borewell |
| 4.   | JalgaonJamod  | Alluvium            | Low             | Dug Well, DCB           |
| 5.   | Khamgaon      | Basalt              | Low             | Dug Well, DCB, Borewell |
| 6.   | Lonar         | Basalt              | Low             | Dug Well, DCB           |
| 7.   | Malkapur      | Basalt and Alluvium | Low to Medium   | Dug Well, DCB           |
| 8.   | Mehkar        | Basalt              | Low to High     | Dug Well, DCB, Borewell |
| 9.   | Motala        | Basalt              | Low to High     | Dug Well, DCB, Borewell |
| 10.  | Nandura       | Basalt and Alluvium | Medium to High  | Dug Well, DCB, Borewell |
| 11.  | Sangrapur     | Alluvium            | Low to Medium   | Dug Well, DCB, Borewell |
| 12.  | Shegaon       | Basalt and Alluvium | Medium to High  | Dug Well, DCB, Borewell |
| 13.  | Sindkhed Raja | Basalt              | Low to Medium   | Dug Well, DCB           |

### **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. The structures like gully plugs, contour bunds are most favourable in the hilly areas, particularly in the Satpuda valley. Existing dugwells can also be used for artificial recharge; however, the source water should be properly filtered before being put in the wells. The artificial recharge structures suitable for alluvial areas are percolation tanks, and recharge wells. 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, the water conservation structures are more feasible. These sites need to be located where the hydrogeological conditions are favourable, 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. Major part of the district is underlain by Deccan Trap Basalt, where only dug wells are most feasible structures for ground water development. The sites for borewell need to be selected only after proper scientific investigation.
2. Borewells generally tap deeper fractures, which may not be sustainable. Besides the borewells should only be used for drinking water supply and not for irrigation.
3. Ground water quality is adversely affected by nitrate contamination in 89% 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 ground water is brackish to saline in some parts underlain by Purna Alluvium, particularly in deeper zones. In such areas, the wells should be constructed after careful study of local hydrogeological conditions.
5. The overall stage of ground water development for the district is relatively low, i.e., 63.4% thus there is a scope for further development of ground water resources.
6. Jalgaon (Jamod) taluka falls under “Over-Exploited” and Motala under “Semi Critical” category, therefore, further development of ground water resources is not recommended Jalgaon Jamod taluka. Caution may be

exercised while planning further ground water development in Motala taluk. Density of observation wells may be increased to study the behaviour of ground water level. Drip and sprinkler irrigation may be adopted in these talukas and less water intensive crops are recommended for growing. The scope exists for construction of suitable artificial recharge structures in the district. The structures recommended for the hilly-Deccan Trap Basalt area in the central part is: contour bunds, gully plugs, nala bunds and check dams. For other basaltic areas, the nala bunds, check dams 26 and KT weirs are suggested. The existing dugwells may also be used for artificial recharge of ground water provided source water is free of silt and dissolved impurities.

7. In Alluvial area of the district, percolation tanks and recharge wells/shafts are suggested wherever the ground water is not saline. The most feasible artificial recharge structure suitable for Alluvial areas, are recharge wells/shafts on the river bed of the tributaries.
8. In saline areas of Purna River Alluvium, water conservation structures may be constructed along with recharge structures on the periphery of the saline tract to augment the fresh water recharge.
9. The existing village ponds/tanks 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 Buldhana 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 Buldhana 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         |

**6.2: GROWING STOCK OF BAMBOO:** Bamboo is almost absent in Buldhana Forest Division. It is present in hilly areas of Jalgaon-Jamod range but these areas are transferred to Ambabarwa sanctuary of Melghat Tiger Reserve.

#### 6.3: INCREMENT IN VOLUME OF IDENTIFIED TIMBER SPECIES:

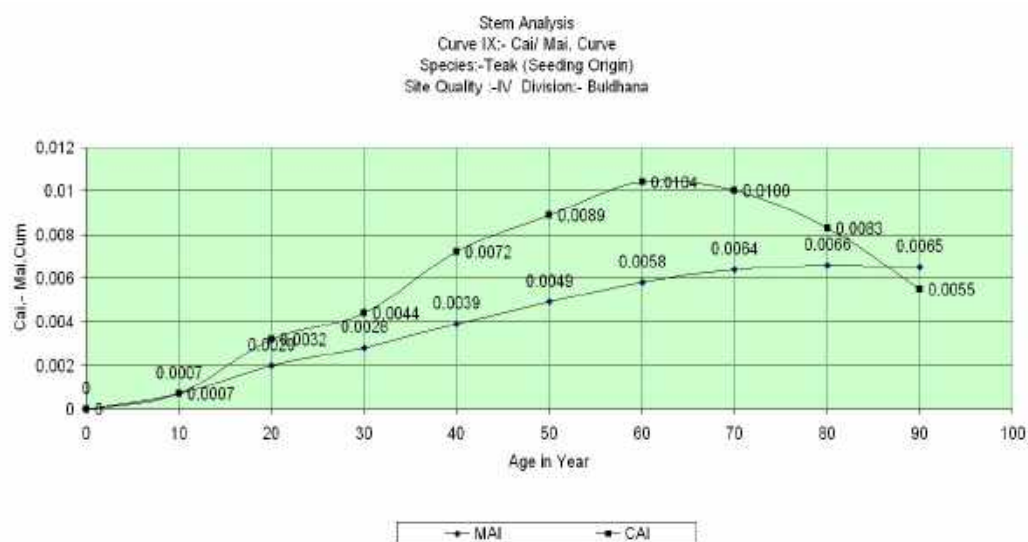
During revision of the current Plan, stem analysis was carried out in September 2008, by selecting 2 *Teak* trees of seed origin and 2 *Teak* trees of coppice origin for site quality IV in the compartment No.173( *Janona* Beat) and Comptt No.175( *Isvi* Beat ) of *Ghatbori* Range. The result of Stem analysis is given in **Appendix No. XXXII** of Volume II.

- Stem analysis was also carried out for 2 representative *Teak* tree of seed origin for site quality IV. It is evident from the graphs that the age of culmination at which CAI & MAI curves of Seed Origin teak trees intersect each other is 87 years (+4yrs correction to be made from seedling data). The corresponding girth is 116 cm. The data is reproduced as under:

**TABLE SHOWING STEM ANALYSIS OF SEED ORIGIN TEAK FOR SITE QUALITY – IV**

**TABLE NO. 6.3**

| Age in years | D.B.H. (O.B.) in cm | G.B.H. (O.B.) in cm | Ht. In Mt. | Volume per tree cum | MAI Cum/year | CAI Cum/year |
|--------------|---------------------|---------------------|------------|---------------------|--------------|--------------|
| 10           | 5.85                | 14.70               | 4.40       | 0.0069              | 0.0007       | 0.0007       |
| 20           | 11.33               | 35.58               | 6.80       | 0.0392              | 0.0020       | 0.0032       |
| 30           | 15.67               | 49.20               | 8.60       | 0.0834              | 0.0028       | 0.0044       |
| 40           | 20.77               | 65.22               | 10.40      | 0.1559              | 0.0039       | 0.0072       |
| 50           | 24.95               | 78.34               | 11.60      | 0.2454              | 0.0049       | 0.0089       |
| 60           | 28.50               | 89.49               | 12.80      | 0.3488              | 0.0058       | 0.0104       |
| 70           | 31.68               | 99.48               | 13.20      | 0.4489              | 0.0064       | 0.0100       |
| 80           | 35.05               | 110.06              | 13.40      | 0.5318              | 0.0066       | 0.0083       |
| 90           | 37.55               | 118.00              | 13.50      | 0.5800              | 0.0065       | 0.0055       |



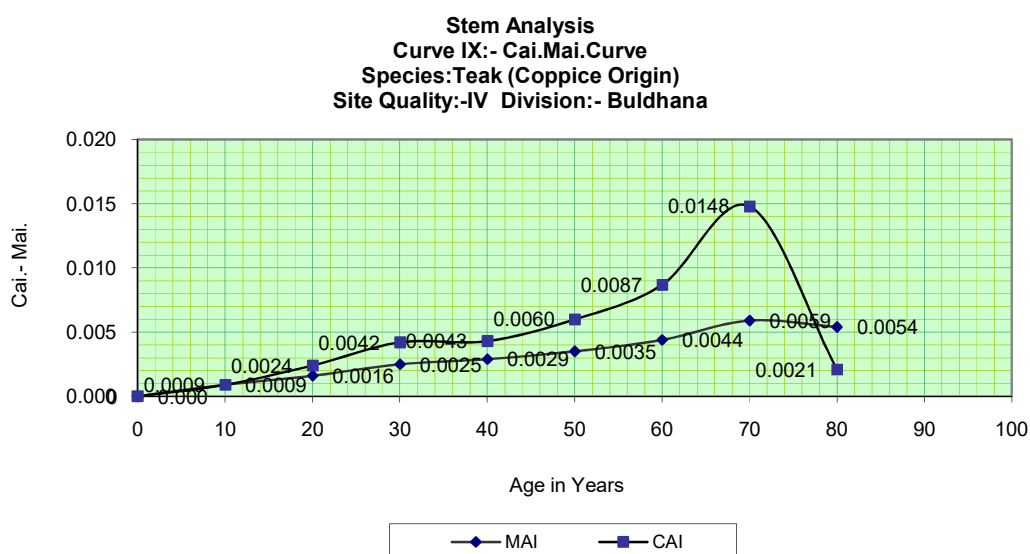
- Stem analysis was also carried out for 2 representative *Teak* tree of coppice origin for site quality IV. It is evident from graph the age of culmination at which CAI & MAI curves intersect each other is 77 yrs (+4

yrs correction to be made from seedling data). The corresponding girth being 97 cm. The data is reproduced as under:

**Table No.6.4**

**Table Showing Stem Analysis of Coppice Origin Teak For Site Quality – IV**

| Age in years | D.B.H. (O.B.) in cm | G.B.H. (O.B.) in cm | Ht. In Mt. | Volume per tree cum | MAI Cum/year | CAI Cum/year |
|--------------|---------------------|---------------------|------------|---------------------|--------------|--------------|
| 10           | 6.29                | 19.75               | 4.40       | 0.0089              | 0.0009       | 0.0009       |
| 20           | 10.63               | 33.38               | 6.50       | 0.0328              | 0.0016       | 0.0024       |
| 30           | 14.59               | 45.81               | 8.30       | 0.0744              | 0.0025       | 0.0042       |
| 40           | 17.71               | 55.61               | 9.90       | 0.1172              | 0.0029       | 0.0043       |
| 50           | 21.17               | 66.47               | 11.00      | 0.1771              | 0.0035       | 0.0060       |
| 60           | 25.13               | 78.91               | 12.00      | 0.2637              | 0.0044       | 0.0087       |
| 70           | 28.54               | 89.62               | 12.80      | 0.4121              | 0.0059       | 0.0148       |
| 80           | 31.40               | 98.60               | 13.10      | 0.4336              | 0.0054       | 0.0021       |



#### **Local Volume Table:**

Since local volume table of Buldhana is not available. The Local volume table for Nagpur Forest division for Ain Bija, Dhawada, and Garadi has been taken. The Local volume table is given in Table 6.3.

**TABLE NO.6.3: LOCAL VOLUME TABLE FOR AIN, BIJA, DHAORA AND GARARI  
(IVA QUALITY AREAS)**

| Girth class<br>(in cms) | Mid-girth<br>in cms. | Volume per tree in cubic<br>meters |        |
|-------------------------|----------------------|------------------------------------|--------|
|                         |                      | Ain, bija,<br>dhaora, and<br>tendu | Garari |
| 16-30                   | 23                   | 0.0185                             | 0.0134 |
| 31-45                   | 38                   | 0.0374                             | 0.0272 |
| 46-60                   | 53                   | 0.0862                             | 0.0627 |
| 61-75                   | 68                   | 0.1631                             | 0.1186 |
| 76-90                   | 83                   | 0.2681                             | 0.1950 |
| 91-105                  | 98                   | 0.4011                             | 0.2917 |
| 106-120                 | 113                  | 0.5622                             | 0.4089 |
| 121-135                 | 128                  | 0.7514                             | 0.5465 |
| 136-150                 | 143                  | 0.9687                             | 0.7045 |
| Over 150<br>cms         | 158                  | 1.2140                             | 0.8829 |

- Local volume table for few miscellaneous species has been prepared by the staff of Working Plan division Nagpur. The field data for this has been collected from Ramtek and Deolapar ranges of Nagpur (T) division is given in table 6.4.

**TABLE NO. 6.4: LOCAL VOLUME TABLE.**

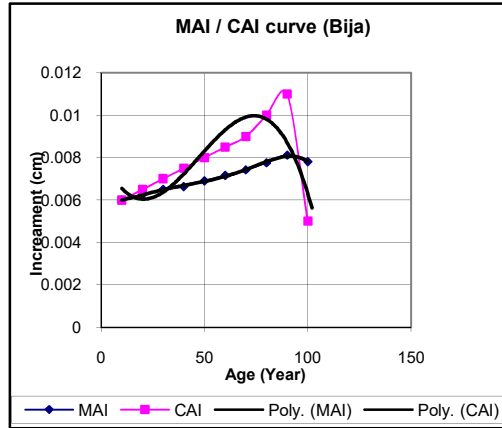
| Girth<br>Class<br>(in cms) | Shisam         | Surya | Haldu | Kumbhi | Khair | Babhul | Mowai | Shiwan | Behada |
|----------------------------|----------------|-------|-------|--------|-------|--------|-------|--------|--------|
|                            | Volume (Cumt.) |       |       |        |       |        |       |        |        |
| 10 -- 20                   | 0.060          | 0.180 | 0.050 | 0.160  | 0.040 | 0.075  | 0.025 | 0.005  | 0.150  |
| 20 -- 30                   | 0.180          | 0.360 | 0.150 | 0.360  | 0.100 | 0.163  | 0.075 | 0.050  | 0.400  |
| 30 -- 40                   | 0.580          | 0.820 | 0.300 | 0.560  | 0.260 | 0.500  | 0.300 | 0.310  | 0.700  |
| 40 -- 50                   | 1.340          | 1.620 | 0.500 | 0.980  | 0.620 | 1.310  | 1.375 | 0.940  | 1.150  |
| 50 -- 60                   | 2.540          | 2.760 | 1.100 | 1.760  | 1.200 | 3.125  |       | 2.200  | 1.800  |
| 60 -- 70                   | 4.900          | 4.660 | 2.250 | 2.980  | 2.080 |        |       |        | 2.550  |
| 70 -- 80                   |                |       | 4.400 | 4.580  | 4.600 |        |       |        | 3.500  |

#### **GROWTH OF MISCELLANEOUS SPECIES:**

Stem analysis is not carried out for miscellaneous species in Buldhana division. However, the growth data of miscellaneous species in Nagpur division is used to determine the annual yield and harvestable girth. The growth statistics of the important miscellaneous species like Bija, Dhawada and Garai is given below: CAI / MAI curves of the following miscellaneous species are given under.

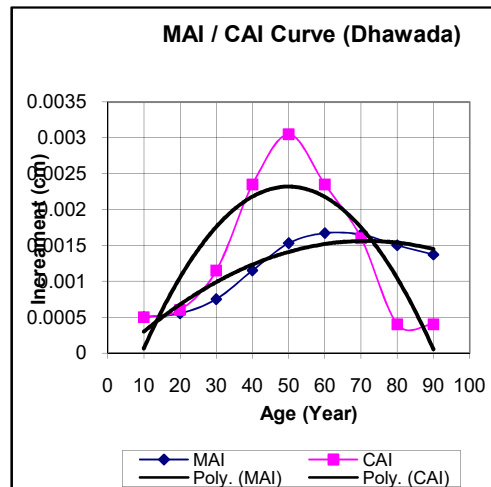
## 1. BIJA

| Age | Gbh   | Volum<br>e | MAI         | CAI        |
|-----|-------|------------|-------------|------------|
| 10  | 18.3  | 0.06       | 0.006       | 0.006      |
| 20  | 31.3  | 0.125      | 0.0062<br>5 | 0.006<br>5 |
| 30  | 42    | 0.195      | 0.0065      | 0.007      |
| 40  | 52.25 | 0.265      | 0.0066<br>3 | 0.007<br>5 |
| 50  | 62.25 | 0.345      | 0.0069      | 0.008      |
| 60  | 72.25 | 0.43       | 0.0071<br>6 | 0.008<br>5 |
| 70  | 80.5  | 0.52       | 0.0074<br>2 | 0.009      |
| 80  | 87.75 | 0.62       | 0.0077<br>5 | 0.01       |
| 90  | 93.25 | 0.73       | 0.0081<br>1 | 0.011      |
| 100 | 100   | 0.78       | 0.0078      | 0.005      |



## 2. DHAWADA

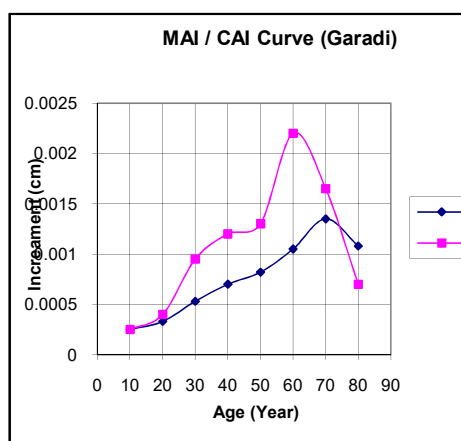
| Age | Gbh       | Volum<br>e | MAI         | CAI         |
|-----|-----------|------------|-------------|-------------|
| 10  | 20        | 0.005      | 0.0005      | 0.0005      |
| 20  | 35        | 0.011      | 0.0005<br>5 | 0.0006      |
| 30  | 48        | 0.0225     | 0.0007<br>5 | 0.0011<br>5 |
| 40  | 60        | 0.046      | 0.0011<br>5 | 0.0023<br>5 |
| 50  | 71        | 0.0765     | 0.0015<br>3 | 0.0030<br>5 |
| 60  | 79.5      | 0.1        | 0.0016<br>7 | 0.0023<br>5 |
| 70  | 82.7<br>5 | 0.116      | 0.0016<br>5 | 0.0016      |
| 80  | 88        | 0.12       | 0.0015      | 0.0004      |
| 90  |           | 0.124      | 0.0013<br>7 | 0.0004      |





### 3. GARADI

| Age | Gbh  | Volume | MAI     | CAI     |
|-----|------|--------|---------|---------|
| 10  | 13.5 | 0.0025 | 0.00025 | 0.00025 |
| 20  | 26   | 0.0065 | 0.00033 | 0.0004  |
| 30  | 38   | 0.016  | 0.00053 | 0.00095 |
| 40  | 57.5 | 0.028  | 0.0007  | 0.0012  |
| 50  | 72   | 0.041  | 0.00082 | 0.0013  |
| 60  | 79   | 0.63   | 0.00105 | 0.0022  |
| 70  | 85   | 0.795  | 0.00135 | 0.00165 |
| 80  | 91   | 0.0865 | 0.00108 | 0.0007  |



**ENUMERATION:** SOFR unit Amravati conducted the Enumeration work in Buldhana forest division. **(April 2018 to March 2019)** as per the procedure given in National Working Plan Code, 2014. The enumeration data was analysed to arrive at Basal area, Growing Stock etc. This data was correlated with Stock Maps prepared by field units and also compared with satellite imagery before the compartments were allotted to various working circles. The results of enumeration and regeneration in various compartment is given in Volume II.

**STOCK MAPPING:** Stock mapping was done during this plan preparation we llin time carried out by Dy. Conservator of Forest, Buldhana Forest Division, and records compared with the enumeration data as well as satellite imageries.

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

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

#### **6.4: EFFORTS TOWARDS ENHANCEMENT OF FOREST PRODUCTIVITY THROUGH QUALITY PLANTATION ACTIVITIES:**

During the period of the Plan there has been no special occasion where quality plantation activities other than the usual plantation carried out year on year. Plantations using the latest technology in terms of high-tech nurseries for raising quality planting material, drip irrigation, chain-linked fencing etc could be tried for specific need-driven plantations in Buldhana forest division.

But Grass fodder plantation has been taken up in Pasture working circle by ploughing and seed sowing. But the result not satisfactory as there is no monitoring and assessment apart from not being able to take it as a plantation project.

#### **6.5: CARBON STOCK (CARBON SEQUESTRATION) :**

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 Buldhana 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. 6.5: WORKING CIRCLE WISE CARBON STOCK**

| <b>Sr. No.</b> | <b>Working Circle</b> | <b>Total Area (ha.)</b> | <b>Average growing stock (m<sup>3</sup>/ha)</b> | <b>Total growing stock (m<sup>3</sup>)</b> | <b>Total carbon stock (metric tons)</b> |
|----------------|-----------------------|-------------------------|-------------------------------------------------|--------------------------------------------|-----------------------------------------|
| 1              | Improvement W.C.      | 44070.375               | 64.58                                           | 2853423.39                                 | 856027.02                               |
| 2              | Pasture W.C.          | 29884.760               | 10.18                                           | 302359.34                                  | 90707.80                                |
| 3              | Protection W.C        | 6861.440                | 60.15                                           | 398842.02                                  | 119652.61                               |
|                | <b>Total</b>          | <b>80816.575</b>        | <b>00</b>                                       | <b>3554624.75</b>                          | <b>1066387.43</b>                       |

**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%.

## **6.6: 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 enhance 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 44184.32 ha. is proposed under Improvement 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.

Further detailed studies for carbon sequestration potential of Buldhana forests need to be carried out. it has to include values of three wildlife sanctuaries- Lonar, Amababarwa and Dhyanganga Wildlife sanctuary which fall in Buldhana district but are outside jurisdiction of Buldhana territorial division.

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## CHAPTER – 7

### OPTIMIZATION OF FOREST RESOURCE UTILIZATION

#### 7.1: RECORDED REMOVAL OF TIMBER:

During the past plan, the Division has not harvested any coupes. Hence the average yield per hectare cannot be obtained.

#### 7.2: RECORDED REMOVAL OF FUELWOOD:

During the past plan, the division has not harvested any coupes. Hence the average yield per hectare cannot be obtained.

#### 7.3: RECORDED REMOVAL OF BAMBOO / RATTANS:

As the Division is devoid of bamboo or rattans, there is no record of removal of bamboo or rattans.

#### 7.4: RECORDED REMOVAL OF LOCALLY IMPORTANT NTFPS INCLUDING MAPS:

The important non timber forest produce that are removed and recorded from the forests are Tendu, Gum and grass. The other NTFPs and medicinal and aromatic plants that are removed from the forests appear to have not been recorded.

The biggest source of NTFP produce that the Division harvests is Tendu. During the past ten years the quantity of Tendu removed is 6650 standard bags. The details are given in **Appendix no. XLVI**.

The other species of NTFP for the Division is the gum tree which is mostly *Sterculiaurens*, *Boswelliaserrata*, *Anogeissuslatifolia*, *Accaciaspp*etc. The total collection of gum was extracted was about 54 quintals.

##### 7.4.1: 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 criteria 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 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 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.

#### **7.4.2: MANAGEMENT OF HIRDA, BEHDA, AOLA, CHAR, SITAPAL AND OTHER NTFPS:**

**Collection of Hirda, Behda, Aonla, Char and Other NTFPs:** Fruits of Hirda, 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 *Hirda*, *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 *Hirda*, *Behda*, *Aonla*, *sitapal* 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. *Hirda*, *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**

Buldhana is the district of the state having geographical area extending over to sq. km forming about percent of the total area of the state. As per 2011 census, the total population of Buldhana district is 2586258 lakhs.

The main forest produce that are harvested from the forests of Buldhana division and those which support the livelihood 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 dhabs 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) Grass:** Coarse grasses are used for thatching and palatable grasses for stall feeding. The demand for fodder grass depends upon the yield of agricultural crops such as Jowar stalks, bhusa and paddy straw, which are used for fodder. The demand for grass is local for fodder Marvel, Sheda, Paonia and Mushan are preferred.

**5) 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 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) **Bamboo Articles:** Burads makes baskets, mats, dholis, etc. From Bamboos and sell them locally. However, there are very little natural bamboos areas to meet these demands. Mostly bamboo articles prepared by Burads come from adjoining Districts.
- iv) **Sawmills:** There are saw mills in the Buldhanadistrict which depend on the supply of wood from the forests as well as private areas.
- v) **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.
- vi) **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.
- vii) **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 Buldhana. The produce that is produced from Buldhana 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 Buldhana. 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 (RahnimanBhatta) are also taken into consideration.

### **NON WOOD FOREST PRODUCES (NWFP)**

**1)Grass:** Grass from grassbirs, 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 birs remain unsold. In the sold areas very little grass is removed. Most of the time the influential people of the village purchase the grass birs and allow grazing in those areas by taking money from the cattle owners. Due to excessive cattle pressure the site conditions of grass birs have been deterioratedseverly; 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.

#### **QUANTITY AND REVENUE GENERATED IN THE SALE OF TENDU, GUM AND GRASS**

| Sr. No. | Year                   | Products | Quantity      | lakhs (rs) |
|---------|------------------------|----------|---------------|------------|
| 1       | 2011 – 12 to 2018 - 19 | Tendu    | 37800 std bag | 360        |
| 2       |                        | Gum      | 54            | NA         |
| 3       |                        | Grass    | NA            | NA         |

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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:**

Buldhana Division along with the state has come to embrace the Joint Forest Management as one of the tools of forest management as early as the mid – nineties. Ever since, the people's/ community's participation in conservation and management of forest and wildlife resources has been an integral part of management. The number of JFMCs formed are 197 and these committees cover an area of 33365.85 ha. All the areas adjoining villages have been covered under JFM, which take up 40% of forest area of Division currently. Out of this 15 JFM Committee have taken up plantation over an area of 450 ha during the period of the last working plan.

- 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, and fire and wildlife offences shall receive priority apart from regularly undertaken works such as SMC and 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 16<sup>th</sup> March 1992, 5<sup>th</sup> October 2011 and 10<sup>th</sup> July 2012. The numbers of villages adjoining to forests are 197 and 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 1/3<sup>rd</sup> of the members are to be from the Gram Panchayat. 50 % of the members should be women and 2 members should be from SC/ST and OBC. The performance of committee in the Division has been adequate. The forest Development agency is well established and its working is satisfactory. Efforts to make the functioning and transaction of funds more and more transparent are going on in the FDA.

### **8.3: LABOUR WELFARE**

The JFM villagers have priority over others in all the activities of the Department for semi-skilled and unskilled labour. Works of plantations, natural regenerations, 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 Department has made its effort in documenting the indigenous technical knowledge of the people in the District. It is incorporated in the micro plan and implemented through JFMC. Meetings are held by time to time. It is in charge of the forest officers to tap all kinds of ITK from the locals, particularly those associated with forest and environment, and to document them for posterity.

### **8.5: EXTENT OF CULTURAL/SACRED GROVES:**

There are no sacred groves in the District.

### **8.6: ECOTOURISM AREAS AND ACTIVITIES:**

Buldhana Forest Division has its varied flora and fauna ranging from the grasslands, the wetland to the thick forests and has quite few ecotourism sites of potential. They are not properly developed and require immediate attention. Places of ecotourism attractions are few but they are having great potentials. Some of them are- *Dnyanganga* Sanctuary, *Ambabarwa* Sanctuary, “*Saptarushi*” (Seven sages) in *Ghatbori* Range. *Lonar* Sanctuary is only crater in basaltic rock formed by the impact of a meteor. Forests of this Division have origins of many rivers. All these places need to be given specialized attention by ensuring preservation of their originality and potential in wild life conservation as well as from eco- tourism point of view.

Some of the sites are actually not in the forest area but are included as they can form a circuit that would be linked with the eco-tourism sites for better packages whenever these sites are developed with proper management plan.

The social aspect of forests in the context of ecotourism is very important as it provides the people with employment. The other important social contribution of

ecotourism is the exposure to the other cultures and the chance to educate others about 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.

### **8.7: SOCIAL CUSTOMS**

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

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

The scheduled tribes and other traditional forest dwellers (Recognition of forest rights)act, 2006 was passed by the parliament of India and the assent to this act was received from the president of India. On 29th December 2006 the said act was notified in the gazette of India on 2<sup>nd</sup> January, 2007. For implementation of the said act, the central govt. notified the rules for recognition of forest right on 1<sup>st</sup>January 2008. These rules were further amended by the central govt. wide notification dated 6<sup>th</sup> September, 2012.

#### **8.8.1: SALIENT PROVISIONS OF THE FOREST RIGHT ACT, 2006:**

- (I) **Section 3 (1)**The following rights which secure individual or community tenure or both, shall be the forest right under the act. They are
- (a) Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers.
  - (b) Community rights such as *nistar*, by whatever name called, including those used in erstwhile Princely states, *Zamindarior* 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 community.
- (f) Rights in over or 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 govt. on forest lands to titles.
- (h) Rights of settlement and conversion of all forest villages, old habitation, unsurveyed villages and other villages in forest 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 to 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 13<sup>th</sup> day of December, 2005.

**(II)Section 3 (2):**Not withstanding anything contained in the forest (conservation) act, 1980, the central govt. shall provide for diversion of forest land for the following facilities managed by the govt. 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 structure
- I) minor irrigation canal
- j) Non-conventional source of energy
- k) Skill upgradation or vocational training centers roads and
- m) Communitycenters.

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 project shall be subject to the condition that the same is recommended by the Gramsabha.

**(III) Section 5:**The holders of any forest right, Gram sabha and village level institution 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 decision 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 Gramsabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest right or both that may be given to the forest dwelling scheduled tribes and other

traditional forest dwellers within the local limit of its jurisdiction under this act by receiving claims , consolidating and verifying them and preparing the map delineating the area of each recommended claim in such manner as may be prescribed for exercise of such rights and the Gramsabha shall the pass a resolution to that effect and thereafter forward the copy of the same to the sub divisional level committee.

- V) Section 6 (3):** The state govt. shall constitute a sub divisional level committee to examine the resolution passed by the Gramsabha 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 govt. 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 govt. dealing with the tribal affairs or any officer or authority authorized by the central govt. in this behalf shall be the nodal agency for the implementation of the provisions of this act.

#### **8.8.2: STATUS OF IMPLEMENTATION OF FRA 2006 IN BULDHANA FOREST DIVISION:**

The status of implementation of this act (up to July, 2019) is summarized in the table below. The cases accepted by the district level committee is 266 cases of individual claims distributed cover an area of 761.29 ha. and the 225 claims of community rights cover an area of 21,087.54 ha.

**TABLE NO. 8.2 STATUS OF IMPLEMENTATION OF FRA 2006**

| <b>Type of claim</b> | <b>No of cases received by gramsabha</b> | <b>No of cases rejected by gramsabha</b> | <b>No of cases rejected by SDLC</b> | <b>No of cases rejected by DLC</b> | <b>No of cases finally accepted by DLC</b> | <b>No of cases pending for decision at DLC</b> |
|----------------------|------------------------------------------|------------------------------------------|-------------------------------------|------------------------------------|--------------------------------------------|------------------------------------------------|
| Individual           | 1435                                     | 773                                      | 689                                 | 417                                | 266                                        | 0                                              |
| Community            | 233                                      | 0                                        | 233                                 | 5                                  | 225                                        | 31                                             |
| <b>Total</b>         | <b>1668</b>                              | <b>773</b>                               | <b>922</b>                          | <b>422</b>                         | <b>491</b>                                 | <b>31</b>                                      |



Under Section 3(2), in 50 cases, a total of 20.11 ha involving land has been diverted for specified purposes.

The 225 claims of Community rights accepted by the District level committee cover an area of 21,087.54 ha. In Buldhana Division were mostly of Grazing Rights and collection minor forest produce, since grazing pressure is high in these areas.

**Prescriptions for management of forest areas on which the forest rights are recognised:**

**1. Boundary demarcation:** The forest areas on which the individual forest rights are recognised by district level committee are to be properly demarcated on ground with suitable boundary pillars in order to prevent any further encroachment. In case of community forest right the area shall be properly demarcated so that the village level institutions and the forest department officials can maintain absolute clarity about the boundaries of CFR. As of now, boundary demarcation work of FRA beneficiaries has not been initiated in the division. Therefore this exercise need immediate attention of DCF and shall be completed within 2 years from the date of commencement of this working plan. The progress of boundary demarcation works shall be monitored on a monthly basis by the DCF and on quarterly basis by the CCF. The GPS coordinates of such boundary pillars shall be maintained in the boundary pillar register which shall be specific to FRA implementation. DCF shall ensure checking of pillars from his /her field staff.

**2. Updation of Area Register:** The divisional area register (form no. 1) shall contain the area vested with rights under FRA in the “remarks “ column against each compartment / survey no / gat no.

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

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

5.If the claims under the act are finally rejected by the competent authority, such encroachments shall be removed immediately by following the due process of law.

6. As per Rule 4 (e) the Gram sabha is duty bound to constitute committee for the protection of wildlife, forest and biodiversity, from amongst its members, in order to carry out the provisions of section 5 of the act similarly as per rule 4 (f) such committee shall prepare a conservation and management plan for community forest resources in order to sustainability and equitably manage such community forest resources and integrate such plan of the forest department. Therefore the territorial officers shall examine such conservation and management plans for CFR areas and ensure that the prescriptions dovetail with the broad prescriptions of the approved working plan.

## **8.9: OTHER RIGHTS AND CONCESSIONS:**

### **8.9.1: RIGHTS AND CONCESSIONS**

#### **RESERVED FORESTS**

There are no rights in the reserved forests except right to way and access in water. There is no communication of *nistar* or *paidawar* in Buldhana forest division. Various concessions have been granted from time to time the agriculturist and other by the erstwhile govt. of Madhya Pradesh and Govt. 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 bonafide domestic use at concessional rates, none of these concessions is a legal right.

The inhabitants of the forest villages were allowed to cultivate the land 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 bonafide 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 "*Wazibularz*" was prepared for every settlement and plots of land were separately recorded showing the *khasra* 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 provisions of the Madhya Pradesh Abolition of the proprietary rights act, all communal and other wasteland became property of the govt. while occupied lands continued to be private. In order to distinguish between the rights existing on the govt. wasteland and on the other lands a provision was made in Madhya Pradesh land revenue code, 1957 prescribing the preparation of the *nistarpatrik* and *wazibularz* for every village. The *nistarpatrik* deals exclusively with management and use of the govt. land while the *wazibularz* deals with community and customs use over private land.

### **8.9.2: Occupational nistar:**

In the *nistarpatrik* occupational rights of the *kumbhars*, *chambhars*, *gonds*, *mahars*, *pradhan* and *lohar* communities have been recorded and recognised in several villages, having entries in the *wazibularz* of each village.

## **DISTRIBUTION OF FOREST PRODUCES UNDER THE NISTAR SYSTEM:**

### **a) Small timber and poles:**

According to the zone arrangement framed by the nistar offices the villagers are entitled to obtain their nistar requirements of small timber and poles from the available material from the forests included in a particular zone either free or on payment up to a certain quantum fixed by the collector. In order to meet the demand of the cultivators of the villages which were not included in the zone the nistar officers have prescribed that in the event of the supply being in excess in a particular zone after meeting the demand of zonal villagers the excess could be given to persons outside the zone on payment at the rates.

## **b) Firewood**

Free removal of firewood from khasra number set aside for nistar is permitted as per rights recorded in nistarpatraks for bonafide use to the villagers in khasra numbers which are in excess no such right is allowed.

In the nistarpatrak of each village the khasra numbers set aside for nistar and grazing are recorded. The details regarding quantum of nistar period during which it is to be allowed payment if any to be made are given in the nistarpatrak in general. However due to overharvesting illicit felling and over grazing these areas have become degraded and no longer able to meet the nistar requirements of the people.

### **8.10: DEPENDENCY OF LOCAL PEOPLE OF NTFPS:**

There is no significant number of people dependent on the forests and forest produce.

### **8.11: OTHER ASPECT:**

The Dhargar community mostly depend upon the forest for Sheep grazing in large extent and scattered all over the division. Allowing sheep grazing in forest areas is longstanding demand of Dhargar community. Sheep not part of GR issued on August 2, 1971. Yet, Sheep grazing was partially allowed between September 15 to May 15, in 21 divisions from May 6, 2008. On trial basis, Sheep was allowed in Buldhana & Jalgaon forest areas in 2017 & 2018 between June-September. Reports submitted by CCF (Territorial) to the State government in 2018 stating that sheep grazing should not be allowed in forest areas between June-September as it affects natural regeneration.

Natural regeneration is found adversely affected in those areas wherever rotational grazing system is not followed properly. Likewise proportion of Non fodder grasses is slowly increasing in such area. Therefore grazing in such areas needs to be managed properly to avoid adverse effect on quantity and quality of the fodder species.

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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 world's geographic areas, India at present is supporting 16% of world's human population and 18% of cattle population. About 41% of forest cover of the country has been degraded and dense forests are losing its 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 its carrying capacity and encroachments are the main cause of continuous degradation of forests.

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

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

### **STRATEGIES**

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

### **9.1.3: HON'BLE ORDERS OF SUPREME COURT OF INDIA**

Hon'ble Supreme Court passed an order in Writ petition (202 of 1995) in the matter of "GodavarmanThirumalkpad" 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.

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 felling be carried out without allocating necessary fund to regenerate the felled areas. In the event of failure felling 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, felling are 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 influences, as this act recognizes several individual as well as the community rights over the forest land and its produce. All the provisions of this Act will have to 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<sup>th</sup> December, 2006. The said Act was notified in the Gazette of India on 2<sup>nd</sup> January, 2007. For implementation of the said Act, the central Government notified the Rules were further amended by the Central Government vide notification dated 6<sup>th</sup> September, 2012.

