GOVERNMENT OF MAHARASHTRA

WORKING PLAN

FOR THE FORESTS OF

SANGLI FOREST SUB DIVISION

Period 2012-13 to 2021 -22

VOLUME I : PART 1 & II

By
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PREFACE

The district derives its name from its town Sangli, which was a princely state, and now forms the headquarters of the district. The district is surrounded by Satara district in the north-west, Solapur district in the north-east, Kolhapur district in the south-west, Ratnagiri district in the west and Karnataka State in the east and south directions. The climate ranges from the highest average annual rainfall of over 1200 mm in the western part of the district to the driest in eastern plains where the average annual rainfall is about 500 mm.

The total forest cover of the district is 144 km^2 out of which, 'Moderately dense forest cover' is 66 % of the total forest cover, while 'Open forest cover' is 34 % of the total forest cover. The geographical area of the district is 8,610.65 km^2 and is spread over 10 talukas. The Sangli forest sub-division has been organised into 6 forest ranges. This Working Plan deals with the entire forest area including all reserved forests, protected forests, acquired private forests and unclassed area in charge of the Sangli forest sub-division within the geographical boundaries of Sangli district. This Working Plan however excludes the areas notified as Chandoli National Park and Sagareshwar Sanctuary within Sangli district as these are covered by separate Management Plans and are under the administrative control of the Kolhapur wildlife division.

This Working Plan covers the forest area of 42,079.80 hectares falling within the jurisdiction of Sangli forest sub-division. It replaces the Working Plan by U.K. Agrawal (2002-03 to 2011-12) which had total 5 Working Circles; 4 main WCs viz. Improvement Working Circle, Afforestation Working Circle, Environmental improvement of Dandoba hills Working Circle, Miscellaneous Working Circle along with an overlapping Working Circle i.e., Wildlife (O.L.) Working Circle. The revised Working Plan has total 6 Working Circles - 3 main Working Circles viz. Improvement Working Circle, Afforestation Working Circle, Miscellaneous Area along with 3 overlapping Working Circles viz. Wildlife Management (O.L.) Working Circle, Bamboo Management (O.L.) Working Circle and NTFP management (O.L.) Working Circle.

The forest area allotted to the various Working Circles of the previous Working Plan has been reallotted on the basis of their present stocking and enumeration data. Environmental improvement of Dandoba hills Working Circle of the previous Plan was revised and merged into Improvement Working Circle in the revised Plan. Bamboo Management (O.L.) Working Circle and NTFP management (O.L.) Working Circle have been added in the revised plan for the management of the Bamboo bearing forest areas and the NTFPs respectively. The Wildlife (O.L.) Working Circle was revised to address the issues of Man – Wildlife conflict issues prevalent in the Sangli Sub-Division. It is prescribed to converge and integrate forestry management interventions with development schemes of other departments under Joint Forest Management (JFM), Forest Development Agency (FDA), Integrated Waste Land Development Programme (IWDP), District

Rural Development Agency (DRDA), District Plan etc. for socio-economic upliftment of the village communities.

This Working Plan was prepared based on the data of forest area, boundaries and other details as made available by Sub-DFO, Sangli Sub-Division. Timely availability of the matching budgetary grants for the development and protection works as per the prescriptions of this Working Plan are crucial for the successful implementation of management inputs and needs to be given proper attention for achieving desired results.

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Date: 11.07.2011
Place: Kolhapur

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Sangli Division, Working Plan Period-2012-13 To 2021-22

EXCUTIVE SUMMARY

THE TRACT DEALT WITH

This Working Plan deals with the entire forest area including all reserved forests, protected forests, acquired private forests and unclassed area in charge of the Sangli forest sub-division within the geographical boundaries of Sangli district. This Plan however excludes the areas notified as Chandoli National Park and Sagareshwar Sanctuary within Sangli district as these are covered by separate Management Plans and are under the administrative control of the Kolhapur wildlife division.

The geographical area of Sangli district is 8,610.65 km^2 which forms 2.80% of the total geographical area of Maharashtra State (3,07,713 km^2). The recorded forest area of the district including the Chandoli National Park and Sagareshwar wild life sanctuary is 556.71 km^2 which is 6.45 % of the geographical area of the district. The Sangli forest sub division has a forest area of 420.79 km^2, spread over 6 forest ranges in 10 talukas and forms 4.89 *%* of the geographical area of the district. As per the latest 'India State of Forest Report 2009' published by Forest Survey of India, Dehradun, the 'total forest cover' of Sangli district is about 1.68% (144 km^2) of the geographic area, of which, 'Moderately dense' is 1.11% (95 km^2) of the total forest cover. 'Open forest cover' constitutes 0.57% (49 km^2) of the total area under forest cover. Significantly, there was an increase in the proportion of the forest cover to the total geographical area was 144 km^2 (1.68 %) in 2009 vis-à-vis 123 km^2 (1.43 %) in 2005.

The forest area of Sangli forest sub division extends over in scattered blocks throughout the civil territories of Sangli district. The Sangli division is surrounded by Satara district in the north-west, Solapur district in the north-east, Kolhapur district in the south-west, Ratnagiri district in the west and Karnataka State in the east and south directions. The district lies between 16^0 45' and 17^0 33' North latitude and 73^0 42' E and 75^0 40' East longitude.

This Working Plan covers 42,079.80 ha. of area falling within the jurisdiction of Sangli forest sub-division.

THE FLORA AND FAUNA

The region has a wide diversity of plant and animal life. According to the Champion and Seth classification of the forests types of India, the main forest types found in Sangli forest district are as follows.

i. $_8A/C_2$ – Western sub-tropical hill forests
ii. $_2A/C_2$ – West coast semi-evergreen forests
iii. $_3B/C_2$ – Southern moist mixed deciduous forests
iv. $_5A/C_3$ – Southern dry mixed deciduous forests
v. $_5A/C_1$ – Dry teak forests
vi. $_5D/S_4$ – Dry grass lands

A study on ***the Biodiversity in the Western Ghats districts of Maharashtra and Goa*** was conducted by the Forestry and Environment Division, Space Application Centre of Indian Space Research Organisation (ISRO), Ahmedabad ***(Report No. SAC/ RESIPA/ FLPG/ FED/ DOS-DBT/ SR/ 02/ 2004 of June, 2004)*** in collaboration with the Maharashtra Remote Sensing Application Centre (MRSAC), Nagpur and Goa University, Panaji as a part of Department of Biotechnology and Department of Science (DBT-DOS) collaborative project carried out in different geographical regions viz., Eastern Himalayas, Western Himalayas and Western Ghats. Digital database generated in the present study on vegetation type distribution using IRS LISS III satellite data is first of its kind and forms a primary input for understanding the processes regulating the biodiversity.

Accordingly, two tree species each belonging to family Apocynaceae, Combretaceae and Anacardiaceae were recorded from the forest. *Rauvolfia serpentina* was found to be most important species in the district. *Ficus racemosa* was the next important species, followed by *Cinnammomum tamala.* These three species dominate in the forest. **Only one Endangered species (*Rauvolfia serpentina*) was found in the district.** Economic value of the species was evaluated in context of its fodder value, edible, medicinal, fuel, timber, charcoal and other utilisation. Out of the total 28 species found in the district, 17 species have some economic value. Amongst all the economically important species, *Syzigium cumini* is the most important species as it has highest Economic value. With respect to plant part utilization, stems of 9 species, roots of 6; bark of 9; leaves of 7; flowers of 6; seeds of 6 and fruits of 11 species have found economic values. Only two species in this forest have single use; 6 species have 2 uses; 6 species have 3 uses; 1 species have 4 and 5 uses. Two species have 6 uses. Only one species have all the uses identified.

UTILISATION OF THE FOREST PRODUCE

The population of Sangli district is 25.84 lakhs as per 2001 census out of which nearly 75% live in the rural areas. The 2003 live stock census estimated 35.15 lakhs domestic cattle in the district. Agriculture is the main occupation of the people. The important agricultural crops of Sangli district are Rice, Jowar, Bajra, Cotton, Wheat, Sugarcane, Ground nut and fruit crops like pomegranate, zizyphus and grapes. Major constituent of the population of the district resides in rural area, whose main occupation is Agriculture. This section of the population depends upon the forests for their requirements of timber for agricultural implements, house construction, firewood, fodder and non-timber forest produces.

STAFF AND LABOUR SUPPLY

The sub-division has sanctioned staff strength of 122 and in addition has a large contingent of 124 van majoors. Labourers required for forestry works are not easily available within the district. The increased industrial activities and the overall increase in the standard of living of the people considering better irrigation facilities also fail to attract labourers for the hard work and low returns they get in forestry activities. For nearly all the forestry works, labour is brought mainly from the adjoining Belgaum, Bijapur and Gulbarga districts of Karnataka state. They are mostly from the 'Lambani' tribe and work as camping labourers.

PAST SYSTEMS OF MANAGEMENT

General history of Forests

There were many estates like Aundh, Jath, Jamkhandi., Kurundwad, Miraj, Sangli & Wadi , in the present Sangli district prior to British rule. The acquisition of these estates was done by British Empire in the 19th century and since then the management of forests took shape. Dr. Gibson, the first Conservator of forests under the Bombay Presidency, who was appointed on 19th December 1846, has remarked in his report that previous destruction of the forests especially on the ghats was so great that it would take many years to build up anything like wood preserves. Forest reserves were set apart in the forests along with the ghats at the time of revenue survey settlement during 1860-62 and in 1879 after the introduction of Indian Forest Act 1878, reserve forests were notified. After independence of India, the former estates were merged with Bombay state in 1948. Before merger, the management of forests in these states was primarily in the hands of revenue officers who during this period gave no scientific treatment to the forests which led to the continuous deterioration of the forests.

Fagan's Provisional Working Plan (1892-93 to 1933-34)

- Prescribed coppice with standards on 40 years rotation for the teak forests.
- For babul clear felling on a 40 years rotation with artificial regeneration was prescribed.
- Light improvement felling on 30 years cycle was prescribed for the evergreen forest.

Maitland- Kirwan's Plan (1907-08 to 1933-34)

- Best teak forests (Karad, Patan and Shirala teak forests) were located.
- The main prescriptions were retained unaltered.
- Additional areas were brought under regular management.
- Allocation to felling series and coupes was modified in some cases.

Singh's Plan (1934-35 to 1972-73)

- In evergreen zone, 4 Working Circles
- Fuel Working Circle 18,316.1ha.
- Experimental Working Circle 552.40 ha.
- Hirda and Shikekai Working Circle 5,20,966 ha.
- In-exploitable Working Circle 93,353 ha.
- In deciduous zone, 3 Working Circles were constituted.
- Teak Timber Working Circle 2513.20 ha.
- Main Working Circle 23,518.40 ha.
- Pasture Working Circle 27,048 ha.

S.M. Wagle's Scheme (1958-59 to 1972-73)

- Three earlier schemes, prepared for Aundh, Akkalkot and Phaltan forests were combined and consolidated into one scheme
- 3 Working Circles.
- Pasture Working Circle 4,534.50 ha.
- Kuran Working Circle 1,722.80 ha.
- Fuel Working Circle

Desai's Plan (1975-76 to 1989-90)

- 7 Working Circles; 6 main WC along with 1 overlapping WC.
- Protection Working Circle 36,362.911 ha.
- Selection cum Improvement Working Circle 32,764.205 ha.
- Improvement Working Circle 4,435.294 ha.
- Afforestation Working Circle 27,857.485 ha.
- Pasture Working Circle 55,547.333 ha.
- Kuran Working Circle 3,042.559 ha.
- Minor Forest Produce (Overlapping) Working Circle

Agrawal's Plan (2002-03 to 2011-12)

The plan had 5 Working Circles; 4 main WCs and 1 overlapping WCs as given below.

1. Improvement Working Circle (9904.66 ha.)

This working circle included forest areas situated mostly on hills having steep to moderate slopes found mostly in Western Ghats of Sahyadri hills in Shirala and Walwa Talukas and some parts of Tasgaon, Khanapur and Jath talukas. Such areas are not fit for carrying out any felling on account of steep slopes and their ecological fragility. The main emphasis was laid on soil and moisture conservation works and carrying out the tending operations to the natural regeneration so that the existing crop may become harvestable in near future. In the areas having natural regeneration and coppicing of teak, tending operations was prescribed to be carried out so as to remove the unhealthy competition among the existing plants and provide them suitable conditions for better growth.

Results: Though treatment has improved Soil and Moisture conservation in the area results of seed sowing are poor – much so in DPAP area of the Sub-Division. Due to poor site quality growth of Teak plantation is very poor and stunted.

2. Afforestation Working Circle (23308.36 ha.)

The working circle comprised of the major part of the sub division. The successful and partially successful plantations of Afforestation working circle of Desai's plan were included in this Working Circle. Some of the areas included are capable of producing medium sized timber of valuable miscellaneous species viz. Ain, Shiras, Khair, Shisam etc. The areas are mostly plain or with gentle to moderate slopes. The live hedge fencing was proposed along the boundary of plantation area. In unworkable areas, seed dibbling was prescribed. In old plantation areas, cleaning and thinning operations was proposed. In workable areas the plantations were to be taken up in continuous contour trenches (1200 r. mtr./ per ha.). The successful or partially successful plantations, which are more than 5 years old, cleaning operation was prescribed such that all the old plantations are cleaned every 5^{th} year. Similarly in the plantations which were more than 10 years old, light thinning (D grade), wherever necessary was prescribed. It was prescribed to close the new plantations to grazing atleast for 5 years. However, the cutting of grasses was permitted. All the areas of pasture working circle of Desai's plan were covered in this working circle.

Results: Soil and Moisture Conservation has improved in the treated area. Vegetal cover has also improved to some extent. A report of the evaluation division reveals that there is considerable pressure of grazing by sheep especially in Atpadi and Jath ranges. Survival and growth of plantations by and large is very good. An analysis of the data on the survival and growth of

various plantations raised in Sangli forest sub division during 1987-88 to 2008-09 revealed that out of the total 902 ha. of plantations analysed as per the norms of the evaluation code, 206 ha. (22.84%) was found successful, 493 ha. (54.66%) was partially successful and only 203 ha. (22.51%) was failure. Thus, more than 71 % of the area under plantations is either Successful or Partially Successful as per the evaluation code norms. These observations were collected from the sample plots of 50 x 100 meters dimension from 37 plantations taken during 1988 to 2008.

3. Environmental Improvement of Dandoba Working Circle (1471.54 ha.)

This working circle comprised the area of Dandoba hills in Sangli Range (Kavathe Mahakal and Miraj talukas) of Sangli sub division. These forests generally belong to the type- 5D/54 Dry Grasslands. The total forest area of this hill is 1471.54 ha. spread over five (5) villages. Part of this area, 163.89 ha. area was included in the previous working plan in Pasture Working Circle. Rest areas, being mostly unclassed forests, were not included in the earlier plan of Desai. The whole area was prescribed to be fenced and to undertake the Soil and moisture conservation works. The plantation was prescribed in CCTs. As the area was proposed to be developed as bio-diversity conservation zone, the planting of religious and medicinal importance was prescribed. Strict fire protection was prescribed to be taken up along with plantations with the objective of beautifying the area. The area was proposed to be developed from DPDC funds. The Government of Maharashtra vide GR No.PGS- 1083/ 3683 /818-F-7 dated 10-9-1994 had constituted a committee to prepare a comprehensive plan for improving the environmental condition of Dandoba Hill and to develop into a tourist spot. Emphasis was laid on Bio-diversity conservation.

Results: Tree cover is improved due to extensive afforestration works. Erosion is controlled because of the SMC works. There is considerable increase in the tourists visiting this area both for pilgrimage and Ecotourism. The number of school trips and visits of students have increased. Protection level is increased by fencing the area. Much has been done for beautification of the area through raising plantation. No efforts were made for the development of Eco-tourism. One dormitory is the only facility available.

4. Miscellaneous Working Circle (7779.53 ha.)

The Gairan lands which have been handed over to the forest department by the revenue department for taking up the plantations are included in this working circle. An area of 7779.53 hectares of Atpadi, Jath, Kavathe Mahakal, Miraj and Khanapur talukas is included in this WC. The prescriptions for areas of this Working Circle are same as in Afforestation Working Circle. As these lands are not the forest lands in legal terms, this separate working circle has been proposed to augment the legal position of the area.

Results: Soil and Moisture Conservation has improved in treated area. Vegetal cover has also improved to some extent. Survival and growth of plantations in this working circle is by and large very good. The prescriptions of survey and demarcation of these areas before taking afforestation was not followed.

5. Wildlife (over lapping) Working Circle (Entire area of Sub-Division)

This is an overlapping working circle and covers the entire area of the sub-division. All the areas in Sangli District outside the Protected Areas (Chandoli National Park and Sagareshwar Sanctuary) are covered in this working circle. Habitat improvement and village eco-development were proposed to be undertaken in this working circle. Apart from this, the general measures for

the protection of wildlife and increasing the awareness among the people about wildlife was prescribed.

Results: Most of the prescriptions were not followed due to non-availability of adequate grants; hence no beneficial effects were noticed.

STATISTICS OF GROWTH AND YIELD

Enumeration during present Plan: While revising the Agrawal's Plan, enumeration of the forest crop was carried out by the 'Forest Resources Survey Scheme Unit' Nashik along with the active cooperation of the field staff from February to December 2010. The sampling design and overall technical guidance was given by the Chief Forest Statistician, MS, Nagpur. The sampling design of 'Systematic Line Plot sampling with random start' was adopted with the sample plot size of 30 x 30 meters i.e. 0.09 ha roughly at an interval of 600 meters. The analysis of the data revealed the stocking of nearly 65 trees per hectare for the entire division. Stocking of trees per hectare for each of the WC is as follows: 42 in Afforestation WC, 60 in Environmental Improvement of Dandoba WC, 155 in Improvement WC and 68 in Miscellaneous WC.

AREA ALLOTTED TO VARIOUS WORKING CIRCLES IN THE REVISED PLAN

2 main WCs along with 1 overlapping Area and 3 overlapping WCs are proposed in the Plan.

Sr. No.	Working Circle	Area allotted (ha.)	%age of area allotted
1.	Improvement Working Circle	18200.09	43.25
2.	Afforestation Working Circle	14314.80	34.02
3.	Miscellaneous Area	9564.91	22.73
4.	Wild Life Management (O.L.) Working Circle	Entire area	100.00
5.	Bamboo Management (O.L.) Working Circle	Entire area	100.00
6.	NTFP Management (O.L.) Working Circle	Entire area	100.00
	TOTAL	**42079.80**	**100.00**

1. IMPROVEMENT WORKING CIRCLE

This Working Circle includes areas that are capable of producing medium size timber of teak and valuable miscellaneous species viz. Ain, Biba, Kalamb, Shisham, Tiwas, Sawar, Shiras and Khair. It includes forest areas situated mostly on hills having steep to moderate slopes. Such areas are found mostly in Western Ghats of Sahyadri hills in Shirala and Walwa Talukas and some parts of Tasgaon, Khanapur and Jath talukas. Such areas are not fit for carrying out any felling on account of steep slopes and their ecological fragility. In previous working plan these areas were included in improvement working circle, afforestation working circle and Environmental improvement of Dandoba Hill working circles. The total area included in this working circle is **18200.09 hectares which forms 43.25 %** of the total forest area. The objective is to improve and enrich the growing

stock and to meet the demand for small timber and fuel which will be achieved by carrying out improvement works with an emphasis on soil and moisture conservation works along with improvement fellings. NR will be tended and supplemented with AR wherever needed. The SMC works like van tali, nalla-bunding, gully plugging etc will be carried out wherever required. In the accessible under stocked areas less than 2 ha. In extent and having good soil depth, seed dibbling shall be done. Rooted stock shall be properly tended. All climbers on the trees except those having medicinal properties and which are used and traded shall be cut. Only dead, diseased, unsound and malformed trees shall be marked for felling, retaining two dead trees per hectare for the benefit of the wild-life. All live high stumps shall be cut flush to the ground and shall be dressed thereafter with a sharp axe to get vigorous coppice shoots.

2. AFFORESTATION WORKING CIRCLE

This Working Circle includes all such compartments which have sparse tree growth and open blank areas in degraded state. These areas are degraded due to biotic pressure and environmental factors. Soil depth is poor. The district has much larger population of the cattle and sheep than the carrying capacity of the forests and as such faces acute shortage of fodder especially during summer months. The total area of this WC is **14314.80 hectares** comprising all ranges and is nearly **34.02** % of the total forest area being dealt in this Plan. These areas bear sparse vegetation, the soil condition is deteriorated due to heavy grazing and frequent fires in the past. The under stocked areas shall be treated in two phases; the restorative phase during which the soil and moisture conservation works shall be carried out during the initial first year and the productive phase during which, the planting activity will be taken in the second year.

3. MISCELLANEOUS AREA

This Chapter includes the following areas:

1. Unclassed lands which were handed over by the Revenue department to Forest department. These are the Gairan lands given by the revenue department to the forest department for taking up the afforestation activities. They have not been declared as forest within the meaning of Indian Forest Act 1927. Such areas are distributed in all the ranges of the sub division. The extent of the area is 8424.12 hectares.
2. Areas which were acquired under Section 3 of Private Forest (Acquisition) Act, 1975 but are yet to be finally vested with the forest department pending inquiry. These are distributed in Shirala and Khanapur ranges. The extent of the area is 802.95 hectares.
3. Forest areas which are under a) the forest nurseries at Retra Dharan, Jath and Khanapur, b) the Sub-division office and residential colonies at various Range HQs. and c) Area under Research plots at Retra Dharan. The extent of the area is 25.72 hectares.
4. Forest area which do not have clear boundaries on the ground and does not have maps is included here. The extent of the area is 312.12 hectares.

The total area included in this Chapter **is 9,564.91 hectares** which is **22.73 %** of the total forest area being dealt in this Plan. These different areas as specified above shall be treated as follows

i. Due to the fact that these lands are legally not the forest lands but form part of the Form-1 Area register, the protection of the plantations from grazing, fires and encroachments would be a handicap to the forest personnel. ***Sub-DFO should immediately send the proposal to the Government to notify all such unclassed lands under section 4 of Indian Forest Act 1927 so that the process of converting these areas into reserved forests may begin.***

ii. These areas have been notified under Private Forest Acquisition Act 1975, but are yet to be decided by the competent authority of the Revenue department. The claims of the concerned persons are yet to be decided. ***Sub-DFO should pursue with the concerned revenue authorities, as these cases are pending for taking the final decision regarding the restoration of such lands to the owners.***

iii. These areas do not require further treatment, but only **needs protection and proper maintenance of the area.**

iv. These areas of Reserved Forests **require survey and demarcation with the help of DILR and preparation of maps for effective management of the area.**

4. WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

The forests along the western parts of Sangli district are rich in wildlife biodiversity. Their continued existence is crucial for the long-term survival of the biodiversity and the ecosystems supporting them. This Working Circle overlaps with the entire area of Sub-Division. While increasing man-animal conflict is an outcome of shrinkage, fragmentation and deterioration of habitats, it has caused destruction of wildlife and generated animosity against wild animals. Habitat destruction to meet the ever increasing needs of the human population force animals like Gaur (*Bos gaurus*), Sambar (*Cervus unicolor*) and Crocodile (*Crocodylus palustris*) leading to man-animal conflict situations by crop depredation or attacks on cattle and human beings. A detailed survey of the fauna and flora of the district, their occurrence, status and conservation strategies with a focus on the endemic and endangered species should be undertaken by the expert agencies appointed by the forest department. Since, water is the major limiting factor in the forest during the summers, so development of various water sources by gully-plugging and by erecting nalla-bunds, check-dams etc. needs to be done. Areas where fodder availability can be increased to prevent straying of wild herbivores like gaur into agricultural lands should be identified and tackled. The infrastructural facilities to handle wildlife emergencies needs to be strengthened. The forest staff at different levels shall be trained and equipped fully to handle wildlife emergencies including handling of tranquilizing as well as trapping equipment. The frontline staff should be trained to provide adequate professional skills in prosecution matters related to wildlife offences. Mass awareness camps should be organized as a part of sustained campaign to educate masses. The willing veterinarians preferably from the government departments shall be imparted basic and advanced training in the wildlife medication in different batches.

5. BAMBOO MANAGEMENT (OVERLAPPING) WORKING CIRCLE

Bamboo is found mainly along the hilly slopes and along the nallahs in Shirala range of Sangli sub-division. Old bamboo plantations covering an extent of 504.43 hectares area is in Compartment No. 17 of Shirala range. In other ranges, stocking is inadequate to harvest bamboos in sustainable manner. Majority of the old bamboo clumps found growing naturally or in plantations in the forest areas have never been worked before and show lot of congestion bearing dead, deformed and over mature bamboos. The culms of *Bambusa bambos* are found to be badly entangled within the clumps due to over congestion. All clumps will be cleaned during the coupe working. All dead, decayed, dry and twisted culms will be removed. No clump shall be considered fit for harvesting unless it contains more than 12 culms of one year or older in age. All current year and previous year culms will be retained. The mature culms equal in numbers to the current year culms subject to minimum of 8 culms must be retained to provide support to the younger culms. The remaining mature culms after reserving as described in the preceding paragraph may be harvested. Such clumps of *Bambusa bambos* or other species which are difficult to work as per standard bamboo working due to heavy congestion should be worked so as to retain culms in 'U' shape or to retain bamboo culms on the periphery of the clumps. This should be done only once after which following standard bamboo working prescriptions should be strictly followed. No culm shall be extracted without cleaning the clump which should be an integral part of the bamboo harvesting.

6. NON-TIMBER FOREST PRODUCE MANAGEMENT (OL) WORKING CIRCLE

This is an overlapping Working Circle, covering the entire forest area being dealt in this Working Plan. Many species yielding Non-Timber Forest Produce (NTFP) including the medicinal plants are found in these forests. The NTFPs found in Sangli district are Hirda fruits, Shikekai, Apta leaves, Agave, Honey and Kadi patta etc. The non-timber forest produce collected in this tract contribute revenue to state exchequer as well as provide work to local people during the time they are not busy with their agricultural works. It is proposed to make a resource inventory of all Non Timber Forest produce in every Range of the Division and mark areas rich in such NTFPs including Medicinal Plants. The areas having promising regeneration of NTFP species and which is not less than 0.5 hectare in extent in a compact block will be identified in the annual coupes of each year and will be tended to remove congestion and promote their growth. The weekly markets should be surveyed to know the extent of various NTFPs reaching the markets, methods of harvesting, their market price and purpose of their utilisation in domestic or international markets. The Sub-DFO should prepare an analytical report based on this. Only sustainable methods of harvesting of NTFPs should be used and expertise for training villagers to put these non-destructive methods into practice should be developed. Leaves and fruits shall be plucked from the tree or shrub branches in a non destructive manner. Lopping of branches or felling of trees/ shrubs for collecting NTFPs should be strictly dealt with.

ECO-TOURISM

There are many religious places and places of tourism interest in Sangli district The eco-tourism or sustainable nature-tourism can be developed in and around forest areas having scenic spots or places of historical and religious importance. Sangli district has following distinct features which make it an attraction for tourists, a) It has many places of historical and religious importance. Ambabai (Jath), Bahe Borgaon (Walwa), Chauranginath (Sonsal), Dandoba hills, Datta tekdi (Islampur), Ganapatipanchayatan of Tasgaon, Ganapati temple of Sangli, Kandoba of Deshing,

Kundal (Palus), Mallikarjun dongar (Islampur) and are the attractions for religious tourists, b) being part of western ghat the district has rich forest cover in Western portion of the district. Mandur area of Shirala range adjoining Chandoli National Park attracts large number of tourists and c) the district also has many minor irrigation tanks at Dubai Kuran (Atpadi) and Ped (Umber Dara). These minor irrigation tanks are located in forest areas and are surrounded by rich forests creating beautiful natural spot for tourists. The objectives of development and management of these Eco tourism sites are 1) to provide livelihood opportunities to local community through their involvement in services delivery through eco-tourism, 2) to promote eco-tourism in forest areas to increase awareness amongst people regarding importance of conservation and protection of forests and wildlife and 3) to utilise the potential of forest areas for tourism as a key economic force for the conservation of nature. Since eco-tourism is distinguished from the resort-tourism for requiring lesser infrastructure development and a lower impact on the environment, it can generate more revenue at lesser costs to the Forest Department as well as can generate employment to the local inhabitants. The FD should take lead to involve various stake-holders like local communities, FD, tourism department and local tour operators and seek their active participation and cooperation to make the eco tourism projects successful ventures. The Sub-DFO should select the scenic spots having potential to develop into excellent ecotourism spots.

JOINT FOREST MANAGEMENT

Forests are facing severe threats detrimental to their survival. These threats are mostly in the form of biotic pressures like illicit felling, encroachments, grazing, fires etc. Considering these realities, the concept of befriending the stakeholders in forests by way of a participatory process was conceived. Managing forests with the active cooperation of village communities will not only help in protecting our forests but will also safeguard the interest of the village communities. In Sangli district, there are 268 villages in the vicinity of forests. Joint Forest Management committees (JFMCs) are formed in 261 villages. On the lines of the JFM, an Integrated Wasteland Development Programme i.e. IWDP has also been implemented in 23 villages as well as a Forest Development Agency (FDA) has also been established in 54 villages. Principles of participatory management, usufruct sharing, eco-system protection, democratic set-up, gender equality, open communication, rights and duties of the community, effective conflict resolution, effective monitoring and evaluation and shramdaan should be adhered to during the implementation of JFM in any village. A comprehensive publicity and awareness campaign regarding JFM should be taken up. The villagers owning land should be convinced to grow the fuel-wood and fodder trees species on their field bunds or fallow lands by involving Social Forestry department. Short orientation courses should also be conducted for the forest staff, to equip them with better communication skills and to orient them towards the forestry extension. Establish Self-Help Groups in the villages and organize necessary training camps for imparting new skills.

FOREST PROTECTION

The forests of Sangli Sub-Division need to be protected against the incidents of illicit felling, poaching, fires, encroachments and unregulated grazing. Protection of forests from the biotic interference is completely essential for prescribed management interventions to be effective. This chapter contains general forest protection regulations along with regulations on fire protection, illicit cutting, encroachments, grazing, poaching etc.

INDEX

LIST OF FLORAL SPECIES OF SANGLI SUB-DIVISION

TREES

No.	Name of Plant species	Vernacular Names
1	*Acacia sp.*	----
2	*Actinodaphne angustifolia*	Pisa
3	*Aglaia lawil*	Bhoram
4	*Albizia odioratissima*	Shiris
5	*Albizia procera*	Kinhi
6	*Artocarpus hirsuta*	Ran-phanas
7	*Artocarpus integrifolia*	Phanas
8	*Atalantia recemosa*	Makad limbu
9	*Bauhinia recemosa*	Apta
10	*Beilschmicedia dalzellii*	-----
11	*Bombax ceiba*	Sawar
12	*Bridelia retusa*	Katak
13	*Butea monosperma*	Dhak, palas-(h)
14	*Callicarpa tomenonsa*	Aisar
15	*Carallia brachiate*	Phanshi
16	*Careya arborea*	Kumbi
17	*Caryota urens*	Mahad\birli mhad
18	*Casearia graveo lens*	Bhokad
19	*Cassia fistual*	Bhava
20	*Cinnamomum tamale*	Tamal patra
21	*Calusena sp.*	----
22	*Cordia myxa*	Bhokar
23	*Canthium dicoccum*	Tupa
24	*Dalbergia latifolia*	Sisam
25	*Dalbergia pentagyna*	Kamal
26	*Dimorphocalyz lawianus*	---
27	*Diospyros melanoxylon*	Tendu
28	*Diospyros nigricans*	Malya
29	*Dalbergia sisso*	Sisso
30	*Diospyros montana*	Govinda
31	*Dolichan drone falcata*	Medsingi
32	*Emblica officinalis*	Amla
33	*Erythrina varigata*	Panghara
34	*Erythrina stricta*	Kate pangara
35	*Euphoria longana*	Wumb
36	*Ficus arnottiana*	Pair
37	*Ficus exasparata*	----
38	*Ficus hispida*	Kala umbar
39	*Ficus microcrpa*	Nandruk

40	*Ficus glomerata*	Wumb
41	*Ficus religiosa*	pipal
42	*Ficus retusa*	----
43	*Ficus rumphii*	Asta
44	*Ficus virens*	-----
45	*Flacourtia indica*	----
46	*Gracinia indica*	Kokam
47	*Grewia tilifolia*	Dhaman
48	*Glycosmis Pentaphylla*	Kirmira
49	*Gmelina arboera*	Shivan
50	*Hardwickya binata*	Anjan
51	*Heterophragma roxburghii*	Waras
52	*Holoptelea integrifolia*	Vavala
53	*Hemigyrosa canescens*	----
54	*Knema attenuata*	Ranjaiphal
55	*Lagerstroemia lanceolata*	Nana
56	*Lepisanthes tetraphylla*	Lokhandi
57	*Lasisiphon eriocephalus*	Rametha
58	*Macaranga peltata*	Chandada
59	*Mallotus philippinensis*	Kukavi
60	*Mangifera indica*	Amba
61	*Mammea longifolia*	Surangi
62	*Maytenus rothiana*	Henkal
63	*Meiogyne pannosa*	----
64	*Memecylon umbellatum*	Anjani
65	*Microcos paniculata*	Asolin
66	*Mimusops elengi*	Bakul
67	*Morinda pubescebs*	Ashi
68	*Muraya koenigii*	Kadnimb
69	*Murraya pinculata*	Pandhari
70	*Myristica malabarica*	Ran-jayphal
71	*Mapia fotida*	narkya
72	*Neola markia*	Cadamba
73	*Olea dioica*	Parjambhal
74	*Pongamia pinnata*	Karanj
75	*Randia dumentorum*	Gela
76	*Rouwofia Serpentina*	Hadaki
77	*Sageraea laurifolia*	Sajeri
78	*Sapium insigne*	-----
79	*Schelerchera oleosa*	Koshimb
80	*Semecarpus anacardum*	Biba
81	*Sterculica guttata*	_____
82	*Strombosia ceylanica*	
83	*Symplocos racemosa*	Lodh

84	*Syzygium cumini*	Jamun
85	*Syzygium heyneanum*	-----
86	*Syzygium phyllaeroides*	------
87	*Terminalia tamentosa*	Ain
88	*Terminalia arjuna*	Arjuna
89	*Terminalia bellirica*	beheda
90	*Terminalia chebula*	Hirda
91	*Terminalia paniculata*	Kinjal
92	*Tamarindus indica*	Chinch
93	*Vanfueria spinosa*	Alu
94	*Wrightia tinctoria*	Kudi
95	*Xantolis tomentosa*	Kate kumbhal
96	*Xylia xylocarpa*	Jamba

SHRUBS

No.	Species	Vernacular Names
1	*Acacia abuurnea*	Murmati
2	*Allophlus cobbe*	Tiphan
3	*Atyiosia lineata*	Rantur
4	*Boehmeria glomerulifeara**	-----
5	*Cappairs zeylanica*	Wagati
6	*Loxora coccinea*	Bakara
7	*Justicia adhatoda**	Adulsa
8	*Lantana camara*	Ghaneri
9	*Lawsonia inermis*	Mendi
10	*Leea indica*	Dinda
11	*Melastoma malabaricum*	------
12	*Carvia callosa*	Karvi
13	*Colebrookea oppositifolia*	Bhaman
14	*Coortalaria retusa*	Dingala
15	*Debregeasia longifolia**	-----
16	*Gnidia glauca*	Rametha
17	*Grewia villosa*	Karmati
18	*Pavetta indica*	Phaphat
19	*Psychotria trucnata*	------
20	*Rhus mysorensis*	Amoni
21	*Thelepaepale ixiocephala*	Waiti
22	*Vitex negundo*	Nirgudi
23	*Ziziphus rugosa*	Toran
24	*Woodfordia fruticosa*	Dhayati
25	*Cariassa carondus*	Karvandi

HERBS

No.	Species	Vernacular Names
1	*Achyranthes aspera*	Aghada
2	*Aerides sp.*	------
3	*Begonia crenata*	-------
4	*Chlodrophytum sp.*	-------
5	*Curcuma sp.*	Ran halad
6	*Dendrobium sp.*	------
7	*Desmodium sp.*	------
8	*Enset superbum*	------
9	*Exacum sp.*	-----
10	*Lmpatiens acaulis*	-----
11	*Leucas stelligera*	Burumbi
12	*Lobelia nicotianaefolia*	Nara, narasala
13	*Oberonia sp.*	-----
14	*Smithia sp.*	-----

CLIMBERS

No.	Species	Varanacular Names
1	*Acacia sinuate*	Sikakai
2	*Bridelia stipularis*	Kangia , velti
3	*Calamus sp.*	Vet
4	*Caesalpinia cucullatat**	-----
5	*Carissa inermis**	Veil karvand
6	*Combretum sp.*	------
7	*Dioscorea pentaphya*	------
8	*Diploclisia glaucesens*	------
9	*Elaeagnus conferta*	Ambgul
10	*Entad pusaetha*	Garambi
11	*Gentum ula*	Ombli
12	*Hemidesmus indicus*	Anantmul
13	*Hoya retusa*	Ambri
14	*Hoya sp.*	-----
15	*Jasminum malabaricum*	------
16	*Piper sp.*	Jungle miri
17	*Reissantia grahamii**	-----
18	*Rourea minor**	Kalavidhara(h)
19	*Scutia myrtina**	-------
20	*Smilax myrtina**	Ghot-wel
21	*Ventilago sp.*	-------
22	*Wagaea spicate*	------
23	*Muecna prurita*	Kahili

Note : * = Endemic to the Western Ghats

GRASSES

No.	Species	Varanacular Names
1	*Andorpogon triticus*	Bangala
2	*Crysopogon fulvas*	Dongari
3	*Hetropogon canturtus*	Kalikusali
4	*Sanerus silaris*	Anjan grass
5	*Thelipogen eleganee*	Phoradi
6	*Thimeda quadrivalvis*	Karad
7	*Aristida funiculata*	Saphet- kusali

BAMBOO

No.	Species	Veranacular Names
1	*Bambusa bamboo*	Kalak
2	*Oxytenanthera ritcheyi*	Chiva
3	*Palm sp.*	Morpisa maad

List of Red Listed species

No.	Species	Vernacular Names
1.	*Dalbergia latifolia*	Sisav
2.	*Muraya koenigii*	Kaduninb
3.	*Mapia fotida*	Narkya
4.	*Terminalia arjuna*	Arjun sadada
5.	*Capparis zeylonica*	Wagati
6.	*Curcuma sp.*	Ran halad
7.	*Acacia Sinuata*	Sikekai
8.	*Calamus species*	Vet
9.	*Entada pusaetha*	Garambi
10.	*Hemidesmus indicus*	Anantmul
11.	*Smilax myrtina*	Ghhot wel
12.	*Palm sp.*	Morpisa mad

LIST OF FAUNAL SPECIES FOUND IN SANGLI DSTRICT

MAMMALS

1	Bear, sloth
2	Boar, Indian wild
3	Cat Jungle
4	Civet small Indian
5	Deer, Barking
6	Common Fox
7	Deer, Mouse
8	Dog , Indian wild
9	Gaur
10	Short nosed fruit bat
11	Hare, Indian
12	Hyaena, Striped
13	Jackal
14	Langur, common
15	Leopard cat
16	Leopard (Panthera pardus)
17	Macaque Bonnet
18	Mongoose
19	Pangolin, Indian
20	Porcupine, Indian
21	Sambar
22	Squirrel, Indian Giant
23	Tiger (Panthera Tigris)

REPTILES

1	Calotes, Forest
2	Gecko, Bark
3	Gecko, Dwarf
4	Gecko, Rock
5	Keelback, Beddomes
6	Lizard, Common Indian
7	Monitor, Common Indian
8	Skink, Snake
9	Snake, Checkered keelback
10	Snake, Common Cat
11	Snake, Common Vine
12	Snake, Indian Python
13	Snake, Rat or Dhaman
14	Snake, Indian Cobra
15	Snake, Striped Keelback
16	Viper Hump-nosed pit.
17	Viper Saw-scaled

AMPHIBIANS

1	Buffo Koyanensis
2	Crocodiles, fresh water
3	Fish
4	Frog, Bronze
5	Frog, Cricket
6	Frog, Skipper
7	Turles (hill turtle and Indian soft shell turtle)

BIRDS

1	Bazas
2	Babbler, jungle
3	Babbler, Quaker
4	Babbler, Spotted
5	Babbler, Statyheaded Scimitar
6	Babbler, Rufous **(E)**
7	Babbler,Yellow eyed
8	Barbet, small Green **(E)**
9	Barbet, Crimson Crested
10	Bee-eater, Green **(E)**
11	Blackbird
12	Bulbul Black
13	Bulbul Redvented
14	Bulbul Rediwiskered
15	Bunting, Crested
16	Buzzard, white eyed
17	Buzzard, honey
18	Chat, collared bush
19	Chat, pied bush
20	Coucal
21	Crow, jungle
22	Cuckoo, pied crested
23	Curlew, stone
24	Dove, little brown
25	Dove, rufous turtle
26	Dove , little bronw
27	Dove, Rufous tutle
28	Drong, Ashy

29	Drongo, Black
30	Drongo, white bellied
31	Eagle, crested serpent
32	Eagle, cattke
33	Finch-lark
34	Finch-lark, black crowned
35	Flower pecker, plain coloured
36	Flower pecker, thickbilled
37	Flower pecker, tickell's
38	Flycatcher, paradise
39	Flycatcher, redbrested
40	Flycatcher, verditer
41	Flycatcher, whitespotted fantailed
42	Flycatcher, white-throated fantailed
43	Fowl, Grey Jungle
44	Hawk-eagle changeable
45	Heron, pond
46	Hoope
47	Indian pied hornbill
48	Lara, common
49	Kingfisher, common
50	Kingfiser , white-breasted
51	Kite, Black
52	Kite, Blackwinged
53	Lapwing, Redwinged
54	Lapwing, Yellow watted
55	Lark, malabar
56	Lorikeet, Indian
57	Larg Falcons
58	Martin Crag
59	Martin, Dusky Crag
60	Martin, Sand
61	Minivet, White bellied
62	Mountain Quail
63	Minivet, Scarlet
64	Munia, Rufous bellied
65	Munia, Whitethroated
66	Myna, Jungle
67	Oriole, Golden
68	Owl, Barn
69	Owlet, spotted
70	Parakeet, Blossomheaded
71	Parakeet, Roseringed
72	Pegion, Bule Rock

73	Pegion, Nigiri Wood **(E)**
74	Petronia, Chestrutshouldered
75	Peafowl
76	Pipit, Brown Rock
77	Pipit , Paddy field
78	Pipit , Tree
79	Quail, Rock Bush
80	Quail, Rain
81	Quail Jungle Bush
82	Risefinch, Common
83	Sandpiper common
84	Shrikra, Bayback
85	Shrikra, Rufousblacked
86	Shrikra, Common wood
87	Skylark, Eastern
88	Sporrow, Yeowbacked
89	Sporrow, House
90	Spurfowl, Red
91	Sunbird, Small **(E)**
92	Sunbird, Yellowbacked
93	Sunbird, Purple
94	Swallow, Redrummped
95	Swallow, wiretailed
96	Swift, Crested tree
97	Swift, Little
98	Swift, Alpine
99	Tailorbird
100	Thursh, Blueheaded Rock
101	Tit, Yellowhecked
102	Vulture, Whitebacked
103	Vulture, Longbilled
104	Wagtail, Yellow
105	Wagtail,Gray
106	Warber, Largecrowned leaf
107	Warber, Tickells leaf
108	Warber, Brown leaf
109	Warber, Booted
110	Warber, streaked fantailed
111	Warber, Tytler's leaf
112	Warber, Olivaceous leaf
113	Warber, Dull Green leaf
114	White-eye
115	Wood pegion Nilgire **(E)**
116	Woodshrike, common