In Buldhana Division the number of claims received were 1668 out of which 491 were accepted. Of this 1668 cases 266 are of individual claims covering an area of 761.29 ha and 225 claims are of community rights which cover an area 21087.54 ha. The Division is in the process of digitizing the polygons of the areas handed over to the villagers. There is a need to guide and train the villagers on how best to use the forest land to meet all their needs and make them away from their dependency on the forest.

#### **9.1.5: THE BIOLOGICAL DIVERSITY ACT 2002**

The Biological Diversity Act 2002 came into existence from 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 5<sup>th</sup> 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 the biodiversity.

As of now 541 Biodiversity Management Committees have been formed in the District of Buldhana. 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 5<sup>th</sup> October 2011 and 10<sup>th</sup> July 2012. All JFM activities should be in consonance with the board prescriptions of the Working plan. The Microplans are to be dovetailed with the prescriptions of the Working Plan.

#### **9.2: STATUS OF APPROVED WORKING PLAN AND COMPLIANCE**

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



### 9.3: NUMBER OF FOREST OFFENCES

The numbers 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    |                |                                |                |             |              |                |
| 2010-11      | 7            | 1180         | 8            | 320          | 238             | 318                     | 507         | 143525         | 217835                         | 54             | --          | 307          | 145025         |
| 2011-12      | 20           | 1475         | 5            | 210          | 239             | 453                     | 472         | 159503         | 149700                         | 23             | --          | 287          | 161188         |
| 2012-13      | 25           | 1812         | 5            | 225          | 257             | 528                     | 594         | 579874         | 799769                         | 31             | --          | 318          | 581911         |
| 2013-14      | 23           | 1642         | 24           | 572          | 191             | 445                     | 476         | 286560         | 355498                         | 69             | --          | 307          | 288774         |
| 2014-15      | 17           | 1573         | 7            | 158          | 295             | 819                     | 797         | 923855         | 819497                         | 69             | --          | 388          | 925586         |
| 2015-16      | 6            | 700          | 16           | 776          | 281             | 744                     | 2125        | 733677         | 831968                         | 72             | --          | 375          | 735153         |
| 2016-17      | 3            | 500          | 13           | 449          | 213             | 620                     | 845         | 570105         | 338348                         | 89             | --          | 318          | 571054         |
| 2017-18      | 7            | 800          | 62           | 4578         | 197             | 488                     | 509         | 692846         | 456514                         | 98             | --          | 364          | 698224         |
| 2018-19      | 38           | 1241         | 42           | 3968         | 241             | 485                     | 465         | 660970         | 419683                         | 66             | --          | 387          | 666179         |
| <b>Total</b> | <b>146</b>   | <b>10923</b> | <b>182</b>   | <b>11256</b> | <b>2152</b>     | <b>4900</b>             | <b>6790</b> | <b>4750915</b> | <b>4388812</b>                 | <b>571</b>     | <b>0</b>    | <b>3051</b>  | <b>4773094</b> |

### 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 field. The status of special training of the staff is as follows.

1. Training for GIS and GPS – Surveyor 2, Forester 31, and Forest Guard 143.
2. Facilities of personal Digital Assistants are given to all guards with application like Offence cases, Fire, Encroachment, Grazing etc. As per the table below, a Total PDAs have been distributed to the staff of the Division.

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.

**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          | 2010-11  | 2011-12  | 2012-13  | 2013-14  | 2014-15  | 2015-16  | 2016-17  | 2017-18  | 2018-19  | 2019-20  |                |
| 1            | Buldhana      | -        | -        | -        | 06       | 06       | 03       | -        | -        | -        | -        | 15             |
| 2            | Khamgaon      | -        | -        | -        | 11       | 10       | 07       | -        | -        | -        | -        | 28             |
| 3            | Motala        | -        | -        | -        | 05       | 05       | 01       | -        | -        | -        | -        | 11             |
| 4            | JalgaonJa     | -        | -        | -        | 20       | 18       | 02       | -        | -        | -        | -        | 40             |
| 5            | Ghatbori      | -        | -        | -        | 11       | 08       | 08       | -        | -        | -        | -        | 27             |
| 6            | Mehakar       | -        | -        | -        | -        | -        | 01       | -        | -        | -        | -        | 01             |
| 7            | Deulgaon Raja | -        | -        | -        | -        | -        | 02       | -        | -        | -        | -        | 02             |
| <b>Total</b> |               | -        | -        | -        | 53       | 47       | 24       | -        | -        | -        | -        | 124            |

## 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 in the last plan and also projected for the period of this plan **Appendix No. XIX**. The quantity and the value of the NTFPs collected in the last ten years have been duly provided in the **Appendix No. XIX**.

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 bio-prospecting
- 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 Buldhan comes under Eco-Class III and the value attached to this area as given below as per the canopy density. The average value of the forests stands at Rs. 8,00,000/- and varies with the type of forest and its attributes. This value has further been revised by the Indian Institute of

Forest Management, Bhopal and is yet to be approved. The IIFM study is more comprehensive and takes into account all aspects of the intangible benefits that the forest eco-system provides.

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

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

| Sr.No        | Area of Buldhana 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                                             | 213          | 8.87                             | 1889.3                                     | 25.08                             | 5342                                        |
| 2            | MDF                                             | 7318         | 8.03                             | 58764                                      | 18.62                             | 136261                                      |
| 3            | OF                                              | 20585        | 6.26                             | 128862                                     | 11.17                             | 229934                                      |
| <b>Total</b> |                                                 | <b>28116</b> | <b>23.16</b>                     | <b>189515</b>                              | <b>54.87</b>                      | <b>371537</b>                               |

The value of the forest of Buldhanacomes to 1895.15/- crores as per the current NPV rates and Rs. 3715.37/- crores as per the proposed NPV rates which has taken into account all the ecosystem services and functions of the forests.

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

## 9.7: BUDGETARY ALLOCATIONS TO THE FORESTRY SECTOR

TABLE NO.9.4

### STATEMENT SHOWING THE REVENUE, EXPENDITURE AND SURPLUS

| Year    | Revenue<br>(Rs in<br>lakh) | Expenditure in (Lakh)                 |                               |                      | Total<br>Expenditure<br>(3+4+5) |
|---------|----------------------------|---------------------------------------|-------------------------------|----------------------|---------------------------------|
|         |                            | Conservancy &<br>Work (Rs<br>in Lakh) | Establishment (Rs<br>in Lakh) | Plan (Rs in<br>Lakh) |                                 |
| 1       | 2                          | 3                                     | 4                             | 5                    | 6                               |
| 2010-11 | 1.09                       | 297.21                                | 675.32                        | 122.81               | 1095.34                         |
| 2011-12 | 5.76                       | 264.06                                | 762.11                        | 434.11               | 1460.28                         |
| 2012-13 | 6.37                       | 530.92                                | 809.26                        | 440.47               | 1780.65                         |
| 2013-14 | 6.19                       | 503.24                                | 872.61                        | 280.53               | 1656.38                         |
| 2014-15 | 1.61                       | 646.59                                | 992.67                        | 186.72               | 1825.98                         |
| 2015-16 | 6.91                       | 795.21                                | 1111.00                       | 391.83               | 2298.04                         |
| 2016-17 | 2.97                       | 1072.47                               | 1318.34                       | 558.97               | 2949.78                         |
| 2017-18 | 1.24                       | 985.36                                | 1599.66                       | 459.91               | 3044.93                         |
| 2018-19 | 1.30                       | 827.15                                | 1487.27                       | 2186.91              | 4501.33                         |
| 2019-20 | 0.00                       | 8.02                                  | 497.50                        | 103.41               | 608.93                          |
| Total   | 33.44                      | 5930.23                               | 10125.74                      | 5165.67              | 21221.64                        |

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.

Buldhana Division has sanctioned strength of 298 posts in total, including 256 permanent posts and 42 temporary 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 Buldhana Division**

| Sr. No                | Designation                      | Pay Scale in Rs. | Premanent Posts | Temporary Posts | Total | Statement Showing Santioned, Filled up and Vacant post in Buldhana Division |           |             |
|-----------------------|----------------------------------|------------------|-----------------|-----------------|-------|-----------------------------------------------------------------------------|-----------|-------------|
|                       |                                  |                  |                 |                 |       | Santioned                                                                   | Filled up | Vacant post |
| Group – A (Class I)   |                                  |                  |                 |                 |       |                                                                             |           |             |
| 1                     | Deputy Conservator of Forests    |                  | 1               | 0               | 1     | 1                                                                           | 1         | 0           |
| 2                     | Assistant Conservator of Forests |                  | 3               | 1               | 4     | 3                                                                           | 2         | 1           |
| Group – B (Class II)  |                                  |                  |                 |                 |       |                                                                             |           |             |
| 3                     | Range Forest Officer             |                  | 10              | 3               | 13    | 13                                                                          | 11        | 2           |
| Group – C (Class III) |                                  |                  |                 |                 |       |                                                                             |           |             |
| 4                     | Forester                         |                  | 28              | 3               | 31    | 31                                                                          | 29        | 2           |
| 5                     | Forest Guards                    |                  | 122             | 21              | 143   | 143                                                                         | 137       | 6           |
| 6                     | Chief Accountant                 |                  | 1               | 0               | 1     | 1                                                                           | 1         | 0           |
| 7                     | Accountant                       |                  | 9               | 2               | 11    | 11                                                                          | 11        | 0           |
| 8                     | Clerks                           |                  | 12              | 7               | 19    | 19                                                                          | 18        | 1           |
| 9                     | Surveyor                         |                  | 2               | 0               | 2     | 2                                                                           | 1         | 1           |
| 10                    | Driver                           |                  | 2               | 4               | 6     | 6                                                                           | 6         | 0           |
| 11                    | Police Constable                 |                  | 2               | 0               | 2     | 2                                                                           | 2         | 0           |
| Group – D (Class IV)  |                                  |                  |                 |                 |       |                                                                             |           |             |
| 12                    | Naik                             |                  | 1               | 0               | 1     | 1                                                                           | 1         | 0           |
| 13                    | Peon                             |                  | 4               | 1               | 5     | 5                                                                           | 5         | 0           |
| 14                    | Daftari                          |                  | 1               | 0               | 1     | 1                                                                           | 1         | 0           |
| 15                    | Watchman                         |                  | 1               | 0               | 1     | 1                                                                           | 1         | 0           |
| 16                    | Mali                             |                  | 3               | 0               | 3     | 3                                                                           | 3         | 0           |
| 17                    | Van Mazoor                       |                  | 55              | 0               | 55    | 55                                                                          | 55        | 0           |
| Total Staff           |                                  |                  | 256             | 42              | 298   | 298                                                                         | 285       | 13          |

## **LABOUR SUPPLY**

Population density is fairly good in the Division. The main occupation is agriculture, hence during agricultural season there is a decline in manpower availability, for the forestry works. A statement showing village wise population, agricultural labours population, casual labours population and marginal labours population is given in **Appendix No. XXVII** of Vol. II.

There are Vankamgars (Barmahi Mazdoors) on muster rolls at present. They execute watch and ward operation of plantations and assists in patrolling of forest area along with regular staff. The wage rates are by annually revised as per the Labour Department's directions. The present wage rates per month are as follows for unskilled labours Rs. 2339/- and Semiskilled Rs. 2539/- , Skilled labours Rs. 2739/- w.e.f. 1.1.09

## **9.9: PUBLIC AWARENESS AND EDUCATION**

Public awareness is carried out by the Division and the Social Forestry Wing of the department in the district. As per information from the Dy. Director of the SFD, a total of 252 schools in Buldhana district have Eco-clubs as part of the National Green Army Scheme of the Government of India. In each of the Club, there are at least 50 members. In these schools regular year around programmes are held and all important days related to the Environment and Forests are celebrated enthusiastically. Regular field visits, 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 Essay/Drawing/Extempore Speech Competitions are held at all levels upto the State level.

## **9.10: ADEQUATE MANPOWER IN FOREST DIVISION**

### **9.10.1: STAFF**

In 1865, one Assistant Conservator of Forests was appointed for regular forest administration of Berar. In 1869-70 Berar was split up in to two divisions, one as a Deputy Conservator in charge of Northern Division and another as Assistant Conservator incharge of Southern Division. In 1881, Berar became a Conservator-ship and the Provincial branch of service was organized, the staff was strengthened and a reclassification of the forests

began. In the year 1870, Akola formed the part of Southern Division under the Assistant Conservator. This was split up in 1880-81 into the Wani, Washim and Purna divisions, when Buldhana forests were included in the Purna forest division and Akola forests formed the part of Wani and Washim Divisions. In 1885-86 Akola and Buldhana became separate Forest Divisions. In 1901 the forests of Akola Division were included in the Buldhana Division but restored to Akola Division in 1906, when Akola Division was formed. On the first of April, 1932 the Buldhana and Akola Forest Divisions were amalgamated to form West Berar Forest Division with Head quarters at Akola. The old Buldhana Division now formed sub-division of the new West Berar Division. Akola and Buldhana Divisions were reconstituted in the year 1964.

In Buldhana Forest Division, there is a post of Deputy Conservator of Forests, assisted by three Assistant Conservator of Forests who are class-I officers. One Assistant Conservator of Forests is at Khamgaon and is incharge of Khamgaon, Motala&Jalgaon-Jamod ranges. Another Assistant Conservator of Forests is stationed at Buldhana and is incharge of Buldhana, Ghatbori, Mehkar and Deulgaon Raja ranges. One A.C.F. is in charge of E.G.S. with head quarter at Mehkar. With the elevation of Range Forest Officer to the gazetted level, the total gazetted officer's strength has been increased considerably. Out of 13 Range Forest Officers in the Division , seven are in charge of territorial ranges. Two hold the charge of mobile squad, with head quarter at Khamgaon and Buldhana. There are four E.G.S. Range Forest Officers at Jalgaon-Jamod, Khamgaon, Sindkhed Raja and Mehkar.

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## CHAPTER 10

### FIVE YEAR PLANS

Since 1947, the Indian economy has been premised on the concept of planning. This has been carried through the Five-year plans, developed, executed and monitored by planning commission (1951-2014) and NITI Aayog (The National Institution of Transforming India) (2014-2017). With the prime minister as the ex-officio chairman, the commission has a nominated deputy chairman, who holds the rank of a cabinet Minister. Montek singh Ahluwalia is the last deputy chairman of the commission. The Twelfth plan completed its term in March 2017.

1. Prior to the Fourth Plan, the allocation of state resources was based on schematic patterns rather than a transparent and objective mechanism, which led to the adoption of the Gadgil formula in 1969. Revised versions of the formula have been used since then to determine the allocation of central assistance for state plans.
2. The new government led by Narendra Modi, has announced the dissolution of planning commission, and its replacement by a think tank called the NITI Aayog (The National Institution Of Transforming India), established with the aim to achieved Sustainable Development Goals and to enhance cooperative federalism by fostering the involvement of State Government of India in economic policy making process using a bottom-up approach.

#### Contents

|                                                                   |                                                                                                         |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>First Five Year Plan (1951 To 1956)</b>                        | During this period Working Plan was not in operation.                                                   |
| <b>Second Five Year Plan (1956-1961)</b>                          | During this period Working Plan was not in operation.                                                   |
| <b>Third Five Year Plan (1961-1966)</b>                           | Working Plan by S. S. Parasnis for this Division was operative from 1966-67 onwards.                    |
| <b>Post Third Five Year Plan (1966-1969):</b>                     | Working Plan by <i>Parasnis</i> was operative.                                                          |
| <b>Fourth Five Year Plan (1969-1974)</b>                          | Working Plan by <i>Parasnis</i> was operative.                                                          |
| <b>Fifth Five Year Plan (1974 - 1979)</b>                         | Working Plan by <i>Parasnis</i> was operative.                                                          |
| <b>Annual Plan (1979-1980) and Sixth Five Year Plan (1980-85)</b> | Working Plan by <i>Parasnis</i> was operative.                                                          |
| <b>Seventh Five Year Plan (1985-90)</b>                           | Working Plan by <i>Parasnis</i> was extended upto 1987-88 but after 1988 Working Plan was not in force. |
| <b>Post Seventh Five-Year Plan (1990-1992)</b>                    | During this period Working Plan was not in operation.                                                   |

|                                            |                                                                                                                                                                                                                                                                              |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Eighth Five-Year Plan (1992-1997)</b>   | During this Five-Year Plan new Working Plan by <i>B.S.Thengdi</i> for the period 1995-96 to 2004-05 came into force.                                                                                                                                                         |
| <b>Ninth Five-Year Plan (1997-2002)</b>    | During this Five Year Plan period , some areas were transferred to WL Division. Prescriptions of existing plans continued during Ninth Five Year Plan. The JFM in <i>Buldhana</i> Forest Division was started in the year 1998-99 under <i>Maharashtra</i> Forestry Project. |
| <b>Tenth Five-Year Plan (2002-2007)</b>    | Prescriptions of existing plans continued upto the year 2004-05 and same prescriptions were extended till 2007-08. Work of FDCM ( <i>Khamgaon</i> Forest Project Sub Division) stopped since 2004. The implementation of project under FDA started in year 2005.             |
| <b>Eleventh Five-Year Plan (2007-2012)</b> | Tiwari's plan in operation during the period 2010-2011 to 2019-20                                                                                                                                                                                                            |
| <b>Twelfth Five-Year Plan (2012-2017)</b>  | Tiwari's plan in operation during the period 2010-2011 to 2019-20                                                                                                                                                                                                            |

**10.1: As per the Twelfth Plan Document under Environment, Forestry and Wildlife 209 the following are the Monitorable Target of are Twelfth Plan.**  
**Environment and Climate Change.**

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

**FOREST AND LIVELIHOOD**

1. Greening 5 million ha. Under Green India Mission including 1.5 million ha. Of degraded lands, afforestation and eco-restoration of 0.9 million ha. Of ecologically sensitive areas.
2. Technology- based monitoring of forest cover, biodiversity and growing stock including change monitoring on periodical basis through dedicated satellite by 2017 and establishment of open web-based National Forestry and Environmental Information system for research and public accessibility by 2015.
3. Engagement of village Green Guards/Community Foresters for every Joint Forest Management (JFM) village by 2016.

4. Establish forestry seed bank in forest circles and Model Nursery in every district with information on public portal by 2014.

#### **WILDLIFE, ECOTOURISM AND ANIMAL WELFARE**

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

#### **ECOSYSTEM AND BIODIVERSITY**

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

#### **10.2: As per the Twelfth Plan Document of the Planning Commission under Environment, Forestry and Wildlife 209 the following are the Goals.**

##### **Environment**

1. Epidemiological studies to assess improvement in health status due to better management of Environment ecology.
2. Promotion and adoption of cleaner technology, strengthening and initiation of reforms in regulations, policy making and enforcement institutions of reforms in regulations, policy making and enforcement institutions for environmental governance.
3. Move towards cumulative and strategic EIA.
4. Ensure ecological flows in all rivers by regulating abstractions so as to allow conservation of 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.

##### **FORESTS AND LIVELIHOOD**

1. Improve forest productivity, production and sustainable management of biodiversity (equity in access to benefit sharing with local people).
2. Restoration and intensification of forest-range lands/ grazing-land management and establish community grazing land around forest fringe villages.
3. Build capacity of Village Forest Committees/Joint Forestry Management Committees for management of forest resources including ecotourism.

4. Revive seed orchards and silviculture plots for various forest types of the country, as well as, for enlisted species under Minor Forest Produce/Non Timber Forest Produce (MFP/NTFP) including genetic improvement of and establishment of clonal orchards.

#### **WILDLIFE, ECOTOURISM AND ANIMAL WELFARE**

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

#### **ECOSYSTEM AND BIODIVERSITY**

1. Develop national targets and indicators related to biodiversity and support actions to strengthen implementation of Biological Diversity Act, 2002 and ensure bio-safety for economic and social development of local communities.
2. Assess coastal biodiversity resources, ensure sustainable management, restoration of mangroves, coral reefs and wetlands and support livelihood.

#### **10.3: DEVELOPMENT UNDER TWELFTH FIVE YEAR PLAN.**

- i) The year 2015-16 was the fifth year of the XII the Five-year plan. An investment of Rs.1380.391 Lakhs was made on various developmental programmes implemented under forestry and related sectors. The targets and achievements under the various developmental work according to various activities are given below.
- ii) The Progress made under various schemes implemented by the Forest Department under the 12th plan is given below.

**Table No. 10.1**

**Financial Targets and Achievements break up according to activity group for  
the year**

| Sr. | Name Of Scheme                                                    | Financial (Rs. In Lakh) |              |              |              |
|-----|-------------------------------------------------------------------|-------------------------|--------------|--------------|--------------|
| No. | (A)TOTAL(2406 FORESTRY AND WILDLIFE) (NON TRIBAL SUB PLAN)(STATE) | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|     |                                                                   | Achievements            | Achievements | Achievements | Achievements |
| 1   | Strengthening of check Nakas                                      | 8.0                     | 0.00         | 0.00         | 0.00         |
| 2   | Strengthening of existing wireless network                        | 0.25                    | 0.20         | 4.85         | 0.00         |
| 3   | Strengthening of Mobile Squad                                     | 0.00                    | 0.00         | 0.00         | 6.00         |
| 4   | Supply of cooking gas                                             | 0.00                    | 5.288        | 9.98         | 89.78        |
| 5   | Join Forest Management                                            | 18.02                   | 14.18        | 30.51        | 46.99        |
|     | Total (A)                                                         | 26.27                   | 19.67        | 45.34        | 142.77       |

| Sr. | Name Of Scheme                                   | Financial (Rs. In Lakh) |              |              |              |
|-----|--------------------------------------------------|-------------------------|--------------|--------------|--------------|
| No. | (B) CENTRALLY SPONSORED SCHEMES                  | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|     |                                                  | Achievements            | Achievements | Achievements | Achievements |
| 1   | Modern forest fire control and management (IFPC) | 0.00                    | 4.26         | 0.00         | 29.08        |
| 2   | National Afforestation Programme                 | 0.00                    | 0.00         | 37.65        | 45.93        |
|     | Total (B)                                        | 0.00                    | 4.26         | 37.65        | 75.01        |

| Sr. | Name Of Scheme                                           | Financial (Rs. In Lakh) |              |              |              |
|-----|----------------------------------------------------------|-------------------------|--------------|--------------|--------------|
| No. | (C) 2406 FORESTRY AND WILDLIFE (TRIBAL SUB PLAN) (STATE) | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|     |                                                          | Achievements            | Achievements | Achievements | Achievements |
| 1   | Supply of cooking Gas                                    | 0.00                    | 10.62        | 15.17        | 32.89        |
| 2   | Vidarbha Vikas                                           | 93.16                   | 83.88        | 63.65        | 49.60        |
|     | Total (C)                                                | 93.16                   | 94.50        | 78.82        | 82.49        |

| Sr. | Name Of Scheme                                                  | Financial (Rs. In Lakh) |              |              |              |
|-----|-----------------------------------------------------------------|-------------------------|--------------|--------------|--------------|
| No. | (D)(2406 FORESTRY AND WILDLIFE) (NON TRIBAL SUB PLAN)(District) | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|     |                                                                 | Achievements            | Achievements | Achievements | Achievements |
| 1   | Soil and Moisture Conservation on forest area                   | 0.00                    | 0.00         | 182.88       | 278.15       |
| 2   | Estt. Of central nursery                                        | 7.00                    | 4.39         | 6.14         | 12.10        |
| 3   | Forest protection from fire                                     | 16.00                   | 13.60        | 13.78        | 23.82        |
| 4   | Reforestation of degraded forest (RDF)                          | 66.15                   | 40.40        | 19.91        | 15.83        |
| 5   | Development in Forest Tourism                                   | 1.05                    | 22.34        | 0.00         | 26.85        |
| 6   | Compensation to the farmers for losses caused by the wildlife   | 15.00                   | 12.75        | 20.00        | 20.00        |
|     | Total (D)                                                       | 105.20                  | 93.48        | 242.71       | 376.75       |

| Sr. | Name Of Scheme                                  | Financial (Rs. In Lakh) |              |              |              |
|-----|-------------------------------------------------|-------------------------|--------------|--------------|--------------|
| No. | (E) 2406 FORESTRY AND WILDLIFE (TSP) (District) | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|     |                                                 | Achievements            | Achievements | Achievements | Achievements |
| 1   | Join Forest Management (OTSP)                   | 0.81                    | 1.13         | 0.00         | 0.00         |
| 2   | Plantation of General Use                       | 11.95                   | 31.20        | 18.08        | 50.98        |
|     | Total (E)                                       | 12.76                   | 32.33        | 18.08        | 50.98        |

| Sr. No. | Name Of Scheme                                      | Financial (Rs. In Lakh) |              |              |              |
|---------|-----------------------------------------------------|-------------------------|--------------|--------------|--------------|
|         | (F) 4406 FORESTRY AND WILDLIFE (NON TRIBAL) (STATE) | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|         |                                                     | Achievements            | Achievements | Achievements | Achievements |
| 1       | Construction of Van Talao                           | 0.00                    | 0.00         | 0.00         | 30.78        |
| 2       | Massive Afforestation Programme                     | 11.27                   | 7.07         | 5.15         | 31.31        |
| 3       | Afforestation for soil Conservation                 | 6.19                    | 3.04         | 0.00         | 4.02         |
|         | Total (F)                                           | 17.46                   | 10.11        | 5.15         | 66.11        |

| Sr. No. | Name Of Scheme                                                | Financial (Rs. In Lakh) |              |              |              |
|---------|---------------------------------------------------------------|-------------------------|--------------|--------------|--------------|
|         | (G) 4406 FORESTRY AND WILDLIFE (NON TRIBAL)                   | 2012-13                 | 2013-14      | 2014-15      | 2015-16      |
|         |                                                               | Achievements            | Achievements | Achievements | Achievements |
| 1       | Forest Building (Repairs)                                     | 9.00                    | 2.44         | 6.50         | 19.96        |
| 2       | Soil and water conservation on forest areas                   | 0.00                    | 0.00         | 0.00         | 166.37       |
| 3       | Forest roads and bridges                                      | 4.99                    | 2.18         | 10.15        | 3.36         |
| 4       | Forest Protection from fire                                   | 50.77                   | 27.84        | 108.19       | 86.10        |
| 5       | Wild Life and Nature Conservation                             | 0.00                    | 0.6          | 0.2          | 52.381       |
| 6       | Development of Forest Tourism                                 | 0.00                    | 0.00         | 0.00         | 29.00        |
| 7       | Compensation to the formers for doses caused by the Wild Life | 11.33                   | 13.87        | 32.21        | 229.12       |
|         | Total (G)                                                     | 76.09                   | 46.93        | 157.25       | 586.281      |
|         | GRAND TOTAL OF PLAN SCHEMES (A to G)                          | 350.94                  | 301.28       | 585.00       | 1380.391     |

It is observed that there is a more than double increase in Plan expenditure in the Division, which is a very encouraging sign. With the implementation of the Working Plan in right earnest, the goals of the 12<sup>th</sup> plan can be achievable.

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## **CHAPTER 11**

### **PAST SYSTEMS OF MANAGEMENT**

#### **11.1.GENERAL HISTORY OF THE FOREST:**

**11.1.1.** In 1853, when the Berar was assigned to the British, it was in a very undeveloped condition. Shifting cultivation was in practice and forests were cut at their will by the neighbouring villages. Soon after the assignment, the districts were rearranged, but Buldhana did not acquire its present dimension till 1905, when Khamgaon and Jalgaontalukas were added to the three talukas Mehekar, Chikhli and Malkapur to form the district of Buldhana with Buldhana as its head-quarter.

In 1865, regular forest administration was started by the appointment of one Assistant Conservator of Forests for the Berar. For the first few years all that could be done was to select and demarcate a few reserves. In 1869-70 Berar was split up into two divisions with a Deputy Conservator placed in-charge of the Northern Division as Chief Forest Officer and an Assistant Conservator in-charge of Southern Division. Forest management was further systematized by the Government of India, Revenue and Agriculture Department, Notification No.520, dated the 25<sup>th</sup> October 1871, which established the following classification of forests :-

- a) Demarcated State Forests.
- b) District Reserved Forests-Defined as lands not to be assigned for cultivation.
- c) District Unreserved Forests-All other lands which were neither cultivated nor assigned for village purposes, nor included in Izara or Jagir.

**11.1.2.** In 1881, Berar became a Conservator-ship and the provincial branch of the service was organized, the staff was strengthened and a reclassification of the forests began. The classification then adopted was completed in 1885-86, and was practically the same as that legally recognized in 1892, by Notification under section 40 (c) of the Berar Forest Law, viz :-



- A.** 1. Reserves: - Tract of some extent primarily intended for production of timber and fuel.
- B.** 2. Woods: - Areas suitable for growing Babul.
- C.** 3. Grass lands: - Areas set aside for production of grass.
- D.** 4. Grazing lands: - Areas reserved for pasture.
- E.** 5. Open forests: - Lands awaiting excision and until then to be treated as 4.

**11.1.3:** This classification worked fairly well till 1900, when after the famine, a boom in land set in and prices of Cotton increased almost annually. Due to this, land under cultivation increased and areas under grazing curtailed, while the livestock increased until the free grazing and "C" (i) class lands could no longer sustain the increased pressure. "C" (ii) areas were either transferred to "A" class or given out for cultivation or formed into "E" class in 1911. Cultivable lands were deforested, waste lands afforested and some new A class reserves formed out of "C" class, but no definite policy was laid down. In November 1913, all "B" class forests were transferred to "A" class.

**11.1.4:** Territorial and internal changes in the history of these forests were as follows:-

In the year 1870 Akola formed part of the Southern Division under an Assistant Conservator. This was split up in 1880-81 into the Wani, Washim and Purna Divisions, when Buldhana forests were included in the Purna Forests Division and Akola forests formed part of Wani and Washim Divisions. In 1885-86 Akola and Buldhana became separate Forests Divisions. Ambabarwa reserve was constituted in 1890. Since then large tracts of forests from the district adjoining the Buldhana Division were transferred to it with a view to distribute the work, and at the same time develop the areas transferred, and to work then to their fullest capacity. These objects not being fulfilled, the areas transferred were restored to their divisions. Thus in 1901, the forests of Akola Divisions were included in the Buldhana Division but restored to Akola Division in 1906, when Akola Division was reformed. In March 1924, 12740 acres of area from Nimar Division was transferred to Buldhana, but, in June, 1926 it was restored to Nimar. In November, 1929, the Burhanpur range of the Nimar Division was transferred to Buldhana and restored in December 1931. Certain forests of Murtijapurtaluqa of Akola district which till 1906 formed part of Amravati Division were also transferred to the Akola Division when it was reformed. These

included three square miles of Babul woods and 35 acres of *Bamboo* plantation. In 1925, an internal change was effected. The Palodi Sub-range of Pangra range was transferred to Murtijapur range. In 1931 Pangra range was abolished and its forests distributed amongst the three remaining ranges Balapur, Murtijapur and Morna of Akola Division. On the first of April, 1932, the Buldhana and Akola Forests Divisions were amalgamated to form West Berar Forest Division with head-quarters at Akola. The old Buldhana Division now formed Sub-Division of the new West Berar Division. Internal changes in the old Buldhana division also had taken place. The Purna range of Buldhana Division was split up into Jalgaon, Chikhali, and Mehkar ranges. In 1936 and 1938 respectively, the Mahoja reserve and Risod C-class both lying in the Washimtaluka of Akola district were transferred to the Buldhana Sub-Division.

**11.1.5.** Jagir forests of Bhingara, Anyar, Rohankhirki, Salwan (area 23259 acres) of Jalgaon range, Asola, Bhanosa and Shekapur (area 971 acres) of Mehkar range were abolished and declared as Protected Forest on 4<sup>th</sup> June, 1957 and now form the part of the range in which they occur.

**11.1.6.** In year 1957 Protected Forests of Andhari and Ada (area 472 acres) of Aurangabad division were transferred to West-Berar Division and formed part of Chikhli range.

**11.1.7.** Akola and Buldhana Divisions were reconstituted in the year 1964.

**11.1.8** Dnyanganga Wildlife Sanctuary has been constituted over an area of 203.56 sq.km in Buldhana district vide Govt. notification No. WLP 1094/CR-363/F-1 dated 9<sup>th</sup> May 1997. Also Ambabarwa Wildlife Sanctuary has been constituted over an area 127.11 sq.km (102.10 sq.km RF + 22.63 sq.km PF + 2.38 sq.km private land) of Buldhana district vide Govt. Notification No. WLP-1094/CR-123/F-1, dated 9<sup>th</sup> April 1997. The areas of Dnyanganga Wildlife Sanctuary and Ambabarwa Wildlife Sanctuary were transferred to Dy. C.F. (Wildlife) Akola, and Akot respectively on 13.1.1998. This led to re-organization and reduction of ranges from eight to seven. Lonar Wildlife Sanctuary has been constituted over 2.67 sq. km of 'C' class Reserve Forests of Buldhana district vide Govt. Notification No. WLP-1098/CR-48/F-1 dated 8<sup>th</sup> June 2000, however, it is continued to be managed by the territorial Division.

**11.1.9:** Lonar Wildlife Sanctuary constituted over an area of 3.65 sq.km in Buldhana district transferred to Akola Wild Life Division & the area of 34.37 sq.km of Buldhana Division transferred to Akot Wildlife Division of Melghat Tiger Reserve

vide Govt. Resolution No. WLP-0718/CR-268/F-1, dated 4<sup>th</sup> December 2018. The details enclosed in **Appendix no IV** of volume II.

## **11.2: PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS:**

**11.2.1.** The forests before the regular working started in the year 1865, suffered badly from heavy felling's and over grazing as such the object of management in the beginning was to give them complete rest from felling and to ensure protection against fire and grazing.

**11.2.2.** 'C' class forests suffered to a much greater extent than the "A" class forests. Felling's flush with ground with a view to obtain coppice regeneration was as far as possible insisted upon, and in some cases departmental felling's were made as back as 1891 and even earlier to improve condition of some of these reserves. It was in the year 1896 that the necessity for the working of these forests on silvicultural lines in accordance with the resources and capabilities was felt, because of 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 Conservator for the greater portion of the timber and fuel reserves and introduced as the demands extended. These felling schemes were based on area and the treatment prescribed was "Coppice-with-Standards". Fifteen felling series were formed under the schemes and an area of 42 square miles was exploited by 1912 with fairly satisfactory results.

**11.2.3.** Provisional working of A class forests of Buldhana began in 1902-03, Coppice-with-Standards fellings on a 20 year rotation were carried-out in Ambabarwa reserve and followed by Cutting Back Operations. *Bamboos* were worked on three years rotations. For grazing the forests were divided into blocks for each of which a maximum limit of cattle was fixed.

**TABLE 11.1: LIST OF WORKING PLANS OF  
BULDHANA DIVISION**

| <b>S.N.</b> | <b>Working plans in chronological order</b> | <b>Plan period</b>                          |
|-------------|---------------------------------------------|---------------------------------------------|
| 1           | RaoBahadur Naidu                            | 1912-13 to 1937-38                          |
| 2           | S.A.Cornelius                               | 1938-39 to 1947-48                          |
| 3           | S.S.Parasnis                                | 1966-67 to 1979-80 (Extended up to 1987-88) |
| 4           | B.S.Thengdi                                 | 1995-96 to 2004-05 (Extended up to 2007-08) |
| 5           | V.R.Tiwari                                  | 2010-11 to 2019-20                          |

### **First Working Plan by RaoBahadur Naidu (1912-13 to 1937-38)**

**11.2.4.** In the year 1912-13, Working Plan for the Buldhana forests, drawn up by RaoBahadurSrinivasalu Naidu was sanctioned. According to it forests were worked on the following lines:-

- i. Teak, *Salai* and mixed areas were worked under the Coppice-with-Standards system on 20 years rotation with a minimum of 25 trees reserved per acre. Cutting Back Operations followed the main fellings and coupes were closed to grazing for five years after the main fellings.
- ii. The greater part of the *Anjan* type was declared unworkable; a small area was to be worked under Improvement fellings on 20 year rotation. Coupes were closed to grazing for five years after fellings. In parts of the felled coupes the soil was to be broken up to the leeward side of seed bearers.
- iii. *Babul* areas were worked under a treatment of clear fellings followed by agricultural sowings. Coupes were to be leased by auction on an agreement of five years. The rotation adopted was twenty five years. The area affected by insect attack was excluded from working. Lines of forest species sown were to be 18 feet apart. Cleanings and Thinnings were prescribed. Grazing was permitted in coupes under regeneration at the rate of one cow or bull per acre. Browzers and Buffaloes were excluded.
- iv. *Bamboo* areas were worked on three years cycle by annual coupes. No culm under one year was to be felled and all remaining culms were to be cut between 1 to 2 feet from the ground.
- v. The leasing out of pasture lands was prescribed. Unlimited grazing was permitted in "C" class forests.
- vi. All the *Anjan*, *Teak*, *Salai* and mixed areas were fire protected.

**11.2.5.** The areas prescribed for working under the Coppice-with Standard system were from 1926-27 onwards, worked under Improvement fellings. *Anjan* areas were worked under Improvement fellings, but in part only, the demand for produce from coupes of these areas being very small till 1925-26, when for two years clear fellings were adopted. After this they have been worked under Improvement fellings in whole or part or not at all, according to the demand each year from each coupe. The prescription of breaking of the soil in these areas did not appear to have been followed rigidly for long.

**11.2.6.** In the *Babul* forests the areas damaged seriously by insect attack, were found to have recovered sufficiently by 1925 to be worked. They were

consequently placed under a separate Felling Series and worked under the same system as the rest, but under a longer rotation of 30 years. Several forest species too were tried in the agri-silvicultural sowings of *Babul*, *Mesquite*, *Garari*, *Teak*, *Rohan*, *Sissoo*, *Kala-siris*, *Neem*, *Siwan*, *Semal* and *Bhirra*; of these the following proved failures, *Semal*, *Bhirra*, *Garari* and *Mesquite*. The leasing of some *Babul* reserves to village bodies for grazing was tried, and continues till today, having proved in these cases to be suitable.

**11.2.7.** The past management has in the Coppice-with Standard areas, resulted principally in the increase of *Teak* reproduction and the spread of *Teak* into *Salai* areas being benefited in that direction by factors such as fire protection regulated grazing and the protection and preferential treatment given to the species. Judging from the standing parent trees, the condition and quality of the crop was improving. Some areas of the *Anjan* type that were unworkable have benefited by the protection allowed to them, and are today stocked sufficiently to fit for working. In the case of these areas again there is an increase in the reproduction of *Teak*, for reasons given already. *Anjan* reproduction, too, has improved in a few places, it being another favored species.

**11.2.8.** The past working in *Babul* reserves has in some cases proved a failure but on the whole it can be described as a success. Vagaries of weather, too little or too much rainfall, lack of proper selection of species suited to the soil, that varied so much in each coupe, lack of timely weedings and damage by wild animals and semi wild cattle, heavy floods combined with attacks of root-borer to *Babul* and pith borer to *Siwan*, have been the causes of failure. The quality of the *Babul* forest has apparently deteriorated for which the short rotations may be responsible. The purpose of management, namely, the production of fuel and quick return, however, offers no alternative. Past experience has shown that the forest species to be sown in each coupe under regeneration must vary with the quality of the soils in the area. Trials with several forest species have led to the conclusion that where there is better quality deep soil *Babul*, *Prosopis juliflora* (Australian variety), *Bamboo* (*Dendrocalamus strictus*) and *Siwan* would grow well, the only species that are likely to give the best results in the poorer soils (bhurandi and chunkhedi) are *Prosopis juliflora* (Australian variety) and *Babul*. Of the two varieties of *Babul*, *Teliya* yielding a better quality wood and more hardy against attacks of root-borers and *Fomes Pappianus* should be preferred to *Kaudia*. The regeneration of *Babul* by agri-silvicultural methods had, in spite of occasional failures, proved to be the best and most remunerative.

**11.2.9. Bamboos** (*Dendrocalamus strictus*) of Ambabarwa have suffered in quality on account of uncontrolled or only partly controlled extraction permitted in the past. All along bridle paths and nalas of Ambabarwa, where Bamboos abound, may be seen, clumps that have been subject to merciless hacking, year after year.

**Second Working Plan by S.A.Cornelius. (1938-39 to 1947-48)**

**11.2.10.** The Working Plan of 1912-13 of Buldhana forests prepared by Rao Bahadur S. Naidu with subsequent modifications was replaced by the Working Plan prepared by S.A. Cornelius. The entire area was stock mapped, and following working circles were formed:-

(i) **Ambabarwa Working circle:** All the workable areas of the Ambabarwa reserve were allotted to this working circle. The method of working prescribed was improvement fellings with ultimate idea of conversion to uniform system by clear-felling suitable patches. A rotation of 40 years was fixed. Originally, intermediate fellings were prescribed at mid rotation. This provision was, however, deleted subsequently. Improvement fellings, thinnings, selection felling and clear-fellings under different conditions and Cutting Back Operations to follow main fellings were prescribed. The grazing closure was of five years after the main fellings.

(ii) **Teak Coppice-with-Reserves Working Circle :** This included the Teak, Salai and Mixed forests of the Amdari, Geru Matergaon, Gumi, Ghatbori, and Mohoja reserves. The silvicultural system prescribed was Coppice-with-Reserves. Rotation of 30 years was fixed. However, in Moegaon FS. Rotation of 45 years was fixed. Clear fellings in well-stocked areas with pollarding of Anjan, Selection-cum-Improvement fellings in the other areas and reservation of Teak patches with healthy advance growth was prescribed. A line of trees on nala banks preferably of Koha and Mahua, Achar, Kulu, elsewhere to be reserved. Only C.B.O. was prescribed. Double closure of grazing one of 4 years after the main fellings and another 4 years after mid rotation were prescribed.

(iii) **Selection-Cum-Improvement Working Circle:** All workable Anjan forests of Chikhli Range found in the central belt were allotted to this working circle. The system of working followed was selection-cum-improvement fellings. Neither regular system subsidiary operations nor any thinnings were prescribed. Actual felling rules were based on the division of the area under different categories namely, (a) Areas fully stocked with Anjan advance growth-sapplings below 9"

were to be retained and everything else was to be felled. (b) Areas well-stocked with advance growth of teak and other valuable species except of babul was to be retained and the rest was to be felled. (c) In other areas selection-cum-improvement fellings were to be carried-out. A felling cycle of 30 years adopted because teak and *Anjan* could grow to 18"-24" girth in 30 years.

(iv) **Babul Working Circle:** The *Babul* reserves of the Sub-Division were allotted to this working circle. The system of clear fellings followed by agrisilvicultural regeneration was prescribed. Rotation was fixed at 30 years. Five years leases were granted for felling and regeneration by agrisilvicultural method. Pure field crops were allowed for the first two years only. In the third year *Babul* (*Teliavariety*) was raised in lines 18 feet apart. Repeated tending particularly in monsoon months were prescribed. Thinnings were prescribed at 5<sup>th</sup>, 10<sup>th</sup> and 20<sup>th</sup> years commencing from the year of leasing out.

(v) **Open Pasture Working Circle:** This Working Circle included all unworkable *Anjan*, *Salai*, and Mixed forests. A periodical grazing closure of 3 years closed and 12 years open was prescribed. Prior to closure fellings to exploit mature trees and thinnings in congested portions were to be carried out at the discretion of the D.F.O. Fruit bearing and shade trees were to be reserved. Grazing, by limited number of cattle, after grass cutting was allowed. 18 Grazing Series were formed out of which 3 were to remain permanently open to grazing. The rest were divided into 5 coupes each. Each coupe was to be closed in turn for three years.

(vii) **Miscellaneous Working Circle:** This Working Circle consisted of 14 grass ramnas and 12 forest villages. Except for 1622 acres from HiwarkhedRamna, all the areas were closed to grazing. Grazing was allowed after grass cutting.

**11.2.11.** Prior to 1912-13 the 'C' class forests, had always been open to unrestricted and unlimited grazing of all animals, while grazing in "A" and "B" classes was always under control. All the "A" class forests when first constituted as State Reserves were absolutely closed for grazing of all kinds. In 1884-85 very light grazing excluding sheep and goats was allowed. This continued till 1888-89. In 1889-90 this was again stopped and all the reserves were closed to grazing, till 1898-99, when owing to the scarcity of fodder and general distress of famine year 1899-1900 all reserves were thrown open to grazing. From this date grazing continued upto 1904-05; only exploited compartments being closed to grazing. Geru-Matergaon and Amdari Reserves of Buldhana district were open for light grazing in 1885-86. In Ghatbhoari and Ambabarwa reserve, light grazing was

allowed till 1900-01 and in Gumi reserve, which was formed in 1901, cattle were admitted from 1907-08. In the "A" class reserves of Buldhana forests during the years 1908-10 definite measures to regulate grazing were taken on the following lines:-

- i) Buffaloes were excluded from all reserves.
- ii) To keep the grazing within the prescribed incidence, where necessary, cattle belonging only to villages adjoining to the forests were admitted and
- iii) Grazing cattle belonging to more distant villages were provided in camps in the interior of the reserves.

**Period 1912-13 to 1937-38:-**

**11.2.12.** The forests were divided into 41 grazing units. Grazing was regulated in order to preserve tree growth and pasture and at the same time to provide sufficient grazing.

**11.2.13. Coppice areas:** - Coupes were closed to grazing for five years after felling. The remaining areas were open to grazing at the rate of 1 head per 1 1/2 acres except in Gumi reserve where an incidence of 1 head per acre was permitted.

**11.2.14. Babul areas:** - The only restriction to grazing in this Working Circle was that during the period of regeneration and establishment of the young crop which was estimated from five to seven years. Cows and bullocks were allowed to the limit of one head per acre after the harvesting of the field crops. Thereafter the limit was to be removed and buffaloes could be admitted. Camels, goats and sheep were not allowed.

**11.2.15. Anjan areas:** -(a) In Felling Series in which regular working was prescribed; coupes were closed to grazing for five years after felling. In the remaining areas grazing of cows and bullocks was allowed at the rate of 1 head per acre. (b) In the areas for which no regular working was prescribed the grazing of cows and bullocks was allowed at the rate of 1 head per 1 1/2 acres.

**11.2.16. Fodder Reserves:** - The grazing of cows and bullocks only in ramnas under Fodder Working Circle was allowed after the 31<sup>st</sup> October at an incidence of 1 head per 1 1/2 acres, provided that the demand for fodder grass was satisfied with exception of Janunaramna situated in the catchment area of Khamgaon tank which was closed to grazing throughout the year.



**11.2.17. Grazing Working Circle:** - This included all the unworkable blocks and unrestricted grazing of all kinds was permitted.

**Prescriptions in Cornelius's Plan for Buldhana introduced from 1938-39.**

**11.2.18.** Grazing was regulated by a system involving periodic closures. All the "A" class reserves were divided into 43 units. Villages were allotted to each unit and maximum number of cattle allowed to graze in them was fixed.

**11.2.19.** The grazing prescriptions laid down for different Working Circles were as below:

- i) **Ambabarwa Working Circle :-** Coupes in this Working Circle were closed for five years after working and for another five years after the lapse of fifteen years as under :-

| Close period | Open Period | Close period | Open period |             |
|--------------|-------------|--------------|-------------|-------------|
| 5            | 15          | 5            | 15          | = 40 Years. |

At no time more than quarter of the area was closed to grazing. Coupes worked under intermediate felling were to be closed for grazing after working.

- ii) **Teak-Coppice-with Reserve Working Circle :-** Coupes in this Working Circle were closed for 4 years and open for 11 years, after which repetition of period of closure and grazing was followed thus :-

| Close | Open | Close | Open |            |
|-------|------|-------|------|------------|
| 4     | 11   | 4     | 11   | = 30 years |

The maximum area closed to grazing was four fifteenth.

- iii) **Anjan Selection-Cum-Improvement Working Circle:** These areas had suffered heavily from grazing in the past and as such a long period of 10 years closure after felling was prescribed, the coupes remained open for the rest of the period.

| Close Period | Open Period |             |
|--------------|-------------|-------------|
| Years        | Years       |             |
| 10           | 20          | = 30 years. |

In the Hiwarkhed Felling, Series which formed about a fifth of the area of this Working Circle, not more than 1400 acres was to be opened to grazing

annually at the discretion of the Divisional Forest Office. Of the remainder of the Working Circle, a third was the minimum closed to grazing.

iv) **Babul Working Circle:-** Grazing was permitted during the period of regeneration of each coupe only to the lessee's cattle subject to a maximum of one animal per acre. At no time more than a sixth of the area was under such restricted grazing. Buffaloes were not permitted during the period of regeneration and for the two years following.

**11.2.20.** Goats and sheep were not permitted to graze in any of the above mentioned Working Circles.

**11.2.21.** The forest areas were classified for grazing control according to the M.P. Government Memorandum No.605-284-XV of 19<sup>th</sup> July, 1933 under the plan prepared by S.A.Cornelius for Buldhana. The classification was as below:-

**Table No.7.1.**

**TABLE SHOWING CLASSIFICATION OF FOREST FOR GRAZING**

| Range          | Tree Forests     |                 | Scrub Forests |                     | Other Forests | Total           |
|----------------|------------------|-----------------|---------------|---------------------|---------------|-----------------|
|                | A (i) moist type | A (ii) dry type | B (i) Pasture | B (ii) Open pasture |               |                 |
| Mehkar         | -                | 23,082          | -             | 13,756              | 3,042         | 39,880          |
| Khamgaon       | -                | 48,513          | 13,047        | 24,206              | 6,594         | 92,360          |
| Jalgaon        | -                | 20,685          | -             | 24,395              | 4,888         | 49,968          |
| <b>Total :</b> | -                | <b>92,280</b>   | <b>13,047</b> | <b>62,357</b>       | <b>14,524</b> | <b>1,82,208</b> |

## **RESULTS OF PAST WORKING**

**11.2.22. Growing-stock:** The regular working and past management based on scientific lines for the last 50 years or so had resulted steadily in the improvement of the crop both in composition and condition. Fire protection, regulated grazing, the general protection and the preferential treatment given to *Teak* had increased, *Teak* reproduction and it spread in *Salai* and other miscellaneous areas. *Teak* is tending to be almost pure in dry exposed localities in these forests of trap zone. This is because of its inherent quality to withstand effects of grazing and fires

better than its usual associates. The general condition of crop was healthy. Except for few old and mature trees in remote forest reserves like *Ambabarwa*, crop in general was young to middle aged. Lack of proper prescriptions regarding treatment and tendings in the forests of *Buldhana* Sub-Division had resulted in congestion of young growth of teak and miscellaneous species.

**11.2.22.1.Reproduction:** Coppice reproduction of Teak all over the forest of this Division and to some extent of *Lendia*, *Dhaora*, *Saja*, *Tendu*, *Tinsa*, *Palas*, was satisfactory. Seedling reproduction of *Teak* was good especially in better quality forests of the Division. Elsewhere it was fairly satisfactory. Seedling reproduction of *Dhaora*, *Lendia*, *Saja*, *Tendu*, and to a lesser extent of *Bija*, and *Tinsa*, was fairly satisfactory where the soil moisture conditions are favorable, while it was very scanty or entirely absent in dry exposed localities with a superficial layer of soil.

**11.2.22.2. Grazing:** Though grazing was regulated and controlled its incidence was quite high in easily accessible areas adjoining big villages and towns.

**Third Working Plan by S.S.Parasnis from 1966-67 to 1979-80 (extended up to 1987-88)**

**11.2.22.3.** Only "A" class Reserved Forests 73767.21 ha (182205 acre) were dealt with under this Plan. These forests were stock mapped. Enumeration, stem and stump analysis were carried out during revision of the Plan.

**(i)SCI Working Circle:** - The area allotted to this Working Circle was **20,685acres**, spread over *JalgaonJamod* range. Two felling series viz. *Ambabarva* and *Mangeri* were formed. Harvestable girth prescribed was 90 cm. Felling cycle of 40 years was adopted. Areas were taken up for clear felling with a view to raise *Teak* plantation. Areas were also taken up for heavy felling for promoting natural regeneration of valuable species. C.B.O., cleaning, thinning etc. were prescribed.

**(ii)The Coppice-with-Reserve Working circle:** -Total Area allotted to this W.C. was **71,595 acres** comprising 104 compartments. All the miscellaneous forest and inferior *Teak* forests producing timber and fuel-wood were included. 19 felling series were formed. Rotation was kept at 40 years and harvestable girth was fixed 37.5 cm. in IVb areas and 45 cm. in IVa areas. Yield was regulated by area. Different treatments were prescribed for unworkable area, clear felled areas. Under normal condition, retention of minimum 30 trees/acre was prescribed. Clear felling for raising teak plantation was prescribed. C.B.O.,

cleaning and half rotation, thinnings were prescribed after 1, 6 and 20 years after main felling respectively.

**(iii)Improvement Working Circle:** The total area allotted to this Working Circle was **27454 acre**, comprising of 40 compartments (4 in Khamgaon Range, 17 in Gerumatergaon Range & 19 in Jalgaon Range of Raipur Reserve). This Working Circle included all the workable, predominantly Anjan Forests of Khamgaon&Jalgaon ranges. 5 Felling Series were formed. Felling cycle of 30 years was adopted. Only felling of malformed, diseased, dying and over mature trees and thinning in congested patches were prescribed for improvement of growing stock.

**(iv)Babul Working Circle:** - The total area allotted to this Working Circle was **4,016 acres** comprising of 147 compartments. All the *Babul Bans* in the *Jalgaon* range were included in this working circle. It formed 3 Felling Series. The system of clear felling with agrisilvicultural regeneration was prescribed. Rotation was kept at 30 years. Stock mapping was done. Before clear felling preparation of stock map and soil map was prescribed. Subsidiary silvicultural operations like weeding and thinning were prescribed.

**(v)Open Pasture Working Circle:** - The total area allotted to this Working Circle was **50,955 acres**. All the open forest of Buldhana Division which were not capable of producing timber or firewood and where the demand for grazing was quite heavy were included with the object of improving the stocking. The periodic rest to these areas were prescribed. Such areas were treated under rotational grazing system for improvement of percentage of palatable grasses, introduction of superior fodder grass species and fodder species.

**(vi)Fodder Reserve Working Circle:** -The total area allotted to this Working Circle was **2279.46 acres**. These were set apart for the production of fodder grass. Cutting of grass was allowed after seeding i.e. after October. For improvement of quality and quantity of the fodder grass following measures was suggested:

- a) Periodic burning of grass ramanas once in five years in the last week of May.
- b) After burning the light soil working, broadcasting of superior grass seeds, planting of tussocks etc.
- c) Removal of dense patches of tree growth.

d) Eradication of weeds/climbers.

**(vii)Sandal Overlapping Working Circle:-***Warwand, Rajur and Lonar* were three felling series formed in Khamgaon&Mehkar Ranges. Each Felling Series was divided into five coupes. a, b, c, d and e to be worked on a five year cycle. Tending of young crop, harvesting of only dead trees were prescribed. Plantation of *Sandal* in at least two acres area of working coupe was prescribed.

**(viii)Bamboo Overlapping Working Circle:-**All the Bamboo bearing compartments were included in this. No felling was prescribed. Period thinning with a felling cycle of 4 years was prescribed. Bamboo planting in suitable 5 acre area was prescribed.

**(ix)Miscellaneous Working Circle:-**The total area allotted to this Working Circle was **5221 acres**. The areas which have not been allotted to any of other working circle had been allotted to this. No regular working was prescribed.

**11.2.22.4. Result:** Areas managed under CWR, have lost its coppicing vigor. Further these forests have dwindled to degradation due to failure to restock the area by artificial regeneration and natural regeneration. As a result the soil loss was accelerated. This was accentuated with biotic interference and illicit cutting which remained unchecked for over the years. Bamboo areas have become unworkable and hence need to restock the areas of bamboos. Sandalwood areas are not workable; rather the species is rarely seen. In the areas worked under SCI system, clear felling to raise *Teak* plantation, could not give encouraging results because the plantations were not successful, and clear felled areas could not remain productive. Further, heavy felling to induce natural regeneration caused the adverse effect on the stocking, because the natural regeneration could not be induced, protected and tended. Thus, the opportunity to improve the growing stock was lost. As a result, number of stems/ha of *Teak* trees was reduced. Further no soil and water conservation works were taken. Illicit cutting, biotic interference, repeated fires, absence of soil and water conservation works have led to the density reduction greatly and sites became degraded.

**Fourth Working Plan by B.S.Thengdi from 1995-96 to 2004-05 (Extended up to 2007-08)**

**11.2.22.5.**The working Plan by B.S.Thengdi included 'C' class R.F. and Ex-Jagir forests declared as P.F. apart from 'A' class R.F. dealt with under Parasnis' Plan.

The stock mapping was carried out in 101 compartments, however, enumeration or stem analysis were not carried out during preparation of Plan by B.S.Thengdi.

**Thengdi's Plan included following Working Circles:-**

**Table No. 11.2**

**Working Circle-wise area included in Thengdi's Plan**

| <b>Name of Working Circle</b>    | <b>Area in ha</b> |
|----------------------------------|-------------------|
| Afforestation cum Improvement WC | 90004.64          |
| Protection WC                    | 12797.93          |
| Catchment                        | 12509.36          |
| Babul Ban WC                     | 01245.74          |
| <b>Total</b>                     | <b>116557.67</b>  |

**i. Afforestation Cum Improvement Working Circle:** This working circle included area under Coppice with Reserve Working Circle (*Ghatbori&Isvi*F.S. area), Improvement Working Circle, Open Pasture Working Circle and Fodder Reserve Working Circle under Parasnis' Plan. It also included 'C' class Reserved Forests & Ex-Jagir Forests (P.F.). The total area of the Working Circle was **90,004.64ha**. Most of these areas were comparatively barren. The areas of *Ghatbori&Isvi*felling series was exception to this. The principal species in this area was *Anjan* and miscellaneous species, in the depression of valley with Teak.

The usual practice of planting 2500 seedlings per hectare tends to over stocking of plantations, ultimately leading to competition for soil, moisture and nutrients resulting in natural thinning and growth retardation. Hence, the concept of "Ecological Index" was adopted, which dictates the number of seedlings which can be sustained by prevalent ecology. The Ecological Index for Buldhana Division worked out to be 1.9, which meant that number of plants to be planted should not be more than 432 / ha. More stress was given on soil and moisture conservation works. Main objectives of this working circle were to protect the soil from further degradation by adopting soil and moisture conservation works & increase the stocking. Silvicultural system was Afforestation Cum-Improvement.

The vegetation which was crooked, stunted, multi forked etc. was recommended for suitable tending operations.

No appreciable yield was available in this working circle. Area was classified into various categories viz. A to E for the purpose of working. Tending of Natural Regeneration was recommended. Artificial Regeneration by afforestation was recommended in D2 area (having regeneration below 625 seedlings per/ha) to the shortfall of 625 seedling per/ha. Besides planting of Bamboo, Jamun, Anjan, agave, grasses was prescribed in "A" area (25° or more slope and 20 meter wide strips on both sides of rivers & perennial nalas or tanks). Bamboo under planting was prescribed in 'B' area (Blank area having slope upto 25 Degree) "C" area (young well grown pole crop area) & D area (Well stocked area). In area "E" II (Blank area having slope beyond 25 Degree) broadcasting of *Prosopis juliflora* seed was recommended in inaccessible areas.

**ii. Protection Working Circle:** In this working circle the area belonging to upper precipitous and very steep slopes of the Sonala Range was included. It was the area managed under Selection Cum Improvement Working Circle, during the Parasnis Plan. It also included the contiguous Protected Forests. In this working circle six felling series viz. North Mangeri, South Mangeri, North Ambabarva, West Ambabarva, South Ambabarva, & Rohinkhed/Salvan were formed. Mangeri & Ambabarva Felling series were having good miscellaneous stocking. Total area of this working circle was **12797.93 ha** having 20 coupes in each felling series having 20 years working cycle. This area is transferred to wild life divisions since 1998.

Primary objective of this working circle was to preserve and improve the existing growing stock in these vulnerable areas by resorting to soil & moisture conservation works.

No felling of trees or shrubs were prescribed in this working circle. Extensive soil and moisture conservation works were recommended. Bamboo under planting was prescribed. Tending of N.R. & rigid fire protection was recommended. Artificial regeneration of valuable species in 'B' area; D2 area was recommended. C.B.O. cleaning and thinning operations were recommended.

**iii. Catchment Treatment Working Circle :** In this working circle total area of **12509.36 ha** was included which mainly comprises catchment of *Dnyanganga* Irrigation Project. Most of this area is now transferred to the Wild Life Division

viz. *Dnyanganga* Wild Life Sanctuary since 1998. The primary objectives of this working circle were to prevent and reduce the rate of siltation of tanks and to improve and restore ecological balance through maintaining and improving adequate soil cover by adopting soil and moisture conservation measures. For the purpose area was classified in 'A' to 'G' categories & the different treatments were prescribed for each category.

Soil and moisture conservation works were prescribed in area "A" (area having crop density less than 0.4), area "C" (area having crop density more than 0.6) along with gap planting and under planting. In area 'B' (area having crop density more than 0.4 but less than 0.6) area "D" (area of slopes on 25 ° or more & 20 meter width on both sides of rives and perennial nalas or tanks) enrichment planting & planting of Bamboo; Jamun, Arjun etc. was prescribed respectively. No planting was prescribed in area 'E' (patches of young well grown pole crop of valuable species.) area "F" (areas containing adequate seedling regeneration). In "G" area (areas between full tank level & H.F.L.) planting of two rows of Babul followed by rows of Ain; Jamun; Bamboo etc. off F.T.L. was prescribed.

Conditional removal of silviculturally available tree was recommended in "D" area. No fellings were prescribed in other areas.

**iv. Babul ban Working Circle:** It was confined to Khamgaon, Jalgaon&Sonala Ranges. The Babul ban were scattered in more than 100 small patches of 2 ha to 50 ha. Scientific management had been stopped since 1974-75 which ultimately resulted in gradual degradation of these forests. Total area under this working circle was **1245.74 ha.**

The objectives were to improve the status of present vegetation by sowing & suitable tending operations & to raise Babul as a main species in the area with the involvement of local people so as to augment the supply of firewood & small timber to local people.

The treatment prescribed was improvement felling supplemented by Artificial Regeneration. The principal species was *Babul*. Some fruit species were also to be planted.

The rotation of 30 years was prescribed. All dead, except 2 trees/ha & 50 % Babul trees above 60 cm girth were prescribed for felling. Planting & protection by Forest Protection Committees was prescribed.



**v. N.T.F.P. (o) Working Circle:** This working circle was a overlapping working circle & it included the entire area of the Division. Besides general objectives, improvement of stocking of NTFP species was one of the objectives. Hence, in case of Tendu 50 ha plantation per year was prescribed, besides circular ditch creation was recommended for the inducement of root-suckers. Scientific pruning of Tendu leaves was recommended, however no specific method was prescribed. Moreover for collection of Moha flower clearing of wasteful litter beneath the crown was recommended. Planting of NTFP species likeeg. Sitaphal, Aola, Char, Myrobalans etc. was recommended. Identification & preservation of medicinal plants was prescribed.

**Results:** Although the period of the Working Plan started from 1995-96, sanction was received from GOI in April 1997. Hence, the Plan could not be implemented in the first two years. Non availability of funds at proper time had been another reason for non execution of the prescriptions of the Plan. Though afforestation was done in the Division, it wasn't done in the sequence prescribed in the Afforestation cum Improvement Working Circle .Forest areas were also assigned to FDCM, which carried out Plantations .However, concept of Ecological Index introduced by Thengdi remained on paper and was not followed. Results of plantations are not encouraging, the plantations were badly affected due to uncontrolled grazing by sheep, goat and other cattle. Tending operations were also not carried out. The areas allotted to Catchment Working Circle was declared as Dnyanganga Wildlife Sanctuary and transferred to Akola Wildlife Division.The areas allotted to Protection Working Circle was declared as Ambabarwa Wildlife Sanctuary and transferred to Akot Wildlife Division. Works as prescribed in Babul ban Working Circle was also not carried out. Overall, implementation of Working Plan was not done as per prescription. Hence, improvement did not take place and crop further degraded. The control forms and compartment history forms have not been received from territorial divisions. Therefore, detailed comments are difficult to make regarding results of Thengdi's plan.

#### **Fifth Working Plan by V.R.Tiwari from 2010-11 to 2019-20**

**IN THIS PLAN,FOLLOWING INDEPENDENT WORKING CIRCLES WERE PRESCRIBED :**

| <b>Sr.No</b> | <b>Name of Working Circle</b>            | <b>Area in ha.</b> |
|--------------|------------------------------------------|--------------------|
| 1            | Selection Cum Improvement Working Circle | 7884.05            |

|   |                            |                 |
|---|----------------------------|-----------------|
| 2 | Improvement Working Circle | 38362.54        |
| 3 | FuelWood Working Circle    | 1245.73         |
| 4 | Pasture Working Circle     | 29701.31        |
| 5 | Protection Working Circle  | 6605.43         |
|   | <b>TOTAL -</b>             | <b>83799.06</b> |

## **WORKING PLAN WISE PRESCRIPTION AS PER V.R.TIWARI (PREVIOUS)**

### **WORKING PLAN:**

#### **1. SELECTION CUM IMPROVEMENT WORKING CIRCLE:**

Total 24 compartments have been allotted to this working circle. They are divided into 3 felling series having 20 coupes in each of them. The working cycle was fixed as 20 years from the year of working and the harvestable girth was fixed at 105 cm.

**Result** – The numbers of trees of harvestable girth class (105 cm) were not available. This is because the degradation of the soil due to over grazing and biotic interference. Hence no felling were done in SCI Working Circle. The marking of trees and silvicultural operations were carried out only in 1<sup>st</sup> and 2<sup>nd</sup> year of plan operation. However the works of improvement like plantation works, tending of root stock in plantation areas, soil and moisture, seed dibbling in blank areas have been taken.

#### **II. IMPROVEMENT WORKING CIRCLE:**

The area of this Working Circle is divided into 7 Felling Series in 167 compartments have been allotted to this Working Circle. The felling cycle is fixed as 20 years. The coupes are worked through JFMC.

**Result** -After commencement of the Forest Right Act 2006 large scale of illicit felling and encroachment on the forest area increased. The tree density is less in this area of working circle. The marking of trees and improvement felling were carried out. The works of improvement like plantation works, tending of root stock in plantation areas, soil and moisture, seed dibbling in blank areas have been taken.

#### **III. FUEL WOOD WORKING CIRCLE:**

In this Working circle total 122 compartments are allotted. There is only one felling series i.e. Bhongaon which is divided into 10 coupes. The felling series is fixed as 10 years. The all trees of girth above 30 cm at breast height will be harvested.

**Result** -Total 855.07 Ha area proposed for artificial regeneration but natural regeneration works and subsidiary silvicultural operation such as Cut Back Operation, Pruning, Coppice cutting has not been done except Soil and Moisture Conservation works such as Vantalao has taken up which has resulted into the enrichment of moisture regime. As major areas approximately 1030 ha. are likely to be submerged under *Jigaon* Irrigation Project, so the object of management is short term and regeneration work has not been carried.

#### **IV. PASTURE WORKING CIRCLE:**

The crop density is generally 0.1. In this Working Circle total 119 compartments are allotted. There are 10 Grazing Series ( $S_1$  to  $S_{10}$ ). The Grazing cycle was fixed for 3 years subsequently it was closed for grazing to the period of next two years with the object of improving the grazing.

**Result:** Grazing closures as envisaged in the scheme have not been followed. As a result percentage of palatable grass did not increase. On the contrary the uncontrolled and heavy grazing in these areas has resulted in further deterioration of the site. Due to heavy grazing the soil erosion has increased and the sites have become poorer. The soil and moisture conservation works and fodder improvement works prescribed in the scheme have been taken up.

#### **V. PROTECTION WORKING CIRCLE:**

The area of Working Circle was divided into 2 Working Series, each containing 20 coupes. The total number of compartment allotted for this Working Circle was 18. The Working Cycle was fixed for 20 years. All the prescriptions will be carried out with the help of JFMC.

**Result** -The works of improvement like plantation works, soil and moisture conservation, seed dibbling in blank areas have been taken. No marking and improvement felling were done as all the areas of this working circle falls under protection. The soil and moisture conservation works were carried through DPDC and JalyuktaShiwarprogramme.

#### **11.3: SPECIAL WORK OF IMPROVEMENT UNDERTAKEN.**

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

- 1) **Fire Protection:**GR No.FDM201 1/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.
- 2) **Improvement in Communication Roads:** - Forests are fairly well connected to main metal led roads by cart tracks and fair weather 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.
- 3) **Amenities to Staff:-**A total of PDAs phone are 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. Communication gap between the DCF and his officers to the lowest functionary of the Division is being slowly bridge. Real-time reporting of illicit incidences has become a possibility if the technology is being used properly.

#### **11.4: PAST YIELD, REVENUE AND EXPENDITURE.**

As harvesting of timber and firewood have not been done in these forests for more than two decades data of past yield in respect of timber and firewood is not available.

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## CHAPTER-12

### STATISTICS OF GROWTH AND YIELD

The main species in Buldhana 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 (2010-2011 to 2019-2020) 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         |

#### 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 Buldhanahas 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 tone) |
|-------|----------------|-------------------|------------------------------------|--------------------------|----------------------------------|
| 1     | IWC            | 44184.315         | 64.58                              | 2853423.39               | 856027.02                        |
| 2     | Pasture WC     | 29701.31          | 10.18                              | 302359.34                | 90707.80                         |
| 3     | Protection WC  | 6630.79           | 60.15                              | 398842.02                | 119652.61                        |
|       | Total          | 80516.42          | 00                                 | 3554624.75               | 1066387.43                       |

## **CARBON SEQUESTRATION AND MITIGATION:**

In this plan an area of 44184.32 ha. is proposed under Improvement 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 Buldhana 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 (CO<sub>2</sub>) from the atmosphere through the process of photosynthesis and turn it into biomass (wood, leaves, fruits etc.). A part of the CO<sub>2</sub> taken in by plants is returned to the atmosphere through respiration. Thus, the carbon cycle is renewed and continues interminably.

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

Excessive quantities of greenhouse gases disturb the balance of transfer of heat through the atmosphere. Normally solar radiation absorbed by space heats the earth while infrared radiation lost to space cools the earth. The presence of excessive anthropogenic greenhouse gas emission (mostly carbon dioxide from fossil fuel burning) in the atmosphere reduces the Earth's ability to cool to outer space through infrared radiation. The result is a heightening of the greenhouse effect, a nature process by which gases as CO<sub>2</sub> 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 CO<sub>2</sub> and changes in the biodiversity of landscape and species. Currently about three-quarters of the direct human induced disturbances to the global carbon cycle are due to fossil-fuel combustion. Emission currently exceed 6 GT C/yr (gigatonnes of carbon per year) and are still increasing.

### **CARBON AND FOREST ECO-SYSTEM**

Forests play an important role in mitigation and adaptation of climate change. Forests sequester and store more carbon than any other terrestrial ecosystem and are an important natural 'brake' on climate change. Carbon sequestration by forests has attracted much interest as a mitigation approach, as

it has been considered a relatively inexpensive means of addressing climate change immediately. In India, the varied climate regimes, the large geographical area, varied topography, long coastline and the possession of the oceanic island have endowed it with a diversity of natural biomass from desert to alpine meadows, from tropical rain forests to temperate pine forests, from mangroves to coral reefs and from marshland to high altitude lakes.

Research is still in progress to understand the effect of climate change on life forms and ecosystem. It has been suggested that the increased proportion of carbon dioxide in the atmosphere increase fertilization effect and enhances growth in plants. In that case warming and an increase in atmosphere CO<sub>2</sub> 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 CO<sub>2</sub> fertilization on vegetation and soil in temperate forest ecosystem suggests that plant C increase in response to excess atmospheric CO<sub>2</sub> (Downing et al., 1992).

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

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

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



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

### **METHODOLOGY FOR THE ASSESSMENT OF FOREST CARBON**

The 'Good Practices Guidance' (GPG) developed by Intergovernmental Panel on Climate Change (IPCC) is universally accepted source book for concepts, definitions, various pools, methods, default values, various required equations etc. for preparing account of forest carbon stocks (FCS). Since the subject has been developing in last two decades, many new concepts and methods have emerged but still many challenges remain. The GPG uses the term "Categories" to refer specific sources of emissions/ removals of greenhouse gases. As per the IPCC GPG 2003, the categories are: Forest land, Cropland, Grassland, Wetlands, Settlements and other land. Each land-use category is further subdivided. The following 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 CO<sub>2</sub> per 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 factor are developed using estimates which are used at different levels; global, national and sub-national and based on the level the ‘Tier levels’ (Table 12.1) are defined which are independent of the approach being followed.

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

The Tier 1 approach employs the basic method and default emission factors provided in the 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 appropriate for the climatic regions and land use systems in the country.

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

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

**TABLE NO. 12.4: DIFFERENT FOREST CARBON POOLS**

| Pools               |                            | Description                                                                                                                                                                                                                                    |
|---------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Living Biomass      | Above ground biomass (AGB) | All living biomass above the soil including stem, stump, branches, bark, seeds and foliage.                                                                                                                                                    |
|                     | Below ground biomass (BGB) | All living biomass of live roots. Fine roots of less than 2 mm diameter (country specific) are often excluded because these often cannot be distinguished empirically from soil organic matter or litter.                                      |
| Dead Organic Matter | 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. In order to confidently scale up this data to the required geographical level, proper sampling design is vital.

Stratified random sampling is generally used for forest/carbon inventory as mostly forest areas are heterogeneous. Under stratified sampling, forest area are stratified into homogenous strata and samples are selected from each strata randomly. This provides precise estimates for different strata and also population. Once sample sites have been selected, established methods of biomass inventory are employed for different pools.

## **12.1.2: 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 based on above-ground biomass carbon (Brown, 2002; Cairns et al., 1997)

**(iii) Dead Organic Matter (wood):**

The DOM wood carbon pools includes all non-living woody biomass and includes standing and fallen trees, roots and stumps with diameter over 10 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 complete 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 has 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 Buldhana:**

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            | Density | 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                 |
| <b>Total</b>                   |         | <b>25863.6</b> | <b>103195</b> | <b>40521</b> | <b>510.4</b> | <b>4250.5</b> | <b>134865</b> | <b>283341.3</b> | <b>109.55</b>         |

The Forests of Buldhana Division mainly falls in Tropical Dry Deciduous Forests. On the basis of above data for forest type of Tropical Dry Deciduous Forests in Maharashtra, the Carbon Stock in Buldhana Forest Division is calculated to be as under:

**TABLE NO. 12.6: FOREST CARBON STOCK IN BULDHANA FOREST DIVISION**

**(In '000 tonnes)**

| Forest type stratum            | Density | Area in sq.km. | ABG           | BGB           | Dead wood   | Litter       | SOM            | Total          | C Stock /ha. (tonnes) |
|--------------------------------|---------|----------------|---------------|---------------|-------------|--------------|----------------|----------------|-----------------------|
| Tropical Dry Deciduous Forests | VDF     | 12.13          | 75.78         | 29.75         | 0.55        | 7.87         | 71.85          | 185.82         | 153.19                |
| Tropical Dry Deciduous Forests | MD F    | 73.176         | 431.73        | 169.55        | 1.20        | 4.54         | 385.41         | 992.26         | 135.6                 |
| Tropical Dry Deciduous Forests | OF      | 205.85         | 263.28        | 103.34        | 2.68        | 8.65         | 617.55         | 995.70         | 48.37                 |
| <b>Total</b>                   |         | <b>291.156</b> | <b>770.79</b> | <b>302.64</b> | <b>4.43</b> | <b>21.06</b> | <b>1074.81</b> | <b>2173.78</b> | <b>74.66</b>          |

Thus the Buldhana Forest Division holds/ stores 2173.78tonnes of Carbon in its forests at an average of 74.66tonnes/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**

### **BASIS OF PROPOSALS**

#### **1.1: OBJECTIVE OF MANAGEMENT**

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

##### **1.1.1: 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, optimize production of forest products to meet the market needs and also bonafide needs of local people. Various standard scientific treatments, suitable for a particular area, are prescribed to conserve and improve the quality and productivity of the forest to meet the national and global needs in general and the 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 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 programmers, especially, on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- Increasing productivity of forests to meet essential national needs.
- Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- Creating a massive peoples movement with the involvement of women, for achieving these objectivities and to minimize pressure on the existing forests.