117	Wren-Warbler, Ashy
118	Wren-Warbler, Plain
119	Wren-Warbler, Jungle

Note : E = Endemic to the Western Ghats

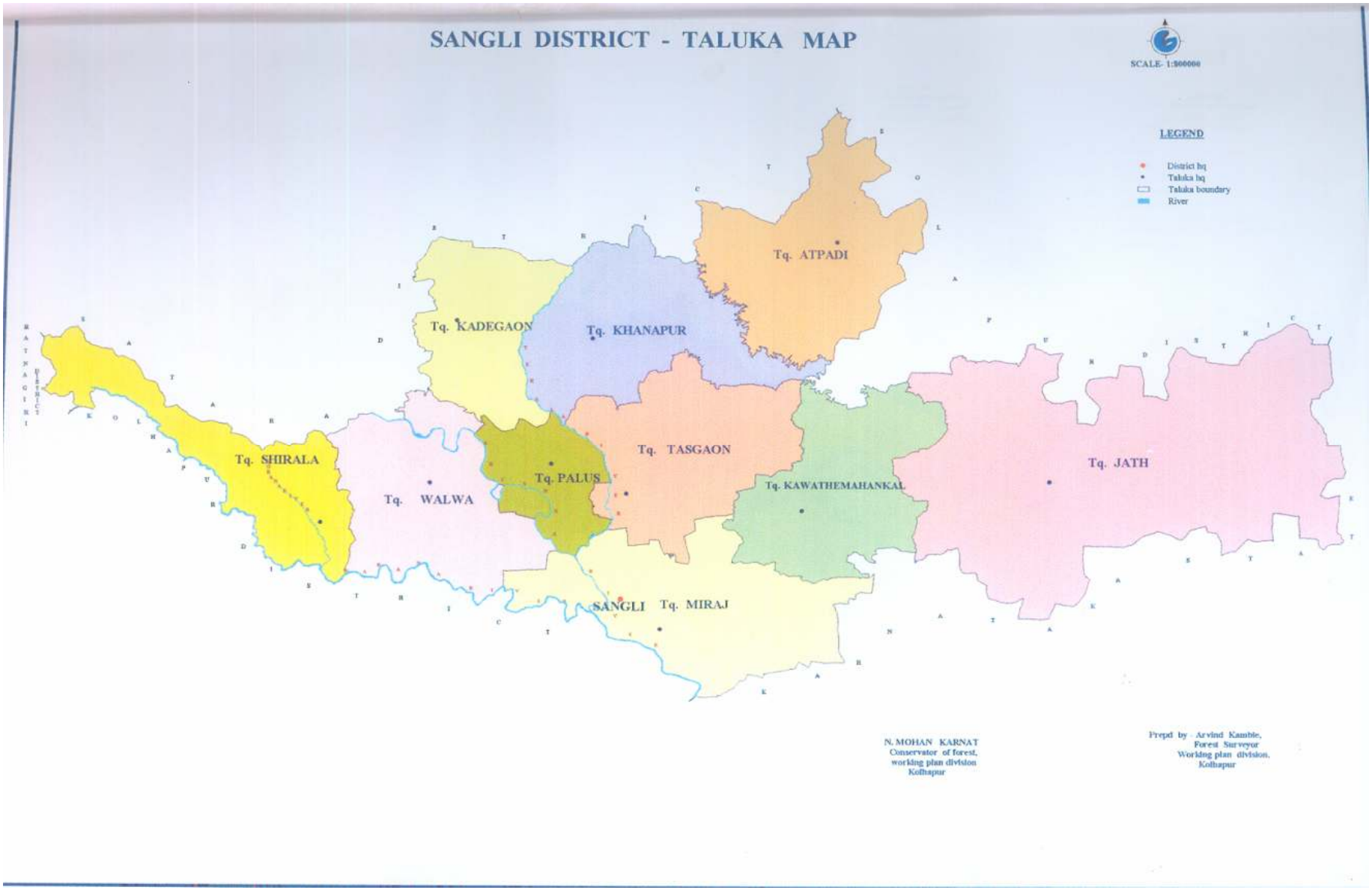
GLOSSARY OF LOCAL TERMS / ABBREVIATIONS

Sr.No.	Local name	Meaning
1.	Geru	Red ochre or red earth
2.	Ghat	A road with a steep gradient
3.	Jhirras	Temporary small well dug in nallas during Summer
4.	Kuran	A grass reserve close to grazing
5.	Malki lands	Lands belonging to private individuals
6.	Murrum	Lateritic soil reddish brown in colour
7.	Nalla	A water course
8.	Nachani	An edible food grain
9.	Rab	A patch of ground which is given a good burn and used for regeneration purpose.
10.	Tahsil/ Taluka	An administrative unit of district
11.	Tahal	Leafy branches of trees

ABBREVIATIONS USED IN THE PLAN

ACF	:	Assistant Conservator of Forests
APCCF	:	Additional Principal Chief Conservator of Forests
AR	:	Artificial Regeneration
CAI	:	Current Annual Increment
CBO	:	Cutting Back Operations
CCT	:	Continuous Contour Trenches
Cum	:	Cubic meter
CF	:	Conservator of Forests
DILR	:	District Inspector of Land Records
DRDA	:	District Rural Development Agency
DCF	:	Deputy Conservator of Forests
EPT	:	Elephant proof Trench
FCA	:	Forest Conservation Act
FD	:	Forest Department
FDA	:	Forest Development Agency
FLCS	:	Forest Labourers' Cooperative Society
FPC	:	Forest Protection Committee
FRSSU	:	Forest Resources Survey Scheme Unit
FYO	:	First Year Operations
FYP	:	Five Year Plan
GIS	:	Geographic Information System
GBH	:	Girth at breast height
Ha.	:	Hectare
IUCN	:	International Union for Conservation of Nature
IWC	:	Improvement Working Circle
IWDP	:	Integrated Watershed Development Programme
JFM	:	Joint Forest Management
MAI	:	Mean Annual Increment

MEDA	:	Maharashtra Energy Development Agency
MPCA	:	Medicinal Plants Conservation Area
MSL	:	Mean Sea Level
MSEDC	:	Maha State Electricity Distribution Co.
NTFP	:	Non Timber Forest Produce
NR	:	Natural Regeneration
PA	:	Protection Area
PCCF	:	Principal Chief Conservator of Forests
PF	:	Protected Forest
PPO	:	Pre planting Operations
PWD	:	Public Works Department
RF	:	Reserve Forest
RFO	:	Range Forest Officer
SCI	:	Selection cum Improvement
SHG	:	Self Help Group
SMC	:	Soil and Moisture Conservation
SOFR	:	State of Forest Report
SYO	:	Second Year Operation
TCM	:	Trench cum mound
TM	:	Treatment map
TYO	:	Third Year Operations
WC	:	Working Circle
WP	:	Working Plan
WL	:	Wild life
WS	:	Working Series


SANGLI DISTRICT - TALUKA MAP
SCALE- 1:500000
LEGEND
District hq
Taluka hq
Taluka boundary
River
Tq. ATPADI
Tq. KADEGAON
Tq. KHANAPUR
Tq. SHIRALA
Tq. WALWA
Tq. PALUS
Tq. TASGAON
Tq. KAWATHEMAHANKAL
Tq. JATH
SANGLI
Tq. MIRAJ
N. MOHAN KARNAT
Conservator of forest,
working plan division
Kolhapur
Prepd by Arvind Kamble,
Forest Surveyor
Working plan division,
Kolhapur

"A"

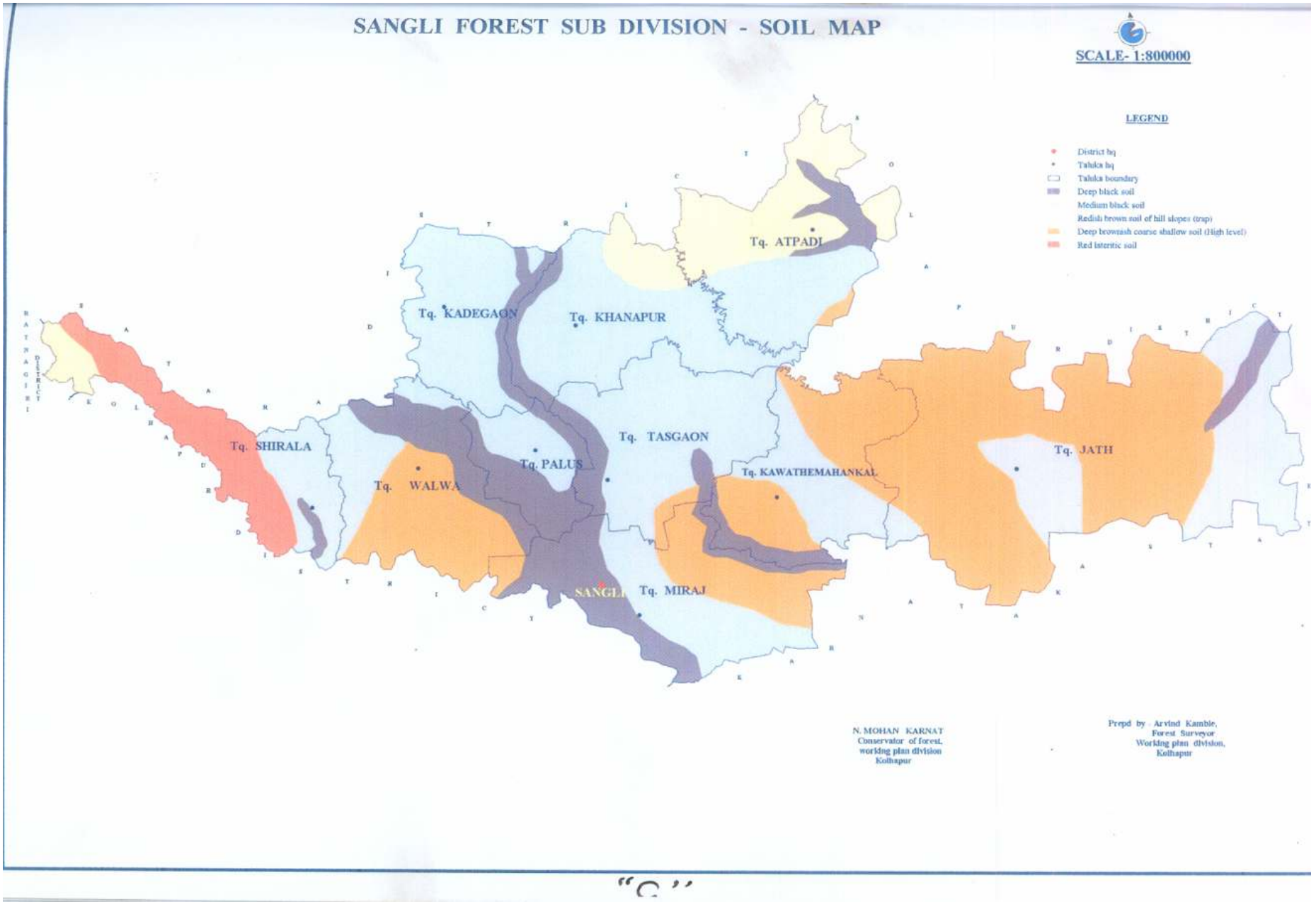
"B"

SANGLI FOREST SUB DIVISION - RANGE MAP

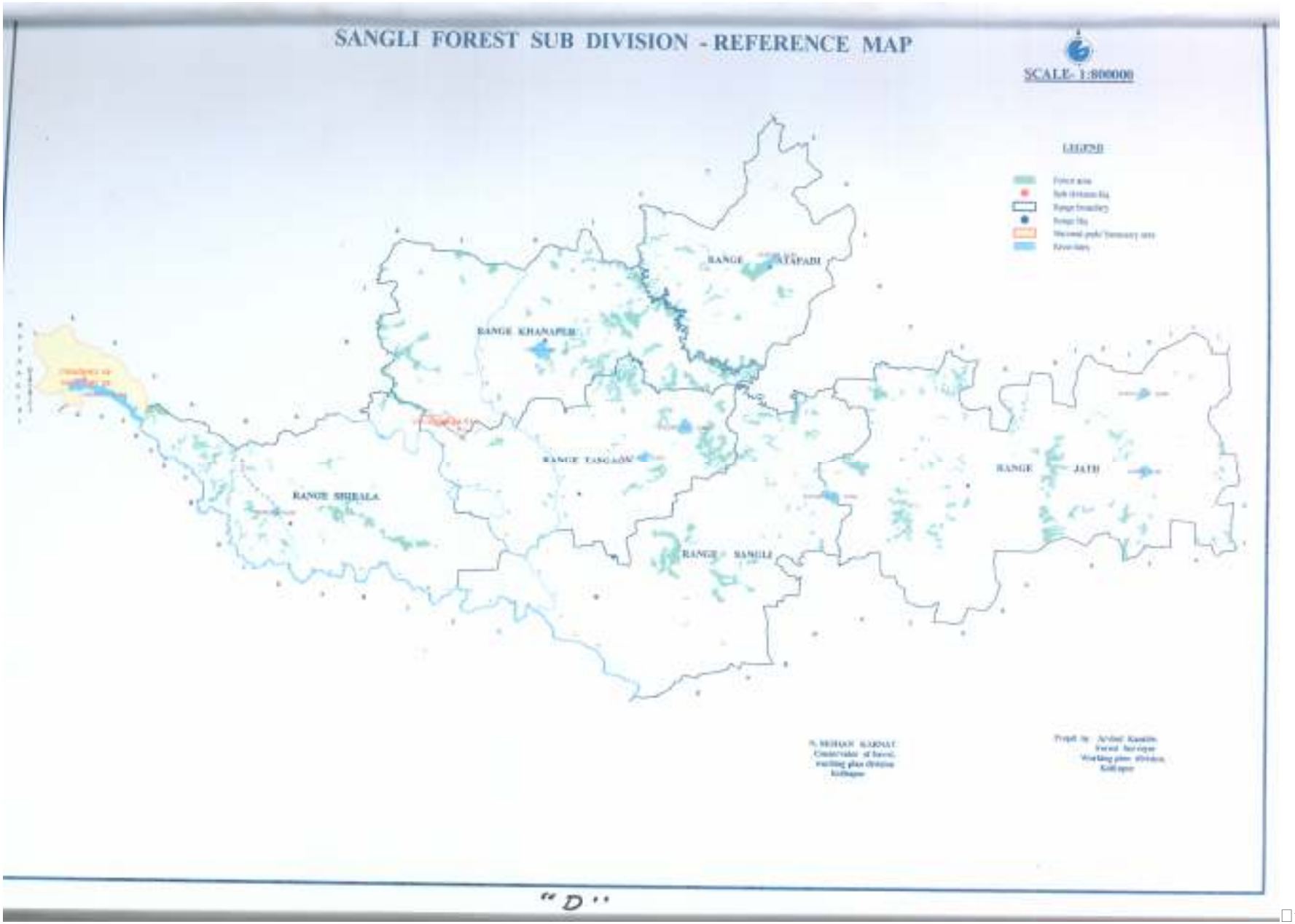
SCALE- 1:800000

N. MOHAN KARNAT
Conservator of forest,
working plan division
Kolhapur

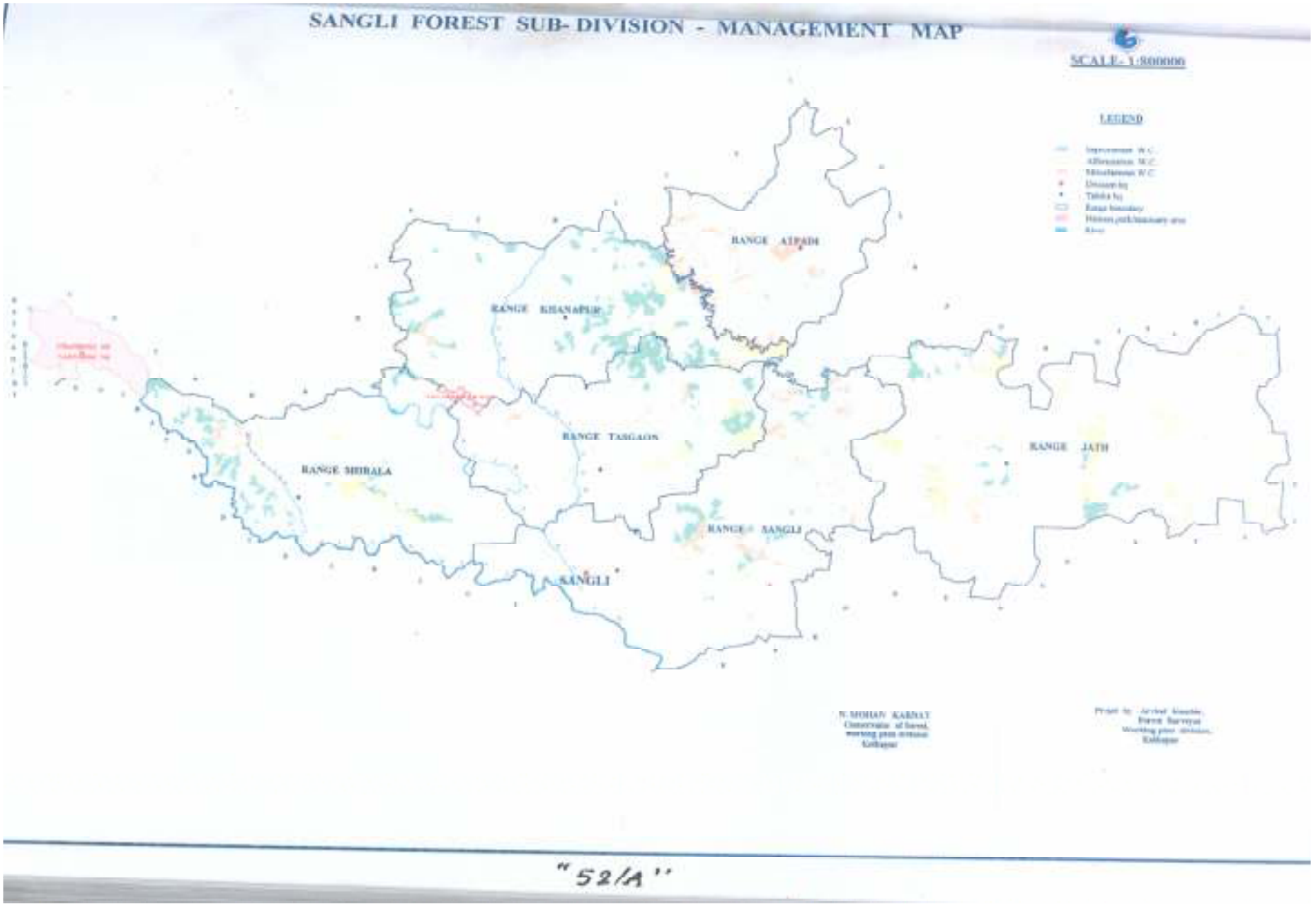
Prepd by Arvind Kamble,
Forest Surveyor
Working plan division,
Kolhapur


SANGLI FOREST SUB DIVISION - SOIL MAP
SCALE- 1:800000
LEGEND
District hq
Taluka hq
Taluka boundary
Deep black soil
Medium black soil
Redish brown soil of hill slopes (trap)
Deep brownish coarse shallow soil (High level)
Red lateritic soil
Tq. ATPADI
Tq. KADEGAON
Tq. KHANAPUR
Tq. SHIRALA
Tq. TASGAON
Tq. PALUS
Tq. WALWA
Tq. KAWATHEMAHANKAL
Tq. JATH
SANGLI
Tq. MIRAJ
RATNAGIRI DISTRICT
N. MOHAN KARNAT
Conservator of forest,
working plan division
Kolhapur
Prepd by Arvind Kamble,
Forest Surveyor
Working plan division,
Kolhapur

"C"


SANGLI FOREST SUB DIVISION - REFERENCE MAP
SCALE- 1:800000
LEGEND
RANGE TASGAON
RANGE SHIRALA
RANGE SANGLI
RANGE JATH

"D"


SANGLI FOREST SUB- DIVISION - MANAGEMENT MAP
SCALE- 1:500000
LEGEND
RANGE ATPADI
RANGE KHANAPUR
RANGE TASGAON
RANGE JATH
RANGE SHIRALA
RANGE SANGLI
SANGLI
N. MOHAN KARNAT

"52/A"

PART - I

SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED

CHAPTER - 1

THE TRACT DEALT WITH

SECTION 1: NAME AND SITUATION

The district derives its name from its headquarters town Sangli, which was a princely state, and now forms a part of the district. This Working Plan deals with the entire area including all reserved forests, protected forests and unclassed area in charge of the Sangli forest sub-division within the geographical boundaries of Sangli district. This Plan however excludes the areas notified as Chandoli National Park (now a part of Sahyadri Tiger Reserve) and Sagareshwar wildlife sanctuary within Sangli district as these are covered by separate Management Plans and are under the administrative control of the Kolhapur wildlife division.

Previously, the forests of Sangli District formed a part of Satara Forest Division. Considering the need for the development and management aspect of the forests of this district, Government of Maharashtra created an independent Sub-Division for the forests of Sangli district vide Resolution No. FDM/1975/141923-F-1 dated 28-1-1976 (given in **Appendix No. 1.1 of Volume - II**)and the actual functioning of Sub Division started with effect from 1st April 1976.

The geographical area of Sangli district is 8,610.65 km^2 which forms 2.80% of the total geographical area of Maharashtra State (3,07,713 km^2). The recorded forest area of the district including the Chandoli National Park and Sagareshwar wild life sanctuary is 556.71 km^2 which is 6.45 % of the geographical area of the district. The Sangli forest sub division has a forest area of 420.79 km^2, spread over 6 forest ranges in 10 talukas and forms 4.89 *%* of the geographical area of the district.

Chandoli National Park was declared vide Government of Maharashtra notification no. WLP. 1099/ CR-117/ F-1 dated 14th May 2004 (given in **Appendix no. 1.2 of Volume-II**), whereas, Sagareshwar wild life sanctuary was declared vide the Government of Mahrashtra notification no. WLP. 1085/ CR-588/ VII/ F-5 dated 10th September 1985 (given in **Appendix no. 1.3 of Volume-II**). The composite area of Chandoli National Park along with the Koyna Wild life Sanctuary in Satara District was notified as Sahyadri Tiger Reserve vide Government of Mahrashtra notification no. WLP. 1008/ CR–232/ F-1 dated 5th January 2010 (given in **Appendix no. 1.4 of Volume-II**).

As per the latest 'India State of Forest Report 2009' published by Forest Survey of India, Dehradun, the 'total forest cover' of Sangli district is about 1.68% (144 km^2) of the geographic area, of which, 'Moderately dense' is 1.11% (95 km^2) of the total forest cover. 'Open forest cover' constitutes 0.57% (49 km^2) of the total area under forest cover.

An increase in the forest cover was observed from 123 Km^2 in 2005 to 144 Km^2 in 2009

The forest area of Sangli forest sub division extends over in scattered blocks throughout the civil territories of Sangli district. The Sangli division is surrounded by Satara district in the north-west, Solapur district in the north-east, Kolhapur district in the south-west, Ratnagiri district in the west and Karnataka State in the east and south directions. The district lies between 16^0 45' and 17^0 33' North latitude and 73^0 42' E and 75^0 40' East longitude. The Sangli district is covered by six Survey of India topo sheets at 1:250 K scale (viz., 47G, 47H, 47K, 47L, 47O and 47P).

The present areas of Sangli district were upto 1948 partly included in old Satara District and partly in the former states of Aundh, Jath, Sangli, Kurundwad, Miraj and Wadi Estates. In 1949, the district was named as South Satara district which included 4 talukas of Khanapur, Shirala, Tasgaon and Walva transferred from Old Satara district and 2 new talukas of Jath and Miraj formed out of the erstwhile Princely Estates. In 1960, the name of South Satara District was changed to Sangli District with its head quarters at Sangli in Miraj Taluka.

At Sangli there is a famous temple of Lord Ganesh, which exists from the period of Shahu Maharaja of Satara in early 18th century. This temple is very famous and Mahotsava is held every year during the Ganesh Chaturthi, during which large number of devotees congregate. In Miraj Taluka, there is a temple of Lord Shiva at Dandoba hills. This temple is very ancient and as per the legend goes; Pandavas had taken shelter here during their period of Vanavas (exile). Every year during Mahashivaratri festival, a big fair is celebrated here attracting a large number of devotees. At Battees Shirala, during the Nagpanchami every year, the local people catch the snakes in presence of all the people and on the day of Nagpanchami, a procession is taken out in which various groups/ Nagmandals display their catch. The groups/ Nagmandals displaying the longest snakes are awarded with the prizes. Later, these snakes are released in the forests.

Ganapati mandir - Sangli

SECTION 2: CONFIGURATION OF THE GROUND

Sangli district has been divided administratively into three Revenue sub divisions Miraj, Vita and Walva. The Walva sub-division is comprised of Shirala, Walva and Palus talukas while Miraj sub-division is comprised of Jath, Kavathe Mahakal, Miraj and Tasgaon Talukas and Vita Sub Division is comprised of Atpadi, Kadegaon and Khanapur talukas.

The physiography of the district may be broadly classified in three parts i.e., (1) The Sahyadri hills: which are situated in the extreme western part of the district. These hills have a height ranging between 700 to 1100 meters and are covered with forests. (2) The Plateau: These are situated in the eastern part of the district and divide the Krishna and Bhima basins. The plateaus, in general, have a height between 600 and 800 meters and have small patches of forest. (3) The basins: The two main

basins are the Krishna and Man – a tributary of Bhima, which is relatively low lying. They have a height ranging between 500 and 600 meters. The Krishna basin is a well-developed, urbanized and industrialized part of the district.

The Krishna forms the main river systems of the district, though Shirala taluka in the west may be described as belonging to the Varna and the eastern part of the district to the Man. The Krishna flow to a distance about 108 km within the district and is joined by the Varna and Yerla, while the Agrani river, with a greater part of its course within the district, joins it just out side the district boundary. The Man river has only about 16 kms of its course within the district, but along with its tributaries is responsible for draining the north-eastern part of Khanapur and Miraj Tahsils and the northern part of Jath tahsil. The highest point in the district is 1170 meters at Veti in Shirala taluka.

SECTION 3: GEOLOGY, ROCK AND SOIL

Geology:

The entire district is composed of Deccan Trap (Cretaceous-Eocene) with inter-trappean beds.

Forest & terrain view Shirala range

The traps area more or less uniform in composition corresponding to dolerite or basalt and are dark grey or greenish in color. The Deccan lava flows are usually found in the form of horizontally bedded sheets. At places, a gentle dip of about 5-degree to the west is noticed. Vertical or inclined jointing at right angles to the bedding planes of the trap are marked at places. The flows usually form flat-topped hills so characteristic of the trappean country. The traps belong to the type called ' Plateau Basalt.' They are more or less uniform in composition corresponding to dolerite or basalt. These are dark grey or greenish grey in colour. These traps are distinguished in the vesicular and non vesicular varieties. The non-vesicular types are hard, tough, compact and medium to fine grained and break with a conchoidal fracture. The vesicular types are comparatively soft and friable and break more easily. The amygdaloidal types are characterized by vesicle filled with quartz, chalcedony, calcite and zeolite.

Rocks:

The inter-trappean beds generally form aquifers. In the area comprising Tasgaon, Walva and Shirala talukas, which is composed of deccan trap flows, the main aquifers are either the inter- trappean beds or the decomposed zones in the traps. The depth of the water table is variable, generally being more than 6 meters. In general, the Deccan traps are unreliable sources of ground-water because of the sporadic distribution of their inter-trappean beds. Supplies are often exhausted owing to the limited storage areas and by leakage through natural springs. Shallow wells located on the banks of streams usually give fair supplies for household purposes. The quality of ground water is good for all purposes, excepting where contamination results through the introduction of foul matter or by

infiltration. Contamination is very common in the area and as such the water is hard, especially if drawn from the decomposed amygdaloidal varieties of the traps and is often brackish owing to the presence of sodium chloride and the calcium and magnesium sulphates.

Soil:

Some parts of the district, especially the river valley areas are occupied by the typical black soil derived from the Deccan traps. All types, though varying in quality, are fertile on the whole. The black soil contains high alumina and carbonates of calcium and magnesium with variable amount of potash, low nitrogen and phosphorus. The soil is generally porous and swells considerably on addition of water and dries up with cracks on losing moisture. The black soil is very fertile and does not require manuring for long periods. The broadest belt of this rich soil is found in the Krishna valley. The soil of reddish brown colour is found on the hills. This type of hill becomes fertile on proper manuring and irrigation. In eastern plateaus, the extent of black soil diminishes and the ash coloured or murramy and red soils become more frequent on account of drier climate. The hills and plateaus in the Khanapur and Jath talukas are generally barren.

Black laterite soil

SECTION 4: CLIMATE AND RAINFALL

Climate:

The climate of the district is characterized by general dryness throughout the year except during the southwest monsoon season. In general, the climate in the district becomes hotter as one proceeds from west to east. The cold season is from December to mid February. The hot season, which follows, lasts till the end of May, which is the hottest month. June to September is the southwest monsoon season and October-November constitute the post monsoon season.

Rainfall:

The average annual rainfall in the district is 702.95 mm. The rainfall in the western portion of the district, near the Western Ghats is considerably higher than the rest of the district. It generally decreases from the Western Ghats towards the eastern portion of the district. Most of the rainfall (> 80 %) is received during southwest monsoon season, although considerable amount (about 20 per cent) is received during post monsoon or retreating monsoon season. The climate in the western parts is cool and healthy in the hot season but gets chilly during rainy season.

Madhavpur (Vadgaon) near western border of the district is getting 1225.8 mm of annual rainfall while Jath in the eastern part of the district is getting only 528.2 mm in the year. Some rainfall in the form of thundershowers occurs in May but the main rainy season is from June to September. The rainfall in the South West monsoon months is about 68.1% of the annual total. About 20% of the annual rainfall is received in the post monsoon season. The details of the total rainfall in all the ten talukas of the district in the year 2010 are shown in the **Appendix No. 1.6 of Vol.II.** As can be seen from the given data, the highest rainfall is in Shirala Taluka. This is quite obvious due to the fact that Shirala area falls in Western Ghats. Though generally July is the month of maximum rainfall, yet in 2010 maximum rainfall has occurred in the month of June. The rainfall generally decreases towards the eastern part of the district viz Atpadi and Jath, but in 2010, Palus is showing the least annual rainfall (448 mm) in the district.

The rainfall at individual station shows considerable variation from year to year. In the Gazetteer of India, Maharashtra State, it is reported that the annual rainfall in the district was highest in 1932 when it was 140 percent of the normal. Both 1918 and 1923 were years with the lowest rainfall, which was only 57 % of the normal. The details of the annual rainfall of all the ten taluka places from 2000 to 2010 are given in **Appendix No. 1.6 of Volume II.**

Temperature:

The temperature increases as one proceeds from west to east and in the eastern parts of the district the climate is much hotter than in the rest of the district. The eastern parts of the district also have a wide range of temperature variation from season to season. The cold weather starts by about the end of November and lasts till about the middle of February. December being the coldest month, in this month the mean daily maximum temperature is 29.68^{o} c while the mean daily minimum is 14.91^{o} c. The minimum temperature may sometimes go below 7^{0} c. The period from the middle of February to the end of May is one of the continuous increase of temperature. In May, the highest mean daily maximum Temperature is 39.77^{o} c. The heat is intense and the maximum temperature may sometimes go upto 42.0^{o} c. Afternoon thunder showers bring welcome relief from the heat on some days. The onset of the south west monsoon by the first or second week of June brings down the day temperature appreciably but night temperature continues to be nearly the same as in summer. During the southwest monsoon months, the weather is cool and pleasant. Sometimes the day temperature is even less than in the cold season. After the withdrawal of the southwest monsoon by the end of September, day temperature increases slightly. After about mid November, both day and night temperatures begin to drop.

The diurnal range of temperature is largest in the month of April while in December these changes are minimum. In the month of May, the maximum temperature goes upto 42^{0} c. The shorter divergence is only during the rainy season. The high temperature during the summer months adversely affects the vegetation in flat and bare countries owing to the exposed and highly refractory soils. In the areas covered with vegetation, more equitable conditions favorable to plant growth are available. The statement showing the monthly mean maximum and mean minimum temperatures of Sangli station for last ten years is shown in **Appendix No. 1.5 of Volume II.**

Humidity:

In the southwest monsoon months the air is highly humid. In the summer and cold seasons the air is dry, particularly in the afternoons. Skies are generally clear or slightly clouded during the month of November to March. Cloudiness begins to increase progressively from April.

Afternoons are generally more clouded than the mornings. During the monsoon months the skies are heavily clouded to overcast. In the southwest monsoon months the air is highly humid. In the summer and cold seasons the air is dry, particularly in the afternoons. Skies are generally clear or slightly clouded during the month of November to March. Cloudiness begins to increase progressively from April. Afternoons are generally more clouded than the mornings. During the monsoon months the skies are heavily clouded to overcast.

Wind:

Winds are light to moderate except in the months of west monsoon season, when they are stronger. In the southwest monsoon season winds are from directions between southwest and northwest, the westerlies being more frequent. In the post monsoon season, they are predominantly from northeast or east. Easterlies and south easterlies are common in cold season. By February westerlies and North westerlies appear and they predominate in the summer.

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Special Weather Phenomenon:

Thunder storms occur in the hot season and the post monsoon season. In the beginning of the southwest monsoon season, rainfall is often associated with thunder.

SECTION 5: WATER SUPPLY

Water supply in the forest tract is satisfactory. The drinking water is available from the tanks, streams and wells in most of the villages but in some of the villages in higher ridges of Western Ghats, the drinking water has to be brought from over long distances during the summer season.

The Krishna forms the main river system of the district, though Shirala taluka in the west may be described as belonging to the Varna river and the eastern part of the district to the Man river. The Krishna flow to a distance of about 108 km within the district and is joined by the Varna and the Yerla, while the Agrani river, with a greater part of its course within the district, joins it just out side the district boundary.

River Krishna

The Man river has only about 16 kms of its course within the district, but along with its tributaries is responsible for draining the north-eastern part of Khanapur and Miraj Tahsils and the northern part of Jat tahsil.

The rivers, nalas, irrigation reservoirs and percolation tanks constitute the sources of water for agriculture and generally for improving the moisture regime in their vicinity. A statement showing the depth of water in some wells near forest areas is shown in **Appendix No. 1.7 of Volume-II** and the number of percolation tanks in each taluka is shown in **Appendix No. 1.8 of Volume-II.**

SECTION 6: DISTRIBUTION OF AREA

Forest area of Sangli forest sub division has been verified with respect to the records of Revenue and State Land Records (SLR) department in the year 2008. The form No. 1 was updated and the area in charge of the Sub-division was reconciled accordingly. The forest area in charge of forest department in Sangli forest sub division is 42079.80 hectares. These areas are in scattered blocks over 6 Forest Ranges throughout the civil territory of Sangli district in ten talukas viz. Atpadi, Jath, Kadegaon, Khanapur (Vita), Kawathe Mahakal, Miraj, Palus, Shirala, Tasgaon and Walva. The major chunks of area are in Jath (11363.82 ha) and Khanapur (7746.15 ha) talukas. Palus taluka (50.81 ha) has the least area. An area of 32,842.79 ha of reserved forests, 9.94 ha protected forests, 8424.12 ha of unclassed land and 802.95 ha of private forests are being covered in the present working plan as shown in **the Table No.1** given below.

Table No. 1: Distribution of area

(Area in hectares)

Taluka	Range	Reserved Forests	Protected Forests	Unclassed Land	Private Forests	Total Area
Shirala	**Shirala**	2888.62	0	72.05	371.55	3332.22
Walwa		2387.70	0	92.68	0	2480.38
Tasgaon	**Tasgaon**	4226.32	0	223.29	0	4449.61
Palus		15.03	0	35.78	0	50.81
Khanapur	**Khanapur**	7703.20	6.41	36.54	0	7746.15
Kadegaon		2132.18	0	0.00	431.40	2563.58
Miraj	**Sangli**	1414.82	3.53	475.19	0	1893.54
K.Mahankal		1223.22	0	2615.09	0	3838.31
Atpadi	**Atpadi**	0	0	4361.38	0	4361.38
Jath	**Jath**	10851.70	0	512.12	0	11363.82
	Total	**32842.79**	**9.94**	**8424.12**	**802.95**	**42079.80**

The forest areas under Desai's plan (Shirala range) were surveyed on 4"= 1 mile scale by the Survey of India and for remaining forest areas (ranges other than Shirala) village maps of 8"=1 mile scale are available.

SECTION 7 : STATE OF BOUNDARIES

The total length of the boundary of the forest is 2735.429 km. and is entirely the artificial boundary. There is no natural boundary in the sub division. The artificial boundary is demarcated by the boundary marks (cairns) as specified in the Article 123 of the Bombay Forest Manual volume II. A first class boundary mark occupies main points and corners and where the forest boundary intersects the village boundary and where the former takes an abrupt turn. A second class boundary mark occupies intermediate points and shape of boundary mark is a truncated cone. They are built of loose stones. Most of the cairns are collapsed and they require repair. For last few years, cement concrete pillars are being erected for demarcation of forest boundaries. A Statement giving the extent of natural and artificial boundaries is given in **Appendix No. 18. 2 of Volume-II.**

SECTION 8 : LEGAL POSITION

The forests of Sangli district were duly constituted into Reserved forests between the years 1879 to 1955. In 1903 and onwards most of the forest areas were transferred to Revenue Department and after reconstitution of forest divisions in 1974, portions of such areas were retransferred to the Forest Department for implementing various developmental schemes. The protected forests were duly constituted between the years 1894 to 1950. The details of the notifications under which the forests have been declared as Reserved and Protected forests are given in the **Appendix No. 1.18 of Volume-II.**

SECTION 9: RIGHTS AND CONCESSIONS

There are no rights except the right of way and access to and use of temples, wells and watering places in the reserved forests. The general and special privileges granted in the forest areas as per the Articles 132 and 138 of the Bombay Forest Manual volume III will have to be made applicable to these areas subject to the condition that the Gram Panchayaths take the responsibility of protection of forest areas.

CHAPTER - 2

THE FLORA AND FAUNA

THE FOREST FLORA

SECTION 1: COMPOSITION AND CONDITION OF THE CROP

The forests are almost entirely limited in area to those lands which were found to be unsuitable for cultivation owing to their physical nature and this remnant area is scattered throughout the district. The pressure of cattle and human population on the forest was the single most important factor in limiting the area and has affected the composition and condition of the vegetation to such an extent that nowhere it has remained in its natural form, leaving most of the areas almost barren and without any tree cover. This was due to repeated and excessive grazing, repeated illicit felling for fuelwood and timber and encroachment for cultivation. Such actions have continued with varying intensity for long period till the handing over of these areas to the Forest Department for adopting conservancy measures like afforestation.

The forests belong to the following types as per the revised classification of the forests of India by Champion and Seth.

a) Type 8A/C-2 - Western sub-tropical hill forests.
b) Type 2A/C-2 - West coast semi-evergreen forests.
c) Type 3B/C-2 - Southern Moist mixed Deciduous forests.
d) Type 5A/C-3 - Southern Dry Mixed Deciduous forests.
e) Type 5A/C-1 - Dry Teak Bearing forests.
f) Type 5B/S-4 - Dry grass lands.

SECTION 2: THE GENERAL DESCRIPTION OF THE GROWING STOCK

The forests of Sangli forest sub-division belong to the following main groups as per revised classification of forest types by Champion and Seth:

According to their habits the forests fall into following types –

a) Western Sub-tropical hill forests (Type 8A/C-2**)**

This forest type occurs in Sahyadri ranges where altitude is more than 1000 mtr. above mean sea level and rainfall in excess of 2500 mm. This category exists in high ridges of Shirala range. The crop is mostly middle aged. Crop density varies from 0.4 to 0.6. Main species occurring are *Syzygium cumini, Terminalia chebula, Memecylon edule, Catanaragam spinosa, Phyllanthus emblica, Olea dioica* etc. The height of the trees varies from 5 to 15 mtrs. Shikakai

Forest in Shirala range

and Hirda occur predominantly. This category exists in higher ridges of Sahyadri the area of which is now included in Chandoli National park (present Sahyadri Tiger Reserve).

b) West Coast Semi-evergreen forests (Type 2 A/C-2**)**

Confined to 450 to 1050 meters above mean sea level in Sahyadri ranges with rainfall exceeding 2000 mm. The crop is mostly middle aged to old and it comprises of *Catanaragam spinosa, Legerstroemia microcarpa, Gmelina arborea, Phyllanthus emblica, Wrightia tinctoria, Cassia fistula, Mangifera indica, Terminalia alata, Salmalia malabarica* etc. This category of forest exists in areas included in Chandoli National Park (present Sahyadri Tiger Reserve).

c) Southern Moist Mixed Deciduous forests (Type 3 B/C-2)

This type occurs along the lower slopes of Sahyadri where rainfall is in between 1500 to 2000 mm. Teak is almost absent. The crop is mostly middle aged and is comprised of *Terminalia alata, Terminalia bellerica, Adina cordifolia, Schleichera oleosa, Grewia tiliaefolia* etc.

d) Southern Dry Mixed Deciduous forests (Type 5 A/C-3)

This type of forest occurs where the rainfall ranges from 750 mm to 1500 mm. In poorer & eroded sites the thorny species tend to increase in proportion. The natural regeneration is poor. The crop consists of *Anoegeissus latifolia, Bauhinia racemosa, Cassia fistula, Terminalia alata, Phyllanthus emblica, Butea monosperma, Acacia leucophloea* etc.

e) Dry Teak Bearing Forests (Type 5 A/C-1)

This forest occurs in parts of Shirala range. Teak forms the major portion of the crop. Crop as a whole is open and stunted. The growth is malformed and the regeneration is poor. The main associates of *Tectona grandis* are *Terminalia alata, Anogeisus latifolia, Schleichera oleosa, Legerstroemia microcarpa, Cassia fistula, Bauhinia racemosa, Butea monosperma, Acacia leucophlea* etc.

f) Dry grass lands (Type 5 D/S-4)

This type occurs in the eastern parts of the district. The rainfall received in these areas is less than 750 mm. These areas are under heavy pressure of biotic interference. If these areas are rigidly protected from biotic interference progression may take place. The common species are *Acacia leucophloea, Butea monosperma, Acacia eburnea, Cassia articulata.* The species of grass are *Heteropogon contortus, Aristida feniculata, Heteropogon triticeus, Cymbopogan martimi* and Xerophytes like *Euphorbia meritolia*.

BIODIVERSITY OF THE SANGLI DISTRICT

A study on ***the Biodiversity in the Western Ghats districts of Maharashtra and Goa*** was conducted by the Forestry and Environment Division, Space Application Centre of Indian Space Research Organisation (ISRO), Ahmedabad ***(Report No. SAC/ RESIPA/ FLPG/ FED/ DOS-DBT/ SR/ 02/ 2004 of June, 2004)*** in collaboration with the Maharashtra Remote Sensing Application Centre (MRSAC), Nagpur and Goa University, Panaji as a part of Department of Biotechnology and Department of Science (DBT-DOS) collaborative project carried out in different geographical regions viz., Eastern Himalayas, Western Himalayas and Western Ghats. Digital database generated in the present study on vegetation type distribution using IRS LISS III satellite data is first of its kind and forms a primary input for understanding the processes regulating the biodiversity. The study has also brought out the following significant information for understanding the biodiversity pattern and developing appropriate conservation strategies.