The principal aim of the forest policy is to ensure environmental stability and maintenances 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 park, 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 worked 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 river banks and the forests that have become depleted through maltreatment and further exploitation of which will accentuate soil erosion and adversely affect the productivity of agricultural lands in the region. The management should aim at conserving these forests, through soil and moisture conservation measures, so that they may exert beneficial influence on the soil, water regime and the physical and climatic factors of the locality.

**b) Tree forests:** These forests are situated in remote tracts that are mainly capable of growing large sized timber and other products of commercial value.

**c) Minor Forests:** It includes forests that are interspersed with cultivated lands and are capable of producing small timber and fuel wood and providing grazing which are indispensable needs of adjoining agricultural population.

**d) Pasture Lands:** These are openly stocked forests or scrub lands that have ceased to yield even the small timber but 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 degree), 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. The natural regeneration will be tended and areas having inadequate natural regeneration will be planted with suitable valuable species. These areas have been included to be worked under SCI Working circle.
- C. Minor Forest:** These areas will be managed to meet the local need of small timber, poles and fuel wood. The growing stock is mainly of site quality 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 Afforestation Working Circle, where only hygienicfellings are prescribed.
- D. Pasture Land:** This area includes forests which are adjoining to villages with heavy biotic interference. They are not capable of producing even small timber and 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 includes the small scattered patches which are yet to handed over by 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 protection forests will be preserved. Soil and moisture conservation works should improve the moisture content and prevent soil erosion and siltation of the water bodies.
- iii. Suitable tending and soil working operations will be carried out to stimulate the growth of the naturally regenerated 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 sides 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 me sic 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 most important consideration for water body management in forest areas.

- iii. The forest of Buldhana Division is extremely important from wildlife management point of view as they intersperse with *Lonar, Dnyanganga & Ambabarwa* 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 the 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 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 the 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 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 crop is carried out after enumeration of the crop. The species and tree girth distribution from the enumeration data and density distribution from satellite imageries and stock Maps prepared by the staff of Buldhana 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 bars 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 foreverlapping working circles are prescribed. (Abstract of allotment of compartment to various working circles and felling series is given in **Appendix No. XXXVIII.**)

**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**

| <b>Sr.No.</b> | <b>Proposed Working Circles</b> | <b>Area (ha.)</b> | <b>Percentage</b> |
|---------------|---------------------------------|-------------------|-------------------|
| 1             | Improvement Working Circle      | 44070.375         | 54.53%            |
| 2             | Pasture Working Circle          | 29884.760         | 36.97%            |
| 3             | Protection Working Circle       | 6861.440          | 8.49%             |
| 4             | NTPF Chapter                    | -                 | Entire area       |
| 5             | JFM Chapter                     | -                 | Entire area       |
| 6             | Wildlife Management Chapter     | -                 | Entire area       |
| 7             | Forest Protection Chapter       | -                 | Entire area       |
| <b>Total</b>  |                                 | <b>80816.575</b>  | <b>100%</b>       |

**TABLE OF COMPARISON BETWEEN EARLIER AND PRESENT PLAN WORKING CIRCLE WISE DISTRIBUTION TABLE NO. 1.2:**

| <b>Sr. No.</b> | <b>Working Circles</b>                   | <b>Area (ha.)</b> | <b>Percent age</b> | <b>Proposed Working Circles</b> | <b>Area (ha.)</b> | <b>Percentage</b> |
|----------------|------------------------------------------|-------------------|--------------------|---------------------------------|-------------------|-------------------|
| 1              | Selection Cum Improvement Working Circle | 7884.05           | 9.41%              | Improvement Working Circle      | 44070.375         | 54.53%            |
| 2              | Improvement Working Circle               | 38362.54          | 45.78%             |                                 |                   |                   |
| 3              | Fuel Wood Working Circle                 | 1245.73           | 1.49%              |                                 |                   |                   |
| 4              | Pasture Working Circle                   | 29701.31          | 35.44%             | Pasture Working Circle          | 29884.760         | 36.97%            |
| 5              | Protection Working Circle                | 6605.43           | 7.88%              | Protection Working Circle       | 6861.440          | 8.49%             |
| <b>Total</b>   |                                          | <b>83799.06</b>   | <b>100%</b>        |                                 | <b>80816.575</b>  | <b>100%</b>       |

**1.4: PERIOD OF WORKING PLAN AND NECESSITY FOR INTERMEDIATE REVISION:**

**Period of the Plan:** This plan will be implemented for a period of 10 (Ten) years from the year 2020 – 21 to 2029 – 30. However, the midterm review shall be carried out as per SCC Meeting Minutes No.No.Desk-14/WP/SCC/Meeting/161/2019-2020, Nagpur Dated 04/05/2020. Concerned Chief Conservator of Forests (Territorial) should come forward with a proposal for review.

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## **Part - II**

# **FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED**



## 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 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.

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

| Sr. No. | Range                 | Total Area of Range (ha) | Area allotted to W.C. |
|---------|-----------------------|--------------------------|-----------------------|
| 1       | Jalgaon Jamod         | 13588.465                | 6525.515              |
| 2       | Khamgaon              | 16952.890                | 7316.62               |
| 3       | Motala                | 10538.550                | 5631.2                |
| 4       | Buldhana              | 14322.280                | 9836.27               |
| 5       | Ghatbori              | 13029.560                | 11097.41              |
| 6       | Mehkar                | 4206.960                 | 1765.2                |
| 7       | Deulgaon Raja         | 8177.870                 | 1898.16               |
|         | <b>Grand Total :-</b> | <b>80816.575</b>         | <b>44070.375</b>      |

### 2.3. GENERAL CHARACTER OF VEGETATION

In general, the forests of this Working Circle are inferior both in quality and composition. The prevalent quality is IV or below IV. It consists of *Anjan* Forests, Open Mixed Forests and also Inferior *Teak* Forests. In *Anjan* Forests, *Anjan* (*Hardwickia binnata*) is the main crop, wherein stunted *Teak* occurs scattered individually or in small pure patches. The other common associates of *Anjan* are *Salai*, *Dhaora*, *Moyen* and *Saja*. The major portion of the crop is young to middle aged. Over-mature and unsound trees are sometimes noticed. Generally seedling regeneration of *Anjan* is sparse and is noticed along nala banks and in remote areas where grazing is low. Open Mixed Forests occur inter-mixed with *Teak* and *Anjan* types. Along with the miscellaneous species *Teak* occur in strips or patches in areas adjoining *Teak* Forests. 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 AND JFM AREAS

**Treatment series and annual coupes:** The entire area of this working circle is divided into 10 treatment series with an **average area of 4419 ha**. The area of each treatment series is further divided into 20 coupes with **average coupe area as 221 ha. (Appendix No. XL)**

### 2.5: BLOCKS, COMPARTMENTS AND JFM AREA (Marked On GIS Based Maps):

Details of the allotment of compartments to Improvement Working Circle have been given in **Appendix XL**

### 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 and
- iv) To check the soil erosion by creating and maintaining the 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 Amravati by following the procedure laid down in National Working Plan Code 2014.

**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. 2.1**

| Sr.No. | Range          | R-1           | R-2          | R-3          | Total         |
|--------|----------------|---------------|--------------|--------------|---------------|
| 1      | Buldhana       | 201.33        | 160.22       | 185.33       | <b>546.89</b> |
| 2      | Deulgaon Raja  | 50            | 20.83        | 35           | <b>105.83</b> |
| 3      | Ghatbori       | 52.86         | 35.71        | 22.38        | <b>110.95</b> |
| 4      | Jalgaon Jamod  | 152.05        | 105.38       | 45.64        | <b>303.08</b> |
| 5      | Khamgaon       | 35.88         | 25           | 10.29        | <b>71.18</b>  |
| 6      | Mehakar        | 80            | 31.43        | 7.86         | <b>119.29</b> |
| 7      | Motala         | 416.43        | 116.79       | 17.14        | <b>550.36</b> |
|        | <b>Average</b> | <b>159.07</b> | <b>87.46</b> | <b>61.92</b> | <b>308.45</b> |

It is necessary to find out in some of the ranges (Deulgaon Raja, Ghatbori Khamgaon and Mehakar) 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*, *Anjan* 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 fellings 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 abstract of the Table of Felling is given below but the detailed schedule is given in **Appendix No. XXXVIII.** of Volume II of this Working Plan.

### **2.6.10: METHOD OF EXECUTING THE FELLING**

#### **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 be include –

- i. A<sub>1</sub> type areas, which have slope more than 25°.
  - ii. A<sub>2</sub> type areas i.e. 20 m wide strip on both sides of streams.
  - iii. A<sub>3</sub> 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 crop 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 1/3<sup>rd</sup> of the crop height and/or to bring down stem number as per the yield table.
2. Unwanted undergrowth interfering or likely to interfere 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**

##### **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 6<sup>th</sup> 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 1/3<sup>rd</sup> 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 3 species.

#### 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 2<sup>nd</sup> 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 15<sup>th</sup> February to 15<sup>th</sup> June on 24 hour 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: *Anjan, 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.

**Lopping Rules for Anjan trees:** The following lopping rules for *Anjan* are prescribed:

- (1) The CCF (T) shall prescribe lopping techniques, in consultation with JFM Committees, for non destructive lopping of *Anjan* trees.
- (2) Lopping shall be permitted only from *Anjan* trees of more than 60 cm girth. Such trees shall be enumerated and given identification mark.
- (3) Lopping shall be permitted only from *Anjan* trees with good foliage cover. In a year not more than 30% foliage shall be removed.
- (4) The lopping shall be permitted for bonafide use of the local people and not for sale.
- (5) The royalty rates may be fixed by the DCF in consultation with CCF (T).
- (6) Only members of JFM Committees shall be issued permit. In case of violation of conditions, action as per rules shall be taken and permit shall be cancelled.

In addition to above, instructions given in Article No. 159 and 160 of Part VI of Bombay Forest Manual Volume III shall also be referred for collection of *Anjan* leaves in famine and other times.

**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 well being of the forest and may not visualize the distinct valuable utility of forests for their material benefit they get or likely to get. Therefore, it should be expedited through viable measures like.

- Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle.
- By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests.
- Grazing and fodder as well as fuel wood should be related with their efforts for protection and management of forests.
- Incentives to FPC/Village committees in terms of cash awards/ free grants on annual basis would be formalized. These measures would help actively involve people in the forest management and should benefit them in the longer run. The people should be made aware of their responsibilities so that long lasting relations get strengthened and wellbeing and sustenance of forests along with people is ensured.

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## CHAPTER – 3

### PASTURE WORKING CIRCLE

**3.1: (NAME OF) WORKING CIRCLE (CLEARLY MARKED ON GIS BASED 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.

### 3.2: 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.3.1.**  
**TABLE SHOWING RANGE WISE DISTRIBUTION OF AREA ALLOTTED TO**  
**PASTURE DEVELOPMENT AND MANAGEMENT WORKING CIRCLE**  
**(Area in Ha.)**

| S. No.        | Range Name           | Total Area of Range (ha) | Area allotted to W.C. | % of Range Area. |
|---------------|----------------------|--------------------------|-----------------------|------------------|
| 1             | <i>Jalgaon-Jamod</i> | 13588.465                | 201.51                | 1.48             |
| 2             | <i>Khamgaon</i>      | 16952.890                | 9636.27               | 70.91            |
| 3             | <i>Buldhana</i>      | 10538.550                | 4907.35               | 36.11            |
| 4             | <i>Ghatbori</i>      | 14322.280                | 4486.01               | 33.01            |
| 5             | <i>Motala</i>        | 13029.560                | 1932.15               | 14.21            |
| 6             | <i>Mehkar</i>        | 4206.960                 | 2441.76               | 17.96            |
| 7             | <i>D'Raja</i>        | 8177.870                 | 6279.71               | 46.21            |
| <b>Total:</b> |                      | <b>80816.575</b>         | <b>29884.760</b>      | 36.97            |

### 3.3. 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, Phetra* are also common. Grass species are *Kusal, Bhurbhushi, Ghonad, Sheda, Marvel* are common.

The existing stock map have been updated the stock is assessed with the help of satellite imageries with appropriate ground truth verification. The Period of Enumeration is from April 2018 to March 2019. The area of sampling is 16.30 hectares and Intensity of Sampling (%) is 0.055.

| <b>Pasture W.C. Tree Enumeration Data Per ha.</b> |                                |                                               |                     |                     |                     |                     |                     |                      |                       |                      |                           |               |
|---------------------------------------------------|--------------------------------|-----------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|-----------------------|----------------------|---------------------------|---------------|
| <b>S<br/>r.<br/>N<br/>o<br/>.</b>                 | <b>Name<br/>of<br/>Species</b> | <b>Girth class wise classification in cms</b> |                     |                     |                     |                     |                     |                      |                       |                      |                           |               |
|                                                   |                                | <b>15 to<br/>30</b>                           | <b>31 to<br/>45</b> | <b>46 to<br/>60</b> | <b>61 to<br/>75</b> | <b>76 to<br/>90</b> | <b>91<br/>to105</b> | <b>106<br/>to120</b> | <b>121 to<br/>135</b> | <b>136<br/>to150</b> | <b>abov<br/>e<br/>150</b> | <b>Total</b>  |
| 1                                                 | Teak                           | 10.61                                         | 11.47               | 5.09                | 1.23                | 0.86                | 0.37                | 0                    | 0                     | 0                    | 0                         | <b>29.63</b>  |
| 2                                                 | Hiwar                          | 2.70                                          | 2.52                | 2.02                | 0.68                | 0                   | 0                   | 0                    | 0                     | 0                    | 0                         | <b>7.92</b>   |
| 3                                                 | Neem                           | 2.94                                          | 1.96                | 0.92                | 0.68                | 0.36                | 0.3                 | 0.12                 | 0.06                  | 0.07                 | 0.07                      | <b>7.48</b>   |
| 4                                                 | Palas                          | 14.66                                         | 7.36                | 2.70                | 1.84                | 0.31                | 0.06                | 0.06                 | 0                     | 0                    | 0                         | <b>26.99</b>  |
| 5                                                 | Anjan                          | 0.86                                          | 0.55                | 1.29                | 2.02                | 1.22                | 1.1                 | 0.73                 | 0.25                  | 0.07                 | 0.24                      | <b>8.33</b>   |
| 6                                                 | Tendu                          | 1.66                                          | 1.35                | 0.49                | 0.18                | 0.18                | 0                   | 0                    | 0                     | 0                    | 0                         | <b>3.86</b>   |
| 7                                                 | Others                         | 10.92                                         | 4.42                | 1.60                | 0.67                | 0.37                | 0.12                | 0.18                 | 0.07                  | 0.13                 | 0.19                      | <b>18.67</b>  |
| <b>Grand Total</b>                                |                                | <b>44.35</b>                                  | <b>29.63</b>        | <b>14.11</b>        | <b>7.30</b>         | <b>3.30</b>         | <b>1.95</b>         | <b>1.09</b>          | <b>0.38</b>           | <b>0.27</b>          | <b>0.50</b>               | <b>102.88</b> |

### **3.4: FELLING SERIES, CUTTING SECTIONS AND JFM AREAS**

**Grazing series and annual coupe** - The working circle has been divided into 10 Grazing series with **average area of fodder series 298 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 99 ha ( Appendix XXXVIII).**

### **3.5: BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAPS)**

Total 119 compartments are allotted to this Working Circle. There are ten grazing series (S1 to S10). 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. XXXVIII** of Volume II. Distribution of Grazing Series is shown in the Table No. 3.5

**Table No.3.5**

**Table showing Ranges and Grazing Series and number of compartments included**

| <b>Sr. No.</b> | <b>Name of Range</b> | <b>Grazing Series</b> | <b>No. of Compartments included</b> | <b>Area</b>     | <b>Maximum annual carrying capacity</b> |
|----------------|----------------------|-----------------------|-------------------------------------|-----------------|-----------------------------------------|
| 1              | <i>Khamgaon</i>      | S1                    | 12                                  | 3922.50         | 3270                                    |
| 2              |                      | S3                    | 10                                  | 3123.87         | 2600                                    |
| 3              | <i>Ghatbori</i>      | S2                    | 14                                  | 4865.42         | 3900                                    |
| 4              | <i>Motala</i>        | S4                    | 26                                  | 5084.19         | 4210                                    |
| 5              |                      | S5                    | 5                                   | 1467.71         | 1220                                    |
| 6              | <i>Buldhana</i>      | S6                    | 7                                   | 1881.32         | 1570                                    |
| 7              | <i>Jalgaon-Jamod</i> | S7                    | 1                                   | 0201.51         | 170                                     |
| 8              | <i>Mehkar</i>        | S8                    | 9                                   | 1781.13         | 1480                                    |
| 9              |                      | S9                    | 5                                   | 0660.63         | 550                                     |
| 10             | <i>D'Raja</i>        | S10                   | 31                                  | 6896.48         | 5750                                    |
| <b>Total</b>   |                      | <b>10</b>             | <b>120</b>                          | <b>29884.76</b> | <b>24720</b>                            |

### **3.6: 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 judicious 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.

#### **3.6.1: ANALYSIS OF THE CROP:**

**(i) Stock mapping** – Conventional Stock Mapping has been done by the territorial staff. Satellite imageries were 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 status of the tree crop in the forests allocated to this working Circle** is given in Table 6.3 below:

**Table No.6.3: Average seedlings and saplings per ha**

| <b>Pasture W.C. (Natural Regeneration Per Hectare )</b><br>Range Wise Data. (Year- 2019-20) |                        |              |              |              |               |
|---------------------------------------------------------------------------------------------|------------------------|--------------|--------------|--------------|---------------|
| <b>Name of Range</b>                                                                        | <b>Number of Plots</b> | <b>R-1</b>   | <b>R-2</b>   | <b>R-3</b>   | <b>Total</b>  |
| Buldana                                                                                     | 25                     | 133.60       | 84.40        | 86.80        | <b>304.80</b> |
| Deulgaon RAJA                                                                               | 30                     | 39.67        | 20.00        | 33.67        | <b>93.34</b>  |
| Ghatbori                                                                                    | 6                      | 38.33        | 25.00        | 0.00         | <b>63.33</b>  |
| Jalgaon Jamod                                                                               | 1                      | 340.00       | 110.00       | 30.00        | <b>480.00</b> |
| Khamgaon                                                                                    | 57                     | 43.57        | 24.29        | 17.50        | <b>85.36</b>  |
| Mehakar                                                                                     | 15                     | 83.33        | 27.33        | 5.34         | <b>116.00</b> |
| Motala                                                                                      | 33                     | 149.39       | 66.67        | 9.39         | <b>225.45</b> |
| <b>Average</b>                                                                              | <b>167</b>             | <b>82.65</b> | <b>41.81</b> | <b>27.59</b> | <b>152.05</b> |

**(vi) Analysis and Valuation of Grass and Fodder Resources**

The proper management of grass and fodder resources and for their further development, different valuation method is 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.

**3.6.2: 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 work of removal of weeds to facilitate these grasses to come up naturally will be taken up. It has been seen that as a result 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 birds (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:

### **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.

Sehima nervosum (Sheda), Chrysopogon fulvus (Dongri), Cenchrus ciliaris (Madras Anjan), Cenchrus setigerus (Kala Dhaman), Dichanthium annulatum (Marvel), Panicum maximum (Guinea grass) are mostly suitable.

*Pennisetum purpurium* (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 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 ha. was selected at each village site. The area will be gradually increased.
- Rooted stock and perennial grasses shall be planted in rains.
- 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 is sufficient for making 1000 poly pot grass seedlings. Grass seeds are very tiny and counts lakhs in one kg. For example (*Sehima nervosum* -977900/kg). So mix the 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 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 improve the soil fertility of soil.
- Association with grasses increases the palatability of the grasses

For Example: *Arachis glabrata* (Chara Bhuimug) 20 kg per ha., *Clitoria ternatea* (Gokarna) 1.50 to 2.00 Kg. per Ha., *Dolichus biflorus* (Horse gram /Kulith) 40 Kg. per ha., *Macroptelium atropurpurium* (Seratro) 2 kg per ha, *Desmanthus virgatus* (Dashrath Grass) 20 kg per Ha.

### 5) REMOVAL OF EXOTIC/ INVASIVE SPECIES:

- Invasive species are weed, non palatable.
- Invasive species changes the species diversity index.
- Invasive species shows the dominance as compare to indigenous species.
- Direct effect on the growth of the grassland.
- E.g.- *Ageratum*, *Celosia*, Wild basil

### 6) Introduction of SILVI-PASTURE method:

In forest all wild life 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 the CCT in the month of May. Plant the fodder giving trees at two meter distance.

**Tree Species:** *Acacia nilotica*, *Acacia catechu*, *Albizia lebbeck*, *Albizia procera*, *Bauhinia racemosa*, *Azadirachta indica*, *Bauhinia variegata*, Bamboos species, *Bridelia retusa*, *Dichrostachys cineraria*, *Hardwickia binnta*, *Ficus racemosa*, *Ficus hispida*, *Grewia tiliafolia*, *Madhuca longifolia*, *Gmelina arborea*, *Terminalia bellerica*, *Zizyphus jujube*, *Zizyphus mauritiana*.

This tree planting will become an additional source of food in the form of leaf and fruits to the animals. Even dried leaves provides nutrition to the animals. It will also give shade in scorching sun.

**3.6.3: ROTATION PERIOD:** Rotational grazing is practiced in coupes; subsequently it will be closed for grazing to period of next two years.

**3.6.4: HARVESTABLE DIAMETERS:** Not applicable

**3.6.5: REDUCING FACTORS AND REDUCED AREAS:** Not applicable

**3.7.6: FELLING CYCLE:** Pasture cycle is fixed as 3 years.

**3.8.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB):**

Not applicable

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

**3.6.9: TABLE OF FELLING:** Not applicable

**3.6.10: 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.

**3.6.11: 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.

**3.6.12. 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, Hardwickia binata (Anjan), Soyimida febrifuga (Rohan), Accacia nilotica (Babul), Accasia leucophloea (Hiwar), Zizyphus mauritiana (Ber), Ficus glomerata (Umbar), Terminalia bellerica (Beheda) etc. and other fruit bearing and other miscellaneous species. No teak should be planted in these areas.

**3.6.13. 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 15<sup>th</sup> September to 15<sup>th</sup> 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's of outside the District shall not be given.
- (7) Permission for putting 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's shall be registered with the concerned Beat Guard.
- (10) The Range Forest Officer shall keep control on 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 November 3, 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 challenge, 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 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.

#### **Grazing Settlement Report:**

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 29896.79 ha C class RF area for sheep grazing. These areas are divided in 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-1 dated 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 Pasture Land.
3. While permitting sheep grazing, sheep shall be considered as 1 Cattle unit and as per Bombay Forest Manual Volume III grazing shall be permitted from 15<sup>th</sup> September to 15<sup>th</sup> 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 24720 cattle unit.

**People:** The Dhargar community mostly depends upon the forest for sheep grazing in large extent. These communities scattered all over the division. Allowing sheep grazing in forest areas is demand of Dhargar community. Sheep not part of GR issued on August 2, 1971. Yet, sheep grazing was partially allowed between September 15 to May 15, in 21 divisions from May 6, 2008. An 8 member state level committee was formed on September 2, 2015 to give its recommendation on Sheep grazing. The panel submitted its recommendations on March 28, 2016 favouring sheep grazing in the state. The state did not accept the report fully but on experimental basis allowed sheep grazing in Buldhana & Jalgaon forest areas in 2017 & 2018 between June-September and Chief Conservator of Forests (Amravati and Dhule) were told to study the impacts and submit reports to PCFF (HoFF) by November 30, 2018. The Report Submitted by CCF Territorial to the state government in 2018, that sheep grazing should not be allowed in forest between June-September.

The cattle population (except goat and sheep) of Buldhana District is approx. 6 lakhs (19<sup>th</sup> livestock census 2012). The Sheep & Goat population of Buldhana District is approximately 3.7 lakhs in which Sheep population accounts approx. 1 lakh (19<sup>th</sup> livestock census 2012). Hence it requires some urgent measures to tackle growing livestock population in order to save the regeneration of the forests.

#### **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

30<sup>th</sup> November, 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 Research Institute (CAZRI) for Kala Dhaman.
- c) *Forest Training Station at Jalna, Jalgaon* provides Grass seeds
- d) Mahatma Phule Krishi Vidyapeeth (MPKV) Rahuri for Grass seeds and Root slips.

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## CHAPTER - 4

### PROTECTION WORKING CIRCLE

#### 4.1: NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50000)

The area of this Working Circle has been clearly marked on the GIS based map 1:50000 and a copy of the same is given on a smaller scale on A4 size here.

#### 4.2: GENERAL CONSTITUTION OF WORKING CIRCLE

This Working Circle includes the area belonging to the precipitous slopes of the *Jalgaon-Jamod* Range. Protection and soil conservation treatment in these forests is necessary for site protection, preserving the steep and precipitous slopes and reducing silt load to the major dams or water bodies in the division.

Following criteria have been proposed for the allocation of forest areas or compartments to this working circle:

- The compartments having more than half of its areas on the steep slope or in the stream buffer.
- The compartments which are close to and in the catchments of the major dams and water bodies in the Buldhanadistrict.

#### RANGE-WISE COMPARTMENT ALLOCATION TO PROTECTION WORKING CIRCLE

TABLE NO.4.1

| <i>Range</i> | <b>No. Of<br/>comptt.</b> | <b>Area in<br/>ha.</b> | <b>Percentage of area</b> |
|--------------|---------------------------|------------------------|---------------------------|
| JalgaonJamod | 18                        | 6861.44                | 8.49%                     |

#### 4.3: GENERAL CHARACTERISTICS OF VEGETATION

The forests composition varies from pure teak to the mixed crop having high proportion of Teak. The common associates of teak are *Ain*, *Dhaora*, *Tiwas*, *Lendia*, *Tendu*, *Moha*, *Bhirra*, *Mowai*, *Salai*, *Rohan*, *Shisham*, *Aonla*, *Achar*, *Kulu*, *Semal* and *Khair*. Majority of the area supports stunted tree crop. *Teak*, *Bhirra*, *Palas* and *Khair* are found in larger proportions.

The site quality of the crop varies from IVa to IVb. The quality is generally IVb in the upper slopes and IVa in the lower slopes. The density of crop generally varies from 0.2 to 0.6, having well stocked patches as well as under stocked and open areas.

#### **4.4: FELLING SERIES, CUTTING SECTIONS AND JFM AREAS**

**Treatment Series and annual coupes:** The area of this working circle is divided into 02 treatment series with average area of 3303 ha. Each treatment series is further divided into 20 coupes with average coupe size of 165ha. Details of treatment series and coupes in given in **Appendix No.XL**.

#### **4.5: BLOCKS, COMPARTMENT AND JFM AREA (MARKED ON GIS BASED MAPS)**

The details of compartment in this working circle have been provide in the **Appendix No. XLVIII**.

#### **4.6: SPECIAL OBJECTS OF MANAGEMENT**

- To check the soil erosion and to arrest the run off by implementing soil and water conservation measures in the forest catchments so as 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 water regime of the forest tracts.

##### **4.6.1: ANALYSIS AND OF THE CROP**

**Stock Maps:** Conventional Stock Mapping has been done by the staff of the Division. Satellite imageries obtained from FSI have also been used for verification.

**Age and Density:** - The Crop is a mixture of all age classes. The young and middle aged girth classes predominate. The crop density varies from 0.2 to 0.6.

**Enumeration:** Enumeration was carried out by SOFR unit of Amravati as per procedure laid down in National Working Plan Code, 2014.

**REGENERATION:** Average numbers of seedlings and saplings per hectare in the Protection 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 is good.



**TABLE SHOWING RANGE WISE DATA OF REGENERATION PER HA. OF PROTECTION  
WORKING CIRCLE TABLE NO.4.6.2**

| <b>Name of Range</b> | <b>No of plots</b> | <b>R-1</b> | <b>R-2</b> | <b>R-3</b> | <b>Total</b>  |
|----------------------|--------------------|------------|------------|------------|---------------|
| JalgaonJamod         | 33                 | 476.97     | 156.67     | 80.61      | <b>714.24</b> |

#### **4.6.2: SILVICULTURAL SYSTEM**

Silvicultural system is proposed on the pattern of watershed management viz. ridge to valley treatment approach. Soil and moisture conservation works to prevent soil erosion, siltation of reservoirs and to enhance the vegetation cover and ground water table.

Harvesting of green trees is prohibited. However, removal of dead trees by retaining two dead trees per hectare as snags is permitted. These areas are proposed to receive strict protection from grazing and fire.

#### **4.6.3: ROTATION PERIOD**

No Rotation period is fixed for this Working Circle as there is no production prescribed.

**4.6.4: HARVESTABLE DIAMETER:** Not Applicable.

**4.6.5: REDUCING FACTORS AND REDUCED AREAS:** Not Applicable.

**4.6.6: FELLING CYCLE:** The Treatment Cycle is fixed for 20 years.

**4.6.7: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB)**

Not Applicable.

**4.6.8: CALCULATION OF YIELD:** Not Applicable.

**4.6.9: TABLE OF FELLING:** Not Applicable.

**4.6.10: METHOD OF EXECUTING THE FELLING:** Not Applicable.

**4.6.11: SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING:**  
Not Applicable.

#### **4.6.11.1: 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.

#### **4.6.11.2: TREATMENT MAP:**

Following areas shall be shown on the treatment map:

- **A Type areas:** Areas having more than 25° slopes and 20 meter wide buffer along streams will be measured from the bank or the high flood mark. Similar buffer of the A2-type areas will be marked along water bodies and tanks.

- The A3-type (excessive erosion prone) includes seasonally flooded areas and such pockets marked on the land use maps.
- B type areas are understocked with density less than 0.3.
- The **C-type areas** would include groups of naturally grown poles, having 15 to 45 cm GBH
- The D - type areas would include well-stocked forest patches.

#### 4.6.11.3: TREATMENT PRESCRIPTION:

The treatments prescribed for various treatment-type areas shall be, as follows:

##### (1) A-Type Areas: Protection Areas

- i. Soil and moisture conservation: The requirement of site would be the prime consideration while planning for Soil and moisture conservation works.
- ii. Bush sowing: Bush sowing of *Khair*, *Neem*, *Maharukh*, *Babool* and other local seeds (except teak) are to be carried out. Any one species should not constitute more than one-third of the total species.
- iii. Stake planting: In the A3-type areas, stakes of *Ficusspp.*, *Pangara*, *Salai* or other suitable species will be planted at six-meter interval, and tussocks of *Khas grass* will be planted on suitable sites. Provided that Stake planting shall be done in the plain areas only and not in high slopes.
- iv. Harvesting prohibited: Harvesting of standing trees (dead or alive) is strictly prohibited in the A-type areas. The marketable down logs of valuable species such as *Teak*, *Shisham* and *Tiwas* may be extracted.

##### (2) B-Type Areas: Under-stocked Areas

Rootstock Management – Tending of rootstock will be carried out as follows:

- i. **Singling of coppice shoots:** One healthy and promising coppice shoot will be retained on the stumps 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.
- ii. **Coppice management of damaged and malformed saplings:** The saplings and poles of up to 45 cm GBH having one third of the stem damaged and malformed shall be coppiced by cutting flush to the ground. Such coppicing, however, should not expose the ground, cause erosion

and lead to soil loss. Poles having at least 2.50 meter of clean bole will not be treated as malformed.

- iii. **Tending of natural regeneration:** All seedlings and saplings of valuable species *more than 1 meter in height will be nursed as future crop*. Spacing operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5 meter spacing. The natural regeneration operation should give priority to non-Teak species and Teak of origin and shall be assisted and encouraged by soil working and mulching around them, in the following manner.

**(a) First year operations:** Weeds in one-meter diameter around saplings of valuable species shall be cleared during the first week of July. Uprooted weed, grasses and leaf-litter shall be mixed in the upper layer of soil as the organic mulch and facilitate loosening and aeration of the soil by worms and insects. One soil working will be carried out in October.

**(b) Second year operations:** The soil working in October will be repeated in the following year.

**(c) Third year operations:** Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance shall be repeated as third year operations.

**iv.** No harvesting in B Type area.

**(3) C-Type Areas: Groups of pole crop**

- i. **Thinning:** Groups of pole crop will be thinned by maintaining average spacing of one-third of the crop height in such patches. Poles of vigorously growing non-teak species should be preferred for retention if teak is more than 50 percent of the crop in stocking.
- ii. No planting shall be done in these areas.

**(4) D-Type Areas: Well-stocked Areas**

- i. No harvesting of green trees is prescribed. However, dead trees after retaining two dead trees per hectare as snags are permitted for harvesting. Similarly, coppice shoots will be tended to retain one or two promising coppice shoots per stump.
- ii. **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 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.

- iii. No plantation is prescribed in these areas.

#### **4.6.12: REGENERATION:**

**NATURAL REGENERATION:** Identified NR will be rigidly protected from grazing, trampling and fire incidences, by resorting to rigid grazing control and fire protection measures applicable to current coupe of working. The order of priority for retention and protection of NR will be *Anjan, Bija, Shivan, Beheda, Moha, Biba, Kulu, Teak, Ain, Tiwas, Khair, Dhavda, Char, Aaola and Lendia*.

**ARTIFICIAL REGENERATION:** Areas, which are deficient in natural regeneration, shall be supplemented with seed sowing of native species. The choice of species will depend upon site suitability. Species like *Anjan, Ain, Lendia, Mowai, Salai, Kusum, Char, Aonla, Beheda*, etc., shall be sown. Van mazdoors and Beat Guards shall carry out seed sowing.

#### **4.6.13: ASSOCIATED REGULATIONS AND MEASURES**

**Fire Protection:** The prescriptions given in Miscellaneous Regulation shall be followed.

**Grazing Control:** The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt. 6<sup>th</sup> Dec. 1968 according to which the grazing incidence in Protection Forests should not **exceed one cattle unit for 4 hectare**.

**Soil and Moisture Conservation Works:** On the steep slopes, neither CCT nor DCT works be carried out to prevent soil erosion. Loose boulder structures, Gabian structures wherever possible shall be taken up in *nalas*. On the gentle slopes, cement *bandharas* and earthen bunds shall be taken up on a large scale to provide moisture regime in the area. In addition to this contour stone bunds of the size - 60cm. x 30cm. at an interval of 50m. On the slopes shall be taken up to prevent soil erosion. Wherever boulders are not available *agave* suckers in two rows be planted along the contours to prevent the soil erosion. The works shall be completed before the onset of Monsoon. The quantum of work will depend upon the site requirement.

**Survey and Boundary Demarcation:** These forests are un-surveyed Forests and prone to encroachments. **Hence, these areas must be got surveyed on priority basis.** A special program for survey and demarcation of the area should be conducted is given **in Appendix No. LI** of Volume II.

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## **CHAPTER-5**

### **NON TIMBER FOREST PRODUCE (NTFP) CHAPTER**

#### **5.1: NON – TIMBER FOREST PRODUCE WORKING CIRCLE:**

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

#### **5.2: GENERAL CONSTITUTION OF THE WORKING CIRCLE**

This working circle covers the entire forest area of the Buldhana 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 forests of Buldhana 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 Buldhana 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.

#### **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, the development of Non Timber Forest Produce is one of the basic objectives for the forest management. Consistent with the above policy, the special objectives of management are as follows:

1. To manage marketable NTFPs and medicinal plants scientifically and to utilize the existing potential optimally and thereby to enhance the productivity of these species.
2. To take measures for conservation and sustainable use of the species identified as NTFP.
3. To generate employment for providing work to the local people and thereby improving their socio-economic conditions.
4. To provide better and improved quality of life to local population through inclusion of traditions which support and link their life styles into sustainable harvest and use of NTFP.
5. To get enhanced economic returns by training the local communities on value addition techniques and marketability of various NTFPs found in the division identify and conserve the forest areas rich in NTFP and medicinal plants.
6. To improve stocking of various NTFP species in the forest areas and enhance collection of various NTFPs by improved collection techniques

### 5.6.1: ANALYSIS OF THE CROP

There are numerous Non-Timber Forest Produce available in this tract and are found in almost all ranges with varying extent. These natural produce contribute revenue to the State exchequers as well as generate employment to local people during their lean season. These natural produce play an important role in the rural economy of local population and help maintain their health.

A sizeable portion of the forests of this division are of Mixed Forest type, supporting species of great NTFP value viz. *Mowai*, *Khair*, *Salai*, *Aonla* etc. These trees are found scattered in the entire division and well mixed with the other species. The Non- Timber Forest Produce, employment opportunities, the important NTFP 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. The girth class wise distribution of number trees of NTFP species per hectare is given below :

| Sr No | Species  | Nos of Comp t. | 15/ 30       | 31/ 45       | 46 / 60     | 61/ 75      | 76/ 90      | 91/ 105     | 106 / 120   | 121/ 135    | 136/ 150    | above 150   | Total        |
|-------|----------|----------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| 1     | Amaltas  | <b>35</b>      | 0.80         | 0.26         | 0.17        | 0.06        | 0.03        | 0.00        | 0.03        | 0.00        | 0.00        | 0.00        | 1.34         |
| 2     | Awala    | <b>5</b>       | 0.40         | 0.60         | 0.40        | 0.40        | 0.00        | 0.20        | 0.00        | 0.00        | 0.00        | 0.00        | 2.00         |
| 3     | Babul    | <b>13</b>      | 4.00         | 1.08         | 0.23        | 0.23        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 5.54         |
| 4     | Behada   | <b>22</b>      | 1.18         | 0.55         | 0.18        | 0.27        | 0.14        | 0.00        | 0.00        | 0.00        | 0.05        | 0.05        | 2.41         |
| 5     | Bel      | <b>4</b>       | 0.00         | 0.25         | 0.00        | 0.25        | 0.25        | 0.00        | 0.25        | 0.00        | 0.00        | 0.00        | 1.00         |
| 6     | Biba     | <b>4</b>       | 2.25         | 0.50         | 0.25        | 0.25        | 0.00        | 0.25        | 0.00        | 0.00        | 0.00        | 0.00        | 3.50         |
| 7     | Chandan  | <b>1</b>       | 1.00         | 0.00         | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 1.00         |
| 8     | Charoli  | <b>14</b>      | 0.14         | 0.71         | 0.29        | 0.29        | 0.29        | 0.21        | 0.07        | 0.00        | 0.00        | 0.00        | 2.00         |
| 9     | Chinchal | <b>1</b>       | 0.00         | 0.00         | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 1.00        | 0.00        | 1.00         |
| 10    | Dhawada  | <b>105</b>     | 1.67         | 1.53         | 0.87        | 0.47        | 0.23        | 0.17        | 0.09        | 0.03        | 0.02        | 0.00        | 5.07         |
| 11    | Kahu     | <b>4</b>       | 0.00         | 0.50         | 0.50        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.25        | 1.25         |
| 12    | Karanj   | <b>1</b>       | 1.00         | 0.00         | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 1.00         |
| 13    | khair    | <b>15</b>      | 1.40         | 0.80         | 0.20        | 0.07        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 2.47         |
| 14    | Moha     | <b>8</b>       | 0.13         | 0.50         | 0.13        | 0.13        | 0.00        | 0.25        | 0.00        | 0.00        | 0.13        | 0.25        | 1.50         |
| 15    | Neem     | <b>91</b>      | 0.91         | 0.58         | 0.25        | 0.22        | 0.12        | 0.08        | 0.07        | 0.01        | 0.02        | 0.01        | 2.27         |
| 16    | Palas    | <b>218</b>     | 2.39         | 1.25         | 0.53        | 0.31        | 0.11        | 0.03        | 0.01        | 0.02        | 0.00        | 0.00        | 4.67         |
| 17    | Salai    | <b>68</b>      | 0.07         | 0.12         | 0.10        | 0.35        | 0.53        | 0.68        | 0.59        | 0.41        | 0.18        | 0.13        | 3.16         |
| 18    | Sitaphal | <b>2</b>       | 4.00         | 0.00         | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 4.00         |
| 19    | Tendu    | <b>73</b>      | 1.75         | 0.89         | 0.27        | 0.12        | 0.05        | 0.00        | 0.00        | 0.00        | 0.01        | 0.00        | 3.11         |
| TOTAL |          |                | <b>23.10</b> | <b>10.12</b> | <b>4.37</b> | <b>3.41</b> | <b>1.75</b> | <b>1.87</b> | <b>1.10</b> | <b>0.47</b> | <b>1.40</b> | <b>0.69</b> | <b>48.28</b> |

Besides the above mentioned trees species there are many herbs and shrubs found in the forests and need to be properly documented.

**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 SILVICULTUREAL OPERATION CLEANING AND THINNING:**  
Not Applicable.

**5.6.12 REGENERATION:** Not Applicable.

#### **5.6.13 ASSOCIATED REGULATIONS 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*, *Apta* and Bamboo, 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 forests 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 categorized into two parts:

- A) 33 NTFPs (MFPs) in Scheduled area
- B) Other NTFPs (MFPs) excluding 33 NTFPs in Scheduled area and NTFPs in Non Scheduled Areas.

##### **A) 33 NTFPs (MFPs) IN SCHEDULED AREA:**

1) "Govt. of India passed the Provisions of the Panchayat Extension to the Scheduled Areas in 1996". In pursuance to this, Govt. 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 Govt. land in Scheduled Areas; ownership lies with Gram Sabha. The MFP's included in the Schedule are (1) *Mahuwa flower* (2) *Mahuwa fruits* (3) *Gum* (4) *Hirda* (5) *Charoli* (6) *Awala* (7) *Baheda* (8) *Neem seeds* (9) *Karanj Seeds* (10) *Amaltas Seeds* (11) *Tamarindusindica* (12) *Tamarind seeds* (13) *Lac of Buteamonosperma* (14) *Lac of Schleicheraleosa* (15) *Seeds of Jatropacarcus* (16) *Takade/paudaClerodendronphburidis* (17) *Nirmali/ Kapi* (18) *Guggul* (19) *Bapchi bee* (20) *Kunchalakari* (21) *Shikakai* (22) *Reetha* (23) *Biba* (24) *Gunj Seed* (25)



*Broom grass (26) Mango seed (27) Wawding (28) Baphali (29) Cut grass and fodder (30) Honey (31) Sitaphal (32) Cashew Nuts (33) Mangroves.*

**B) OTHER NTFPS (MFPS) EXCLUDING 33 NTFPS IN SCHEDULED AREA AND NTFPS IN NON SCHEDULED AREAS**

- 1) R & RD, GoM, Govt. Resolution dated 5<sup>th</sup> October 2011, confers the rights of NTFP collection, processing and sale to the JFMCs. Therefore, capacity building of JFMCs is crucial for realizing 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 has to be initiated by that community.
- 3) Excluding the above mentioned areas, DCF can form NTFP units and put for auction. However, mechanism has to be evolved to regulate excess harvesting.

**5.6.13.2: NTFP COLLECTION:**

The details of NTFP collection is given in **Appendix No XIX (a) and XIX (b)**. From these tables, it is evident that, NTFP collection is very meager and restricted to only few species. Therefore, specific holistic efforts are needed to encourage JFMCs to harvest NTFPs to create livelihoods. Demonstrative effect has to be shown in at least few villages, so that, the positive results will spread to other villages.

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 microplan. Proper grading, value addition and exploring new markets for the traditional NTFPs (such as gum), shall be included under the JFM program of the Division. The possibility of involvement of NGOs in such an endeavor should be explored.

**5.6.13.3 METHODS OF TREATMENT:**

**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 Feb- April to check the spread of fires specially during the Tendu and Mahua flower season.

#### **TRAINING PROGRAM FOR NTFP COLLECTION:**

To reduce the Destructive Harvesting Techniques, training program and workshops for proper NTFPs collection, value addition, and marketing shall be organized in each range to ensure their sustainable harvest and use. The Education Circle should prepare and oversee the training modules. Considering the potential of NTFPs, such as Moha, Gum and Lac etc. attention shall be given for non-destructive harvesting, value addition and marketing of these NTFPs.

| <b>Potential Yield of NTFP in Buldhana District</b> |                 |                     |               |
|-----------------------------------------------------|-----------------|---------------------|---------------|
| Sr No                                               | Name of Species | No of Trees / ha    | Yield Kg/Tree |
| 1                                                   | Moha Flowers    | 0.13 (>75 cm girth) | 1.300         |
| 2                                                   | Moha Seeds      | 0.13 (>75 cm girth) | 0.283         |
| 3                                                   | Dhawda Gum      | 0.46 (>90 cm girth) | 0.500         |
| 4                                                   | Salai Gum       | 5.01 (>90 cm girth) | 0.500         |
| 5                                                   | Palas Lac       | 3.05 (>45 cm girth) | 0.200         |

#### **DOCUMENTATION OF NTFP COLLECTION:**

The Beat Guard will send a monthly report to the Range Forest Officer on the quantity of NTFPs collected in their Beats, both by contractors and villagers. 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.

*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 nationalized by the Govt. of Maharashtra Act No LVII of 1969. Tendu leaves were collected by the department through agents till 1990 season. During the 1991 season Tendu units were sold on lump sum basis. The collection of Tendu leaves commences from the last week of April each year and continues up to first week of June. Quality of leaves is a major criteria for bidi manufactures. The quality depends on the colour, texture and presence of nodules and veins. The best quality leaves are those ranging from ashy to palest hue; almond colour is also prized shade. Leaves with leathery texture either too thick or thin are good quality for making Bidi. The leaves are collected at various collection centers called phadies. The leaves (pudas) are dried and then packed in gunny bags. The quantity is measured in standard bags.

- Tendu leaf collection is governed by the policy of the State Govt. in conjunction with various Laws presently in force.
- Tendu leaf collection is an income generating activity for most local and tribal villages in the region. The local village communities shall be gainfully engaged in Tendu collection in the Division to support their livelihood.
- Pruning of young Tendu plants does help in increasing the leaf yield saplings having more than 5 cm collar diameter shall not be pruned. However felling of Tendu trees or branch lopping for leaf collection should be dealt with firmly.

##### **TENDU REGENERATION:**

In view of the importance of Tendu to support the livelihood of forest dwelling communities and its economic value for the region, sustainable management and use of Tendu is prescribed 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 root stock areas to promote growth of Tendu seedlings along with the annual coupes in area-specific working circles.

**SOIL WORKING FOR TENDU TREES:**

Digging of 30 cm deep trench encircling Tendu trees of diameter matching tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse suckers come out. Singling and tending shall increase the population of this species. The practice is proposed to regenerate areas deficient in Tendu species in stocking should be identified and aided for creation of congenial growth conditions such as cleaning of bushes, protection from fire etc.

**5.6.13.5:MANAGEMENT OF MOHA:****MOHA COLLECTION:**

There is substantial number of Moha trees in the forest corp. the villagers in the tract have local system for allocation of collection right of Moha flowers and fruits. For better protection of Moha trees and to increase its stock, Moha trees be numbered and these trees be allotted to members for JFM committee. The members of committees who have been assigned with job of protection & nurture of Moha trees they should protect them from fire. This exercise would inculcate sense of ownership and responsibility in protecting the resource. This also indirectly aids in controlling forest fires. Range Forest Officer shall take lead in promoting such practices and also monitor its implementation Documentation of such steps is necessary to promote the achievements of JFMCs.

**MOHA REGENERATION:**

It is prescribed to provide soil working along with other planted seedlings during coupe operations of area- specific working circles. Moha will be one of the species in mixed plantation. Seedlings of Moha raised during the previous season i.e. 18 months old, should only be planted in the mixed plantation schemes.

**SOIL WORKING FOR MOHA TREES:**

Digging of 30 cm deep trench encircling Moha trees of diameter matching the tree crown has been found useful to regenerate the species from root suckers. By doing so roots are injured and from which profuse shorts come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient in Moha species in stocking.

Moha is to be included in the list of species prescribed for planting in various area specific working circles.

The Moha yield data collected by the MVSS Chandrapur are given below:

Moha trees starts bearing flowers and fruits between 10<sup>th</sup> to 15<sup>th</sup> years of planting. A study with reference to the yield of Moha flowers and fruits has been

conducted by the MVSS, Chandrapur in cmptt. No 195 in Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girths were selected for the purpose of this study. Results obtained are given in.

**Table No.5.1**

| <b>Yield of Moha Flower and Fruits Weight in Kg.</b> |                     |               |             |
|------------------------------------------------------|---------------------|---------------|-------------|
| <b>Sr No</b>                                         | <b>G.B.H. in cm</b> | <b>Flower</b> | <b>Seed</b> |
| 1                                                    | 076 – 090           | 06.00         | 1.20        |
| 2                                                    | 091 – 105           | 10.00         | 1.00        |
| 3                                                    | 106 – 120           | 11.25         | 2.00        |
| 4                                                    | 121 – 135           | 13.30         | 2.75        |
| 5                                                    | 136 – 150           | 13.00         | 3.80        |
| 6                                                    | 151 – 175           | 13.00         | 4.00        |
| 7                                                    | 176 – 190           | 20.00         | 4.30        |
| <b>Average</b>                                       |                     | <b>12.36</b>  | <b>2.72</b> |

***(Note: As year 1992 was not a good seed year, the average obtained above is on lower side)***

As per the tree enumeration carried out by FRSS Amravati, the number of Moha trees/ ha having gbh> 75 cm is 0.63/trees/ha. On the basis of the study mentioned above expected yields of flowers and seeds come to 1.20 kg/ha and 0.283 kg/ha respectively. Estimated yield for Buldhana Division forest area is 14,200 kg and 3100 kg respectively. However, the phonological character of the species is that flowering and fruiting generally occur alternate years or twice in three years.

#### **FORMATION OF UNITS AND COUPES:**

The Range shall be the units of working for the purpose of this working circle. Since operation is to be carried annually throughout the area and so the unit will be the coupe in this case. Individuals are presently doing the collection of Moha flowers and seeds. Normally they confine themselves around their village only to collect Moha flower and seeds. As per latest Amendment to Panchayati Raj Act, the ownership of the Minor Forest Produce in Schedule Areas is vested with Gram Panchayat. The collection and disposal of produce is to be carried out by the Gram Panchayat as decided by the concerned Gram Sabha. In the Non-Scheduled Areas for large- scale operation, collection may be done either by FLCS or any other agency under terms and conditions as decided by the Government.

#### **MARKET:**

The Forest Department will facilitate in the marketing of Moha collected through JFMC, so that better price can be made available to the collectors.

**OTHER REGULATIONS:**

- 1) Compartment wise list of Moha trees shall be prepared and maintained at Beat, Round and Range levels.
- 2) One of the important reasons of forest fire is the burning of leaf litter on ground under Moha trees by the people to collect Moha flower. Therefore, before the start of flower falling, the round under the Moha tree crown shall be cleaned with the cooperation of villagers and chaukidars. This may be treated, as one of the most important duties of the Beat Guard, failure in it and occurrence of fire shall be viewed seriously.
- 3) The measures for enhancing the production and productivity by local means shall be explored and taken up.
- 4) The collection and removal of seeds/ fruits shall not be more than 75% of production.

**5.6.13.6: MANAGEMENT OF GUMS:****USE AND VALUE:**

Gum is an important NTFP and is exuded by plants, partly as normal phenomena and partly as the result of disease or injury to the bark. Wood Gum is a substance of more or less sticky nature. The Kulu (*Sterculiaurens*), Dhaora (*Anogeissuslatifolia*), Salia (*Boswellia serrate*) and Acacia Gum (*Acacia Nilotica*) are main sources of gums in the area. These are used in medicines, chemicals, cosmetics, food industries and incense. Indian Gum, Arabic or Babul gum is from (*Acacia nilotica*) and is of great commercial importance. The gum is used in calico printing, dyeing and as a sizing material for silk and cotton and in the manufacturing of paper. Salai gum is mostly used in the Indian Medicines for the treatment of rheumatism and nervous diseases. Salai gum has the potential of becoming mounting media by substituting imported Canada balsam in the preparation of microscopic slides. Dhaoda gum is used in food industry for making sweets. It may also be suitable in the manufacture of elastic, adhesive, lacquers, oilcloth compositions, ink and perfumery. Kulu gum is the costliest gum and is having export potential.

**REGENERATION OF GUM YIELDING TREES:**

NR of gum yielding trees such as Kulu, Dhawra and salai shall be provided soil working along with other planted seedling during coupe operations of area specific working circles.

#### 5.6.13.7: SOIL WORKING OF GUM YIELDING TREES:

- i. Digging of 30cm deep trench encircling *Kulu, Dhawda and Salai* trees of diameter matching the tree crown has been found to be useful to regenerate the species from roots; by doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *Kulu, Dhawra and Salai* in stocking.
- ii. *Kulu, Dhawra and Salai* are prescribed to be included in the list of species prescribed in various area specific working circles.

#### 5.6.13.8: YIELD

The study of actual yield of gums has not been done in this tract. The production is low. No scientific method for tapping has been used so far in this area. This is a very potential field of employment generation and revenue earning. Besides, the regulations of the collection are very important protection of forest from the fire point of view.

**Gum extraction:** A study was conducted in Wardha division during the preparation of this plan by adopting “Drill Method” for Gum extraction through Ethephon injection. The findings of the study are given below:

| Sr.no | Species | Girth Class | Avg Gum Yield per tree<br>in grams |
|-------|---------|-------------|------------------------------------|
| 1.    | Dhawda  | 91-105      | 68                                 |
|       |         | 106-120     | 108                                |
|       |         | 121-135     | 117                                |
|       |         | 136-150     | 576                                |
|       |         | >150        | 599                                |
| 2     | Mowai   | 91-105      | 278                                |
|       |         | 106-120     | 183                                |
|       |         | 121-135     | 608                                |
|       |         | 136-150     | 522                                |
|       |         | >150        | 600                                |
| 3     | Salai   | 91-105      | 8                                  |
|       |         | 106-120     | 22                                 |
|       |         | 121-135     | 16                                 |
|       |         | 136-150     | 74                                 |
|       |         | >150        | 109                                |

#### TAPPING RULES FOR DRILL METHOD:

- 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.

**Grading:** The collected gum is graded into three classes: i) White, ii) Yellowish, iii) Black coloured. White coloured gum fetches higher price in the market compared to yellowish and black gum. Yellowish gum fetches fewer prices as compared to white one. Black gum fetches the lowest price. When gum is collected it is a mixture of all the three grades. By grading the gum the trader is able to assess correctly and offers correct price. So skill for grading is provided to the people by organizing training to the gum collectors. The colour of the gum is dependent upon the climatic conditions. It is said that clear sky in the night will exude white coloured gum.

**FORMATION OF UNITS:**

Range is the unit.

**AGENCY:**

As per latest Amendment to Panchayati Raj Act, the ownership of the Minor Forest Produce in Schedule Areas is with Gram Panchayat. The collection and disposal of that is to be carried out by the Gram Panchayat as decided by the concerned Gram Sabha. Hence the collection and disposal of these Minor Forest Produces will be governed by the Panchayat concerned. In the Non-Scheduled Areas for large- scale operation, collection may be done either by FLCS or any other agency under terms and conditions as decided by the Government.

**MARKET:**

The Forest Department will facilitate in the marketing of gum collected through JFMC, so that better price can be made available to the collectors.

**OTHER REGULATIONS:**

- Compartment wise list of such trees shall be prepared and maintained at Beat, Round and Range levels.
- Cleaning around the trees to facilitate gum collection and to avoid fire, shall be done.
- Gum producing trees shall be reserved from felling.
- A strict watch is necessary to enforce tapping rules and check unauthorized collection of gum and tapping during the period of rest.

**5.6.13.9: MANAGEMENT OF HIRDA, BEHEDA, AONLA, CHAR, SITAPHAL AND OTHER NTFPS.**

**Collection of Hirda, Beheda, Aonla, Char, Sitaphal 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 with job of protection & 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 Hirda, Beheda, Aonla, sitaphal and Char:** Required tending is prescribed where saplings of *Beheda*, *Aonla* and *Char* are found in worked coupes, to remove congestion. Soil working and mulching are prescribed along with planted seedlings and to be done during coupe operations of various areas in working circles. *Hirda*, *Beheda*, *Aonla* and *Char* are prescribed for plantations.

#### **5.6.13.10: MANAGEMENT OF GRASS:**

The common grasses are Kusal, Bhurbhusi, Ghonad, Sheda and Marvel. Coarse grasses are used for thatching and palatable grasses for stall feeding. The demand for grass is local. For fodder, Marvel, Sheda, Paunia are preferred. Some villagers also collect Broom grass (Jhadugavat).

Development of suitable grazing sites to the local cattle is a basic demand of local villagers. Therefore, the degraded areas adjoining to villages should be taken up for fodder plantations with the active involvement of JFMCs. Development of fodder resources to meet the requirements of local cattle should be a major criteria for performance evaluation of JFMCs.

### 5.6.13.11: MEDICINAL PLANTS:

#### IMPORTANT MEDICINAL PLANTS:

The important medicinal plants found in this Division along with the parts used are listed in Table. Detailed list of medicinal plants is given in **Appendix no. XLVII** of Volume II

**Table showing list of important medicinal plants and their uses**

| Sr No | Local Names              | Botanical Names                | Parts Used                                                                                                                                                    |
|-------|--------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1)    | <i>Aghada</i>            | <i>Achyranthusaspera</i>       | Roots and seeds are used in Ayurvedic medicines                                                                                                               |
| 2)    | <i>Adulsa</i>            | <i>Adhatodazelanica</i>        | Leaves used in cough and bronchial asthma                                                                                                                     |
| 3)    | <i>Bel</i>               | <i>Aeglemarmelos</i>           | Fruits are used medicine                                                                                                                                      |
| 4)    | <i>Maharukh</i>          | <i>Ailanthus excelsa</i>       | Leaf extract is used for washing wounds and skin eruptions                                                                                                    |
| 5)    | <i>Shirish</i>           | <i>Albizialebeck</i>           | Bark and Seeds are used given in piles and diarrhea                                                                                                           |
| 6)    | <i>Piwaladhotra</i>      | <i>Argemone Mexicana</i>       | Yellow juice is used in dropsy and jaundice                                                                                                                   |
| 7)    | <i>Kidamari</i>          | <i>Aristolochiabracteolata</i> | Leaf paste is used as a remedy for itch and insect bites.                                                                                                     |
| 8)    | <i>KaduNeem</i>          | <i>Azadirachtaindica</i>       | 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)    | <i>Hinganbet</i>         | <i>Balanitesaegyptiaca</i>     | Fruits decoction is used as fish poison and as detergent                                                                                                      |
| 10)   | <i>Danti</i>             | <i>Baliospermummountanum</i>   | Seeds are used as drastic purgative. The roots are cathartic.                                                                                                 |
| 11)   | <i>Salai</i>             | <i>Boswellia serrate</i>       | Resin is used in preparation of ointment for sores and external eruptions.                                                                                    |
| 12)   | <i>Rui</i>               | <i>Calatropisgiagantea</i>     | Milky latex is applied for curing tooth ache                                                                                                                  |
| 13)   | <i>Amaltas or Bahawa</i> | <i>Cassia fistula</i>          | The pulp of fruit is taken as purgative.                                                                                                                      |
| 14)   | <i>Malkagni</i>          | <i>Celastruspaniculata</i>     | Oil extracted from the seeds is used as stimulant.                                                                                                            |
| 15)   | <i>Tilwan</i>            | <i>Cleome viscosa</i>          | Juice of leaves is put in to ears to cure tooth aches.                                                                                                        |
| 16)   | <i>Gokharu</i>           | <i>Clitoriaternatea</i>        | Various parts of plants are used medicinally.                                                                                                                 |
| 17)   | <i>Vasanvel</i>          | <i>Cocculushirsutus</i>        | Roots are the used in chronic rheumatism                                                                                                                      |
| 18)   | <i>Awla</i>              | <i>Emblicaofficinalis</i>      | Fruits are the rich source of Vitamin C                                                                                                                       |
| 19)   | <i>Vishnukanta</i>       | <i>Evolvulusalsinoides</i>     | Leaves are used in chronic bronchitis and asthma.                                                                                                             |
| 20)   | <i>Wad</i>               | <i>Ficusbenghalensis</i>       | Barks, roots and leaves are used in medicines                                                                                                                 |
| 21)   | <i>Murud sheng</i>       | <i>Helicteresisora</i>         | Fruits are used against cough.                                                                                                                                |

|     |              |                                  |                                                                                                                                     |
|-----|--------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 22) | TalimKhana   | <i>Hygrophilaauriculata</i>      | Seeds are used in medicine.                                                                                                         |
| 23) | Mahua        | <i>Madhucalongifolia</i>         | Oil is good laxative used in rheumatism and treatment of inflammation, sprains epilepsy and digestive disorders. Fruits aphrodisiac |
| 24) | Arani        | <i>Maeruaoblongifolia</i>        | Juice or ash of leaves is used as preventive in dysentery.                                                                          |
| 25) | Chikana      | <i>Malvastrumcoromandelianum</i> | Juice or ash of leaves is used externally by local people for healing wounds and bruises.                                           |
| 26) | Khaj- Khauri | <i>Mucunapruriens</i>            | Roots and seeds are medicinal                                                                                                       |
| 27) | Chitrak      | <i>Plumbagozeylanica</i>         | Roots are used in rheumatism, skin diseases and diarrhea                                                                            |
| 28) | Sanjiwani    | <i>Polygala arvensis</i>         | Roots are given in fever and dizziness                                                                                              |
| 29) | Peru         | <i>Psidiumguajava</i>            | Leaf decoction is used to cure pain in teeth                                                                                        |
| 30) | Satap        | <i>Rutagraveolens</i>            | Rue is narcotic and stimulant                                                                                                       |
| 31) | Jambhul      | <i>Syzygiumcumini</i>            | The kernel is used in diabetes                                                                                                      |
| 32) | Behada       | <i>Terminaliabellicica</i>       | Fruits are used as tannins and in Triphalachurna that is laxative powder                                                            |
| 33) | Parpimpal    | <i>Thespesiapopulnea</i>         | The extract of bark is applied externally for skin diseases.                                                                        |
| 34) | Gulvel       | <i>Tinosporacordifolia</i>       | Roots are used as antidote in snake bite                                                                                            |
| 35) | Gokhru       | <i>Tribulusterrestris</i>        | Roots used as tonic                                                                                                                 |
| 36) | Dagadipala   | <i>Tridaxprodumbens</i>          | Juice of leaves used to cure wounds and cuts                                                                                        |
| 37) | Dam vel      | <i>Tylophora indica</i>          | Leaves are used to cure bronchial asthma Leaves are also used against cold and fever                                                |
| 38) | Ashwagandha  | <i>Withaniasomnifera</i>         | Roots are used in treatment of leucoderma, nervous breakdown, leaves in fever and ophthalmities.                                    |
| 39) | NalaBarki    | <i>Zornia gibbosa</i>            | Roots given in children to induce sleep                                                                                             |
| 40) | Sitaphal     | <i>Annonasauamasa</i>            | Seed us in Sampoo                                                                                                                   |
| 41) | Kal-Lawi     | <i>Gloriosasuperba</i>           | Use roots for delivery                                                                                                              |
| 42) | Biba         | <i>Semicarpusanacardium</i>      | Dry fruits & oil in cancer                                                                                                          |

The plants found in Buldhana forest and included in the Red Listed Medicinal Plants of Maharashtra (Source: FRLHT) are given in.

#### RED LISTED MEDICINAL PLANTS OF MAHARASHTRA (SOURCE: FRLHT)

**Table 5.7**

| Sr No | Name of Species              | Common Name             |
|-------|------------------------------|-------------------------|
| 1     | <i>Aegle marmelos</i>        | Bel                     |
| 2     | <i>Celastrus paniculatus</i> | Malkanguni / Jotishmati |
| 3     | <i>Gloriosa superba</i>      | Kallavi                 |
| 4     | <i>Santalum album</i>        | Chandan                 |
| 5     | <i>Terminalia arjuna</i>     | Arjun                   |

### **SUSTAINABLE MANAGEMENT REGIME:**

A sustainable harvesting system for Non-timber Forest resources is generally defined as one in which fruits, roots, leaves, nuts, latexes, other products can be harvested till perpetuity from a given forest area without any adverse impact on the species being harvested sustainable harvesting is possible with various safeguards and methods. The best is to use only mature parts, harvest only at maturity and leave 20-40 % parts behind for regeneration (this may change with further research) which may be applicable through previous information and local experiences.

### **SUSTAINABLE HARVESTING:**

Sustainable harvesting should take into consideration the following aspects:

1. (a) Time / season of harvest (b) quantum of harvest/ collection (c) technique of harvest and (d) area of harvest.
2. The local people knowledge about the yield, as well as the sound scientific basis needs to be considered while determining the sustainable harvesting limit. A user friendly and well illustrated manual of sustainable harvesting techniques of some important species should be prepared.
3. Special care should be taken for post harvest value addition (grading, processing and shelf life improvement.)
4. Community adaptive management strategy, bases on sound scientific silviculture and local harvesting knowledge, needs to be adopted.
5. Monitoring and revalidation of the harvesting protocol need to be done on regular basis by the forest staff.
6. There should be restriction on multiple harvesting of a particular species i.e. Salai (*Boswelliaserrata*) if used for gum extraction should not be used for any other purpose like fodder etc.

### **SILVICULTURAL TREATMENT:**

For development of Silvicultural Prescription of NTFPs prioritization of the species has to be done. It will be based on its commercial importance, historical potential and threat status. NTFP based sites needs to be identified on the basis of its density, viz. – NTFP rich areas, moderate density and poor density pockets. Some potential sites based historical importance, may also be identified by the territorial Deputy Conservator of Forest.

In special NTFP areas additional prescriptions under the broad silvicultural systems needs to developed for sustainable development of the NTFP in consultation with ICFRE / SFRI and other Institutes.

Silvicultural prescriptions of the NTFP should be based on the usage of the NTFP species. These prescriptions should be species and site specific. Since NTFPs are available in plenty on forest floor, special care should be taken for ground floor management like fire, grazing, which dose maximum damage to the NTFP should be taken care of with great efforts.

A synergy needs to be developed between the Community management practices and silviculture techniques.

### **ARTIFICIAL REGENERATION:**

Restocking (enrichment) of commercially important, threatened and potential NTFP species should be done by artificial regeneration through different methods. Assisted Natural Regeneration should also be adopted.

Nursery and plantation techniques should be developed for selected important prioritized species by the local/ regional research institutes. Care will be taken for factors like seed viability, problematic regeneration etc.

### **YIELD CALCULATION:**

For yield calculation the survey of NTFP should be done through stratified sampling as in case of bamboo on following basis:

- I. Dense areas
- II. Medium areas
- III. Low density areas

The perception of the people about the previous yield of the species needs to be considered while determining sustainable harvesting limit of a NTFP.

### **CONSERVATION STRATEGY:**

#### **(I) IN SITU CONSERVATION:**

NTFP cannot be segregated for a separate treatment in a mosaic of NTFPs that is occurring in nature Conservation through the protection and assisted natural regeneration activities of natural areas should be the main focus for the maintenance of these resources. Some of the other points are as follows:

1. Natural regeneration through renewal of degraded forests and augmentation of NTFP resources through supplemental planting should be promoted.
2. The forest department staff as well as the communities should be jointly trained and motivated through reorientation ecological and

economic importance of the NTFP species to be conserved and their sustainable harvesting.

3. SFRI's should be encouraged to take up research on insitu conservation issues.
4. A checklist of all available NTFPs and list of most important commercial NTFPs in each block separately. Should be prepared and incorporated in the compartment annexure.

## **(II) EX- SITU CONSERVATION:**

Ex-situ conservation is an important strategy for the conservation of the NTFP. The following points needs to be considered for ex-situ conservation of the NTFPs.

1. Plant Genetic Resource Management (germ plasm collection, characterization and evaluation, conservation for sustainable use) of priority species viz. RET and species having economic potential needs to be developed by the local/ regional research institutes and then incorporated in the Working Plan Code.
2. Herbal garden with genetic diversity in each Forest Division for conservation and need based use needs to be developed.
3. Bamboo arboretum / Bamboo setum / orchidaria and conservation areas for other important species should be created for the conservation of the germ plasm.
4. Domestication and cultivation of NTFP species (Commercially important) needs to be promoted by offering technical and material inputs to the formers / villagers and prescriptions to such efforts should be incorporated in the Working Plan document.

## **ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS:**

### **METHODOLOGY FOR STUDYING THE MEDICAL PLANTS- SURVEY ETC:**

In order to assess the potential of areas rich in medicinal plants the field surveys were conducted by FRSS of Amravati also it conducted enumeration of 1% of the entire tract for trees and shrubs. Enumeration of herbaceous plants and grasses could not be done as these species occur in monsoon season. It should be done by the territorial Division.

### **MANAGEMENT OF THE AREA:**

Medicinal plants are mainly herbaceous, tubers, shrubs and some trees. Hence the management of medicinal plants is same as that of Non-Timber Forest

Produces. It is a new concept in forest management. Judicious utilization of medicinal plants need detailed studies about its occurrence, area, extent, phenology, production level and non-destructive exploitation.

#### **METHOD OF TREATMENT:**

The involvement of Joint Forest Management Committees in conservation and management of medicinal plants to augment their income should be the basis of management. Division should facilitate the training for treatment of medicinal plants their product along with marketing. Help of taxonomists of local science college or university should also be sought for identification of plants. Creation of market links and bank guarantees for sale of produce will lead to generating confidence for forest management. Methodology to be adopted should be as follows:

- i. Selection of suitable non-degraded areas where medicinal plant collections are already underway.
- ii. Involvement of a competent local NGO for organizing the community.
- iii. Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “Conservation Science”.
- iv. Creation of market links for sale of produce at the outset of the programs.
- v. Building and strengthening community institutions for sustainable management.
- vi. Only such plants/ parts of the plant specified for each species whose medicinal values are recognized should be collected e.g. fruits and seeds of Neem tree.
- vii. Removal of plants or plant parts of species other than the specified ones shall be totally prohibited.
- viii. Lopping of branches to gather buds, fruits or leaves shall be totally prohibited.
- ix. Fruits and seeds that have fallen to the ground alone are to be collected. May be the branches can be gently shaken to facilitate the shading of fruits and seeds.
- x. For each medicinal plant/tree species about 10-20% of the population shall be left as seed bearers for encouraging natural regeneration and also seed collection. These trees shall be number and ring marked and no collection shall be done from these seed bearers.

- xi. Species to be raised for use in Primary Health Care, trade in the RF/ PF areas will be listed out category wise, well in advance to facilitate nursery operation. Information already generated on nursery and plantation techniques for the chosen species will be used for artificial regeneration.
- xii. Based on the outcome of the survey of the vegetation, the proportion of medicinally important species shall be increased while taking up reforestation works under eco-restoration and water augmentation programs.
- xiii. Tending of coppice shoots/root stocks of existing trees shall be taken up and the natural regeneration shall be encouraged.
- xiv. Seeds/ seedlings shall be sown / planted in the barren patches and in the weeded and soil worked areas around the tree saplings. Medicinal plant species of the nature of the climbers can be planted close to the naturally existing trees and shrubs or their natural hosts.
- xv. If contour trenching is carried out, the species mentioned in the previous Para can be raised on the mounds in the first year and in the trenches during the next year when some silt gets deposited in them.
- xvi. At convenient contour intervals, say 30 m shrubs like Kumari (*Aloe barbensis*), Adulsa (*Adhatoda Vasica*), Nirgudi (*Vitex negundo*) and Vettiver (*Vetiveria Zizanioides*) can be raised as vegetative barriers along the contour. These species can also be planted along the RF boundary. This will incidentally facilitate demarcation of the RF from the buffer zone.
- xvii. In the swamps, along the stream banks and on the water spread areas and aprons of check dams and percolation ponds, hydrophytes like Neerbrahmi (*Bacopa monnieri*), Vallarari (*Centella asiatica*), Vekhand (*Acorus calamus*), Arathi (*Alphina calcarata*) etc can be planted.

#### **SUSTAINABLE HARVESTING OF MEDICINAL PLANTS:**

Information suggesting norms for sustainable levels of harvest shall be worked out by the territorial Deputy Conservator of Forests after taking into consideration the results of vegetation survey and availability of medicinal plants species and the parts of the plant or tree used for medicinal uses. Untimely harvesting should not be permitted otherwise natural regeneration will be affected. In case where the roots/ tubers / rhizomes or the specific plant parts are used in medicine, the natural regeneration of these species shall be ensured by leaving well distributed and adequate numbers of seed bearers. An alternative



would be replanting the area after harvest. Destructive collection should be prohibited. In some plants whose leaves are used for medicinal purposes, it is common practice to uproot the whole plant and therefore, in such cases only the leaves should be allowed to be collected. In case of Vettiver, the roots alone are used in medicine. Since it is raised as a soil binder and vegetative barrier, harvesting can be taken up only when the slips establish, produce tillers and the clumps form a thick barrier. At this stage, leaving a strip of grass barrier on the uphill side tillers can be uprooted on downhill side. Similarly in case of Cymbopogon species, leaves are to be harvested every quarter. On no account should the clumps be allowed to set fire to, to encourage tillering and development of new and young shoots. In this case if the clumps lie scattered, the harvesting will be done only once a year and that too well after the plants flower and seed dispersal has taken place.

National Medicinal Plant Board, Department of AYUSH, Ministry of Health & Family Welfare, Government of India has published a book “Agrotechniques of Selected Medicinal Plants”. In introduction to the said book (Vol-I); WHO guidelines for good agricultural and collection practices for medicinal plants are mentioned. These guidelines can be equally applicable in forestry. Certain basic guidelines are to be followed for harvesting of the crop, some of which are described below:

- Prune and collect only desired mature parts (s), without harming the mother plants.
- Do not collect the whole population; leave at least 30-40% for regeneration.
- Do not cut twigs / branches for collection of plants parts.
- Use proper equipment's for cutting, shearing, peeling and so on.

For collection of underground part (s), barks and whole plants, following guidelines shall be adhered to:

- Collect after the seed are shed to facilitate regeneration.
- Do least digging for collection of underground parts and leave some underground part to facilitate regeneration.
- Collect underground parts when the mother plants is fully matured.
- Don not harvest bark from immature plants; instead collect from the branch of the main trunk.
- Strip the bark longitudinally and not from all over circumference of the trunk / branches.
- Harvest only mature branches for stem.

For collection of leaves, flowers, fruits, seeds, floral parts and so on, follow the following recommendations:

- Harvest only matured parts from healthy plants.
- Do not collect all material of the plant at one time.
- Do not cut branches for collection of leaves, flowers, fruits and so on.
- Leave some floral parts on the plant to facilitate natural regeneration.
- Parts like stigma, anthers, buds and so on should be collected at appropriate time.
- Harvest the seeds once the fruits are completely mature.