It is seen that there is a wide variation in topography and climate in Sangli district. This variation has led to the localization of the forest, which is found only in the western part of the district. The district affords only one type of forest i.e. semi evergreen forest. The following **table no. 2** gives the diversity status in the forest.

Table 2 : Biodiversity status in the forests of Sangli district

Forest type	No. of families	No. of genera	No. of species
Semi evergreen	23	27	28

This forest is a regenerating forest. Two tree species each belonging to family Apocynaceae, Combretaceae and Anacardiaceae were recorded from the forest. Single species from each of the remaining families were found. The ecological importance of a species within stands or a community is determined among all the species recorded, *Rauvolfia serpentina* was found to be most important species in the district. *Ficus racemosa* was the next important species, followed by *Cinnammomum tamala.* These three species dominate in the forest. Following **table no. 3** gives the first ten important species in the forests of Sangli district.

Table 3: Top Ten Ecologically important species in Sangli district

Sr. No.	Species name	Sr. No.	Species name
1.	*Rauvolfia serpentina*	**6.**	*Dalbergia paniculata*
2.	*Ficus racemosa*	**7.**	*Pavetta crassicaulis*
3.	*Cinnammomum tamala*	**8.**	*Capparis mooni*
4.	*Memecylon umbellatum*	**9.**	*Mangifera indica*
5.	*Glochidion bokenacheri*	**10.**	*Khuri **

Local name * = Could not be identified. Hence, no botanical name is assigned.

The uniqueness of the species recorded in the forests of Sangli district was obtained with the help of various literatures, flora dealing with the region and Red Data book. **Only one endemic species (*Rauvolfia serpentina*) was found in the district.** Economic value of the species was evaluated in context of its fodder value, edible, medicinal, fuel, timber, charcoal and other utilisation. Out of the total 28 species found in the district, 17 species have some economic value. Amongst all the economically important species, *Syzigium cumini* is the most important species as it has highest Economic value. Such high Economic value is because of the fact that the species has multiple uses. Humans eat the seeds of this species, also use in medicine; yield low quality timber that is used by rural people in preparation of agricultural implements. *Mangifera indica* is the next economically important species of the district as its fruits are edible and yield timber. With respect to plant part utilization, stems of 9 species, roots of 6; bark of 9; leaves of 7; flowers of 6; seeds of 6 and fruits of 11 species have found economic values. Only two species in this forest have single use; 6 species have 2 uses; 6 species have 3 uses; 1 species have 4 and 5 uses. Two species have 6 uses. Only one species have all the uses identified. Accordingly, species of the Economic value are given in **table no. 4** below.

Table 4: Species of Economic value in the forests of Sangli district

Sr. No.	Species name	Sr. No.	Species name
1.	*Syzigium cumini*	**10.**	*Nephellium longana*
2.	*Mangifera indica*	**11.**	*Memecylon umbellatum*
3.	*Olea diocia*	**12.**	*Carissa carandas*
4.	*Terminalia bellerica*	**13.**	*Leea macrophylla*
5.	*Callaphyllum enophyllum*	**14.,**	*Randia dumetorium*
6.	*Lagerstroemia lanceolata*	**15.**	*Rauvolfia serpentina*
7.	*Cinnammomum tamala*	**16.**	*Capparis moonii*
8.	*Careya arborea*	**17.**	*Cantbium dicoccum*
9.	*Semecarpus anacardium*		

Use of species, for medicinal value is one among the seven uses identified. Following **table no. 5** gives such species found in this type of forest in the district. Different plant parts of 9 tree species are utilized in treatment of various ailments. Of these trees, bark of 3 species, seeds of 2 species; roots of 2 species, leaves of 2 species and fruits of 2 species are used for their medicinal values.

Table 5: Species recorded in Sangli district for their medicinal value

Species name	Plant part utilized	Medicinal value
Callaphyllum inophyllum	Seed	Seed oil used in rheumatism and skin diseases.
Cinnammomum tamala	Leaf	Leaves area carminative and are used in colic and diarrhea.
Glochidion lanceolarium	Bark	Bark used as stomachic.
Leea macrophylla	Root	Used as remedy for ringworm and guinea worm.
Memecylon umbellatum	Leaf, root	Leaves are given in leucorrhoea and gonorrhea. Root decoction is useful in excessive menstrual discharge.
Randia dumetorum	Fruit	Pulp of fruit is given in dysentery.
Symplocos racaemosa	Bark	Decoction of bark is said to stop bleeding of gums. It is also useful in eye diseases, digestive disorders and ulcers.
Syzygium Cumini	Bark, seed	Bark decoction and seeds are useful in diarrhea and dysentery. Alcoholic extract of seeds has been reported to reduce level of blood sugar in diabetic patients.
Terminalia bellerica	Fruit	Fruit–pulp is used in dropsy, diarrhea and leprosy and half-ripe fruits as purgatives. Fruits are reported to have antibiotic activity.

SECTION 3: STATUS OF NATURAL REGENERATION

Natural regeneration in Shirala range

Young recruits of Ain, Anjani, Chandada, Chandan, Jambhul, Katak, Kinjal, Kumbhi, Pisal, Umbar etc. appear profusely after first few showers of the season. The status of NR in general can be treated as satisfactory except for the forest patches adjoining villages that are prone to fires and unregulated grazing.

The principle causes of injury to which crop is liable in the order of importance are human agency, grazing, drought, fire, climbers and weeds, wind, wild animals, epiphytes and parasites, insects and fungi.

Illicit cutting

Illicit cutting of trees and shrubs by the villagers for timber, poles, fuel and their other domestic needs are common. The damage to forests is particularly more in easily accessible areas. Due to the various above mentioned factors, the forests in Sangli are already in dilapidated conditions. However, whatever little is left is also being damaged due to illicit cutting in almost all parts of the district. Due to the increase in roads, the accessibility to the forest areas has increased .In addition to this the construction activities due to the burgeoning populations have also increased putting heavy demand for poles and shuttering material. The demand for fuel wood has also
increased tremendously, again, due to the increase in population. A statement showing the extent of illicit cuttings from 2000-2001 to 2009-2010 is given in Appendix No. 2.1 of Volume-II. To check this menace of illicit cutting by the people, they should be provided with suitable alternative sources like Bio-gas/ LPG, so that their dependence on forests is reduced.

Encroachments

The increasing population is putting heavy pressure on the agricultural lands to produce more grains. To fulfill their demand of agricultural produce, the people resort to encroachment in the forest lands. One of the other major reasons of encroachments in the forests is the lack of existence of proper boundary marks between the forest and private lands. In Sangli the instances of encroachments, though not many, are not ruled out. Some encroachments have taken place in Shirala taluka. The statement showing encroachments prior to 1980 is given in Appendix No. 16.2 of Volume-II. All the illegal encroachments were to be removed before 30th September 2002 as per the time bound programme circulated by the PCCF Maharashtra State letter No. Desk-18/ Vigilance/CR/ 51-2/363/2002-2003 Nagpur dated, 20th June 2002. The ineligible encroachments are not deleted from the working plan areas, these ineligible encroachment areas are incorporated in the working plan under various working circles. Hence, after removal of the encroachments the respective working circle prescriptions do apply to these areas.

Grazing

Sangli district is having cattle population of 35.15 lakhs, as per the district statistical information, 2009. Damage caused by grazing is heavy in the forest of Sangli sub-division due to large cattle population. There are 854 co-operative milk societies which harbour a big number of cattle herds. The scattered patches of forest are more vulnerable to grazing. Continuous and heavy incidence of grazing not only prevents regeneration of tree species but also the young regeneration obtained during the period of closure is lost soon after the areas are opened to grazing. The movement of cattle also leads to hardening of soil and reduction in the soil

Sheep grazing

aeration. Thus the grazing adversely affects the growth of plants and increases the soil erosion and the environmental degradation. The indiscriminate and uncontrolled grazing has deteriorated the forests of Sangli sub division considerably. Details of the cattle population of the district as per the census carried during the year 2003 is given in **Appendix No. 4.1 of Volume II**. The data shows that the population of Goats and Sheep is quite high with a population of 5,77,000 which forms 4.24% of the State's population. This has direct impact on the grazing in forest area. The grazing is also affecting the success of new plantations. The excessive grazing may lead the forests to the point of no return. A statement showing the instances of illicit grazing reported and the offences registered is given in **Appendix No. 2.1 & 2.2 of Volume II**. This list also shows the number of cattle impounded by the forest personnel. It can be seen from the list that a large number of cattle, sheep, goats and other animals, have been grazing the forest illegally. Grazing settlement report for sheep of this sub division is sanctioned by Government of Maharashtra vide order No. MFP - 2103/ 135/ F-1/ dt. 6/5/2008. An area of 4705.22 Ha. is reserved for grazing according to this grazing settlement report.

Drought

It is severe in the Sangli district. There is a long spell of dry weather from the beginning of November till the arrival of Monsoon. The eastern region of the area under consideration is susceptible to drought conditions on account of low and erratic rainfall. Occasional summer showers received during April and May are localised and so erratic that their beneficial effect is not of much use. Drought adversely affects young regeneration. There is thus the danger of afforestation works being adversely affected in the early stages itself.

Fires

Considerable damage is caused by fires in areas of the deciduous forests. Dry season from February to June is very long during which the forests are susceptible to fires. Fires mostly damages young regeneration coming up on the forest floor. Recurrent fires badly affect the regeneration status of the forest by killing the young recruits and seedlings. There is a long and extremely hot dry season from March to May during which the 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 the species. Fires also indirectly cause soil erosion by destroying the soil cover as well as the organic matter. The repeated fires cause the loss of humus of the soil and thus cause environmental degradation.

In Shirala range, though the rainfall is heavy but during March to May period, the temperature goes sufficiently high to facilitate the fires. As the forests are not high forests and the density is also low, the fires are not natural but are manmade, intentional and accidental. These are caused by local people and hunters for driving the game to a convenient spot or by graziers for getting better growth of grasses in the next season. Fire is also caused by local people, sometime to remove the spot evidence of illicit cutting. Fires are either accidental or set by people with an interest to get good flush of grass. There is a good growth of grasses in the Western Ghat forests due to heavy rainfall. The dried grass after winter season in these areas poses major threat of forest fire.

Climbers and weeds

Climbers do damage to the trees by strangling. The damage is appreciable in Semi-evergreen forests of Shirala range. The few climbers are *Acacia concinna, Atlantia racemosa, Abrus precatorius, smilax zeylanica, Caesalpinia decapetala*. Karvi (*Strobilanthes callosus*) has become a major weed in the forest areas while *Lantana camara* is also common weed in many areas of this tract.

Wind

In monsoon period as well as during the period of April and May, strong winds blow in the region particularly in Western Ghats. This could be a source of damage in new artificially regenerated areas.

Wild animals

Damage in some plantations by bisons, wild-boars, porcupines and monkeys is noticed. Frequent incidents of damage of the crop in the private fields by bisons and wild boars in the western part especially in Shirala area are reported.

Insects and fungi

There is a sporadic attack soon after the rains by teak skeletoniser (*Hapalia machaeralis*) and teak defoliator (*Hyblea puera*) and it does not become epidemic. Damage by fungi is not common.

Epiphytes and parasites

It is commonly seen in the semi evergreen forests that the Dendrobium species forming large masses on the branches of trees. The damage is however not serious. Some Loranthus species infest tree species like Teak, Kinjal, Anjani etc. and the attack is apparently endemic.

SECTION 5: SOIL EROSION

Eastern part of the division has been affected badly due to soil erosion which is mainly caused due to absence of vegetal cover. Repeated fires and excessive grazing are mainly responsible for the destruction of the vegetal cover in this region. The erratic rains which gave rise to heavy run off accelerated the process of soil erosion resulting removal of top soil, exposing the gravely sub-soil. To avoid further destruction, the area must be protected from uncontrolled grazing, fires and illicit felling and effective soil conservation measures will have to be undertaken.

THE FOREST FAUNA

SECTION 6 : DISTRIBUTION OF WILD LIFE

The wild animals are mainly confined to the hilly regions of the Sahyadri and its foot hills. Due to natural inaccessibility and scanty population around the Chandoli National Park area and Sagareshwar Wild Life Sanctuary and also availability of water, forest cover and protection, the wild animals are sighted more frequently. The common wild animals and birds found in the tract and their general distribution are as under:

I. Carnivora

1. *Tiger (Panthera tigris)*
Tiger has become very rare in the tract and found only in the Chandoli National Park (Sahyadri Tiger Reserve) and its surrounds.

2. Leopard (Panthera pardus)
Leopards are particularly seen in the forests of Shirala range and in the surrounding forests of Sagareshwar Wild Life Sanctuary.

3. The Wild cat or Ran manjar (Felis chaus)
It is one of the smaller cat and is found in large numbers. It generally lives in open grass land and scrub jungle and reedy banks of river and marshes and is a serious menace to poultry.

4. The Civet or Joswadi manjar (Viverricula indica)
They are mostly found in the semi-evergreen forests of Shirala range. The common palm civet is also found in open grassy scrub forests but is rare.

5. The Hyena or Taras (Hyaena hyaena)
The striped Hyena is found in open grass lands and in low hills around Sagareshwar Wild Life Sanctuary in Palus taluka.

6. The Wolf or Landaga (Canis lupus)
It is a member of the canidae family and is a powerful animal having great endurance and is found in the hills around the Chandoli National Park and Sagareshwar Wild Life Sanctuary but has become rare.

7. The Jackal or Kolha (Canis aureus)
It is found all over the tract in grassy open woodlands.

8. The Fox or Khokad (Vulpes bengalensis)
It is commonly found in the open grassy plains of Sangli Sub division.

9. The Wild dog or Dhole (Cuon alpinus)
It is one of the remarkable animals and always moves in packs and runs at a tireless trot. They are mostly found in the forests around Chandoli National Park area and Sagareshwar Wild Life Sanctuary.

10. The sloth bear or Aswal (Melursus ursinus)
The sloth bear has whitish 'V' shaped mark on his breast, a pale whitish grey snout and long white claws and are confined to the well wooded hilly portions of the ghat areas of the Chandoli National Park area but are not numerous.

11. The Indian grey mongoose (Herpestes edwardsi)

It is a common mongoose found all over Satara division and they adopt themselves to their surroundings.

12. The Indian Pangolin (Manis crossicaudata)

It is a peculiar animal which has large scales and is light yellowish brown in colour, found on the river banks.

II) Herbivores

1. The Bison or Indian Gaur (Bos gaurus)

Indian Gaur is the biggest ox in the world and are essentially animals of deep forests in the hills and are occasionally found in the Mandur forests around the Chandoli National Park.

2. Indian Gazelle or Chinkara (Gazella gazella)

It is an antelope found in small numbers in the forests of Sangli forest Sub division, but now has become rare.

3. The barking deer or bhekad (Muntiacus muntjak)

A small deer makes series of crackling barks when alarmed or in flight.

4. *Sambar (Cervus unicolor)*

It is the biggest Indian deer found in the hilly forests of Shirala range and around the Sagareshwar Wild Life Sanctuary.

5. *The Wild boar or Ran dukkar (Sus scrofa)*

It is usually found in grassy and bushy forest areas as well in hilly forests of Sangli forest Sub division.

6. *The India hare (Lepus nigricollis)*

It is found in open bushy areas in all over the division and often on the banks of rivers.

III) Rodents

Squirrels are rodents like rats, mice, porcupines. They are easily recognized by their slender built, bushy tails and arboreal habits. The Indian giant squirrel (*Ratufa indica*) is a shy and wary animal keeping mostly to the canopy and is occasionally found in Shirala forests in the Western Ghats. The Indian porcupine or sayal (*Hystrix indica*) is common throughout the forests areas of Sangli forest Sub division. The five-striped palm squirrel (*Funambulus Pennanti*) is also common throughout the tract.

IV) Birds

The Indian sand grouse (*Pterocles exustus*), Green Pigeon are commonly found in the eastern part of the district. Pond heron, Cattle egrets, Stone plover (*Dicnemus indicus*), Bald coots are commonly found through out the district. The painted partridge (*Francolonus pictus*)

Common quail, Jungle bush quail, Grey Jungle fowl, Pea fowl are found in the forests of Shirala and around the Sagareshwar Wild Life Sanctuary. The Rain Quail breed in September in the meadows and kurans. The common Grey partridge (*Ortygornis pondicerianus*) is generally found in the sugar cane fields towards Tasgaon. The Courser (*Cursorius coromandelicus*) is very common in the Eastern part of the district. The Great Cormorant (Phalacrocorax carbo), the Darter (*Anhinga melanogaster*), Little Green bittern (*Ixobrychus minutus*), the Spoon Bill (*Platalea leucorodia*), the White Ibis (*Threskiornis aethiopica*), the Common teal (*Anas crecca*), the Whistling teal (*Dendrocygna jayanica*), Pin-tail Duck (*Anas acuta*), the Spot bill Duck (*Anas poecilorhyncha*), the Comb Duck or Nakta (*Sarkidiornis melanotos*) are found in large rivers of Krishna and Yerla and also in tanks and lakes etc. The migrant birds viz., the Demoiselle crane (*Grus virgo*) Greater Flamingo (*Phoenicopterus ruber*), Lesser Flamingo (*Phoenicopterus minor*), the Siberian Ducks, the white necked stork (*Ciconia episcopus*) the Black necked stork (*Ephippiorhynchus asiaticus)* the Bar headed goose (*Anser indicus*) are some of the birds seen in winter season in large rivers, in tanks and lakes etc.

Other than the birds mentioned above the common birds viz. Indian Roller, Paradise Fly catcher, Pied king Fisher, Koel, Golden Oriole, Crow Pheasant, Parakeets, Bulbul, Doves, Wood peckers, Sun birds, Magpie, Hoopoe, Tailor Bird, Rock Pigeon, Hawks, Eagles and Owls, Green bee eater etc. are seen in the district.

SECTION 7 : INJURIES TO WILDLIFE

The major reasons for depletion of wild animal populations are as follows:

i. Poaching of wild animals for meat and other non consumptive uses.
ii. Habitat destruction / shrinkage.
iii. Easy access to forest areas because of extensive road network.
iv. Loss of contiguity of forest areas.
v. Inadequate and ill-equipped field staff for protection.
vi. Lack of awareness amongst people regarding importance of wildlife conservation.
vii. Forest fires.
viii. Availability of guns with farmers for crop protection.

The animals which are poached are Barking deer, Hare, Wild boar, Sambar, Jungle fowl, Peafowl, Quails and Partridges. Electric wires, guns and locally made hand bombs are found to be used for poaching. Trained dogs are used to chase and hunt the prey at places.

CHAPTER - 3

UTILIZATION OF FOREST PRODUCE

SECTION 1: AGRICULTURAL CUSTOMS AND WANTS OF THE POPULATION

The population of Sangli district is 25.84 lakhs as per 2001 census out of which nearly 75% live in the rural areas. The live stock census in 2003 was estimated to be 35.15 lakhs domestic cattle in the district (refer Appendix No. 4.1 in Volume-II. Agriculture is the main occupation of the people. Out of the total population, 37% constitutes the working population and nearly 63% of this working population is farmers and farm laborers. Only 10% people have land holdings above 4 hectares while majority 49% have holdings less than 1 hectare.

All cultivable lands of Sangli district can be divided into three main categories viz. Jirayat i.e. dry crop lands, Bagayat i.e. irrigated crop lands and Paddy lands. Dry lands largely depend on monsoons for irrigation and depending upon the season the Kharif crops (July to September) and Rabi crops (mid October to February) are grown. Jowar, Bajra, Rice, Ground nut, Maize, Wheat,

Food crop - Jowar

Cotton, Sugar cane, millets, pulses, oilseeds are the main crops of the district. During 2001-02 of the total area under cropping in the district, 68% of area was under food crops, 16% under oilseeds, 8% under sugarcane, 5% under fodder crops and rest 3% under fruits, vegetables, cotton and tobacco crops. The district has major area under paddy crop in Shirala taluka, kharif/ rabi jowar and pulse crops in Jath taluka and sugarcane as the major crop in Walva taluka.

The district has a net work of irrigation projects which includes 5 major, 6 medium and many minor irrigation projects. As per the statistics during the year 2001-02, an area of 1,58,000 hectares i.e. 22% is covered under irrigation. Wells are important means of irrigating the cultivable lands in the district and covered 72% of the total irrigated area under crops. Jowar, Sugarcane, Wheat, Bajari and Rice are the main crops using irrigation potential of the district and covered around 42% of the irrigated area. Nearly 32% of agricultural area was covered under sugarcane. Rest 26% of agricultural area was covered under fruits and vegetable crops.

Many fruit crops like grapes, zizyphus, pomegranate and sugarcane are being grown in the eastern part of the district. Lately people have started green houses where various varieties of flowers e.g.rose, jaswanti are grown and exported to Europe and other West Asian countries through Mumbai. The district also has large number of sugar mills (16) where the sugarcane is crushed and converted into sugar.

Major constituent of the population of the district resides in rural area, whose main occupation is agriculture. This section of the population depends upon the forests for their requirements of timber for agricultural implements, house construction, firewood, fodder and non-timber forest produces.

Fruit crop-Dalimb (*Punica granatum)*

The farmers are progressive and large number of them is using improved agricultural practices. Besides agriculture, there are few small occupations/ industries in the villages and urban areas which are inter-linked with forests. They are given as follows:

1) Cattle breeding

There are 854 milk co-operative societies operating in the district. 1,02,100 members in the milk co-operative societies collect 1,40,000 liters of milk every day. A large quantity of this milk is sent to Pune & Mumbai. The statement showing the cattle population in the district in the year 2003 is given in **Appendix No. 4.1 in Volume-II.**

2) Grape Orchards

Grape is a crop of commerce. Grapes are grown in the eastern part of the district, particularly in Tasgaon, Khanapur, Kavathe Mahakal and Miraj Talukas. Grape orchards require bamboo and small poles for supporting the fruit laden branches.

3) Saw mills

There are many (130) saw mills in the Sangli sub-division which depends on the timber purchased from the forest depots outside the district and to certain extent from the timber brought from the private lands. As the forests are very less in the district, these are not able to meet the total requirement of timber and firewood of the saw mills. The statement showing the details of the saw mills is shown in **Appendix No. 16.3 of Volume II**.

Since there is very less extent of forest area, hence there are very few cottage industries based on forests in the district.

The major requirements of the people from forests are as under:

1) **Timber**

The demand is mostly for small timber and poles. Teak is preferred to all other species but it is available in very small quantity and its cost is also a prohibiting factor. Other species used as alternative to teak in construction are Neem, Mango, Babul, Suru, Nilgiri etc. The demand for timber is about 15,500 Cum. (5,16,705 families X 0.03 Cum. = 15,502 Cum.)

2) **Fuel** (Firewood): - There is a great demand for firewood throughout the district. Firewood is used by the people extensively for cooking. In the high forest areas it is brought from forest. The annual demand of firewood is estimated to be 11,16,100 M.T.(5,16,705 families X 2.16 M.T. =11,16,082 M.T.

3) **Grasses and Grazing**

Grasses are used for feeding the animals. The demand for grazing in district is very high. But stall-feeding is still not very popular with the villagers as they graze their cattle in their fields in the lean season when there are no crops in the fields.

4) **Other forest produces**

The other forest produces which the villagers take from the forests are edible fruits and flowers, gum, honey, chillar bark, Shikekai, thorns etc. To protect the crops from wild and domestic animals, thorns of henkal, arati, bor and babul etc are used for fencing their fields and houses.

SECTION 2: MARKETS AND MARKETABLE PRODUCE

By and large the forest produce of this division is locally consumed. Some produce is also transported to neighbouring villages and towns. The main local markets for the forest produce in Sangli district are Islampur, Sangli, Miraj, Vita, Kavathe mahakal, Jat, Tasgaon. Produces like firewood, pole are sold in these markets on bazaar day. Gum, Honey, Hirda, Kadu-nimb leaves, Apta leaves, Chillar bark, Agave etc. are partly consumed locally and partly exported outside to the various confectionaries in the State.

All the market places are well connected by metalled and asphalt roads.

The marketable products from these forests are as under.

A) **Major Forest Produces**

i) *Timber*

There is great demand for teak timber and poles for building and agricultural purposes. Most of the requirement of teak timber is met by importing from Karnataka state and Konkan areas as the

quantity of teak timber available in the forest is of negligible amount. Due to prohibitive cost of teak timber, other superior injaili species obtained from these
forests are also used for building and other purposes. The average sale of timber for the last ten years i.e. from 1986-87 to 1995-96 is 40.865 Cum. as against the tremendous demand of 15,500 Cum.

ii) *Firewood*

Like timber, firewood is also in great demand by people as this is the major source of fire for cooking and other purposes. But due to already depleted forest stocks, it is not possible to extract the firewood from forests on commercial scale. So, for the supply of firewood people depend mainly on trees standing in private lands. As a need for its substitute, people have started using agricultural wastes as the major source of firewood for cooking and other domestic purposes.

iii) *Charcoal*

In remote areas upto last few years charcoal was manufactured where the transport of timber was very difficult and uneconomical. Now a days manufacture of charcoal is totally stopped. The manufacture of charcoal in the district is not done simply due to the paucity of firewood.

B) Non-Timber Forest Produces

i) *Hirda*

Hirda is mostly consumed locally by tanning industries and some quantity is exported to other markets. The average annual production of hirda fruits is 900 kg.

ii) *Shikekai*

Shikekai pods are used in manufacture of soap and powder which is used for washing hair. The average annual production of shikekai is 1670 kg. and most of the quantity is exported to Mumbai.

iii) *Apta leaves*

Apta leaves are commonly used for making bidis. Most of the Apta leaves are exported to Mumbai.

iv) *Grasses*

Most of the areas are either devoid of tree growth or are poorly stocked. Grass kurans are generally allotted to the Gram panchayats if they so demand on the upset price. Generally the areas adjoining the villages are overgrazed with the result that quality of the grass is deteriorated. The average annual production of the grass is about 400 Metric Tonnes.

Other NTFPs

Some other non-timber forest produces like agave and kadipatta are also collected from the forests by the local people. Agave is a hardy plant and grows in drought conditions and in the degraded soil. The leaves of the Agave are broad and long and contain fibres. People pluck these leaves, thrash them after dipping in the water and get the fibres out of it. These fibers are used for making ropes. Kadipatta leaves are sweet in taste and are used by the rural folk as delicacy in the food.

SECTION 3: LINES OF EXPORT

The following are the modes of transport in the district,

(i) Railways: The Mumbai - Kolhapur railway line passes from North to South through the eastern part of the tract and traverses Vita, Walva, Tasgaon and Miraj tahsils of Sangli District. It made the transport easy and prompt.

(ii) Roads: Public works Department of the State Government and Zilla parishad maintain roads in the district. Mumbai - Bangalore National highway (NH-4) is maintained by superintending Engineer, Special project Circle, Pune. In general, there are adequate roads in the tract dealt with. As the forests are scattered all over the district and are in patches, there are not many forest roads. However, there is a metal road of 7 km in length called Dandoba hill road which goes from Kharsingh phata to Dandoba Temple. This road is a forest road which is maintained by the forest department. A statement showing the details of forest roads is given in **Appendix No. 17.1 of Volume II.**

SECTION 4: METHODS OF EXPLOITATION AND THEIR COST

Previously timber and firewood were being extracted from the forest areas of Shirala, Tasgaon and Khanapur ranges. Till the year 1987-88, some quantity of timber and firewood were produced from the forests. 91.83 cum. Timber and 1120.37 cum. firewood were produced in the year in 2004-05 and 2001-02 respectively, but now with the acute degradation of the forests and loss of high forests, the availability of timber and firewood has become almost nil. Hence there is no question of the exploitation of the timber from forests. A statement showing the annual outturn of timber, firewood, Grass and Sandal wood is given in **Appendix No. 3.2 of Volume II.**

As there are no high forests, the exploitation activities are out of question now. Hence the forest labour co-operative societies are also not in existence. As the exploitation activities are not being undertaken, the necessary rate structure of exploitation is not being appended with the plan. The exploitation of NTFPs like Hirda, Shikakai, Grass and Apta leaves from the forest areas is done by the people depending on its availability and convenience in the forests. The auction of grass kurans is done by the forest department.

Before commencement of the working season every year, the piece work rates to be paid for the various forestry operations are fixed by the Circle wage Board presided over by the Conservator of Forests.

SECTION 5: PAST AND CURRENT PRICES

The prices of all forest produce have undergone a revolutionary change during the last decade. The quantity of timber and firewood produced in this tract is quite inadequate to meet the local demands hence the bulk quantity has to be brought from outside. Market rates are therefore comparatively higher than those in other divisions.

A statement showing the prevailing local rates for various length and girth classes of poles and timber of Teak, Neem and Babul are given in **Appendix No. 3.1 of Volume II.** These rates have been collected from the local market in the month of February 2011 and the rates shown are only an indication of the prevailing market rates.

CHAPTER – 4

SOCIO ECONOMIC SURVEY

SECTION 1: SOCIO ECONOMIC SURVEY

As per socio-economic survey report of 2009-10, the land use pattern of the district as in 2000-01 estimates 5% of the geographical area under forests, 9% area is not available for cultivation, 7% area is not sown, 4% is kept fallow while 82% area is under cultivation.

Table No. 6: Land use pattern in Sangli District

Sr. No.	Land use pattern	Area in '000 ha.	Percentage
1.	Total geographic area	861	100
2.	Area under forest	48	5
3.	Area not available for cultivation		
	a) Area under non-agricultural use	39	9
	b) Barren and not suitable for agriculture	38	
4.	Fallow land	36	4
5.	Sown	700	82

Agriculture is the main occupation of the people. Out of total population 37% constitutes the working population and nearly 63% of this working population is farmers and farm laborers. Only 10% people have land holdings above 4 hectares while majority 49% have holdings less than 1 hectare. Nearly 3% are in manufacturing and service sector while 31% are engaged in miscellaneous jobs. There are about 68000 families living below poverty line in the year 2002 in the district.

The population of Sangli district is 25.84 lakhs as per 2001 census out of which 75% live in the rural areas and 25% in urban areas. Around 12% population of the district belongs to scheduled castes whereas percentage of scheduled tribes is less than 1%. The population density of the district is 301 per sq. km. which is less than the state average of 315 per sq. km. Miraj taluka has the highest population density of 816 per sq. km. while Atpadi taluka has the lowest density of 151 per sq. km. The district has sex ratio of 957 which is higher than the state average of 922. The average literacy rate of the district is 77% comprising 86 percent for men and 67 percent for women. The literacy rate in the rural and urban areas is around 74 % and 84 % respectively.

The 2003 live stock census estimated 14.07 lakh domestic cattle in the district, density being 164 per sq. km. Buffaloes consists 33% of cattle population followed by cow/ox as 25%, while sheep and goat consists 41% of the total population. There is decline in live stock population of the 2003 compared to 1997 live stock census by more than 2%. These cattle graze both in forest areas as well as in gairan land. A statement showing Cattle population is given in the **Appendix No. 4.1 of Volume II.**

In all there were 5,880 registered cooperative societies in the district by 2007-08. Being a leading producer of Sugarcane, the district had 16 sugar factories which produced 4.5 lakh metric tons of sugar from 37.37 lakh metric tons during the year 2008-09. The district is amongst leading producers of milk. There are 854 milk cooperatives in the district which produced 1850 lakh litres milk during the year 2008-09, collecting and marketing nearly 5.07 lakh litres of milk every day. In all, there are 9 industrial areas in the Sangli district. There are 820 factories registered in the district out of which 750 are working providing employment to nearly 16,523 labourers during 2007.

SECTION 2 : HARVESTING AND MARKETING OF FOREST PRODUCE BY FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA (FDCM)

The Forest Development Corporation of Maharashtra (FDCM) does not have any role in harvesting/ marketing of forest produce in Sangli forest Sub division.

CHAPTER – 5

FIVE YEAR PLANS

Forest Resources

India is one of the 12 mega diversity countries, commanding 7% of the world's biodiversity and supporting 16% of the major forest types, varying from tropical rainforest in the north-east, to desert and thorn forests in Gujarat and Rajasthan; mangrove forest in West Bengal, Orissa, Maharashtra and other coastal areas; and dry alpine forests in the western Himalaya. The most common forest types are tropical moist deciduous forests, tropical dry deciduous forests, and wet tropical evergreen forests. India has 45,000 identified plant species, including 15,000 flowering plants [5154 - endemic] and 81,000 species of fauna. Though India has only 2.5% of the land and less than 2% of the world's forest area but it support more than 7% of its variety of flora and fauna.

But nearly half of the country's area is degraded, affected by the problems of soil degradation and erosion. According to the Government statistics, nearly 22%, or 65 million ha, of the country's land have been recorded as forests, but only 19.5% have forest or tree cover, which is much less than the goal of 33% set by the National Forest Policy, 1988.

The rising population has forced the rural poor to deplete the natural resources. It was reported that the population reached one billion people in 2000, comprising about 16% of the world's population. The problem is further compounded by the high cattle population, estimated to be 450 million, about 18% of the cattle population in the world. Most of these animals have a very low productivity but graze freely in forest areas, causing the degradation of forests. This has led to severe erosion, loss of soil, and floods in the lower plains, in addition to the destruction caused by shifting cultivation. As a result, the demographic and economic landscape of the country is plagued with poverty and underemployment. Agricultural productivity is only 1 ton per ha against the actual capability of 4 ton per ha. How to achieve the optimum land use, including soil and moisture conservation measures, are the main challenges confronting the policy and decision-makers.

Mobilization of Funds in the Past

Since the commencement of the First Five Year Plan (FYP) in 1951, a total Rs 85 billion have been spent by the end of the Eighth FYP in 1996-97, on forestry development planning activities. During this period, afforestation of about 26.9 million ha has been carried out. Financial allocation to the forestry sector has increased from Rs 76 million in the First FYP to Rs 40 820 million in the Eighth FYP, but has always been less than 1% of the total plan outlay of the country. This is one of the main reasons for the continuous deterioration of forest resources.

A provision of Rs 68 billion has been made for the Ninth Plan. During 1997-98, afforestation of 1.48 million hectares was completed and thus, up to 1997-98, the total area afforested is 28.38 million hectares. The average annual plan outlay for the forestry sector during the Eighth FYP was about Rs. 8.16 billion whereas the estimated annual value of harvests (recorded and unrecorded) from the forests was worth Rs. 300 billion during the same period, which is about 36 times more than the planned investment. Budgetary allocation for forestry under the Five Years Plans is given in the following table.

Table No. 7: Budget allocation for forestry under the Five Year Plans, (million Rs.) (GoI)

Plan/Year	Thrust Areas	Total Plan		Forest and Wildlife Plan		Forest Outlay
		Outlay	Actual	Outlay	Actual	(% of total)
First Plan (1951-1956)	S&D, Rehabilitation of degraded forest	23 780	19 600	76	85	0.32
Second Plan (1956-1961)	As above	45 000	46 720	212	212	0.47
Third Plan (1961-1966)	Increasing Productivity, Fast growing spp. Pl. Modern logging	75 000	8 577	458	459	0.61
Annual Plan (1966-1969)	As above	66 250	66 225	419	421	0.63
Fourth Plan (1969-1974)	As above	159 020	157 790	894	938	0.56
Fifth Plan (1974-1979)	Social Forestry	393 220	394 260	2 088	2 088	0.53
Annual Plan (1979-1980)	Social Forestry	126 010	121 760	683	683	0.54
Sixth Plan (1980-1985)	Social Forestry Forest Cons.	975 000	1 092920	6 924	NA	0.71
Seventh Plan (1985-1990)	Forest Cons. Massive Aff. Wasteland Dev.	1 800 000	2 187 300	18 519	19759	1.09
Annual Plan (1990-1991)	As above	647 170	583 690	6 299	5 764	0.97

Annual Plan (1991-1992)	As above	723 170	647 500	7 831	7 153	1.08
Eighth Plan (1992-1997)	JFM, Ecotourism Biodiversity Conservation Wasteland utilisation	4 341 000	-	40 820	39 930	0.94
Ninth Plan (1997-2002)	As above	8592000	7058180	68 228		0.79
Tenth Plan (2002-2007)	Biodiversity Conservation	15923000				
Eleventh Plan (2007-2012)	Increase Forest and tree cover by 5 percentage points	- NA-				
Total up to 9th Five Year Plan		**17966620**		**153523**		**0.85**

Forest Policy and Planning

India has a long tradition of professional forestry and a nation wide concern for forest resources. Contemporary forestry legislation and policy date to at least 1864, at which time forests became almost exclusively State property under the then British rule. The first forest policy of 1894 was revised in 1952. The present guiding legislation dates back to the Indian Forest Act of 1927. The National Commission of Agriculture (NCA) studied the forestry planning in the country in 1976 and made recommendations for future action. This led to the emergence of Social Forestry and the establishment of Forest Development Corporations (FDCs). The new policy accords highest priority to the environmental role of forests and the derivation of direct economic benefit must be subordinated to this priority. The main aim of establishing FDCs was to enable the Forest Department to retain earnings from the sale of products for investment in plantations. However, this policy had two undesirable effects, namely:

Given the realities of budgetary allocations, external aid for social forestry resulted in the earmarking of 70 to 80% of the funds for social forestry. As a result natural forests received little attention.

The establishment of high value plantations at the expense of natural forests resulted in the loss of biodiversity and non-wood forest products. As a result, there was opposition to the practice from the people, and the Government had to revise the plantation programme strategy.

The forest policy has been updated, most recently through the National Forest Policy (1988). Other supplementary legislation has been enacted to explicitly provide for control and regulations covering non-forest resources, wildlife protection and environmental protection, together with other broad directives in substantive areas of national policy which have an impact on forestry, including land use. A Wildlife Action Plan was formulated in 1983, a National Conservation Strategy in 1992, followed by a National Environmental Action Plan in 1993.

As a result of the National Forest Policy, 1988, the mechanism of Joint Forest Management (JFM) was legalised in 1990. Its principal aim is to ensure environmental stability and maintenance of the ecological balance through the preservation and rehabilitation of forests, while providing for fuel wood, fodder, Non-Timber Forest Products (NTFPs), and small timber needs. The JFM has since been institutionalised by most of the States. The emphasis has been on the formation of Village Forest Committees and empowering them for participatory management of degraded forests on a benefit-sharing basis.

It was reported that the country's achievement in raising forest plantations, in terms of area, has been impressive. Up to 1998, the total area of tree plantations was 28.38 million ha, of which about 17 million ha were planted before 1990's. The current annual rate of plantation is 1.2 million. The quality of these plantations varies considerably. It should be noted that forest plantations are a means to meet the increasing demand for industrial raw material or for direct consumption, i.e. fuel wood, but not to justify deforestation or claim restoration of biodiversity and other environmental services.

The performance of forest plantations, in terms of survival, growth and yield, has been poor caused by several factors, including inadequacies in site selection and site-species matching, poor planting stock, lack of proper maintenance and protection (from fire, grazing, pests and diseases), lack of timely tending/thinnings, delays in fund allocation, and inadequately trained staff.

According to the latest State of Forest Report, 2009, the total forest cover of the country is 6,90,899 sq.km. or 21.02 % of the geographical area, with very dense forest (VDF) accounting for 2.54 %, moderately dense forest (MDF) accounting for 9.71 % and open forest constituting 8.77 %. The Report shows that the forest cover has increased by 728 km2 or 0.11% since the last survey in 2005. Funding to the tune of Rs 66.95 billion per year is required in order to achieve one-third forest cover within the next 20 years whereas, Rs 16 billion per year is available from both the central and state budget together to be allocated for afforestation.

Despite the enactment of all the above legislations, clear symptoms of degradation and a declining capacity in meeting the various needs of the population, particularly the rural poor and tribals are evident. Efforts to enlarge the forest estate as set forth in the National Forest Policy (from the present 19 percent to 33 percent of the total geographical area) would require a substantial

increase in fund allocation to the forestry sector. To reverse the process of degradation and for the sustainable development of forests, the Government has prepared the National Forestry Action Programme (NFAP).

National Forestry Action Programme (NFAP)

In 1993, the Government decided to start a new strategic planning process following the National Forestry Action Programme (NFAP) concept. The preparation of an NFAP was decided with the goal of addressing the issues underlying the major problems of the forestry sector in line with the National Forest Policy, 1988. The NFAP is to evolve as a development process by integrating forestry development in the country within the framework of the national five-year plans. The exercise was supported by the UNDP.

The objective of the NFAP is to enhance the contribution of forestry and tree resources to ecological stability and people-centred development through qualitative and quantitative improvement in investment on sustainable conservation and development of forest resources.

The basic purpose of the NFAP is to establish a direct linkage between the national forest policy and the national five-year plans. In the past, there has not been a comprehensive and constant programme structure, so it was difficult to get linkages and establish trends.

In the context of sector policies, the NFAP exercise proposed that imperatives need to be identified which represent the absolute requirements to which all supporting objectives should contribute. For the forest policy in India, three imperatives are suggested: *sustainability, efficiency, and people's participation*. Sustainability should be the guiding factor for forest management. Neither conservation nor development can be achieved in isolation. Efficiency in production implies improving productivity, reducing wastes and indirect costs, and thus registering a higher economic rate of return compared to other alternatives. The philosophy of people-based development assumes that participation is not only a fundamental precondition for, and a tool of, any successful development strategy, but also is an end in itself.

Five Year Plans

The basic purpose of the NFAP is to establish direct linkages between the National Forest Policy and the National Five Year Plans (FYPs). In the past, there was no comprehensive and constant programme structure for forestry. Every FYP has had its own programme structure, so it was difficult to get linkages and establish trends. Although plans had specific objectives and programmes, the main activity under most of them was tree planting. The emphasis of different FYPs regarding forestry was as follows:

· First and Second FYPs: Rehabilitation of degraded forest, introduction of economic species, survey, and forest demarcation;

· Third and Fourth FYPs: Increasing productivity of forest through fast growing species plantations, scientific assessments, and modern logging;

· Fifth FYP: Social forestry and fuel wood reserves to save natural forests;

. Sixth FYP: Social forestry, Forest conservation

· Seventh FYP: Forest conservation, massive afforestation, and wasteland development; and

· Eighth and Ninth FYP: Preservation of biological and genetic diversity (both flora and fauna), protection of forest against biotic interference, utilisation of wastelands, and promotion of people's participation through Joint Forest Management (JFM) schemes. The percentage share of Forestry Sector Outlay changed from 0.32 percent of the total outlay in First FYP to 0.94 percent in Eighth FYP. The highest allocation was in the Seventh FYP (1.09%). For the sustainable development of the sector, allocation to the forestry sector should be raised to about 4 to 5 percent of the total outlay of the country.

CHAPTER - 6
STAFF AND LABOUR SUPPLY

SECTION 1: STAFF

The following is the position of the staff working in Sangli Forest sub division.

Table No. 8: Staff of Sangli forest sub division

Sr.No.	Designation	Number of Posts.
1	Sub DFO	1
2	Range Forest Officer	8
3	Forester	27
4	Forest Guard	68
5	Surveyor	2
6	Head Clerk	1
7	Accountant	6
8	Clerk	6
9	Driver	1
10	Peons	2
	Total	122
	Van majur	124

A list of officers who held the charge of Sub DFO, Sangli forest sub division in the past is given in the **Appendix No. 6.1 of Volume II.**

SECTION 2: LABOUR SUPPLY

Labourers required for forestry works are not easily available in the district. The local labour prefer working on agricultural activities which coincide with the forestry activities like plantations since the returns from the agricultural activities are higher compared to the forestry works and the work is available nearer or in the village itself compared to the remote locations of forestry works. The rate structures of forestry works therefore need to be revised keeping this in view. The increased industrial activities and the overall increase in the standard of living of the people considering better irrigation facilities also fail to attract labourers for the hard work and low returns they get in the forestry activities. For nearly all the forestry works, labourers are brought mainly from the adjoining Bagalkot, Belgaum, Bijapur and Gulbarga districts of Karnataka state. They are mostly from the 'Lambani' tribe and work as the camping labourers.

CHAPTER - 7

PAST SYSTEMS OF MANAGEMENT

SECTION 1 GENERAL HISTORY OF FORESTS

There is no consolidated record available on the past history of the forests of Sangli district. However, the past history of the forests of Sangli sub division has been deduced by basing references from Gazetteer of India series, Sangli district published by Government of Maharashtra, from the previous working plans and from records available in this office.

From the excavations done at Newasa in Ahmednagar district, it appears that the earliest habitations of the people in the pre-historic period used to live in river valleys by cutting down thick forests. The elevated sides on the river banks were chosen for settlement. Hunting and grazing formed their main occupations. There was practically no control on the forests and anybody was free to use it in the manner he liked. With the advent of civilization and subsequent increase in population, large tracts of forest areas were cleared and brought under cultivation and colonization spread through the plains by cutting these forests. This process of clearing the vegetation and bringing the land under cultivation continued for centuries together.

The present talukas viz. Jath, Khanapur, Walva, Kavthe Mahakal, Miraj, Tasgaon and Atpadi are the typical areas of this kind of treatments which have now become almost devoid of forests and fall under the category of drought prone areas. This process of clearing vegetation was relatively slow in the hilly tracts of Shirala taluka as these areas were remote and were covered with dense forests of the Western Ghats. In the midst of these forests, small and scattered settlements have come in over time.

There were many estates like Aundh, Jath, Miraj, Jamkhandi, Cincini, Kurundwad in the present Sangli district prior to British rule. The acquisition of these estates was done by British Empire in the 19th century and since then the management of forests took shape.

Dr. Gibson, the first Conservator of forests under the Bombay Presidency, who was appointed on 19th December 1846, has remarked in his report that previous destruction of the forests especially on the ghats was so great that it would take many years to build up anything like wood preserves. Forest reserves were set apart in the forests along with the ghats at the time of revenue survey settlement during 1860-62 and in 1879 after the introduction of Indian Forest Act 1878, reserve forests were notified. After independence of India, the former estates were merged with Bombay state in 1948. Before merger, the management of forests in these states was primarily in the hands of revenue officers who during this period gave no scientific treatment to the forests which led to the continuous deterioration of the forests.

SECTION 2: PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS

The history of the past systems of management of the forest areas of the present sub division has been traced as follows -

Fagan's Provisional Working Plan (1892-93 to 1933-34)

In 1892-93, Fagan wrote and brought into force a provisional WP for 47,579 acres of teak forest, 518 acres of babul (Acacia arabica) forest and 1,484 acres of evergreen forest at Mahabaleshwar. For the *teak forests coppice with standards on 40 years rotation was prescribed, for babul clear felling on a 40 years rotation with artificial regeneration and for the evergreen forest, light improvement fellings on 30 years cycle* was prescribed. The Plan remained in force till 1932-33 for most of the eastern half of the Satara division.

Maitland- Kirwan's Plan (1907-08 to 1933-34)

In the South-Western portion of the Satara division, where the best teak forests (Karad, Patan and Shirala teak forests) were located, Fagan's Plan was revised by J.D. Maitland- Kirwan in 1907-08. Here also the main prescriptions were retained unaltered but some additional areas were brought under regular management and the allocation to felling series and coupes was modified in some cases.

Results

The past system of management was coppice with standards in all organised deciduous forests. Coppice with standards was worked on rotation of 40 years for coppice and (40 + X) years for standard, X is the age of which the standard was reserved. The rotation of 40 years in deciduous forests was fixed arbitrarily without making detailed test as to what rotation age would be productive of the highest volume or revenue returns. As a consequence, better teak in the South-West had been wasted under a short rotation as 40 years. The crop did not seem to have been benefited under coppice with standard system as the coppice was found to be of poor quality due to overhead cover and most of the standards deteriorated having remained much too long on the area. The forests were gradually invaded by shade bearing species since light demanders had little chance to flourish under the existing growth. The Plantations of teak suffered considerably. The babul forests which apparently existed in the past were no longer found. Many lands had been disforested for agriculture. Prescriptions of marking rules were not clear. The terms like "supposed dying trees", "trees of valuable species", "Large trees", "unsound trees" were not defined. That resulted in felling for revenue.

J.A. Singh's Plan (1934-35 to 1972-73)

In 1934-35, J.A. Singh revised all existing Plans for different parts combining them into one Plan. He divided the forest into evergreen zone and deciduous zone. In deciduous zone, Teak Timber Working Circle, the Main Working Circle and the Pasture Working Circle were constituted. All the best teak bearing forests were included in the Teak timber Working Circle covering the forest areas of the present Sangli Sub division. The silvicultural system prescribed was *modified clear felling followed by natural and artificial regeneration*. The rotation of 65 years was adopted.

Mixed deciduous forests capable of producing small sized timber and fuel with satisfactory regeneration from coppice shoots and artificial regeneration were included in the Main Working Circle. The system prescribed was '*modified clear felling*' limited to those areas where satisfactory regeneration could be obtained from coppice shoots supplemented by artificial regeneration. Rotation of 40 years was adopted. All degraded areas in the mixed deciduous zone were allotted to the Pasture Working Circle. Thinning of congested stems, removal of over matured trees, and Plantation of sandalwood and fodder yielding species were prescribed. Controlled grazing, periodical closures and soil conservation measures were also advocated.

Results

In fuel working circle, the prescriptions of marking rules were not clear. This resulted in over felling for revenue to a certain extent. As maturity was not defined, thinning prescribed in the 11^{th} and 21^{st} year amounted to main felling for revenue. The prescription of artificial regeneration in the felled coupes was not attended properly. In Hirda and Shikakai working circle, except extraction of Hirda and Shikakai fruits, no other operations were carried out for encouragement of Hirda trees and Shikakai climbers.

In the Teak timber Working Circle in the deciduous zone, over exploitation of teak trees, failure of teak plantations in clear felled area, heavy illicit cutting and hacking of shoots from raised plantations resulted in conversion of, once known as best teak bearing areas into poor and degraded teak forests and the main object to convert them into high forests could not be achieved. In the Main Working Circle, clear felling of the areas unfit for regeneration, lack of artificial regeneration, failure of plantations due to improper selection of site, heavy illicit cutting and hacking, improper working of subsidiary silvicultural operations, resulted into formation of scrubs and grassy blanks. In the Pasture Working Circle, the scheme was not implemented successfully due to lack of co-operation from local people, lack of trained staff. The areas were heavily grazed due to excess cattle population than carrying capacity. Except selling of the grass, no improvement works were carried out. All these factors resulted in heavy soil erosion leading to exposure of hard parent rock and growing of unpalatable coarse grasses.

S.M. Wagle's Scheme (1958-59 to 1972-73)

Three separate schemes, previously prepared for the forest areas in Aundh, Akkalkot and Phaltan were combined and consolidated into one scheme by S.M. Wagle as the forest areas of these states were alike in many respects. In this scheme the Pasture Working Circle, the Kuran Working Circle and the Fuel Working Circle were constituted. Highly denuded areas containing a sparse scrub type growth of forest with large blanks were included in the Pasture Working Circle. In this Working Circle, rotational grazing and periodic grazing with land improvement and afforestation were prescribed. The areas which were in excess of grazing requirements and were in large blocks

were allotted to the Kuran Working Circle. Maintenance of Kurans under permanent closure and introduction of edible and nutritious

varieties of fodder grasses and trees of fodder value were prescribed. The areas covered with natural babul and other species of fuel value were included in the Fuel Working Circle. The silviculture system prescribed was clear felling with artificial regeneration of babul and other fuel species. Rotation of 25 years was prescribed.

Results

In the Pasture Working Circle improper implementation of scheme, lack of co-operation from local people and over- grazing resulted in growing unpalatable and coarse grasses, heavy soil erosion and exposure of hard parent rock. In Kuran Working Circle no improvement works were carried out as prescribed. In the Fuel Working Circle the worked areas had been reduced to blanks due to failure of regeneration operations. The areas were subjected to heavy soil erosion. *Prosopis juliflora* was raised in some areas which eventually encroached upon some of the adjacent babul areas.

B.P. Desai's Plan (1975-76 to 1989-90)

B.P. Desai revised the Singh's Plan (1934-35 to 1972-73) and S.M. Wagle's scheme (1958-59 to 1972-73) and consolidated the whole forest area of Satara forest division except area transferred from other department to this forest division from 1973 onwards. B.P. Desai constituted seven Working Circles for the forests of this division. Allocation of areas, treatment prescribed and the results for each Working Circle is summarised as below.

1. The Protection Working Circle (36,362.911 ha.)

This Working Circle included all forests occurring on very steep slopes forming the catchment of the hydro-electric project at Koyana nagar and irrigation project at Dhom. It also included areas of Hirda and Shikekai Working Circle, inaccessible areas of Fuel Working Circle and all areas of In-exploitable Working Circle of Singh's Plan. No working and silviculture systems were prescribed except the collection of Minor Forest Produce on lease to avoid erosion and laterization due to opening of the canopy of the existing vegetal cover. The area was proposed to be fire protected and completely closed to grazing.

Results

The forests under this WC were not worked under any silvicultural system. Only Planting of blanks and afforesting the open lands was done. In regular Plantations, only weedings were done. All these operations resulted in improving the stock and site conditions by soil and water conservation. The improvement was very conspicuous in Koyana catchment forests mainly due to protection from grazing, Fires and illicit-cutting. Area had regenerated naturally.

2. The Selection cum Improvement Working Circle (32,764.205 ha.)

This WC included all the evergreen and semi-evergreen forests found in Mahabaleshwar, Satara, Dhebewadi and Patan ranges of the Western region, other than those included in Protection

Working Circle. It also included all accessible and workable areas excluding the areas under the Silviculturist plots of the Experimental Working Circle of Singh's Plan. The special objects of management in the constitution of this Working Circle were

i. To maintain adequate soil cover over catchment areas of important rivers like Koyna and Krishna.
ii. To improve existing crop.
iii. To improve and preserve aesthetic beauty of the Mahabaleshwar plateau.
iv. To meet firewood and charcoal demand of the consumers of the Mahabaleshwar and Pachgani area.

The area was divided into 18 felling series out of which 6 felling series were provisional (which were remote) and remained unexploited. The felling cycle of 20 years was adopted, since these forests were not worked in the past. In each felling series 20 annual coupes were formed. The forest area of Malcompeth felling series was interspersed amongst the populous places of plateau, so felling was not prescribed in this felling series. To achieve the above special objectives, operation prescribed were (1) Climber cutting except Shikekai, (2) Removal of growth interfering with Pisa and Hirda trees as well as saplings and poles of Medshing, Chimat and Gela etc. over the whole area, (3) No felling of living trees in unworkable areas, (4) Removal of unsound, diseased, dying and over-matured trees strictly on silvicultural considerations and plantable under-stocked area to be planted with suitable species, (5) Subsidiary silvicultural operations like cutting back, cleaning to be carried out, (6) Protection of felled coupe from fire and grazing for 7 years. The exploitable girth for Ain and Nana was kept at 105 cm gbh, 90 cm gbh for Jambhul and Kinjal and 75 cm gbh for Anjani and Bhoma etc.

Results

The prescriptions laid down in the Working Plan were good and suited to improvement of the growing stock. As the operations were not carried out as per the prescriptions, no beneficial effect to achieve the objectives could be seen.

3. The Improvement Working Circle (4,435.294 ha.)

This Working Circle included all such areas where teak was found and which were capable of producing medium sized timber of teak and valuable miscellaneous species. All such areas from the Teak timber Working Circle and the Main Working Circle of Singh's Plan were included in this Working Circle. The forests in these areas were poor and degraded due to over-exploitation, heavy grazing and frequent fires. Large gaps and under-stocked areas were found commonly. The special objects of management in constituting this Working Circle were (1) To improve the condition of the growing stock (2) To increase the economic value of forest by restocking the over-exploited and area affected by illicit fellings (3) To preserve and improve site quality by preventing soil erosion. The area was divided into 6 felling series with 20 coupes in each felling series. To cover whole area quickly, 20 years felling cycle was adopted. To achieve the above special objectives the operations prescribed were (1) Climber cutting over the whole area.

(2) Removal of over matured (>90 cm gbh) and malformed trees in patches of advance growth and in old Plantations. (3) In plantable areas, all tree growth except teak and other valuable species to be removed and planting with teak and other suitable valuable species was to be done. (4) In remaining areas, removal of over matured, dead, dying trees, trees of inferior species interfering with growth of valuable species (5) Cutting back operations, anti-erosion measures, weeding in plantation areas, cleaning, thinning as subsidiary silviculture operations to be carried out. (6) Worked coupes were to be closed to grazing for 7 years.

Results

Treatments prescribed were not followed strictly and carried out timely resulting in adverse impact on soil and moisture condition. Even the crop is further deteriorated.

4. The Afforestation Working Circle (27,857.485 ha.)

All areas which were unfit for working on account of sparse growth and low percentage of economically valuable species and which were incapable of producing small sized timber or firewood were included in this Working Circle. To cover whole area quickly, an Afforestation period of 20 years was adopted. The area was divided into 19 afforestation series with 20 coupes in each afforestation series. Object of management was to restock the blanks and under-stocked areas, to prevent soil erosion and to produce fuel, small timber and fodder grasses. To achieve the objectives, operations prescribed were (1) Removal of only dead trees from unworkable areas. (2) Improvement fellings to benefit the crop in workable areas i.e. areas adequately stocked and areas successfully planted and not in need of afforestation. (3) Removal of bushy and undesirable growth if interfering with afforestation operations and planting the area with suitable species like Neem, Shiras, Babul, Khair, Anjan, Karanj, Eucalyptus, Hirda, Bibla, Tendu, Teak, Sissoo, Shikekai in the afforestation area. Gully plugging and nalla bunding was also advised in afforestation areas.

Results

The results were found not satisfactory especially in the Eastern part of the district because these areas suffered from drought and erratic rains and adverse biotic factors like illicit cutting, illicit grazing and fires. The problems of protection of these artificially regenerated areas in post-planting years is more acute in this region due to ever increasing demand of grazing population of sheep, goats and other cattle.

5. The Pasture Working Circle (55,547.333 ha.)

This Working Circle included all the areas of the Pasture Working Circle of Singh's Plan and Wagle's scheme and also the area other than those included in Afforestation Working Circle which were not under any management before. These areas were devoid of any tree growth except thorny bushes seen sparsely. The areas were distributed all over the division. The main object of this Working Circle was to provide grazing to the maximum possible local domestic cattle with improvement of pastures. The system adopted was rotational grazing with "Three pasture Scheme". Area was divided into 40 grazing series and three pastures in each grazing series. Out of

three pastures, one was to be closed to grazing for continuous period of 6 years, in rotation. During 1st year of closure, improvement works were to be carried out. From 3rd year onwards, cutting of grasses in closed pasture was to be permitted. Improvement of grasses and protection of forests from fires had been suggested.

Results

In this Working Circle no treatment was given which had affected adversely on soil and moisture. The forest area available for grazing was much less than was necessary to meet the grazing demands. The pressure of grazing on forest areas was heavy due to excessive cattle population and excessive grazing had upset the biological balance. At places rocky out crops had emerged out due to heavy soil erosion. All this resulted in increased proportion of coarse and unpalatable grasses.

6. The Kuran Working Circle (3,042.559 ha.)

This Working Circle comprised the areas similar to those which had been allotted to Pasture Working Circle and where there was keen demand for fodder grasses near towns and large villages. In all 30 Kurans had been formed. The special objects of management were (1) to protect area from soil erosion (2) to improve the quality and to increase the yield of fodder by introducing better fodder grass species. Closure of area to grazing and sale of grass annually on cutting terms was prescribed. Cutting of grasses was allowed only after 31st October. 10th portion of each Kuran was prescribed to be taken up for special improvement operations like fencing, gully-plugging and nalla-bunding, introduction of better varieties of fodder grasses and removal of obnoxious weeds, annually.

Results

Treatment as per the prescriptions was not completely given so no beneficial effect was noticed.

7. The Minor Forest Produce (Overlapping) Working Circle

This Working Circle included all the areas covered by the Working Plan. Apart from Hirda and Shikekai and grass, various minor forest products sold annually from area dealt with were Apta, Tendu and Kadi nimb leaves, Chillar and Tarvad bark, Pisa fruit, Arrow root tubers, sticks of Medshing, Rohtal, Pandhari, Atki and Gela and Agave leaves. Objects of management of this Working Circle were to increase the yield to the maximum extent to ensure and proper collection of Minor forest products. Treatment prescribed were (1) Removal of congestion by removing inferior species to avoid suppression of Hirda, Kadu nimb trees and Shikekai climbers (2) Planting of Apta, Tembhurni, Agave in suitable localities.

Results

Climber cutting, removal of lateral shade of fruit bearing trees etc. does not seem to have been done, affecting adversely on minor forest production.

U.K. Agrawal's Plan (2002-03 to 2011-12)

U.K. Agrawal wrote the first working plan for the Sangli forest sub-division which included the forests earlier with the Satara forest division along with the new forest areas made available from Revenue Department. The whole forest area of 42,464.09 ha has been constituted into 4 main and an overlapping Working Circle. Allocation of areas, treatment prescribed and results for each Working Circles is given below.

Table No. 9: Allocation of area to the Working Circles

Sr. No.	Working Circle	Area (Ha.)
1.	Improvement Working Circle	9904.66
2.	Afforestation Working Circle	23308.36
3.	Environmental Improvement of Dandoba Hill Working Circle	1471.54
4.	Miscellaneous Working Circle	7779.53
5.	Wild life (Over lapping) Working Circle	Entire Sub division
	Total	**42464.09**

Paucity of funds and timely availability of the same were the major constraints in timely implementation of the prescriptions of the Plan. The Plan period is 2002-03 to 2011-12. Hence, few Plantations/ SMC works were carried out as per availability of funds. In addition to this afforestation and SMC work taken over from the other sources like E.G.S., SGRY, WGDP, RVP, etc.

1. Improvement Working Circle (9904.66 ha.)

This working circle included forest areas situated mostly on hills having steep to moderate slopes found mostly in Western Ghats of Sahyadri hills in Shirala and Walwa Talukas and some parts of Tasgaon, Khanapur and Jath talukas. Such areas are not fit for carrying out any felling on account of steep slopes and their ecological fragility. The main emphasis was laid on soil and moisture conservation works and carrying out the tending operations to the natural regeneration so that the existing crop may become harvestable in near future. In the areas having natural regeneration and coppicing of teak, tending operations was prescribed to be carried out so as to remove the unhealthy competition among the existing plants and provide them suitable conditions for better growth.

Results:

Though treatment has improved Soil and Moisture conservation in the area results of seed sowing are poor – much so in DPAP area of the Sub Division. Due to poor site quality growth of Teak plantation is very poor and stunted.

2. Afforestation Working Circle (23308.36 ha.)

The working circle comprised of the major part of the sub division. The successful and partially successful plantations of Afforestation working circle of Desai's plan were included in this Working Circle. Some of the areas included are capable of producing medium sized timber of valuable miscellaneous species viz. Ain, Shiras, Khair, Shisam etc. The areas are mostly plain or with gentle to moderate slopes. The live hedge fencing was proposed along the boundary of plantation area. In unworkable areas, seed dibbling was prescribed. In old plantation areas, cleaning and thinning operations was proposed. In workable areas the plantations were to be taken up in continuous contour trenches (1200 rmt/ per ha.). The successful or partially successful plantations, which are more than 5 years old, cleaning operation was prescribed such that all the old plantations are cleaned every 5th year. Similarly in the plantations which were more than 10 years old, light thinning (D grade), wherever necessary was prescribed. It was prescribed to close the new plantations to grazing atleast for 5 years. However, the cutting of grasses was permitted. All the areas of pasture working circle of Desai's plan were covered in this working circle.

Results:

Soil and Moisture Conservation has improved in the treated area. Vegetal cover has also improved to some extent. A report of the evaluation division reveals that there is considerable pressure of grazing by sheep especially in Atpadi and Jath ranges. Survival and growth of plantations by and large is very good. An analysis of the data on the survival and growth of various plantations raised in Sangli forest sub division during 1987-88 to 2008-09 revealed that out of the total 902 ha. of plantations analysed as per the norms of the evaluation code, 206 ha. (22.84%) was found successful, 493 ha. (54.66%) was partially successful and only 203 ha. (22.51%) was failure. Thus, more than 71 % of the area under plantations is either Successful or Partially Successful as per the evaluation code norms. These observations were collected from the sample plots of 50 x 100 meters dimension from 37 plantations taken during 1988 to 2008. The details are given in the **Appendix no. 11.6 of vol. II**.

3. Environmental Improvement of Dandoba Working Circle (1471.54 ha.)

This working circle comprised the area of Dandoba hills in Sangli Range (Kavathe Mahakal and Miraj talukas) of Sangli sub division. These forests generally belong to the type- 5D/54 Dry Grasslands. The total forest area of this hill is 1471.54 ha. spread over five (5) villages. Part of this area, 163.89 ha. area was included in the previous working plan in Pasture Working Circle. Rest areas, being mostly unclassed forests, were not included in the earlier plan of Desai. The whole area was prescribed to be fenced and to undertake the Soil and moisture conservation works. The plantation was prescribed in CCTs. As the area was proposed to be developed as bio-diversity conservation zone, the planting of religious and medicinal importance was prescribed. Strict fire

protection was prescribed to be taken up along with plantations with the objective of beautifying the area. The area was proposed to be developed from DPDC funds. The Government of Maharashtra vide GR No.PGS-
1083/3683/818-F-7 dated 10-9-1994 had constituted a committee to prepare a comprehensive plan for improving the environmental condition of Dandoba Hill and to develop into a tourist spot. Emphasis was laid on Bio-diversity conservation.

Results:

Tree cover is improved due to extensive afforestration works. Erosion is controlled because of the SMC works. There is considerable increase in the tourists visiting this area both for pilgrimage and Ecotourism. The number of school trips and visits of students have increased. Protection level is increased by fencing the area. Much has been done for beautification of the area through raising plantation. No efforts were made for the development of Eco-tourism. One dormitory is the only facility available.

4. Miscellaneous Working Circle (7779.53 ha.)

The Gairan lands which have been handed over to the forest department by the revenue department for taking up the plantations are included in this working circle. An area of 7779.53 hectares of Atpadi, Jath, Kavathe Mahakal, Miraj and Khanapur talukas is included in this WC.

The prescriptions for areas of this Working Circle are same as in Afforestation Working Circle. As these lands are not the forest lands in legal terms, this separate working circle has been proposed to augment the legal position of the area.

Results:

Soil and Moisture Conservation has improved in treated area. Vegetal cover has also improved to some extent. Survival and growth of plantations in this working circle is by and large very good. The prescriptions of survey and demarcation of these areas before taking afforestation was not followed.

5. Wildlife (over lapping) Working Circle

This is an overlapping working circle and covers the entire area of the sub division. All the areas outside the Protected Areas (Chandoli National Park and Sagareshwar Wildlife Sanctuary) are covered in this working circle. Habitat improvement and village eco-development were proposed to be undertaken in this working circle. Apart from this, the general measures for the protection of wildlife and increasing the awareness among the people about wildlife was prescribed.

Results

Sagareshwar Wildlife Sanctuary has the boundary measuring 38.995 km. of which 28.448km. has been chain link fenced and rest of the area is proposed to be fenced shortly. There is considerable reduction in the extent of crop raiding by the strayed herbivores over the years. This has been revealed in the following Table No.10.

Table No. 10: Details of compensation paid for crop damage in Sangli Sub-Division

Year	No. of cases	Extent of crop damage (in ha.)	Compensation paid (Rs.)
2005-06	47	14.58	29160
2006-07	82	31.44	62880
2007-08	6	1.29	2580
2008-09	20	11.55	23100
2009-10	13	10.04	20740
2010-11	23	10.34	122300

Lavanmachi and Bhavaninagar villages in Walwa taluka and Sonsal and Nerli villages in Kadegaon taluka in the vicinity of the Sagareshwar sanctuary have shown higher crop damage cases by the Spotted deers, Black bucks etc. Hence there is need for the fencing of the balance length of boundary around the sanctuary.

Also during the period, many water tanks in the forest areas were taken up under various schemes of the Government. The details are given in the Table No. 11 as given below.

Table No. 11: Details of Forest tanks constructed in Sangli Sub-Division

Sr. No.	Name of the Forest Range	No. of Forest tanks constructed
1.	Sangli	18
2.	Shirala	30
3.	Tasgaon	14
4.	Khanapur	198
5.	Atpadi	2
6.	Jath	19

It has been found that these Forest tanks constructed in the various parts of the Sub-Division has provided water to the wild animals during the pinch period. Excepting Shirala range, all other ranges fall in the DPAP zone and receive very low rainfall.

SECTION 3: SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN

A number of special works of improvement were undertaken in the past in the tract dealt with.

1. Plantations

A number of teak and other miscellaneous plantations have been raised in the past in Shirala taluka. The plantations are better due to high rainfall but in eastern part of the sub division, survival percentage is mostly unsatisfactory and growth is not encouraging mainly due to degraded sites, heavy grazing, hacking, drought prone conditions and heavy human pressure.

An abstract of the plantations taken up in the sub-division from 1986 to 2010 under various schemes is shown as below in **Table No. 10.** The details are shown in the **Appendix No.11.7 a & b of Volume-II.** An abstract of the plantations taken up in the sub-division from 1986 to 2010 under various schemes is shown as below:

Table No. 10: Scheme-wise Plantations raised in Sangli sub division during 1986 to 2010

Sr. No.	Name of the scheme	Area in Ha.
1	**Plan**	22,057.62
2	**Non-Plan**	2,629.73
3	**E.G.S.**	6,238.00
Total		**30,925.35**

2. Establishment of Nurseries

There are three nurseries at Posewadi in Khanapur range, Rethra dharan in Shirala range and at Jath in Jath range in the sub division. Seedlings are raised in these nurseries to take up the plantations under massive afforestation, EGS and World Bank programmes. But these nurseries are not equipped for raising good quality seedlings. Since, the raising of plantations is a regular activity as prescribed in the working plan, it is essential to have a well planned, central nursery in the sub division. A nursery with all the modern facilities needs to be established near Sangli preferably at Bhose near the foothills of Dandoba to cater to the needs of the planting stock of the sub division.

3. Creation of Protected Areas

The position of the Wildlife conservation in the entire tract was not satisfactory. Very drastic steps were required to be taken otherwise it was felt that there would be no Wildlife left in the area. Hence, two Protected Areas were created by merging some reserved forests with unclassed forests. Consequently, Sagareshwar Wildlife Sanctuary was created out of the forest areas of Khanapur, Tasgaon and Walva talukas, while Chandoli National Park was created out of the forest areas of Shirala taluka. Both these Protected Areas have been established with the objective of preserving the wildlife and the bio-diversity of the tract dealt with.

4. Creation of mobile squad

The mobile squad unit consisting of a Range Forest Officer, an armed constable, a Forest Guard with jeep and driver has been created in the sub division. The object of creation of this unit was to strengthen the organization for the protection of forest resources from illicit felling and transport, fires, illicit grazing, encroachments etc. by the anti-social elements.

SECTION 4: PAST YIELD

Most of the areas of Sangli sub division fall under Drought Prone Zone except Shirala range where some forest exists on the Western Ghat but these forests are also not exploitable. Hence, there has not been much exploitation of timber and fuel wood from the forest during past many years. But, now with the loss of high forests and acute degradation of the forests, the availability of timber and firewood has become almost negligible. Hence, no harvest of timber is done from forests. Statement showing annual out turn of timber/ firewood and revenue realised is given in **Appendix No. 3.2** of Volume II.

SECTION 5: PAST REVENUE AND EXPENDITURE

The details of revenue and expenditure are given in the **Appendix No. 7.1** of Volume II.

CHAPTER - 8
STATISTICS OF GROWTH AND YIELD

SECTION 1:GROWTH

The area under teak and other commercially important species has been reduced considerably. In fact except the western part of the district, Shirala range and few patches in Tasgaon and Khanapur range, there is hardly any forest worth mentioning in the sub division. The stocking in the sub division has gone down over the successive years. Stem analysis is not carried out as felling is not proposed in this revised Working Plan. The data collected during Maitland - Kirwan's Plan and J.A. Singh's Plan can be made use of wherever required.

The data collated by Maitland-Kirwan for Karad, Patan and Shirala Working Plan showed that in Ghotil forests the average age for teak tree to attain 30.5 cms diameter was 32.3 years, at Salve 45 years and at Korivle it was 69.5 years, whereas at Khusgaon and Saikade apparently the trees had never grown above 20.3 cm. diameter. The details of his observations are as under:

Table No. 11

Forest		Average age of trees Measured (years)	Average girth of trees measured (Inches)
Khusgaon		59.5	31.1
Ghotil		55.4	35.6
Saikade		52.6	27.8
Salve		53.5	36.8
Korivle		60.7	36.6
Korivle		56.0	34.5
Total	:	337.7	202.4
Average	:	56.2	33.7

It was pointed out by him that trees which were measured, were the largest and oldest sound trees met with in that year's (presumably 1907) fellings and he deduced that the average life of teak tree in that area was 56 years when it attained an average circumference of 8.83 cm. at breast height. The growth in the deciduous zone varies considerably in quality from place to place. To collect data for his Working Plan J.A. Singh distinguished teak into two qualities viz. good quality teak and poor quality teak. The results obtained by him from stem analysis of teak trees from both the qualities were as under:

Good quality teak

16 teak trees were cut from the below mentioned places for the purpose of stem analysis.

Table No. 12

Name of forest	Coupes as per Singh's WP	Number of trees cut
Kalgaon	65	2
Bhosgaon	2	2
Salve	6	3
Dhoroshi	40	2
Gavdi	16	2
Ghot	53	1
Kokisra	10	2
Kuthra	59	2
	Total :	16

The results derived from the average curves were as under:

Table No. 13

Age	Height In feet	Girth-B.H.O.B. in inches	Volume in cubic Feet	Mean annual incremnt	Current annual increment
10	13.0	9.58	0.6	0.065	0.080
20	25.0	18.53	2.2	0.124	0.200
30	33.5	26.79	5.7	0.176	0.378
40	39.5	32.03	9.0	0.220	0.470
50	44.0	35.48	11.9	0.242	0.317
60	47.0	37.92	14.6	0.245	0.258
70	53.0	---	17.0	0.244	0.223
80	---	---	19.3	0.241	0.240

Poor quality teak

Stem analysis of 22 teak trees selected from forests all over the division was carried out and the results obtained from the average curves were as under.

Table No. 14

Age	Height In feet	Girth-B.H.O.B. in inches	Volume in cubic Feet	Mean annual increment	CAI
10	9.5	5.97	0.2	0.017	0.027
20	17.5	12.56	0.8	0.043	0.073
30	24.0	18.21	2.0	0.070	0.124
40	28.5	23.24	3.5	0.091	0.163
50	32.0	27.45	5.2	0.105	0.180
60	33.8	31.09	6.8	0.113	0.159
70	34.5	33.60	8.1	0.120	0.100
80	---	---	---	---	---

From the above data it is seen that average teak of good quality attains a girth of 37.92 inches (96.32 cm) and height of 47 feet (14.32 meters) at the age of 60 years, whereas the average teak of poor quality attains a girth of 33.8 inches (85.85 cm.) and height of 31 feet (9.45 meters) in the same period. The volume of average teak of good and poor qualities at 60 years is 14.6 and 6.8 cubic feet (0.413 and 0.192 cu. meters) respectively. The current and mean annual increment curves cross at 63 ½ years in case of good quality teak and 66 ½ years in case of poor quality teak. In the case of poor quality teak the growth being poor from the very start, the trees show signs of considerable deterioration at the age of 66 years.

SECTION 2: STOCKING

The tree enumeration work was carried out by the field staff of the Sangli Forest Sub-division under the supervision of the Conservator of Forests, Working Plan, Kolhapur and with the guidance of the Survey of Forest Resources Division, Nashik, from February to December 2010. The entire area of the Sangli Forest Sub-division was considered for sampling enumeration plan. The trees were enumerated in girth classes started from 15 cms to 135 cms and above girth at breast height (gbh). The statistical sampling method namely "Systematic Line Plot Sampling with Random Start" was used for the tree enumeration. The plot size of 30 meters x 30 meters, was found to be suitable with the least standard error. The complete enumeration of trees, seedlings, coppices were carried out in these plots. Similarly qualitative measurements were also carried out. Scrutiny of data and preparation of results i.e. (1) Stock per hectare was calculated with the help of computer program. The analysis work was carried out by the Forest Survey Unit, Nashik under the guidance of Conservator of Forests, Working plan, Nashik and the results are being reported in the form of following statements.

Statement I : Estimated growing stock- No. of Sound trees.

Statement II : Estimated growing stock- No. of Sound trees per ha.

Statement III : Percentage distribution of total stock of species over all girth classes.

Statement IV : Percentage of stock of species in a girth class to the total stock in that particular girth class.

Statement V : Estimated growing stock in volume in cubic meters per hectare (cu.m./ha).

Some noteworthy results on the current enumeration are shown in the following Tables.

Table No. 15 : Estimated no. of trees per hectare for the Current tree enumeration

Sr. No.	Name of Working Circle	Current Enumeration during February to December 2010
1	Afforestation Working Circle	42.014
2	Improvement Working Circle	155.005
	Environmental Improvement of Dandoba hill Working Circle	60.256
3	Miscellaneous Working Circle	68.381
	Weighted Average	**65.257**

Increase in total estimated number of trees per hectare in the current enumeration (Feb. to Dec. 2010), from 14.678 to 65.257 is observed over the previous enumeration (Sept. 97 to Nov. 98). It is also worth to note that in the current enumeration in all the 4 working circles more than 89% of trees are in lower most girth classes i.e. 15 U 30 and 30 U 45. This is evident from the following table.

Table No. 16 : Estimated percentage of trees in 16-30 and 31-45 girth classes

Working Circle	16-30	31-45	Remaining Girth Classes	Total estimated no. of trees
Afforestation Working Circle	72.178	17.949	9.873	100
Environmental Improvement of Dandoba hill Working Circle	90.781	6.383	2.836	100
Improvement Working Circle	53.865	28.467	17.668	100
Miscellaneous Working Circle	73.522	17.594	8.884	100
Weighted Average	**70.281**	**19.086**	**10.633**	**100**

Also, it was observed that, the Teak species occupies second position only in the Improvement working circle. The estimated number of sound trees per hectare working circle-wise is as follows.

Table No. 17 : Distribution of trees per hectare in different Working Circles

Sr. No.	Name of Working Circle	Grand total	General utility species	Special utility species	NTFP species	Other species
1	Afforestation Working Circle	42.014	0.685	7.648	4.658	29.023
	% distribution	100.00	1.64	18.20	11.09	69.07
2	Environmental Improvement of Dandoba hill Working Circle	60.256	0.000	33.761	4.700	21.795
	% distribution	100.00	0.00	56.03	7.80	36.17
3	Improvement Working Circle	155.005	46.702	15.058	8.539	84.706
	% distribution	100.00	30.13	9.71	5.51	54.65
4	Miscellaneous Working Circle	68.381	0.000	19.030	5.891	43.460
	% distribution	100.00	0.00	27.83	8.61	63.56
Total weighted average		**65.257**	**7.663**	**11.941**	**5.497**	**40.156**
% of stock to total stock		**100.00**	**11.74**	**18.30**	**8.42**	**61.54**

Highlights from the results of tree enumeration as given in the above table no. 17, are summarised below:

1) **Afforestation Working Circle :-** It is observed that Ain and Teak species of General utility was found in this area which is 1.64 % to the total growing stock. The species of special utility viz, Dhawada, Hiwar, Khair, Sawar and Shiwan are 18.20 % to the total growing stock. The species of NTFP utility viz., Apta, Biba, Bor, Chandan, Chinch, Jambhul, Nilgiri, Palas, Shiras and Sitaphal are 11.09 % to the total growing stock and rest of the species are 69.07 % to the total growing stock.

2) **Environmental Improvement of Dandoba Hill Working Circle :-** It is observed that Ain and Teak species of General utility was found in this area which is 0 % to the total growing stock. The species of special utility viz, Dhawada, Hiwar and Khair are 56.03 % to the total growing stock. The species of NTFP utility viz., Chinch, Palas and Shiras are 7.8 % to the total growing stock and rest of the species are 36.17 % to the total growing stock.

3) **Improvement Working Circle :-** It is observed that Ain and Teak species of General utility was found in this area which is 30.13 % to the total growing stock. The species of special utility viz, Dhawada, Hiwar, Khair, Sawar and Shiwan are 9.71 % to the total growing stock. The species of NTFP utility viz., Amba, Biba, Chandan, Nilgiri, Palas and Shiras are 5.51 % to the total growing stock and rest of the species are 54.65 % to the total growing stock.

4) **Miscellaneous Working Circle :-** It is observed that Ain and Teak species of General utility was found in this area which is 0 % to the total growing stock. The species of special utility viz, Dhawada, Hiwar, Khair and Shiwan are 27.83 % to the total growing stock. The species of NTFP utility viz., Apta, Bor, Chandan, Chinch, Nilgiri, Palas and Shiras are 8.61 % to the total growing stock and rest of the species are 63.56 % to the total growing stock.

The detailed statement showing Working Circle wise enumeration results is given in **Appendix No. 8.1** of Volume II.

Table No. 18 : Working Circle wise availability of Teak trees (Enumeration period of Sept. 1997 to Nov. 1998)

Sr. No.	Name Working Circle	Total growing Stock	Teak/Ha	% of stock of teak trees to the total stock
1	Afforestation Working Circle	4.95	0.46	9.29
2	Improvement Working Circle	28.51	9.71	34.06
3	Miscellaneous Working Circle	21.06	10.04	47.67
	Weighted Average	**14.68**	**5.20**	**35.42**

Table No. 19 : Working Circle wise availability of Teak trees (Enumeration period of Feb. to Dec. 2010)

Sr. No.	Name Working Circle	Total growing Stock	Teak/ Ha.	% of stock of teak trees to the total stock
1.	Afforestation Working Circle	42.014	0.386	0.920
2.	Environmental Improvement of Dandoba hill Working Circle	60.256	0.000	0.000
3.	Improvement Working Circle	155.005	39.294	25.350
4.	Miscellaneous Working Circle	68.381	0.000	0.000
Total (Weighted Average)		**65.260**	**6.330**	**9.700**

From the Table 18 and 19 it is observed that ***the availability of Teak has increased from 5.20 to 6.33 trees per hectare.***

Statistical Analysis: - The Statistical personnel of the office of the Chief Forest Statistician, Maharashtra State, Nagpur, has carried out the statistical analysis of the data.

SECTION 3 : YIELD

It is not proposed to carry out felling in any of the working circle. Hence, estimation of the yield is not required.

PART – II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER - 9

BASIS OF PROPOSALS

SECTION 1: NATIONAL FOREST POLICY

In 1952 the Govt. of India, vide Ministry of Food and Agriculture, Resolution No. (Agri.) 13-1/ 52, dated 13.5.1952, declared the National Forest policy. Since then development of far reaching consequence in social, economic and political field took place and role played by forests in various spheres of national life came to be better understood. In 1988, therefore the National Forest policy of 1952 has been revised by Govt. of India vide No.3-/86-EP, Ministry of Environment and forest dated 7th December, 1988. It will be the guiding principle to decide the general object of management.

The basic objectives governing the new National forest policy of 1988 are as under:

i) Maintenance of environmental stability through preservation and where necessary restoration of ecological balance that has been adversely disturbed by serious depletion of the forests of the country.

ii) Conserving the National heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna which represents the remarkable biological diversity and genetic resources of the country.

iii) Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation for mitigating floods and droughts and for the retardation of siltation of reservoirs.

iv) Increasing substantially the forest/tree cover in the country through massive afforestation and soil conservation programmes, especially on all denuded, degraded and unproductive lands.

v) Meeting the requirements of fuel wood, fodder, non-timber forest produce and small timber of rural and tribal populations.

vi) Increase the productivity of forest to meet essential national needs.

vii) Encouraging efficient utilization of forest produce and maximizing substitution of wood.

viii) Creating a massive people's movement with the involvement of women for achieving these objectives and so minimize pressure on existing forests.

ix) The derivation of direct economic benefit must be subordinated to environmental stability and maintenance of ecological balance.

Strategy and salient features of National Forest Policy of 1988 are as under:

i) Bring one third of the total land area under forest or tree cover.

ii) Severe restriction on schemes and projects which interface with forest that clothe steep slopes, catchments of rivers, lakes and reservoirs.

iii) No working of forests without the Government having approved the management plan.

iv) Non-introduction of exotic species without long-term scientific trials.

v) The rights and concession including grazing, to always remain related to the carrying capacity of the forests.

vi) Rights and concessions which cannot be met from the forests to be met by development of social forestry.

vii) The rights and concessions enjoyed by the tribals should be protected. Their domestic requirements of fuel wood, fodder, non-timber-forest produce and construction timber should be the first charge.

viii) Forest management plans to take special care of the needs of wildlife conservation.

ix) Effective action should be taken to prevent encroachments on the forest lands and the existing encroachments should not be regularized.

x) Forest based Industries should raise the raw material needed by themselves in arrangement with the private cultivators.

xi) Survey of forest resources to be completed on scientific lines.

xii) For domestic energy, fuel wood needs to be substituted as far as practicable with alternative sources like biogas, L.P.G. and solar energy. Fuel efficient "Chullahs" as a measure of conservation of fuel wood needs to be popularized in rural areas.

xiii) Diversion of forestlands for non-forest purpose should be subjected to careful scrutiny.

xiv) People should be made forest conscious through extension.

SECTION 2: FOREST CONSERVATION ACT, 1980

In the past large tracts of forest lands were dis-forested for providing land for different developmental projects such as irrigation dams, hydro-electric projects, roads, railways, transmission lines, rehabilitation of project affected persons etc. As the country was already short of the desired forest cover, the need for some legislation to restrict and regulate further diversion of forest lands in the name of developmental projects resulted in the Forest Conservation Act, 1980. It came into force from the 25th October 1980 and extends to the whole of India, except the State of Jammu and Kashmir. It places restrictions on the de-reservation of forest or use of forest land for non forestry purposes. It mainly stipulates that:

1. No State Government or other authority shall make, except with the prior approval of the Central Government, any order directing that any reserved forest or any portion thereof shall cease to be reserved and that any forest land or any portion thereof may be used for any non-forestry purpose.

2. The Central government may constitute a committee to advise the Government with regards to this Act and any other matter connected with the conservation of forests.

3. The Central Government may by notification in the Official Gazette make rules for carrying out the provisions of this Act.

SECTION 3: MISSION OF MAHARASHTRA FOREST DEPARTMENT

The Maharashtra Forest Department carried out institutional reforms under the Maharashtra Forestry Project and came out with a clear mission statement and objectives of the Forest Department. This mission and the objectives were approved by the Government of Maharashtra vide its Resolution No. R&FD-FDM/1098/CR-540/F-11 dated 22nd April 1998. The mission statement and the objectives are as follows:

The Mission

To activate the sector by catalyzing the positive involvement of all the stakeholders in enrichment, expansion and sustainable development of the forest resources by being a responsive and transparent learning organization.

Core Elements of the Mission

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

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 and Development support to the sector.
- To regulate the activities of various players involved in forestry sector development.

- To undertake and co-ordinate planning along with the other government departments and agencies.
- To develop a pro-active interface with the 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 a 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.
- To Upgrade the quality of the land by soil and water conservation measures.
- To identify, map and conserve the bio-diversity rich areas.
- To promote the efficient utilization and value addition of forest produce including promotion of substitutes.