For collection of gums, oils, resins and so on

- Make incision only vertically on some portion of the tree and not horizontally.
- Treat the incision after collection of desired material.
- Do not collect the gum or resin from a tree continuously and collect them in precisely right season.

**Future Interventions :** For building the database on NTFPs it is prescribed that weekly markets will be surveyed extensively to find out the types of NTFPs coming from forest areas, their extent, purpose of utilization, rate, chain and the agency of marketing and final destination. JFMCs being primary stakeholders should be involved in this important exercise. A suitable printed register be supplied to all the JFMCs by the division so as to collect this information.

It is prescribed that the above information should be used to formulate correct prescriptions at the time of next revision.

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## **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 Buldhana Forest Division which is co-terminus with the area of Buldhana District. Villages that are adjoining to the forest areas are the focal areas for practicing Joint Forest Management.

#### **6.3: GENERAL CHARACTERISTICS OF VEGETATION:**

The forests of Buldhana 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 Buldhana 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.

#### **6.4: FELLING SERIES, CUTTING SECTIONS AND JFM AREAS:**Not Applicable

#### **6.5: BLOCKS, COMPARTMENTS AND JFM AREA:**

Entire Forest area of the Division.

#### **6.6: 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 degraded 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.

#### 6.6.1: ANALYSIS OF THE CROP:

The spread of JFM in the division is large. All the villages that are adjoining to forest area have been brought under the ambit of Joint Forest Management. 207 JFMCs are registered and 197 JFMCs are MoU with Forest Department approximately areas allotted to JFMCs 33365.85 ha.

**Table No6.6.1**-Range wise Area Distribution under JFM Committees.

| Sr. No. | Range        | No. of Villages adjoining to forest | JFM Committees formed | Area allotted to the committee (ha) | Plantation undertaken |             |              |
|---------|--------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------|-------------|--------------|
|         |              |                                     |                       |                                     | Name of scheme        | No of JFMCs | Area Planted |
| 1       | Mehakar      | 27                                  | 27                    | 3771.20                             | FDA                   | 2           | 50           |
| 2       | Khamgaon     | 39                                  | 29                    | 3925.20                             | FDA                   | 4           | 105          |
| 3       | JalgaonJamod | 20                                  | 20                    | 6974.10                             | FDA                   | 5           | 125          |
| 4       | Buldhana     | 20                                  | 20                    | 4154.61                             | FDA                   | 7           | 175          |
| 5       | DeulgaonRaja | 28                                  | 28                    | 4221.15                             | FDA                   | 5           | 170          |
| 6       | Ghatbori     | 38                                  | 38                    | 5744.77                             | FDA                   | 9           | 225          |
| 7       | Motala       | 35                                  | 35                    | 4574.82                             | FDA                   | 5           | 130          |
|         |              | 197                                 | 197                   | 33365.85                            |                       | 37          | 980          |

**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 SILVICULTUREAL 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 top soil 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 forest only in larger national interests overlooking the basic needs of local communities did not succeed and forests were degraded as a result of over use.

Forest resource 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 requirement 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 holders of customary rights and concession in forest areas should be motivated to identify themselves with the protection and development of forest from which they derive benefits. In pursuance to the National Forest Policy, the Ministry of Environment and Forests advised the State Governments to adopt the Joint Forest Management (JFM) approach for the protection and rehabilitation of degraded forest. The Govt. of Maharashtra vide Resolution No SIF-1091/199/F-11, dated 16<sup>th</sup> 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 5<sup>th</sup> 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 LPG / Biogas, Distribution of improved cattle in lieu of scrub cattle, protection of plantations.

JFM is a concept under which forest Department and village committee jointly protect and manage the forest. The starting point of JFM has to be the realization of the need of JFM both by Forest Department and the local people.

Generally, the scarcity of forest products such as fuel wood, fodder etc. as a result of degradation of forest on which the local communities depended, forces the people to think of steps for the protection and improvement of degraded forests. The people are usually reluctant to participate in JFM where sufficient forest areas are still available to meet their requirement. On the part of Forest Department the challenge to effectively protect forests with limited resources is enormous. The JFM program succeeds where the initiative comes from the people's side and it usually fails where it is forced from FD side as it would only be a Govt. driven and target oriented program. Villagers themselves are required voluntarily to participate in the program. Forest Protection Committee (FPC) is to be formed in each village through the resolution of Gram Sabha. Each Forest Protection Committee constitutes a Managing Committee consisting of members elected from general body and with local Forest Guard/ Forester as the member secretary. The managing committee is responsible to implement the decisions of general body with regard to the execution of JFM works in partnership with Forest Dept. Memorandum of Understanding (MOU) is signed between Forest Dept. and managing committee clearly specifying the duties and responsibilities of both parties. Entitlement of FPC members to the share in forest produce is subject to the fulfillment of conditions of MoU.

The members of the FPC will help in protection and development of forests and in turn they will receive 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 has to be sustainable, should cater to needs of local communities and the same time, the silvicultural requirements of the forest are to be factored properly.

Govt. of Maharashtra Vide Resolution dated 5<sup>th</sup> October 2011 and 10<sup>th</sup> 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, and 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 also generate livelihoods to local people.
- vii) JFMC is authorized to impose penalties on persons involved in forest and wildlife crimes.
- viii) RFO and JFMC have to submit an annual performance report jointly to the DCF w.r.t the responsibilities assigned and achievement of the committee.
- ix) The JFMC would be eligible for usufruct sharing from intermediate and final felling's as per working plan if the responsibilities trust on the committee is executed for a period of five years. However, in case of Bamboo, yield from dense areas / degraded areas, the same would be available to JFMC soon after execution of MoU and upon protection of Bamboo for 3 years respectively. All removals would be as per the provisions of approved Working Plan.



- 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 10<sup>th</sup> 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, 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.

- Plantation of bamboo, fruit trees shall be done through JFMC's so that it will fetch early return and there will be benefit sharing.
- 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 JFM programme.
- All potential wildlife areas are to be included in either 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 13 JFMCs are covered under 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 forest or protected forests in the village as assigned to the village Panchayat under the Indian Forest Act, 1927 and the Village Forest Rules 2014 and also under the Maharashtra Village Panchayat Act 1959 for management through Joint Forest Management Committee. The JFMC shall manage its village forest 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 13<sup>th</sup> May, 2014. The salient aspect of these rule are 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 VyavasthapanSamiti” has to 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 Micro-plans should be reflected in the planning process of the Gram Panchayat.
- Wherever required, NGOs be involved for creating awareness programmes.
- Documentation of successful initiatives under the JFM approach must receive importance at the Range and Division level. A compilation of works undertaken in JFM villages in a financial year should be done at division level and published. This work should be given wide publicity in print and electronic media.
- JFM programme should be implemented with complete transparency. The accounts of JFMCs shall be annually audited as per 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 works are to be executed by JFM members only. Monitoring of JFM activities by supervisory cadres (ACF to CCF) is the key for effective implementation of JFM program. Periodic reviews at various levels will aid in good implementation.
- 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 grassroots 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 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 10<sup>th</sup> July 2012 decided to distribute LPG connections to forest fringe villages. JFMC's have played a key role in implementing this schemespread 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 source 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.

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## 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 harbours valuable and also 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.** The tract dealt with is around *Dnyanganga* Sanctuary, *Lonar* Sanctuary and adjoining to *Ambabarwa* Sanctuary. Most of the wild animal resides in these Sanctuaries. In the past these forests sheltered many Tiger (*Panthera tigris*) but now they are almost extinct not only from the territory of this Division but also from the geographical boundary of the Buldhana District. Their presence is not only essential to preserve the eco-system and biodiversity of the area but also to maintain the hygiene of the forests. Moreover, they add beauty to the forests. As man- animal conflict is increasing day by day, there is a great threat to the wild animals. Therefore, to preserve the remaining wildlife and to ensure that they will not be wiped out as the Tiger, keeping this necessity in the mind, Wildlife Management Chapter is constituted.

### **7.3: GENERAL CHARACTERISTICS OF VEGETATION:**

The forests of Buldhana 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 Buldhana 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.

**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 large geographical area and is adjoining to Lonar, Dnyanganga & Ambabarwa Wildlife Sanctuary. However it is not rich in wild animals due to heavy biotic disturbance. 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 (*Boselaphustragocamelous*). 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

(*Naja naja*), Dandekas (*Bugarus caeruleus*), Russel's Viper or  
 Ghunus (*Viperarusselli*). Checkered keel back (*Xenochrophis piscator*)

**F) Birds:** (i) Painted sand grouse (*Pterocles indicus*) (ii) Common sand grouse (*Pterocles sexustus*) (iii) Pea fowl (*Pavocristatus*) (iv) Grey jungle fowl (*Gallus sonnerati*) (v) Red jungle fowl (*Gallus gallus*) (vi) Red spur fowl (*Gallus spadicea*) (vii) Painted partridges (*Francolinus pictus*) (viii) Grey partridges (*Francolinus pondicerianus*) (ix) Jungle bush quail (*Perdica asiatica*) (x) Black breasted quail (*Coturnix coronandelicus*) (xi) Indian Bustard quail (*Turnix suscitator*) (xii) Common or grey quail (*Coturnix spp*), (xiii) Pigeon (*Treron phoenicoptera*) (xiv) Crane (*Grus antigone*) (xv) Dove (*Streptopias spp*) (xvi) Cotton teal (*Nettapus coromandelianus*) (xvii) Whistling teal (*Dendrocygna javanica*) (xviii) Comb duck (*Sarkidiornis melanotus*). (xxix) Little Grebe (*Podiceps ruficollis*) (xxx) Cormorant (*Phalacrocorax carbo*) (xxxi) Grey Heron (*Ardeacinera*) (xxxii) Large Egret (*Ardea alba*) (xxxiv) Black ibis (*Pseudibis papillos*) (xxxv) Pariah Kite (*Milvus migrans govinda*) (xxxvi) Shikra (*Accipiter badius*) (xxxvii) India Whitebacked Vulture (*Typs bengalensis*).

**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, their 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, coordinated 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 ..... 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 XVII**. 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 .6.13.4:HUMAN-ANIMAL CONFLICT:**

##### **I.HUMAN-SLOTH BEAR CONFLICT:**

“Evaluation of habitat and human bear conflicts in Buldhana forest division and adjoining areas of Dnyanganga Wildlife Sanctuary & To suggest possible conflict mitigation measures”, a research project was carried out for 12 months (April 2017 to March 2018) Submitted by Youth for Nature Conservation Organization, Amaravati; Wildlife & Conservation Biology Lab, Patan; Gujarat IUCN SSC- Bear Specialist Group. The project was funded by the Maharashtra Forest Department. The main objective of the research was to find out the causes of increased Human-

Sloth bear conflict incidences during year 2016-17 as compared to conflict incidences during previous years and to suggest immediate and long terms mitigation measures.

The study has been conducted in Buldhana forest under Amravati territorial circle in Dnyanganga under Melghat Tiger Reserve and situated in Buldhana district, located in western most part of Vidarbha region of Maharashtra state in India. The forest area is protected with the status of sanctuary under Dnyanganga Wildlife Sanctuary (WLS) known as Botha forest and reserved forest under Buldhana territorial division. The forest area of this region also has two other WLSs viz. Amba-barwa and Lonar WLS which are moist deciduous forest; among which Amba-barwa holds good population of Sloth bears. The objectives of the study were to evaluate sloth bear habitat and assess the reasons behind the increasing human-Sloth bear interactions and to suggest immediate and long term conflict mitigation strategies. The cases of direct human-animal conflicts like human injury or death and indirect conflicts like infrastructural damage by bears, habitat encroachment by humans were reported during the study.

The final report is incorporated in VOLUME II in **Appendix No. LXIII (B)** which provides some major findings of our research being conducted for 12 months of study period; which mainly includes the sign survey of the sanctuary and territorial forests, habitat use by sloth bear, its feeding ecology, presence and distribution of food resources for Sloth bear, interviewing victims attacked by Sloth bear in order to collect the information regarding conflict, sloth bear attack pattern and the perception of locals towards the sloth bear and its recommendations.

## **II. STANDARD OPERATING PROCEDURE (SOP) FOR SLOTH BEAR:**

Sloth bear is listed under Schedule I of the Wildlife (Protection) Act 1972. To check attacks and their straying in human habitations, the SOP calls for maintaining law and order situation and assisting forest staff in rescue operation by mobilizing police patil, sarpanch, talathi, gram panchayat or joint forest management committee (JFMC) members.

It also calls for seeking help from district collector and superintendent of police and timely deployment of adequate forces to the site to maintain law and order. The SOP also suggests different solutions for sloth bear falling in a well or pit,

climbing a tree or occupying abandoned spaces & structures. It calls for chemical immobilization in case trapping fails.

Sop for sloth bear sanctioned by Government of Maharashtra is incorporated in Volume II, **Appendix No.LXIII (A)**

#### **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 equipments 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 NGO's 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 borewells.

**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 water-bodies 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, specially with Joint Forest Management Committee, to gather information about any activities related to poachers and traders of wild life.

- Regular patrolling by the staff shall be carried out in the areas where the population of wildlife is more, specially 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, Water-Birds, 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 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, Gular, 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.Buldhana will take special care to motivate and orient the field staff in favour of Wild life 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 water-bodies 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 Buldhana Forest Division. The forests of *Buldhana* Division are burdened with heavy biotic interferences, hence addressing of 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 Buldhana 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 Buldhana 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.

#### **8.4. FELLING SERIES AND CUTTING SECTIONS AND JFM AREAS:** Not Applicable

#### **8.5. BLOCKS AND COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED 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 which the rocks have 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 man made 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:**

Illicit cutting of trees for fuel and timber is the main source of injury to the crop. Last five year's record shows illicit cutting of Teak and other miscellaneous species for timber and poles is observed in forests of villages in Jalgaon Jamod range which is adjoining to Madhya Pradesh. Many cases of illicit fellings have been observed in the village of Ghatbori range.

At present there is no wireless network in the Division. The territorial Division has 2 mobile squads apart from the territorial staff for protection purpose.

The Division has only 6 vehicles available for protection; 1 -Tata Victa used by DCF; 1- Tata Sumo used by ACF, Khamgaon; 1 -Mahindra Bolero and 1 - Maruti Gypsy used by RFO, MS Buldhana and Khamgaon respectively; 1- Mahindra Jeep used by RFO, Jalgaon Jamod and 1- mini Truck used by RFO Buldhana. Other ACFs and RFOs do not have vehicles.

There are 6 Forest Check Posts in Buldhana Division-namely at -Dongaon and Deulgaon Sakharsha in Ghatbori Range, Warwand in Buldhana Range, Khamgaon in Khamgaon Range, Malkapur in Motala Range and Deulgaaon Raja in Deulgaon Raja Range.

The Buldhana Division consists of 96 beats out of which 67 are Normal, 21 are Sensitive and 8 are Hyper Sensitive.

- 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 charge sheets in the courts is viewed seriously.
- Use IPC provisions, for the effective control of the 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 of information.
- Provide regular training to the staff in submitting the charge sheets, preparation of panchanamas etc.
- Plan in such a way to have young guards in the hyper sensitive areas.
- Patrolling squads shall be not less than 10 in number to over come the group of offenders.
- History sheets of all the offenders along with their photo and bio-data are maintained at Round Level, Range and Division Level.
- Prepare 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 on top priority.
- Efforts are made to appoint the forest counsel as directed by PCCF office.
- Every stump in the forest be numbered with digit nail 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 Performa. 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 1, 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 the 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.
- Inter state 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 the forest development. The division officials and local people shall be sensitized about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

Fires are of common occurrence. With a 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 the 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 persons including regular staff and firewatchers. The staff shall be trained in the application of modern fire-fighting tools. The 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 area.

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 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 to the forest crop.

The group of firewatchers shall immediately rush to the site and extinguish 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. 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 February 15, 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 its 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 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 the **Table 8.1.**

**TABLE SHOWING STANDARD WIDTHS OF VARIOUS TYPES OF FIRE LINES:**

| <b>S. No.</b> | <b>Characteristics of the area</b>                                 | <b>Width of fire line in meters</b> |
|---------------|--------------------------------------------------------------------|-------------------------------------|
| 1             | External boundaries of the forest                                  | 12                                  |
| 2             | Naturally or artificially regenerated areas (For 5 years) (coupes) | 6                                   |
| 3             | Remaining coupe boundary                                           | 3                                   |
| 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 taken 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 the soil erosion.

It is not uncommon to see goats grazing in timber forests. The 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 November 3, 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 challenge, 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 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 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 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.

The cattle population (except goat and sheep) of Buldhana District is approx. 6 lakhs (19<sup>th</sup> livestock census 2012). The Sheep & Goat population of Buldhana District is approximately 3,70,000 as per 2012 Census Report. Hence it requires some urgent measures to tackle growing livestock population in order 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 29896.79 ha C class RF area for sheep grazing. These areas are divided in 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-1 dated 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 Pasture Land.
- (3) While permitting sheep grazing, sheep shall be considered as 1 Cattle unit and as per Bombay Forest Manual Volume III grazing shall be permitted from 15<sup>th</sup> September to 15<sup>th</sup> 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 24720 cattle unit. The details are given in **Appendix No. LX** of Volume II.

#### **FOREST ENCROACHMENT:**

The problem of encroachment on forest land exists since 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 Jalgaon-Jamod Range and some part of Motala Range and 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 the 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 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 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 the 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 taking 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 1104.22 ha of encroachment area have been registered by the Buldhana Division upto (31/3/18).

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 13<sup>th</sup> of December 2005.

The position of individual and community Forest Right claims in Buldhana division (upto March 2020) is as under.

| Sr. no. | Particulars         | Received claims | Area in ha. |
|---------|---------------------|-----------------|-------------|
| 1       | Individual claims   | 266             | 761.29      |
| 2       | Community claims    | 225             | 21087.54    |
| 3       | Section 3(2) claims | 50              | 20.11       |

#### **POACHING:**

The issues related with poaching have been dealt in detail under Chapter on Wildlife Management Chapter.

**MINING:**

The Agates, cornelians and calcite (double refracting spar) found in the trap in the southern part of the district, have some possible value, the two first named for ornamental purpose and the last for optical purpose. The potential locality of agate stone of carlenian variety are Undri, Amdapur, Dhasala villages of Chikhali Tahsil. Though damage due to mining is not reported, care shall be taken to ensure that no illegal mining of agate stones from forest area takes place.

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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 Buldhana.

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 harbour and sustain immense biodiversity. The country is also one of the 12 primary centres of origin of cultivated plants and domesticated animals.

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

**9.3: GENERAL CHARACTERISTICS OF VEGETATION AND BIODIVERSITY:-**

The forests of Buldhana 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 considerable and hence not much 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 Buldhana 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 AND JFM AREA (MARKED ON GIS BASED 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 Buldhana 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)

Buldhana Forest Division have been worked under CWR and CWS systems since 1902 as per the working plan of 1912 to 1937 and after thereafter to 1995-96 to 2004-2005. This has resulted in the overabundance of teak in the forest of

Buldhana. In view of this the forest are reduced to monoculture in many areas leaving the biodiversity in the area highly impoverished.

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 biodiversity.

Total Forest area in charge of Buldhana Forest Division is 80516 ha. As per Buldhana FSI report 1997, Inventory of Forest Resources of Buldhana 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 division can be classified into two strata viz, Teak and Miscellaneous, Teak forest which contains 40% of teak as whereas miscellaneous forest contains 60%.

**9.6.2: Facts** - As per this FSI report 'Inventory of Forest Resources of Buldhana 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 Buldhana 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 Buldhana has booked offence on the killing/trapping of the following species: Bluebull (Nilgai), Leopard (Chitta), Sloth Bear (Aswal), Black Buck (Kalvit), Indian Black naped hare (Sasa), Monkey (Vanar), Snake (Sap), Peafowl (Mor), Shikra, Ruddy Shelduck, Ibis, Red-wattled lapwing, Laughing dove. However, there is often neglected part the hunting for the quails and partridges in places inhabited by Pardhis which is very essential to be curbed. Hunting of animals in any form needs to be curbed. Unlike tiger and leopards etc which get national and international attention about 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 (Panthera pardus), Sloth bear (Melursus ursinus), Wild dog (*Cuon alpinus*).

Birds species which are listed as Critically Endangered in IUCN red list version 2013.2 are White backed Vulture (*Gyps bengalensis*), Red-headed Vulture (*Sarcogyps calvus*) and other endangered species like Indian 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 Buldhana 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 Buldhana 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 Buldhana 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 Buldhana 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 Buldhana 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 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 5<sup>th</sup> 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 by products, 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 Buldhana 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 Buldhana 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.

#### **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 skeletonisers to all forms of parasites, fungal attacks.
- 4) Ensuring grazing in forest is kept to a minimum.
- 5) Reducing human interference of all forest, from illegal felling, grazing, hunting etc. by enforcing the law & changing moral perception.

**B)** As the forest of Buldhana 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 Buldhana 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)

Buldhana Forest Division have been worked under CWR and CWS systems since 1902 as per the working plan of 1912 to 1937 and after thereafter to 1995-96 to 2004-2005. This has resulted in the overabundance of teak in the forest of Buldhana. Because the teak coppices were given importance and priority, there is no fresh seedling originated trees in the forests. Moreover, as the teak is of third to fourth generation coppice, the general vitality of the crop and its resistance to injuries has been abysmally low. This is evident from the amount of hollowness in the trees in the Buldhana forests. Preferential treatment towards teak and other commercially important species over the years has also reduced the forest in many places into almost monocultures which again adversely affect the forest in every area including its growth and production.

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 Buldhana Forest Division is 80516.42 ha. As per Buldhana FSI report 1997, Inventory of Forest Resources of Buldhana 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 Buldhana District' (1997) the findings about the forests of the District shows the condition of the crop and health status in poor condition. One can only presume that an area where the forests with little regeneration, overabundance of a single species and subjected to various biotic and abiotic pressure would be in poor health and vitality. The details of the findings area summarised below:

- (i) Dense forest is totally absent 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 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 Buldhana 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 Buldhana 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, overdependence 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 rapport 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) **Firelines:** 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 Division has purchased 113 number of fire blowers for extinguishing fire. These blowers are very effective for the clearing the litter from the ground and breaking the spread of fire. The use of these blowers has proven very effective in reducing the labour intensiveness of 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 Buldhana 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 Buldhana which provides for soil working on 400 seedlings/ha in a coupe is being modified. In the forests of Buldhana, **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 **Appendix No.XXXV** 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 and 1979 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.

*Eutectionagrandis* (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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## 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 BULHANA:**

*The National Bureau of Soil Survey and Land Use Planning, ICAR and Deptt of Agriculture, GoMetc have published the 'Soil Resource Atlas, Bulhana District' in 2005. The characteristics of the Soils of Bulhana District are extracted from this Atlas and discussed below.*

**Soil Types:** Soils are varied in nature. Their extent and development depends on the environmental setting in which they have been evolved. The knowledge on the kinds of soils and their extent is very essential for sustainable land use planning. Soil resource inventory provides this kind of information, obtained through a systematic interpretation of satellite imageries, aerial photographs, field survey, laboratory characterization and cartography.

There are three major soil types in this district, locally called as Bharkali, morand and Barad.

Morand soils are silt and lime mixed heavy in texture and blackish one suitable for cotton growing.

Black soil is also found in Chikhali and Mehakar area but the depth of Top soil being very low hence suitable for wheat growing.

Sandy soils are locally called as Barad, percentage of sand is more than silt and clay hence light in nature hence identified as light soils. These are very poor fertile soil types than morand.

Constitute the physical basis of all agricultural practices. The infiltration and transmission of moisture through soil depends upon the particle size, amount of organic matter in the soil depth. These factors are also depend upon the approach of soil for the saturation its swollen capacity and individual physical properties.

From the physical properties of the soil in the district it can be divided into

- 1) Coarse shallow soil
- 2) Medium black soil and
- 3) Deep black soil

Coarse shallow soil covers the high lands in district. The depth of such soil remains very less. The infiltration is much less in these types of soils and run off is more. This type covers an area of 4564.72 Sq. Km.

Medium black soil is developed comparatively in the plains along the tributaries of main rivers and small plateau of the district. This type of soil area generally low in clayey material. The area covered by the type of soil in the district is 3574.68 sq.m. and remains at 37 percentage of the total soil.

**Statement Showing Distribution of Soils in Buldhana District.**

| <b>Sr.No.</b> | <b>Taluka</b>         | <b>Course shallow</b> | <b>Medium Black</b> | <b>Deep Black</b> |
|---------------|-----------------------|-----------------------|---------------------|-------------------|
| 1             | Buldana               | 433.55                | 138.39              | 135.76            |
| 2             | Chikhali              | 343.70                | 173.52              | 170.25            |
| 3             | D.raja                | 474.85                | 151.55              | 148.69            |
| 4             | Mehkar                | 320.23                | 514.50              | 150.87            |
| 5             | Lonar                 | 260.23                | 419.24              | 122.93            |
| 6             | S. Raja               | 258.00                | 414.74              | 121.66            |
| 7             | Khamgaon              | 581.21                | 317.14              | 149.69            |
| 8             | Shegaon               | 428.04                | 234.03              | 110.42            |
| 9             | Malkapur              | 165.72                | 197.86              | 84.49             |
| 10            | Motala                | 280.25                | 334.62              | 142.88            |
| 11            | Nandura               | 171.68                | 204.97              | 87.53             |
| 12            | Jalgaon               | 299.44                | 219.86              | 44.72             |
| 13            | Sangrapur             | 346.98                | 254.26              | 51.71             |
|               | <b>Total- 9661.00</b> | <b>4564.72</b>        | <b>3574.68</b>      | <b>1521.60</b>    |

Deep black soil generally develops along the banks of the Major River and main tributaries of the river in the district it has been developed along Purna (Tapi).

## SOIL DEPTH

The soil depth is of vital importance for plant growth as it provides foothold to plant to draw the required water and nutrients from underground sources. As such, the greater soil depth normally results in better forest growth. It takes about 500-1000 years to develop on inch thick soil from the hard basement/rock due to different action & interaction of various soil forming factors and processes. However, a very little time is required to erode this soil if the canopy protection is removed. The depth of soil, therefore, depends on the climate, landform, land use land cover and conditions responsible for management practices. The distribution of soil in different depth classes of the district is given below:

**TABLE NO. 11.2: THE SOIL DEPTH CLASS**

| Sr. No. | Depth Class       | Depth (cm.) | Area     |          |
|---------|-------------------|-------------|----------|----------|
|         |                   |             | Ha.      | (%) TGA* |
| 1       | Extremely Shallow | <10         | 1,39,118 | 14.4     |
| 2       | Very Shallow      | 10-25       | 3,15,915 | 32.7     |
| 3       | Shallow           | 25-50       | 1,79,694 | 18.6     |
| 4       | Slightly deep     | 50-75       | 39,610   | 4.1      |
| 5       | Moderately deep   | 75-100      | 40,576   | 4.2      |
| 6       | Deep              | 100-150     | 2,02,881 | 21       |
| 8       | Water bodies      | --          | 48,305   | 5        |
|         | Total             | 966100      |          |          |

## SOIL EROSION

The soils have been grouped into different erosion classes, their areal extent and expected soil loss is given below:

**Table No. 11.3:** Different erosion classes

| Erosion class | Area     |          | Expected soil loss (tonnes ha <sup>-1</sup> yr <sup>-1</sup> ) |
|---------------|----------|----------|----------------------------------------------------------------|
|               | Ha       | (%) TGA* |                                                                |
| Slight        | 1,06,271 | 11.3     | 5-10                                                           |
| Moderate      | 3,51,660 | 36.4     | 10-15                                                          |
| Severe        | 2,26,067 | 23.4     | 15-20                                                          |
| Water bodies  | 48,305   | 5.1      |                                                                |

\*Total geographical area

**SLOPE:**

The slope can be defined as an element of the surface inclined to the horizon. A slope possesses a gradient, giving it a direction or orientation in space. The gradient in the terrain is the result of several factors viz. relief, drainage, climate and geology operating in the area.

**TABLE NO. 11.4: CLASS OF SLOPE**

| Class               | Slope (%) | Area     |          |
|---------------------|-----------|----------|----------|
|                     |           | (ha)     | (%) TGA* |
| Very gently sloping | 1-3       | 2,55,050 | 26.4     |
| Gently sloping      | 3-5       | 5,27,490 | 54.6     |
| Moderately sloping  | 5-15      | 1,45,881 | 15.1     |
| Steeply sloping     | >15       | 37,678   | 3.9      |
| Water bodies        | --        |          | -        |
| Total               | 966100    |          |          |

On analysis of the maps as seen above, it is seen that the area falling under forest are highly prone to erosion coming under severe category. The soil depth is very low and is seen to be in most places to be less than 10 centimeters. The slope in the forests areas is comparatively high than any area in the District, which is seen from the slope map above showing areas to be >15% slope. This makes soil and water conservation in the forest area very critical for the filtration of water, the prevention of siltation of dams, the longevity of the live streams, the supply of water, the survival of the dams and every aspect of water regime management.

**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: 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.

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

**TABLE NO. 11.1: MAJOR DAMS IN OR IN THE VICINITY OF THE FOREST AREAS  
DAM PROJECTS (EXISTING)**

| <b>Name of Dam</b> | <b>Type of Dam</b> | <b>Capacity of Dam</b> | <b>River on which Dam is located</b> | <b>Dam Prone villages</b>       | <b>Tahsil</b> |
|--------------------|--------------------|------------------------|--------------------------------------|---------------------------------|---------------|
| Nalganga           | Major              | 1386 cum               | Nalganga                             | Makodi, Talni, Shelapur, Datala | Motala        |
| Dhynganga          | Medium             | 4249 cum               | Dhyanganga                           | G. Matergaon, Konti,            | Khamgaon      |
| Paldhag            | Medium             | 1739 cum               | Vishwaganga                          | Tarapur, Kothali,               | Motala        |

|         |        |          |         |                              |          |
|---------|--------|----------|---------|------------------------------|----------|
|         |        |          |         | Jaipur, Paldhag              |          |
| Mandawa | Medium | 850 cum  | Mandawa | Mandawa, Bibi                | Lonar    |
| Mas     | Medium | 2496 cum | Mas     | Kalegaon, Chitode, K.Mahadeo | Khamgaon |
| Koradi  | Medium | 2436 cum | Koradi  | Nagzari, Palaskhed, Hiwara   | Mehkar   |

#### ON GOING PROJECTS:

| Name of Dam | Type of Dam | Capacity of Dam | River on which Dam is located | Dam Prone villages | Tahsil    |
|-------------|-------------|-----------------|-------------------------------|--------------------|-----------|
| Wan         | Major       | 4559 cum        | Wan                           | Wasadi, wari       | Sangrapur |
| Khadkpurna  | Major       | 18000 cum       | Khadkpurna                    |                    | Mehkar    |
| Man         | Medium      | 6587 cum        | Man                           | Ambetakli, Shirla  | Khamgaon  |
| Torna       | Medium      | 2384 cum        | Torna                         | P. Korade, Nimkhed | Khamgaon  |
| Pentakli    | Medium      | 8562 cum        | Painganga                     | Boradi, Pachla     | Mehkar    |
| Jigaon      | Major       | 91800 cum       | Purna                         | Jigaon, Takli      | Nandura   |
| Utawali     | Medium      | 265 cum         | Utawali                       | D. Sakarsha        | Mehkar    |

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) NalaBunding 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 nalabunding is proposed as 5 meter<sup>3</sup>/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 nalabunding. 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 Bulhana Division, the catchment areas of thesedam covered by forest areas. In order to avoid siltation in the Dam, SMC work should be carried out in the catchment areato 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 ets. can be taken as per site specification.

**TABLE NO.11.2: DETAILS OF CCT MODELS AS GIVEN BELOW:**

| Sr .<br>No | Model<br>No | Slope<br>% | Distance<br>Between<br>CCT | Length<br>of<br>CCT | CCT<br>/ Ha. | Excess<br>water<br>Drain<br>out<br>from<br>CCT<br>(gap) | Length<br>of<br>CCT<br>including<br>Gap<br>(Mtr) | Unit<br>of<br>pea-<br>chi-<br>ng<br>Sq<br>mt | Gully<br>plug-<br>ging<br>(Unit<br>m <sup>3</sup> ) | Seed<br>Kg. | Agave |
|------------|-------------|------------|----------------------------|---------------------|--------------|---------------------------------------------------------|--------------------------------------------------|----------------------------------------------|-----------------------------------------------------|-------------|-------|
| 1          | 5           | 0 to 4     | 10                         | -                   | 1000         | -                                                       | 1000                                             | -                                            | 20                                                  | 10          | 1200  |
| 2          | 6           | 4 to 8     | 8                          | 50                  | 1179         | 3                                                       | 1250                                             | -                                            | 20                                                  | 11.79       | 1400  |
| 3          | 7           | 8 to 15    | 6                          | 30                  | 1514         | 3                                                       | 1666                                             | -                                            | 20                                                  | 15.14       | 1700  |
| 4          | 8           | 15 to 33   | 4                          | 20                  | 2174         | 3                                                       | 2500                                             | -                                            | 20                                                  | 21.74       | 2400  |

\* **Source:** As per Maharashtra Govt. Water conservation Department, No.-2013/F.N.114/Water-7, and Dt.10 October, 2013.

**(iii) Forestry measures:** Afforestation of eroded lands is best method of erosion control. The standing vegetation and dried leaves on the floor intercept the rain

and reduce the impact of rain drops, thus averting the erosion process. Moreover, 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 resist the soil erosion. Therefore, areas as prescribed in the various Working Circle for raising plantations should be taken in right earnest.

**(iv) Other Measures:** These include:

**(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 channelled.

**(ii) Stream bank protection:** To grow vegetation alongside the river bank, to construct drains, concrete or stone pitching etc. For checking the cutting and caving of river banks.

**11.5.1: Implementation of other schemes:** Soil & moisture conservation work under JalayuktaShivar 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**

### **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/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 Buldhana 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 (*Ficus religiosa*) and to a great extent the banyan tree (*Ficus bengalensis*) have been traditionally revered and therefore never cut. There are a number of 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 are 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 world.

Ecotourism is also recognized, as important industry, by UNWTO (United Nations World Tourism Organization). The World Tourism Day celebration started by UNWTO since 1980 to aware the people about significant role of tourism in social, economic and cultural values.

Ecotourism is now defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education" (TIES, 2015). Education is meant to be inclusive of both staff and 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, behavioral, and psychological impacts.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Generate financial benefits for both local people and private industry.
- Deliver memorable interpretative experiences to visitors that help 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 27<sup>th</sup> September. To aware the people about the role and impact of tourism on society, the UNWTO started celebrating World Tourism Day on 27<sup>th</sup> 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 highlights of this policy.

- iv) Govt. of Maharashtra in Revenue and forest Department vide Resolution No. WLP 1002/C.R.53/F-1, Mumbai dated 20.2.2008 has declared “Eco-tourism Policy 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 Forest Department to prepare management plan of eco-tourism centers’ in pursuance of Forest Conservation Act.1980, Wildlife Protection Act 1972, and guidelines by National Tiger Conservation Authority. The Maharashtra Eco-tourism Board has key role in co-ordination of line departments, granting of permission for infrastructure development, signing of MOU with Forest Department for development of infrastructure and revenue sharing.

- v) The Govt. of Maharashtra, in Revenue and Forest Department vide Resolution No.-M-2011/ C.R. 174/F-5, Mumbai, dated 24.11.2011 has issued guidelines for implementing eco-tourism activities in forest areas. Identification of eco-tourism places, preparation of management plan, involvement of stake holders, stay 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: POTENTIAL ECO-TOURISM SITES IN BULDHANA FOREST DIVISION.

Buldhana Forest Division has its varied flora and fauna ranging from the grasslands, the wetland to the thick forests and has quite few ecotourism sites of potential. They are not properly developed and require immediate attention. Places of ecotourism attractions are few but they are having great potentials. Some of them are- *Dnyanganga* Sanctuary, *Ambabarwa* Sanctuary, “*Saptarushi*” (Seven sages) in *Ghatbori* Range. *Lonar* Sanctuary is only crater in basaltic rock formed by the impact of a meteor. Forests of this Division have origins of many rivers. All these places need to be given specialized attention by ensuring preservation of their originality and potential in wild life conservation as well as from eco- tourism point of view.

Some of the sites are actually not in the forest area but are included as they can form a circuit that would be linked with the eco-tourism sites for better packages whenever these sites are developed with proper management plan.

The social aspect of forests in the context of ecotourism is very important as it provides the people with employment. The other important social contribution of ecotourism is the exposure to the other cultures and the chance to educate others about 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:

- 1) Sindkhed Raja- which is a birth place of *Jijabai*.
- 2) Mehkar- Famous for the temple of *Lord Balaji (Sharandhara)*,
- 3) Lonar- Famous for crater, temple of “*Lawanasura*”,
- 4) Deulgaon Raja - famous for temple of Lord Balaji.
- 5) Shegaon- famous for temple of *Gajanan Maharaj*; *Anand Sagar*
- 6) Nandura- famous for 105 feet Lord Hanuman statue.
- 7) Sailani- famous Dargah of Muslim Saint Sailani Baba.

The principles of Eco-tourism stated above should be the guide for all such developments.