SECTION 4: FACTORS INFLUENCING THE GENERAL OBJECTS OF MANAGEMENT

The important factors which have influenced the objects of management are as follows:

1. The forests of Sangli sub division have been worked under the prescriptions of U.K.Agrawal's plan and B.P.Desai's plan in the past. But the results show that not much improvement of forests has taken place. Most of the forest areas excluding the western corner of this sub division represent scanty growth. This would have to be improved by undertaking soil conservation and plantation works.

2. A large portion of the Western Ghats falls in the catchment areas of important irrigation projects like Warna, Krishna, Yerla etc. This part of the forest on Western Ghats which come under Chandoli National Park and presently apart of the Sahyadri Tiger Reserve will have to be protected so as to reduce the siltation of dams and to preserve wildlife.

3. The forest areas of Chandoli National Park and Sagareshwar sanctuary have been the places of attraction for the tourists. The forests of these areas have to be conserved by way of complete ban on fellings. There is need to improve the areas aesthetically and from the point of view of wild life conservation.

4. Local people depend on the forests for various non timber forest produce like Grasses, Agave etc. It would, therefore, be necessary to make adequate provisions to meet these demands to the best possible extent.
5. The eastern part of this district is rainfall deficient and drought prone, hence measures should be taken to harvest whatever rain water received by adopting soil conservation cum afforestation measures.
6. Because of shortage of fodder in Sangli district, for increased dairy development activities in the district, emphasis will have to be given to produce more fodder by resorting to Silvi-pasture techniques.
7. About 75% population in the district is rural which mainly uses firewood, cow-dung and agricultural waste for domestic purposes. Heavy destruction to the forests has been caused on account of the use of wood for domestic energy. To stop this custom of the people, the alternatives to the wood are to be provided to them.

SECTION 5: GENERAL OBJECTIVES OF MANAGEMENT

Taking into consideration the above facts and guidelines elaborated in National Forest Policy 1988, the objects of management of these forests are set out as under.

1. Maintenance and conservation of ecological balance and natural heritage by preserving the natural forests and biological diversity.
2. Checking soil erosion and denudation in the catchment areas of rivers, reservoirs, tanks to protect them from siltation.
3. Increasing the productivity of forests to meet essential local needs.
4. Increase forest cover through massive afforestation especially on denuded and unproductive lands.
5. Meeting the requirements viz. fuel, food, fodder, non timber forest produce of rural and the tribal population.

The recent National Forest Policy clearly emphasizes that the derivation of direct economic benefit must be subordinated to the principle aim of environmental stability and maintenance of ecological balance for sustenance of life forms of human, animal and plant.

SECTION 6: FUNCTIONAL CLASSIFICATION OF FORESTS

The State Government vide Revenue and Forests Department resolution no. MRF-1365/132211/Y dated December 6, 1968 recognized following classes of forests on functional basis:

a. *Protection forests*: It includes forests on very steep slopes (25^0 and above) or along river banks and forests that have become depleted due to maltreatment and further exploitation of which shall accentuate soil erosion and adversely affect the productivity of agricultural lands

in the lower region. The management shall aim at soil and moisture conservation measures.

b. *Tree forests*: These forests are situated in remote areas on which there is little or no local demands and which 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 the areas capable of producing small timber and firewood and providing grazing which are indispensable needs of the adjoining population.

d. *Pasture forests*: These are openly stocked forests or scrub lands that have ceased to yield even small timber but which are conveniently situated for providing grazing to the cattle.

e. *Miscellaneous forests*:

i. *Grass reserves*: They are small block of forests situated amidst intensively cultivated tracts carrying scrubby growth and are capable of producing good fodder grasses.

ii. *Remaining areas*: Areas needed for other purposes

Keeping in view the above mentioned classification, the forests in this tract can be classified into the following classes:

i) *Protection forests* :

These forests occur on very steep slopes of the Sahyadri ranges forming the catchment of major irrigation and hydroelectric projects. In these areas rainfall exceeds 1750 mm. It will be necessary not to disturb whatever scantly forest cover they are having. Moreover, steps in improving the site should be taken and the area should be protected from felling, illicit cutting, fire and grazing which are common reasons for deterioration of site.

ii) *Minor Forests* :

These forests, falling in the category of Dry Teak bearing forests (type A/C-1 B) and dry grasslands (type SD/S-4), are found in most part of the district. Whatever little is available in forests, people try to remove them to meet their requirements of timber, firewood and agricultural tools. In fact any attempt to improve forests will not be successful unless sincere efforts are made to improve the quality of the site and grazing is controlled.

SECTION 7: METHOD OF TREATMENT PROPOSED

In view of the above considerations, the method of treatment to be proposed to the forest dealt with under this Plan according to their functional classes are as under:

1) Treatment for Protection forests

The forests lying on the Western Ghats in Shirala range are potential good teak forests but due to unabated plundering, these forests have become almost unproductive at present. The main objective of managing these forests is to prevent soil erosion and facilitate natural regeneration

of various species. To achieve these objectives, it is necessary that steps are taken to improve the site conditions and protect the areas from illicit felling, fire and grazing etc which are the most damaging factors for the deterioration of the forests.

2) Treatment for minor forests

These forests are very heavily degraded and presently are not in a condition of production. Growth is by and large stunted. These forests have suffered a lot due to adverse biotic factors. Enrichment of the land will be the primary objective of treatment. As a matter of fact, the primary treatment for these forests will be improvement of stock qualitatively and quantitatively by planting, singling out of congested and stunted coppice growth and soil conservation works. The active co-operation and the participation of the local people and villagers has to be ensured by motivating them and making them involved in the process of decision making for the management of forests. The material that will be obtained incidentally will cater the needs of the local people.

SECTION 8: FORMATION OF WORKING CIRCLES AND THEIR DISTRIBUTION

The main criteria for the formation of Working Circles are as under:

a) Topography and accessibility of terrain.

b) Type and quality of the forest.

c) Silvicultural requirement of forests.

d) Compactness of areas.

e) Availability of labour for intensive working such as artificial regeneration etc.

f) Nature and quantum of local demand of forest produce.

In view of the above considerations, the following Working Circles have been constituted:

Table No. 20 : Area allotment to working circles

Sr. No.	Name of Working Circle	Compartment included	Area (ha.)	% of total area
1.	Improvement Working Circle	17,18,18A,19,20,21,22,23,24,25,26,29,30,31 ,33,34, 35,36, 37, 38,39, 40,49, 50,51,52,54, 55, 56, 57,60,76,77,78,79, 80, 84, 86,87, 99, 106, 110,112, 114, 115, 116, 117, 118,121, 122,123,124,126,127,128, 129, 130,131,132, 133,134, 135, 136, 138,139, 140,141, 142, 143, 146,147, 148, 149,149 A,B, C, 158,159, 166,167,171, 173, 175, 178, 179,180,182, 185,186,187 188, 189,190, 193, 194,196, 246,247, 252 ,253, 265, 275, 277, 283,301,	18200. 09	43.25%

2.	Afforestation Working Circle	41.42.43.44.45.46.47.58.59.62.63.64.65.66 .67.67A.68.69.71, .72.73.75.91.100.105.107.125.137.150.151 .154.156.157.165.176.177.180.181.183.18 4.189.191.206.222.223.235.236.237.238.2 44.245.248.249.254.255.256.258.259.260. 261.262.264.265.268.269.270.271.272.276 .278.280.281.282.284.285.286.287.288.28 9.293.294.295.296.297.298.299.300.302.3 03.304.	14314. 80	34.02**%**
3.	Miscellaneous Working Circle	27,32,61,150,180,109, 120.	9564.9 1	22.73**%**
4.	Wild life (overlapping) Working Circle	Entire area	Entire area	100**%**
5.	Bamboo management (overlapping) Working Circle	Entire area	Entire area	100**%**
6.	NTFP Management (overlapping) Working Circle	Entire area	Entire area	100**%**
	Total		**42079. 80**	**100.00 %**

AREA STATEMENT :-- As per form No 1 A, submitted by the Sub Divisional Officer Sangli, his letter No A/ land/1268 Dt. 15-02-2011, Range & Talukawise area statement is shown in Appendix No. 9 of Volume-II.

IMPROVEMENT WORKING CIRCLE: This Working Circle includes all forest areas capable of producing small and medium sized timber. It also includes areas having sparse growth and low percentage of economically valuable species. The forest area included in this working circle is **14314.80 ha.**

AFFORESTATION WORKING CIRCLE: This Working Circle includes the forest areas which have sparse tree growth and open blank areas in degraded state. The forest area included in this working circle is **18200.09 ha**.

MISCELLANEOUS WORKING CIRCLE: This Working Circle includes the forest area under the control of the Sub-division but being used for the administrative use like office, depot, nursery, etc. It also includes the unclassed land given by the Revenue Department for the purpose of afforestation. The forest area included in this working circle is **9564.91 ha**.

WILD LIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE:

This overlapping Working Circle covers the entire forest area of this Plan.

BAMBOO MANAGEMENT (OVERLAPPING) WORKING CIRCLE:

This overlapping Working Circle covers the entire forest area of this Plan.

NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE:

This overlapping working circle covers the entire forest area of this plan.

SECTION 9: BLOCKS AND COMPARTMENTS

In the working plan prepared by B.P.Desai, which covered part of area of the present Sangli sub division, 113 compartment numbers were allotted (from 735 to 848). In the working plan prepared by U.K.Agrawal all the reserved forests, protected forests, and the unclassed forests of the sub division have been stock mapped and allotted to some compartment number. The present plan covered all the forest areas of the present sub division excluding the forest area transferred to Wildlife division and the forest area with the Revenue department.

In Desai's plan only 28412 ha forest area of the present sub division spread over 113 villages was covered for which 113 compartment numbers were allotted. In Agrawal's plan, an area of 42,464.09 ha was considered for the working plan with an extent of 47,220.86 hectares of Reserved forests and 9.94 hectares of Protected forests, apart from 8439.81 hectares of lands with revenue department which were handed over by revenue department to the forest department for afforestation purposes. This area was designated as unclassed land.

While preparing the present plan, area statement of the Sangli sub division was reconciled and the Form No. 1 was updated. Accordingly, the total area of the Sangli forest sub – division is 42079.80 hectares which includes the Reserved Forests of 32842.79 hectares, the Protected Forests of 9.94 hectares, the Unclassed lands of 8424.12 hectares and the Private Forests of 802.95 hectares. In view of the problems faced by the working plan division during the reconciliation of the area, it is suggested that the RFOs acquire the 7/12 extracts of all the lands in possession of the forest department and send them to the office of the Sub-DFO for the purpose of necessary verification and rectification. If any discrepancy is noticed it should be immediately reported to the working plan division and the CF (T), Kolhapur. The Sub-DFO should make necessary corrections in the area statement of the Annual Administration Report (AAR) being submitted to the office of the PCCF every year. This rectified area statement should tally with the area of Form No.1 as verified by the working plan division. Hence forth, if any change in area in charge of the Sub - division occurs, it should be reflected in the AAR.

SECTION 10: ANALYSIS AND VALUATION OF THE CROP

For the first time, the forest areas of Sangli sub division was stock mapped during the preparation of working plan of B.P.Desai for the period 1975-90. The stock mapping in the sub division was carried out from June 2010 till January 2011 by the territorial staff of the Sangli sub-division under the supervision of the RFO’s of the Working Plan division. The work of

stock mapping for all the forest areas of sub division has been undertaken to update details of density, site quality etc. From the available stock maps it is clear that the tract dealt with under the current plan comprises mostly of under-stocked and scrub forests interspersed with extensive blanks. These forests consist of poor type of teak and miscellaneous forests where site quality is mostly IV-b comprising of stunted and malformed crop. The density and the plantations have been shown on the stock maps. The standard conventional signs and symbols have been used on maps to show the details of stock mapping. The conventional signs and symbols used for stock mapping are **shown in Appendix No. 19.2 of Volume–II.** The abstract of the compartment wise **details of the stock mapping is shown in Appendix No.s 10.2, 11.2 of Volume II for different Working Circles.** From the perusal of stock mapping details, it will be seen that the teak forest in the sub-division is very less (about 1130 ha.) and is found only in few compartments of Shirala taluka.

SECTION 11: PERIOD OF THE PLAN

This Plan has been prepared for ten (10) years from 2012-13 to 2021-22.

CHAPTER - 10

IMPROVEMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

This Working Circle includes areas that are capable of producing medium size timber of teak and valuable miscellaneous species viz. Ain, Biba, Kalamb, Shisham, Tiwas, Sawar, Shiras and Khair. It includes forest areas situated mostly on hills having steep to moderate slopes. Such areas are found mostly in Western Ghats of Sahyadri hills in Shirala and Walwa Talukas and some parts of Tasgaon, Khanapur and Jath talukas. Such areas are not fit for carrying out any felling on account of steep slopes and their ecological fragility. In previous working plan these areas were included in improvement working circle, afforestation working circle and Environmental improvement of Dandoba Hill working circles. The total area included in this working circle is **18200.09 hectares which forms 43.25 %** of the total forest area.

Table No. 21 : Allotment of area to the WC

Sr.No.	Range	Area in ha.	No. of compartments	Area allotted to W.C.	% to area of range	% to area of the sub division
1	**Jath**	11363.82	8	2508.99	22.08	**5.96**
2	**Khanapur**	10309.73	42	7036.33	68.25	**16.72**
3	**Sangli**	5731.85	8	2488.95	43.42	**5.91**
4	**Shirala**	5812.60	41	3424.32	58.91	**8.14**
5	**Tasgaon**	4500.42	10	2741.50	60.92	**6.52**
	Total	**37718.42**	**109**	**18200.09**		

SECTION 2 : GENERAL CHARACTER OF VEGETATION

On account of steepness of the hills, there is considerable soil erosion and soil is, therefore, shallow. Consequently the site quality is poor, usually belonging to IV-b category. These forests belong to type 2A/C-2, 3B/C-2, 5A/C-3 and type 5A/C-1. The main tree species are Teak, Dhawada, Ain, Jambul, Mango, Butea & Bauhinia etc. The forests are generally under stocked and the crop is young to middle aged. The density generally does not exceed o.4. The coppicing in teak is profuse and natural regeneration is also forthcoming. In some parts of Shirala, the occurrence of bamboo is also reported.

SECTION 3: SPECIAL OBJECTS OF MANAGEMENT

i. To improve and enrich the condition of the existing growing stock within the forests

ii. To manage the run-off water and to improve the water regime within the forests.

iii. To maintain and improve soil cover within forest areas by undertaking seed dibbling and soil conservation works.

iv. To meet demands of local people for fuel wood and small timber to some extent.

SECTION 4: COMPARTMENTS AND WORKING SERIES

This Working Circle is divided into 20 Working Series. The details of the compartments and Working Series allotted to this Working Circle are given in **Appendix No. 10.3 of Volume II.**

SECTION 5: ANALYSIS AND VALUATION OF CROP

i. S*tock mapping*

All the forest areas included in this WC are being stock mapped on 4"= 1 mile scale toposheets with the help of local territorial staff. The results of the stock mapping are given in **Appendix No. 10.2 of Volume II**. The stocking details of the areas belonging to this working circle are as follows:

Table No. 22 : Extent of planimetered area as per stock maps

Sr. No.	Range	Area in ha.					Total
		Well stocked	Under stocked	Scrub	Plantation	Blank	
1	**Jath**	0	205.11	39.01	697.11	1567.76	2508.99
2	**Khanapur**	0	867.97	1744.85	1801.39	2622.12	7036.33
3	**Sangli**	0	422.33	0	576.70	1489.92	2488.95
4	**Shirala**	949.59	356.44	30.00	1469.47	618.82	3424.32
5	**Tasgaon**	0	147.59	173.48	1531.86	888.57	2741.50
	Total	**949.59**	**1999.44**	**1987.34**	**6076.53**	**7187.19**	**18200.09**
	% to WC	**5.22**	**10.99**	**10.92**	**33.39**	**39.48**	**100.00**

ii. Age and Density:

The crop in general is young to middle aged. The mature and over mature trees are few and scattered in the area. The forests included in this WC are generally under stocked and density varies from 0.1 to 0.4. Few scattered patches are with high-density up to 0.5 to 0.8.

iii. *Enumeration* **:**

The enumeration of the growing stock has been done and is being analysed below. Average total numbers of trees per hectare are found to be 82 out of which nearly 64 % fall within 15-30 cm girth class while nearly 95 % fall within a larger girth class of 15-60 cm. It implies majority of the crop is young and is in pole stage. Teak, Acacia, Ain, Sisoo, Shiwan, Neem, Dhawada are the top seven species in terms of number of trees per hectare. Important NTFP species along with their stocking per hectare have been listed below. Amba, Biba, Chandan, Nilgiri, Palas, Shiras, Sitaphal are the seven NTFP species in terms of stocking. A detailed statement showing WC wise enumeration results is given in **Appendix 8.1 of Volume II**.

Table No. 23 : Number of trees per hectare

Girth Classes (cms)									
15-30	**31-45**	**46-60**	**61-75**	**76-90**	**91-105**	**106-120**	**121-135**	**Above 135**	**Total**
52.14	17.87	7.94	2.70	0.66	0.12	0.10	0.05	0.02	**81.61**

Table No. 24 : Species having maximum number of trees/ha. in descending order

Sr.No.	**Species**	**No. of trees / ha.**	**Percentage**
1	**Teak**	39.29	48.14
2	**Acacia**	9.10	11.15
3	**Ain**	7.41	9.08
4	**Sisoo**	6.92	8.48
5	**Shivan**	5.15	6.31
6	**Neem**	5.07	6.21
7	**Dhawada**	4.27	5.23
8	**Others**	4.40	5.39

Table No. 25 : Estimated number of NTFP species per hectare

Sr. No.	NTFP Species	No./ha
1	**Amba**	0.02
2	**Biba**	0.20
3	**Chandan**	0.27
4	**Nilgiri**	0.86
5	**Palas**	1.01
6	**Shiras**	0.12
7	**Sitafal**	0.12
	Total	**2.60**

Table No. 26 : No. of plants/ ha. in natural regeneration

Height class (cms)			
0-90	**91-300**	**Above 300**	**Total**
21.90	0	0	**21.90**

Table No. 27 : Species having maximum number of plants/ ha. in descending order (N.R.)

Sr.No.	Species	No. of plants per ha.	Percentage
1	**Neem**	14.81	67.60
2	**Karanj**	1.93	8.81
3	**Glyricidia**	1.77	8.08
4	**Chinch**	1.13	5.16
5	**Babul**	0.81	3.70
6	**Murmuti**	0.64	2.92
7	**Khair**	0.48	2.19

SECTION 6: SILVICULTURAL SYSTEM

The area of this working circle is generally of hilly terrain. The main emphasis will be on soil and moisture conservation works and carrying out the tending operations to the natural regeneration so that the existing crop may become harvestable in the near future. As these areas are situated on slopes, any sort of working for the harvesting of timber and firewood will immediately enhance the danger of further soil erosion. Therefore, any type of felling is undesirable and hence not prescribed. Instead the existing vegetal cover in the area needs to be completely protected and improved for preventing soil erosion. The area will be strictly protected from the grazing. However, collection of non timber forest produces, which does not involve cutting of trees, will be permitted. In order to increase the stocking of the area, seed sowing of the suitable local species, which produce useful fruits and flowers and are of medicinal value also, shall be taken up. Adequate soil and moisture conservation works shall be taken up in the areas. Sowing of seeds of local species shall be carried out in the understocked areas.

Plantation in Shirala range

Plantation in Shirala range

SECTION 7: WORKING CYCLE

The working cycle has been fixed at 20 years.

SECTION 8: HARVESTABLE GIRTH

Improvement fellings shall include removal of dead, diseased, unsound and malformed trees for which there is no need to prescribe any harvestable girth. The removal of such trees shall help establishment of Natural Regeneration along with overall improvement of the forest flora. No such fellings shall however be done to create permanent openings in the canopy.

SECTION 9: FORMATION OF COUPES

The details of sequence of working of annual coupes are given in **Appendix no. 10.3 of Volume II.**

SECTION 10: REGULATION OF YIELD

Since only improvement fellings have been prescribed, the yield of timber will be negligible and hence has not been calculated.

SECTION 11: AGENCY OF HARVESTING

The coupes will be worked departmentally or by an agency as per the prevalent government rules/ policy.

SECTION 12: PREPARATION OF THE TREATMENT MAP

The proposed annual working coupes will be demarcated one year in advance of working season.

After demarcation of the area a treatment map shall be prepared by the field staff and shall be verified by a gazetted officer emphasizing the suitability of sites for Soil Moisture Conservation works as well as other improvement works. Treatment map will be prepared on graph paper in 1:5000 scale. Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B areas, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid. Grid-wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Grid-wise record of operations mentioned under Natural Regeneration e.g. tending, root stock management, singling of coppice, weeding etc shall be maintained.

The following areas shall be shown distinctively in the map:

I. Area 'A' - Protection Areas : It shall include the following areas.

i. Areas with steep slopes i.e. more than $25^{0.}$

ii. Eroded areas or areas liable to erosion.

iii. Twenty meters wide strip on either side of the water courses.

II. Area 'B' - Under stocked Areas : include areas with crop density less than 0.4.

III. Area 'C' - Old plantation areas **:** include areas under old plantations.

IV. Area 'D' - Well stocked areas : include areas with crop density more than 0.4.

Treatment: The various treatments proposed for the above mentioned areas are as follows:

I. Area 'A' :

i. The SMC works including nalla-bunding and gully plugging will be carried out wherever essential. Sites with perennial sources of water locally known, as 'jivant jhirra' should be tackled appropriately as explained under 'general prescriptions'.

ii. In the accessible under stocked areas having good soil depth, seed-dibbling shall be done to suitably clothe the area. Bamboo and other suitable species shall be planted in accessible under stocked areas within 20 meters wide strip on either side of water courses to ensure soil conservation.

II. Area 'B' :

i. The SMC works like van tale, bandharas, nalla-bunding, gully plugging etc will be carried out wherever required.

ii. In the accessible under stocked areas less than 2 ha. in extent, having good soil depth seed dibbling shall be done with suitable miscellaneous species.

iii. Rooted stock shall be properly tended.

III. Area 'C' :

i. Old plantations shall be treated as given under 'Marking Rules'.

IV. Area 'D' :

i. No planting shall be done in these areas.

ii. Improvement fellings shall be done as prescribed under 'Marking Rules'

SECTION 13: MARKING TECHNIQUE AND MARKING RULES

a. Marking technique for the trees to be marked for felling is discussed in the chapter on 'Miscellaneous Regulations'.

b. Marking Rules: Marking shall be done under the close supervision of the RFO. The Sub DFO shall inspect majority of the marked coupes to impart proper guidance and instructions to the staff as well as to guard against excessive marking if any.

I. Area 'A' :

i. No tree shall be marked for felling.

II. Area 'B' **:**

i. No tree shall be marked for felling.

III. Area 'C' :

Due to poorer site quality, the plantations generally show stunted growth and are usually sparse. Felling or Thinning of such plantations is not found to be suitable for this area, considering the fact that most of such plantations are sparse and are generally not congested. Therefore, only improvement works have been prescribed for such plantations as follows:

1. The SMC works like van tali, bandharas, nalla-bunding, gully plugging etc will be carried out wherever required.
2. Rooted stock of the planted species shall be properly tended.
3. The undesirable under growth which is preventing or likely to prevent the development of seed based NR of the desired species, shall be removed.
4. In the accessible under stocked areas less than 2 ha. in extent, having good soil depth seed dibbling shall be done with suitable miscellaneous species.

IV. Area 'D' :

i. All climbers on the trees except those having medicinal properties and which are used and traded shall be cut.

ii. Only dead, diseased, unsound and malformed trees shall be marked for felling, retaining two dead trees per hectare for the benefit of the wild-life.

iii. No fruit tree shall be marked for felling.

iv. The undesirable undergrowth which is preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed

- *A tree will be considered as*

(a) ***Unsound*** *when its bole emits a hollow sound when struck by any hard object or when it does not have any marketable timber.*

(b) ***Malformed*** *if it is badly shaped having defective stem or abnormal crown occupying more space than its future value warrants and includes conditions like stag headedness, gnarls, twists, or constrictions due to climbers or crookedness etc., heavily burnt by fire at its base and likely to fall down, with general cavities dug in the stem for taking out honey or has many ant holes or fungus, rots or other diseased portion.*

SECTION 14: SOIL AND MOISTURE CONSERVATION WORKS

SMC work in Shirala range

The area gets very poor average rainfall less than 500 mm. per year and most of the valuable rain water goes waste as run-off into the streams, rivers and ultimately into the sea. Therefore a large tract of this division except on the western side faces acute shortage of water during the summer months. The soil becomes compact during the pinch period resulting in poor drainage as well as poor aeration of the soil. Intensive SMC works viz. gully plugging, nalla-bunding, contour trenching, van-tali and other appropriate water harvesting structures shall help young regeneration to establish easily. Ridge to valley concept shall be followed while treating the watershed. A village shall be taken as a unit of holistic development. For this purpose, it shall be endeavored to integrate forestry management interventions with development schemes of other departments within the selected villages. Hence, the following prescription shall be followed:

1) Management of run-off water will be of utmost importance as most of the villages suffer from water scarcity for few months during summers. All major nallas, perennial sources of water, water bodies etc. shall be shown prominently in the treatment map. All prominent nallas shall be numbered and a plan shall be chalked out to treat all these nallas, gullies from ridge towards valley. Each selected nalla shall be treated completely with series of loose boulder structures (LBS) at the top to arrest the speed of the run off along with the fertile soil being washed away. At the appropriate sites downstream, suitable water harvesting structures like forest tanks i.e 'van talis' Kolhapuri bandharas etc. shall be taken. In addition, various soil moisture conservation works like gully plugging, gabion structures, brushwood dams, Vanrai bandharas, contour bunding, contour trenching, van talis etc. shall be done as per suitability and requirement of the area. Ridge to valley concept shall be followed while treating the watershed Water level in the village wells shall be monitored regularly by the forest staff and raised water level in the village wells during the scarcity period or raised ground water level and resulting changes in land use pattern and increased productivity of crops and vegetables shall be taken as indicators of success.

2) Sites with perennial sources of water locally known, as 'jivant jhirra' within the forest areas shall be identified and their locations shall be marked on the map of each Range, which shall be displayed prominently in each Range office. These sites shall be tackled appropriately through various means like desilting, deepening, diverting small trickles into dug out troughs adjacent to nallas, construction of Forest tanks locally known as 'Van-talis' in the nearby vicinity. This will ensure availability of water sources for wild animals and reduce straying of those animals into agricultural fields thus reducing conflict situations.

SECTION 15: REGENERATION

The young recruits of Ain, Anjani, Aonla, Chandada, Chandan, Jamun, Katak, Kinjal, Umbar etc. appear profusely after first few showers of the season. Areas having good NR of the local species will be identified. NR within such patches shall be properly spaced and tended as well as protected from fire and grazing. The various prescriptions have been discussed in detail under Section 8 in the chapter on 'Afforestation Working Circle'.

SECTION 16: PRE-PLANTING AND PLANTING OPERATIONS

The various pre-planting and planting operations have been discussed in detail under Section 9 in the chapter on 'Afforestation Working Circle'.

SECTION 17: OTHER REGULATIONS

Fire Protection: Main Improvement coupe shall be fire-traced and rigidly fire-protected for a period of five years from the Ist year of its working. The area shall be cleared-off of all the dry and cut remains of bushes, leaves etc. by end of February to avoid fire hazards to standing crop as well as to NR. Effective protection against fire for a period between Feb.15 to June 15 is a must to ensure survival and establishment of NR of all species for developing it into the future growing stock. 'Joint Forest Management committees' shall be formed and a comprehensive fire fighting scheme shall be chalked out, the details of which are given in the 'Miscellaneous Regulations'.

Closure to grazing: Main Improvement coupes shall remain closed to grazing for a period of 5 years from 1st year of its working.

Resolving conflict with Micro Plans made under JFM/ FDA: If any conflict is noticed between the prescriptions given in this WC and the Micro Plan written under JFM, FDA etc. for the same area, then the said area shall be treated in accordance with the special objects of management pertaining to this W.C. and suitable amendments shall be made in the Micro Plan, if necessary.

The prescriptions of this WC will not be applicable on areas bearing Seed Orchards, Sample Plots, Candidate Plus Trees, Plantations, nurseries etc falling in the areas allotted to this WC and which are otherwise in possession of the Silva MS. These areas are managed with a perspective of research and extension in forestry and hence will be managed as per their silviculture requirements as included in the Plan of Operations duly approved by Research and Advisory Committee (RAC) MS chaired by the PCCF.

The workshops should be organized in each Range to sensitize and train the field staff in implementing the prescriptions of this WP. The induction training of the field staff should be organised on priority by the CF, Education Circle which will help in effective implementation of various Working Plan prescriptions.

CHAPTER - 11
AFFORESTATION WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

This Working Circle includes all such compartments which have sparse tree growth and open blank areas in degraded state. These areas are degraded due to biotic pressure and environmental factors. Soil depth is poor. The district has much larger population of the cattle and sheep than the carrying capacity of the forests and as such faces acute shortage of fodder especially during summer months. Large cattle and sheep population hamper the regenerative capacity of the forests. This Working Circle also includes areas having good potential to raise fodder grasses. Such areas could be the ones which are either being auctioned or allotted to JFM committees regularly or were previously allotted to 'Kuran WC' and 'Pasture WC' in Desai's Working Plan. The total area of this WC is **14314.80 hectares** comprising all ranges and is nearly **34.02** % of the total forest area being dealt in this Plan.

Table No. 28 : Allotment of area to the Working Circle

Sr.No.	Range	Area in ha.	No. of compartments	Area allotted to W.C.	% to area of range	% to area of the sub division
1	**Jath**	11363.82	51	8339.58	73.39	**19.82**
2	**Khanapur**	10309.73	13	2525.80	24.50	**6.00**
3	**Sangli**	5731.85	1	125.46	2.19	**0.30**
4	**Shirala**	5812.60	22	1842.06	31.70	**4.38**
5	**Tasgaon**	4500.42	9	1481.90	32.93	**3.52**
	Total	**37718.42**	**96**	**14314.80**		

SECTION 2: GENERAL CHARACTERS OF VEGETATION

This Working Circle includes the forests of the following main types viz. Dry teak forests- $_5A/C_{1b}$, Dry grass lands- $_5D/S_4$. These forest areas have either sparse tree growth with bushes or totally blank and eroded areas situated on poor sites with shallow soils. The areas are over grazed. The site quality is at the most IV-b. The crop consists of bushy, thorny scrub forest with a predominance of unpalatable grasses and other weed species. The old plantations are mostly with stunted growth and have poor stocking. The better stocked patches are due to partially successful plantations or natural crop.

There areas are largely degraded yet few green patches in the valleys, along the nallahs etc found scattered in between. In the kuran areas, prescriptions regarding developing fodder resources as given in Desai's WP were not followed and instead large scale plantations of *Acacia auriculiformis, Glyricidia* etc. were taken in the past. As a result, patches with good growth of grasses are few and found scattered in between largely degraded kuran areas. Grasses of lesser nutritional value like Kusali, Kunda, are the main species found growing in these areas. The site quality is IV b. The crop consists of bushy, thorny scrub forest with a predominance of unpalatable grasses and other weed species. Intention here is to maintain and improve the existing fodder resources especially the grasses in these areas.

Teak plantation in Shirala range

SECTION 3: SPECIAL OBJECTS OF MANAGEMENT

i. To increase the vegetal cover and to increase the productivity of the land.

ii. To identify and develop areas having good potential to raise fodder grasses so as to augment fodder supply to meet the needs of the locals and their cattle.

iii. To conserve soil and moisture in the area by taking appropriate SMC measures.

iv. To improve the quality and quantity of fodder resources in the forests by introducing improved varieties of fodder grasses.

v. To reduce the grazing incidence in the forests and thereby improving their regenerative capacity.

vi. To recharge ground water supplies.

SECTION 4: COMPARTMENTS AND WORKING SERIES

The list of compartments allotted to different Working Series and sequence of annual coupes is given in **Appendix No. 11.3 of volume II.**

SECTION 5: ANALYSIS AND VALUATION OF CROP

i. *Stock mapping*: The area of this Working Circle is being stock mapped on 4 inch = 1 mile toposheets and 8 inch=1 mile village maps with the help of territorial staff. Steep and precipitous slopes are practically blank and devoid of any tree growth due to absence of soil in the exposed rocks. The results of the stock mapping are given as follows.

Table No. 29 : Extent of planimetered area as per stock maps in the Afforestation WC

Sr. No.	Range	Area in ha.					Total
		Well stocked	Under stocked	Scrub	Plantation	Blank	
1	**Jath**	0	2673.82	82.01	3011.67	2572.08	8339.58
2	**Khanapur**	0	408.26	358.94	696.94	1061.66	2525.80
3	**Sangli**	0	0	58.25	32.32	34.89	125.46
4	**Shirala**	174.92	519.36	40.99	648.68	458.11	1842.06
5	**Tasgaon**	0	489.39	0	477.19	515.32	1481.90
	Total	**174.92**	**4090.83**	**540.19**	**4866.80**	**4642.06**	**14314.80**
	% to WC	**1.22**	**28.58**	**3.77**	**34.00**	**32.43**	**100**

ii Age & Density :

The crop in this WC is young to middle aged. The upper hill slopes have poor density or blank areas while the density on the lower slopes and in valleys varies 0.3 to 0.4.

iii. *Enumeration* **:**

The enumeration of the growing stock has been done and is being analysed below. Average total numbers of trees per hectare are found to be 36 out of which nearly 65 % fall within 15-30 cm girth class while nearly 97 % fall within a larger girth class of 15-60 cm. It implies majority of the crop is young and is in pole stage. Glyricidia, Sisoo,Neem, Khair, Babhul, Hiwar, Palas, Subabhul, Dhawada, Kashid are the top ten species in terms of number of trees per hectare. 6 important NTFP species along with their stocking per hectare have been listed viz. Biba, Chandan, Nilgiri, Palas, Shiras and Sitaphal. The detailed statement showing WC wise enumeration results is given in **Appendix 8.1** of Volume II.

Table No. 30 : Number of trees per hectare

Girth Classes (cms)									
15-30	**31-45**	**46-60**	**61-75**	**76-90**	**91-105**	**106-120**	**121-135**	**Above 135**	**Total**
23.30	8.53	3.20	0.83	0.06	0	0	0	0	**35.92**

Table No. 31 : Species having maximum number of trees/ ha. in descending order

Sr. No.	Species	No. of trees / ha.	Percentage
1	**Glyricidia**	5.54	18.42
2	**Sisoo**	5.08	14.14
3	**Neem**	4.98	13.86
4	**Khair**	2.71	7.54
5	**Babul**	2.55	7.10
6	**Hiwar**	2.23	6.21
7	**Palas**	1.85	5.15
8	**Subabul**	1.58	4.40
9	**Dhawada**	1.48	4.12
10	**Kashid**	1.40	3.93
11	**Others**	6.51	18.12

Table No. 32 : Estimated number of NTFP species per hectare

Sr. No	NTFP Spp.	No./ha
1	**Biba**	0.12
2	**Chandan**	0.12
3	**Nilgiri**	2.09
4	**Palas**	3.23
5	**Shiras**	0.31
6	**Sitafal**	0.65
	Total	**6.52**

Table No. 33 : No. of plants/ ha. in natural regeneration

Height class (cms)			
0-90	**91-300**	**Above 300**	**Total**
0.087	0.052	0.035	**0.174**

Table No. 34 : Species having maximum number of plants / ha. (N.R.)

Species	No. of plants per ha.	Percentage
Khair	**0.174**	**100**

SECTION 6: PREPARATION OF THE TREATMENT MAP

The proposed annual working coupes will be demarcated one year in advance of working season. After demarcation of the area, a treatment map shall be prepared by the field staff and shall be verified by a gazetted officer. Treatment map will be prepared on graph paper in 1:5000 scale. Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B areas, where plantations are prescribed, grids of size 0.5 ha shall be laid. In C and D type areas grids of 1 ha size shall be laid. Grid-wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed, live high stump, singling of coppice shoot etc. will be recorded. Grid-wise record of operations mentioned under Natural Regeneration e.g. tending, root stock management, singling of coppice, weeding etc shall be maintained. The following areas shall be shown distinctively in the map:

I. Area 'A' - Protection Areas : include the following areas.

i. Areas with steep slopes i.e. more than $25^{0.}$

ii. Eroded areas or areas liable to erosion.

iii. Twenty meters wide strip on either side of the water courses.

II. Area 'B' - Under stocked areas: include areas with crop density less than 0.4.

III. Area 'C' - Old Plantation areas**:** include areas under old plantations.

IV. Area 'D' - Well stocked areas: include areas with crop density more than 0.4.

In addition, the Treatment Map shall also show prominently the type and location of SMC works to be undertaken.

Treatment:

The various treatments proposed for the above mentioned areas are as follows:

I. Area 'A' :

i. The SMC works including nalla-bunding and gully plugging works shall be carried out wherever needed.

ii. Cuttings of Ficus, Vitex spp. (Nirgudi), bulbils of Agave etc. shall be planted for binding the soil where ever possible.

II. Area 'B' :

These areas shall be treated in following two stages:

A) Restorative Phase: During this phase, soil and moisture conservation works shall be carried out during the initial first year. The area of the annual working unit shall be protected completely from biotic interference by digging a T.C.M. During this phase various works will be taken up as under:

i. Preparation of the T.C.M. and/ or live hedge around the working area. Preparation for the live hedge should be started before the rains set in so that the seeds/ cuttings/ seedlings of suitable local species should be sown/ planted at the onset of the rains. TCM may be dug after the rains.

ii. The SMC works like van tale, nalla-bunding, gully plugging, contour trenches etc will be carried out wherever required and as per the suitability of the area before the rains set in.

iii. Species like Agave, bamboo, Chillar and other suitable local species should be grown on the mound of the live hedge and TCM.

iv. Motivating the villagers for J.F.M. shall be done during this period.

B) Productive Phase: In the second year, the planting activity shall be taken in the same annual working unit.

i. Rooted stock shall be properly tended.

ii. Suitable local miscellaneous species including medicinal plants will be planted in the under-stocked areas having good soil depth. Preferred species are indicated in the Section 8 on Regeneration. Areas prone to excessive grazing shall be excluded from planting activity.

iii. Areas with existing good growth of fodder grasses as well as areas suitable for growth of fodder grasses shall be identified and closed to grazing.

iv. Seeds of superior fodder grasses like Sheda, Pawnya, Marvel, Dinanath etc. should be sown on the freshly excavated and heaped soil bund on the lower side of the contour trenches in the suitable areas. Other suitable models for raising fodder grasses may also be used after getting prior approval from the CF (T), Kolhapur.

v. All obnoxious weeds, thorny shrubs and bushes shall be uprooted from these identified areas.

vi. No other tree species except for only suitable fodder tree species may be introduced in the erstwhile Kuran areas.

III. Area 'C' :

The following norms are laid down to adjudge success or failure of plantations as per the 'Evaluation Code'.

Table No. 35 : Norms for plantations as per Evaluation code

Area category	Successful plantations	Partially Successful plantations	Failure plantations
Suitable sites with soil depth > 2', rainfall 50" to 150", average prevalence of adverse biotic factors, gentle to moderate slopes	60% and above	33% to 60%	Less than 33%
Medium quality sites with soil depth > 1', rainfall 35" to 50", average prevalence of adverse biotic factors, moderate slopes	50% and above	25% to 50%	Less than 25%
Poor sites with soil depth < 1', rainfall < 35" or > 125", excessive prevalence of mist and fog, adverse biotic factors	40% and above	20 % to 40%	Less than 20%

The plantations, which are found to be failure as per the evaluation code, shall be evaluated by the DFO evaluation to ascertain the causes of failure so as to avoid and overcome them in future. Deviation proposals shall be prepared for such plantations and sent to CF Kolhapur/ CF WP.

Due to poorer site quality, the plantations generally show stunted growth and are usually sparse. Felling or Thinning of such plantations is not found to be suitable for this area, considering the fact that most of such plantations are sparse and are generally not congested.

Therefore, only improvement works have been prescribed for such plantations as follows:

i. The SMC works like van tale, bandharas, nalla-bunding, gully plugging etc will be carried out wherever required.

ii. Rooted stock of the planted species shall be properly tended.

iii. The undesirable under growth which is preventing or likely to prevent the development of seed based NR of the desired species, shall be removed.

iv. Accessible under stocked areas having good soil depth and more than 2 hectares in extent in a compact block shall be planted with suitable miscellaneous species while in areas less than 2 hectares in extent, seed dibbling shall be done.

IV. Area 'D' :

i. No planting shall be done in these areas.

SECTION 7: SOIL AND MOISTURE CONSERVATION WORKS

The area gets heavy average rainfall of about 2000 mm. per year but most of the valuable rain water goes waste as run-off into the streams, rivers and ultimately into the sea. Therefore a large tract of this division especially on the eastern side faces an acute shortage of water during the summer months.

Forest tank in Khanapur range

The soil becomes compact during the pinch period resulting in poor drainage as well as poor aeration of the soil. For this purpose, it shall be endeavored to integrate forestry management interventions with development schemes of other departments within the

Hence, the following prescription shall be followed

1) Management of run-off water will be of utmost importance as most of the villages suffer from water scarcity for few months during summers. All major nallas, perennial sources of water, water bodies etc. shall be shown prominently in the treatment map. All prominent nallas shall be numbered and a plan shall be chalked out to treat all these nallas, gullies from ridge towards valley. Each selected nalla shall be treated completely with series of loose boulder structures (LBS) at the top to arrest the speed of the run off along with the fertile soil being washed away. At the appropriate sites downstream, suitable water harvesting structures like forest tanks i.e 'van talis' Kolhapuri bandharas etc. shall be taken. In addition, various soil moisture conservation works like gully plugging, gabion structures, brushwood dams, Vanrai bandharas, contour bunding, contour trenching, van talis etc. shall be done as per suitability and requirement of the area. Ridge of valley concept shall be followed while treating the watershed Water level in the village wells shall be monitored regularly by the forest staff and raised water level in the village wells during the scarcity period or raised ground water level and resulting changes in land use pattern and increased productivity of crops and vegetables shall be taken as indicators of success.

2) Sites with perennial sources of water locally known, as 'jivant jhirra' within the forest areas shall be identified and their locations shall be marked on the map of each Range, which shall be displayed prominently in each Range office. These sites shall be tackled appropriately through various means like desilting, deepening, diverting small trickles into dug out troughs adjacent to nallahs, construction of Forest tanks locally known as 'Van-talis' in the nearby vicinity. This will ensure availability of water sources for wild animals and reduce straying of those animals into agricultural fields thus reducing conflict situations.

SECTION 8: REGENERATION

The young recruits of Ain, Anjani, Aonla, Chandada, Jamun, Katak, Kinjal, Umbar etc. appear profusely after first few showers of the season. The status of NR in general can be treated as satisfactory in the western part except for the forest patches adjoining villages that are prone to fires and unregulated grazing. So to help the young recruits of above mentioned species to establish and to further induce the NR, the following prescriptions shall be followed:

Regeneration of mix plantation in Khanapur range

i. The areas containing promising NR shall be identified inside the coupe.

ii. The undesirable undergrowth which is preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed.

iii. Identified NR patches shall be properly spaced and tended and rigidly fire-protected.

iv. Coppice shoots interfering with the development of young seedlings shall be removed.

Artificial Regeneration and Choice of the Species:

The limiting factors of a plantation to be successful are listed below. They should be properly addressed before taking up any new plantation activity-

i. Timely plantation targets.

ii. Selection of suitable plantation sites.

iii. Choice of species as per the sites and as per the requirement of the village communities.

iv. Analysis and eradication of reasons for previous failures.

v. Timely release of budgetary grants.

vi. Seed procurement from known sources.

vii. Healthy and hardy nursery stock.

viii. Proper depth of trenches or pits.

ix. Proper soil-working.

x. Full protection from biotic-interference.

The choice of the species to be planted shall depend upon the area suitability of the species and its local demand and shall be decided by the Sub DFO in close consultation with the local village communities. Local plant species should be preferred. The species suitable for these areas for planting are Amba, Anjan, Arjun Sadada, Awala, Behada, Bel, Charoli, Chinch, Chinch Hingan, Jambhul, Karanj, Kawath, Khair, Ladai, Nandrukh, Neem, Pimpal, Pimpe, Ramkathi, Sadhi Babul, Sissoo, Shiras, Sitaphal, Shivan, Soundad, Subabul, Teak, Umber, Wad and other suitable local species. Areas suitable for Bamboo plantations should be

identified and planted preferably with locally available and sought after bamboo species viz. Kanak bamboo (*Bambusa bambos*). However, the list of all suggested species is only indicative and not exhaustive.

Care shall be taken to give due representation to local fuel and fodder tree species (about 15% of the misc. stock) as well as to the edible fruit and NTFP tree species (another 15% of the misc. stock). Seedlings raised preferably in root-trainer containers shall be used. Tall plants of 1.5 to 2.5 years old should also be raised in the nurseries and few plantations may be raised using these tall plants in 1x1 meter deep pits on the barren hillocks on experimental basis. The Sub-DFO should consult the Silva, MS for seeking his guidance to introduce certain new/exotic/endangered species for field trials in a limited way which have been found to successfully establish after fair trials in the research areas. The Sub-DFO may also try to raise plantations using irrigation at suitable places having perennial sources of water.

Suitable fodder grasses shall also be raised either on the mounds of the contour- trenches or on the fodder beds as per the plantation model adopted. The objective shall be to provide fuel and fodder to the local community under JFM and to encourage them to raise fast growing fuel and fodder trees and fodder grasses on the mounds of their fields or fallow lands and community lands under appropriate schemes of the Social Forestry department so as to make them self-sufficient and to reduce their dependence on forests. Fodder so produced shall be disposed of to the JFMCs of the area as per the provisions pertaining to JFM given in the Government of Maharashtra, Resolution no. MSC/ 2000/ case no. 143/ F-2 dated 25.04.2003 and fodder grass disposal as formed by Govt. of Maharashtra vide order No. TAG/ 1089/ C.R./ 2161/ Mumbai 11, dt. 20/10/1989.

SECTION 9: PRE-PLANTING AND PLANTING OPERATIONS

i) Pre-planting operations:

PPO shall be carried out during the restorative phase i.e. one year before the actual planting works are to be taken up.

(a) Soil Working:

It will include digging up of pits/trenches along with nalla-bunding, check-dams and other SMC works. Proper depth of the pits/trenches as per the plantation model is essential for the early establishment of the seedlings and therefore should be given appropriate attention by the inspecting officers.

(b) Fencing:

The area to be planted shall be fenced with a TCM but care shall be taken not to dig it across the contour and instead live-hedge fencing shall be provided across the contour. On the mound of the TCM, a row of suitable fast growing species like Chillar, Ipomoea, Vitex negundo, Acacia pinnata (Shembati) shall be planted along with Agave bulbils and tussocks of Khus and Sabai grasses on either side. Karvand and Bamboo may also be planted at suitable places on

the TCM. In the drier areas on the eastern side of the district, Prosopis and Parkinsonia can be the preferred species to be planted on the mound. Repair of the TCM in the following years shall be attended to, if required in order to keep it effective and cattle-proof. Live-hedge fencing works should be started before the rains.

SECTION 10 *©Nursery:*

Nursery shall be raised well in time using root trainers/ poly pots as per the yearly requirement of the stock. *Only good quality seeds of known origin should be used. The Silva MS has maintained many seed orchards across the State*. The Sub DFO should first try to procure good quality seeds of the required species from the Silva as well as from the seed units of the FDCM for raising nurseries. Adequate budgetary grants must be provided to the Sub DFO in time so as not to affect the nursery operations. Nursery stock should be a judicious mix of indigenous species valuable to the local community for their daily needs like that of timber, fuel, fodder, NTFP as well as of bamboo. *Tall plants (1.5 to 2.5 years old) of miscellaneous species should also be raised in the nursery so as to introduce them in the field at a large scale.* The stock should be tended with great care so that the seedlings of various species grow into healthy and hardy planting stock and attain sufficient height and age before they are planted out. The sorting and grading of the planting stock should be done on regular basis and only healthy and hardy seedlings of sufficient height and age should be allowed to leave the nurseries for planting in the field. A list of central nurseries is given in **Appendix no. 11.4 of Volume-II.**

ii) Planting Operations :

(a) Planting

The planting of miscellaneous species shall be done in the pits/ trenches during the Productive phase in the next year. It shall be completed within a fortnight from the outbreak of monsoons. *The Sub DFO should also try to raise irrigated plantations at suitable places having permanent source of water. Afforesting barren, degraded sites, hillocks with tall plants in deep pits/ trenches as per the requirement of the site should also be tried.*

SECTION 11 *Weedings, Soil-working and Casualty-replacement*

Weedings, Soil-working and Casualty-replacement shall be done timely and as per the plantation model adopted. Proper soil-working of the seedlings planted is absolutely essential and therefore close attention should be given to it by the inspecting officials.

SECTION 10 : OTHER REGULATIONS

i. **Fire Protection:** Main Afforestation coupe shall be fire-traced and rigidly fire-protected for a period of five years from the 1st year of its working. The area shall be cleared-off of all the dry and cut remains of bushes, leaves etc. by the end of February to avoid fire hazards to standing crop as well as to NR. Effective protection against fire for a period between Feb.15 to June 15 is a must to ensure survival and establishment of NR of all species for developing it into the future growing stock. 'Joint Forest Management committees' shall be formed and fire tracing and other related works will be carried out through these committees.

ii. **Closure to grazing:** Coupe shall remain closed to grazing for a period of 5 years from the 1st year of its working.

iii. **Resolving conflict with Micro Plans made under JFM/ FDA**: If any conflict is noticed between the prescriptions given in this WC and the Micro Plan written under JFM, FDA etc. for the same area, then the said area shall be treated in accordance with the special objects of management pertaining to this W.C. and suitable amendments shall be made in the Micro Plan, if necessary.

iv. The prescriptions of this WC will not be applicable on areas bearing Seed Orchards, Sample Plots, Candidate Plus Trees, Plantations, nurseries etc falling in the areas allotted to this WC and which are in possession of the Silva MS. These areas are managed with a perspective of research and extension in forestry and hence will be managed as per their Silviculture requirements as included in the Plan of Operations duly approved by Research and Advisory Committee (RAC) MS chaired by the PCCF.

v. The Workshops should be organized in each Range to sensitize and train the field staff in implementing the prescriptions of this WP. The induction training of the field staff should be organised on priority by the CF, Education Circle.

CHAPTER – 12
MISCELLANEOUS AREA

SECTION 1: GENERAL CONSTITUTION

This Chapter includes the following areas:

5. Unclassed lands which were handed over by the Revenue department to Forest department. These are the Gairan lands given by the revenue department to the forest department for taking up the afforestation activities. They have not been declared as forest within the meaning of Indian Forest Act 1927. Such areas are distributed in all the ranges of the sub division. The extent of the area is 8424.12 hectares. **The details are given in Appendix No. 12.2 of Volume II.**
6. Forest areas which are under a) the forest nurseries at Retra Dharan, Jath and Khanapur, b) the Sub-division office and residential colonies at various Range HQs. and c) Area under Research plots at Retra Dharan. The extent of the area is 25.76 hectares. The extent of the area is 8424.12 hectares. **The details are given in Appendix No. 12. 3 of Volume II.**
7. Forest area which do not have clear boundaries on the ground and does not have maps is included here. The extent of the area is 312.08 hectares. **The details are given in Appendix No. 12.4 of Volume II.**
8. Areas which were acquired under Section 3 of Private Forest (Acquisition) Act, 1975 but are yet to be finally vested with the forest department pending inquiry. These are distributed in Khanapur and Shirala ranges. The extent of the area is 802.95 hectares. **The details are given in Appendix No. 12. 5 of Volume II.**

The total area included in this Chapter **is 9,564.91 hectares** which is **22.73 %** of the total forest area being dealt in this Plan. The compartment wise area details are given in **Appendix No. 12.1 of Volume II.**

Table 36 : Allotment of area

Sr. No.	Range	Area (in ha.)	No. of compartments	Area allotted to WC	% to area of range	% to area of the division
1	**Atpadi**	4361.38	27	4361.38	100	**10.36**
2.	**Jath**	11363.82	22	515.25	4.53	**1.22**
3.	**Tasgaon**	4500.42	11	277.02	6.16	**0.66**
4.	**Khanapur**	10309.73	24	747.60	7.25	**1.78**
5.	**Sangli**	5731.85	30	3117.44	54.39	**7.41**
6.	**Shirala**	5812.60	19	546.22	9.40	**1.30**
	Total	**42079.80**	**133**	**9564.91**		

SECTION 2 : METHOD OF TREATMENT

The method of treatment for different areas as specified in Section 1 shall be as follows:

v. Due to the fact that these lands are legally not the forest lands but form part of the Form-1 Area register, the protection of the plantations from grazing, fires and encroachments would be a handicap to the forest personnel. ***Sub-DFO should immediately send the proposal to the Government to notify all such unclassed lands under section 4 of Indian Forest Act 1927 so that the process of converting these areas into reserved forests may begin.***

vi. These areas do not require further treatment, but only needs protection and proper maintenance of the area.

vii. These areas of Reserved Forests require survey and demarcation with the help of DILR and preparation of maps on an urgent basis for effective management of the area.

viii. These areas have been notified under Private Forest Acquisition Act 1975, but are yet to be decided by the competent authority of the Revenue department. The claims of the concerned persons are yet to be decided. ***Sub-DFO should pursue with the concerned revenue authorities, as these cases are pending for taking the final decision regarding the restoration of such lands to the owners.***

CHAPTER - 13
WILD LIFE (OVERLAPPING) WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

The forests along the western parts of Sangli district are rich in wildlife biodiversity. Their continued existence is crucial for the long-term survival of the biodiversity and the ecosystems supporting them. This Working Circle overlaps with the entire area being dealt in the Working Plan.

SECTION 2: SPECIAL OBJECTIVES OF MANAGEMENT

i. To conserve and protect the rich wildlife bio-diversity.

ii. To reduce man-animal conflict situations.

iii. To strengthen the corridors connecting the protected areas.

iv. To increase habitat suitability in areas rich in wild animal populations

v. To train the staff and to strengthen the infrastructure to handle wildlife emergencies.

SECTION 3 : GENERAL DESCRIPTION OF VEGETATION

The forest types that occur in this Working Circle as per Champion and Seth classification are 1) Western sub tropical hill forest 2) West coast semi evergreen forest 3) Southern moist mixed deciduous forest 4) Southern dry mix deciduous forest, 5) Dry teak forest and 6) Dry grass lands. The floristics of these forest types have already been discussed in the previous chapters. From wild life point of view, by and large two regions of the division can be considered I) Eastern portion of the division mainly comprising of Southern dry mix deciduous forest, Dry teak forest and Dry grass lands and ii) Western portion of the division mainly comprising of rest of the forest types.

However, the increase in human population resulting in increasing demands for housing and agricultural land, easy access into forest areas through the development of an extensive road network, diversion of forest for various “developmental” projects, mining, hangover of shikar traditions, paucity of staff and no specific schemes for wildlife conservation in areas other than sanctuaries have all contributed to the decline of wildlife in the district. The habitats of the wild animals have been drastically reduced and the populations of wild animals that remain feel cornered in small isolated pockets of wilderness. The contiguous patches of forests are lost in most areas of the district. It is important to note that although the focus of wildlife protection has normally been on the bigger wild animal species like the Tiger and Gaur, the Western Ghats harbour innumerable small endemic and extremely rare species of plants and animals many of which may not even have been reported as yet. These gene pools assume great significance in today’s shrinking world and all out efforts are required to ensure their protection and conservation.

The Western Ghats running along the western boundary of the district and the adjoining forest areas however still have good populations of wild animals and plants. The two protected areas in the district viz. Chandoli and Sagareshwar were declared as wild life sanctuaries vide Govt. notification no. WLP 1085/ CR-588/ 7/ F-5, dated 16/9/1985 and WLP 1085 / CR-588 / II / F-5, dated 16/9/1985 respectively. Chandoli wildlife sanctuary area has been declared as a National Park vide. Government notification no. WLP 1099 / CR 117 / F-1, dated 14/5/2004.

SECTION 4 : DISTRIBUTION OF WILD ANIMALS

Existence of crocodile in Krishna around Sangli

Scanning of the old records reveal that the hilly region of Sahyadri and its foot hills were rich in wildlife in the past. Wild life is rich and varied in the Western part of the division i.e. along the Western Ghat where there is natural protection due to inaccessibility and scanty population. Panther, Bear, Gaur, Sambar, Barking deer, Four horned antelope, Wild boar, Wild dog, Indian giant squirrel etc. are found in the western part; in the Eastern part where the climate is comparatively dry and dry grass lands occur, the animals found are Chinkara, Hyaena, Wolf, Jackal, Fox etc. Animals found in both Eastern and Western parts are Hare, Porcupine, Pangolin, Jungle cat, Common tree cat, Grey mongoose, Monkeys etc. Indian sand grouse, Green pigeon, Stone plover, Bald coot, Egrets are common throughout the sub division. Jungle bush quail, Rain quails, Painted partridge, Jungle fowl etc. are mostly found in the Western part of the division. Grey partridge is generally found in the sugar cane fields. The Pelicans, Spoon bills, White ibis, Whistling teals, Brahminy ducks are found in large rivers. White necked storks and Black necked storks are found only in winter season. The Demoiselle crane is the only crane seen in the rivers around March month. Other birds like Indian roller, Pied kingfisher, Koel, Paradise fly catcher, Crow pheasant, Bulbul, Parakeets, Oriole, Hawks, Eagles and Owls are common in the sub division. In the lake at Mayani and Yeralwadi, adjoining the Sangli district boundary, the local as well as migratory birds especially the Siberian cranes, Flamingoes, Demoiselle cranes etc are found.

SECTION 5 : LEGAL POSITION

There were no written regulations for control over hunting when these areas were under the erstwhile Sansthan and Jahagiris except that hunting by people other than the Rulers was generally not permitted. The Wild Birds and Animal Protection Act of 1912 was the first legislation which was implemented in the forests under British regime. However, the provisions of this Act were not enough to control the hunting of wild animals. The Indian Forest Act of 1927 had provisions under section 26 (1) (i) and 32 (j) for protection of wild

animals in notified Reserved and Protected Forests but these provisions were not applicable outside notified Reserved and Protected forests.

The Bombay Wild Animals and Wild Birds Protection Act 1951 was a more comprehensive piece of legislation affording much wider protection to wild animals and wild birds and also included constitution of a State Wildlife Advisory Board, Procedures for issuing licences for hunting certain wild animals and birds, Constitution and control of game sanctuaries, Regulations for dealing in trophies and Prevention and detection of offences and penalties for contravention of the provisions of the Act.

Accordingly the Indian Board for Wildlife was first constituted in 1952 to advise the Government on policies related to Wildlife Conservation and Protection. In 1972 the Wildlife (Protection) Act was passed and the long title of the Act was as follows. "An Act to provide for the protection of Wild animals, birds and plants and for the matters connected therewith or ancillary or incidental thereto".

The Wildlife (Protection) Act 1972 underwent major amendments in 1982 (Amendment Act. 23 of 1982), 1986 (Amendment Act. 28 of 1986), 1991 (Amendment Act 44 of 1991), 1993 (Amendment Act 26 of 1993) and 2003 (Amendment Act 16 of 2003). The long title of the recently amended Act 2003 reads as follows.

"An Act to provide for the Protection of Wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country".

It is thus evident that the scope of the recently amended Wildlife Protection Act has been broadened to correlate the ecological and environmental security of the country with the protection of Wild animals, birds and plants.

The first National Wildlife Action plan was adopted in 1983 and recently i.e. in 2002 this has been modified by the second National Wildlife Action Plan (2002 – 2016). The Preamble of this new National Wildlife Action Plan is as follows:

"The first National Wildlife Action Plan was adopted in 1983 based on the decisions taken in the XVth meeting of the Indian Board for Wildlife held in 1982. The plan had outlined the strategies and action points for Wildlife Conservation, which is still relevant. In the mean while, however, some problems have become more acute and new concerns have become apparent, requiring a change of priorities. Increased commercial use of natural resources, continued growth of human and live stock populations and changes in consumption patterns are causing greater demographic impacts. Biodiversity conservation has thus become a focus of interest. The National Forest policy was also formulated in 1988, giving primacy to conservation hence this new National Wildlife Action Plan (2002 – 2016)".

Thus the present policies and legislation concerning Wildlife conservation / protection are as follows:

1. National Wildlife Action Plan (2002-2016)
2. Wildlife (Protection) Act 1972 as Amended in 2003
3. National Zoo Policy 1998
4. The Biological Diversity Act 2002

SECTION 6 : RIGHTS AND CONCESSIONS

There are no rights and concessions granted to people in respect of wild animals and birds for capturing, hunting or shooting.

SECTION 7 : STATISTICS OF WILD ANIMALS

The population estimation for wild animals in the territorial division is done once every four years. The estimation of Tigers and Leopards was basically done using the Pug Mark Estimation technique between the 18th and 22nd of April 2005 (both days inclusive) and the estimation of other animals was done using the Waterhole Count method on 2 occasions in 2005 viz. the 23rd – 24th April and the 22nd – 23rd May 2005 in the entire state including Sangli territorial sub-division.

According to the state level committee report, 2005 the population estimates for various wild animals in Sangli sub division are as follows:

Table No. 37 : Population Estimates of Wild animals in Sangli sub division - 2005

Name	Nos.
Barn Owl	002
Bonnet Macaque	032
Common Mongoose	008
Common Langur	015
Common Palm Civet	002
Common Yellow Bat	008
Grey Jungle fowl	010
Jackal	017
Jungle Cat	004
Indian Pangolin	004
Indian Peafowl	063
Indian Porcupine	018
Indian Hare	025
Striped Hyena	009
Wild Boar	014
Wolf	048

One important recommendation made in the Report of the State level Committee on population Estimation, 2005 is as follows:

"*Tiger presence in the Kolhapur Forest circle including its Protected Areas needs closer monitoring through a system of keeping records of direct sightings by the field staff at the lowest level and proper follow up of all cattle kill cases to find out probable territories of the predator. This is important considering that getting pugmarks is very difficult in these areas".*

A statement showing population estimates of wild animals in Kolhapur Wild life division is given in **Appendix No. 13.1** of Volume-II of the Plan.

SECTION 8 : MAN-ANIMAL CONFLICT

Incidents of man-animal conflict have increased manifold over the years. While increasing man-animal conflict is an outcome of shrinkage, fragmentation and deterioration of habitats, it has caused destruction of wildlife and generated animosity against wild animals. Habitat destruction to meet the ever increasing needs of the human population force herbivores like wild boar to enter agricultural fields leading to incidents of crop depredation.

Table No. 38 : Details of cases of Wild Life Conflicts

Year	Cattle killed (No.)		Human (No.)		Crop Compensation	
	Goat	Cow / Buffalo	Injured	Killed	No.	Amount (Rs.)
1998-99	03	0	0	0	0	2,900
99-2000	05	0	1	0	0	18,100
2000-01	03	0	0	0	0	2,000
2001-02	01	0	0	0	0	1,000
2002-03	01	0	1	1	0	4,000
2003-04	02	3	0	3	0	5,19,875
2004-05	02	0	0	0	0	4,725
2005-06	21	0	2	0	47	1,15,112
2006-07	43	4	0	0	82	1,59,293
2007-08	12	0	0	1	6	2,26,355
2008-09	75	0	6	0	12	2,04,595

Incidents of Panthers attacking cattle are seen in Shirala range. Attacks of Wolf and Hyena on sheep and Goat are common in eastern part of Sangli sub division. Also, there were some cases of attacks of Hyena on human being in Palus tahsil. Attacks of crocodiles on human being in Krishna river is the major conflict in Sangli district. There were 4 cases of

killing and 7 incidences of injuries caused to human life by crocodiles in the last 10 years.

Cases of crop depredation by spotted deer and blackbucks are very common in the area surrounding the Sagareshwar wildlife sanctuary. There is a rising trend of compensation amount spent for crop damage in the recent years.

HUMAN-CROCODILE CONFLICTS

The Krishna River and its tributaries in Sangli district have a breeding population of mugger crocodiles *Crocodylus palustris,* which have caused attacks on humans and livestock in the recent years. Mr. Nikhil Whitaker, Curator of the Madras Crocodile Bank Trust has visited these attack sites in December, 2007 and again in June 2008 to conduct survey and suggest measures for mitigation of the

Injured in crocodile attack in (Bhilwadi) sangli range

Crocodile attacks on livestock and humans. He conducted the survey along with the forest department staff and the local NGOs.

- As per his report, 10 villages are proposed for the conservation of Crocodiles, namely Chopadewadi, Bhilwadi, Ankalkhop, Kasbedigraj, Samdoli, Nagrale, Ankaly, Dhangaon, Kavathepiran and Sukhawadi.
- Majority of attacks occurred in the months of March to May, which calls for a wide publicity among the villagers to keep off the danger sites.
- Translocation of Crocodiles is not a very effective measure to tackle this problem because of the homing instinct found in Crocodiles.
- Setting up the suitably designed bathing/ washing cages at the suitable locations.
- Establishing a small-scale rescue centre for Crocodiles to tackle the situation.
- Local network of NGOs in the Sangli district, such as Vasundhara and River Valley Expeditions has to be involved for resolving conflict issues effectively and further for creating conservation awareness among the local villagers.

Capacity building/ technical training of the staff, local villagers and the NGO members is necessary for identification and rescue operations.

NAGPANCHAMI AT BATTIS SHIRALA

Battis Shirala is a small village situated at about 65 km from Sangli located in the hilly area covered by thick forests. This is best known for its Nagpanchami festival. Every year during the "Snake Festival - Nagpanchami", thousands of visitors from India and abroad visit this place. Nagpanchami Festival is celebrated on the day of shrawan shudha panchami every year. Tradition of Nagpanchami celebration is unique and different at

Battis Shirala. Varieties of snakes used to be captured from the surrounding area of Shirala. On Nag-panchami day huge number of Nag-devotees takes out procession of the king of snakes 'Cobra' on the main roads of the town to display the snakes and later they are taken to the their homes for worshipping. Competition was being held amongst the participating Nagmandals for the best Cobra displayed with the criteria such as length, thickness and size. Later, the captured snakes were being released into the nature after the festival celebrations.

As this tradition of capturing and displaying of snakes was against the provisions of Wild life Protection Act, 1972 a Public Interest Litigation No. 62/2002 was filed in the Hon. Mumbai High Court by Shri. Ajit Shridhar Patil and others. The Hon. Mumbai High Court passed an interim order in this Public interest Litigation on 9.8.2002. The operative Part of this order is as follows,

"1) Rule. Respondents waive service. Petition to be placed for hearing in the I week of September 2002.

2) Authorities under the various Acts including Forest, Revenue and Police department shall not allow any procession with exhibition of snakes in festival of Nagpanchami at Battis Shirala. No display of snakes shall be permitted on any truck or vehicle etc.

3) Authorities shall ensure that:

a) Snakes shall not be used for any games in any manner.

b) There shall be no competition and prize for snakes.

c) After the festival is over the snakes are released by the concerned mandals/ organizers in forest under the supervision of the concerned forest officials.

4) A committee is constituted of Collector of Sangli district or his representative, District Judge or his representative, Chief Warden of Forest Department, Superintendent of Police to ensure compliance of this order. The Committee shall make a report to this court within a period of two weeks."

Accordingly, the Nagpanchami festival is celebrated at Shirala as per the interim orders issued on 9.8.2002 under the supervision of the committee every year from 2002. Offence cases were booked against the Nagmandals where ever they were found to violate the interim orders of the Hon. Mumbai High court. The Gram Panchayath of Shirala had filed a writ petition No. 3652/2003 in the Hon. Mumbai High court mentioning that this tradition is their constitutional right and they should be allowed to follow the tradition. This writ petition was clubbed with the Public Interest Litigation 62/2002 and no separate orders were issued in this writ petition.

The Public Interest Litigation and writ petition was finally disposed of by the Hon. Mumbai High court on 17.07.2008 with the following order.

"It is agreed between the counsel appearing for the parties that the Principal Secretary. Revenue and Forest Department along with the Conservator of Forest, Kolhapur Region, Chief Conservator of Forest, Nagpur shall hear all the parties before us, Keeping in mind the orders passed by the Division Bench of this court on 9th August, 2002 and 1st August 2003. After hearing the parties, if necessary, they shall conduct the physical verification of factual matrix and they pass appropriate directions and suggestions in regard to the various issues raised in this petition expeditiously and preferably before the concerned festival. Liberty to all the parties to challenge the report/ directions issued by the Committee in accordance with law.

Writ petition stands disposed of with the aforesaid directions."

In accordance with the above orders, the Government of Maharashtra vide its Resolution No. S-30/2002/C.No.195/F-1 dated 28.07.2008 has constituted a committee of Additional chief secretary (Forests), Revenue and Forest Department, Government of Maharashtra, Mumbai, Principal Chief Conservator of Forests (Wildlife), Maharashtra State, Nagpur and Conservator of Forests, Kolhapur Circle, Kolhapur. Based on the meeting of the committee, the Government of Maharashtra has issued the Resolution No. S-30/2002/C.No.195/F-1 dated 04.08.2008 and No. S-30/2002/C.No.195/(Part-2)/F-1 dated 24.07.2009 and accordingly, as the short-term measure has prohibited any playing, displaying of the snakes and also organizing any competition or declaring awards as per orders the Hon. Mumbai High Court. The District Collector, Sangli, District Superintendent of Police, Conservator of Forests (Territorial), Kolhapur and Chief Conservator of Forests (Wildlife), Mumbai shall be present together at Battis Shirala on 26.07.2009 during the Nagpanchami festival day and shall ensure the implementation of the provisions of the Wildlife (protection) Act, 1972. During this festival, major emphasis shall be laid on the public awareness and education on the conservation of snakes and the important role they play in nature. Further, as a long-term measure, Principal Chief Conservator of Forests (Wildlife), Maharashtra State, Nagpur was directed to submit a proposal in consultation with the District Collector and Superintendent of Police of Sangli District along with the advocates of all the parties of the writ petition and the Gram panchayath of Battis Shirala village.

SECTION 9 : MEASURES ADOPTED FOR WILDLIFE PROTECTION AND CONSERVATION

1. The main achievement towards this goal is the notification of the Chandoli National Park and the Sagareshwar wildlife sanctuary in the district. These areas have been transferred to the Kolhapur wildlife division and thus it is expected that intensive management of these two Protected Areas on the basis of prescriptions given in separate Management Plans would improve the status of wildlife conservation in these areas.

2. The practice of giving shooting permits has been stopped after the 1991 amendment to the Wildlife (Protection) Act.

3. The Wildlife week is observed in the first week of October every year with an objective to create awareness amongst the people regarding the importance of wildlife conservation.

4. The rates of compensation for cattle killed by wild animals have been substantially increased since January 2003 and compensation upto a maximum of Rs. 9,000/- is now payable to the cattle owner. The compensation payable for human deaths and injuries has also been substantially increased since January 2003 and in case of human death or permanent handicap, the compensation now payable is Rs. 2,00,000/-. This was earlier Rs. 40,000/- for adults and Rs. 20,000/- for children upto 18 years of age.

BUFFER ZONE OF SAHYADRI TIGER RESERVE

The area on the western corner of the Sangli district which forms the catchment of Warna project was included in the Chandoli National Park. To fortify the conservation measures, the Chandoli National Park together with the Koyna Wildlife Sanctuary (Satara District) has been notified as Sahyadri Tiger Reserve. Buffer zone for the Protected Area is essential to provide effective protection and to ensure the safe haven for wild denizens so as to reduce the human-wildlife conflicts. The area to be included in the buffer zone of Chandoli National Park is not yet finalized. But, the details of the area proposed to be included are as follows,

Table No. 39: Area proposed in the Buffer Zone of Sahyadri Tiger Reserve

Village	Compartment No.	Coupe No.	Area (Ha.)
Mandur	17 pt.	I	51.56
		II	53.11
		III	48.13
		IV	50.00
		V	40.00
		VI	47.00
		VII	54.00
		VIII	60.64
		IX	49.00
		X	51.00
		Total	**504.44**

The forests of the buffer zone shall be managed in accordance with the Tiger Conservation Plan of the Sahyadri Tiger Reserve.

SECTION 10 : METHODS OF TREATMENT

i. A detailed survey of the fauna and flora of the district, their occurrence, status and conservation strategies with a focus on the endemic and endangered species should be undertaken by the expert agencies appointed by the forest department. A database shall be prepared identifying all endemic and endangered species of flora and fauna, surveying their environs and habitats to establish the current level of security and the nature of threats. Periodic reviews of flora and fauna species status should be conducted and the same should be correlated with the IUCN Red data list of this region every three years.

ii. An expert committee shall be constituted to explore possibilities for developing suitable habitat sites at the selected places such as the Mandur area in Shirala Range and around Sagareshwar sanctuary in Khanapur, Tasgaon and Walwa Ranges and for developing continuous corridors of contiguous blocks of forested land for the free movement of the wild animals between the existing Protected Areas in and adjoining
the district. The committee shall also explore the possibility of constituting the conservation reserves or declaration of certain areas as ecologically sensitive areas and give its recommendation.

iii. Since, water is the major limiting factor in the forest during the summers, so development of various water sources by gully-plugging and by erecting nalla-bunds, check-dams, bandharas etc. needs to be done. Sites with perennial sources of water locally known, as 'jivant jhirra' within the forest areas shall be identified and their locations shall be marked on the map of each Range, which shall be displayed prominently in each Range office. These sites shall be tackled appropriately through various means like desilting, deepening, diverting small trickles into dug out troughs adjacent to nallahs, construction of Forest tanks locally known as 'Van-talis' in the nearby vicinity. Water holes shall be created at the appropriate places. This will ensure availability of water sources for wild animals and reduce straying of those animals into agricultural fields thus reducing conflict situations.

iv. Areas where fodder availability can be increased to prevent straying of wild animals like gaurs, wild boars, deers etc into agricultural lands should be identified and tackled. Fodder and fruit tree species favoured by the wild fauna shall be planted as part of the various afforestation schemes. Seeds of superior fodder grasses like Sheda, Pawnya, Marvel, Dinanath etc. should be sown on the freshly excavated and heaped soil bund on the lower side of the contour trenches in the suitable areas. Other suitable models for raising fodder grasses may also be used after getting prior approval from the CF, Kolhapur. Natural salt licks should be identified and protected. Artificial salt licks should be provided where required.

v. Cattle immunization camps for the domestic cattle in villages surrounding Sagareshwar wild life sanctuary and Chandoli National park shall be taken on a regular basis.

vi. The infrastructural facilities to handle wildlife emergencies should be strengthened. One set of tranquilizing equipment along with capture and trapping equipment like cages etc. shall be provided to each Range within the first two years of the Plan. A Rescue centre at an appropriate place should be established to handle wildlife emergencies.

vii. To mitigate man-animal conflict situations, the Sub DFO should prepare an analytical report in consultation with the wildlife wing, NGOs etc. suggesting the affectivity and necessity of different measures required along with the financial projections. Also, it is suggested for trying different methods such as solar fencing and dry rubble wall along the boundary of the forests to keep wile animals away and to avoid the crop damage.

viii. The pending court cases of Battis Shirala Nagpanchami violations should be expedited.

ix. The forest staff and officers at different levels shall be trained and equipped fully to handle wildlife emergencies including handling of tranquilizing as well as trapping equipment. Well trained and well equipped 'Rescue team' with advance communication facilities should be kept under the control of Sub DFO at the sub divisional level. Training facilities at Madras Crocodile Bank Trust shall be availed for tackling the Human-Crocodile conflicts effectively.

x. Insufficient or badly presented evidence often coupled with non-availability of witnesses, frivolous appeals and interim orders stall most wildlife offence cases at trial courts. The frontline staff should be trained to provide adequate professional skills in prosecution matters related to wildlife offences.

xi. Mass awareness camps should be organized as a part of sustained campaign to educate masses regarding man-animal conflict situations, the reasons, the analysis and the management being done by the forest department. The awareness can be enhanced by personal contact, by publishing and distributing written material. The local press should also be educated and properly briefed from time to time.

xii. The willing veterinarians preferably from the Government departments shall be imparted basic and advanced training in the wildlife medication in different batches. The outstanding wildlife trained veterinarians should be empanelled by the forest department and a list of the same should be sent to the wildlife and the territorial wings to handle the wildlife emergencies in the field.

xiii. Felling shall not be allowed near the water holes as well as on the paths frequently used by the wild animals. Two dead trees per hectare shall be retained in each coupe where felling is prescribed, for nesting and resting of the wild-life. These trees shall

preferably be of low commercial value. Also during working of the coupes, some unsound and hollow logs of commercially low utility may also be left in the forest to serve as shelter to the wild-life.

xiv. Complete and effective protection of the wild-life from poaching and hunting is a must. For this purpose, watch-towers will be erected at suitable locations and the provisions contained in the Wildlife Protection Act, 1972 will be enforced rigidly. All important entry and exit points from the forests of this division should have check posts which shall be manned by staff for 24 hours. They should have a system of wireless communication.

CHAPTER -14

BAMBOO MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

Bamboo is found mainly along the hilly slopes and along the nallahs in Shirala range of Sangli sub-division. Old bamboo plantations covering an extent of 504.43 hectares area is in Compartment No. 17 of Shirala range. In other ranges, stocking is inadequate to harvest bamboos in sustainable manner.

SECTION 2: GENERAL CHARACTERS OF THE VEGETATION

Bamboo crop is both natural as well as planted in origin. Within forest areas, *Dendrocalamus strictus* has been planted largely while *Bambusa bambos* (Kanak bamboo) has also been planted to limited extent. *Bambusa bambos* and *Oxytenanthera monostigma* (Chiva Kathi) are generally found growing naturally in the wild in the forest areas mainly on tops of ridges and hills. *Oxytenanthera stocksii* (Managa/ Chivari/ Mes) on the other hand is found growing luxuriantly on the bunds of private cultivations in the western region of the district but is rarely seen in the forest.

Majority of the old bamboo clumps found growing naturally or in plantations in the forest areas have never been worked before and show lot of congestion bearing dead, deformed and over mature bamboos. The culms of *Bambusa bambos* are found to be badly entangled within the clumps due to over congestion. The growing stock is also damaged due to forest fires and illicit cutting

Matured bamboo clumps in Shirala range

These clumps therefore require immediate management interventions.

SECTION 3 : SPECIAL OBJECTS OF MANAGEMENT

i. To harvest bamboos scientifically to get maximum yield on sustainable basis.

ii. To improve bamboo productivity by using various management interventions.

iii. To meet the local market demand by regular harvesting of bamboos.

iv. To generate employment to the local people.

SECTION 4 : COMPARTMENTS AND WORKING SERIES

The compartments allotted to different Working Series and the statement showing the Working Series and annual coupes is given in **Appendix No. 14.1** of volume II.

SECTION 5 : CUTTING CYCLE

A Cutting cycle of 3 years duration is kept for bamboo harvesting. The details of cutting cycle are shown in **Appendix No. 14.2** of volume II.

SECTION 6 : AGENCY FOR HARVESTING

The coupes will be worked departmentally or as per the prevailing Government policy.

SECTION 7 : METHOD OF TREATMENT

Considering heavy congestion and entanglement of culms in the clumps especially in the case of Bambusa bambos, practicing following prescriptions in the annual coupes being worked for the first time may not be easy. Harvesting of highly entangled bamboos may not be possible without breaking them. *Such clumps of Bambusa bambos or other species which are difficult to work as per standard bamboo working due to heavy congestion should be worked so as to retain culms in 'U' shape or to retain bamboo culms on the periphery of the clumps. This should be done only once after which following standard bamboo working prescriptions should be strictly followed.* Considering the difficulties in working of the bamboo clumps for the first time, special wage rates may be sanctioned by the CF Kolhapur based on the work study report submitted by the Sub-DFO Sangli.

i. Bamboo harvesting will not be permitted during June 15 to September 30, the period of culm formation.

ii. Bamboo plantations or their parts on steep slopes i.e. more than 25^0 will not be worked.

iii. Bamboo cutting will be done with a sharp axe. A bamboo culm must be cut in a single stroke with a slant cut so that cutting is above the first inter-node and the height of the cut is between 15 cm to 45 cm above the ground, to avoid drying of the rhizome due to capillary action.

iv. All clumps will be cleaned during the coupe working. Cleaning operations in bamboo clumps will include the following:
   a. Climbers infesting bamboo clumps will be removed.
   b. All dead, decayed and dry culms will be removed.
   c. All culms will be cut above the first internode.
   d. Twisted culms will be removed.
   e. Top broken culms with more than half of the top damaged and malformed culms will be removed.

v. No clump shall be considered fit for harvesting unless it contains more than 12 culms of one year or older in age.

vi. While extracting bamboo, it should be ensured that the reserved culms are evenly spaced and some mature culms are present on the periphery of the clumps.

vii. All current year and previous year culms will be retained. Current year culms have the culm sheath on the lower half and abundant bloom i.e. white powdery dust which comes off easily when touched. Previous years culms do not have the culm sheath and the patchy bloom does not come off easily. Older or mature culms have blackish grey bloom.

viii. The mature culms equal in numbers to the current year culms subject to minimum of 8 culms must be retained to provide support to the younger culms.

ix. The remaining mature culms after reserving as described in the preceding paragraph may be harvested. No culm shall be extracted without cleaning the clump which should be an integral part of the bamboo harvesting.

x. Debris after cutting the bamboos should be stacked atleast 3 metres away from clumps.

xi. Digging of rhizomes, removing tender parts of older culms or cutting of current or previous year culms will be strictly prohibited.

xii. The culms at the periphery of the clump will not be removed except where it is absolutely necessary for facilitating working in the interior portion of the clump.

xiii. The leading exterior culms may not be cut under any circumstances even if they are malformed. Their relation is in the interest of the outward growth of rhizome and clump as they support new culms.

xiv. In order to make whole of the clump accessible, removal of all the culms in the form of a wedge may be permitted but the width of the wedge shall not be more than one metre.

xv. The working of the clump will be such that the culms after working are well spaced.

xvi. The bamboo extraction should end by March when the culms are almost devoid of starch and attract less insect borers.

xvii. Areas suitable for bamboo plantations should be identified and planted preferably with Managa bamboo (Oxytenanthera stocksii) or Kanak bamboo (Bambusa bambos).

Gregarious flowering

The period, extent and location of the gregarious flowering shall be recorded in the divisional notebook. The clumps will be clear felled after seeds are matured and have been collected. The areas after gregarious flowering will be provided with strict protection from fire and grazing so as to facilitate germination and establishment of bamboo seedlings. Seed collection, disposal of bamboos from dried clumps after flowering and tending operations
for bamboo seedlings requires extensive planning and timely action. In case the seeds after the gregarious flowering are subjected to fungus attack, then the area should be sprayed with a light solution of a fungicide.

To induce formation of healthy clumps, evenly distributed clump foci of 1 meter diameter at 5 x 5 meters espacement (from centre of one clump foci to another) will be formed in the area having good bamboo regeneration. Groups of bamboo seedlings showing good growth will be preferred for the foci formation. Weeds, climbers and other bamboo seedlings upto 2 meters around bamboo foci should be cleared in July - August to assist growth of bamboo seedlings in the selected foci.

Silviculturally untreated bamboo

The entire area will strictly be protected from fire. Immature crop will receive cleaning operations till the crop becomes harvestable. All badly grown, twisted and damaged culms will be removed from the selected foci. Weeds, climbers and other bamboo seedlings upto 2 meters around bamboo foci should be cleared and soil working should be carried out in August. The entire area will continue to receive protection from fire and grazing. Fully mature clumps may be harvested in the eighth year onwards depending upon location in the annual coupe.

CHAPTER – 15

NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION

This is an overlapping Working Circle, covering the entire forest area being dealt in this Working Plan. Many species yielding Non Timber Forest Produce (NTFP) including the medicinal plants are found in these forests. The NTFPs found in Sangli district are Hirda fruits, Shikekai, Apta leaves, Agave, Honey and Kadi patta etc. The non-timber forest produce collected in this tract contribute revenue to state exchequer as well as provide work to local people during the time they are not busy with their agricultural works.

NTFPs account for 70% of India's forest product exports. India has probably the oldest, richest and most diverse cultural traditions in the use of medicinal plants. Exploration for forest-based plant products for pharmaceuticals and the demand for medicinal plants are increasing in both developing and developed countries. In India, medicinal plants are widely used by all sections of the population and it has been estimated that, in total over 7500 species of plants are used by several ethnic communities (Anthropological survey of India 1994). The bulk of the traded material is still from the wild and a very small number of species are cultivated. According to the data compiled by the International Trade Centre, Geneva, India is ranked second amongst the exporting countries, after China, with an annual export of 326 000 tonnes with a value of Rs 45.95 million (about US$ 1.4 million) during 1992-93. Recent trends have indicated further increase in this trade with the herbal cosmetic industry playing a major role in fuelling the demand for herbals worldwide. The expanding trade in medicinal plants has serious implications on the survival of several plant species, many of which are under threat of becoming extinct. Today this rich biodiversity of medicinal plants is facing a serious threat because of the rapid loss of natural habitats and overexploitation of plants from the wild. To meet the demands of the Indian herbal industry, which has an annual turnover of about US$ 300 million, medicinal plants are being harvested every year from some of 165 000 ha of forests (FRLHT, 1997). A list of important medicinal plants and their uses and a list of NTFP based industries in Sangli district is given in the **Appendix no. 15.1 and 15.2 of Volume-II.**

The ownership rights over certain NTFP in the scheduled areas have been vested in the village communities through statutory provisions. Rights over the trees and the land however remain with the government. Tendu, Apta and Bamboo are excluded from this list. However there are no scheduled areas presently in Sangli district.

SECTION 2: SPECIAL OBJECTIVES OF MANAGEMENT

i. To identify and conserve the forest areas rich in NTFP.
ii. To build up a database on NTFP.
iii. To promote sustainable methods of harvesting NTFPs.
iv. Identification of Medicinal Plants Conservation Areas (MPCA) for long term in-situ protection to rare and endemic medicinal plants.
v. To improve the socio-economic condition of the local communities by generating employment.

SECTION 3: NON TIMBER FOREST PRODUCTS OF THE AREA

The following are the Non-Timber Forest Products that occur in the division.

1. Apta leaves (*Bauhinia racemosa*)
2. Hirda (*Terminalia chebula*)
3. Shikekai (*Acacia concinna*)
4. Kadi patta (*Murraya Koenigii*)
5. Biba (Semecarpur anacardium)
6. Karanj (*Pongamia pinnata)*
7. Jatropha (Jatropha curcas)
8. Honey
9. Narkya (*Nothapodytes nimmoniana)*
10. Variety of grasses
11. Sticks of Medshing (*Ligustrum neilgherrense*), Pandhari (*Murraya paniculata*) and Gela (*Catunaregam spinosa).*

SECTION 4 : DESCRIPTION OF SOME IMPORTANT NTFPs

Terminalia chebula (Hirda)

Hirda trees are quite common on hill slopes of western ghat forests. Fruits are pendulous, ellipsoid, brown in colour and obscurely five ribbed and are used in the manufacture of triphala churna. Current level of collection of the fruits is quite erratic. Felling of trees as well as lopping of tree branches for the collection of fruits is strictly prohibited. Fruits should be plucked without damaging the trees. Compartments having good NR of Hirda should be identified and tended to remove the congestion in each range.