- Biodiversity garden, Medicinal Plants gardens, Nakshatra van etc
- Nature interpretation centers,
- Adventure Sports,
- Tent camping,
- Nature Trail,
- Observation towers,
- Camping,
- Homestaydevelopment,
- 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 a 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. 1445.42 lakh annually in the first three years and Rs. 2412.25 lakh annually for the next seven years that is from the fourth year onwards. The total expenditure will come to Rs. 21221.64 lakh. The expected revenue from the implementation of the plan is Rs. 212.22 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<br>(Rs in<br>lakh) | Expenditure in (Lakh)                     |                                   |                      | Total<br>Expenditu<br>re (3+4+5) |
|---------|----------------------------|-------------------------------------------|-----------------------------------|----------------------|----------------------------------|
|         |                            | Conserva<br>ncy &<br>Work (Rs<br>in Lakh) | Establish<br>ment (Rs<br>in Lakh) | Plan (Rs in<br>Lakh) |                                  |
| 1       | 2                          | 3                                         | 4                                 | 5                    | 6                                |
| 2010-11 | <b>1.09</b>                | 297.21                                    | 675.32                            | 122.81               | 1095.34                          |
| 2011-12 | <b>5.76</b>                | 264.06                                    | 762.11                            | 434.11               | 1460.28                          |
| 2012-13 | <b>6.37</b>                | 530.92                                    | 809.26                            | 440.47               | 1780.65                          |
| 2013-14 | <b>6.19</b>                | 503.24                                    | 872.61                            | 280.53               | 1656.38                          |
| 2014-15 | <b>1.61</b>                | 646.59                                    | 992.67                            | 186.72               | 1825.98                          |
| 2015-16 | <b>6.91</b>                | 795.21                                    | 1111.00                           | 391.83               | 2298.04                          |
| 2016-17 | <b>2.97</b>                | 1072.47                                   | 1318.34                           | 558.97               | 2949.78                          |
| 2017-18 | <b>1.24</b>                | 985.36                                    | 1599.66                           | 459.91               | 3044.93                          |
| 2018-19 | <b>1.30</b>                | 827.15                                    | 1487.27                           | 2186.91              | 4501.33                          |
| 2019-20 | <b>0.00</b>                | 8.02                                      | 497.50                            | 103.41               | 608.93                           |
| Total   | <b>33.44</b>               | 5930.23                                   | 10125.74                          | 5165.67              | 21221.64                         |

## **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.21221.65 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.916.74 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 Non plan averages approximately to Rs.160.09 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 Buldhana Division, the campa fund between 2016-17 to 2018-19 was Rs. 577.99 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 as a result of this plan is given as follows:

|                                                                    |                   |
|--------------------------------------------------------------------|-------------------|
| Annual estimated average expenditure for the prescribed operations | = 690.30 lakhs    |
| Annual tangible benefit from the forest                            | = 100.78 lakhs    |
| Annual intangible benefit as calculated above                      | = 458943 lakhs    |
| Total benefit (both tangible and intangible) from the Forests      | = 459043.78 lakhs |

**Social Cost- Benefit Ratio is 690.30 Lakhs: 459043.78 lakhs**

**Or 1:664.99**

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 1:664. 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.**458943** lakhs as per the current rate of NPV value for the Buldhana Forest. As the NPV rate is taken for the benefits accuarable over the period of 20 years the annual benefit comes to Rs.22947.15lakhs.This figure as per the new NPV rate proposed is Rs. 1:664lakh 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 maths works out as under:

**664.99 say, 1:664 as per current rate of NPV,**

i.e. for every rupee that is invested the returns are Six Hundred sixty four Time

**Estimated Annual Expenditure (details) for the working Plan Implementation in Buldhana Division**  
**Improvement Working circle**

| Sr No . | Particulars of work                                                                               | Arg. Quantum of work | Unit   | Man days/unit | Rate/unit (Rupees ) | Annual (lakh Rs.) | 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                                                                           | 4407                 | Ha     | 1.5/@320      | 480                 | 21.15             | 21.15  | 21.15  | 21.15  | 21.15  | 21.15  | 21.15  | 21.15  | 21.15  | 21.15  | 21.15   | 21.15                |
| 2       | Coupe working (Hygene felling) D+B area                                                           | 200                  | Ha     | 14            | 3738                | 7.48              | 7.48   | 7.48   | 7.48   | 7.48   | 7.48   | 7.48   | 7.48   | 7.48   | 7.48   | 7.48    | 7.48                 |
| 2a      | Timber harvesting                                                                                 | 0                    | Cum    | 0             | 0                   | 0                 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0                    |
| 2b      | Firewood extraction                                                                               | 5650                 | Stacks | 3.5           | 1120                | 63.28             | 63.28  | 63.28  | 63.28  | 63.28  | 63.28  | 63.28  | 63.28  | 63.28  | 63.28  | 63.28   | 63.28                |
| 3       | Natural regeneration                                                                              | 200                  | Ha     | 10            | 0                   | 0                 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0                    |
|         | ANR + Nursing of naturally occurring seedlings and coppice management etc in understocked patches | 200                  | Ha     | 10            | 3200                | 6.40              | 6.40   | 6.40   | 6.40   | 6.40   | 6.40   | 6.40   | 6.40   | 6.40   | 6.40   | 6.40    | 6.40                 |
| 3a      | PPO/FYO                                                                                           | 200                  | Ha     | 207.38        | 70094/338           | 140.19            | 140.19 | 140.19 | 140.19 | 140.19 | 140.19 | 140.19 | 140.19 | 140.19 | 140.19 | 140.19  | 140.19               |
| 3b      | FYO (first year operations)                                                                       | 200                  | Ha     | 91.60         | 30961               | 61.92             | 61.92  | 61.92  | 61.92  | 61.92  | 61.92  | 61.92  | 61.92  | 61.92  | 61.92  | 61.92   | 61.92                |
| 3c      | SYO (second year operation)                                                                       | 200                  | Ha     | 57.49         | 19432               | 38.86             | 38.86  | 38.86  | 38.86  | 38.86  | 38.86  | 38.86  | 38.86  | 38.86  | 38.86  | 38.86   | 38.86                |
| 3d      | TYO (third year operation)                                                                        | 200                  | Ha     | 58.88         | 19901               | 39.80             | 39.80  | 39.80  | 39.80  | 39.80  | 39.80  | 39.80  | 39.80  | 39.80  | 39.80  | 39.80   | 39.80                |
| 4       | Soil and moisture conservation works                                                              | 200                  | Ha     | 0             | 0                   | 0                 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0                    |
|         | 100 cum/coupe                                                                                     | 1000                 | Cum    | 0.92          | 295                 | 2.95              | 2.95   | 2.95   | 2.95   | 2.95   | 2.95   | 2.95   | 2.95   | 2.95   | 2.95   | 2.95    | 2.95                 |
| 5       | Plantation                                                                                        | 0                    | 0      | 0             | 0                   | 0                 | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0                    |

|    |                                                                      |     |    |              |               |                    |                    |                     |                    |                    |                    |                     |                     |                    |                    |                    |               |
|----|----------------------------------------------------------------------|-----|----|--------------|---------------|--------------------|--------------------|---------------------|--------------------|--------------------|--------------------|---------------------|---------------------|--------------------|--------------------|--------------------|---------------|
|    | (miscincludinga<br>mboo<br>depending<br>upon suitability<br>of site) |     |    |              |               |                    |                    |                     |                    |                    |                    |                     |                     |                    |                    |                    |               |
| 6  | Teak/mix<br>plantation                                               | 100 | Ha | 0            | 0             | 0                  | 0                  | 0                   | 0                  | 0                  | 0                  | 0                   | 0                   | 0                  | 0                  | 0                  | 0             |
| 6a | PPO/FYO                                                              | 100 | Ha | 51.93        | 16618         | 16.62              | 16.6<br>2          | 16.6<br>2           | 16.6<br>2          | 16.6<br>2          | 16.6<br>2          | 16.6<br>2           | 16.6<br>2           | 16.6<br>2          | 16.6<br>2          | 16.62              | 16.62         |
| 6b | FYO (first year<br>operations)                                       | 100 | Ha | 158.70       | 50784         | 50.78              | 50.7<br>8          | 50.7<br>8           | 50.7<br>8          | 50.7<br>8          | 50.7<br>8          | 50.7<br>8           | 50.7<br>8           | 50.7<br>8          | 50.7<br>8          | 50.78              | 50.78         |
| 6c | SYO (second<br>year operation)                                       | 100 | Ha | 103.00       | 32960         | 32.96              | 32.9<br>6          | 32.9<br>6           | 32.9<br>6          | 32.9<br>6          | 32.9<br>6          | 32.9<br>6           | 32.9<br>6           | 32.9<br>6          | 32.9<br>6          | 32.96              | 32.96         |
| 6d | TYO (third year<br>operation)                                        | 100 | Ha | 76.00        | 24320         | 24.32              | 24.3<br>2          | 24.3<br>2           | 24.3<br>2          | 24.3<br>2          | 24.3<br>2          | 24.3<br>2           | 24.3<br>2           | 24.3<br>2          | 24.3<br>2          | 24.32              | 24.32         |
| 6e | 4 <sup>th</sup> YO (fourth<br>year operations)                       | 100 | Ha | 38.50        | 12320         | 12.32              | 12.3<br>2          | 12.3<br>2           | 12.3<br>2          | 12.3<br>2          | 12.3<br>2          | 12.3<br>2           | 12.3<br>2           | 12.3<br>2          | 12.3<br>2          | 12.32              | 12.32         |
| 6f | 5 <sup>th</sup> YO (fifth<br>year operations)                        | 100 | Ha | 38.50        | 12320         | 12.32              | 12.3<br>2          | 12.3<br>2           | 12.3<br>2          | 12.3<br>2          | 12.3<br>2          | 12.3<br>2           | 12.3<br>2           | 12.3<br>2          | 12.3<br>2          | 12.32              | 12.32         |
|    | <b>TOTAL</b>                                                         |     |    | <b>920.4</b> | <b>219911</b> | <b>531.3<br/>5</b> | <b>531.<br/>35</b> | <b>531.<br/>.35</b> | <b>531.<br/>35</b> | <b>531.<br/>35</b> | <b>531.<br/>35</b> | <b>531.<br/>.35</b> | <b>531.<br/>.35</b> | <b>531.<br/>35</b> | <b>531.<br/>35</b> | <b>531.3<br/>5</b> | <b>531.35</b> |

**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 Buldhana Division**  
**PASTURE DEVELOPMENT AND MANAGEMENT WORKING CIRCLE**

| Sr No. | Particulars of work                                         | Arg. Quantu m of work | Unit | Man days/ unit | Rate/u nit (Rupee s) | Annu al (lakh Rs.) | 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                                        | 2988.476              |      | 0.5            | 160                  | 4.78               | 4.78   | 4.78   | 4.78   | 4.78   | 4.78   | 4.78   | 4.78   | 4.78   | 4.78   | 4.78    | 4.78                 |
| 2      | Deep ploughing in 10 ha. Area suitable for grass land.      | 40                    | Ha   | 0              | 2000                 | 0.80               | 0.80   | 0.80   | 0.80   | 0.80   | 0.80   | 0.80   | 0.80   | 0.80   | 0.80   | 0.80    | 0.80                 |
| 3      | Seed broadcasting in july                                   | 40                    | Ha   | 2.5            | 800                  | 0.32               | 0.32   | 0.32   | 0.32   | 0.32   | 0.32   | 0.32   | 0.32   | 0.32   | 0.32   | 0.32    | 0.32                 |
| 4      | Enclosure                                                   | 40                    | Ha   | 0              | 30000                | 12.00              | 12.00  | 12.00  | 12.00  | 12.00  | 12.00  | 12.00  | 12.00  | 12.00  | 12.00  | 12.00   | 12.00                |
| 5      | Removal of shrub growth & weeds                             | 200                   | Ha   | 5.00           | 1600                 | 3.20               | 3.20   | 3.20   | 3.20   | 3.20   | 3.20   | 3.20   | 3.20   | 3.20   | 3.20   | 3.20    | 3.20                 |
| 6      | Grass seedling nursery cost for six month (1H=5000polyb ag) |                       |      | 0              | 0                    | 0                  | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0                    |
| 6a     | per ha.                                                     | 30 ha.                | Ha   | 129.85         | 46227                | 13.87              | 13.87  | 13.87  | 13.87  | 13.87  | 13.87  | 13.87  | 13.87  | 13.87  | 13.87  | 13.87   | 13.87                |
| 6b     | Material Cost for nursery with L.W.+ Contingency            |                       |      |                | 15813                | 4.74               | 4.74   | 4.74   | 4.74   | 4.74   | 4.74   | 4.74   | 4.74   | 4.74   | 4.74   | 4.74    | 4.74                 |
| 7      | PPO Grass Planting                                          | 30                    | Ha   | 134.40         | 47846                | 14.35              | 14.35  | 14.35  | 14.35  | 14.35  | 14.35  | 14.35  | 14.35  | 14.35  | 14.35  | 14.35   | 14.35                |
|        | Material Cost L.W.+contingen cy                             |                       |      |                | 2637                 | 0.79               | 0.79   | 0.79   | 0.79   | 0.79   | 0.79   | 0.79   | 0.79   | 0.79   | 0.79   | 0.79    | 0.79                 |



|    |                                |    |    |        |               |              |              |              |              |              |              |              |              |              |              |              |              |
|----|--------------------------------|----|----|--------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 8  | FYO                            | 30 | Ha | 220.40 | 78462         | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        | 23.54        |
|    | Material Cost L.W.+contingency |    |    |        | 8700          | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         | 2.61         |
| 9  | SYO                            | 30 | Ha | 146.64 | 52204         | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        | 15.66        |
|    | Material Cost L.W.+Contingency |    |    |        | 6476          | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         | 1.94         |
| 10 | TYO                            | 30 | Ha | 4      | 1424          | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         | 0.43         |
|    | <b>TOTAL</b>                   |    |    |        | <b>294349</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> | <b>99.03</b> |

**Estimated Annual Expenditure (details) for the working Plan Implementation in Buldhana Division**  
**Protection Working Circle**

| Sr No. | Particulars of work                                                    | Arg. Quantum of work | Unit | Man days/unit | Rate/unit (Rupees) | Annual (lakh Rs.) | 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      | Special Program (Survey and Demarcation Through TILR Three year prog.) |                      |      |               |                    |                   |        |        |        | 0      | 0      | 0      | 0      | 0      | 0      | 0       |                      |
|        | 1 <sup>st</sup> year Kuwardeo                                          | 2272                 |      |               | 500/ha             |                   | 11.36  | 11.41  | 11.41  |        |        |        |        |        |        |         | 11.39                |
|        | 2 <sup>nd</sup> Year Bhingara                                          | 2282                 |      |               | 500/ha             |                   |        |        |        |        |        |        |        |        |        |         |                      |
|        | 3 <sup>rd</sup> Year Bhingara                                          | 2282                 |      |               | 500/ha             |                   |        |        |        |        |        |        |        |        |        |         |                      |

|    |                                                                                   |           |                 |      |         |       |       |       |       |       |       |       |       |       |       |       |       |
|----|-----------------------------------------------------------------------------------|-----------|-----------------|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2  | Soil & moisture conservation work 200 cum/coupe                                   | 1321      | Cum             | 0.92 | 327.52  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  | 4.33  |
| 3  | Fire Protection                                                                   | 0         | 0               | 0    | 0       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 3a | Fire line cutting and burning                                                     | 826.93    | Km              | 6.5  | 2221.44 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 | 18.37 |
| 3b | Fire watcher (1 beat 1 fire watcher)for 4 month fire season                       | 96        | Beat            | 1    | 34176   | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  | 1.37  |
| 3c | Protection Squad (1range 10 mandays = 7 range 70 mandays) for 4 month fire season | 7         | Range           | 10   | 24920   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| 3d | Fire equipment                                                                    | 7         | Range           | LS   | 2.00    | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 |
| 4  | Enumeration for New Working Plan last 3years                                      | 1773 plot | 4 mandays @plot | 356  |         |       |       |       |       |       |       |       |       | 11.35 | 11.35 | 0.00  | 11.35 |
|    | <b>TOTAL</b>                                                                      |           |                 |      |         | 39.07 | 50.43 | 50.48 | 50.48 | 39.07 | 39.07 | 39.07 | 39.07 | 50.42 | 50.42 | 39.07 | 61.81 |

**Estimated Annual Expenditure (details) for the working Plan Implementation in Buldhana Division**  
**Boundary Demarcation**

| S<br>r<br>N<br>o<br>. | Particular<br>s of work                                                                                            | Arg.<br>Quant<br>um of<br>work | Unit   | Man<br>days<br>/unit | Rate/<br>unit<br>(Rupee<br>s) | Ann<br>ual<br>(lak<br>h<br>Rs.) | Year<br>1 | Year<br>2 | Year<br>3 | Year<br>4 | Year 5 | Year<br>6 | Year<br>7 | Year<br>8 | Year<br>9 | Year<br>10 | Average<br>(Rs in<br>lakh) |
|-----------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------|--------|----------------------|-------------------------------|---------------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|------------|----------------------------|
| 1<br>a                | Fixing<br>boundary<br>pillars<br>(Artificial<br>& Natural<br>RF<br>Boundary)                                       | 838                            | Pillar | 1                    | 320                           | 2.68                            | 2.68      | 2.68      | 2.68      | 2.68      | 2.68   | 2.68      | 2.68      | 2.68      | 2.68      | 2.68       | 2.68                       |
| 1<br>b                | Fixing<br>boundary<br>pillars<br>(Artificial<br>& Natural<br>PF<br>Boundary)                                       | 1676                           | Pillar | 1                    | 320                           | 5.36                            | 5.36      | 5.36      | 5.36      | 5.36      | 5.36   | 5.36      | 5.36      | 5.36      | 5.36      | 5.36       | 5.36                       |
| 1<br>c                | New<br>Demarcati<br>on of<br>Zudpi<br>Jungle,<br>Acquired<br>Pvt.<br>Forest,<br>Non forest<br>land for<br>C.A. and | 75<br>H/yea<br>r               | Ha     | 10<br>pillar<br>/Ha  | 15000<br>/ Ha                 | 11.2<br>5                       | 11.2<br>5 | 11.25     | 11.25     | 00        | 00     | 0         | 0         | 0         | 0         | 0          | 11.25                      |
|                       | <b>TOTAL</b>                                                                                                       |                                |        |                      |                               | 19.2<br>9                       | 19.2<br>9 | 19.29     | 19.29     | 8.04      | 8.04   | 8.04      | 8.04      | 8.04      | 8.04      | 8.04       | 19.29                      |

**Estimated Annual Expenditure (details) for the working Plan Implementation in Buldhana Division**  
**Wild life (Overlapping) working circle**

| Sr No. | Particulars of work       | Arg. Quantum | Unit              | Man days /unit | Rate /unit (Rupees) | Annual (lakh Rs.) | Year 1           |                    | Year 2            |                    | Year 3            |                    | Year 4            |                    | Year 5            |                    |
|--------|---------------------------|--------------|-------------------|----------------|---------------------|-------------------|------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|
| 1      | Preparation of water hole | of work      | No. of water hole |                |                     |                   | 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 |
|        |                           | 50           |                   |                | 2.75                | 137.50            | 5                | 13.75              | 5                 | 13.75              | 5                 | 13.75              | 5                 | 13.75              | 5                 | 13.75              |

| 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 |
| 5                 | 13.75              | 5                 | 13.75              | 5                 | 13.75              | 5                 | 13.75              | 5                 | 13.75              |

**Abstract of Yearwise 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       | IWC                                                    | 521.35 | 521.35 | 521.35 | 521.35 | 521.35 | 521.35 | 521.35 | 521.35 | 521.35 | 521.35  |
| 2       | Grass &F.R.M.                                          | 99.03  | 99.03  | 99.03  | 99.03  | 99.03  | 99.03  | 99.03  | 99.03  | 99.03  | 99.03   |
| 3       | Protection                                             | 50.43  | 50.48  | 50.48  | 39.07  | 39.07  | 39.07  | 39.07  | 50.42  | 50.42  | 39.07   |
| 4       | Boundary demarcation                                   | 19.29  | 19.29  | 19.29  | 8.04   | 8.04   | 8.04   | 8.04   | 8.04   | 8.04   | 8.04    |
| 5       | Wildlife (overlapping)<br>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   |
|         | <b>Grand Total</b>                                     | 703.85 | 703.90 | 703.90 | 681.24 | 681.24 | 681.24 | 681.24 | 692.59 | 692.59 | 681.24  |

**Note:-**The requirement for funds will vary according to prevailing wage rate.

**REVENUE FORECAST OF BULDHANA FOREST DIVISION**

| SR NO | WORKING CIRCLE     | Approximate Expected yield (annual) |          |      |          |       |          |             |               | Avg. Unit price in Rupees (as per schedule of rates) |          |      |          |       |          |             |               |
|-------|--------------------|-------------------------------------|----------|------|----------|-------|----------|-------------|---------------|------------------------------------------------------|----------|------|----------|-------|----------|-------------|---------------|
|       |                    | Timber                              |          | Beat |          | Poles |          | Bamboo      |               | Timber                                               |          | Beat |          | Poles |          | Bamboo      |               |
|       |                    | Teak                                | Non-Teak | Teak | Non-Teak | Teak  | Non-Teak | Long bamboo | Bundle bamboo | Teak                                                 | Non-Teak | Teak | Non-Teak | Teak  | Non-Teak | Long bamboo | Bamboo bundle |
| 1     | 2                  | 3                                   | 4        | 5    | 6        | 7     | 8        | 9           | 10            | 11                                                   | 12       | 13   | 14       | 15    | 16       | 17          | 18            |
| 1     | IWC                | -                                   | 350      | -    | 5650     | -     | -        | -           | -             | -                                                    | 1550     | -    | 600      | -     | -        | -           | -             |
| 2     | NTFP               |                                     |          |      |          |       |          |             |               |                                                      |          |      |          |       |          |             |               |
| a     | Tendu(stdbag)      | 6500                                |          |      |          |       |          |             |               | 0.009                                                |          |      |          |       |          |             |               |
| b     | Sitafal(MT)        | 3                                   |          |      |          |       |          |             |               | 0.18                                                 |          |      |          |       |          |             |               |
| c     | Grass (MT)         | 3                                   |          |      |          |       |          |             |               | 0.083                                                |          |      |          |       |          |             |               |
| d     | Gum (MT)           | 9                                   |          |      |          |       |          |             |               | 0.14                                                 |          |      |          |       |          |             |               |
|       | <b>Grand Total</b> |                                     |          |      |          |       |          |             |               |                                                      |          |      |          |       |          |             |               |

| SR NO       | WORKING CIRCLE | Approximate Expected yield (annual) |          |      |          |       |          |        |               | Grand Total |
|-------------|----------------|-------------------------------------|----------|------|----------|-------|----------|--------|---------------|-------------|
|             |                | Timber                              |          | Beat |          | Poles |          | Bamboo |               |             |
|             |                | Teak                                | Non-Teak | Teak | Non-Teak | Teak  | Non-Teak | Bamboo | Bamboo bundle |             |
| 19          | 20             | 21                                  | 22       | 23   | 24       | 25    | 26       | 27     | 28            |             |
| 1           | IWC            | -                                   | 5.43     | -    | 33.90    | -     | -        | -      | -             | 39.33       |
| 2           | NTFP           |                                     |          |      |          |       |          |        |               |             |
| a           | Tendu(stdbag)  | 59.40                               | -        | -    | -        | -     | -        | -      | -             | 59.40       |
| b           | Sitafal(MT)    | 0.54                                | -        | -    | -        | -     | -        | -      | -             | 0.54        |
| c           | Grass (MT)     | 0.25                                | -        | -    | -        | -     | -        | -      | -             | 0.25        |
| d           | Gum (MT)       | 1.26                                | -        | -    | -        | -     | -        | -      | -             | 1.26        |
| Grand Total |                |                                     |          |      |          |       |          |        |               | 100.78      |

**Note:** The expected annual revenue would vary as per the prevailing market price.

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## 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 then tire 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 XX** and this need 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. LI& XLII.**

**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.

#### **14.4: SPECIFICATION OF A BOUNDARY CAIRN:**

Artificial boundaries should be marked with a series of boundary cairns. A cairn should be made of loose stones upon excavated foundation to a depth of 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  $\frac{1}{2}$  (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 out 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 Buldhana 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 Buldhana 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 coupe after demarcation and issue 'Coupe Demarcation Certificate' in the prescribed format, given in the following paragraph, which is to be verified by the concerned 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:  
RFO

Signature of the

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 gbh, at suitable intervals standing on the periphery of the coupe will be given two coal tar bands and a geru band in between after scrapping the loose dead bark. The lower coal tar band will be at B.H. and 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**

| <b>Sr. No.</b> | <b>Name of species</b> | <b>GBH(OB)</b> | <b>Remarks</b> |
|----------------|------------------------|----------------|----------------|
| <b>1</b>       |                        |                |                |
| <b>2</b>       |                        |                |                |
| <b>3</b>       |                        |                |                |

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 1.5meter wide cut lines by clearing brushwood, unless the section line runs along a permanent features.

7. Trees above 45cm 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 para 9.21(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 Buldhana 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 trees 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 45 cm and above, girth at b.h. (o.b.)

b) Trees of all other species, of and above, 60cm girth at b.h.

5. The remaining trees marked will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series.

6. The number of the tree marked shall be written vertically on the blaze, shown as under:

**For Tree no. 195**

**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. 14.4: Format for marking of Trees for Harvesting**

| Tree<br>Digit No. | Serial No.<br>Coal tar | Name of<br>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 fireline 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                                         | 3 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 05 number 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. Fire fighting Squad:** The critical condition of the forests of Buldhana 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 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 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 existing 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.

**NalaBunding and check dams:** The primary objective of nalabunding 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 nalabunding is proposed as 5 meters/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 nalabunding. 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 tankis 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 spacing 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 Buldhana which provides for soil working on 400 seedlings/ha in a coupe is being modified. In the forest of Buldhana, **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 be carried out meticulously to ensure that whatever natural regeneration exists is nurtured properly.
- v. This is an important step to help the forest regain its health and vitality which has been under much stress from biotic interference and managerial neglect. Reference to the planning department GR NO.2011/CNO.130/EGS-10A DATED 28.12.2011 for carrying out ANR in the forest areas may be made for preparing estimates. A model estimate of 100 NR seedlings and 525ANR seedlings is attached in the plan as **Appendix No XXXV** 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 stretches 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, Buldhana 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 nistarpatraks. 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 nistarpatraks 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 Buldhana 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 effect will be recorded annually in the form no 1- register during the month of June.

**Forest notification:** Identified forest, acquired pvt. 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 Buldhana Forest Division to mark completion of the process.

Along with reconciliation, the details of land grants (patta) issued on the forestland will also be made available to the Buldhana 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 Buldhana.

#### **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

#### **14.27. Petty Felling and extraction**

Petty Felling and extraction for research and training needs should be allowed. It is necessary to emphasize the fact that experimental, preservation and sample plot, seed stand and their demarcated surrounds, etc. are excluded from all operations prescribed in the working plan. Special grants in exceptional circumstances for maintenance of these may be allowed, which do not cause much deviation.

#### **14.28. Rights and Concessions**

Govt. of India passed the Provisions of the Panchayat (Extension to the Scheduled Areas) act in 1996". In pursuance to this, Govt. 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 vide which ownership of 33 MFP specified in the scheduled, found in the Govt. land has been transferred to the Panchayats. The Hon'ble Governor of Maharashtra had modified the existing act and has given ownership of all MFP to gram sabha vide notification dated 19.08.2014.

There are some burad communities in the division, whose livelihood depends on bamboo. The department distributes bamboo to these communities and also they acquire from nearby forest areas. There is no sizable population of grazing community in the District. However livelihood of local community depends upon forest for grazing their cattle. The range wise grazing units are formed and every year the grazing passes are issued to the local community people for grazing purpose.

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## CHAPTER - 15

### SCIENCE AND RESEARCH

During the process of writing of this Plan the following papers, articles, report and documents were referred and used for the writing of the Plan.

**Table No.15.1**

**List of Papers, articles, reports and documents**

| Sr. No. | Department                                                                                                                                                                                                         | Subject                                                                                                                                                                                                    |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | FSI (Forest Survey of India)<br>I) SFR 2005<br>II) SFR 2009<br>III) SFR 2015                                                                                                                                       | 1)The condition of the forests and forest cover the last decade during the implementation of the plan based on the FSI<br><br>2)The Plantation Tree outside forest for the State of Maharashtra (SFR 2015) |
|         | IV)Carbon Statistics of India                                                                                                                                                                                      | Carbon and Forest Eco- system Methodology for the assessment of Forest Carbon, accounting of Forest Carbon Stock.                                                                                          |
|         | V) Inventory of Forest Resources of Buldhana District                                                                                                                                                              | Buldhana Inventory                                                                                                                                                                                         |
| 2       | Indian Institute of Forest Management, Bhopal (IIFM)                                                                                                                                                               | Net Present Value.                                                                                                                                                                                         |
| 3       | Ground water survey and Development Agency (GSDA)                                                                                                                                                                  | 1) Assessment of Dynamic Ground Water Resources of Maharashtra and Aquifer Parameters.<br><br>2)Taluka wise Ground Water Resources in BuldhanaDirtict.                                                     |
| 4       | Control Ground Water Board (CGWB)                                                                                                                                                                                  | Water level data with the long term trend (2001 to 2010) Ground Water Recharge, Ground Water Development.                                                                                                  |
| 5       | Check list of the Birds of Maharashtra. By Humayun Abdul Ali Published by BNHS                                                                                                                                     | 1)Check list of Birds in Buldhana District.<br>2)IUCN Listed Threatened Birds in BuldhanaDisrtict.                                                                                                         |
| 6       | Preliminary survey of Reptile Fauna of Vidharbha Region, Maharashtra,(Central India) Presented by :ParagDandge and AshishTiple. The 8 <sup>th</sup> Indian Symposium off Odonatology and Biodiversity 2014 Nagpur. | List of Reptiles found in Buldhana Division.                                                                                                                                                               |

|    |                                                                                                                              |                                                                                                                                                                |
|----|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7  | Iucnredlist.org                                                                                                              | IUCN Status of animals.                                                                                                                                        |
| 8  | Maharashtra AAR N2014-15                                                                                                     | Scheme under the 12 <sup>th</sup> Five Year Plan                                                                                                               |
| 9  | Social Forestry Buldhana                                                                                                     | Hon <sup>ble</sup> Supreme Court order in write petition (202 of 1995) dated 12/09/2000 in interlocutory application No. 424                                   |
| 11 | National Bureau of Soil Survey and Land Planning (NBLSS)                                                                     | 1) Soil erosion classes and their areal extent and expected Soil Loss. (Soil Resources Atlas Buldhana District.)<br>2) Slope, Soil erosion, Soil texture maps. |
| 12 | Twelfth Five year plan document under Environment, Forestry and Wildlife 209                                                 | Five year Plan Target and Goals.                                                                                                                               |
| 13 | Geological Survey of India (GSI)                                                                                             | Rock Formation in Buldhana District.                                                                                                                           |
| 14 | DFO, Silvicultural Scientist, Nagpur                                                                                         | Information regarding preservation plot in Buldhana Division.                                                                                                  |
| 15 | Survey of Forest Resources (SOFR), Amravati                                                                                  | Tree Enumeration Data of Buldhana Division.                                                                                                                    |
| 16 | Maharashtra Remote Sensing Application Center (MRSAC)                                                                        | Village Boundary and Survey No. Data of Buldhana District.                                                                                                     |
| 17 | An Account of Preservation plots in Central India by B.N.Gupta and N.G. Totey, Tropical Forest Research Institute, Jabalpur. | Information on the Preservation Plots in Maharashtra.                                                                                                          |

## 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 Buldhana could not be written with accurate data. The research gap is in almost every aspect of the Working Plan as our writing of the Plans in early years has not looked into the new aspects that the need of our present times require, like Biodiversity and all its components, Climate change and Carbon sequestration, NTFP research, ITK, Trees outside forests, Social and cultural aspects of forests, Ecosystem Services etc. 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 variety of species than we ever know. This is evident from the list of the medicinal plants that have been listed by the vaidyas of Buldhana following the Workshop that was held in the Division. The list is appended at 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 also 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 BN Gupta and NG 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 3<sup>rd</sup> All India Silvicultural Conference (Anon, 1929), preservation plots in the representative areas of Chief Forest Types were marked. By 1939, about 112 preservation plots were established throughout the country, when concept of preservation of both climatic and 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 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 Km<sup>2</sup> (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 Buldhana Forest Division.

### **15.2: SAMPLE PLOTS:**

For the preparation of this Working Plan a total of 462 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 Buldhana 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 list of the Sample plots are given in the Volume II **Appendix No. XXXV**. These plots shall be monitored and data collected by FRSS 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. XXXV** 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 produce contribute revenue to the State exchequers as well as generate employment to local people during their lean season. These natural produce 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 Buldhana 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 of local villagers. Their sustainable management and harvesting can conserve bio-diversity, 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 Buldhana 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 poly-bags are being replaced with root trainers in almost all nurseries. Also, mist chambers, poly-house, 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:

Buldhana Forest Division is situated between 20° 13' to 21°32' North latitude and between 78° 49' to 75° 75' East longitude. The boundary of the Buldhana Division is conterminous with the boundary of the Buldhana district. The forest areas of Buldhana Division occur in compact blocks and some scattered patches. The forest type belongs to the Sub group Southern Tropical Dry Deciduous Forest. The District of Buldhana is surrounded by Burhanpur District of [Madhya Pradesh](#) in the North; [Akola](#), [Washim](#), and [Amravati](#) districts on the East; [Parbhani](#) and Jalna districts on the South and [Jalgaon](#) and [Aurangabad](#) districts on the west.

For Administrative convenience the Ranges, Rounds and Beats were reorganized in year 2018-19 and the entire division has been divided into 7 Ranges, 24 Rounds and 96 Beats.

#### 16.2: DISTRIBUTION OF THE FOREST AREA:-

| Sr. No.      | Name of Range | Area in Ha.     |                  |                |                  |
|--------------|---------------|-----------------|------------------|----------------|------------------|
|              |               | Reserved Forest | Protected Forest | Unclass Forest | Total Area       |
| 1            | Jalgaon Jamod | 13335.34        | 230.650          | 22.475         | 13588.465        |
| 2            | Khamgaon      | 16559.79        | 393.100          | 0              | 16952.890        |
| 3            | Motala        | 10538.55        | 0                | 0              | 10538.550        |
| 4            | Buldana       | 14322.28        | 0                | 0              | 14322.280        |
| 5            | Ghatbori      | 13024.68        | 0                | 4.88           | 13029.560        |
| 6            | Mehkar        | 4206.96         | 0                | 0              | 4206.960         |
| 7            | Deulgaon Raja | 8177.87         | 0                | 0              | 8177.870         |
| <b>Total</b> |               | <b>80165.47</b> | <b>623.750</b>   | <b>230.650</b> | <b>80816.575</b> |

**16.3: Distribution of Area in Working Circles:** Area of *Buldhana* Forests is distributed in Working Circles as given in

**Table 16.3**  
**Area allocation to different Working Circles**

| Sr. No.      | Proposed Working Circles    | Area (ha.)       | Percentage  |
|--------------|-----------------------------|------------------|-------------|
| 1            | Improvement Working Circle  | 44070.375        | 54.53%      |
| 2            | Pasture Working Circle      | 29884.760        | 36.97%      |
| 3            | Protection Working Circle   | 6861.440         | 8.49%       |
| 4            | NTFP Chapter                | -                | Entire area |
| 5            | JFM Chapter                 | -                | Entire area |
| 6            | Wildlife Management Chapter | -                | Entire area |
| 7            | Forest Protection Chapter   | -                | Entire area |
| <b>Total</b> |                             | <b>80816.575</b> | <b>100%</b> |

#### **16.4: THE WORKING CIRCLEWISE SUMMARY OF PRESCRIPTION:**

##### **1. IMPROVEMENT WORKING CIRCLE:**

##### **Coupe Demarcation & Treatment Map:**

1. Demarcation and Marking: One year in advance
2. Treatment Map to be prepared
3. A type: Protection area (A1: Steep slopes, A2: 20 M wide strips along streams, A3: excessively erosion prone areas)
4. B-type: Under stocked 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 stumps shall be marked for felling. Matured trees that have developed hollowness and show visual sign of decay will be marked for felling.

##### **SILVICULTURAL SYSTEM:**

1. Hygienic operation of improvement felling.
2. Adequate growing space is provided to trees of valuable species.

3. The improvement felling supplemented by tending of naturally generated crop & root stock will aid in transition of middle aged stem to maturity.
4. The species whose population in the 'stand' dynamics is less than 1% shall be retained till they reached the rotation age.

**Regeneration:**

1. Natural Regeneration: NR of seed origin of valuable species to be preferred and managed through cultural operations.
2. Artificial Regeneration: Only in B type area if site is suitable.
3. Strict protection from fire and grazing
4. Tending operation for Natural regeneration in the 'D' type area & Root stock management in the 'B' type shall be taken up.

**SMC Works:**

SMC works, as described in the chapter of Miscellaneous Regulations are prescribed in A & B type area.

**Subsidiary Operations:**

1. Cleaning operations: 6th Year
2. Thinning is proposed to be carried out in the patches of Dense pole crop  
By maintaining average spacing of one third of the crop height.

**2. PASTURE MANAGEMENT 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 planting, area closure through enclosures is prescribed.
4. JFMCs to be actively involved.

**3. PROTECTION WORKING CIRCLE:**

**Coupe Demarcation & Treatment Map:**

1. Demarcation and Marking: One year in advance
2. Treatment Map to be prepared
  - i. A type: Protection area (A1: Steep slopes, A2: 20 M wide strips along streams, A3: excessively erosion prone areas)
  - ii. B-type: Under stocked and Blank areas (density less than 0.3)
  - iii. C-type: Group of naturally green poles.
  - iv. D-type: Well stocked forest patches.

**Treatment:**

1. A type area: Harvesting of standing trees is strictly prohibited.
2. B type: No. harvesting. All seedling & saplings of valuable species more than 1 mtr. in height will be nursed as future crop.
3. C type: Group of pole crop will be thinned by maintaining average spacing. No planting will be done.
4. D type: No harvesting of green trees & Plantation is not prescribed.