Acacia concinna (Shikakai)

It is a prickly, scandent shrub occurring commonly in the western ghat forests especially in Shirala region. Leaves are bipinnate; flowers are in yellow, globose, auxillary heads; pods are brown, wrinkled and depressed between the seeds and contain 6-10 seeds in each pod. The pods are extensively used as a shampoo as well as in the manufacture of shampoos for cleaning the hair and the dry ones are powdered and perfumed, and sold in the market as soap nut powder.

Murraya koenigii (Kadi patta)

Murraya koenigii or Kadi-patta tree is a tropical to sub-tropical tree in the family Rutaceae, which is native to India. It is a small tree, growing 4-6 m tall, with a trunk up to 40 cm diameter. The leaves are pinnate, with 11-21 leaflets, each leaflet 2-4 cm long and 1-2 cm broad. The flowers are small white, and fragrant.

The curry leaf tree is native to India, Sri Lanka, Bangladesh and the Andaman Islands. Later spread by Indian migrants, they now grow in other areas of the world where Indian immigrants settled. Widely cultivated, the leaves are particularly associated with south Indian cuisines to provide flavourings for curries. The use of the curry leaf tree to treat diabetes has attracted a great deal of interest. Special compounds have been found which might make it an effective new medicine for diabetes sufferers. The branches of Murraya koenigii are very popular for cleaning the teeth as datun and are said to strengthen the gums and the teeth. Mature leaves can be plucked with hand or pruned with secateurs. Care should be taken not to damage the plant while plucking the leaves.

Nothapodytes nimmoniana (Narkya/ Amruta)

It is a small shrubby tree, widely distributed in Western Ghats from Satara, Sangli, Kolhapur and Konkan southwards - Nilgiris, Anamalais and common in Sirsi and Honnavar forests of North Kanara in Karnataka State. In Maharashtra, it is found in forests and non-forest areas in and around Radhanagari in Kolhapur district and Mahabaleshwar, Koyna, Patan, Dhebewadi in Satara district and Mulshi in Pune district. The species can easily be recognised in field during its blooming season by its strong foetid odour leading to its earlier scientific name - *Mappia foetida*. Leaves are alternate and simple, broad, ovate and acute at both ends with whitish yellow in colour. Bark is rough, grey coloured with peculiar lenticels. The plant shows good coppicing when cut or pollarded. It is not preferred as fodder by the cattle or as fuel due to its bad taste and bad smell. The plant yields from its stem and root bark, an alkaloid called ‘Camptothecin’ (CPT) having anti cancer properties and as a result, the wood of the plant has a high demand in the pharmaceutical market world wide. It is feared that as a consequence of its overexploitation and habitat loss, the natural populations of this species have declined by 50 to 80 percent in the last one decade. Hence it is now designated as an endangered species in the North Western Ghats and threatened in the remaining parts of Western Ghats.

The individuals of this species can bear only male flowers, only female flowers, male and female flowers, male and hermaphrodite flowers, female and hermaphrodite flowers or only hermaphrodite flowers. The flowers emit fowl odour of rotting meat to attract the pollinators such as dipteran flies. The species usually flowers during August and the fruits ripe till December. Only the female and hermaphrodite flowers can bear the fruits. Birds like Bulbuls, Barbets are known to feed on the pulp, thus helping in seed dispersal.

The fruits can be collected from December to February. At maturity, seeds turn black in colour. It is preferable to collect seeds from the plant itself since fallen ones are highly susceptible to fungal attacks. The fruits or de-pulped seeds after collection should be dried in the shade. The seeds should be stored in airtight containers under ordinary room conditions if not required immediately for sowing. Such storage may give 100% viability of seeds upto 45 days which may decrease upto 50 % in 120 days.

Pongamia pinnata (Karanj)
It is a small or middle sized tree, found commonly in the forests. The Karanj trees have also been extensively used as avenue trees in and around Sangli city. Seeds and seed oil are used in ayurvedic medicines. Oil cakes are used as manure and keeps off white ants.

Adhatoda vasica (Adulsa)
It is a branched, evergreen shrub with broad leaves tapering at both ends. Flowers are white, bi-lipped arranged in dense and short spikes. It is found commonly in the forest areas. Its leaves are used in curing the cough and respiratory troubles, hoarse throat, burning sensation of feet, menstrual disorders and the roots are used to cure the fever. Mature leaves can be plucked with hand or pruned with secateurs. Care should be taken not to damage the plant while plucking the leaves.

Asparagus racemosus (Shatawari)
It is a spiny climbing shrub with leaf like rudimentary branchlets arranged in whorls. It bears white, fragrant flowers in spikes and small black pepper like fruits. Its roots are clusters of cylindrical tubers. It is also cultivated as an ornamental. The plant likes sunlight and thrives well in hot and dry conditions. Its tuberous roots are used for curing acidity, burning feet, hoarse throat, menstrual disorders, scanty breast milk and increasing general immunity. Root tubers can be collected from a year old plant. A ‘C’ shaped pit can be dug around the plant and a few tubers can be collected without uprooting the plant. The pit should then be filled with the dug earth.

Cymbopogon citratus (Lemon grass)
It is a tall grass that grows into about 2 metres tall clumps. Leaves are long with rough margins and are strongly aromatic. The aromatic leaves are used in cough and respiratory troubles. Mature leaves should be cut from near the base while dried leaves should also be removed along with.

Tinospora cordifolia (Guduchi, Gulvel)
It is a large spreading climber with stems having papery bark and many small eruptions. The plant bears small flowers and round pea sized seeds that turn attractive red on maturity. It can be found climbing upon the trees with thread like aerial roots dangling from the stems. The stem of the climber is used for curing acidity and fever. Stem extracts are also used as a liver tonic, for increasing the general immunity and for hair care. Mature stems of pencil thickness can be cut with the help of sharp knife.

Embelia ribes (Vavding)

It is a large spreading shrub. Leaves are 2 to 4 inches long. Fruits are globose and turn black when ripe. Seeds are used against the flat worms' infestation of the humans.

Gum

Dhaoda (*Anogeissus latifolia*) and Ain are two main species found in these forests which produce edible gum. The tapping rules as derived by the FRI, Dehradun are listed below:

i. The tapping season will commence from November to the end of May each year. No tree below 90 cm in girth shall be tapped.

ii. Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.

iii. Only trees above 90 cm in girth at breast height will be tapped.

iv. Each tree will be tapped continuously for three years and will be given a rest for three years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of three years.

v. The initial blaze of 20 cm wide and 30 cm in length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edge having 7.5 cm wide blade. The blaze made is 0.6 cm deep in the bark.

vi. Blazes shall be made horizontally leaving approximately equal space between the two blazes. The blazes should not have any loose fiber. The lower surface of the blaze should be slightly slopping outwards to avoid lodging of gum in the blazed pocket.

vii. The gum starts oozing out soon after the blazes are made and may be collected initially after a month. i.e. around December when the blazes may also be freshened. Subsequent collections and freshening may be done fortnightly upto May. Overall, 12 freshening are required to be made during the year.

viii. In each freshening, the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm is increased on either side in width, at the end of 12th freshening. This means that about 0.3 cm should be scraped off from either side in width in each freshening.

ix. The lowest row of blazes will be at one meter above the ground level. The next row of blazes will be made at the height of 60 cm from the lower. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.

x. The number of blazes to be made on each tree will depend on its girth at breast height, as given below:

Table No. 40 : Girth-wise blaze table

Category	Girth at BH	Maximum blazes allowed on each tree
I	0.9 m to 1.3 m	2
II	1.3 m to 2.0 m	3
III	2.0 m to 3.0 m	4
IV	over 3 m	One blaze for each 45 cm girth in addition to the category III, above.

xi. No fresh blaze will be made on the partially healed up surface or old wounds.

xii. Each blaze will be in a shape of parabola with a 2.5 cm wide base. The curved side of the parabola will be upwards and of height not more than 7.5 cm and the depth of the blaze will not exceed 0.6 cm in the wood.

xiii. At the end of the season, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10 cm x 12.5 cm x 0.6 cm in width, height and depth, respectively.

xiv. Since tapping is to be done continuously for three years, the total height of the blaze at the end of three years of tapping will be 37.50 cm, the width and the depth remaining the same.

xv. In the second cycle that is, in the 7th year new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operations will be repeated till un-blazed portion is fully covered.

SECTION 5 : METHOD OF TREATMENT

The stocking of the NTFPs is not adequate enough for harvesting on sustainable basis. Hence for the systematic harvesting of these non-timber forest produce on sustainable basis following recommendations are made.

1. Hirda fruits and Shikekai

In the areas carrying Hirda and Shikakai trees, following improvement operations be carried out.

i. All climbers except Shikakai interfering with trees and advance growth of Hirda should be cut.

ii. Mature and fruit bearing Hirda trees should be freed from over head and lateral shade.

iii. To increase the proportion of Hirda and Shikekai, the planting of these species should be taken up along with other species. Rooted cuttings of Shikakai in polythene bags will be planted soon after pre monsoon showers.

2. Apta and Tembhurni leaves

i. Plantations of Apta and Tembhurni should be raised in suitable localities covering at least 5% of the net area afforested annually under the Afforestation Working Circle.

ii. The species propagate well by root- suckers. In order to stimulate the development of root-suckers, soil around the base of the trees should be worked. Care should be taken not to damage the roots, by deep digging and exposing them.

iii. Plucking of the leaves should be restricted to the lower 2/3rd of the crown leaving upper 1/3rd portion intact.

3. Kadi patta leaves

The leaves have a good market in Mumbai where it is used for flavour in curry making. The shrub comes up in the Evergreen forests of Mahabaleshwar, Satara, Patan and Dhebewadi ranges. The existing growth of this shrub should be freed from suppression. It should be raised by sowing seeds in suitable areas to the extent possible. Sowing should be done in pits on the onset of monsoon. It also propagates well by root-suckers. In order to stimulate the development of root-suckers, soil around the base of these shrubs should be worked. Care should be taken not to damage the roots by deep digging and exposing them.

4. Agave species

Agave species viz. *Agave vereguz, Agave americana, Agave cantala and Agave sisalana* yield fibers of varying utility. *Agave sisalana* produces the sisal fiber of commerce. *Agave americana* also yields excellent fiber which is durable for ropes and cordage. These species grow usually under semi- arid environment. They are drought resistant and will grow where most other species will fail. In blank areas with shallow soil under the Enrichment working circle and Afforestation working circle where plantation of tree species can not be raised the above Agave species especially Agave sisalana will be planted. It should also be raised on TCM in three rows one meter apart. The species can be raised successfully by planting two year old nursery raised plants. Harvesting of Agave should normally be started from 4th year onwards on a regular cycle of 12 months, 8 months or 6 months depending on the growth in the locality. The length of the leaves to be cut should be more than one meter and after cutting, the plant should not have less than 8 to 18 leaves depending on the cutting cycle.

SECTION 6 : GENERAL PRESCRIPTIONS

i. Make a resource inventory of all Non Timber Forest Produce in every Range of the Sangli Sub Division and mark areas rich in such NTFP including Medicinal Plants. A database for unit (Beat, Range, Division) wise potential and production for various NTFPs should be compiled.

ii. The areas having promising regeneration of NTFP species and which is not less than half hectare in extent in a compact block will be identified in the annual coupes of each year and will be properly spaced and tended to remove congestion and promote their growth.

iii. Important NTFP species to the extent of 10 to 15 % will be planted in the various afforestation schemes to increase the stocking of these species. Emphasis should be laid on species like Hirda, Narkya, Jamun, Karanj and Shikakai etc. amongst tree species and Adulsa, Shatawari, Gulvel etc. amongst herbs/ shrubs.

iv. Use sustainable methods of harvesting of NTFP and develop expertise for training villagers to put these non-destructive methods into practice. Leaves and fruits shall be plucked from the tree or shrub branches in a non destructive manner. The collection and disposal of various NTFPs should be done as per the provisions pertaining to JFM given in the Government Resolution no. MSC/ 2000/ case no. 143/ F-2 dated 25.04.2003 of Maharashtra state. Lopping of branches or felling of trees/ shrubs for collecting NTFP should be strictly dealt with.

v. Identify and demarcate areas rich in medicinal plants, preferably with an area of 200 ha or more as 'Medicinal Plant Conservation Areas' (MPCA) for long term in situ protection to rare and endemic medicinal plants.

vi. The weekly markets should be surveyed to know the extent of various NTFP reaching the markets, methods of harvesting, their market price and purpose of their utilisation in domestic or international markets. The analytical report based on this data should be prepared by the Sub DFO and submitted to the Working Plans, Research and Education wings of the Forest department for further analysis.

vii. The auction period for the NTFP species should be specified and the sanction to the auction should be given in time by the competent authority e.g. Wavding/ Kadi patta by July/August, Shikakai/ Tamalpatra/ Hirda by September, Honey by September, Grasses by August etc.

viii. Training programmes in association with the Research and Education wing of the department should be organized to impart training for non-destructive and sustainable methods of NTFP harvesting, their value addition and marketing.

ix. The Research Circle which has done field trials on medicinal plants should be consulted to promote use of such medicinal plants in various plantation programmes.

x. The provisions of 73rd amendment will be translated into practice for NTFP in the scheduled areas. For rest of the NTFP in such areas and for all NTFP in all other areas, handling of the same will be attempted through Joint Forest Management Committees and/ or the items may be sold by open auction subject to the existing exercise of privileges for the specific items.

CHAPTER-16

ECO-TOURISM

SECTION 1 : GENERAL CONSTITUTION

Wilderness based recreation is an important value. It has an important role in support of management. It can directly benefit the cause of conservation, bring about economic benefit to local communities and open the way for conservation education of local people and visitors. Conservation education and nature interpretation are integral to nature based/ wildlife tourism. Tourism is capable of generating substantial pressures thereby adversely affecting the value of the forests, significantly reduce visitor experience and curtail management problems. The eco-tourism or sustainable nature-tourism can be developed in and around forest areas having scenic spots or places of historical or religious importance.

There are many religious places and places of tourism interest in Sangli district e.g.,

Ambabai, Chauranginath (Sonsal), Dandoba Hills, Datta tekdi (Islampur), Dubai Kuran, Mandur and Ped in Jath, Kadegaon, Miraj, Walva, Atpadi, Shirala and Tasgaon talukas respectively. Forests around Chandoli National Park and Sagareshwar wildlife sanctuary are very scenic and popular with the tourists and therefore can be developed into popular eco-tourism spots. Since eco-tourism is distinguished from the resort-tourism for requiring lesser infrastructure development and a lower impact on the environment, it can generate more revenue at lesser costs to the Forest Department as well as can generate employment to the local inhabitants.

Juna Rajwada

The Forest Department should take lead to involve various stake-holders like local communities, Forest Department, tourism department and local tour operators and seek their active participation and cooperation to make the eco tourism projects successful ventures.

SECTION 2: SPECIAL OBJECTIVES OF MANAGEMENT

i. To provide livelihood opportunities to local community through their involvement in services delivery through eco-tourism.

ii. Promoting eco-tourism in forest areas to increase awareness amongst people regarding importance of conservation and protection of forests and wildlife.

iii. To utilise the potential of forest areas for tourism as a key economic force for the conservation of nature.

SECTION 3: POTENTIAL SITES FOR DEVELOPMENT

Following are some of the important historical and religious sites of the district with the potential for promoting as eco-tourism spots.

Ambabai Temple, Jath Taluka – Situated at about 70 kms from Sangli in the eastern most part of the district adjoining Karnataka State. The temple is situated on a hillock surrounded by the forest area of about 100 ha. Large number of local people and the devotees from the adjoining Karnataka State apart from the local people visit this temple on a regular basis and during festival days like. Ideal place for developing as an eco-tourism spot.

Bahe Borgaon – This place has its own sacred value and story. Bahe Borgaon is near walwa, when Prabhu Shri Ramchandra was seating for Meditation, there was a big flood occured on River Krishna due to this the Meditation of Shri Prabhu Ramchandra would have been disturbed. At the same time to avoid the disturbance in the Meditation Shri Hanuman spread his both hands and obstructed the flow of river and diverted the path of river water on both side of his hands. This is an ancient heard story. Because of this one island was formed, where Idol of Shri Hanuman spreading both his hands and obstructing the river water is here and is a sacred and faith places for the devotees. The place is suitable to be developed as an eco-tourism spot.

Chauranginath (Sonsal), Kadegaon Taluka – Sonsal is a village situated at about 40 kms from Sangli and 30 kms away from Karad (Pune - Bangalore National Highway). The temple of Lord Chauranginath located at the peak of the hillock added with the surrounding scenery is the major point of attraction. The surrounding forests of about 180 ha. adds value to the serenity of the area and makes it an ideal place for developing as an eco-tourism spot. Large number of people visits this area regularly. An ideal place for developing as an eco-tourism spot.

Dandoba Hills, Miraj Taluka –Dandoba hills is a place of religious importance situated at about 20 kms from Sangli on the border of Miraj and Kavathe Mahankal Taluka, which is supposed to be the 'Dandakaranya' mentioned in Ramayana. There is an ancient temple of Lord Shiva or Lord Mahadeva (Dandoba) is located in the caves near the plateau of the

hill of Dandoba. Also this place has "Tehalni Buruj' with big size historical tower. The place is suitable to be developed as an eco-tourism spot.

Dubai Kuran, Atpadi Taluka – This place is situated at Atpadi situated at about 95 kms from Sangli, the Taluka headquarters on the northern part of the district adjoining Solapur District. The area is drought prone and receives very scanty rainfall (max. 400mm.). The forest area is popularly known as Dubai Kuran. Extensive afforestation works taken up in the past, have succeeded in creating a good vegetal cover in this area. The water body created by minor irrigation tank has increased the beauty of the area and provides ideal habitat for wild birds and animals. Large number of people visits this area as a picnic spot. An ideal place for developing as an eco-tourism spot.

Datta tekdi (Islampur), **Walva Taluka** – Islampur is a town in Walva taluka, situated at about 40 kms form Sangli. There is a small hillock with a temple of Lord Datta in the town surrounded by forests of about 12 hectares. The afforestation works in the past shaped this area into green lungs of the town attracting the local people for morning walk and picnic. The place is suitable to be developed as an eco-tourism spot.

Ganapatipanchayatan of Tasgaon – The Ganapati Panchayatan means a group of five

Cobra - Nagpanchmi festival at Battishirala

deities. Adi Shankaracharya introduced the idea of having five deities for worship. At Tasgaon (which is a famous grapes-producing centre), in Sangli district there is such grouping of five deities. This temple or rather a temple-complex, was built by Parashurambhau Patwardhan, an esteemed general of Peshwas in 1785. Patwardhans later founded small princely states in Sangli district. The penta-pantheon is formed as follows: at the centre there is idol of Siddhi-Vinayak. On right, it is flanked by Rameshwar temple, on left there is temple of Vishnu. Remaining two are those of Suryanarayana(the sun god) and Uma. They are situated along the peripheral perambulation track. This is a attracting a large number of devotees. An ideal place for developing as an eco-tourism spot

Kundal, Palus Taluka – Kundal situated at about 50 km from Sangli, was historically the capital of the Chalukyas. Kundal is a pilgrimage centre for the Digambar Jains. Every year, thousands of Jains visit this place. The palace built by the Chalukyas. As per the inscriptions, the Kundal was an ancient village, it is about 1600 years old and was called Kaundanyapur (old name), was a part of province rule (present day Karad) by the Chalukyas. There is a temple built in the memory of Maharaja Jaising. Pulakesi-I chose Vatapi (Badami in Karnataka) as his Capital. Kundal is surrounded by hills, including Zari Parshwanath (the water from trough cascades near the idol of Mahaveer), has two caves

which house the idol of Mahaveer and the images of Ram, Sita and Lakshman. Samav Sharan (large open space on top of another hill) is considered holy by the Jains, they believe that Mahaveer gave sermons to his followers here. The place is suitable to be developed as an eco-tourism spot.

Ganpati of Sangli - The temple is situated on *eastern* bank of river Krishna at Sangli is

Ganpati of Sangli

most beautiful temple in south Maharashtra. It is a tutelary deity of Sangli. Thorle (elder) Chintamanrao Patwardhan consecrated the idol in 1843. Here too there is a conclave of celestial beings- Shankar, Suryanarayana, Chintamaneshwari, LaxmiNarayan and Ganesha. This temple is very famous for its artistic construction, built in black stone made available from the hills of Jyotiba. Like traditional layout of Indian temples, there is sanctum-sanctorum, middle chamber, outer chamber (Sabha-griha) and "Nagarkhana". The temple has a large premise, covering a sprawling two acres. It comprises of a platform, an excellent hall and a "Nagarkhana". The door of the sanctum is carved of different natural wood. The place is suitable to be developed as an eco-tourism spot.

Khandoba of Deshing - The village of Deshing is situated in Kavathe-Mahankal Taluka at about 35 kms from Sangli. It is said that the origin of temple goes back to 300 years. As a legend says, one Kulkarni, an ancestor of present manager of the temple, had the God appeared in his dream, telling him that he would surface in Deshing. Later, his family members built the temple along the river bank. A large number of pilgrims visit this place to offer their prayers. An ideal place for developing as an eco-tourism spot.

Ped, Tasgaon Taluka – Village Ped is situated at about 40 kms from Sangli. It is a drought prone area in Tasgaon taluka. There is a minor irrigation tank in Umber Dara area surrounded by the forests of about 1000 ha. The area was afforested in the past under various schemes. The greenery created along with the available water has created a good habitat for the wild birds and animals. The scenic surroundings has been attracting the local people, who visit this area for picnic and outings. An ideal place for developing as an eco-tourism spot.

Mallikarjun Dongar (Islampur) – Situated on the National Highway – 4 near Islampur, 40 kms from Sangli. This place is locally called as "Mallikarjun dongar" and is surrounded by the forest area of about 800 ha. The temple on the hillock with Shiva or Mallikarjun as diety is situated in the cave of 15 x 25 mtr. dimension. Also, in the vicinity of temple,

there is a grave of a muslim saint called Bawaruddin and a durga of Chand Bukari. The holy place is revered both by Hindu and Muslims. During the Shravan season on the last monday, a large number of devotees visit this place and offer prayers. The place is suitable to be developed as an eco-tourism spot.

Mandur, Shirala Taluka – Situated on the borders of the Chandoli National Park in the catchment of Warana project, at about 60 kms from Sangli. The surrounding forests are in the Western Ghats and are very rich in biodiversity. Lot of tourists visits this area for sighting animal, birds and to enjoy the scenic surroundings of Chandoli. This is an ideal place for developing as an eco-tourism spot.

Sangli district has following distinct features which make it a attraction for tourists.

1. It has many places of historical and religious importance. Ambabai (Jath), Bahe Borgaon (Walwa), Chauranginath (Sonsal), Dandoba hills, Datta tekdi (Islampur), Ganapatipanchayatan of Tasgaon, Ganapati temple of Sangli, Kandoba of Deshing, Kundal (Palus), Mallikarjun dongar (Islampur) and are the attractions for religious tourists.
2. Being part of western ghat the district has rich forest cover in Western portion of the district. Mandur area of Shirala range adjoining Chandoli National Park attracts large number of tourists.
3. The district also has many minor irrigation tanks at Dubai Kuran (Atpadi) and Ped (Umber Dara). These minor irrigation tanks are located in forest areas and are surrounded by rich forests creating beautiful natural spot for tourists.

SECTION 4: METHOD OF TREATMENT

1. The Sub-DFO, Sangli Forest Sub-Division should select the scenic spots having potential to develop into excellent ecotourism sites as per the ecotourism policy of Maharashtra vide Govt. resolution No. WLP / 002 / C.R. 53 / F-1, dt. 20/ 2/ 2008 and the guidelines for forest and wildlife eco-tourism issued by National Tiger Conservation Authority, Ministry of Environment and Forests, New Delhi.
2. Necessary prior permission from the competent authority under Forest Conservation Act, 1980 should be obtained wherever required.
3. The planning should be flexible, site-specific and participatory and should form part of a larger regional plan for the area, within the normative standards of a Landscape Code.
4. Assessment of existing infrastructure, surface transportation, air service, road, electricity, water supply, law and order situation.
5. Infrastructure for awareness creation like setting up of suitable site-specific facilities like Forest information centres (Van Chetan Kendras), Reception centres, Orientation centres, Visitor centres, Museums, Amphitheatres, Souvenir shops, Nature

interpretation centres, Light and sound display, Literatures, Signages, Way-side exhibits, Self-guided Nature trails, Observation towers, Vehicular excursions, Public conveniences, Garbage disposal facilities, Pagodas, Log huts and Camping sites should be developed.

6. Simple, adequate boarding and lodging facilities be developed wherever suitable in tune with the environment and the general setting of the landscape.
7. Devise mechanism to ensure continuous monitoring of adverse effects of tourism for quick redressal.
8. Periodic training programmes on eco-tourism should be conducted for tourism administration, planners, operators and general public.
9. Ensuring periodic training programme to the local community in (a) Lodge ownership/ management, (b) Basic education and awareness, (c) Health and sanitation, (d) Codes of conduct, (e) Forest and wildlife conservation, (f) Litter control, (g) Environmental management, (h) Skill development for preparation of local souvenirs as appropriate, (i) Forging partnerships with tourist and tourism industry.
10. Local communities shall be involved in these projects and the benefits should go to the 'host communities' and in the long run capacity building in this regard should be built in for forging partnership with the local people.
11. Rules and Regulations of visitors' conduct – Do's and Don'ts should be framed and widely circulated to tourists and tourist agencies as well as prominently displayed on notice boards.
12. Select suitable eco-guides from the local communities, who shall be trained to impart knowledge of nature conservation and prevention of abuse of the ecotourism sites.

SECTION 5: OTHER REGULATIONS

i. Fire Protection: The area needs to be strictly protected against fire annually. These areas are quite susceptible to fires. Effective protection against fire for the period from February 15th to June 15th is a must to ensure survival and establishment of natural regeneration of all species for developing them into future growing stock. Special fire lines shall be provided and they should be cleared annually. Firewatchers shall be appointed during the summer season. Entire area of this Working Circle shall be rigidly fire-protected and shall be classified as class I forest areas with reference to fire protection, the details of which are given in the 'Miscellaneous Regulations'. 'Joint Forest Management committees' shall be formed and a comprehensive fire fighting scheme shall be chalked out, the details of which are given in the 'Miscellaneous Regulations'.

ii. Closure to Grazing: Entire area shall remain closed to grazing completely for a period of 5 years from the 1st year of its working.

iii. Protection Measures: The area will be strictly protected from illicit felling and encroachments including seasonal encroachment for the purpose of agriculture.

iv. Resolving conflict with Micro Plans made under JFM/ FDA: If any conflict is noticed between the prescriptions given in this WC and the Micro Plan written under JFM, FDA etc. for the same area, then the said area shall be treated in accordance with the special objects of management pertaining to this WC and suitable amendments shall be made in the Micro Plan, if necessary.

v. The prescriptions of this WC will not be applicable on areas bearing Seed Orchards, Sample Plots, Candidate Plus Trees, Plantations, nurseries etc falling in the areas allotted to this WC and which are otherwise in possession of the Silva MS. These areas are managed with a perspective of research and extension in forestry and hence will be managed as per their Silviculture requirements as included in the Plan of Operations duly approved by Research and Advisory Committee (RAC) MS chaired by the PCCF.

vi. The Workshops should be organized in each Range to sensitize and train the field staff in implementing the prescriptions of this WP. The induction training of the field staff should be organised on priority by the CF, Education Circle, which will help in effective implementation of various Working Plan prescriptions.

CHAPTER-17

JOINT FOREST MANAGEMENT

SECTION 1 : GENERAL CONSTITUTION

Forests are facing severe threats detrimental to their survival. These threats are mostly in the form of biotic pressures like illicit felling, encroachments, grazing, fires etc. The increased pressure of burgeoning population is subjecting forests to high pressures resulting in increase in area of degraded forests and decrease in the dense forest cover. Considering these realities, the concept of befriending the stakeholders in forests by way of a participatory process was conceived in the revised National Forest Policy of 1988. Based on this, the Government of India in 1990 issued directives in this regard and the Government of Maharashtra by its Government Resolution dated March 16, 1992 resolved to introduce Joint Forest Management in degraded forest areas and laid down the procedure for this purpose. The provisions of the same were revised and extended to urban areas also vide a Government Resolution dated April 25, 2003. Accordingly, the stakeholders are assured of a certain share in the usufructs and they are taken into confidence in the planting and management of the forest areas. Managing forests with the active cooperation of village communities will not only help in protecting our forests but will also safeguard the interest of the village communities.

SECTION 2: SPECIAL OBJECTIVES OF MANAGEMENT

1. Making forestry more relevant by balancing between the needs of the community and forest protection.

2. Protecting and conserving the bio-diversity in the forests with the active participation of the local communities.

3. Integrating forestry management interventions with development schemes of other departments for holistic development of the villages.

4. Promoting eco-tourism in forest areas to increase awareness amongst people regarding importance of conservation and protection of forests and wildlife.

5. Empowering local communities by generating employment for the local people in forestry activities, Soil Moisture Conservation works, eco-tourism and by imparting new skills for alternative income sources to the Self-Help Groups.

SECTION 3: GENERAL DESCRIPTION

JFM : There are 268 villages in the vicinity of forests. Joint Forest Management committees (JFMCs) are formed in 261 villages. Joint forest management program was implemented in 261 villages under World Bank program, 100% centrally sponsored schemes, Forest Development Agency and IWDP scheme.

People's participation in some of the villages is very good. Following are the villages, which have been awarded by the State Government under **"Sant Tukaram Vangram Yojana"** at district and state levels.

Table No. 41 : Villages awarded under "Sant Tukaram Vangram Yojana"

Year	Name of Village	Prize awarded		Prize amount (Rs.)	
		District level	State level	District level	State level
2006-07 (Nominations received-20)	1)Vadgaon, Tal.Tasgaon	1st Prize	3rd Prize	Rs.25,000/-	Rs.3,00,000/-
	2)Bhose, Tal.Miraj	2nd Prize	---	Rs.15,000/-	---
	3)Bhood, Tal.Khanapur	3rd Prize	---	Rs.7,500/-	---
2007-08 (Nominations received-13)	1)Vasumbe Tal.Khanapur	1st Prize	---	Rs.25,000/-	---
	2)Ranjani, Tal.K.Mahankal	2nd Prize	---	Rs.15,000/-	---
	3)Gourgaon, Tal.Tasgaon	3rd Prize	---	Rs.7,500/-	---
2008-09 (Nominations received-10)	1)Vasumbe Tal.Khanapur	1st Prize (Divisional)	3rd Prize	Rs.25,500/-	Rs. 15,000/- (Divisional)
	2)Ghoti Bk. Tal.Khanapur	1st Prize (Divisional)	Appreciation certificate	Rs.25,500/-	Appreciation certificate
	3)Yeldari Tal.Jath	2nd Prize	---	Rs.31,000/-	---
	3)Karanje Tal.Khanapur	3rd Prize	---	Rs.11,000/-	---
2009-10 (Nominations received-32)	1)Vanurgad, Tal.Khanapur	1st Prize	---	Rs.51,000/-	---
	2)Pare, Tal.Khanapur	2nd Prize	---	Rs.31,000/-	---
	3)Nagaj, Tal.K.Mahankal	3rd Prize	---	Rs.11,000/-	---

IWDP : On the lines of the JFM, an Integrated Wasteland Development Programme (IWDP) has also been implemented as well as a Forest Development Agency (FDA) has also been established. Integrated Wasteland Development Programme i.e. IWDP, a centrally sponsored project was sanctioned for 23 villages in National Watershed No. KR-43 falling in Shirala taluka of Sangli district with the project area to the extent of 12308.13

hectares. The project was implemented by two different Project Implementing Agencies (PIAs) out of which PIA-I is Deputy Director SFD Sangli and PIA-II is Bharathi Vidya Peeth, Sangli. The main objective was to achieve the holistic development of the villages by treating their watersheds as well as to empower the village communities by providing them adequate training and by establishing Self-Help Groups. Various developmental works in the forest as well as non forest areas were executed with the active cooperation of the village communities. SMC works like CCTs, earthen bunds etc. were undertaken along with raising plantations within forest areas since 2003-04. PIA-I deals with 11 villages in Shirala taluka viz. Tadwale, Upawale, Biwoor, Khed, Bhatwadi, Beldhariwadi, Kapri, Ingrul, Jamblewadi, Chikalwadi and Bhatshirgaon while PIA-II deals with 12 villages in Shirala taluka viz. Punwath, Padaliwadi, Dholewadi, Phakirwadi, Natoli, Padli, Khande, Kandur, Wadibhagai, Ladhewadi, Sagaon and Chikli.

FDA : The proposal for constitution of Forest Development Agency (FDA) for 55 villages and with proposed budgetary grant of Rs. 450.54 lakhs was sanctioned for Sangli sub division vide Ministry of Environment and Forests, Government of India's letter no.16.1.50/2002-b-III dated 10.12.2002. The main objective of this programme is to integrate all schemes aimed at the development of the villages in and around forest areas and to avoid the delay in transfer of the funds from the Government of India to the implementing agencies. Accordingly 54 villages i.e. 5 in Shirala, 17 in Khanapur, 7 in Tasgaon, 8 in Sangli, 7 in Atpadi and 10 in Jath Ranges have been selected and the Societies have been registered according to the provisions of the Mumbai Public Trust Act. 1950. The details are given in the table below.

Table No. 42 : Villages under FDA

Sr. No.	Range	No. of Villages	Villages
1.	Shirala	5	Kusaiwadi, Retre dharan, Rile, Maralnathpur and Biwoor.
2.	Khanapur	17	Kadegaon, Khambale-aundh, Pare, Goti Bk, Devikhindi, Bhikawadi Bk, Jadhavwadi, Vasumbe, Yetgaon, Vita, Sonsal, Padali, Apsinge, Lengare, Banurgad, Tadachiwadi and Bhud.
3.	Tasgaon	7	Ped, Vadgaon, Sawarde, Padali, Siddhewadi, Lokrewadi and Sawarde
4.	Sangli	8	Nagaj, Karsing, Bhose, Gundewadi, Kuktoli, Ranjani, Jakhapur and Dongarwadi.
5.	Atpadi	7	Pimpri Bk, Lengrewadi, Atpadi, Kargani, Jambhulni, Hivtal and Vibhuthwadi.
6.	Jath	10	Jath, Gundapur, Darikonur, Girgaon, Singanhalli, Kalati, Vhaspet, Yeldhari, Mirwad, and Belunki.

The development works under the FDA were started since 2002-03 and till 2010-11, afforestation works to the extent of 3626 hectares have been completed with an expenditure of 627.59 lakhs under various schemes, like Natural regeneration, Artificial regeneration, Grassland development, Bamboo plantations, Mix plantations, Medicinal Plantations. In addition under 'entry point activities' permanent assets like construction of compound wall around a Primary school, construction of drinking water storage tanks, construction of a public library halls, road repairs, construction of drainage along roads, construction of retaining wall of wells, construction of pucca bandharas, concretization of roads, digging of bore-wells, construction of public toilets, construction of open crematoriums etc have been created in certain villages while set of utensils, sewing machines, chairs, tables etc have been provided in some villages.

DPAP : Development works have been taken under Drought Prone Area Programme (DPAP) by the Social Forestry Department in the drier areas of Sangli district viz. Atpadi and Kawathe Mahankal talukas. Works were taken in forest areas of 4 villages - 2 in Atpadi i.e., Umbergaon (Watershed no. BM-103/1) and Pandarewadi (Watershed no. BM-105) and 2 in Kawathe Mahankal talukas i.e., Jambalewadi (Watershed no. BM-116) and Chudekhindi (Watershed no. BM-117) by the active involvement of their Joint Forest Management committees (JFMCs). Works taken up under this program included community plantations, CCT, farm bunding, loose boulder structures, earthen bunds and formation of self-help groups.

SECTION 4: METHOD OF TREATMENT

Following initiatives should be taken by the Sub-DFO as a part of the strategy for the success of JFM:

iv. Principles of participatory management, usufruct sharing, eco-system protection, democratic set-up, gender equality, open communication, rights and duties of the community, effective conflict resolution, effective monitoring and evaluation and Shramadaan should be adhered to during the implementation of JFM in any village.

v. A comprehensive publicity and awareness campaign regarding JFM should be taken up by organizing mass awareness camps in the villages, by distributing pamphlets, by publishing success stories in the print media etc. with the active participation from the schools, NGOs and gram panchayats. The village communities should be sensitized to the concept of sustainable forest management, the tangible and intangible benefits of the forests, the perils of depleting forests, the benefits of stall feeding to the cattle and benefits of using bio gas, LPG, fuel efficient chullahs, solar cookers etc over using fuel wood.

vi. The villagers owning land should be convinced to grow the fuel-wood and fodder trees species on their field bunds or fallow lands by involving Social Forestry department.

vii. Short orientation courses should also be conducted for the forest staff, to equip them with better communication skills and to orient them towards the forestry extension.

viii. It shall be endeavored to integrate forestry management interventions with development schemes of other departments as well as eco-tourism under JFM for holistic development of the villages. Proper linkages should be developed with other departments like Animal husbandry, Fisheries, Horticulture, Minor irrigation, Social forestry, MEDA, PWD and MSEDC etc. for convergence of various developmental schemes of different agencies in the same village.

ix. The Sub DFO should select the scenic spots having potential to develop into excellent ecotourism spots. Infrastructure for awareness creation like setting up of Nature interpretation centres, Nature trails, Watch towers, Pagodas, Log huts and Camping sites should be developed. Local communities shall be involved in these projects and the benefits should go to the 'host communities' and in the long run capacity building in this regard should be built in for forging partnership with the local people. Rules and Regulations of visitors' conduct need to be framed and widely circulated to tourists and tourist agencies as well as prominently displayed on notice boards. These eco-tourism complexes should be run primarily by the local management committees formed under JFM. Necessary prior permission from the competent authority under Forest Conservation Act, 1980 should be obtained wherever required.

x. Establish Self-Help Groups in the villages and organize necessary training camps for imparting new skills like manufacture of herbal oils, herbal face packs, and bamboo craft etc., resulting in alternative employment generation to the local communities. Select Eco-guides from the local communities, who shall be trained to impart knowledge of nature conservation and prevention of abuse of identified sites.

xi. The Sub DFO should periodically monitor and evaluate the success of the JFM programme by considering parameters like reduction in number of forest offences, watershed development, involvement of other development agencies, increased alternative sources of employment generation, women empowerment, effective conflict resolving, voluntary shramdaan by community members, well established SHGs, reduction in migration to urban areas, increase in annual household income, usufruct sharing etc.

SECTION 5 : GENERAL REGULATIONS

The area to be included under JFM, FDA or other JFM related schemes will be treated according to the Micro Plans for the area which will be prepared in consultation with the villagers as per the guide lines given by the Government of Maharashtra R & FD, G.R. of 25th April 2003. But while preparing the Micro Plan, it would be mandatory to adhere to the special objectives of management mentioned for the concerned Working Circle to which the area has been allotted in the Working Plan. If any conflict is noticed between the prescriptions given in the WC to which the area is allotted and the Micro Plan written under JFM, FDA etc. then the said area shall be treated in accordance with the special objectives of management pertaining to the concerned Working Circle and suitable amendments shall be made in the Micro Plan, if necessary.

CHAPTER-18

FOREST PROTECTION

SECTION 1: GENERAL CONSTITUTION

The forests of Sangli sub division needs to be protected against the incidents of illicit felling, poaching, fires, encroachments and unregulated grazing. These injuries to the forests are generally man made and are largely inflicted due to ignorance, poverty, needs and greed of the communities living around. Protection of forests from the biotic interference is completely essential for prescribed management interventions to be effective.

SECTION 2: SPECIAL OBJECTIVES OF MANAGEMENT

i. To protect forests in their pristine forms with the active participation of the people.
ii. Empowering local communities by generating employment and alternative income sources for the local people.
iii. To link up forest protection with JFM initiative.

SECTION 3: INJURIES TO THE FOREST

The forests are inflicted injuries mainly by the humans and their cattle for their needs and greed. Major factors causing damage to the forest are listed below.

i. ***Forest fires:*** The forests are susceptible to fires during summers which are mostly man-made. Fires are caused intentionally sometimes to get good flush of grass or for hunting of wildlife or for making encroachments. Sometimes fires caused for rab burning or burning agricultural wastes accidentally stray into the adjoining forests while at times careless throwing of lighted cigarette or bidi butts in the forests by the villagers cause the fires. Recurrent fires badly affect the regeneration status of the forest by killing the young recruits and seedlings. Fires also destroy the soil cover as well as humus on the forest floor as a result of which there is less moisture absorption and more run-off, thereby resulting into soil erosion and degradation of the site.

ii. ***Grazing:*** Unregulated grazing in the forests is rampant in the district. Milch cattle belonging to developed milk dairies are usually stall fed. The district is having larger area under sugarcane cultivation and therefore the green leaves of the sugarcane are largely used as fodder for the cattle. In addition, *Kadba*, the dried lops, tops and remains of the jowar and bajari after the final harvest, is also used as fodder. Apart from these two, kadval, makka and grasses coming on the field bunds or fallow lands are also used as fodder. Unregulated grazing by the cattle in the forest areas badly affects the NR status of different species. Frequent trampling and browsing not only destroys the young seedlings and coppices but also has resulted into compaction and hardening of soil, thus hampering the establishment and growth of the young recruits and seedlings and thereby affecting the natural process of restocking of the forests.

iii. ***Illicit-Felling:*** The forest crop comprises of miscellaneous species mainly. The percentage of commercially valuable trees in the forest is very less. Therefore the extent of illicit felling in the district is not very serious. Yet illicit-felling and lopping of the trees for small timber, poles, firewood and fencing material is often resorted to, mainly for fulfilling the domestic requirements of constructing or repairing the huts and firing the hearth. It results into further depletion of the growing stock and degradation of the forest area.

iv. ***Encroachments:*** The state of boundary demarcation is not satisfactory in almost all the ranges. Such situation leads to encroachments in forest areas. Encroachments in the forest lands for cultivation as well as for habitation cause a lot of damage to the forests. Encroachments lead to forest fires, illicit-cutting of trees as well as tahal-cutting. Rab-burning i.e. burning the field before planting paddy and tahal-cutting are common practices in the district. The areas need to be protected against the encroachments.

v. ***Poaching:*** The jungles on the western corner of the district were known to be the favourite hunting grounds of the shikaris in the past. The hangover of these shikar traditions still persists. Though the incidents of poaching have comparatively reduced over the years but it is mainly because of the dwindling population of wild animals in the district. The wild boars, hares and peacocks are still available in good numbers in and around the forests and are hunted secretively. The preys are hunted either by electrocuting them using live wires around the fields, by shooting them using guns procured for crop protection or self-defence as well as by using small explosive bombs, locally called '*daru-che-gole*'. Pet dogs are also used sometimes to chase the prey to a point where it can be shot easily.

SECTION 4: METHOD OF TREATMENT

Following are the ***general prescriptions*** for the forest protection

i. Each check naka should be adequately staffed to run day and night as well as should be connected to the forest sub division/ range HQ through wireless/ telephones. Proper checking of vehicles should be ensured by the staff at the check nakas. The check nakas should be frequently visited by the senior officers to review their working.

ii. The Range HQs and mobile squad units should be strengthened by providing faster mode of communications like telephones/ wireless, jeeps etc.

iii. The field staff should be imparted professional training for handling fire arms, martial art forms for self defence and for keeping them fit.

iv. Identified extra sensitive and sensitive beats should be patrolled in group formations atleast once or twice a week.

v. A system of timely rewards for the informants and the field staff may be introduced for facilitating early detection and reducing the quantum of offences.

vi. Considering the inadequate knowledge of the forest law with the field staff and the special nature of forest offences, calls for strengthening the legal support at the division level. A forest prosecutor may be provided at the divisional level to meet the requirement of handling the legal cases effectively.

vii. Field staff should be sensitized to protect forest areas in possession of research wing.

viii. A schedule of beat checking and saw mill checking by RFOs and Sub DFO as prescribed by the CCF (Protection) shall be strictly adhered to.

ix. Forest protection should be effectively linked up with the JFM initiative in the villages and village forest protection committees should be strengthened.

x. To seek cooperation of local village communities, they should be empowered financially by generating employment opportunities through JFM/ FDA/ IWDP/ DPAP and other developmental activities, skill upgradations, formation of SHGs etc.

xi. Awareness campaign should be organised from time to time highlighting ill effects and gravity of forest fires, grazing, lopping, poaching and their legal complications.

Following are the ***specific prescriptions*** for forest protection

4.1 Fire Protection

This important operation in forest management has been neglected in the past. The characteristics of the system of fire protection in the area under the Plan are a) a very low rate of expenditure per square kilometer, b) a high percentage of area actually burnt year after year and c) a high proportion of failure to protect the forest from fire. The successful protection year after year of a comparatively small area of valuable forest is of greater importance than imperfect protection of a large area.

The forests of the area under Plan are liable to recurrent annual fires which cause considerable damage to young regeneration as well as the old crop, especially if they occur late in the hot season. Some of the plantations, even though fire protected, have been damaged severely due to such fires. In view of the occurrence of repeated fire, some of the very valuable areas should be completely fire protected. For this purpose, special fire lines of 20 metres width should be cleared. Besides all along the boundary of the forest a line of 10 metres will be cleared of all growth and burnt every year. This will prevent fire from entering from the malki areas. All new fire lines to be prepared should be got approved from Conservator of Forests, Kolhapur circle.

The expenditure on fire protection is very low compared to the area involved and their vulnerability to fire. Hence, more funds should be made available for this purpose. It is also essential to take steps to educate the public in this connection as more often fires occur due to carelessness or neglect of elementary precautions on the part of passers by or the residents of adjoining villages. Without the cooperation and good will of the neighboring villagers, no scheme of fire protection, however perfect, will give the desired results. Often the burning of fire lines along the fire protected coupe has found to be fatal

because of carelessness on the part of the subordinates. Hence, this should be seen with great care or else the object with which it is prescribed will be defeated.

Rules for fire protection operations

The forest areas of the division will be divided into three classes for the purpose of protection against fire by orders of the CF, Kolhapur Circle.
The areas would be classified as follows.

Class I Areas: Strictly Protected areas

This class includes the following

i. Regeneration areas
ii. Young regeneration in the Improvement WC and Afforestation WC upto 5 years.
iii. Such other areas as the CF, Kolhapur may by special reasons direct e.g. important sacred groves etc.

All areas in this class will be isolated by means of fire lines and cut guide lines which will be patrolled by fire watchers. Any fire occurring in them will be a calamity and must be reported along with the area burnt, the date of occurrence and the amount of loss.

Class II areas generally protected

This class includes

i. All forests under systematic working but not included in class I and
ii. Such other areas as the CF Kolhapur circle may for special reasons direct.

All areas in this class, will be isolated from the surrounding country by means of external fire lines, and divided into convenient blocks by interior fire lines. Guide lines will be cut, but all fire lines, roads, paths, suitable ridges, grassy maidans, etc will be burnt in successive stages as the grass dries sufficiently to become combustible. Fire watchers may be employed only if sanctioned by the CF, Kolhapur circle. The Sub DFO, Sangli sub division will submit a proposal for all such areas in the forest.

Class- III areas Protected by provisions of law only

In this class are included all forests not included in the two foregoing classes. In forests of this class deliberate burning is prohibited, but no special measures of protection will be undertaken. The forest guards, however, will be responsible for ensuring fire protection through extensive patrolling.

Fire lines

Fire lines are of two kinds, exterior and interior. The responsibility for their up keep rests with the Sub DFO, Sangli forest sub division. The following instructions will be carefully attended to by the staff in the performance of this duty-

1. It is an established principle in case of exterior fire lines that as far as practicable they should be within the limits of the Government forest and that they should follow the boundary thereof. Occasions may sometimes arise when, in order to secure efficiency, it is necessary to deviate from this.

2. Interior fire lines are made within Government forest and are intended to restrict within limits, fires which have broken out in protected areas and cannot be controlled except by counter firing. These fire lines should follow the course of roads open to the public and the beds of rivers and streams which in addition to other advantages; themselves constitute natural efficient interior fire lines. Interior fire lines should, as far as possible, not be constructed along ridges, as there the effect of wind is greatest and water is scarce.

3. Fire lines should be selected and laid out on the ground such that it will be not only practicable, but easy to traverse them with speed. Steep gradients and rough ground should be avoided as far as possible. Where ever practicable fire lines should be following natural clearings such as open edges of cultivated plains, or the beds of wide ravines and streams. They should be located to be as near water as possible and the localities where wells exist or should be made and all spots where water can be procured should be marked on the fire maps.

In Class - I Forests: The following measures are prescribed:

i. The first consideration is the isolation of the forest from the surrounding country. This will be affected by clearing the exterior fire lines of all inflammable material to a width determined by local circumstances, ordinarily not less than 40 feet or more than 100 feet. Not later than the month of November two guide lines will be cut one on either side of the area on the fire line. The width of guide lines will depend on the height of the grass through which they run and they must be carefully cleared. This work must be completed by the end of December.

ii. Exterior lines include coupe lines which form the boundary between class 1 area and areas of class II and III. In adjoining Class II & III areas no fire lines will be cleared but a guide line will be cut and burnt.

iii. Interior fire lines will be similarly treated, but will usually be narrower than exterior lines.

iv. As the season advances, the grass in the center of the fire lines will dry and should either be burnt off standing or cut close to the ground over the whole width of the line. If the latter course is followed, the cut grass should be spread over the fire line between the guides and burnt as soon as dry.

v. Dry leaves and other dry material on fire lines must be collected from time to time and deposited along the edge of the fire lines, but burning such material on the lines after the hot weather has commenced, is strictly prohibited.

vi. Except with the express order of the Sub DFO, Sangli sub division and in the presence of the RFO or any other subordinate authorized by the Sub DFO, Sangli sub division no fire lines shall be burnt after January 31st every year.

***In Class II areas*:** Fire protection measures will be taken by fire tracing the existing roads, cart-tracks, range boundaries, etc. All operations of fire tracing and burning should be over by 31st Jan every year.

Existing fire lines will be utilized as far as possible, new lines will not be made without the sanction of the CF, Kolhapur Circle.

Fire Watchers

It is the duty of fire watchers constantly to patrol the fire lines in their beats, to keep them entirely free from inflammable material, to prevent the carrying or making of fire within or in the vicinity of the protected area, to give immediate notice of the occurrence of a fire to the beat officer to collect assistance and themselves to aid in extinguishing any fire that may occur.
Fire watchers must always be on their beats. The Sub DFO, Sangli forest sub division will see that proper machans for the men to stay on by night and fair accommodation below for cooking by day are provided at suitable places. Fire stations must be situated on elevated spots, so that the watchers may command a good view of the forest they are watching.

Fires

Any RFO, Forester or Forest Guard who may see smoke rising any where in or near the forest shall at once collect such aid as is immediately available and proceed in person to the spot. He must not sit quiet and send some one else to enquire or report. The forest official who arrives at a spot where a fire is burning shall at once proceed to extinguish it even if the fire is outside his own beat or range, unless the fire is so strong as to demand further help. This rule applies to all three classes of forests.
Greatest care must be taken that fires are thoroughly extinguished and all smoldering materials are absolutely quenched. No official shall leave the burnt locality till the senior Forest Officer present has satisfied himself that no smoldering material remains. All men assisting in extinguishing fire in a Government forest shall be paid according to the amount of assistance rendered, at rates fixed by Sub DFO, Sangli forest sub division in consultation with the CF, Kolhapur circle.

The RFO will be held personally responsible for the efficiency of the fire protection in his range. Where protected forests of two ranges adjoin, the responsibility for efficient protection and clearing on the common fire line will rest with one of the RFO to be selected, by the Sub DFO, Sangli forest sub division.
The Sub DFO, Sangli sub division will be personally responsible for carrying out efficiently the fire protection measures in the sub division. He must satisfy himself that the exterior fire lines have been properly cleared and thoroughly burnt before danger from external fire arises, and that at the same time all interior fire lines are in good order. He must by continual inspection assure himself that the protective staff is efficient and he must continue to attend to this work until arrangements for the efficient protection of the forest from fire are made. He must, during his tour, satisfy himself by constant enquiries that no fires in fire protected areas have gone unreported and that the areas of reported fires have been accurately estimated. These checks require extensive and thorough personal inspection by him.

Fire Reports

The RFO shall report the outbreak of a fire to the Sub DFO, Sangli sub division at once, using special dispatch if the fire extends over a large area. The RFO must provide for rapid communication between himself and his staff in fire protected areas so that no delay may occur in his receiving report of the outbreak of a fire and in transmission by him of such intimation to the Sub DFO, Sangli forest Sub division. The inspection of the area burnt and submission of a full final report with a sketch map by the RFO shall not, without a valid excuse, be delayed for more than a fortnight after the outbreak.

The Sub DFO, Sangli forest sub division will submit a monthly summary to the CF, Kolhapur circle of fires showing the serial number, date of occurrence, cause, area burnt and extent of damage. Measures taken to extinguish the fire and further precautionary measures taken will be included in the summary. The summary must consist of the following:

(a) All fires in class I areas,

(b) All fires that have occurred in class-II areas after the date fixed for completion of the time of the burning prescribed in the paragraph above and

(c) All fires that have occurred in class-II areas before that date if obviously of a serious nature.

A record of fires in a map form will be maintained for class-I areas only, and will be filed in the Compartment histories form no V.

4.2 Grazing and Fuel wood Regulations

Inadequate protection of regenerated areas from grazing has been one of the main adverse factors responsible for failure of plantations carried out in the past. Traditional methods of TCM/ Live hedge fencing around the regenerated areas and plantation watchmen etc. have not proved to be very effective. Protection can be further ensured by encouraging the people to raise their own resources by raising fodder and firewood species on their farm lands and by popularizing stall feeding efforts to reduce the dependence of local people on forests for grazing and fire wood to whatever extent feasible. The practice of 'Cut and carry' with regards to fodder should be popularized.

Efforts should be made to popularise the use of energy saving devices like more efficient smokeless chullahs. Use of solar cookers and alternate sources of energy like biogas and gobar gas plants etc should be promoted to curtail the dependence of local people on forests for meeting their fuel wood needs. JFM committees should be involved in the promotion and distribution of material earmarked and also in containing the problem of removals by head loads. LPG connections which are now easily available should be promoted through JFM/ FDA programmes. Efforts should also be made to promote and popularize alternate source of gainful self employment by net working with the other departments and private institutions for development of dairy, sericulture, apiculture and cottage based industries in the rural areas to curtail the dependence of local people on the removal and sale of firewood by head loads as source of livelihood. Grazing will be

controlled according to the policy formulated by the Government of Maharashtra vide its Resolution No. MFP-1365/13221/Y dated 6-12-1968 and the grazing rules as framed by the Government of Maharashtra vide its Resolution No. MFP-1371/237035-Z dated 03-11-1973 and the Government approval for the grazing settlement report for the Sangli district vide its Resolution No. MFP-2103/Pra.Kra.135/F-1 dated 06-05-2008.

4.3 Research Areas

In Sangli forest sub division, there are two experimental Plots at Rethare dharan village of Shirala range being managed by the Silva, MS. The details of the research area are given in the **Appendix no. 16.1 of Volume – II.** This asset formed by the research wing over the years need to be protected and therefore the territorial staff should be sensitized towards protection of these assets.

CHAPTER - 19

FINANCIAL FORECAST AND COST OF THE PLAN

SECTION 1: FINANCIAL FORECAST

Anticipated Annual Yield and Revenue:

The present Working Plan emphasizes on the development of forests and conservation of biodiversity in the ecologically sensitive Western Ghat forests of Sangli sub division. Therefore revenue generation is not the prime objective. Annual yield of timber, poles and firewood will be negligible as only improvement works are prescribed. The following table gives an estimate of the anticipated annual yield and revenue as part of the tangible benefits derived from the forest. Though, due to unstable market trends, it is not possible to forecast the anticipated revenue accurately.

Table No. 43 : Anticipated Annual Yield and Revenue

Sr. No.	Working Circle	Forest Produce	Annual Yield (Approx.)	Anticipated annual Revenue (in lakh Rs.)	Rates
1.	Improvement WC	Firewood	200 m^3	0.80	@Rs 400/m3
		Bamboo	15000 nos.	15.00	@Rs100/bamboo
2.	NTFP (OL) WC	Fodder grass,	L.S.	0.70	L.S.
	TOTAL			**16.50**	

The intangible benefits of the forests e.g. mitigating climatic changes, carbon sequestering and providing shelter to the wildlife etc are very high. It is, however not easy to assign economic value to the intangible benefits. Yet some of the parameters contributing to the environmental services provided by a medium sized tree of 50 tonnes during its 50 years life span (excluding the value of timber, fruits and flowers) have been assigned notional values by Professor TM Das in 1980 using surrogate market techniques as given in ***'The value of a tree by TM Das 1980 - Proceedings of Indian Science Congress'.***

Table No. 44 : Environmental benefits derived from a medium sized tree

Sr. No.	Environmental benefits	Single tree Rs (Lakhs)	Forest type	
			Tropical Lakhs/ha	Sub tropical Lakhs/ha
1.	Oxygen Production	2.50	22.50	20.50
2.	Conversion to animal protein	0.20	1.80	1.64
3.	Control of soil erosion	2.50	22.50	20.50
4.	Recycling of water & control of humidity	3.00	27.00	24.60
5.	Shelter for birds, squirrels, insects, plants	2.50	22.50	20.50
6.	Control of Air Pollution	5.00	45.00	41.00
	Total	**15.70**	**141.30**	**128.74**

So, according to Das, from 1 hectare of subtropical forest, environmental benefits worth Rs. 128.74 lakhs are accrued over a period of 50 years i.e. benefits worth Rs. 2.60 lakhs per hectare are accrued per year at 1980-81 rates. Hence the intangible benefits being accrued from the well stocked forests of Sangli forest sub division (approx. 42,080 hectares) are worth Rs. 1,094.08 Crores per year at 1980-81 rates.

Estimated Annual Expenditure and Mandays Generation

The anticipated expenditure for the implementation of the Working Plan prescriptions along with the mandays generated is given below. Wage board rates as fixed by the CF, Kolhapur for the year 2010-11 have been used for calculation purposes. Calculations for expenditure on Afforestation activities have been made on the basis of the sanctioned estimate of Afforestation model for zone III by pit planting at 2 x 2 meter spacing. The annual expenditure on the various activities for the next ten (10) years has been calculated by progressively increasing 10% in the previous year's rate.

Table No. 45 : Estimated Annual expenditure

Daily wage 188.60 / day

Sr. No.	Working Circles	Mandays generated annually (Lakhs)	Estimated annual expenditure during first 3 years of Plan period (Lakhs Rs.)		
			Ist Yr	IInd Yr	IIIrd Yr
I	Improvement Working Circle	0.362	69.43	76.37	84.01
II	Afforestation Working Circle	1.72	330.93	364.02	400.43
	Total	**2.082**	**400.36**	**440.39**	**484.44**

Cost Benefit Analysis

Cost

Estimated average annual expenditure for the prescribed operations = Rs. 441.73 lakhs

Benefit

Estimated annual Revenue from tangible benefits = Rs.16.50 lakhs
Estimated annual intangible environmental benefits = Rs. 109408 lakhs
Total benefits accrued from forests of Sangli sub-division annually = Rs. 109424.50 lakhs
The cost benefit ratio is Rs. 442 lakhs: Rs. 109424.50 lakhs i.e. 1: 248

SECTION 2: COST OF THE PLAN

The total expenditure incurred on the preparation of this Plan is Rs 84.96 lakhs which works out to be Rs. 202 per hectare. It has been worked out by summing up the expenditure incurred from February 2010 to March 2011 and does not include the expenditure incurred on the enumeration of the forest stock undertaken by the FRSS unit at Nashik.

CHAPTER - 20

ESTABLISHMENT AND LABOUR

The forests in Sangli sub division are spread over 10 talukas and divided into 6 ranges, 14 rounds and 32 beats. The Sub DFO, Sangli forest sub division is assisted by 8 RFOs, 27 Foresters and 68 Forest Guards, 1 driver for managing the field while 1 Head Clerk, 6 Accountants, 6 Clerks, 2 Surveyors assist him in performing his office job. In addition, 124 Van majdoors are also part of the establishment. Overall, Sangli forest sub division has an establishment of 246 personnel. The sub division has a large cadre of 124 van majdoors whose services should be put to maximum and appropriate use.

Adequate health and education facilities are usually not available at many beat and round head quarters in the interior locations. Even staff quarters at many such places are either not available or are not in use due to poor maintenance. Therefore majority of the staff members posted in interior areas had to keep their families at other places out of compulsion.

Various Staff welfare activities can be undertaken under newly created Forest welfare fund apart from the regular government schemes. The staff should be encouraged to first become the member of the Fund to become eligible to avail the facilities. It is also seen that the staff is not adequately trained to handle the wild life emergencies, court cases etc. They are usually unaware of the latest developments in the field of forestry and wild life. Therefore forest guards and foresters should be imparted induction training at the time of recruitment itself that will help equip them with the knowledge pertaining to various aspects of forestry. The trained field personnel can shoulder the overall responsibilities of their job as well as the implementation of the prescriptions of this WP in more efficient and effective manner. Short-term training modules should also be devised by the C.F, education wing to train the officers as well as field staff at regular intervals to keep them abreast of the latest developments in the field of forestry.

CHAPTER -21

MISCELLANEOUS REGULATIONS

SECTION 1: PETTY FELLING

It is tree felling of small nature to meet departmental demands, research needs and special grants in exceptional circumstances. Forest produce required for departmental works and free grants may be removed on the orders of the DCF under the provisions contained in Article 256 of BFM Vol. I and Article 147 of BFM Vol. III respectively up to the limits of his power. The fellings under these provisions however must be on silvicultural lines and as far as possible will be confined to the coupe of the year or to the coupe to be worked next. Felling of fruit trees will be excluded and fellings in a radius of 40 meters from the perennial waterholes, nalas and springs will be prohibited. The detailed guidelines regarding the procedure and quantum of petty felling should be fixed for the state by the PCCF.

In addition removal of dead, fallen firewood on rated passes is permitted from all parts of the forest except in the coupes due for working. Every year in the month of October each beat guard will report the availability of dead fallen firewood compartment wise to the concerned RFO. The Sub DFO will compile this information and fix the quantum of the dead fallen firewood to be removed from each range by mid November. Each RFO under the guidance of the Sub DFO will distribute the targets of the available material amongst various gram panchayats as per their demand and availability along with the location of the area from where it could be collected. The list of the persons so prepared by each gram Panchayat will be handed over to the concerned RFO latest by 15th December. Based on this list, the rated passes will be issued to the concerned persons by the RFO No felling of trees will be permitted to obtain firewood. The Sub DFO may however stop extraction of firewood on rated passes from a specified area, in case, he is satisfied that no firewood exists in that area for such removal.

Felling of trees on forest land required by the other departments such as Irrigation, B & C etc. should only be undertaken after the proposals for the use of forest land for non- forestry purposes are approved by the Government of India under the provisions of Forest (Conservation) Act, 1980. The cost of harvesting of trees is to be provided by the concerned agency.

SECTION 2: DEVIATIONS

Petty fellings carried out as mentioned in Para under Petty fellings as well as removal of dead fallen firewood will not be constituted as deviation from the Working Plan.

All other deviations can be classified into following two categories as per National Working Plan Code, 2004:

1. **Deviations which do not permanently alter the basis of management**

1a. *<u>Minor deviations</u> which would seek to alter the schedule of working given in the Working Plan, for example:*

i. Both non-working a coupe in the prescribed year or working the coupe in the year not prescribed by the WP.

ii. Changes in the areas of coupe on account of disforestation or undertaking areas for execution of any special scheme under plan programme.

2. Deviations which permanently alter the basis of management

2a. *Minor deviations which would involve alteration in the silvicultural treatment, for example:*

i. Stopping or curtailing fellings or planting because of shortage of labour, funds, material for plantation work, or unsuitability of terrain and soil or excessive biotic pressure for undertaking plantations to the extent prescribed by the WP.

ii. Fellings involving modifications in the prescribed marking rules etc.

2b. Major deviations of the following nature

i. Change in Silvicultural system

ii. Clear felling of natural forest

iii. Formation of new Felling Series

iv. Large scale felling due to natural calamities, which cannot be adjusted against future yield

Procedure for obtaining sanction for deviations:

1a. In case of deviations of the type '1a' above, the territorial Sub DFO will submit in quadruplicate the proposals of deviations yearly with his copy of control forms to the CCF, Working Plans, Pune through the territorial CF who will forward it to CF WP. The CF, WP will submit it to CCF, WP, Pune along with his remarks. No explanatory remarks are required on the deviation form but these should be given in the forwarding letter. One copy each of the statement will be returned to the Sub DFO, CF (T) and CF, WP after the deviations have been sanctioned by the CCF, WP. In case of difference of opinion between the CCF, WP and CF (T), the former will refer the matter to the PCCF for instructions.

2a. In case of deviations of the type '2a' above, the Sub DFO (T) should submit in quadruplicate the proposals of deviations with a copy of control form to the PCCF through the CF (T), CF WP and CCF WP. The PCCF will then issue necessary sanction orders.

2b. In case of the deviations of the type '2b' above, the Sub DFO (T) should submit in quadruplicate the proposals of deviations with a copy of control form to the PCCF through the CF (T), CF WP and CCF WP. The PCCF, before sanctioning the specified major deviations, will necessarily take prior approval of the Regional CCF, Bhopal.

The format of the deviation statement is given in **Appendix No. 19.1** of Volume II.

SECTION 3: RESEARCH AREAS

The prescriptions of this Working Plan will not be applicable on the Research areas in the sub division, which have been handed over to the State Silviculturist and are in his possession. In Sangli sub division, there are two experimental Plots at Retare dharan village of Shirala range being managed by the Silva, MS. The details of the research area are given in the **Appendix No. 16.1 of Volume –II.** This area being managed with a perspective of research and extension in forestry and hence will be managed as per their Silviculture requirements as included in the Plan of Operations duly approved by Research and Advisory Committee (RAC) MS chaired by the PCCF.

SECTION 4: DEMARCATION AND MARKING TECHNIQUE

The annual coupes shall be demarcated one year in advance of its due year of working as shall be specified in the appendix.

A. Demarcation of Coupes :

i. Annual coupes shall be demarcated by cutting and clearing bushy undergrowth on 3 meter wide line.

ii. Trees selected at suitable intervals along the coupe boundary will be given two coaltar bands and a geru band in between after scrapping the loose dead bark except where the coupe boundary runs along a permanent feature like a big nalla, a fire-line or a road.. Lower coaltar band will be at the breast height while the upper coaltar band will be 15 cm. above it. The tree shall also bear the coupe number, name of the F.S. and the W.C. on the side away from the area of the coupe.

iii. Tree serial number will be given just below the lower coaltar band and away from the area of the coupe. Serial number of such trees will be maintained in the marking register in the following form :

Sr. No.	Species	G. B. H.	Remarks
1.	2.	3.	4.

iv. No tree bearing coupe demarcation bands will be marked for felling.

B. Demarcation of Protection Areas :

Selected trees on periphery of the protection areas shall be given two geru bands, 15 cm. apart with the lower one at the bh. In addition a cross (X) mark in geru shall also be given in between the bands, on the side away from the protection area. The tree serial number shall be given just below the lower geru band on the side bearing the cross. If the number of protection areas is more than one in a coupe, then all the PA's shall be numbered in Roman numerals and the trees standing on periphery of each PA shall be numbered in Arabic. For example, the trees on periphery of PA No. I shall bear the Sr.No.I/1; II/2 etc. while the trees on the periphery of the PA No. II shall bear the Sr.No. II/1, II/2 and so on.

C. Demarcation of other areas given in the treatment map :

The other categories of areas if any shall be marked by giving one geru band and one coaltar band 5 cm apart with the geru band at the bh. The coupe demarcation shall be certified by the R.F.O. in the following format.

"I, ----------, RFO, ----------certify that I have personally inspected the demarcation of coupe No --------- in compartment No ---------- of ---------- F. S of----------W.C on dated ----------and found that coupe has been demarcated as prescribed in the Working Plan. The area of the coupe is ---------- hectares."

Date: Signature of the RFO

D. Marking Technique :

i. All trees to be marked for felling shall be given a geru band at bh and shall bear marking hammer mark at the bh as well as on the base of the tree on a clear blaze of size 10 cm X 10 cm

ii. All trees marked for felling shall bear serial nos. in coaltar only. The number of the trees marked shall be written vertically on the blaze as shown below :

For tree No. 123 xx

1

2

3

Where xx gives marking hammer inscription and 123 is the serial no. of the marked tree.

iii. All trees bearing serial nos. will be recorded in marking book in the following format :

Serial No.	Species	gbh (ob)	Remarks
1.	2.	3.	4.

iv. Abstract of trees marked for felling shall be made in 15 cm girth classes. Timber, poles and firewood trees shall be indicated in the marking book.

** *If a tree is capable of yielding 30% of the timber expected form it as per the form factor, it is classed as 'Timber tree'. 10% to below 30% as "carpentry tree" and below 10% as "Fire wood tree*".

SECTION 5: MAINTENANCE OF BOUNDARIES

The forest boundaries have not been properly maintained and boundary marks are not seen at many places. The survey and demarcation of acquired private forest has not yet been

done. At many places, there is no boundary distinction between this class of RF and the adjoining private agricultural fields or revenue lands. Hence, it is necessary that the Sub DFO, Sangli forest sub division should attend to this work without loss of time and get the accurate maps prepared. One trace map showing the boundary pillar numbers should be given to the CF, WP Kolhapur showing these pillar numbers on the master set maintained in his office. A statement showing details of 5 years boundary demarcation programme is given in **Appendix No. 21.1** of Volume II.. and the statement showing the extent of natural and artificial boundaries is given in **Appendix No. 21.2** of Volume II.

The following works are required to be carried out for these areas

1) The village maps and 7/12 extracts of all types of forest lands will be obtained from the DILR and compared with the records of the forest department. The discrepancies found will be identified and removed with the help of DILR by carrying out survey and final maps of the areas will be prepared and demarcated on the ground as suggested in the Bombay Forest manual Volume II article 120 – 129, except that the cairns will be replaced with cement concrete pillars. The specifications of cement concrete pillars for boundary demarcation work, viz. size, design and cost are already approved by the PCCF, Maharashtra state, Nagpur.

2) Compilation of forest area notifications. All Gazette notifications under various Indian forest Acts, (1878, and its amendments from time to time, 1927 IFA) declaring lands as reserved and disforested will be collected.

3) Updating the area statement in Form No. 1

4) Updating the forest maps and survey records

5) After survey and demarcation the area will be included in the annual boundary maintenance programme according to the one fifth boundary demarcation programme.

The work of survey, mapping and demarcation for all areas of the Sub Division will be completed within a period of 2 years. The $1/5^{th}$ boundary demarcation programme will continue according to the schedule which will be prepared after the completion of the survey and demarcation.

The boundaries of the forests will be maintained as given below.

A 12 meter wide outer boundary of the forest will be cut by clearing off the brushwood and shrubs so that one boundary mark is visible from its neighbouring one. Trees on the boundary line will not be felled so long as they do not obscure the view of the boundary marks one from the other. Demarcation will be done erecting concrete pillars on the boundary line except where the natural features form the boundary. The pillars will be of the specifications as approved by the PCCF office. These concrete pillars will eventually replace the cairns. But till the time, the concrete pillars replace all the cairns, the cairns also need to be maintained annually.

Rules for the inspection and maintenance of forest boundary marks :

(i) The forest beat guard shall be responsible for the maintenance and protection of all the boundary marks in his beat. He shall himself colour wash them annually after rains and

shall make a special report of having performed this work. Each forest boundary mark in his beat shall be specially inspected by the beat guard atleast once every year and a record of his inspection shall be entered in his diary.

(ii) The Round Officer shall be responsible for the maintenance and protection of all the boundary marks in his round and shall see that they are maintained and properly repaired and colour washed by the beat guard. He shall check all the boundary marks in a year which come up for maintenance and repair as per the $1/5^{th}$ boundary demarcation scheme. A mention of this shall be made by him in his diaries. He shall also annually submit the R.F.O. a certificate in the following form –

"I, Shri. _____ R.O.

_____ certify that the annual length of the boundary lines as prescribed under the scheme given in the Appendix of the Working Plan for Satara forest division has been verified by me personally and that boundary line and marks are found to be correct as per the maps. I further certify that each cairn bears a correct serial number and next cairn is visible from either side of each cairn. There are no encroachments or encroachments are as detailed below:

Signature of the R.O. with date.

Legal provisions available for protection of the boundary marks:

Under Section 63 (c) of IFA 1927, altering, moving, destroying or defacing any boundary mark of any forest to which the provisions of this Act apply, is punishable with imprisonment for a term which may extend to two years, or with fine, or with both. This offence is non-compoundable under Section 68.

A statement showing details of 5 year boundary demarcation programme is given in **Appendix** of Volume-II.

SECTION 6: USE AND DISPOSAL OF MAPS

The different categories of maps and their scale are as under:

Stock maps

As a general rule, if the stock maps of previous WP are available they should only be checked and if they are found to be reasonably accurate, no further action is required. But if they do not already exist, they will have to be prepared on 1:50,000 scale. Normally a stock map will show the crop composition, crop density, quality age classes, regeneration and blank areas. A statement showing signs used in stock maps is given in **Appendix No. 19.2** of Volume II.

Management maps

It will show divisional, range, block, compartment boundaries and boundary pillars with their numbers. In addition it will bear the name and boundaries of Working Circle, Felling/ Working Series and coupes. It will be prepared on 1:50,000 scale.

Working Plan maps

These are prepared on 1:25,000 scale. These are like management maps which in addition to silvicultural units like WC, FS/ WS, Coupes etc, show as many management, administrative and physiographic features as possible.

Reference map

When reading a WP, it is inconvenient and unnecessary, except when detailed information is sought, to have to refer to a separate WP/ management map. Thus each WP will include a small reference map on the inside of the back cover. The map will be of such a convenient size as can be simply folded once or twice to the size of the printed volume. It should show the main boundaries, the forests, ranges, roads, canals, FRH, neighbouring towns and villages and such other relevant features as can be shown without overcrowding it.

Disposal of maps

Eight sets of fresh maps have been prepared as follows:

1. Stock maps - 3 sets (1 cut and mounted + 2 uncut and mounted)
2. Management maps - 3 sets (1 cut and mounted + 2 uncut and mounted)
3. Working Plan maps- 2 sets (2 uncut and mounted)

The distribution of these maps will be as follows:

I. Conservator of Forests, Working Plans :

One rough uncut and mounted set showing the existing compartment boundaries and stocking details will be prepared based on which the master sets of stock maps and management maps showing the compartments, coupes, Felling series, Working Circles and other management details will be prepared.

i. Management maps - 1 master set (cut and mounted)

ii. Stock maps- 1 master set (cut and mounted)

II. Sub Divisional Forest Officer, Sangli sub division :

i. Management maps - 1 set (1 uncut and un mounted)

ii. Stock maps- 1 set (uncut and un mounted)

iii. Working Plan maps- 1 set (uncut and un mounted)

III. Chief Conservator of Forests, Working Plans Circle, Pune :

i. Management maps - 1 set (uncut and un mounted)

ii. Stock maps- 1 set (uncut and un mounted)

iii. Working Plan maps- 1 set (uncut and un mounted)

Additional copies of these maps may be made by the Sub DFO, Sangli forest sub division as per their requirement.

SECTION 7: ROADS AND BUILDINGS

Most of the forest areas are connected by district roads. But in the interior hilly areas, the road network is not well developed. The paths are maintained by the department for going to plantations and nursery sites. These are a few roads which are maintained by the Sangli forest sub division. A statement showing the list of forest Roads and paths in Sangli sub-division is given in **Appendix No. 17.1** of Volume II.

The position of the buildings both for office and residential purposes in the Sub Division is not very satisfactory. Sufficient residential accommodation is not available for the Range officers, field staff, and the ministerial staff. Under the Maharashtra Forestry Project some residential buildings have been constructed in Sangli sub division, but these are not sufficient to fulfill the requirement of the whole staff. A statement showing the list of Buildings is given in **Appendix No. 17.2** of Volume II.

CHAPTER- 22

CONTROL AND RECORDS

SECTION 1: CONTROL FORMS

The records of all subsidiary silvicultural operations, regeneration works and soil and moisture conservation works carried out in each Working Circle as per the Working Plan prescriptions will be maintained in the control forms. The prescribed performae of the coupe control forms and felling control forms shall be given in the **Appendix no.20.1 of Volume-II.**

The Sub DFO, Sangli Forest Sub division will annually make entries in his copy of the control forms and send them together with the deviation statement in triplicate to the CCF WP Pune through the CF (T) After the entries have been checked and approved, the CCF WP will first get his copy completed and then send the Sub DFO's copy to the CF (T). The later will then complete his copy and finally return the Sub DFO's set for deposit in the latter's office till next year. The CCF WP Pune will send three copies of deviation statement to the PCCF for sanction. After the sanction, one copy each will be sent to the CF (T) and the Sub DFO for their record and the CCF WP will keep the third copy for his set of control forms.

The control forms should be submitted by the Sub DFO to the CF (T) on or before December 1 and the latter should send them to the CCF WP on or before January each year.

SECTION 2: COMPARTMENT HISTORIES

Compartment histories i.e. the record of various forestry activities and observations made in the past year will be maintained in Form Nos. 1 to 5 as given below.

i. Form No. 1 : Compartment description to be filled by the CF, WP

ii. Form No. 2 : Compartment enumeration to be filled by the CF, WP

iii. Form No. 3 : Trees marked for felling to be filled by the Sub DFO (T)

iv. Form No. 4 : Compartment out-turn to be filled by the Sub DFO (T)

v. Form No. 5 : Compartment History to be filled by the Sub DFO (T)

The formats for the different forms shall be given in the **Appendix no.20.2 of Volume-II.**

If compartment history with full entries already exists, past entries made by the Sub DFO, Sangli forest sub division will be scrutinized by the CF, WP who may edit them if necessary. Usually no condensation should be necessary.

The Sub DFO is responsible for recording current events as they occur and will make his entries on the separate sheet of the form and not on that prepared by the CF, WP. At the next revision of the WP, the CF, WP will scrutinize these entries and edit them if necessary.

The principal information, which the Sub DFO, Sangli forest sub division should record, is as follows:

Felling, Subsidiary Silvicultural Operations, Slash disposal with costs, Plantations, Control burning with costs, Fire incidences and damage caused, Damage by other factors like drought, storm, snow, insect, fungi, grazing etc. Remedial measures taken along with costs, good seed or seedling years of important species.

The entries should be brief and concise; whole or part compartment that was involved should be made clear. For event timings- month or months should be given.

SECTION 3: PLANTATION AND NURSERY REGISTERS

Plantation registers will be maintained for all the areas regenerated artificially in the Form Nos. 1 to 9 in standard format.

Nursery registers will be maintained in Form Nos. 1 to 10 in standard format.

SECTION 4: SUB DIVISIONAL NOTE BOOK

The matters of sub divisional importance will be recorded under standard headings for records and ready reference in the sub divisional note-book. A brief note of the plantations will also be recorded by the Sub Divisional Forest Officer, Sangli forest sub-division under the appropriate heads.

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण एवं वन मंत्रालय
MINISTRY OF ENVIRONMENT & FORESTS
सत्यमेव जयते

क्षेत्रीय कार्यालय, पश्चिम क्षेत्र
Regional Office, Western Regior
"केन्द्रीय पर्यावरण भवन'
"Kendriya Paryavaran Bhavan'
लिन्क रोड नं0-3/Link Road No. 3
E-5, रविशंकर नगर/Ravishankar Nagar
दूरभाष /Phone: 2466525,2465496, 246505
फैक्स /Fax: 0755-246310
भोपाल (म0प्र0)/Bhopal-462016 (M.P.)
अणुडाक /E-mail: rccfbhopal@gmail.com

No. : 12-67/1999 (FOR)/ 1147

Dt - 13-07-2012,

To,

The Principal Secretary,
Revenue and Forest Department,
Mantralaya,
MUMBAI

Sub : **Working Plan proposal for Sangli Forest Sub- Division, written by Shri N. Mohan Karnat, IFS for the period of 2012-13 to 2021-22.**

Ref : Revenue and Forests Deptt., Government of Maharashtra letter No. FDM 2012/C.R. 114/F-2, dated 11.06.2012.

Sir,

With reference to the above mentioned subject, I am to say that after careful examination of the Working Plan of Sangli Sub-Forest Division, the Central Government hereby conveys its approval to the said working plan in accordance with the powers vested under Forest (Conservation) Act, 1980 subject to following conditions:-

(1) The currency of the Working Plan shall be for a period of 10 years i.e. from 2012-13 to 2021-22.

(2) The orders of Hon'ble Supreme Court in the matter of Godaverman Therumalkpad Vs Union of India in W.P. (Civil) No. 202/95 and related Inter Locutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.

(3) Further, in compliance with orders of Hon'ble Supreme Court's dated 22.09.2000, the State Government of Maharashtra shall ensure that regeneration of forests is commensurate with fellings carried out under this working plan.

(4) No felling shall be carried out without allocating necessary funds for implementation of regeneration operation so as to make regeneration commensurate with fellings. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.

(5) Following the directions of the Hon'ble Apex Court in their order dated 22.09.2000, a Core Group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with fellings. Instruction/directions of the Central Government in the matter to be issued in future shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MOEF, New Delhi.

(6) No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.

(7) Prescriptions of microplans for JFM (if made) should not deviate the broad framework/guidelines of the working plan and shall be in accordance with various orders of Hon'ble Supreme Court.

(8) Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/following years to compensate this removal.

(9) No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval by the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out of turn plantations carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.

(10) The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented or relevant modification in the working plan is required so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy.

Yours faithfully,

(Pradeep Vasudeva)
Conservator of Forests (Central)

Copy to :

1. The Additional Director General of Forests (FC), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003.
2. The Addl. Principal Chief Conservator of Forests, Govt. of Maharashtra, Seminary Hills, Nagpur.
3. The Addl. Principal Chief Conservator of Forests, (Working Plan Circle-West), Pune/Nagpur
4. The Chief Conservator of Forests, Kollhapur.
5. The Conservator of Forests (Working Plan Circle-west), Kollhapur.
6. The Dy. Conservator of Forests Sangli Sub Division, Sangli Maharashtra

(Pradeep Vasudeva)
Conservator of Forests (Central)

केके
3/7/12 वनसंरक्षक,
कार्य आयोजना विभाग,
कोल्हापूर.

वनसंरक्षक कार्य आयोजना
विभाग ...
आवक ... : 886
दिनांक : 24/6/2012

E-mail for F-2 Desk :- dof2@rediffmail.com Tel. No. 022-22794077

GOVERNMENT OF MAHARASHTRA

NO. FDM 2012/CR-114/F-2
Revenue and Forests Department,
Mantralaya, Mumbai-400 032
Dated :- 9 November, 2012

SUBJECT :- **APPROVAL OF WORKING PLAN OF SANGLI FOREST DIVISION WRITTEN BY SHRI N. MOHAN KARNAT, IFS FOR THE PERIOD OF 2012-2013 TO 2021 - 2022.**

MEMORANDUM:

The undersigned presents compliments to the Additional Chief Conservator of Forests (Production & Management) and, with reference to his letter no. Desk-14/WP-P/CR-11(11-12)/152/2012-13, dated 03.05.2012 on the above subject, is directed to convey the sanction of Government of Maharashtra to the working plan of SANGLI FOREST DIVISION, Maharashtra state for the period of 2012-13 to 2021-22 prepared by **SHRI N. MOHAN KARNAT, IFS**

The Government of India, Ministry of Environment and Forests has already conveyed its approval to the above said working plan vide its letter No.12-67/1999(FOR)/1147, dated 13.7.2012 under certain conditions. These conditions should be strictly followed.

By order and in the name of the Governor of Maharashtra ,

वनसंरक्षक कार्यआयोजना विभाग कोल्हापूर.
आवक क्रमांक : 680
दिनांक : 9/11/12

वनसंरक्षक
कार्य आयोजना विभाग
कोल्हापूर.

(N. M. SHILWANT)
Deputy Secretary
Revenue and Forests Department

To,

1. ADDITIONAL PRINCIPAL CHIEF CONSERVATOR OF FORESTS, (PRODUCTION & MANAGEMENT) MAHARASHTRA STATE, NAGPUR.
2. ADDITIONAL PRINCIPAL CHIEF CONSERVATOR OF FORESTS, (WORKING PLAN CIRCLE-WEST), PUNE/NAGPUR
3. CHIEF CONSERVATOR OF FORESTS, KOLLHAPUR
4. CONSERVATOR OF FORESTS, (WORKING PLAN CIRCLE-WEST), KOLLHAPUR
5. DY. CONSERVATOR OF FORESTS, SANGLI SUB DIVISION, SANGLI

D:\New Folder formats\aparna\F-2 NOTEKARYA AYOJANA PRASTAV

No. : 12-67/1999 (FOR)/ 1147

दूरभाष /Phone: 2466525,2465496, 2465(
फैक्स /Fax: 0755-2463
भोपाल (म.प्र.)/Bhopal-462016 (M.
अणुडाक /E-mail: rccfbhopal@gmail.c

Dt - 13-07-2012

To,

The Principal Secretary,
Revenue and Forest Department,
Mantralaya,
MUMBAI

Sub : **Working Plan proposal for Sangli Forest Sub- Division, written by Shri N. Mohan Karnat, IFS for the period of 2012-13 to 2021-22.**

Ref : Revenue and Forests Deptt., Government of Maharashtra letter No. FDM 2012/C.R. 114/F-2, dated 11.06.2012.

Sir,

With reference to the above mentioned subject, I am to say that after careful examination of the Working Plan of Sangli Sub-Forest Division, the Central Government hereby conveys its approval to the said working plan in accordance with the powers vested under Forest (Conservation) Act, 1980 subject to following conditions:-

(1) The currency of the Working Plan shall be for a period of 10 years i.e. from 2012-13 to 2021-22.

(2) The orders of Hon'ble Supreme Court in the matter of Godaverman Therumalkpad Vs Union of India in W.P. (Civil) No. 202/95 and related Inter Locutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.

(3) Further, in compliance with orders of Hon'ble Supreme Court's dated 22.09.2000, the State Government of Maharashtra shall ensure that regeneration of forests is commensurate with fellings carried out under this working plan.

(4) No felling shall be carried out without allocating necessary funds for implementation of regeneration operation so as to make regeneration commensurate with fellings. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.

(5) Following the directions of the Hon'ble Apex Court in their order dated 22.09.2000, a Core Group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with fellings. Instruction/directions of the Central Government in the matter to be issued in future shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MOEF, New Delhi.

MOEF, New Delhi.