**SILVICULTURAL SYSTEM:**

1. Silviculture system is proposed on the pattern of watershed management.
2. Harvesting of green trees is prohibited.
3. Removal of dead trees by retaining two dead trees per ha. as snags is permitted.

**Regeneration:**

1. Natural Regeneration: All seedlings and saplings of valuable species more than 1 meter height will be nursed as future crop.
2. Strict protection from fire and grazing

**SMC Works:**

Soil & Moisture conservation works to prevent soil erosion siltation.

**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 has to 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. MISCELLANEOUS REGULATION:**

1. Boundary demarcation of all undemarcated 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. Updation of area registers.
6. Where claims are finally rejected, removal of such encroachments.

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## CHAPTER – 17

### TREE COVER OUTSIDE FOREST

#### 17.1: INTRODUCTION:

This chapter deals with the important aspects of tree presence and its contribution to the tree cover of the district and Forest Division of Buldhana. Trees outside the Forest are defined by default, as all trees excluded from the definition of forest and other wooded lands. Trees outside the forests are located on other lands mostly on farmlands and built up areas, both in rural and urban areas. A large number of TOF consists of planted or domesticated trees. TOF include trees in agro-forestry systems, orchards and small woodlots. They may grow in meadows, pastoral areas and on farms, or along rivers, canals and roadsides, or in towns, gardens and parks. Some of the land use systems include alley cropping and shifting cultivation, permanent tree cover crops (e. g. coffee, cocoa), windbreaks, hedgerows, home gardens and fruit tree plantations (FAO).

The total geographical area of the Buldhana District is 9661 sq. km of which 1168.55 sq. km. is forest. The total forest cover works out to be just about 12.1% of the total geographical area. This is way below the targeted 33 % forest cover as per the National Forest Policy.

The Social Forestry Department (SFD) of the state has the mandate for the forestry outside Forest area. Since the early 1980s the SFD has carried innumerable plantation and plantation drives across the state. It has not only conducted such plantations but has backed up with good awareness and extension efforts which have borne fruits in many ways. The SFD has been carrying out plantations in the private areas since in the District which include block plantations, agricultural bund planting and roadside plantation which form a substantial quantity and forest cover in the areas outside the forest. It is interesting to note that the Department has also carried out the assessment of the success and survival of these plantations in and the results are very encouraging.

Between 2008 to 2018, the Social Forestry Buldhana Division carried out Block plantation for a total of 178 beneficiaries and planted 317 ha. Area. The total number of seedlings planted were 1.43 lakhs of which the total number of seedlings surviving at the time of handing over the scheme was 8.20. During the

period of road side plantation of a length 1894 k.m. with 15.66 lakhs planted seedlings was carried out of which the total of 12.57 lakhs seedlings survived at the time of handling.

The assessment of survival as on date is required to be carried out. The above information has been extracted from the booklet prepared by the Social Forestry, Buldhana Division where year wise, scheme wise, and species planted are given. The same is too bulky to be appended.

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

The forest survey of India, Ministry of Environment and Forests has come up with the field manual on assessment of trees outside Forest (urban)(TOF) which may be taken as a guide for the assessment of the TOF in the urban area of the District.

## **17.2: REALISING THE DREAM OF 33 % FOREST TREE COVER**

In tune with objectives of our national forest policy 1988 we have to achieve a national target of bringing 33 % of landmass of our country under forest and tree cover for ensuring ecological security and environmental balance. However forest cover and tree cover in India has over the years stabilized at around 23 % of geographical area under forest cover. The area under forest and forest land is difficult to increase, in fact, lot of diversion of forest land take place from year to year. As such there is hardly any scope to increase the recorded forest area in Buldhana or in the country in general.

The only way left for the increase of forest cover and tree cover has to be through afforestation activities in non-forest area. The areas outside forest comprises mainly of private farm forestry, canal bank areas, road side strips, Railway line side strip, blank and degraded land, wasteland etc. Apart from increasing the tree cover, extension of forestry in non-forest areas especially as agro-forestry and farm forestry has tremendous potential to increase production of timber and other wood products and reduce the pressure on natural forests. We are going to explore the following means of bringing more trees outside forest.



### 17.3: AGROFORESTRY:

According to FAO, Agro-forestry 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 agro-forestry systems there are both ecological and economical interactions between the different components. Agro-forestry can also be defined as a dynamic, ecologically based, natural resource management system that, through the integration of the trees on farms and in the agricultural landscapes, diversifies the sustains production for increased social, economic and environmental benefits for land users at all levels. In particular agro-forestry is crucial to smallholder farmers and other rural people because it can enhance their food supply, income and health. Agro-forestry systems are multifunctional systems that can provide a wide range of economic, socio-cultural, and environmental benefits.

#### THERE ARE THREE MAIN TYPES OF AGRO-FORESTRY SYSTEMS:

**Agrisilvicultural** systems are a combination of crops and trees, such as alley cropping or home gardens.

**Silvopastoral** systems combine forestry and grazing of domesticated animals on pastures, rangelands or on farm.

The three elements, namely trees, animals and crops, can be integrated in what are called **agrosilvopastoral** systems and are illustrated by home gardens involving animals as well as scattered trees on croplands used for grazing after harvests. (Extract from <http://www.fao.org/forestry/agroforestry/80338/en/>).

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 variety of products, including food, fuel-wood and animal fodder. Agroforestry combines agriculture and forestry technologies to create more integrated, diverse, productive, profitable, healthy and sustainable land-use systems (Ujwal Ghosh: Agroforestry: Key for achieving one third area under forest and tree cover, TERI, here and elsewhere.)

#### **17.4: ROADSIDE/CANAL – SIDE PLANTATIONS:**

This is an important component of the work of Social Forestry Department and as noted above, during the last ten years the Social Forestry Buldhana Division has taken up Road side plantation of a length planted of 1394k.m. with 1566331 planted seedlings was carried out of which the total of 1256808 seedlings survived at the time of handing over the scheme.

With the adoption of Bihar model of roadside plantation, it is seen that the burden on the Social Forestry Department staff in taking up such plantation has reduced and that the success of plantation is also excellent. This rate of plantation could be increased covering more sites and taking up more such plantations in the future.

#### **17.5: 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) Block Plantation: Trees + crops
- c) Energy Plantation: Trees + crops during initial year
- d) Alley cropping: Shrubs + crops
- e) Agri-horticulture: Fruit trees + crops
- f) Agri-hortisilviculture : Trees + Fruit Trees + crops
- g) Hortipasture : Fruit Trees + pasture / animals
- h) Shelterbelts : Trees +/- crops
- i) Windbreaks : Trees +/- crops
- j) Homesteads : Multiple combination of Trees , Fruit Trees etc .

#### **17.6: SUGGESTIVE STEPS FOR THE INCREASE OF AREA FORESTRY / AGROFORESTRY**

- a) The identification of the fallow lands, culturable and unculturable wasteland Range / Taluka-wise in agricultural land which is available for taking up afforestation should be done at the district level. The area under community land should be given priority for plantations.
- b) Drawing up appropriate time specific action plan is essential, which will require the involvement of the Social Forestry Department and the Agriculture Department along with the Forest Department.
- c) Farmers must be encouraged and motivated by way providing them technical assistance and cooperation by Forest Department and Social Forestry Department for taking up planting trees.

- d) Land Laws, If Any , should be so modified wherever necessary so as to facilitate and motivate individuals and institutions to undertake trees farming and grow fodder plants, grasses and legumes on their own land.
- e) Wherever possible, degraded lands should be made available for this purpose either on lease or on the basis of a tree – pattascheme. Steps necessary to encourage them to do so must be taken. Appropriate regulations governing the felling of trees on private holding should be appropriately relaxed.
- f) High quality planting stock including clonal planting stock supported with improved silvicultural management practices can usher in a second green revolution in India this time in respect of tree crops for timber and fuel – wood / fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality improvements.
- g) 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 institution, KrishiVigyanKendras, mass media, audio – visual aids and the extension machinery, Trainers Training Centers to learn agri – silvicultural and silvicultural techniques to ensure optimum use of their land and water resources.
- h) The wood based industries have important role to play in development of agroforestry. They should consider making appropriate arrangements with farmers and play a facilitate role in arranging quality planting material and enter into by back arrangements.
- i) 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.
- j) The possibility of a Public – Private Partnership in regenerating the culturable wasteland and barren unculturable wastelands of about 260 sq. kms. should be explored. This can also be explored for raising the improved planting material for supply to the farmers.

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## CHAPTER – 18

### CONTROL AND RECORDS

#### 18.1: CONTROL & RECORDS:

The following Records will be maintained in the Buldhana 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 **APPENDIX NO. LII & LIV** of Volume II.

The records of all harvesting, subsidiary cultural operations, regeneration works and soil and moisture conservation works carried out as per this working plan prescriptions, will be maintained in the control forms. The prescribed proforma of the control forms have been given in the Volume II **of APPENDIXNO. LII.**

The control forms (e-Flying Copy) should be Online submitted by the DFO territorial Buldhana to the CCF, territorial Amravati circle up to October each year. and the e-mail/latter should send them to the WPO (Amravati). After checking, if it is correct, online forward to the WPO (Amravati) up to December each year.

##### 18.1.1 : Deviation

The DFO territorial Buldhana 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.

#### **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 in **APPENDIX NO. LIV.**

Each Compartment must have a separate file for its records. Compartment history must be maintained in the office of Buldhana 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. Buldhana 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.

#### **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.

#### **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 31<sup>st</sup> march. as per working Plan Coad-2014. They should be Suggested reporting Formats For Sustainable Management of Forests are given in **Appendix No LII of Volume II.**

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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: apcccentral-ngp-mef@gov.in

F.No. 12-14/2005 (FOR) /6422

Date: 27.04.2020

To,

The Principal Chief Conservator of Forests (P & M)  
Maharashtra State,  
Van Bhawan, Ramgiri Road, Civil Lines,  
Nagpur - 440001.

Sub: Submission of DWPR of Buldhana Forest Division for the period 2019-20 to 2028-29  
Regarding,

Sir,

The undersigned is directed to refer to your office e-mail dated 23.04.2020 on the above mentioned subject and it is to inform that after examination of DWPR of Buldhana Forest Division, following shortcomings were observed:

- I. It is mentioned in the Working Plan that certain areas of Forest has been diverted under Section 3 (2) of Forest Rights Act, 2006 for individuals and Communities. Proper justification for diversion of Forest area of around 761.29 ha in 266 cases under individual claims and 21087.54 ha in 225 claims under Community Rights shall be submitted (Pg. 77, Part-1).
- II. A committee for identification of land banks for CA was constituted as per par 2.7 of Ministry's guideline. Accordingly, Working Plan Officer shall identify lands suitable to carry out Compensatory Afforestation and the same shall be incorporated as Section- 2.9 under Chapter- II, Part- I while writing Working Plan of the Division.
- III. Information on below mentioned Sections under Executive summary along with the constraints faced during writing of the plan is not submitted:
  - a. Introduction.
  - b. Glossary of terms.
  - c. List of Flora (indicating RFL and unique species).
  - d. List of Fauna.
  - e. Others.
- IV. Titles of Section- 4.2, 4.3, 4.6 and 4.8 of Part- I shall be written as per Working Plan Code, 2014.
- V. Information on below mentioned Sections are not written as per contents mentioned in National Working Plan Code, 2014:
  - a. Tree cover outside Forest area (Chapter- 2.7, Part- I).
  - b. Status of Biodiversity conservation in forests.



- VI. Title of Section- 2.6.10 of Part- II should have been Method of executing the felling instead of Method of executing the treatment.
- VII. Title of Section- 7.6.1 of Part- II should have been Analysis of the crop instead of Analysis of the Wildlife in the District.
- VIII. Title of Chapter- 8 of Part- II is mentioned as Forest Protection (Overlapping) Working Circle, whereas in table No. 2.2 of Part- I and table No. 1.3 of Part- II it is mentioned as Protection (Overlapping) Working Circle. Uniformity shall be maintained while writing the Plan.
- IX. General information w.r.t Miscellaneous regulations chapter containing below mentioned sections is not incorporated in the Working Plan:
- a. Petty felling.
  - b. Rights and Concessions.
- X. Stock map of the division is not submitted along with the Working Plan.
- XI. Soft copy of KML/ Shape files w.r.t. boundary of the division is not submitted.

Therefore, you are requested to submit the requisite information and make necessary corrections in the Working Plan, so that further necessary action may be taken in the matter.

This issues with the approval of DDGIF (Central), Regional Office (WCZ), MoEF & CC, Nagpur.

Yours faithfully,



(Karthik, M.L.)  
Technical Officer



**DY. CONSERVATOR OF FORESTS,  
WORKING PLAN, AMRAVATI.**

Upper Wardha Colony Road,  
Camp Amravati-444 602  
Tel.No.0721-2662641, Fax.:2665844  
E-mail:- cfw\_p\_amt@rediffmail.com



महाराष्ट्र शासन

**उपवनसंरक्षक,  
कार्य आयोजना विभाग, अमरावती.**

उर्ध्व अपर वर्धा प्रकल्प यसाहत मार्ग,  
कैम्प रोड, अमरावती -444 602.  
दूरध्वनी:-.0721-2662641 फॅक्स-2665844.  
ई मेल- cfw\_p\_amt@rediffmail.com

No. Desk-02/RS/WP/Amt/ 39 /2020-21  
Amravati-444602 Date:- 19/05/2020

To,

**The Member Secretary,**  
Standing Consultative Committee &  
Chief Conservator of Forests.  
Working Plan - East  
Nagpur

**Ref:-** Letter of the CCF, WP, East, Nagpur, No.Desk-14/WP/SCC/Meeting161/  
dated 04/05/2020

**Sub:-** Minutes of the Standing Consultative Committee held on 27/04/2020,  
29/04/2020 and 30/04/2020 for Approval of DWPRs/PWPRs.

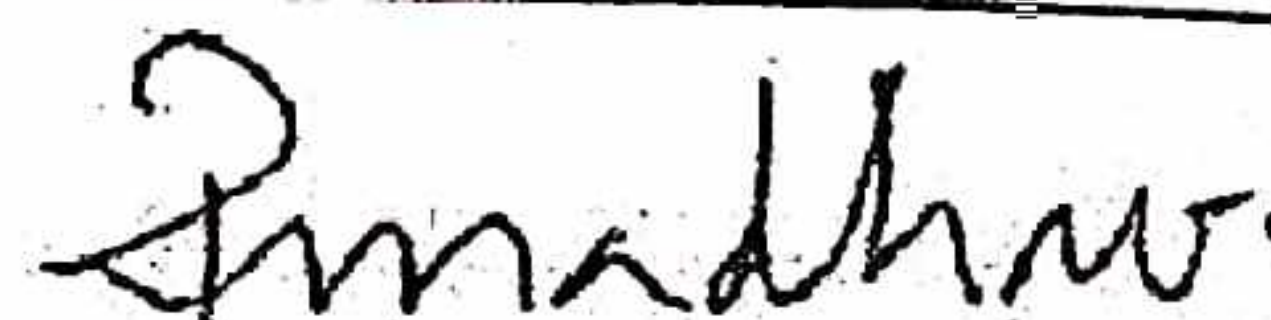
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**COMPLIANCE OF BULDHANA FOREST DIVISION WORKING PLAN'S QUERIES**

| Sr.No. | Queries                                                                                                                                     | Compliance                                                                                                                               |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 10.1   | <b>Shri. S.S. Gairola, PCCF (HoFF)<br/>M.S.Nagpur</b>                                                                                       |                                                                                                                                          |
| 1      | Reconcilate the area from base record.                                                                                                      | The area of New Working Plan(80816.575 ha) is reconcilated with A to O Statement (80816.575 ha) of Buldhana Division.                    |
| 2      | There should be no change in old compartment number.                                                                                        | It is complied, the old compartment numbers are kept as it is.                                                                           |
| 3      | Prescription for post eviction encroachment should be incorporate in Working Plan.                                                          | It is complied in Volume-I, Part -II, Chapter No. 14, Para 14.19, Page No.285.                                                           |
| 4.     | In Pasture Working Circle, Dy. CF Buldhana should propose workable prescription to WPO Amravati and WPO should incorporate in Working Plan. | It is complied in Volume-I, Part - II chapter No. 3, Para No. 3.6.11, Page No. 158.                                                      |
| 5.     | Report on sheep grazing submitted to Govt. in 2018 should be incorporate in Working Plan.                                                   | It is complied in Volume-II, in Appendix No. LXI (B)                                                                                     |
| 10.2   | <b>Shri. NitinKakodkar, PCCF (WL),<br/>M.S.Nagpur</b>                                                                                       |                                                                                                                                          |
| 1.     | Spelling errors should be checked                                                                                                           | The spelling errors are checked and corrected                                                                                            |
| 2.     | Existence of wild animal through smell should be deleted.                                                                                   | Existence of Wild Animal through smell has been deleted                                                                                  |
| 3.     | There should be chapter of sloth bear conflict.                                                                                             | It is complied in Volume I, Part II, Chapter No. 7 , Para 7.6.13.4, Page No: 207                                                         |
| 10.3   | <b>Shri. S.G. Tembhurnikar, APCCF<br/>(Conservation), M.S.Nagpur</b>                                                                        |                                                                                                                                          |
| 1.     | The revised specification regarding boundary pillars approved by PCCF (Hoff) office should be incorporated in the Plan.                     | The revised specification regarding boundary pillars approved by PCCF (Hoff) office is incorporated in Volume II of Appendix No.LXIV (A) |



|             |                                                                                                                                               |                                                                                         |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 2.          | The length of the boundary pillars should be updated                                                                                          | It is incorporated Volume II Appendix No. LXIV (B)                                      |
| 3.          | Form No. 1 should be updated                                                                                                                  | It is incorporated in Volume I, Part -II, Chapter 14, Para No. 14.24, Page No 291.      |
| 4.          | The database of IFR and CFR should be updated as per the guidelines issued                                                                    | It is incorporated in Volume II of Appendix No. LXIV (C)                                |
| <b>10.4</b> | <b>Shri. Praveen Shrivastava, PCCF (P&amp;M), M.S.Nagpur</b>                                                                                  |                                                                                         |
| 1.          | Statement of works carried out as per prescription of last working plan and deviation should be incorporate in the Plan.                      | It is complied in Volume I, Part -I, chapter 11, Para No 11.2.22.6, Page No. (120-121). |
| C           | In Pasture working circle, 2011 census data of live stock should be consider for proposal and prescription for pressure of grazing on forest. | It is complied in Volume I, Part II, Chapter No. 3, Page No. 161.                       |
| <b>10.5</b> | <b>Shri. M. K. Rao, PCCF (ITP), M.S.Nagpur</b>                                                                                                |                                                                                         |
| 1.          | As sheep grazing problem in Buldhana is very high therefore captive sheep grazing should be encourage and prescribed in working plan.         | It is complied Part II, chapter 3 Para 3.6.13 (Measure taken) on Page No. 160.          |
| 2.          | Rotational grazing also is prescribed in working plan.                                                                                        | It is complied in Volume I, Part II, Chapter 3, Para No. 3.6.3, Page No. 157.           |
| 3.          | Buldhana is Tiger corridor from Melghat to Yawal so protection measure M.P. borders should be prescribed in working plan.                     | It is complied in Volume I, Part II, Chapter 7, Para No. 7.6.14.5, Page No. 213.        |
| <b>10.6</b> | <b>Shri. Mali, DCF, Buldhana</b>                                                                                                              |                                                                                         |
| 1.          | Drinking water facility should be prescribed for wild animal which are outside forest area.                                                   | It is complied in Volume I, Part II, chapter 7, Para No. 7.6.14.4 (A), Page No. 211     |

  
 (G.R. Madhavaraj)  
 Dy. Conservator of Forests  
 Working Plan, Amravati.



**DY. CONSERVATOR OF FORESTS,  
WORKING PLAN, AMRAVATI.**

Upper Wardha Colony Road,  
Camp Amravati-444 602  
Tel.No.0721-2662641, Fax.:2665844  
E-mail:- cfw\_p\_amt@rediffmail.com



सत्यमेव जयते  
महाराष्ट्र शासन

**उपवनसंरक्षक,  
कार्य आयोजना विभाग, अमरावती.**

उर्ध्व अपर वर्धा प्रकल्प वसाहत मार्ग,  
कैम्प रोड, अमरावती -444 602.  
दूरध्वनी:-.0721-2662641 फॅक्स-2665844.  
ई मेल- cfw\_p\_amt@rediffmail.com

**No. Desk-02/RS/WP/Amt/ 40 /2020-21  
Amravati-444602 Date:- 19/05/2020**

To,

**The Member Secretary,  
Standing Consultative Committee &  
Chief Conservator of Forests.  
Working Plan – East  
Nagpur**

**Ref:-** Letter of the Govt. of India, Ministry of Environment, Forests & Climate Change  
F.No.12-14/2005 (FOR) 6442 Dated 27/04/2020.

**Sub:-** Submission of DWPR of Buldhana Forest Division for the period 2019-20 to  
2028-29 Regarding.

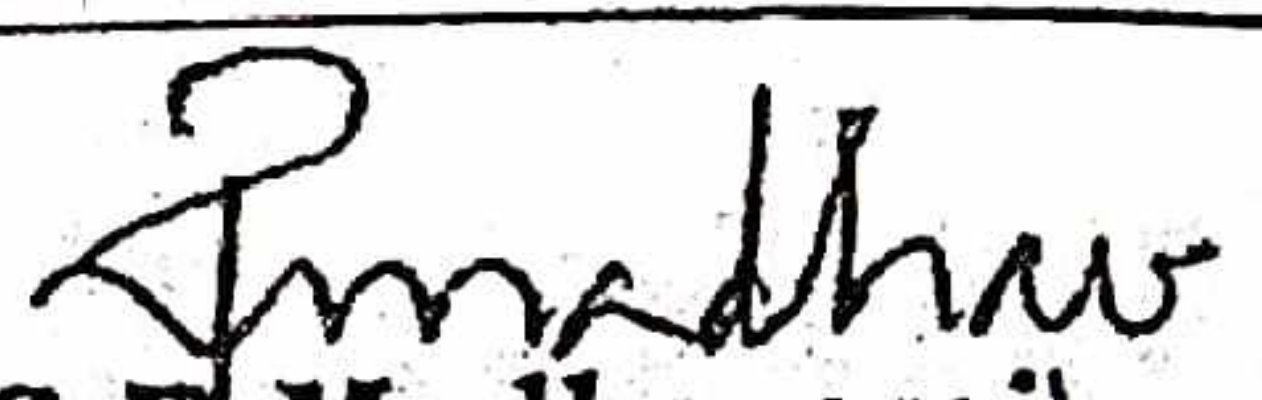
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**COMPLIANCE OF BULDHANA FOREST DIVISION WORKING PLAN'S QUERIES**

| Sr.No. | Queries                                                                                                                                                                                                                                                                                                                                                                | Compliance                                                                                                                                                                                                                                                                                                                                                              |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I.     | It is mentioned in the Working Plan that certain area of Forest has been diverted under Section 3 (2) of Forest Rights Act, 2006 for individuals and Communities. Proper justification for diversion of Forest area of around 761.29 ha. In 266 cases under individual claims and 21087.54 ha. In 225 claims under Community Rights shall be submitted (Pg. 77 Part-I) | It is complied in Volume I, Part – I, Chapter 8, Page No. 78                                                                                                                                                                                                                                                                                                            |
| II.    | A committee for identification of land banks for CA was constituted as per par 2.7 of Ministry's guideline. Accordingly, Working Plan officer shall identify lands suitable to carry out Compensatory Afforestation and the same shall be incorporated as Section – 2.9 under Chapter – II Part- I while writing Working Plan of the Division.                         | It is complied in Volume I, Part – I, Chapter 2, Para 2.9, Page No. 15 and the Working Plan prescription for CA is incorporated in the plan. 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 Improvement working circle, then CA land allotted to IWC. |
| III.   | Information on below mentioned Sections under Executive summary along with the constraints faced during writing of the plan is not submitted: a. Introduction b. Glossary of terms. c. List of Flora (indicating RET and unique species) d. List of Fauna. e. Other                                                                                                    | It is enclosed & submitted for perusal.                                                                                                                                                                                                                                                                                                                                 |
| IV.    | Title of Section- 4.2, 4.3, 4.6 and 4.8 of Part- I shall be written as per Working Plan Code                                                                                                                                                                                                                                                                           | It is complied in Volume I, Part I, Chapter 4, Para 4.2, 4.3, 4.6 and 4.8 in Page No. 38,39,40 respectively.                                                                                                                                                                                                                                                            |



|       |                                                                                                                                                                                                                                                                                        |                                                                                                                       |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| V.    | Information on below mentioned Sections are not written as per, contain mentioned in National Working Plan Code,2014<br>a. Tree cover outside Forest area                                                                                                                              | It is complied in Volume I, Part I, Chapter 2, Para 2.7, Page No. 14.                                                 |
|       | b. Status of Biodiversity conservation in forest                                                                                                                                                                                                                                       | It is complied in Volume I, Part I, chapter 3, Para 3.3, Page No. 24. .                                               |
| VI.   | Title of Section - 2.6.10 of Part-II should have been Method of executing the felling instead of Method of executing the treatment.                                                                                                                                                    | It is complied in Volume I,Part II,Table No 1.3,Para no 2.6.10,Page no 144.                                           |
| VII.  | Title of Section - 7.6.1 of Part -II should have been Analysis of the crop instead of Analysis of the Wildlife in the District.                                                                                                                                                        | It is complied in Volume I,Part II,Table No 1.3,Para no 7.6.1,Page no 202.                                            |
| VIII. | Title of Chapter - 8 of Part-II is mentioned as Forest Protection (Overlapping) Working Circle, whereas in table No. 2.2 of Part - I and table No. 1.3 of Part - II it is mentioned as Protection (Overlapping) Working Circle. Uniformity shall be maintained while writing the plan. | It is complied in Volume I,Part I,Table No 2.2,Page no 10 and Volume I,Part II,Table No 1.3,Page no 140 respectively. |
| IX.   | General information w.r.t, Miscellaneous regulations chapter containing below mentioned sections is not incorporated in the Working Plan. a. Petty felling. b. Rights and Concessions.                                                                                                 | It is complied in Volume I, Part -II, Chapter 14, Para No. 14.27 & 14.28, Page No. 292                                |
| X.    | Stock map of the division is not submitted along with the Working Plan.                                                                                                                                                                                                                | Stock Map of the Division is submitted.                                                                               |
| XI.   | 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.                                            |

  
 (G.R. Madhavaraj)  
 Dy. Conservator of Forests  
 Working Plan, Amravati.





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. 12-14/2005 (FOR) /7240

Date: 22.09.2020

✓ To,

The Secretary (Forests),  
Revenue and Forest Department,  
Government of Maharashtra,  
Mantralaya,  
Mumbai-400032.

बुद्ध वनसंरक्षक  
कार्य आदेशात  
वर्गिक कार्यनिष्पन्न  
माहिती क्र. 658  
दिनांक 20/9/2020  
स्थान

Sub:- Permission to work in Coupe No. I & II for the year 2020-21 in Buldhana Forest Division - regarding.

Sir,

I am directed to refer to PCCF (Production & Management), Maharashtra State letter No. Desk-14/WP-E/68/2020-21 dated 12.06.2020 wherein it is requested to permit to work in Coupe No. I & II for the year 2020-21. In this regard, it is to inform that separate felling proposal after approval of competent authority may be submitted to this office for further examination and recommendation by REC.

This issues with the approval of DDGF (Central), Regional Office (WCZ), MoEF & CC, Nagpur.

Yours faithfully,

(N.K. Dimri)

Technical Officer (Gr. I)

Copy to:

1. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
2. The Principal Chief Conservator of Forests (Production and Management), Van Bhawan, Ramgiri Road, Civil Lines, Nagpur - 440001.
3. Guard File.

Sd.

(N.K. Dimri)

Technical Officer (Gr. I)





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. 12-14/2005 (FOR) /724/

Date: 22.09.2020

To,

The Secretary (Forests),  
Revenue and Forest Department,  
Government of Maharashtra,  
Mantralaya,  
Mumbai-400032.

**Sub:-** Approval of Working Plan of Buldhana Forest Division for the period 2020-21 to 2029-30-  
regarding.

Sir,

I am directed to refer to the PCCF (P&M), Maharashtra office letter No. Desk-14/WP/C.No.163/(20-21)/366 dated 02.09.2020 on the above subject seeking prior approval of the Central Government under Forest (Conservation) Act, 1980 and to say that DWPR of Buldhana 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 Buldhana Forest Division written by Shri G.R. Madhavaraj, IFS; the Central Government hereby accords approval to the said Working Plan for the period of 2020-21 to 2029-30 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 2020-21 to 2029-30. Period of last Working Plan was up to the year 2019-20, the present Working Plan is approved from the year 2020-21.
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 State; further, no commercial felling shall be carried out along the strip of 500 meters of all seasonal Rivers; only eco-restoration work shall be carried out.
14. 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 year.
16. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the prescription of Working 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-tourism sites will be managed by the forest department as per the prescriptions of the working plan and after taking prior approval of Central Government under Section-2 of Forest (Conservation) Act, 1980.

21. Demarcation and consolidation of Forest Boundaries will be done adequately. Identification of Land Bank in the form of degraded forest areas in the Division to be explored for CA plantations.
22. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.
23. Proper mechanism has to be put in place to control illegal felling, grazing and fire. Proper fire management plan shall be prepared and executed meticulously.
24. Only 50% of 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 communicated by Regional Office, Nagpur vide letter No. 12-14/2005 (FOR) dated 27.04.2020 and also inclusion of following information and submission of final Working Plan within 6 months:

1. Scientific names of Trees, Shrubs, Climbers, Grasses, Sedges and Bamboos mentioned at page No. xlv-xlviii has to be italicized or it has to under lined as per International Code of Botanical Nomenclature (ICBN).
2. 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.
3. Compliance report to shortcomings communicated vide this office letter dated 27.04.2020 has not been submitted along with the Working Plan.
4. Compliance report w.r.t suggestions/ recommendations made by Standing Consultative Committee is not submitted along with the Working Plan.

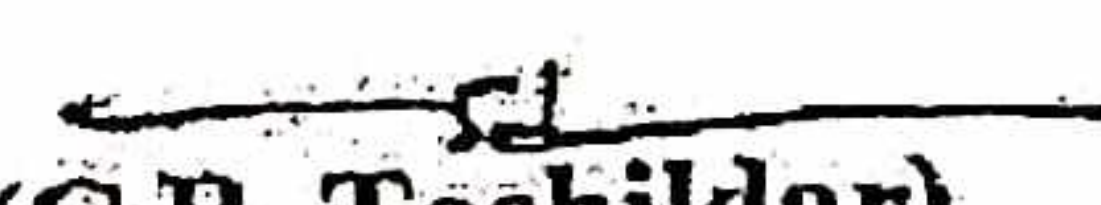
This issues with the approval of DDGF (Central), Regional Office (WCZ), MoEF & CC, Nagpur.

Yours faithfully,

  
(C.B. Tashildar)  
AIGF (Central)

Copy to:

1. The Additional Director General of Forests (FC) Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi-110003.
2. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
3. Guard File.

  
(C.B. Tashildar)  
AIGF (Central)



**DY. CONSERVATOR OF FORESTS,  
WORKING PLAN, AMRAVATI.**

Upper Wardha Colony Road,  
Camp Amravati-444 602  
Tel.No.0721-2662641, Fax:2665844  
E-mail:- cfw\_p\_amt@rediffmail.com



महाराष्ट्र शासन

**उपवनसंरक्षक,**  
कार्य आयोजना विभाग, अमरावती,  
उर्ध्व अपर वर्धा प्रकल्प वसाहत मार्ग,  
कैम्प रोड, अमरावती -444 602.  
दूरध्वनी:-0721-2662641 फॅक्स-2665844.  
ई मेल- cfw\_p\_amt@rediffmail.com

**No. Desk-02/RS/WP/Amt/ 369 2020-21**  
**Amravati-444602 Date:- 5 /03/2021**

**To,**

**The Member Secretary,**  
Standing Consultative Committee &  
Chief Conservator of Forests.  
Working Plan – East  
Nagpur.

- Ref:-** 1. This office Letter no Desk-02/RS/ WP/Amt/39&40 Dated:-19/05/2020.  
2. Letter of the APCCF(Central) Ministry of Environment, Forest & Climate  
Change (WCZ) Nagpur. No.F.No.12-14/2005(FOR)7241 Date: 22/09/2020.  
3. Letter of the CF, WP, East, Nagpur, No.Desk-14/WP/327/2020-21  
dated 06/10/2020.  
4. Letter of the CF, WP, East, Nagpur, No.Desk-14/WP/626/20-21  
dated 18/01/2021.

**Sub:-** Approval of Working Plan of Buldhana Forest Division For the period 2020-21 to  
2029-30 regarding.

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**COMPLIANCE OF WORKING PLAN OF BULDHANA FOREST DIVISION**

| Sr.No. | Queries                                                                                                                                                                                                            | Compliance                                                                                                                             |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | Scientific names of Trees, Shrubs, Climbers, Grasses, Sedges and Bamboos mentioned at page No. xlv-xlvii has to be italicized or it has to under lined as per International Code of Botanical Nomenclature (ICBN). | It is complied in Volume -I, Part -I, in Page No. li-lxx.                                                                              |
| 2.     | 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.                                                        | It is complied in Volume -I, Part -I, Chapter 1, Table no 1.2, in Page No-2                                                            |
| 3.     | Compliance report to shortcomings communicated vide this office letter dated 27/04/2020 has not been submitted along with the Working Plan.                                                                        | Compliance report to shortcomings has been submitted and attached in Volume-I of this Working Plan.                                    |
| 4.     | Compliance report w.r.t. suggestions/ recommendations made by Standing Consultative Committee is not submitted along with the Working Plan.                                                                        | Compliance report to w.r.t. suggestions/ recommendations made by SCC has been submitted and attached in Volume-I of this Working Plan. |

**Attachments :-** Buldhana Forest Division's Working Plan. (2020-21 to 2029-30) Volume I & II.

(G.R. Madhavaraj)

**Dy. Conservator of Forests**  
**Working Plan, Amravati.**

**Copy to:-** The Principal Chief Conservator of Forest(Production and Management), Van Bhawan,  
Ramgiri road, Civil Line , Nagpur 440001.





भारत सरकार  
GOVERNMENT OF INDIA  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
MINISTRY OF ENVIRONMENT, FORESTS  
& CLIMATE CHANGE

Integrated Regional Office  
Ground Floor, East Wing  
New Secretariat Building  
Civil Lines, Nagpur - 440001  
apccfcentral-ngp-mcf@gov.in

F.No. 12-14/2005 (FOR) /8256

Date: 12.07.2021

To,

The Principal Secretary (Forests),  
Revenue and Forest Department,  
Government of Maharashtra,  
Mantralaya,  
Mumbai-400032.

Sub:- Approval for final printing of Working Plan of Buldhana Forest Division for the period 2021-22 (Proposed 2020-21) to 2029-30 (Proposed 2029-30)- regarding.

Sir,

The undersigned is directed to inform that after examination of Draft Working Plan after incorporation of suggestions made by this office, approval for final printing of Working Plan of Buldhana Forest Division for the period 2021-22 (Proposed 2020-21) to 2029-30 (Proposed 2029-30) is hereby accorded. Copy of final print of Working Plan may be submitted to this office and to all concerned offices.

This issues with the approval of Regional Officer (Central), Integrated Regional Office, MoEF & CC, Nagpur.

Yours faithfully,

(C.B. Tashildar)  
AIGF (Central)

Copy to:

- ✓ 1. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
2. The Principal Chief Conservator of Forests (Production and Management), Van Bhawan, Ramgiri Road, Civil Lines, Nagpur - 440001.
3. Guard File.

(C.B. Tashildar)  
AIGF (Central)



**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



महाराष्ट्र शासन

**उपवनसंरक्षक,**  
**कार्य आयोजना विभाग, अमरावती.**  
उर्ध्व अपर वर्धा प्रकल्प बसहत मार्ग,  
कॅम्प रोड, अमरावती -444 602.  
दूरध्वनी:-0721-2662641 फॅक्स-2665844.  
ई मेल:- cfwp\_amt@rediffmail.com

No. Desk-02/RS/WP/Amt/361/2021-22  
Amravati-444602 Date:- 2/03/2021

To,

**AIGF(Central),**  
Integrated Regional Office  
Ground Floor, East Wing.  
New Secretarial Building  
Civil Lines, Nagpur.-440001.

- Ref:-** 1. Letter of the APCCF(Central) Ministry of Environment, Forest & Climate Change (WCZ) Nagpur. No.F.No.12-14/2005(FOR)8256 Date: 12/07/2021.  
2. Letter of the CF, WP, East, Nagpur, No.Desk-14/WP/ACF/248/2021-22 dated 30/07/2021.

**Sub:-** The period of Working Plan of Buldhana need to Corrected Regarding.

\*\*\*\*\*

Respected sir,

In above cited letter no-1, Approval For Final Printing of Working Plan of Buldhana Forest Division For the period 2021-22 (Proposed 2020-21) to 2029-30 (Proposed 2029-30) has been issued. The approval period should have to be Corrected. The period has to be 2021-22 (Proposed 2020-21) to 2030-31 (Proposed 2029-30) for the period of 10 years. Against (2021-22 to 2029-30).

Yours faithfully,

*G.R. Madhavaraj*  
(G.R. Madhavaraj)  
o/c Dy. Conservator of Forests  
Working Plan, Amravati.

**Copy to:-**

1. The Principal Chief Conservator of Forest (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri road, Civil Line, Nagpur 440001.
2. The Principal Chief Conservator of Forest(Production and Management), Van Bhawan, Ramgiri road, Civil Line, Nagpur 440001.
3. The Member Secretary, Standing Consultative Committee & Conservator of Forests. Working Plan -( East) Nagpur, Ravi Nagar Nagpur 44001